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**Review of *Glyphidocera* Walsingham of Costa Rica  
(Lepidoptera: Gelechioidea: Glyphidoceridae)**

DAVID ADAMSKI

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Kuniko Arakawa



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## Review of *Glyphidocera* Walsingham of Costa Rica (Lepidoptera: Gelechioidea: Glyphidoceridae)

DAVID ADAMSKI

Department of Entomology, National Museum of Natural History, P.O. Box 37012, MRC-168, Smithsonian Institution, Washington, D.C. 20013-7012; Email: dadamski@sel.barc.usda.gov

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## ABSTRACT

The genus *Glyphidocera* (Glyphidoceridae) of Costa Rica is reviewed. Eighty-eight new species are described: *Glyphidocera adrogantiae*, *G. advenae*, *G. aediculae*, *G. aedis*, *G. ambrosiae*, *G. amittae*, *G. ancillae*, *G. animae*, *G. arae*, *G. arakawae*, *G. arenae*, *G. asymmetricae*, *G. audaciae*, *G. brumae*, *G. burpurae*, *G. barbae*, *G. capsae*, *G. cauponae*, *G. caveae*, *G. cellae*, *G. cenae*, *G. cenulae*, *G. cerula*, *G. ciatae*, *G. clavae*, *G. comae*, *G. contionis*, *G. coquae*, *G. corniculae*, *G. coronae*, *G. cotis*, *G. coturnicis*, *G. crepidae*, *G. dictionis*, *G. diciae*, *G. eminentiae*, *G. fabulae*, *G. faecis*, *G. ferae*, *G. fidem*, *G. formae*, *G. gazae*, *G. gemmae*, *G. glaebae*, *G. gloriae*, *G. harenae*, *G. infulae*, *G. lanae*, *G. laricae*, *G. lawrenceae*, *G. lupae*, *G. luxuriae*, *G. minarum*, *G. notae*, *G. novercae*, *G. nubis*, *G. olivae*, *G. ollae*, *G. operae*, *G. orae*, *G. paenulae*, *G. pali*, *G. personae*, *G. pilae*, *G. placentae*, *G. plebis*, *G. plumae*, *G. positurae*, *G. raedae*, *G. ranae*, *G. reginae*, *G. rodríguezi*, *G. rubetae*, *G. sapphiri*, *G. sardae*, *G. scuticae*, *G. sollertiae*, *G. spathae*, *G. speculae*, *G. staerae*, *G. terrae*, *G. tibiae*, *G. umbrae*, *G. vappae*, *G. virgulae*, *G. vocis*, *G. zamia*, and *G. zothecuale*. *Glyphidocera illiterata* Meyrick, 1928, from Panama; *G. zophocrossa* Meyrick, 1929, from Trinidad; *G. vestita* Walsingham, 1911, from Panama; and *G. guaroa* Adamski 2002, from Costa Rica are redescribed. Diagnoses, descriptions, and type information are provided for each species. Photographs of holotypes, illustrations of head, wing venation, and male and female genitalia, digitized distribution maps, and a key to all *Glyphidocera* found in Costa Rica are included.

**Resumen.**— Los *Glyphidocera* (Glyphidoceridae) de Costa Rica son revisados. En este trabajo ochenta y ocho especies nuevas son descritas: *Glyphidocera adrogantiae*, *G. advenae*, *G. aediculae*, *G. aedis*, *G. ambrosiae*, *G. amittae*, *G. ancillae*, *G. animae*, *G. arae*, *G. arakawae*, *G. arenae*, *G. asymmetricae*, *G. audaciae*, *G. brumae*, *G. burpurae*, *G. barbae*, *G. capsae*, *G. cauponae*, *G. caveae*, *G. cellae*, *G. cenae*, *G. cenulae*, *G. cerula*, *G. ciatae*, *G. clavae*, *G. comae*, *G. contionis*, *G. coquae*, *G. corniculae*, *G. coronae*, *G. cotis*, *G. coturnicis*, *G. crepidae*, *G. dictionis*, *G. diciae*, *G. eminentiae*, *G. fabulae*, *G. faecis*, *G. ferae*, *G. fidem*, *G. formae*, *G. gazae*, *G. gemmae*, *G. glaebae*, *G. gloriae*, *G. harenae*, *G. infulae*, *G. lanae*, *G. laricae*, *G. lawrenceae*, *G. lupae*, *G. luxuriae*, *G. minarum*, *G. notae*, *G. novercae*, *G. nubis*, *G. olivae*, *G. ollae*, *G. operae*, *G. orae*, *G. paenulae*, *G. pali*, *G. personae*, *G. pilae*, *G. placentae*, *G. plebis*, *G. plumae*, *G. positurae*, *G. raedae*, *G. ranae*, *G. reginae*, *G. rodríguezi*, *G. rubetae*, *G. sapphiri*, *G. sardae*, *G. scuticae*, *G. sollertiae*, *G. spathae*, *G. speculae*, *G. staerae*, *G. terrae*, *G. tibiae*, *G. umbrae*, *G. vappae*, *G. virgulae*, *G. vocis*, *G. zamia*, and *G. zothecuale*. *Glyphidocera illiterata* Meyrick, 1928, de Panamá; *G. zophocrossa* Meyrick, 1929, de Trinidad; *G. vestita* Walsingham, 1911, de Panamá; y *G. guaroa* Adamski de Costa Rica Adamski son redescribas. Diagnósis, descripciones e información de los holotipos son provistas para cada especie.

Fotografías de los imagos, ilustraciones de la cabeza, venación de las alas, genitales del macho y de la hembra, así como mapas digitalizados de la distribución y una clava para todos las especies de *Glyphidocera* de Costa Rica son incluídes.

**Key words:** Central America, *Glyphidocera*, Glyphidoceridae, microlepidoptera, Central America

## INTRODUCTION

*Glyphidocera* Walsingham (1892) are small to medium-sized moths that vary in color from pale yellowish brown to dark brown with few, if any, diagnostic markings. Known only from the New World, their greatest diversity is in the tropics where species richness is much greater than in the temperate region. Host associations are unknown for all species except for *G. juniperella*, which feeds on *Juniperus horizontalis* Moench (Cupressaceae) (Adamski and Brown 1987).

*Glyphidocera* was first recognized by Walsingham (1892) who described *G. audax* from Saint Vincent Island in the West Indies. Originally placed in Gelechiidae (Walsingham 1892), *Glyphidocera* later was transferred by Hodges (1978), along with several other genera, to the Symmocinae within Blastobasidae. Hodges later (1998) transferred Symmocinae to Autostichidae, except for *Glyphidocera*, which was elevated to family status; it is considered a sister-group to Chimabachidae, Xyloryctidae, and Elachistidae. Becker (1999) following Hodges (1998), recognized two genera, *Ptilostonychia* Walsingham and *Stibarenches* Meyrick, as junior synonyms of *Glyphidocera*. Kaila (2004) proposed an alternative classification for the Gelechioidea and concluded that *Glyphidocera* is a basal taxon in the “oecophorid lineage,” closely related to the autostichid, xyloryctid, and oecophorid lineages, and distantly related to the Chimabachidae. Although, there are major differences between Hodges (1998) and Kaila (2004) in the relationship of *Glyphidocera* to Autostichidae, Elachistiade, and other taxa, both classifications agree that *Glyphidocera* is distantly related to the Blastobasidae, Coloeophoridae, Momphidae, and Pterolonchidae as proposed by Hodges (1978).

Species of *Glyphidocera* (Glyphidoceridae) usually can be recognized by a combination of the following features: male 4<sup>th</sup> flagellomere with a tuft of setiform scales on the dorsal surface extending over a deep or shallow concavity with sex scales on the lateral surface of the 5<sup>th</sup> and 6<sup>th</sup> flagellomeres (the inner surface of concavity); male abdomen usually with squamiform or piliform sex scales on intersegmental membrane between terga 2–3 and/or terga 3–4; valva narrowed basally, abruptly widened apically, apex protracted, base of costa usually with digitate process; sacculus twisted apically; gnathos projecting dorsally from beneath tuba analis, juxta basally narrowed and fused to vinculum, distolaterally expanded and forming a ventral support for the aedeagus; aedeagus with medium to large cornutus or cornuti; ductus ejaculatoris coiled; female ductus bursae large, sclerotized, with funnel-shaped antrum; ductus seminalis coiled from middle or pos-

terior end of corpus bursae and with internal sclerotized support; and corpus bursae spinulate, especially on anterior end, and with a sclerotized plate opposite base of ductus seminalis.

The purpose of this study is to document the *Glyphidocera* (Glyphidoceridae) of Costa Rica and to provide a foundation for other studies that may include related taxa from this and other faunal regions of the world.

## MATERIALS & METHODS

Over 800 pinned adult specimens were examined, representing the 92 species treated herein. Many species are represented by male specimens only. To be recognized as a distinct "species" a specimen(s) must possess at least one unique feature or unique combination of features that is distinct from features observed from other related specimens. With few exceptions, the abdominal regions bearing the male sex scales and genital apparatus were relied on for this propose. Because of the low interspecific variation in wing pattern, few female specimens could be associated with male specimens. Consequently all holotypes selected are male specimens. In addition, all unassociated female specimens were grouped by "morphospecies" and deposited in INBio (Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica).

Kornerup and Wanscher (1978) was used as a color standard for the description of the adult moths. Genitalia were dissected as described by Clarke (1941), except mercurochrome and chlorazol black were used as stains. Specimens listed without a genital slide number in the species accounts are undissected specimens. Pinned specimens were examined using a stereoscopic dissecting microscope. Genitalia and wing preparations were examined and illustrated using both dissecting and compound microscopes. Measurements were made using a calibrated ocular micrometer.

All specific epithets are feminine in the genitive case and, except for patronyms, are randomly assigned to complete the binomial for all new taxa. In addition, these names have no descriptive meaning concerning any features of the taxa with which they are associated.

Terminology for wing pattern follows Common (1970) and that of the genitalia follows Klots (1970), modified by the author.

Acronyms for depositories of specimens are as follows: INBio - Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica; USNM - National Museum of Natural History, Smithsonian Institution, Washington, DC, USA. All holotypes are deposited in INBio. Paratypes are deposited in depositories stated at the end of the "paratype section."

Abbreviated words on label data for all holotypes are completed within brackets. Other abbreviations used in the paratype sections are as follows: Alaj. = Alajuela; Biol. = Biologica; Carta. = Cartago; Est. or Estac. = Estación; Fca. = Finca; Guan. or Guana. =

Guanacaste; Here. = Heredia; Lab. = Laboratorio; Microlepidop. = Microlepidoptera; P. N. = Parque Nacional; P. N. G. = Parque Nacional de Guanacaste; Pen. = Peninsula; Prov. = Provincia; Punt. or Punta. = Puntarenas; Queb. = Quebrada; Res. Reserva; S. = San; Sta. = Santa; Vol. = Volcán.

INBio prefixes for bar code labels are written in full for all specimens included herein.

#### KEY TO THE SPECIES OF COSTA RICAN *GLYPHIDOCERA*

1. Male..... 2  
- Female ..... 93
2. Labial palpus brushlike, with many erect scales apically (Fig. 2a)..... 3  
- Labial palpus apically pointed, with appressed scales throughout length (Fig. 2)..... 4
3. Apicoventral margin of valva narrow, costal furca long, dorsal strut absent (Fig. 19), sex scales between terga 2–3 and 3–4 small (Fig. 18)..... *operae*  
- Apicoventral margin of valva widened, costal furca short, dorsal strut extending from posteroventral margin of tegumen to base of uncus (Fig. 22), sex scales between terga absent (Fig. 21) ..... *advenae*
4. Valvae asymmetrical (Fig. 4) ..... *asymmetricae*  
- Valvae symmetrical ..... 5
5. Outer margin of valva truncate, slightly rounded, or rounded apically (Figs. 7, 10, 13) ..... 6  
- Outer margin of valva with an apical furca (*ex.*, Figs 28, 94) or bifurcate (*ex.*, Fig. 127) ..... 8
6. Valva with a short, pointed costal tooth slightly beyond midlength (Fig. 13), sex scales between abdominal terga 2–3 and 3–4 large (Fig. 12) ..... *paenulae*  
- Valva without a costal tooth (Figs. 7, 10), sex scales between abdominal terga 2–3 and 3–4 small (Figs. 6, 9)..... 7
7. Costa of valva slightly upturned, uncus wide (Fig. 7), few rows of sex scales between terga 2–3 and 3–4 (Fig. 6) ..... *ferae*  
- Costa of valva slightly downturned, uncus narrow (Fig. 10), many rows of sex scales between terga 2–3 and 3–4 (Fig. 9)..... *nubis*
8. Valval costa with an apical furca (Figs. 16, 19, 22, 25, 28, 31, 34, 37, 40, 43, 46, 49, 52, 55, 58, 61, 64, 67, 70, 73, 76, 79, 82, 85, 88, 91, 94, 97, 100, 103, 106, 109, 112, 115, 118, 121, 124) ..... 9  
- Valval costa apically bifurcate (Figs. 127, 130, 133, 136, 139, 142, 145, 148, 151, 154, 157, 160, 163, 166, 169, 172, 175, 178, 181, 184, 187, 190, 193, 196, 199, 202, 205, 208, 211, 214, 217, 220, 223, 226, 229, 232, 235, 238, 241, 244, 247, 250, 253, 256, 259, 262, 265, 268, 271, 274, 277) ..... 43
9. Sex scales on abdomen present (*ex.* Figs. 15, 27, 30, 42, 54, 99a) ..... 10



- Sex scales on abdomen absent (Fig. 108) ..... *cenae*
- 10.** Two bundles of piliform sex scales present on eighth segment (Fig. 99a) ... *lawrenceae*
  - No such sex scales present ..... 11
- 11.** Sex scales present within an invaginated pocket between abdominal terga 3–4 (Fig. 54)
  - ..... *cerula*
  - Sex scales within an invaginated pocket not present ..... 12
- 12.** A short row of sex scales present on dorsolateral membrane between abdominal terga 2–3 and two clusters of piliform scales on dorsolateral membrane between abdominal terga 3–4 (Fig. 15) ..... *arakawae*
  - No such sex scales present ..... 13
- 13.** Multiple rows of sex scales between only abdominal terga 2–3 (Figs. 33, 36, 39, 42, 57, 81, 96, 123) ..... 14
  - No such pattern of sex scales present ..... 21
- 14.** Furca of valval costa upturned (Figs. 37, 40, 43, 82, 97) ..... 15
  - Furca of valval costa straight or slightly downturned (Figs. 34, 58, 124) ..... 19
- 15.** Gnathos distally setose (Figs. 43, 82, 97) ..... 16
  - Gnathos not distally setose (Figs. 37, 40) ..... 18
- 16.** Gnathos narrow, furcal length less than half width of distal valva (Fig. 43) ..... *cellae*
  - Gnathos wide, furcal length greater than half length of distal valva (Figs. 82, 97) .... 17
- 17.** Furca of valval costa greater than width of distal valva (Fig. 97) ..... *plebis*
  - Furca of valval costa less than width of distal valva (Fig. 82) ..... *area*
- 18.** Outer margin of valva acutely curved inwards (Fig. 37) ..... *corniculae*
  - Outer margin of valva slightly curved inwards (Fig. 40) ..... *terrae*
- 19.** Gnathos distally setose, furca of costa slightly downturned (Fig. 58) ..... *raedae*
  - Gnathos not distally setose, furca of costa downturned or straight (Figs. 34, 124) .... 20
- 20.** Furca of valval costa downturned; digitate process of valva acutely curved (Fig. 124).
  - ..... *burpurae*
  - Furca of valval costa nearly straight; digitate process of valva straight (Fig. 34) ... *ollae*
- 21.** Multiple rows of sex scales between abdominal terga 2–3 and a small, elliptical sex scale cluster on dorsolateral membrane between terga 3–4 (Figs. 30, 75, 90, 93) ..... 22
  - Multiple rows of sex scales between abdominal terga 2–3 and 3–4 (Figs. 24, 27, 45, 48, 51, 60, 63, 66, 69, 72, 78, 84, 87, 103, 105, 111, 114, 117, 120) ..... 25
- 22.** Furca of valval costa straight (Fig. 31) ..... *gemmae*
  - Furca of valval costa upturned (Figs. 76, 91, 94) ..... 23
- 23.** Outer margin of cucullus at right angle to costa (Fig. 94) ..... *brummae*
  - Outer margin of cucullus broadly rounded (Figs. 76, 91) ..... 24
- 24.** Cucullus linear; furca of valva acutely curved (Fig. 76) ..... *dietionis*
  - Cucullus broadly rounded; furca of valva broadly rounded (Fig. 91) ..... *eminetiae*
- 25.** Furca of valval costa upturned (Figs. 46, 49, 52, 61, 64, 67, 70, 73, 79, 85, 88) ..... 26
  - Furca of valval costa straight or straight or downturned (Figs. 25, 28, 104, 106, 112,

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-	Apicoventral margin of cucullus near parallel with costa; digitate process of valva nearly reaching base of dorsal strut of tegumen (Fig. 85).....	<i>cauponae</i>
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-	Valval costa not dilated subapically; apex of uncus broadly rounded (Fig. 88)... <i>sardae</i>	
<b>29.</b>	Furca of valval costa slightly less than width of valva (Figs. 70, 73).....	30
-	Furca of valval costa ½ length or less than width of valva (Figs. 46, 49, 52, 61, 64, 67) .....	31
<b>30.</b>	Membranous area beyond sacculus wider than costa of valva; cornutus nearly as wide as long (Fig. 73) .....	<i>infulae</i>
-	Membranous area beyond sacculus narrower than costa of valva; cornutus longer than wide (Fig. 70).....	<i>coronae</i>
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-	Gnathos not setose; furca of costa slightly upturned (Fig. 61).....	<i>rodríguezi</i>
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*Glyphidocera asymmetricae*, new species

(Figs. 3–5, 288, Map 1)

Diagnosis.— The relationship of *G. asymmetricae* to its congeners is difficult to determine because of the extreme asymmetry of the male valvae.

Description.— Head: Vertex and frontoclypeus brown; outer surface of labial palpus brown intermixed with pale-brown scales to apical margin of segment II, inner surface pale brown; scape of antenna brown, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a wide and deep concavity opposite slightly excavated flagellomeres 5–6; proboscis brown.

Thorax: Tegula and mesonotum brown. Foreleg brown intermixed with pale-brown scales along apical margins of all segments and tarsomeres, pterothoracic legs pale brown. Forewing (Fig. 288): Length 7.5–8.0 mm (n = 2), brown intermixed with pale-brown scales; cell with 2 large, faint brown spots, 1 near middle, 1 near distal end. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 3): Male with 4 transverse, irregular rows of sex scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 4–5): Uncus elongate, wide at base, broadly constricted near midlength, broadened medially, apex acuminate and setose; gnathos protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms fusing medially from posteroventral margin to base of uncus; valvae asymmetrical, right valva with apex of costa elongate, forming an upturned furca, about 1/4 length of valva; left valva with irregularly truncate, with a downturned apical process arising dorsally and a small toothlike process ventrally; apicoventral area beyond sacculus wider on left valva than on right valva; sacculus twisted apically, constricting valva beyond midlength; digitate process on base of valva absent; vesica of aedeagus denticulate, with a moderately large, conical, apical cornutus; cornutus with one side shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Queb[rada] Bonita, 50 m Res[erva] Biol[ógica] Carara, Prov[incia] Punt[arenas], COSTA RICA, R. Zuniga, Ago. 1990, L-N194500, 469850”, “INBio, COSTA RICA: CRI000, 181066” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 649” [yellow label].

Paratype (1 ♂): “Est. Queb. Bonita, 50 m Res. Biol. Carara, Prov. Punt., COSTA RICA, R. Zuniga, Jun 1991, L-N-194500, 469850”, “CRI000, 349044”, “Slide No. 647.”

Distribution (Map 1): *Glyphidocera asymmetricae* is known from one coastal collecting site in southern Costa Rica along Río Tárcoles near the mouth of Golfo de Nicoya.

Etymology: The species epithet *asymmetricae* is derived from the Greek “asymmetros,” meaning without symmetry, and refers to the asymmetry of the male genitalia.





MAP 1. Distribution of *Glyphidocera asymmetricae* (●) and *G. ferae* (▲).

***Glyphidocera ferae*, new species**

(Figs. 6–8, 289, Map 1)

Diagnosis.— *Glyphidocera ferae* is similar to *G. nubis* but differs from the latter in having a wider uncus, a sparsely setose gnathos, a more angular digitate process of the valva, a wider distal part of the valva, and fewer sex scales between abdominal terga 2–3 and terga 3–4 in the male.

Description.— Head: Vertex and frontoclypeus brown; labial palpus with outer surface brown intermixed with pale grayish-yellow scales to near apical margin of segment II, inner surface as above but paler; scape of antenna pale grayish yellow intermixed with few brown scales, flagellum brown; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6 [setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere missing]; proboscis pale grayish yellow.

Thorax: Tegula and mesonotum brown. Foreleg and midleg brown intermixed with pale grayish-yellow scales on apices of all segments and tarsomeres, hindleg brown intermixed with pale grayish-yellowish scales on apical area of tibia, tarsomeres brown. Forewing (Fig. 289): Length 4.9 mm (n = 1), brown. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 6): Male with 3 transverse, irregular rows of sex scales on intersegmental area between terga 2–3 and 2 transverse, irregular rows of sex scales between terga 3–4. Sex scales between terga 2–3 slightly larger and more numerous than sex scales between terga 3–4.

Male Genitalia (Figs. 7–8): Uncus elongate, wide at base, slightly constricted above base, wide medially, parallelsided, gradually narrowing to a rounded, setose apex; gnathos

setose, protuberant, wide throughout length, upturned apically; tegumen narrow throughout length; dorsal strut of tegumen with arms convergent, fusing basally, atrophied dorsally; valva with costa broadly sloped from a shallow depression slightly beyond basal digitate process to a rounded apex; sacculus wide, twisted apically, constricting valva near midlength, widening distoventrally, forming an wide cucullus; cucullus membranous and setose, outer margin nearly truncate, with a broadly rounded apicoventral margin; vesica of aedeagus sparsely denticulate, bearing a large, conical, apical cornutus; cornutus slightly dilated, with one side slightly shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, "COSTA RICA, Heredia: Est[ación] Biol[ógica] La Selva, 50–150 m 10°26'N, 84°01'W, Feb. 1996, INBio-OET", "22 Feb. 1996, L/00/160, CES 300 m", "INBio: COSTA RICA: CRI002, 057137" [bar code label], "INBio, ♂ Genitalia Slide by D. Adamski, No. 905" [yellow label].

Distribution (Map 1): *Glyphidocera ferae* is known from a single collecting site in north-central Costa Rica.

Etymology: The species epithet *ferae* is derived from the Latin "fera," meaning wild beast.

### ***Glyphidocera nubis*, new species**

(Figs. 9–11, 290, Map 2)

Diagnosis.— *Glyphidocera nubis* is similar to *G. ferae* but differs from the latter in having a narrower and shorter uncus, a more densely setose gnathos, a slightly curved digitate process of the valva, a narrower distal part of the valva, and more sex scales between abdominal terga 2–3 and terga 3–4 in the male.

Description.— Head: Vertex and frontoclypeus grayish brown; outer surface of segments I–II of labial palpus grayish brown intermixed with pale grayish-yellow scales to apical margins, segment III brown intermixed with pale grayish-brown scales apically; inner surface of segments I–II pale grayish yellow intermixed with few grayish-brown scales, segment III brown intermixed with few pale grayish-yellow scales; scape of antenna brown intermixed with few pale grayish-yellow scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6, concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale grayish yellow.

Thorax: Tegula and mesonotum brown intermixed with few pale-brown scales. Legs brown intermixed with pale grayish-yellow scales on apical margins of all segments and tarsomeres. Forewing (Fig. 290): Length 5.8 mm (n = 1), brown intermixed with few slightly paler scales. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 9): Male with 6 transverse, irregular rows of sex scales on intersegmental area between terga 2–3 and 4 transverse, irregular rows of sex scales on intersegmental area between terga 3–4. Sex scales between terga 2–3 slightly larger and more numerous than sex scales between terga 3–4.

Male Genitalia (Figs. 10–11): Uncus elongate, abruptly constricted slightly beyond base, nearly parallelsided to a narrowly rounded and setose apex; gnathos densely setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing midway between posteroventral margin and base of uncus, arms diverging dorsally from middle; costa of valva slightly rounded from shallow depression slightly beyond base of digitate process to a rounded apex; sacculus twisted apically, constricting valva at 2/3 length, widening distoventrally, forming a moderately elongate cucullus; cucullus membranous and setose, with a nearly truncate outer margin; vesica of aedeagus with rounded denticles, bearing an moderately elongate, conical, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Queb[rada] Bonita, 50–150, Res[erva] Biol[ógica] Carara, Prov[incia] Punt[arenas], COSTA RICA, R. Zuniga, Jun. 1991, L-N-194500, 469850”, “INBio: COSTA RICA: CRI000, 349007” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 639” [yellow label].

Distribution (Map 2): *Glyphidocera nubis* is known from one collecting site near Río Tárcoles at the mouth of Golfo de Nicoya along the Pacific coast.



**MAP 2.** Distribution of *Glyphidocera nubis* (●) and *G. paenulae* (▲).

Etymology: The species epithet *nubis* is derived from the Latin “nubes,” meaning clouds.

*Glyphidocera paenulae*, new species

(Figs. 12–14, 291, Map 2)

Diagnosis.— Relationships between *Glyphidocera paenulae* and other species of *Glyphidocera* are difficult to determine because of the several unique features possessed by the former that include a short digitate process of the valva, a toothlike process on the distal 1/3 of valva, an angular distal part of valva, and large sex scales between abdominal terga 2–3 and terga 3–4 in the male.

Description.— Head: Vertex and frontoclypeus pale grayish orange; outer margin of labial palpus pale grayish orange intermixed with few dark-brown scales, inner surface as above but paler; scape of antenna pale grayish orange intermixed with few dark-brown scales, flagellum with alternating bands of pale grayish-orange and brown scales; male 4<sup>th</sup> flagellomere not protuberant, 5<sup>th</sup> and 6<sup>th</sup> flagellomeres slightly excavated; proboscis pale grayish orange intermixed with few dark-brown scales.

Thorax: Tegula and mesonotum pale grayish orange intermixed with few dark-brown scales. Legs with all segments pale grayish orange intermixed with few dark-brown scales, tarsomeres dark brown intermixed with pale grayish-orange scales to apical margins. Forewing (Fig. 291): Length 7.2–7.5 mm (n = 2), pale grayish orange intermixed with few dark-brown scales, with several small, dark-brown spots; 1 on base of costa, 2 on base near middle of cell between Radius and Cubitus, 2 near distal end of cell near to and parallel with crossvein, and 4 marginal spots. Undersurface pale grayish orange. Hindwing: Pale grayish brown basally, gradually darkening to apex.

Abdomen (Fig. 12): Male with 4 transverse, irregular rows of large sex scales on intersegmental areas between terga 2–3 and terga 3–4.

Male Genitalia (Figs. 13–14): Uncus elongate, wide, slightly constricted beyond base, parallelsided to a slightly rounded apex; gnathos protuberant, wide throughout length, apex rounded and upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially, narrow throughout length and extending dorsally from posteroventral margin to the base of uncus; costa of valva gradually downturned broadly from a shallow depression slightly beyond a stout digitate process to a slightly rounded apex; costa with a recurrent, toothlike process near 2/3 length; sacculus twisted apically, constructing valva narrowly, widening distoventrally, forming an angular cucullus; cucullus membranous and setose, with a slanted outer margin; vesica of aedeagus with an elongate apical cornutus and several small, thin cornuti.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Heredia: Est[ación] Biol[ógica] La Selva, 50–150 m 10°26'N, 84°01'W, Apr. 1996, INBio-OET”, “10 Abril 1996, L/00/211, CES 350 m”, “INBio: COSTA RICA: CRI002, 057137” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 911” [yellow label].

Paratype: 1 ♂, Same label data as above except, “15 Abril 1996, L/05/214”, “CRI002, 060221”, “Slide No. 917.”

Distribution (Map 2): *Glyphidocera paenulae* is known from a single collecting site in north-central Costa Rica.

Etymology: The species epithet *paenulae* is derived from the Latin “paenula,” meaning a traveling cloak.

***Glyphidocera arakawae*, new species**

(Figs. 15–17, 292, Map 3)

Diagnosis.— Relationships between *Glyphidocera arakawae* and other species of *Glyphidocera* are difficult to determine because of the unique features it possesses that include a narrow uncus and gnathos, a straight and wide digitate process of the valva, an angular apicoventral margin of valva, a straight lower margin of the distal valva, a short row of sex scales on dorsolateral membrane between abdominal terga 2–3 in male, and a dense cluster of piliform sex scales on dorsolateral membrane between abdominal terga 3–4 in the male.

Description.— Head: Vertex and frontoclypeus pale yellow; outer surface of labial palpus pale yellow intermixed with dark-brown scales or segment I and segment II dark brown and segment III dark brown intermixed with few pale-yellow scales, inner surface pale yellow; scape of antenna dark brown intermixed with pale-yellow scales or pale yellow intermixed with few dark-brown scales, flagellomeres with alternating bands of pale-yellow and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a narrow and deep concavity opposite slightly excavated flagellomeres 5–6; distal opening of concavity nearly closed by setiform scales on apex of 4<sup>th</sup> flagellomere; proboscis pale yellow.

Thorax: Tegula brown basally, pale yellow apically; mesonotum pale yellow. Foreleg dark brown with pale-yellow scales near apical margins of all segments and tarsomeres, pterothoracic legs pale yellow. Forewing (Fig. 292): Length 5.1–7.0 mm (n = 6), pale yellow intermixed with dark-brown scales; costal margin mostly dark brown intermixed with pale-yellow scales, 1 large, dark-brown spot near middle of R<sub>1</sub>; base of Radius with 2 short, dark-brown streaks; cell with 2 large dark-brown spots, 1 near middle, 1 near distal end; termen and outer margin pale yellow or mostly dark brown, with 2–3 marginal spots from subapical area. Undersurface pale brownish gray. Hindwing: Pale brownish gray.

Abdomen (Fig. 15): Male with two short rows, of 6–8 sex scales each, on dorsolateral part of intersegmental area between terga 2–3, and two dense clusters of piliform scales on dorsolateral part of intersegmental area between terga 3–4.

Male Genitalia (Figs. 16–17): Uncus elongate, wide at base, broadly constricted near 2/3 length, forming a slightly widened, setose apex; gnathos setose, protuberant, narrow throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing slightly beneath base of uncus; valva short, narrow, parallelsided from distal sacculus to apical furca; furca attenuate; base of costa with a

decumbent digitate process; sacculus weakly twisted apically, slightly constricting valva near midlength; cucullus membranous and sparsely setose; vesica of aedeagus, denticulate, bearing a slightly narrowed and elongate, apical cornutus; cornutus with one side slightly shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Pitilla 700 m, 9 km S S[an]ta Cecilia, P[arque] N[acional] Guanacaste, Prov[incia] Guanacaste, COSTA RICA, Jul. a 14, Ago. 1992, L-N-330200, 380200”, “INBio: COSTA RICA: CRI000, 867250” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 774” [yellow label].

Paratypes (6 ♂): 1 ♂, Same label data as above except, “CRI000, 700177”, “Slide No. 758”; 1 ♂, “Est. Cacao, 1000–1400 m, Lado SO Vol. Cacao, P.N.G., Prov. Guan., COSTA RICA, C. Chaves, Set. 1991, L-N-323300, 375700”, “CRI000, 357381”, “Slide No. 951”; 1 ♂, “Est. Cacao, Prov. Guana., COSTA RICA, 1100 m, 11–18 Feb. 1995, B. Gamboa, L-N-323100, 375800, # 4737”, “CRI002, 187621”; “Slide No. 943”; 2 ♂, “Est. La Casona, 1520 m, Res. Biol. Monteverde, Prov. Puntarenas, COSTA RICA, Jun 1992, N. Obando, L-N-253250, 449700”; “CRI000, 691658”, “Slide No. 832”; CRI000, 691716”, “Slide No. 833”; 1 ♂, “Jul 1993, # 2287”, “CRI001, 130707”, “Slide No. 831”, (3 in INBio, 3 in USNM).

Distribution (Map 3): *Glyphidocera arakawae* is known from four collecting sites in Costa Rica; three approximate sites in the northwest along the Cordillera de Guanacaste, and one collecting site along the Cordillera de Tilarán in the west-central part of the country.



**MAP 3.** Distribution of *Glyphidocera arakawae* (●). Outlying circles indicate multiple adjacent localities.

Etymology: *Glyphidocera arakawae* is named in honor of Kuniko Arakawa, who provided the illustrations of the genitalia for this revision.

***Glyphidocera operae*, new species**

(Figs. 2a, 18–20, 293, Map 4)

Diagnosis.— *Glyphidocera operae* is most similar to *G. orae* but differs by having a larger gnathos, a dorsal strut of the tegumen that is atrophied dorsally, a curved digitate process of the valva, a narrower distal part of the valva, and a longer apical cornutus of the aedeagus.

Description.— Head: Vertex and frontoclypeus brown; outer surface of labial palpus with segments I–II brown intermixed with few pale grayish-yellow scales near bases and apices, segment III brown; apical area of segment II and entire length of segment III with raised scales (Fig. 2a); inner surface with segment I and basal half of segment II grayish yellow, distal half of segment II and segment III brown; scape of antenna dark brown, flagellomeres brown; 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a narrow concavity opposite slightly flattened flagellomeres 5–6, concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale grayish orange intermixed with few brown scales.

Thorax: Tegula and mesonotum dark brown. Legs dark brown intermixed with pale grayish-orange scales on apices of all segments and tarsomeres. Forewing (Fig. 293): Length 7.0 mm (n = 1), dark brown intermixed with few grayish-brown scales. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 18): Male with 7 transverse, irregular rows of minute sex scales on intersegmental area between terga 2–3 and 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 3–4.

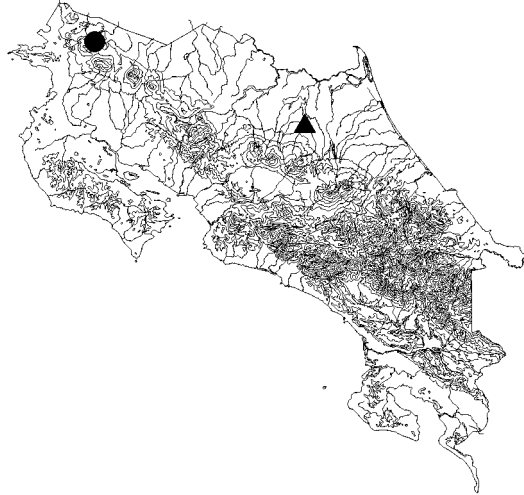
Male Genitalia (Figs. 19–20): Uncus elongate, wide at base, broadly constricted near 1/3, slightly rounded medially, apex narrowly rounded and setose; gnathos protuberant, widened basally, abruptly narrowed, forming a knoblike and setose apical process; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially along posteroventral margin; costa slightly rounded broadly from a shallow depression beyond digitate basal process to an attenuate apical furca; base of costa with a stalked, slightly downcurved digitate process; sacculus twisted apically, constricting valva near 1/3 length, forming an elongate cucullus; cucullus membranous and setose, with outer margin convergent to valval apex; vesica of aedeagus densely denticulate, bearing an elongate, conical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Pitilla 700 m, 9 km S S[an]ta Cecilia, P[arque] N[acional] Guanacaste, Prov[incia] Guan[acaste], COSTA RICA, C. Moraga, Jun. 1991, L-N-330200, 380200”, “INBio: COSTA RICA: CRI000, 699973” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 753” [yellow label].

Paratype, 1 ♂, Same label data as above except, “P. Rios & C. Morgana, 10 Set–22 Oct 1990”, “CRI000, 182166”, “Slide No. 752.”

Distribution (Map 4): *Glyphidocera operae* is known from one collecting site in north-western Costa Rica along the Cordillera de Guanacaste.



MAP 4. Distribution of *Glyphidocera operae* (●) and *G. advenae* (▲).

Etymology: The species epithet *operae* is derived from the Latin “opera,” meaning task.

***Glyphidocera advenae*, new species**

(Figs. 21–23, 294, Map 4)

Diagnosis.— Relationships between *Glyphidocera advenae* and its congeners are difficult to determine because of the unique combination of features it possesses that include the absence of abdominal sex scales in the male, a small gnathos, a curved digitate process of the valva, a narrowly rounded costal furca of the valva, a slightly constricted apical part of the aedeagus, and an elongate apical cornutus of the aedeagal vesica.

Description.— Head: Vertex and frontoclypeus brown; outer surface of labial palpus brown intermixed with few pale-brown scales, inner surface pale brown intermixed with few brown scales; apical area of segment II and entire length of segment III with raised scales; scape of antenna and basal half of flagellum brown, distal half with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a narrow and deep concavity opposite slightly excavated flagellomeres 5–6; distal opening of concavity nearly closed by setiform scales on apex of 4<sup>th</sup> flagellomere; proboscis brown.

Thorax: Tegula and mesonotum brown intermixed with few pale-brown scales. Fore-leg brown with pale-brown scales on apical margins of all segments and tarsomeres,



pterothoracic legs slightly paler than foreleg. Forewing (Fig. 294): Length 6.0–6.9 mm (n = 7), brown intermixed with pale-brown scales; cell and surrounding areas paler than marginal areas; cell with 2 large brown spots, 1 near middle, 1 near distal end [some specimens with spots faint or rubbed]. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 21): Male absent of sex scales on abdomen.

Male Genitalia (Figs. 22–23): Uncus elongate, broadly constricted above a widened base, parallelsided to an acuminate and narrowly bifurcate apex; gnathos short, narrow, protuberant, slightly upturned apically; tegumen slightly widened basally; dorsal strut with arms fused medially along posteroventral margin, forming a widened base, extending dorsally, narrowing to base of uncus; valva with costa broadly rounded from a shallow depression beyond basal digitate process to apical furca; furca short, acuminate; base of costa bearing an laterally curved digitate process; sacculus twisted apically, constricting valva before midlength, widening distoventrally, forming an elongate cucullus; cucullus membranous and setose, with a broadly rounded outer margin; aedeagus abruptly constricted subapically, forming a small, knoblike apex; vesica denticulate, bearing an elongate, conical, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Heredia: Est[ación] Biol[ógica] La Selva, 50–150 m 10°26'N, 84°01'W, July 1994, INBio-OET”, “4 Julio 1994, Bosque primario, L/02/117”, “INBio: COSTA RICA: CRI001, 244430” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 878” [yellow label].

Paratypes (6 ♂): 3 ♂, Same label data as above except, “L/02/117”, “CRI001, 244472”; “3 Julio 1994, Bosque secundario, L/00/115”, CRI001, 244376”, “2 Julio 1994, Lab. area, L/04/114”, “CRI001, 244271”; 2 ♂, “8 Abril 1996, L/04/205, Biblioteca”, “CRI002, 059406”; “17 Abril 1996, L/05/216, Arboleda”, “CRI002, 060339”, “Slide No. 877”; 1 ♂, Same label data as above except, “01 Mayo 1996, L/00/235/CES 400 m”, CRI002, 061899”, (3 in INBio, 3 in USNM).

Distribution (Map 4): *Glyphidocera advenae* is known from a single collecting site in north-central Costa Rica.

Etymology: The species epithet *advenae* is derived from the Latin “advena,” meaning stranger.

### ***Glyphidocera orae*, new species**

(Figs. 24–26, 295, Map 5)

Diagnosis.— *Glyphidocera orae* appears most similar to *G. operae* but differs from the latter by having a smaller gnathos, a dorsal strut of the tegumen that extends dorsally to the base of the uncus, a straight digitate process of the valva, a wider distal part of the valva, and a shorter apical cornutus of the aedeagus.

Description.— Head: Vertex and frontoclypeus brown; outer surface of labial palpus brown [many scales missing on specimens], inner surface pale brown; scape of antenna

brown, flagellum pale brown; male 4<sup>th</sup> flagellomere not protuberant, 5<sup>th</sup> and 6<sup>th</sup> flagellomeres slightly excavated; proboscis brown.

Thorax: Tegula and mesonotum brown. Legs pale brown [many scales rubbed]. Forewing (Fig. 295): Length 5.6–5.8 mm (n = 2), brown. Undersurface brown. Hindwing: Pale brown.

Abdomen (Fig. 24): Male with 4 transverse, irregular rows of minute sex scales on intersegmental areas between terga 2–3 and terga 3–4.

Male Genitalia (Figs. 25–26): Uncus elongate, narrowly constricted above a widened base, gradually narrowed distally to an acuminate and setose apex; gnathos short, broadly rounded apically; tegumen slightly widened basally; dorsal strut with arms convergent, fusing medially from posteroventral margin to base of uncus; costa of valva broadly rounded from a shallow depression beyond an elongate, basal digitate process to apical furca; furca aristate; sacculus twisted apically, constricting valva near midlength, widening distoventrally, forming an elongate cucullus; cucullus membranous and setose, with a broadly rounded outer margin; aedeagus subapically constricted, forming a bulbous apex; vesica of aedeagus denticulate, bearing a short, conical cornutus; cornutus with one side shortened near 1/3 length, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Murciélago, 8 km SO de Cuajiniquil, Prov[incia] Guana[caste], COSTA RICA, 100 m, 10–18 Set. 1993, F. Quesada, L-N-320300, 347200, # 2351”, “INBio: COSTA RICA: CRI001, 159470” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 516” [yellow label].

Paratype 1 ♂, “Fca. Jenny, 30 km N Liberia, P. N. Guanacaste, Prov. Guan., COSTA RICA, E Araya & R. Espinoza, Set. 1990, L-N-316200, 364400”, “CRI000, 227332”, “Slide No. 520.”

Distribution (Map 5): *Glyphidocera orae* is known from two collecting sites in north-western Costa Rica, between the Cordillera de Guanacaste and the Pacific Coast.



MAP 5. Distribution of *Glyphidocera orae* (●) and *G. aedis* (▲).

Etymology: The species epithet *orae* is derived from the Latin “ora,” meaning coast.

***Glyphidocera aedis*, new species**

(Figs. 27–29, 300, Map 5)

Diagnosis.— *Glyphidocera aedis* is similar to *G. rodríguezi* but differs by having a shorter apical furca of the valval costa, and a wider distal part of the valva.

Description.— Head: Scales of vertex and frontoclypeus brown tipped with pale brown; outer surface of labial brown intermixed with few pale-brown scales, segment II with few pale-brown scales along apical margin; inner surface as above but paler; scape of antenna brown intermixed with pale-brown scales, flagellum brown; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; distal opening of concavity nearly closed by setiform scales on apex of 4<sup>th</sup> flagellomere; scales of proboscis brown tipped with pale brown.

Thorax: Scales of tegula and mesonotum brown tipped with pale brown. Legs brown intermixed with pale-brown scales along apical margins of all segments and tarsomeres. Forewing (Fig. 300): Length 7.4–8.9 mm (n = 9), brown intermixed with pale-brown scales and brown scales tipped with pale brown; cell with 2 brown spots, 1 large spot in middle, and 1 smaller spot near distal end [some specimens with a large brown spot near base of cell]. Undersurface brown except costa brown intermixed with pale-brown scales. Hindwing: Brownish gray.

Abdomen (Fig. 27): Male with 4 transverse, irregular rows of minute sex scales on intersegmental areas between terga 2–3 and terga 3–4; sex scales between terga 2–3 appear slightly larger than the sex scales between terga 3–4.

Male Genitalia (Figs. 28–29): Uncus elongate, wide at base, constricted near 1/3 length, broadly rounded apically, apex acuminate and setose; gnathos setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent basally, forming a wide base, fusing midway between posteroventral margin of tegumen and base of uncus; costa of valva nearly straight from a shallow depression beyond a basal digitate process to apical furca; furca short, acuminate, with a wide base; sacculus twisted apically, constricting valva near midlength, forming an elongate cucullus; cucullus membranous and setose, with a straight, and elongate outer margin, and a broadly rounded apicoventral margin; vesica of aedeagus denticulate, bearing a large, crescent-shaped, apical cornutus; cornutus with one side slightly shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Heredia: Est[ación] Biol[ógica] La Selva, 50–150 m 10°26'N, 84°01'W, Aug. 1993, INBio-OET”, “L/01/060, 18 Agosto 1993, Bosque primario”, “INBio: COSTA RICA: CRI001, 230133” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 874” [yellow label].

Paratypes (8 ♂): 1 ♂, Same label data as above except, “L/02/062”, “CRI001, 234844”; 1 ♂, “18 Jun., L/01/044”, CRI001, 228451”; 1 ♂, “19 Julio 1993, Lab. clearing, L/04/053”, “CRI001, 233746”; 1 ♂, “17 Ene. 1993, Lab. area, L0015”, “CRI001, 223275”; 2 ♂, “14 Febrero 1994, Bosque primario, L/02/102”, “CRI001, 242166”, “CRI001, 242167”; 1 ♂, “10 Febrero 1994, Bosque secundario, L/03/097”, “CRI001, 259613”; 1 ♂, “4 Marzo 1996, L/00/175/SOR 700 m”, “CRI001, 250704”, “Slide No. 925”, (4 in INBio, 4 in USNM).

Distribution (Map 5): *Glyphidocera aedis* is known from a single collecting site in north-central Costa Rica.

Etymology: The species epithet *aedis* is derived from the Latin “aedes,” meaning temple.

### ***Glyphidocera gemmae*, new species**

(Figs. 30–32, 303, Map 6)

Diagnosis.— *Glyphidocera gemmae* is similar to *G. eminentiae* but differs from the latter by having a straight apical furca of the valval costa, a less angular distal part of the valva, and a larger apical cornutus of the aedeagal vesica

Description.— Head: Scales of vertex and frontoclypeus brown tipped with pale brown; scape pale brown, flagellum pale brown; male 4<sup>th</sup> flagellomere not protuberant, 5<sup>th</sup> and 6<sup>th</sup> flagellomeres slightly excavated; proboscis pale brown.

Thorax: Tegula and mesonotum pale brown. Legs brown intermixed with pale-brown scales to apical margins of all segments and tarsomeres. Forewing (Fig. 303): Length 5.3–5.8 mm (n = 2), costa and distal 1/3 brown intermixed with pale-brown scales; cell and surrounding areas of cell paler than marginal areas; cell with 2 brown spots, 1 near middle, 1 near distal end, CuP with a small brown spot slightly basal and posterior to midcell spot [one specimen with wing spots absent]. Undersurface pale brown. Hindwing: Pale brown.

Abdomen (Fig. 30): Male with 4 transverse, irregular rows of sex scales on intersegmental area between segments 2–3, and with two elliptical-shaped clusters of sex scales, formed by 3–4 short, irregular rows of scales, on intersegmental area between terga 3–4.

Male Genitalia (Figs. 31–32): Uncus elongate, broadly constricted above a widened base, broadly rounded medially, gradually tapering to an acuminate and setose apex; gnathos setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms fusing medially, dorsally atrophied; costa of valva nearly straight from a shallow depression beyond a slightly downturned, basal digitate process to apical furca; furca slightly upturned, nearly as long as width distal valva; sacculus twisted apically, constricting valva before midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a large, conical, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Sirena, 0–100 m, P[arque] N[acional] Corcovado, Prov[incia] Punt[arenas], COSTA RICA, G. Fonseca, Set. 1991, L-S-270500, 508300”, “COSTA RICA: CRI000, 357448” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 1079” [yellow label], “PARATYPE, *Glyphidocera guaroa*, Adamski” [blue label].

Paratype 1 ♂, “P. N. Manuel Antonio, Quepos, Prov. Punta., COSTA RICA, 80 m, Ago. 1993, G. Varela, L-S-370900, 448800, # 2307”, “CRI001, 656012”, “PARATYPE, *Glyphidocera guaroa*, Adamski”, “Slide No. 1009.”

Distribution (Map 6): *Glyphidocera gemmae* is known from two coastal collecting sites along the Pacific Ocean in south-eastern Costa Rica.



MAP 6. Distribution of *Glyphidocera gemmae* (●) and *G. ollae* (▲).

Etymology: The species epithet *gemmae* is derived from the Latin “*gemma*,” meaning jewel.

### ***Glyphidocera ollae*, new species**

(Figs. 33–35, 298, Map 6)

Diagnosis.— *Glyphidocera ollae* and can be distinguished from its congeners by the following combination of features: a wide upturned gnathos, angular apical furca of valval costa, and small apical cornutus of the aedeagal vesica.

Description.— Head: Vertex grayish brown; frontoclypeus with scales grayish brown tipped with pale yellow; outer surface of labial palpus grayish brown intermixed with pale-

yellow scales to near apical margin of segment II, inner surface as above but paler; scape of antenna brown intermixed with few pale-yellow scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere protuberant and curved, forming a deep concavity opposite slightly excavated 5<sup>th</sup> and 6<sup>th</sup> flagellomeres [setiform scales a apex of protuberance of 4<sup>th</sup> flagellomere missing]; proboscis pale yellow intermixed with grayish brown scales.

Thorax: Tegula and mesonotum with scales grayish brown tipped with pale yellow intermixed with grayish-brown scales. Legs grayish brown intermixed with pale-yellow scales near apices of all segments and tarsomeres. Forewing (Fig. 298): Length 6.4 mm (n = 1), grayish brown intermixed with pale-yellow scales, and brown scales on distal 1/3. Undersurface grayish brown. Hindwing: Pale yellow basally, darkening to grayish brown apically.

Abdomen (Fig. 33): Male with 4 transverse, irregular rows of sex scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 34–35): Uncus elongate, broadly constricted above a wide base, narrowly rounded medially, gradually tapering to a rounded and setose apex; gnathos protuberant, upturned, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a wide base, fusing slightly beneath the base of uncus; costa of valva gradually upturned, from a shallow depression beyond a basal digitate process to apical furca; furca acuminate; base of costa with a straight, digitate process with a slightly dilated base; sacculus twisted apically, constricting valva slightly before midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a small, conical, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Rancho Quemado, Pen[insula] Osa, Prov[incia] Punt[arenas], COSTA RICA, F. Quesada, Ene. 1991, L-S-292500, 511000”, “INBio: COSTA RICA: CRI000, 392362”, [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 527” [yellow label].

Distribution (Map 6): *Glyphidocera ollae* is known from one collecting site in southeastern Costa Rica on the Osa Peninsula.

Etymology: The species epithet *ollae* is derived from the Latin “olla,” meaning jar.

### ***Glyphidocera corniculae*, new species**

(Figs. 36–38, 299, Map 7)

Diagnosis.— *Glyphidocera corniculae* is most similar to *G. terrae* but differs by having a digitate process of valva that is apically dilated, an apical furca of valval costa that is shorter and more acutely upturned, and a larger apical cornutus of the aedeagal vesica.

Description.— Head: Vertex and frontoclypeus brownish orange; labial palpus with outer margin brownish orange intermixed with few dark-brown scales, inner surface pale brownish orange intermixed with few brownish-orange scales; scape of antenna brownish orange, flagellomeres pale brownish orange; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6 [setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere missing]; proboscis pale brownish orange.

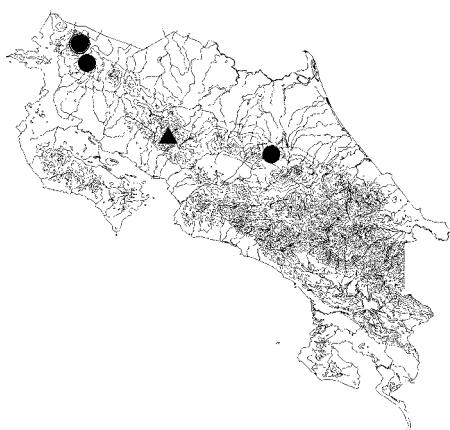
Thorax: Tegula and mesonotum brownish orange. Legs pale brownish orange. Forewing (Fig. 299): Length 9.1 mm (n = 1), brownish orange with a brown spot near distal end of cell. Undersurface brownish orange. Hindwing: Brownish orange.

Abdomen (Fig. 36): Male with 4 transverse, irregular rows of sex scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 37–38): Uncus elongate, wide at base, parallelsided to midlength, gradually narrowing to an acuminate and setose apex; gnathos sparsely setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen absent; costa of valva gradually sloped to an abruptly upturned apical furca; furca with slightly serrate outer margin; base of costa with a digitate process with a knoblike apical process; sacculus twisted apically, constricting valva slightly before midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a broad and elongate apical cornutus; cornutus with a slightly shortened side, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] La Carsona, 1520 m, Res[erva] Biol[ógica] Monteverde, Prov[incia] Puntarenas, COSTA RICA, N. Obando, Ene. 1992, L-N-253250, 449700”, INBio: COSTA RICA: CRI000, 922216” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 830” [yellow label].



MAP 7. Distribution of *Glyphidocera corniculae* (▲) and *G. terrae* (●).

Distribution (Map 7): *Glyphidocera corniculae* is known from one collecting site in the cloud forests of Monteverde in west-central Costa Rica along the southern part of the Cordillera de Tilarán.

Etymology: The species name *corniculae* is from the Latin “cornicula” meaning a little cow.

***Glyphidocera terrae*, new species**

(Figs. 39–41, 280, 297, Map 7)

Diagnosis.— *Glyphidocera terrae* is most similar to *G. corniculae* but differs from the latter by having a digitate process of valva that is not apically dilated, an apical furca of the valval costa that is longer and less acutely upturned, and a smaller apical cornutus of the aedeagal vesica.

Description.— Head: Vertex and frontoclypeus brown; outer surface of labial palpus brown intermixed with pale brownish-yellow scales, segment II with pale brownish-yellow scales along apical margin; inner surface pale brownish yellow or pale yellowish brown intermixed with few brown scales; scape of antenna brown or dark brown intermixed with few pale brownish-yellow scales, flagellum pale brown; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; distal opening of concavity nearly closed by setiform scales on apex of 4<sup>th</sup> flagellomere; proboscis brown.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with pale-brown scales to near apical margins of all segments and tarsomeres. Forewing (Fig. 297): Length 7.1–8.0 mm (n = 13), brown intermixed with few pale-brown scales; cell and surrounding areas paler than marginal areas; cell with 2 large brown spots, 1 near middle, 1 near distal end; Undersurface brown. Hindwing: Brownish gray.

Abdomen (Fig. 39): Male with 2 transverse, irregular rows of sex scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 40–41): Uncus elongate, broadly constricted near basal 1/4, nearly parallelsided apically, apex slightly rounded and setose; gnathos protuberant, wide basally, abruptly narrowed distal half and apically upturned, apex narrowly rounded; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially from posteroventral margin to base of uncus; costa of valva gradually upturned from a shallow depression beyond basal digitate process to apical furca; furca angular and elongate, extending beyond base of uncus; sacculus twisted apically, constricting valva slightly before midlength, widening distoventrally, forming an elongate cucullus; cucullus membranous and setose, with a nearly straight and elongate outer margin; vesica of aedeagus denticulate, with an elongate, conical, apical cornutus; cornutus with one side slightly shortened, exposing a hollow, basal cavity.



Female Genitalia (Fig. 280): Papillae anales elongate, slightly wider basally than apically; apophysis posterioris and apophysis anterioris about equal in length; eighth sternum narrower than eighth tergum; posterior margin of eighth sternum broadly rounded, anterior margin emarginate; posterior margin of eighth tergum broadly emarginate, anterior margin broadly rounded; antrum enlarged posteriorly from a narrow anterior part, posterior margin broadly rounded, posterolateral margin angular; constricted anterior part with a pair of short, spinelike processes inside cavity formed from outer wall; ductus bursae short; corpus bursae slightly expanded posteriorly, denticulate on anterior 2/3; inception of ductus seminalis enlarged; ductus seminalis coiled throughout length, decreasing in diameter from a widened base to apex; base of ductus seminalis with a small, single-coiled, internal support; a slightly enlarged bulla opposite side of ductus seminalis; bulla with a twisted, platelike, internal support.

Holotype, ♂, “Est[ación] Pitilla, 700 m, 9 km S S[an]ta Cecilia, Prov[incia] Guan[acaste], COSTA RICA, P. Rios & C. Moraga, 10 Set.–22 Oct. 1990, L-N-330200, 380200”, INBio: COSTA RICA: CRI000, 579902” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 733” [yellow label].

Paratypes (9 ♂, 3 ♀): 1 ♂, “Est. Pitilla, 700 m, 9 km S Sta. Cecilia, Prov. Guan., COSTA RICA, P. Rios & C. Moraga, 10 Set.–22 Oct. 1990, L-N-330200, 380200”, “CRI000, 182146”, “Slide No. 731”; 1 ♂, “Set. 1991, C. Moraga”, “CRI000, 460236”, “Slide No. 730”; 1 ♂, “6–19 Set. 1993, P. Rios, # 2345”, “CRI001, 613362”, “Slide No. 741”; 1 ♂, “P. Rios & C. Moraga, Oct. 1990”, “CRI000, 226245”, “Slide No. 742”; 1 ♂, “Dic. 1990”, “CRI000, 281095”; “Slide No. 735”; 1 ♂, “C. Moraga, May 1991”, “CRI000, 649000”, “Slide No. 732”; 1 ♀, “2–9 Mar. 1992”, “CRI000, 414815”, “Slide No. 737”; 1 ♀, “C. Moraga & P. Rios, Nov. 1990”, “CRI000, 686179”, “Slide No. 739”; 1 ♀, “C. Moraga, Ago. 1991”, “CRI000, 537964”, “Slide No. 743”; 1 ♂, “May 1995, P. Rios, L-N-329950, 380450, # 4815”, “CRI1002, 203461”, “Slide No. 740”; 1 ♀, “Fca. San Gabriel, 2 km SW Dos Ríos, 600 m, Prov. Alaj., COSTA RICA, I Curso Microlepidop., Jul. 1990, L-N-318800, 383500”, “CRI000, 475389”, “Slide No. 514”; 1 ♂, “Est. Carrillo, 700 m, P. N. Braulio Carrillo, Prov. S. José, Costa Rica, I Curso Microlepidop., Jul. 1990, L-N-236700, 541800”, CRI000, 219478”, “Slide No. 835”, (7 in INBio, 5 in USNM).

Distribution (Map 7): *Glyphidocera terrae* is known from three collecting sites in north-western Costa Rica along the Cordillera de Guanacaste, and one collecting site north of San José, along the Cordillera Central.

Etymology: The species epithet is derived from the Latin word for earth - terra.

### ***Glyphidocera cellae*, new species**

(Figs. 42–44, 296, Map 8)

Diagnosis.— *Glyphidocera cellae* can be distinguished from its congeners by a unique combination of features including a narrow gnathos with an acutely upturned apex, a cos-

tal furca with a broadly rounded apex, a shortened sacculus, a slightly constricted area beyond sacculus, an absence of an apical cornutus of the aedeagal vesica, and vesica of aedeagus with many spinelike cornuti.

Description.— Head: Vertex and frontoclypeus pale brownish yellow; outer surface of segments I–II brown intermixed with pale brownish-yellow scales to near apical margin, segment III brown intermixed with few pale brownish-yellow scales; inner surface pale brownish yellow intermixed with few brown scales; scape of antenna pale brownish yellow, flagellum with alternating bands of brown and pale brownish-yellow scales, male 4<sup>th</sup> flagellomere without dorsal protuberance, flagellomeres 5–6 slightly excavated; proboscis pale brownish yellow.

Thorax: Tegula brown intermixed with few brownish-yellow scales; mesonotum brownish yellow. Legs brownish yellow intermixed with few brown scales. Forewing (Fig. 296): Length 5.1 mm ( $n = 1$ ), basal 2/3 pale brownish yellow intermixed with few brown scales, distal 1/3 brown intermixed with few pale brownish-yellow scales; cell with 2 brown spots, 1 near middle, 1 near distal end. Undersurface brown. Hindwing: Pale grayish brown basally, gradually darkening to apex.

Abdomen (Fig. 42): Male with 3 transverse, irregular rows of sex scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 43–44): Uncus elongate, parallelsided from a wide base to an acuminate apex; gnathos setose, protuberant, wide basally, gradually narrowed distally, apex abruptly upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially and narrowly from posteroventral margin to base of uncus; costa slightly upturned from slightly beyond base to apical furca; furca wide, broadly rounded apically; basal digitate process of valva absent; sacculus moderately twisted, slightly constricting valva near midlength, slightly widening distoventrally, forming a broadly rounded cucullus; cucullus membranous and setose, with a narrowly rounded outer margin beneath apex of costa; vesica of aedeagus with many moderately long, spine-like cornuti.

Female Genitalia: Unknown.

Holotype, ♂, “San Luis, Monteverde, Prov[incia] Punta[renas], COSTA RICA, 1000–1350 m, Jul. 1994, Z. Fuentes, L-N-250850, # 3074”, “INBio: COSTA RICA: CRI002, 025736” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 504” [yellow label].

Distribution (Map 8): *Glyphidocera cellae* is known from one collecting site in the cloud forests of Monteverde in west-central Costa Rica along the southern part of the Cordillera de Tilarán.

Etymology: The species epithet *cellae* is derived from the Latin “cella,” meaning room.



MAP 8. Distribution of *Glyphidocera cellae* (●) and *G. adrogantiae* (▲).

***Glyphidocera adrogantiae*, new species**

(Figs. 45–47, 301, Map 8)

Diagnosis.— *Glyphidocera adrogantiae*, *G. faecis*, and *G. aediculae* share an abdomen with sex scales between terga 2–3 and terga 3–4 in male, a similar sized gnathos, an upturned costal furca of the valva, a wide cucullus of the valva, and a relatively small apical cornutus of the aedeagal vesica. However, *G. adrogantiae* differs from the latter by having fewer setae on the gnathos, a larger costal furca of the valva, and a wider cucullus of the valva.

Description.— Head: Scales of vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus brown intermixed with few pale-brown scales, segment II with pale-brown scales along apical margin; inner surface of labial palpus pale brown intermixed with few brown scales; scape of antenna brown intermixed with few pale-brown scales, flagellum brown; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6; distal opening of concavity nearly closed by setiform scales on apex of 4<sup>th</sup> flagellomere; proboscis brown.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with few pale-brown scales along apical margins of all segments and tarsomeres. Forewing (Fig. 301): Length 7.2–7.8 mm (n = 3), brown intermixed with pale-brown and brownish-yellow scales; cell with 2 large brown spots, 1 near middle, 1 near distal end. Undersurface brown except costa brownish yellow intermixed with few brown scales. Hindwing: Pale brown

Abdomen (Fig. 45): Male with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3 and terga 3–4.

Male Genitalia (Figs. 46–47): Uncus elongate, wide at base, broadly constricted slightly near midlength, apex broadly rounded and sparsely setose; gnathos sparsely setose, protuberant, moderately wide throughout length, apex upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms fused medially and narrowly, extending from posteroventral margin to base of uncus; costa of valva slightly rounded from a shallow depression beyond a slanted, basal digitate process to apical furca; furca acuminate, slightly upturned; sacculus twisted apically, constricting valva near midlength, widening distoventrally forming a broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a large conical, apical cornutus; cornutus abruptly widened basally, with one side shortened, exposing a large, hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Cacao, 1000–1400 m, Lado Suroeste del Volcán Cacao, Prov[incia] Guan[acaste], COSTA RICA, C. Chaves, 23 Oct.– 9 Nov. 1990, L-N-323300, 375700”, INBIO: COSTA RICA: CRI000, 316051” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 939” [yellow label] (1 in INBio, 1 in USNM).

Paratypes (2 ♂): 1 ♂, Same label data as holotype except, “CRI000, 576658”, “Slide No. 950”; 1 ♂, 25 Set.–11 Oct. 1990”, “CRI000, 639876”, “Slide No. 948.” (1 in INBio, 1 in USNM).

Distribution (Map 8): *Glyphidocera adrogantiae* is known from one collecting site in north-western Costa Rica along the Cordillera de Guanacaste.

Etymology: The species epithet *adrogantiae* is derived from the Latin word for pride - *adrogantia*.

### ***Glyphidocera faecis*, new species**

(Figs. 48–50, 302, Map 9)

Diagnosis.— *Glyphidocera adrogantiae*, *G. faecis*, and *G. aediculae* share an abdomen with sex scales between terga 2–3 and terga 3–4, a similar sized gnathos, an upturned costal furca of the valva, a wide cucullus of the valva, and a relatively small apical cornutus of the aedeagal vesica. However, *G. faecis* differs from the latter by having a wider costal furca of the costal valva, and an outer margin of the valval cucullus that is straight.

Description.— Head: Vertex with grayish-brown scales tipped with yellowish brown; frontoclypeus grayish brown; outer surface of labial palpus grayish brown intermixed with few yellowish-brown scales, inner surface yellowish brown; scape grayish brown intermixed with few yellowish-brown scales, flagellum with alternating bands of yellowish-brown and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a narrow and deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis grayish brown.

Thorax: Tegula and mesonotum grayish brown. Legs grayish brown intermixed with yellowish-brown scales to near apical margins of all segments and tarsomeres. Forewing (Fig. 302): Length 8.2 mm ( $n = 1$ ), grayish brown intermixed with yellowish-brown scales mostly along costal and subcostal areas; cell with 2 large brown spots, 1 near base, 1 near distal end. Undersurface grayish brown intermixed with yellowish-brown scales along costal margin. Hindwing: Grayish brown.

Abdomen (Fig. 48): Male with 4 transverse, irregular rows of sex scales on intersegmental areas between terga 2–3 and terga 3–4. Sex scales between terga 2–3 appear slightly larger than sex scales between terga 3–4.

Male Genitalia (Figs. 49–50): Uncus elongate, broadly constricted above a wide base, slightly rounded apically, apex broadly rounded; gnathos sparsely setose, protuberant, moderately wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a wide base, fusing near 1/3, gradually divergent from point of constriction to base of uncus; costa of valva nearly straight from a shallow depression beyond a slanted, basal digitate process to apical furca; furca acuminate, slightly upturned; sacculus twisted apically, constricting valva near midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose, with outer margin nearly straight from costa to a broadly rounded apicoventral angle; vesica of aedeagus denticulate, bearing a moderately large, crescent-shaped, apical cornutus; cornutus shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Cacao, 1000–1400 m, Lado SO Vol[cán] Cacao, P[arque] N[acional] G[uanacaste], Prov[incia] Guan[acaste], COSTA RICA, C. Chaves, Abr. 1991, L-N-323300, 375700”, “INBio: COSTA RICA: CRI000, 434715” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 946” [yellow label].



**MAP 9.** Distribution of *Glyphidocera faecis* (▲) and *G. aediculae* (●). Outlying circles indicate multiple adjacent localities.

Distribution (Map 9): *Glyphidocera faecis* is known from a single collecting site in north-western Costa Rica along the Cordillera de Guanacaste.

Etymology: The specific epithet *faecis* is derived from the Latin “faex,” meaning dregs.

***Glyphidocera aediculae*, new species**

(Figs. 51–53, 304, Map 9)

Diagnosis.— *Glyphidocera adrogantiae*, *G. faecis*, and *G. aediculae* share an abdomen with sex scales between terga 2–3 and terga 3–4, a similar sized gnathos, an upturned costal furca of the valva, a wide cucullus of the valva, and a relatively small apical cornutus of the aedeagal vesica. However, *G. aediculae* differs from the latter by having a shorter and more upturned costal furca of the valva, a shorter digitate process of the valva, and a shorter valva.

Description.— Head: Scales of vertex and frontoclypeus grayish yellow tipped with pale grayish yellow; outer surface of labial palpus dark brown intermixed with grayish-yellow scales, segment II with grayish-yellow scales along apical margin; inner surface grayish yellow intermixed with dark-brown scales; scape of antenna grayish brown intermixed with dark-brown scales, flagellum with alternating bands of grayish-yellow and brown scales; male 4<sup>th</sup> flagellomere not protuberant, 5<sup>th</sup> and 6<sup>th</sup> flagellomeres slightly excavated; proboscis grayish yellow.

Thorax: Tegula and mesonotum grayish yellow intermixed with few dark-brown scales basally. Legs dark brown intermixed with few pale grayish-yellow scales to apical margins of all segments and tarsomeres. Forewing (Fig. 304): Length 6.1–7.0 mm (n = 15), grayish yellow intermixed with pale grayish-yellow and dark-brown scales; cell and surrounding areas paler than marginal areas; cell with 2 faint brown spots, 1 near middle, 1 near distal end. Undersurface brown except, pale grayish yellow along posterior half. Hindwing: Brownish gray.

Abdomen (Fig. 51): Male with 3 transverse, irregular rows of sex scales on intersegmental areas between terga 2–3 and terga 3–4. Sex scales on both regions are about equal in size.

Male Genitalia (Figs. 52–53): Uncus elongate, broadly constricted above a wide base, apically rounded to an rounded apex; gnathos sparsely setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a narrow base, fusing medially from posteroventral margin to base of uncus; valva nearly straight from a shallow depression slightly beyond a basal digitate process to apical furca; furca short, acuminate, and slightly upturned; digitate process of valva short with a bulbous base; sacculus twisted apically, constricting valva near midlength, widening distoventrally forming an elongate and broadly rounded cucullus;

cucullus membranous and setose, with outer margin straight from costa to apicoventral angle; vesica of aedeagus sparsely denticulate, bearing a large, conical, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Cerro Tortuguero, 0–120 m, P[arque] N[acional] Tortuguero, Prov[incia] Limón, COSTA RICA, Set., 1992, R. Deigado, L-N-285000, 588000”, “INBio: COSTA RICA: CRI000, 840484” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 576” [yellow label].

Paratypes (15 ♂): 4 ♂, Same label data as holotype except, “Ene. 1992”, “CRI000, 536954”, “Slide No. 600”; “CRI000, 537057”, “Slide No. 577”; “CRI000, 332175”, “Slide No. 593”; “CRI000, 537011”, “Slide No. 575”; 1 ♂, “Jul. 1992”, “CRI000, 735770”, “Slide No. 601”; 1 ♂, “Nov. 1992”, “CRI000, 992130”, “Slide No. 586”; 1 ♂, “J. Solano, Abr. 1991”, “CRI000, 444088”, “Slide No. 574”; 1 ♂, “May. 1991”, “CRI001, 399177”, “Slide No. 594”; 2 ♂, “Sector Cerro Cocori, Fca. de E. Rojas, 150 m, Prov. Limón, COSTA RICA, Ene. 1993, E. Rojas, L-N-286000, 567500”, “CRI001, 402811”, “Slide No. 473”, “CRI001, 402749”; 1 ♂, “Mar. 1992”, “CRI000, 363839”; 1 ♂, “26 Jun. A 16 Jul. 1992”, “CRI000, 745120”, “Slide No. 474”; 1 ♂, “Nov. 1991”, “CRI000, 460113”; 1 ♂, “31 Ene. - 21 Feb. 1992”, “CRI000, 785253”, “Slide No. 424”, “Wing Slide No. 424a”; 1 ♂, “Ene. 1994, # 2549”, “CRI001, 856462”, “Slide No. 469”, (9 in INBio, 6 in USNM).

Distribution (Map 9): *Glyphidocera aediculae* is known from two coastal collecting sites in north-central Costa Rica along the Caribbean Sea.

Etymology: The species epithet *aediculae* is derived from the Latin “aedicula,” meaning shrine.

### ***Glyphidocera cerula*, new species**

(Figs. 54–56, 305, Map 10)

Diagnosis.— *Glyphidocera cerula* can be distinguished from its congeners by several unique features, including male with a large elliptical-shaped, membranous internal cavity, within an area from the middle of tergum-2, extending posteriorly to the middle of tergum-4, containing many elongate sex scales in male; a short sacculus; an elongate distal part of valva; and a broad, triangular-shaped costal furca of the valva.

Description.— Head: Vertex and frontoclypeus grayish brown; outer surface of labial palpus brownish gray intermixed with few yellowish-brown scales to apical margins of all segments, inner surface yellowish-brown intermixed with few grayish-brown scales; scape of antenna grayish brown intermixed with few yellowish-brown scales, flagellum with alternating bands of yellowish-brown and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated

flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis yellowish brown.

Thorax: Tegula and mesonotum grayish brown. Legs grayish brown intermixed with yellowish-brown scales to near apical margins of all segments and tarsomeres. Forewing (Fig. 305): Length 7.2 mm (n = 1), grayish brown intermixed with few brown and yellowish-brown scales; cell with 1 large brown spot near distal end [wing slightly rubbed]. Undersurface brown. Hindwing: Pale brown.

Abdomen (Fig. 54): Male with a large elliptical-shaped, membranous, internal cavity, within an area from the middle of tergum 2, extending posteriorly to the middle of tergum 4, containing many elongate sex scales.

Male Genitalia (Figs. 55–56): Uncus elongate, wide at base, slightly constricted from above, gradually narrowed apically, apex narrowly rounded; gnathos protuberant, moderately widened throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen absent; valva nearly straight from a shallow depression slightly beyond a basal digitate process to a slightly decumbent apical furca; furca wide, apex narrowly rounded; sacculus twisted apically, constricting valva near 1/3 length, widening distoventrally forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing and a moderately elongate, conical, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Pitilla, 700 m, 9 km S S[an]ta Cecilia, P[arque] N[acional] Guanacaste, Prov[incia] Guanacaste, COSTA RICA, C. Moraga, 31 Mar.–15 Abr. 1992, L-N-330200, 380200”, “INBio: COSTA RICA: CRI000, 725138” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 727” [yellow label].



MAP 10. Distribution of *Glyphidocera cerula* (●) and *G. raedae* (▲).



Distribution (Map 10): *Glyphidocera cerula* is known from a single collecting site in north-western Costa Rica.

Etymology: The specific epithet *cerula* is derived from the Latin “cerula,” meaning wax.

***Glyphidocera raedae*, new species**

(Figs. 57–59, 306, Map 10)

Diagnosis.— *Glyphidocera raedae* can be distinguished by a unique combination of features possessed that include a large gnathos that is apically setose, a digitate process of valva that is widened basally, a triangular-shaped costal furca of the valva, a cucullus that is dilated from the base of the costal furca to the apicoventral angle, and the presence of a small apical cornutus within the aedeagal vesica.

Description.— Head: Vertex and frontoclypeus grayish brown; outer surface of labial palpus grayish brown intermixed with few yellowish-brown scales to apical margin of segment II, inner surface yellowish brown intermixed with few grayish-brown scales; scape of antenna grayish brown intermixed with yellowish brown scales, proximal 6–7 flagellomeres yellowish brown, distal flagellomeres with alternating bands of brown and yellowish-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis yellowish brown.

Thorax: Tegula and mesonotum grayish brown. Legs grayish brown intermixed with yellowish-brown scales to near apical margins of all segments and tarsomeres. Forewing (Fig. 306): Length 5.9 mm (n = 1), grayish brown intermixed with yellowish-brown scales; cell and surrounding areas paler than marginal areas; cell with 3 grayish-brown spots, 1 large spot near middle, 2 smaller spots at base and distal end. Undersurface grayish brown. Hindwing: Grayish brown.

Abdomen (Fig. 57): Male with 3 transverse, irregular rows of sex scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 58–59): Uncus elongate, narrow throughout length, slightly constricted near midlength, apex narrowly rounded; gnathos setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially and narrowly from posteroventral margin to the base of uncus; costa of valva distally upturned, with a slightly decumbent and acuminate apical furca; base of costa bearing a digitate process with a widened base; sacculus twisted apically, constricting valva slightly beyond midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose, with outer margin nearly straight from base of costal apex to apicoventral angle;

vesica of aedeagus denticulate, bearing a stout, conical, apical cornutus; cornutus slightly shortened on one side, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Sirena, 0–100 m, P[arque] N[acional] Corcovado, Prov[incia] Puntarenas, COSTA RICA, G. Fonseca, Mar. 1992, L-S-270500, 508300”, “INBio: COSTA RICA: CRI000, 780430” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 789” [yellow label].

Distribution (Map 10): *Glyphidocera raedae* is known from a single collecting site within the coastal area of the Osa Peninsula.

Etymology: The species epithet *raedae* is derived from the Latin “raeda,” meaning coach.

### ***Glyphidocera rodriguezii*, new species**

(Figs. 2, 60–62, 307, Map 11)

Diagnosis.— *Glyphidocera rodriguezii* is similar to *G. aedis* but differs by having a longer apical furca of the valval costa and a narrower distal part of the valva.

Description.— Head (Fig. 2): Scales of vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus brown intermixed with few pale-brown scales, segment II with pale-brown scales along apical margin; inner surface pale brown intermixed with brown scales; scape of antenna brown intermixed with few pale-brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis brown.

Thorax: Scales of tegula and mesonotum brown tipped with pale brown. Legs with brown scales tipped with pale brown and pale-brown scales along apical margins of all segments and tarsomeres. Forewing (Fig. 307): Length 7.7–9.1 mm (n = 53), Scales brown tipped with pale brown; distal 1/3 slightly darker than basal 2/3; cell with 2 large brown spots, 1 near middle, 1 near distal end. Undersurface brown. Hindwing: Grayish brown.

Abdomen (Fig. 60): Male with 4 transverse, irregular rows of sex scales on intersegmental area between terga 2–3 and terga 3–4. Sex scales between terga 2–3 appear slightly larger than the sex scales between terga 3–4.

Male Genitalia (Figs. 61–62): Uncus elongate, slightly constricted above a widened base, apically widened to an acuminate and sparsely setose apex; gnathos protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a widened base, fusing midway between posteroventral margin of tegumen to base of uncus; costa of valva nearly straight from a shallow depression beyond a slanted, basal digitate process to apical furca; furca acuminate,

slightly excavated dorsally; sacculus twisted apically, constricting valva near midlength, dilated distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose, with short, nearly truncate outer margin; vesica of aedeagus denticulate, bearing a large, crescent-shaped, apical cornutus; cornutus slightly shortened on one side, exposing a large, hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Cuatro, Esquinas, P[arque] N[acional] Tortuguero, 0 m, Prov[incia] Limón, COSTA RICA, J. Solano, Oct. 1990, L-N-280000, 590500”, “INBio: COSTA RICA: CRI000, 178834” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 838” [yellow label].

Paratypes (52 ♂): 2 ♂, Same label data as holotype except, “L/02/062”, “CRI001, 234829”, “Slide No. 873”; “CRI001, 234806”; 1 ♂, “13 Ene. 1993, L0009”, “CRI001, 219488”; 1 ♂, “20 Mar. 1993, Arboleda, L/05/021”, “CRI001, 226054”; 1 ♂, “20 Julio 1994, L/01/109”, “CRI001, 243886”; 1 ♂, “1 Julio 1994, Bosque secundario, L/00/111”, “CRI001, 262151”; 1 ♂, “10 Febrero 1994, L/03/097”, “CRI001, 259612”; 1 ♂, “28 Feb 1996, L/04/168, Biblioteca”, “CRI001, 250663”, “Slide No. 903”; 1 ♂, “12 Feb. 1996, L/04/140, Biblioteca”, “CRI001, 258205”; 1 ♂, “13 Febrero 1996, L/04/142”, “CRI001, 258070”; 1 ♂, “15 Feb. 1996, STR 250 m, L/00/148”, “CRI001, 251015”; 1 ♂, “19 Feb. 1996, L/05/159, Arboleda”, “CRI001, 250084”, “Slide No. 881”; 1 ♂, “22 Feb. 1996, L/04/162, Biblioteca”, “CRI001, 257947”; 1 ♂, “L/00/160, CES 300 m”, “CRI002, 057138”; 1 ♂, “4 Marzo 1996, L/04/172, Biblioteca”, “CRI002, 057072”; 1 ♂, “L/00/173, CES 600 m”, “CRI002, 057039”, “Slide No. 882”; 2 ♂, 6 Marzo 1996, L/00/179, CCC 650 m”, “CRI002, 057675”, “CRI002, 057678”; 1 ♂, “L/00/177, STR 545 m”, “CRI001, 250851”; 1 ♂, “L/04/176, Biblioteca”, “CRI001, 250925”; 3 ♂, “11 Marzo 1996, L/00/180, STR 1850 m”, “CRI001, 250796”, “CRI001, 250793”, “CRI001, 250792”; 1 ♂, “L/00/181, STR 2050 m”, “CRI001, 250739”; 3 ♂, “13 Marzo 1996, L/00/187, STR 450 m”, “CRI002, 058145”, “CRI002, 058113”, “CRI002, 058149”, “Slide No. 916”; 2 ♂, “21 Marzo 1996, L/04/192, Biblioteca”, “CRI002, 058330”, “CRI002, 058336”; 2 ♂, “25 Marzo 1996, L/04/196, Biblioteca”, “CRI001, 257119”, “CRI001, 257110”; 1 ♂, “27 Marzo 1996, L/04/202, Biblioteca”, “CRI002, 058814”; 1 ♂, “L/00/201, CCC 650 m”, “CRI002, 059039”, “Slide No. 910”; 2 ♂, “8 Abril 1996, L/00/207, STR 2550 m”, “CRI002, 059779”, “CRI002, 059775”; 1 ♂, “15 Abril 1996, L/00/213, STR 540 m”, “CRI002, 060065”; 2 ♂, “17 Abril 1996, L/00/217, CCC 650 m”, “CRI002, 060327”, “CRI002, 060336”; 1 ♂, “L/05/216, Arboleda”, “CRI002, 060356”; 1 ♂, “L/00/219, STR 300 m”, “CRI002, 060496”; 1 ♂, “L/04/218, Biblioteca”, “CRI002, 060205”; 1 ♂, “22 Abril 1996, L/04/220, Biblioteca”, “CRI002, 061154”; 1 ♂, “L/00/221, CES 200 m”, “CRI002, 061106”; 1 ♂, “L/05/222, Arboleda”, “CRI002, 060715”; 1 ♂, “L/00/223, SOR 700 m”, “CRI002, 060643”; 2 ♂, “24 Abril 1996, L/00/227, STR 500 m”, “CRI060603”, “CRI002, 060608”; 1 ♂, “29 Abril 1996, L/00/229, STR 300 m”, “CRI002, 061864”; 1 ♂, “L/04/228, Biblioteca”, “CRI061654”; 1 ♂, Est. Cuatro Esquinas, P. N. Tortuguero, 0 m, Prov. Limón, COSTA

RICA, J. Solano, Oct. 1990, L-N-280000, 590500", "CRI000, 178794", "Slide No. 837"; 1 ♂, "E. Rojas, 20 Set. – 7 Oct. 1990", "CRI000, 676842", "Slide No. 839"; 1 ♂, "COSTA RICA, Prov. Limón, Sector Cedrales de la Rita, 3 km N del Puente Río Suerte, Ruta Puerto Lindo., 10 m, Oct. 1996, E. Rojas, L-N- 278600, 566500, # 44661", "CRI002, 492793", "Slide No. 851", (37 in INBio, 15 in USNM).

Distribution (Map 11): *Glyphidocera rodríguezi* is known from three collecting sites in north-central Costa Rica between Cordillera Central and the coastline along the Caribbean Sea.



**MAP 11.** Distribution of *Glyphidocera rodríguezi* (▲) and *G. capsae* (●). Outlying circles indicate multiple adjacent localities.

Etymology: The species is named in honor of Carlos M. Rodríguez.

### *Glyphidocera capsae*, new species

(Figs. 63–65, 308, Map 11)

Diagnosis.— *Glyphidocera capsae* is similar to *G. audaciae* but differs from the latter by having a wider gnathos, a wider distal part of valva, a larger costal furca of the valva, and a smaller apical cornutus of the aedeagal vesica.

Description.— Head: Scales of vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus brown intermixed with brownish-yellow scales, segment II with pale brownish-yellow scales along apical margin; inner surface pale brownish yellow intermixed with brown scales; scape of antenna brown intermixed with pale brownish-yellow scales, flagellum with alternating bands of brown and brownish-yellow scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few seti-

form scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis brown with some scales tipped with pale brown.

Thorax: Tegula and mesonotum brown intermixed with brown scales tipped with pale brown. Legs brown intermixed with few pale-brown scales to near apical margins of all segments and tarsomeres. Forewing (Fig. 308): Length 6.9–8.0 mm (n = 12), brown intermixed with pale brownish-yellow and pale-brown scales; cell and surrounding areas paler than marginal areas; cell with 2 large brown spots, 1 near middle, 1 near distal end. Under-surface brown except, costa pale yellowish brown. Hindwing: Pale brown.

Abdomen (Fig. 63): Male with 4 transverse, irregular rows of sex scales on intersegmental area between terga 2–3 and terga 3–4. Sex scales between terga 2–3 appear slightly larger than the sex scales between terga 3–4.

Male Genitalia (Figs. 64–65): Uncus elongate, slightly constricted from a wide base, nearly parallelsided apically, apex acuminate and setose; gnathos setose, protuberant, wide throughout length, upturned apically, tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a narrow base, fused narrowly above posteroventral margin of tegumen, gradually widening, forming a triangular-shaped pigmented area below base of uncus; costa of valva nearly straight from a shallow depression slightly beyond a slightly curved, basal digitate process to apical furca; furca acuminate, dorsally excavated, slightly upturned; sacculus twisted apically, constricting valva slightly before middle, widening distoventrally, forming an elongate, broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a small, crescent-shaped apical cornutus; cornutus abruptly dilated basally, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Quepos, 80 m, P[arque] N[acional] Manuel Antonio, Prov[incia] Punt[arenas], COSTA RICA, R. Zuniga, Ene. 1991, L-S-370900, 448800”, “INBio: COSTA RICA: CRI000, 564568”, [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 567”, [yellow label].

Paratypes (11♂): 3 ♂, Same label data as holotype except, “CRI000, 366824”, “Slide No. 549”; “CRI000, 366939”, “Slide No. 552”; “CRI000, 366921”, “Slide No. 554”; 1 ♂, “Abr. 1991”, “CRI000, 593356”, “Slide No. 556”; 1 ♂, “Mar. 1993, G. Varela”, “CRI001, 409671”, “Slide No. 571”; 1 ♂, “Set. 1991”, “CRI000, 493875”, “Slide No. 570”; 2 ♂, “120 m, G. Varela & R. Zugina, Nov. 1990, L-S-370900, 449800”, “CRI000, 227894”, “Slide No. 563”; “CRI000, 180563”, “Slide No. 553”; 1 ♂, “Dic. 1990”, “CRI000, 228838”, “Slide No. 564”; 1 ♂, “30 m, Oct. 1990, L-S-370500, 449000”, “CRI000, 274946”, “Slide No. 566”; 1 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, Feb. 1996, INBio-OET”, “7 Feb. 1996, L/00/127, CES 450 m”, “CRI002, 057344”, “Slide No. 914”, (6 in INBio, 5 in USNM).

Distribution (Map 11): *Glyphidocera capsae* is known from five collecting sites; four nearby coastal sites in south-central Costa Rica, and one collecting site in the north-central part of the country.

Etymology: The species epithet *capsae* is derived from the Latin “capsa,” meaning bookcase.

***Glyphidocera audaciae*, new species**

(Figs. 66–68, 309, Map 12)

Diagnosis.— *Glyphidocera audaciae* is similar to *G. capsae* from which it can be distinguished by a narrower gnathos, a narrower distal part of valva, a smaller costal furca of the valva, and a larger apical cornutus of the aedeagal vesica.

Description.— Head: Vertex and with brown scales tipped with pale brown; frontoclypeus as above [specimen with many scales missing]; outer surface of labial palpus brown intermixed with pale-brown scales along apical margin of segment II and base of segment III, inner surface with segments I–II pale brown intermixed with few brown scales, segment III brown intermixed with few pale-brown scales; scape of antenna mostly pale brown intermixed with few brown scales, flagellum with alternating bands of pale yellowish-brown and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale yellowish brown.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with pale yellowish-brown scales to apical margins of all segments and tarsomeres (legs with many scales missing). Forewing (Fig. 309): Length 8.0 mm (n = 1), with brown scales tipped with pale brown intermixed with pale yellowish-brown scales and brown scales; cell and surrounding areas paler than marginal; cell with 2 large brown spots, 1 near middle and 1 near distal end. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 66): Male with 3 transverse, irregular rows of sex scales on intersegmental areas between terga 2–3 and terga 3–4.

Male Genitalia (Figs. 67–68): Uncus elongate, broadly constricted near 1/3, widening near middle, gradually tapering to an acuminate and setose apex; gnathos setose, protuberant, wide throughout length, upturned apically; tegumen slightly widening basally; dorsal strut of tegumen with arms convergent, fusing narrowly from posteroventral margin to base of uncus; valva with margin of costa slightly upturned from a shallow depression beyond a slanted, basal digitate process; subapical margin slightly excavated; apical furca acuminate and upturned; sacculus twisted apically, constricting valva near midlength, gradually widening distoventrally, forming an elongate cucullus; cucullus membranous and setose, with a slightly rounded outer margin; vesica of aedeagus denticulate, bearing a large, crescent-shaped, apical cornutus; cornutus shortened on one side near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Sirena, P[arque] N[acional] Corcovado, Prov[incia] Punta[renas], COSTA RICA, 1–100 m, Mar. 1993, G. Fonseca, L-S-270500, 508300, # 1895”, “INBio: COSTA RICA: CRI001, 695400” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 794” [yellow label].

Distribution (Map 12): *Glyphidocera audaciae* is known from a single collecting site along the coast near the Osa Peninsula.



MAP 12. Distribution of *Glyphidocera audaciae* (▲) and *G. coronae* (●). Outlying circles indicate multiple adjacent localities.

Etymology: The specific epithet *audaciae* is comes from the Latin word for courage - audacia..

***Glyphidocera coronae*, new species**

(Figs. 69–71, 282, 310, Map 12)

Diagnosis.— *Glyphidocera coronae* is most similar to *G. infulae* but differs from the latter by having a narrower gnathos, a more upturned costal furca of valva, a narrower cucullus, and a narrower apical cornutus of the aedeagal vesica..

Description.— Head: Scales of vertex and frontoclypeus brown or scales brown tipped with pale brown; outer surface of labial palpus brown intermixed with few pale-brown scales, segment II brown intermixed with pale-brown scales to apical margin; inner surface pale brown, or pale brown intermixed with few brown scales; scape of antenna brown intermixed with pale-brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow

concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis brown.

Thorax: Tegula and mesonotum brown or brown intermixed with few brown scales tipped with pale brown. Legs brown intermixed with few brown scales tipped with pale brown and pale-brown scales on apical margins of all segments and tarsomeres. Forewing (Fig. 310): Length 7.0–8.9 mm (n = 36), brown intermixed with dark-brown scales and few brown scales tipped with pale brown and pale-brown scales; cell with 4 large, dark-brown spots, 2 spots near middle, 2 spots near distal end [some specimens with spots in cell faint or absent]. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 69): Male with 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3 and terga 3–4. Sex scales between terga 2–3 appear slightly larger than the sex scales between terga 3–4.

Male Genitalia (Figs. 71–72): Uncus elongate, broadly constricted above a wide base, widened subapically, apex setose and acuminate; gnathos setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a wide base, fusing midway from posteroventral margin of tegumen to base of uncus; costa nearly straight from a shallow depression slightly beyond a slanted, basal digitate process to apical furca; furca acuminate, slightly upturned; sacculus twisted apically, constricting valva slightly before middle, widened distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose, with a short, narrowly rounded outer margin; vesica denticulate, bearing a large, hornlike, apical cornutus; cornutus dilated basally, exposing a hollow, basal cavity.

Female Genitalia (Fig. 282): Papillae anales elongate, wider basally than apically; apophysis posterioris and apophysis anterioris about equal in length; eighth sternum about equal in width as eighth tergum; posterior margins of eighth sternum and eighth tergum broadly rounded; anterior margin of eighth sternum broadly emarginate, anterior margin of eighth tergum straight; antrum greatly enlarged posterolaterally from a broadly constricted anterior part, posterior margin broadly emarginate medially, posterolateral margins broadly rounded; anterior part of antrum bearing a pair of elongate, spinelike processes inside cavity formed from outer wall; ductus bursae short; corpus bursae densely denticulate within anterior half; ductus seminalis basally enlarged, coiled from base to apex, each coil gradually narrowed distally; ductus bursae with a short, single-coiled, internal support; membrane of basal coil slightly denticulate; side opposite ductus seminalis with a convoluted, internal plate.

Holotype, ♂, “Quepos, 120 m, P[arque] N[acional] Manuel Antonio, Prov[incia] Punt[arenas], COSTA RICA, G. Varela & R. Zuniga, Dic. 1990, L-S-370900, 449800”, “INBio: COSTA RICA: CRI000, 228656” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 565” [yellow label].

Paratypes (35 ♂): 2 ♂, Same label data as holotype except, “CRI000, 228657”, “Slide No. 559”; “CRI000, 229039”, “Slide No. 560”; 2 ♂, “Nov. 1990”, “CRI000, 227819”,



“Slide No. 561”; CRI000, 180588”, “Slide No. 562”; 2 ♂, “Oct. 1990”, “CRI000, 274909”, “Slide No. 550”; “CRI000, 274811”, “Slide No. 551”; 1 ♂, “Abr. 1991, R. Zuniga”, “CRI000, 593, 412”, “Slide No. 555”; 2 ♂, “Oct. 1990, G. Varela & R. Zuniga, L-S-371500, 449450”, “CRI000, 223312”, “Slide No. 558”; “CRI000, 556533”, “Slide No. 557”; 2 ♂, “Est. Sirena, P. N. Corcovado, 0–100 m, Prov. Punt., COSTA RICA, G. Fonseca, Mar. 1991, L-S-270500, 508300”, “CRI000, 226291”, “Slide No. 795”; “CRI000, 183329”, “Slide No. 797”; 1 ♂, “Dic. 1990”, “CRI000, 700820”, “Slide No. 802”; 4 ♂, “Mar. 1991”, “CRI000, 447974”, “Slide No. 784”; “CRI000, 447868”, “Slide No. 785”; “CRI000, 447727”, “Slide No. 786”; “CRI000, 447967”, “Slide No. 787”; 1 ♂, “CRI000, 708155”, “Slide No. 791”; 1 ♂, “Est. Esquinas, Pen. de Osa, Prov. Punta., COSTA RICA, 200 m, May 1998, M. Segura, L-S-301400, 542200, # 2144”, “CRI001, 697318”, “Slide No. 493”; 1 ♂, “Rancho Quemado, Pen. Osa, Prov. Punt., COSTA RICA, F. Quesada, Dic. 1990, L-S-292500, 511000”, “CRI000, 342678”, “Slide No. 492”; 1 ♂, Est. Bijagual, 500 m, Res. Biol. Carara, Prov. San José, COSTA RICA, R. Zuniga, Nov. 1989, L-N-192250, 474760”, “CRI000, 679085”, “Slide No. 800”; 1 ♂, 600 m, N de Bijagualito, Prov. San José, Prov., COSTA RICA, 500 m, Feb. 1995, J.C. Saborio, L-N-191800, 476800, # 4370”, “CRI002, 177108”, “Slide No. 498”; 2 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N,84°01'W, Jan. 1993, INBio-OET”, “15 Ene. 1993, Plantación abandonada, L0012”, “CRI001, 223153”, “Slide No. 893”; “13 Ene. 1993, Bosque primario, L0010”, “CRI001, 219610”, “Slide No. 966”; 2 ♂, “11 Septiembre 1993, Bosque primario, L/01/064”, “CRI001, 235257”, “Slide No. 965”; “L/02/066”, “CRI001, 239007”, “Slide No. 967”; 1 ♂, “13 Mayo 1993, Bosque primario, L/02/034”, “CRI001, 227240”, “Slide No. 960”; 2 ♂, “30 Junio 1994, Lab area, L/04/110”, “CRI001, 243782”, “Slide No. 969”; “29 Junio 1994, Bosque primario, L/01/109”, “CRI001, 243887”, “Slide No. 964”; 2 ♂, “5 Julio 1994, Lab area, L/04/119”, CRI001, 244523”, “Slide No. 961”; “4 Julio 1994, Bosque primario, L/02/117”, “CRI001, 244469”, “Slide No. 968”; 1 ♂, “12 Feb. 1996, L/05/141, Arbolada”, “CRI002, 058744”, “Slide No. 895”; 1 ♂, “11 Marzo 1996, L/00/180, STR 1850 m”, “CRI001, 250755”, “Slide No. 959”; 2 ♂, “24 Abril 1996, L/00/227, STR 500 m”, “CRI002, 060605”, “Slide No. 963”; “17 Abril 1996, L/00/217, CCC 650 m”, “CRI002, 060442”, “Slide No. 962”; 1 ♂, “Cerro Tortuguero, 0–120 m, P. N. Tortuguero, Prov. Limón, COSTA RICA, Jun. 1992, R. Delgado, L-N-285000, 588000”, “CRI000, 708856”, “Slide No. 636”, (25 in INBio, 10 in USNM).

Distribution (Map 12): *Glyphidocera coronae* is known from several south-eastern and south-central coastal sites, northward across the Cordillera Central to the Caribbean Coast.

Etymology: The species epithet *coronae* is derived from the Latin word “corona,” meaning crown.

***Glyphidocera infulae*, new species**

(Figs. 72–74, 311, Map 13)

Diagnosis.— *Glyphidocera infulae* is similar to *G. coronae* but differs in its possession of a wider gnathos, a nearly straight costal furca of the valva, a broader cucullus, and a larger apical cornutus of the aedeagal vesica.

Description.— Head: Scales of vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus with brown scales tipped with pale brown, segment II with few pale-brown scales along distal margin; inner surface with segment I–II pale brown, segment III brown; scape of antenna brown, flagellum with alternating bands of pale-brown and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis brown.

Thorax: Tegula and mesonotum with brown scales tipped with pale brown. Legs with brown scales tipped with pale brown intermixed with pale-brown scales along apical margins of all segments and tarsomeres. Forewing (Fig. 311): Length 7.1–9.0 mm (n = 13), brown intermixed with brown scales tipped with pale brown and few pale-brown scales; cell with 2 large, faint spots, 1 near middle, 1 near distal end. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 72): Male with 5 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3 and terga 3–4. Sex scales between terga 2–3 appear slightly larger than those sex scales between terga 3–4.

Male Genitalia (Figs. 73–74): Uncus elongate, slightly constricted above a wide base, parallelsided apically, gradually tapering to a narrowly rounded and setose apex; gnathos sparsely setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent medially, fusing from posteroventral margin of tegumen to base of uncus; costa of valva shallowly emarginate from a shallow depression beyond a basal digitate process to a slightly raised subapical area; apical furca aristate, slightly upturned; sacculus twisted apically, constricting valva, slightly before middle, widening ventrodistally forming an elongate, broadly rounded cucullus; cucullus membranous and setose, with a short, slightly rounded outer margin; vesica of aedeagus with rounded denticles, bearing a large, crescent-shaped cornutus; cornutus dilated basally, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Sector Cocori, 30 km al N de Cariari, Prov[incia] Limón, COSTA RICA, 100 m, Dic. 1993, E. Rojas, L-N-286000, 567500, # 2495”, “INBio: COSTA RICA: CRI001, 646686” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 673” [yellow label].

Paratypes (12 ♂): 1 ♂, “Est. Cuatro Esquinas, P. N. Tortuguero, 0 m, Prov. Limón,

COSTA RICA, E. Rojas, 20 Set. – 7 Oct. 1990, L-N-280000, 590500”, “CRI000, 676844”, “Slide No. 836”; 1 ♂, “Cerro Tortuguero, P.N. Tortuguero, 0- 100 m, Prov. Limón, COSTA RICA, J. Solano, Mar. 1991, L-N-285000, 588000”, “CRI000, 197551”, “Slide No. 635”; 5 ♂, “Sector Cerro Cocori, Fca de E. Rojas, 150 m, Prov. Limón, COSTA RICA, E. Rojas, Abr. 1992, L-N-286000, 567500”, “CRI000, 786388”, “Slide No. 672”; “Feb. 1993”, “CRI000, 998601”, “Slide No. 674”; “Ago. 1993, # 2291”, “CRI001, 135571”, “Slide No. 675”; “28 May. a 17 Jun. 1992”, “CRI000, 738662”, “Slide No. 676”; “Dic. 1993, # 2495”, “CRI001, 646694”, “Slide No. 702”; 1 ♂, “Est. Magsasay, P. N. Braulio Carrillo, 200 m, Prov. Here., COSTA RICA, R. Aguilar, Nov. 1990, L-N-264600, 531100”, “CRI000, 226717”, “Slide No. 759”; 4 ♂, “Est. Queb. Bonita, 50 m, Res. Biol. Carara, Prov. Punt., COSTA RICA, R. Zuniga, Ago. 1990, L-N-194500, 469850”, “CRI000, 181291”, “Slide No. 633”; “CRI000, 181261”, “Slide No. 637”; “CRI000, 181089”, “Slide No. 638”; “Feb. 1991”, “CRI000, 680024”, “Slide No. 634”, (7 in INBio, 5 in USNM).

Distribution (Map 13): *Glyphidocera infulae* is found in Costa Rica from the northern boarder along the Caribbean Coast, south-west to the Cordillera Central, south to the Pacific Coast along Río Tárcoles, near the mouth of the Golfo de Nicoya.



**MAP 13.** Distribution of *Glyphidocera infulae* (●).

Etymology: The species epithet *infulae* is derived from the Latin “infula,” meaning bandage.

***Glyphidocera dictionis*, new species**

(Figs. 75–77, 279, 312, Map 14)

Diagnosis.— *Glyphidocera dictionis* is similar to *G. brumae* but differs from the latter by having a smaller gnathos, a shorter apical furca of the valval costa, and a broader outer margin of the valval cucullus.

Description.— Head: Vertex and frontoclypeus pale brownish yellow; outer and inner surfaces of labial palpus pale brownish yellow; scape and flagellum of antenna pale brownish yellow; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brownish yellow.

Thorax: Tegula and mesonotum pale brownish yellow. Legs pale brownish yellow. Forewing (Fig. 312): Length 6.3–7.5 mm (n = 10), pale brownish yellow intermixed with brown scales; costal margin and distal 1/4 brown intermixed with few pale brownish-yellow scales; cell with 2 large spots, 1 near middle, 1 near distal end [some specimens with spots faint or missing]; marginal spots present or absent. Undersurface pale brown except, costal margin pale brownish yellow. Hindwing: Grayish brown.

Abdomen (Fig. 75): Male with 2 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3, and two small, elliptical-shaped clusters of sex scales on dorsolateral surface of intersegmental area between terga 3–4.

Male Genitalia (Figs. 76–77): Uncus elongate, slightly constricted broadly near 1/3, apically rounded, abruptly dilated subapically, tapering to a short, narrowly rounded and setose apex; gnathos setose, protuberant, narrow throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a wide base, fusing near 2/3 length from posteroventral margin of tegumen to base of uncus; costa of valva broadly emarginate medially; apical furca acuminate, upturned; base of costa bearing a slightly downturned digitate process; sacculus twisted apically, constricting valva slightly before midlength, widened distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose, with outer margin short and slightly rounded; vesica sparsely denticulate, bearing a moderately large, crescent-shaped cornutus; cornutus dilated basally, exposing a hollow, basal cavity.

Female Genitalia (Fig. 279): Papillae anales elongate, slightly wider basally than apically; apophysis posterioris and apophysis posterioris about equal in length; eighth sternum narrower than eighth tergum; posterior margin of eighth sternum broadly rounded, anterior margin slightly emarginate; posterior margin of eighth tergum broadly emarginate, anterior margin broadly rounded; antrum subtriangular, greatly enlarged posteriorly from a constricted anterior part, posterior margin nearly straight, posterolateral margin angular; anterior part of antrum with a pair of elongate, spinelike processes inside cavity formed from outer wall; ductus bursae short; corpus bursae sparsely denticulate posteriorly,

slightly enlarged anteriorly; inception of ductus seminalis widened basally from posterior part of corpus bursae, about 8-coiled, each coil gradually decreasing in diameter for base to apex; ductus seminalis with a short, basal, internal, 4-coil support on side opposite an elongate, internal plate.

Holotype, ♂, “Sector Cerro Cocori, F[in]ca de E. Rojas, 150 m, Prov[incia] Limón, COSTA RICA, 26 Jun. a 16 Jul. 1992, E. Rojas, L-N-286000, 567500”, “INBio: COSTA RICA: CRI000, 703073” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 478” [yellow label].

Paratypes (7 ♂, 2 ♀): 1 ♂, Same label data as holotype except, “CRI000, 703224”, “Slide No. 483”; 3 ♂, “Dic. 1991”, “CRI000, 361254”, “Slide No. 487”, “♂ Wing Slide No. 487a”; 1 ♂, “May 1992”, “CRI000, 373535”, “Slide No. 477”; 1 ♀, “Mar, 1992”, “CRI000, 363663”, “Slide No. 475”, 1 ♂, “Cerro Tortuguero, P. N. Tortuguero, 0–100 m, Prov. Limón, COSTA RICA, J. Solano, Abr. 1991, L-N-285000, 588000”, “CI000, 444307”, “Slide No. 598”; 1 ♂, “Est. Pitilla, 700 m, 9 km S Sta. Cecilia, P. N. Guanacaste, Prov. Guanacaste, COSTA RICA, C. Moraga, 2–9 Mar. 1992, L-N-330200, 380200”, “CRI000, 414816”, “Slide No. 761”; 1 ♂, “R. Rios, Mar. 1991”; “CRI000, 450298”, “Slide No. 480”; 1 ♂, Est. Cacao, Prov. Guana., COSTA RICA, 8–18 Feb. 1995, L. Angulo, L-N-323700, 376700, # 4673”, “CRI002, 185636”, “Slide No. 945”; 1 ♀, “Est. Sirena, P. N. Corcovado, P.N. Corcovado, Osa, Prov. Punta., COSTA RICA, 1–100 m, Ene. 1994, G. Fonseca, L-S-270500, 508300, # 2551”, “CRI001, 843233”, “Slide No. 476”, (6 in INBio, 3 in USNM).

Distribution (Map 14): *Glyphidocera dictionis* is known from five collecting sites in Costa Rica; two nearby sites in the north-west along the Cordillera de Guanacaste, two sites in north-central part of the country along the Caribbean Coast, and a single site in the south-east along the Pacific Coast.



**MAP 14.** Distribution of *Glyphidocera dictionis* (●).

Etymology: The specific epithet *dictionis* is derived from the Latin “diction,” meaning speech.

***Glyphidocera zothecuale*, new species**

(Figs. 78–80, 313, Map 15)

Diagnosis.— *Glyphidocera zothecuale* is most similar to *G. sardae* but differs by having a smaller gnathos, a shorter and less upturned costal furca of the valva, and a more angular outer margin of the valval cucullus.

Description.— Head: Vertex and frontoclypeus with grayish-brown scales tipped with pale brown; outer surface of labial palpus grayish brown intermixed with pale yellowish-brown scales to apical area of segments I–II; inner surface pale yellowish brown; scape of antenna pale yellowish brown intermixed with few grayish-brown scales, flagellum with alternating bands of pale yellowish-brown and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale yellowish brown.

Thorax: Tegula and mesonotum with grayish-brown scales tipped with pale brown. Legs grayish brown intermixed with yellowish-brown scales to near apical areas of all segments and tarsomeres. Forewing (Fig. 313): Length 8.0 mm (n = 1), pale yellowish brown intermixed with brown and grayish-brown scales tipped with pale brown; cell and surrounding areas paler than marginal areas; cell with 2 large brown spots, 1 near middle, 1 near distal end. Undersurface grayish brown intermixed with yellowish-brown scales along costa. Hindwing: Pale grayish brown.

Abdomen (Fig. 78): Male with 4 transverse, irregular rows of sex scales on intersegmental areas between terga 2–3 and terga 3–4. Sex scales between terga 2–3 are slightly larger and more numerous than sex scales between terga 3–4.

Male Genitalia (Figs. 79–80): Uncus elongate, slightly constricted broadly near 1/3, slightly rounded apically, tapering to an acuminate and setose apex; gnathos setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing near 2/3 length from a widened base along posteroventral margin to base of uncus; valva with costa broadly emarginate from a shallow depression beyond a basal digitate process to subapical part; subapical area slightly raised, with base of apical furca excavated; furca acuminate, slightly upturned; base of costa with a digitate process with a slightly widened base; sacculus twisted apically, constricting valva near 1/3 length, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus sparsely denticulate, bearing a large, crescent-shaped, apical cornutus; cornutus dilated basally, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Prov[incia] Limón, Est[ación] Aguas Frias, 10–20 m, Jun. 1997, E. Rojas, de Luz, L-N-264700, 580300, # 46786”, “INBio: COSTA RICA: CRI002, 554248” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 507” [yellow label].

Distribution (Map 15): *Glyphidocera zothecuale* is known from one collecting site in northeastern Costa Rica, south of Tortuguero.



MAP 15. Distribution of *Glyphidocera zotheculae* (●) and *G. arae* (▲).

Etymology: The species epithet *zothecuale* is derived from the Latin “zothecula,” meaning small alcove.

***Glyphidocera arae*, new species**

(Figs. 81–83, 314, Map 15)

Diagnosis.— *Glyphidocera arae* is similar to *G. plebis* but differs from the latter by having smaller sex scales between abdominal terga 2–3 in male, a tegumen with a more developed dorsal strut, broader cucullus of valva, and a shorter apical furca of the valval costa.

Description.— Head: Scales of vertex dark brown tipped with pale yellow, fronto-clypeus pale yellow intermixed with dark-brown marginal scales; outer surface of labial palpus dark brown intermixed with few pale-yellow scales, segment II with pale-yellow scales along apical margin; inner surface pale yellow intermixed with few dark-brown scales; scape of antenna dark brown intermixed with few pale-yellow scales, flagellum

with alternating bands of brown and pale-yellow scales; male 4<sup>th</sup> flagellomere not protuberant, 5<sup>th</sup> and 6<sup>th</sup> flagellomeres slightly excavated; proboscis pale yellow.

Thorax: Tegula dark brown intermixed with pale-yellow scales apically, or dark brown intermixed with grayish-orange scales; mesonotum pale yellow intermixed with few dark-brown scales or grayish orange intermixed with few dark-brown scales. Legs brown intermixed with pale-yellow scales on apical margins of all segments and tarsomeres. Forewing (Fig. 314): Length 7.0–7.2 mm (n = 3), grayish orange and pale-yellow scales intermixed with dark-brown and brown scales; base with 1 or 2 dark-brown short streaks along Radius; cell with 4 dark-brown spots, 2 near middle, 2 spots near distal end; veins arising from cell sparsely overlaid with dark-brown scales to marginal spots. Undersurface brown. Hindwing: Brownish gray.

Abdomen (Fig. 81): Male with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 82–83): Uncus elongate, wide basally, slightly constricted near 1/3 length, widest near midlength, gradually narrowed to a rounded apex; gnathos setose, protuberant, wide throughout length, upturned apically; tegumen narrow, parallelsided throughout length; dorsal strut of tegumen with arms convergent from a wide base, fusing near midlength between posteroventral margin and base of uncus; costa of valva broadly emarginate medially from a shallow depression beyond a slanted, basal digitate process to a raised subapical part; apical furca acuminate, slightly upturned; sacculus twisted apically, constricting valva slightly before midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose, with outer margin short, slanted to a narrowly rounded apicoventral margin; vesica of aedeagus denticulate, bearing an elongate, apical cornutus; cornutus shortened near midlength on one side, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “San Luis, Monteverde, Prov[incia] Punta[renas], COSTA RICA, 1000–1350 m, Feb. 1995, Z. Fuentes, L-N-250850, 449250, # 4393”, “INBio” COSTA RICA: CRI002, 165554” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 497” [yellow label].

Paratypes (2 ♂): Same label data as holotype except, “Buen Amigo, Set. 1994, # 3224”, “CRI 002, 022118”, “Slide No. 501”, “CRI002, 022097”, “Slide No. 502”, (1 in INBio, 1 in USNM).

Distribution (Map 15): *Glyphidocera arae* is known from one collecting site in west-central Costa Rica, along the southern slope of the Cordillera de Tilarán.

Etymology: The species epithet *arae* is derived from the Latin “ara,” meaning altar.



***Glyphidocera cauponae*, new species**

(Figs. 84–86, 315, Map 16)

Diagnosis.— *Glyphidocera cauponae* can be distinguished from its congeners by the following unique combination of features: a broad dorsal strut of tegumen, an elongate digitate process of the valva, a short sacculus, an elongate and narrow cucullus of the valva, and an elongate furca of valval costa.

Description.— Head: Scales of vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus brown intermixed with pale-brown scales, segment II with pale-brown scales along apical margin; inner surface pale brown; scape of antenna pale brown intermixed with few brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity open, setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere absent; proboscis pale brown.

Thorax: Tegula and mesonotum pale brown or pale brown intermixed with few brown scales. Legs brown intermixed with pale-brown scales to apical margins of all segments and tarsomeres. Forewing (Fig. 315): Length 8.0–8.5 mm (n = 4), pale brown intermixed with few grayish-orange and brown scales; basal area with one short, brown streak on Radius or streak absent; cell with 4 brown spots, 2 near midcell, 2 near distal end. Under-surface brown. Hindwing: Brownish gray.

Abdomen (Fig. 84): Male with 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3 and terga 3–4. Sex scales from both areas are of about equal size.

Male Genitalia (Figs. 85–86): Uncus elongate, wide basally, slightly constricted near 1/3, wide at midlength narrowing apically to an acuminate apex; gnathos setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms abruptly convergent, fusing widely from posteroventral margin of tegumen to base of uncus; costa of valva slightly emarginate from beyond a shallow depression beyond an elongate, basal digitate process to apical furca; furca elongate, and slightly upturned; sacculus twisted apically, constricting valva slightly before midlength, slightly widening distoventrally, forming an elongate and narrow cucullus; cucullus membranous and setose; vesica of aedeagus densely spinulate, bearing a large apical cornutus; cornutus shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] La Carsona, 1520 m, Res[erva] Biol[ógica] Monteverde, Prov[incia] Punt[arenas], COSTA RICA, Dic. 1992, N. Obando, L-N-253250, 449700”, “INBio: COSTA RICA: CRI001, 358275” [bar code label], “INBio, ♂ Genitalia slide by D. Adamski, No. 840” [yellow label].

Paratypes (3 ♂): 1 ♂, “Est. Cacao, 1000–1400 m, Lado SO Vol. Cacao, P.N.G., Prov. Guan., COSTA RICA, C. Chaves & R. Espinoza, Nov.-Dic. 1990, L-N-323300, 375700”,

“CRI 000, 544652”, “Slide No. 947”; 1 ♂, “1100 m, 8–18 Feb. 1995, M. Moraga, L-N-323100, 375800, # 4623”, “Slide No. 940”; 1 ♂, “Est. La Casona, 1520 m, Res. Biol. Monteverde, Prov. Puntarenas, COSTA RICA, Ago. 1992, N. Obando, L-N- 253250, 449700”, “CRI000, 947147”, “Slide No. 510”, (2 in INBio, 1 in USNM).

Distribution (Map 16): *Glyphidocera cauponae* is known from four collecting sites in Costa Rica; two nearby sites in the northwest along the Cordillera de Guanacaste, one site along the southern side of the Cordillera Central in the west-central part of the country, and one site in north near the Caribbean coast.



**MAP 16.** Distribution of *Glyphidocera cauponae* (●) and *G. sardae* (▲). Outlying circles indicate multiple adjacent localities.

Etymology: The species epithet *cauponae* is derived from the Latin word for tavern - caupona.

### ***Glyphidocera sardae*, new species**

(Figs. 87–89, 316, Map 16)

Diagnosis.— *Glyphidocera sardae* is similar to *G. zothequale* but differs in its larger gnathos, longer costal furca of the valva, less rounded outer margin of the cucullus of the valva, and smaller apical cornutus of the aedeagal vesica.

Description.— Head: Scales of vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus brown intermixed with few pale-brown scales, segment II with pale-brown scales to near apical margin; inner margin pale brown or pale brown intermixed with few brown scales; scape of antenna pale brown intermixed with

few brown scales, flagellum pale brown; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brown.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with pale-brown scales to near apical margins of all segments and tarsomeres. Forewing (Fig. 316): Length 7.6–8.0 mm (n = 2), brown intermixed with few brown scales tipped with pale brown; costal margin pale brown; cell with 2 large brown spots, 1 near middle, 1 near distal end [one specimen with darker basal half nearly obliterating midcell spot]. Undersurface brown except, pale brown along costal margin. Hindwing: Pale brown.

Abdomen (Fig. 87): Male with 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3 and terga 3–4. Sex scales between terga 2–3 appear slightly larger than the sex scales between terga 3–4.

Male Genitalia (Figs. 88–89): Uncus elongate, wide basally, slightly constricted near 1/3, parallelsided to a narrowly rounded and setose apex; gnathos setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen convergent, and fused along posteroventral margin of tegumen, narrowing to midlength, and gradually widening to base of uncus; costa of valva broadly emarginate from a shallow depression beyond a slanted, digitate process to a slightly raised subapical part; apical furca upturned and aristate; sacculus twisted apically, near midlength, widened distoventrally forming a broadly rounded cucullus; cucullus membranous and setose; vesica sparsely spinulate, bearing a conical, apical cornutus; cornutus dilated basally, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “F[in]ca Jenny, 30 km N Liberia, P[arque] N[acional] Guanacaste, Prov[incia] Guan[acaste], COSTA RICA, E. Araya & R. Espinosa, Set. 1990, L-N-316200, 364400”, “INBio: COSTA RICA: CRI000, 227281” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 499” [yellow label].

Paratype (1 ♂): Same label data as holotype except, “240 m, 6–13 Set. 1994, E. Araya, # 3223”, “CRI002, 022656”, “Slide No. 521.”

Distribution (Map 16): *Glyphidocera sardae* is known from one collecting site in north-western Costa Rica along the Cordillera de Guanacaste.

Etymology: The species epithet *sardae* is derived from the Latin “sarda,” meaning sardine.

### ***Glyphidocera eminentiae*, new species**

(Figs. 90–92, 317, Map 17)

Diagnosis.— *Glyphidocera eminentiae* is similar to *G. gemmae* but differs from the latter by

having an upturned apical furca of the valval costa, a more angular distal part of the valva, and a smaller apical cornutus of the aedeagal vesica.

Description.— Head: Vertex and frontoclypeus pale brownish yellow; outer surface of labial palpus pale brownish yellow intermixed with few brown scales, inner surface pale brownish yellow; scape of antenna pale brownish yellow, flagellum with alternating bands of pale brownish-yellow and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brownish yellow.

Thorax: Tegula and mesonotum pale brownish yellow intermixed with few brown scales. Legs pale brownish yellow intermixed with few brown scales. Forewing (Fig. 317): Length 6.2–7.6 mm (n = 11), pale brownish yellow intermixed with brown scales; costa and distal 1/4 darker patterned; cell with 2 large spots, 1 near middle, 1 near distal end [some specimens with some or all spots absent]. Undersurface brownish gray. Hindwing: Pale brownish gray.

Abdomen (Fig. 90): Male with 3–4 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3, and two small, elliptical-shaped clusters of sex scales on dorsolateral surface of intersegmental membrane between terga 3–4.

Male Genitalia (Figs. 91–92): Uncus elongate, wide basally, broadly constricted near 2/3, apically widened, tapering to an acuminate and setose apex; gnathos sparsely setose, protuberant, narrow throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing about 2/3 distance from posteroventral margin of tegumen, gradually widening dorsally to base of uncus; costa of valva nearly straight from base to subapical part; apical furca, acuminate, and slightly upturned; base of costa bearing a slanted digitate process; sacculus twisted apically, constricting valva near midlength, distoventrally forming a broadly rounded cucullus; cucullus membranous and setose; vesica sparsely spinulate, bearing a short, conical, apical cornutus; cornutus shortened on one side, exposing a hollow, basal cavity.

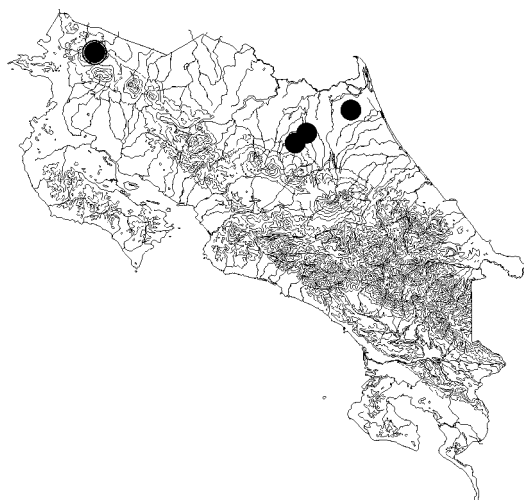
Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Pitilla, 700 m, 9 km S S[an]ta Cecilia, P[arque] N[acional] Guanacaste, Prov[incia] Guanacaste, COSTA RICA, C. Moraga, 31 Mar.–15 Abr. 1992, L-N-330200, 380200”, “INBio, COSTA RICA: CRI000, 725144” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 756” [yellow label].

Paratypes (10 ♂): 6 ♂, Same label data as holotype except, “2–9 Mar. 1992”, “CRI000, 414805”, “Slide No. 769”, “CRI000,414789”, “Slide No. 770”; “3–9 Feb. 1992”, “CRI000, 537631”, “Slide No. 762”; “Jul. 1991, “CRI000, 300184”, “PARATYPE, *Glyphidocera guaroa* Adamski”, “Slide No. 1075”; “10 Set. 22 Oct 1990”, “CRI000, 628172”, “Slide No. 757”; Ene 1995, C. Moraga, L-N-329950, 380450, # 4354”, “CRI002, 131715”, “PARATYPE, *Glyphidocera guaroa* Adamski”, “Slide No. 1076”; 2 ♂, “COSTA RICA, Heredia, Est. Biológica, La Selva, 50–150 m, 10°26'N,84°01'W, Apr.

1996, INBio-OET”, 22 Abril 1996, L/00/221, CES 200 m”, “CRI002, 061202”, “ Slide No. 869”; “13 Marzo 1996, L/00/184, Sura 350 m”, “CRI002, 058005”, “Slide No. 871”; 1 ♂, “Est. Magsasay, P. N. Braulio Carrillo, 200 m, Prov. Here., COSTA RICA, R. Aguilar, Abr. 1991, L-N- 264000, 531100”, “CRI000, 275070”, “PARATYPE, *Glyphidocera guaroa* Adamski”, “Slide No. 1067”; 1 ♂, “Sector Cerro Cocori, Fca. de E. Rojas, 150 m, Prov. Limón, COSTA RICA, Feb. 1993, E. Rojas, L-N-286000, 567500”, “PARATYPE, *Glyphidocera guaroa* Adamski”, “Slide No. 1036”, (5 in INBio, 5 in USNM).

Distribution (Map 17): *Glyphidocera eminentiae* is known from five collecting sites in northern Costa Rica; two nearby sites in the north-west along the Cordillera de Guanaacaste, two nearby sites in the north-central part of the country along the Cordillera Central, and one site half way between Tortuguero and Barra del Colorado.



**MAP 17.** Distribution of *Glyphidocera eminentiae* (●). Outlying circles indicate multiple adjacent localities.

Etymology: The species epithet *eminentiae* is derived from the Latin “eminentia,” meaning prominence.

### ***Glyphidocera brumae*, new species**

(Figs. 93–95, 318, Map 18)

Diagnosis.— *Glyphidocera brumae* is similar to *G. dictionis* but differs from the latter by having a larger uncus, a longer apical furca of the valval costa, and a straight outer margin of the cucullus of the valva.

Description.— Head: Vertex and frontoclypeus grayish yellow intermixed with few dark-brown scales laterally; outer surface of labial palpus dark brown intermixed with

brownish-yellow scales to margin of segment II, inner margin pale brownish yellow intermixed with few dark-brown scales; scape of antenna brownish yellow intermixed with few dark-brown scales, flagellum with alternating pale brownish-yellow and pale-brown bands; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brownish yellow.

Thorax: Tegula and mesonotum pale brownish yellow. Legs grayish yellow intermixed with few dark-brown scales, grayish yellow along apical margins of all segments and tarsomeres or dark brown intermixed with few pale brownish-yellow scales to near apical margins of all segments and tarsomeres. Forewing (Fig. 318): Length 6.0–7.0 mm (n = 21), grayish yellow intermixed with few dark-brown scales; cell with 2 large, dark-brown spots, 1 near middle, 1 near distal end; one small spot on CuP posterior to midcell spot; marginal spots present or absent. Undersurface brown except, brownish yellow along costa. Hindwing: Pale gray.

Abdomen (Fig. 93): Male with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3, and two elliptical-shaped clusters of sex scales on dorsolateral surface of intersegmental membrane between terga 3–4.

Male Genitalia (Figs. 94–95): Uncus elongate, wide at base, constricted broadly near midlength, widely rounded distally, tapering to rounded and setose apex; gnathos protuberant, distally upturned; tegumen slightly widened basally; dorsal strut with arms convergent medially, fused from posteroventral margin to base of uncus; costa of valva slightly broadly emarginate from a shallow depression beyond a slightly curved, digitate process to a slightly raised subapical part; apical furca acuminate, slightly upturned; sacculus twisted apically, constricting valva near midlength, widened distally forming an elongate and narrow cucullus; cucullus membranous and setose with a nearly truncate outer margin; vesica of aedeagus sparsely denticulate, bearing an apical cornutus; cornutus as wide as long, with one side shortened, exposing a wide and hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, Nov. 1993, INBio-OET” “16 Noviembre 1993, Lab clearing, L/04/085”, “INBio: COSTA RICA: CRI001, 258476” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 872” [yellow label].

Paratypes (20 ♂): 1 ♂, Same label data as holotype except, “16 Noviembre 1993, Arboleda, L/05/087”, “CRI001, 240910”; 1 ♂, “16 Ene. 1993, Bosque primario, L0014”, “CRI001, 219886”; 4 ♂, “28 Junio 1994, Lab area, L/04/106”, “CRI001, 243680”; “30 Junio 1994, Lab area, L/04/110”, “CRI001, 243770”; “27 Junio 1994, Arboleda, L/05/105”, “CRI001, 244167”; “28 Junio 1994, Bosque primario, L/006/107”, “CRI001, 243967”; 1 ♂, “2 Julio 1994, Lab area, L/04/114”, “CRI001, 244272”; 1 ♂, “4 Marzo 1996, L/05/174, Arboleda”, “CRI001, 250689”; 1 ♂, “6 Feb. 1996, Arboleda, L/05/124”, “CRI001, 249819”; 2 ♂, “8 Feb. 1996, L/05/130, Arboleda”, “CRI002, 058654”,

“CRI002, 058643”; 1 ♂, “12 Feb. 1996, L/05/141, Arboleda”, “CRI002, 058754”; 2 ♂, “19 Feb. 1996, L/05/159, Arboleda”, “CRI001, 250067”, “CRI001, 250062”; 1 ♂, “6 Feb. 1996, Biblioteca, L/04/122”, “CRI001, 249720”; 1 ♂, “18 Feb. 1996, L/04/156, Biblioteca”, “CRI001, 258374”; 1 ♂, “17 Feb. 1996, L/04/153”, “CRI002, 058854”; 2 ♂, “22 Abril 1996, L/04/220, Biblioteca”, “CRI002, 060993”, “L/05/222, Arboleda”, “CRI002, 060719”; 1 ♂, “19 Marzo 1996, L/04/188”, “CRI001, 257392”, (14 in INBio, 6 in USNM).

Distribution (Map 18): *Glyphidocera brumae* is known from one collecting site in north-central Costa Rica north of the Cordillera Central.



**MAP 18.** Distribution of *Glyphidocera brumae* (▲) and *G. plebis* (●). Outlying circles indicate multiple adjacent localities.

Etymology: The species epithet *brumae* is derived from the Latin “bruma,” meaning winter solstice.

### *Glyphidocera plebis*, new species

(Figs. 96–98, 319, Map 18)

Diagnosis.— *Glyphidocera plebis* is most similar to *G. arae* but differs from the latter by having with larger sex scales between abdominal terga 2–3 in male, a tegumen with a less developed dorsal strut, a narrower cucullus of the valva, and a longer apical furca of the valval costa.

Description.— Head: Vertex and frontoclypeus brownish orange; outer surface of labial palpus dark brown intermixed with brownish-orange scales, segment II with brownish-orange scales along apical margin; inner surface pale brownish intermixed with few

dark-brown scales; scape of antenna brownish orange intermixed with few dark-brown scales, flagellum with alternating bands of pale brownish-orange and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6 [setiform scales closing concavity on apex of protuberance of 4<sup>th</sup> flagellomere missing]; proboscis pale brownish orange.

Thorax: Tegula and mesonotum brownish orange or brownish orange intermixed with dark-brown scales. Legs brownish orange intermixed with dark-brown scales, and brownish-orange scales along apical margin of all segments and tarsomeres. Forewing (Fig. 319): Length 5.0–5.8 mm (n = 10), brownish orange intermixed with few dark-brown scales; cell with 3 dark-brown spots, 1 near middle, 2 near distal end; posterior spot near distal end slightly basal to anterior spot; marginal spots present or absent. Undersurface brown except brownish orange along costa. Hindwing: Pale gray.

Abdomen (Fig. 96): Male with 4 transverse, irregular rows of large-sized sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 97–98): Uncus elongate, wide at base, broadly constricted near midlength, apex narrowly rounded; gnathos densely setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially from posteroventral margin of tegumen, atrophied dorsally near midway from base of uncus; costa of valva broadly emarginate from a shallow depression beyond a slanted, digitate process to apical furca; furca acuminate, upturned, slightly longer than width of distal valva; sacculus twisted apically slightly before midlength, constricting valva, widening distoventrally, forming an elongate and narrow cucullus; cucullus membranous and setose; vesica denticulate, bearing an elongate, horn-like, apical cornutus; cornutus shortened near 2/3 length, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Quepos, 120 m, P[arque] N[acional] Manuel Antonio, Prov[incia] Punt[arenas], COSTA RICA, G. Varela & R. Zuniga, Dic. 1990, L-S-370900, 449800”, “INBio: COSTA RICA: CRI000, 228218” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 545” [yellow label].

Paratypes (9 ♂): 4 ♂, Same label data as holotype except, “Feb. 1991, R. Zuniga”, “CRI000, 347185”, “Slide No. 486”; “CRI000, 346833”, “Slide No. 488”; “CRI000, 347073”, “Slide No. 539”; “CRI000, 625775”, “Slide No. 540”; 2 ♂, “80 m, May 1993, G. Varela, # 2140”, “CRI001, 732001”, “Slide No. 569”; “CRI001, 732002”, “Slide No. 485”; 1 ♂, “120 m, G. Varela & R. Zuniga, Dic. 1990, L-S-370900, 449800”, “CRI000, 229082”, “Slide No. 538”; 1 ♂, “140 m, Oct. 1990, L-S-371500, 449450”, “CRI000, 222984”, “Slide No. 546”; 1 ♂, “Est. Queb. Bonita, 50 m, Res. Biol. Carara, Prov. Punt., COSTA RICA, R. Zuniga, Feb. 1991, L-N-194500, 469850”, “CRI000, 680027”, “Slide No. 595”, (4 in INBio, 5 in USNM).

Distribution (Map 18): *Glyphidocera plebis* is known from collecting sites along coastal south-central Costa Rica.



Etymology: The species epithet *plebis* is derived from the Latin “plebes,” meaning the multitude.

***Glyphidocera lawrenceae*, new species**

(Figs. 99–99a, 100–101, 320, Map 19)

Diagnosis.— Relationships between *Glyphidocera lawrenceae* and its congeners are difficult to determine because of the unique features possessed by the former that include a narrow, transverse, sclerotized band between terga 2–3 and terga 3–4, posterior margin of fourth tergum emarginate medially, a pair of piliform sex-scale bundles on posterolateral margins of segment eight in male, small gnathos, a long digitate process of the valva, valva acutely constricted near 3/4 length, costa of valva curved dorsolaterally, and vesica of aedeagus with an elongate and narrow apical cornutus.

Description.— Head: Vertex and frontoclypeus pale yellowish orange; outer surface of labial palpus brown intermixed with pale yellowish-orange scales to apical margin of segments I–II, inner surface pale yellowish orange; scape and flagellum of antenna pale yellowish orange; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale yellowish orange.

Thorax: Tegula and mesonotum yellowish orange. Legs pale yellowish orange intermixed with few brown scales. Forewing (Fig. 320): Length 5.9 mm (n = 1), yellowish orange intermixed with pale-yellow scales and few brown scales along costa and area beyond cell; cell with 2 brown spots, 1 near middle, 1 near distal end. Undersurface pale brown intermixed with pale yellowish-orange scales along submarginal and marginal areas. Hindwing: Pale brown.

Abdomen (Fig. 99–99a): Male with a narrow, transverse, sclerotized band between terga 2–3 and terga 3–4; posterior margin of fourth tergum emarginate medially; eighth segment with two bundles of elongate piliform sex scales, each on posterolateral margin.

Male Genitalia (Figs. 100–101): Uncus elongate, broadly constricted above a wide base, slightly widened apically, apex setose and acuminate; gnathos sparsely setose, protuberant, narrow throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially beneath base of uncus; costa of valva slightly downcurved from about 2/3; costa with a basally wide and acuminate apical furca; base of costa with a straight, elongate, digitate process; sacculus twisted apically, constricting valva near 3/4, widening distoventrally, forming an angular cucullus; cucullus membranous and setose; outer margin S-shaped; vesica of aedeagus denticulate [some large], bearing a narrow, elongate, apical cornutus.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, Jan. 1994, INBio-OET” “10 Enero 1994, bosque secundario, L/06/091”, “INBio: COSTA RICA: CRI001, 258941” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 898” [yellow label].

Distribution (Map 19): *Glyphidocera lawrenceae* is known from one collecting site in north-central Costa Rica, north of San José.



MAP 19. Distribution of *Glyphidocera lawrenceae* (●) and *G. lanae* (▲).

Etymology: *Glyphidocera lawrenceae* is named in honor of Linda H. Lawrence, former scientific illustrator, Systematic Entomology Laboratory, USDA, Washington, DC, and friend.

***Glyphidocera lanae*, new species**

(Figs. 102–104, 321, Map 19)

Diagnosis.— *Glyphidocera lanae* is similar to *G. notae* but differs from the latter by having abdominal sex scales between terga 2–3 and terga 3–4 in male, and a narrower cucullus.

Description.— Head: Scales of vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus brown intermixed with pale-brown scales, segment II with pale-brown scales along apical margin; inner surface pale brown intermixed with few brown scales; scape of antenna brown intermixed with few pale-brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brown.

Thorax: Tegula and mesonotum brown intermixed with few brown scales tipped with pale brown. Legs brown intermixed with brown scales tipped with pale brown, and pale-brown scales to apical margins of all segments and tarsomeres. Forewing (Fig. 321): Length 6.0–6.9 mm (n = 2), pale brown intermixed with brown scales tipped with pale brown and few brown scales; area between crossvein of cell and outer margin darkly patterned; cell with 2 large brown spots, 1 near middle, 1 near distal end; one short, brown streak along CuP, posterior and slightly basal to midcell spot. Undersurface brown except, pale brown along costal margin. Hindwing: Grayish brown.

Abdomen (Fig. 102): Male with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3 and between terga 3–4.

Male Genitalia (Figs. 103–104): Uncus elongate, base wide, constricted near 2/3, widening apically, apex setose and acuminate; gnathos sparsely setose, protuberant; narrow throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a wide base, fusing narrowly at midlength, gradually widening to base of uncus; costa of valva nearly straight from a shallow depression beyond a slanted, digitate process to a downturned apical furca; furca falcate, nearly as long as width of distal valva; sacculus twisted apically, constricting valva near middle, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus sparsely denticulate, bearing moderately large, crescent-shaped cornutus; cornutus with one side shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Carrillo, 700 m, P[arque] N[acional] Braulio Carrillo, Prov[incia] S[an] José, COSTA RICA, I curso Microlepidoptera, Jul. 1990, L-N-236700, 541800”, “INBio: COSTA RICA: CRI000, 067341” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 842” [yellow label]. Holotype is missing labial palpi and antennae.

Paratype 1 ♂, “Same label data as holotype except, “CRI000, 067325”, “Slide No. 834.”

Distribution (Map 19): *Glyphidocera lanae* is known from one collecting site in north-central Costa Rica along the Cordillera Central.

Etymology: The species epithet *lanae* is derived from the Latin “lana,” meaning wool.

### ***Glyphidocera notae*, new species**

(Figs. 105–107, 322, Map 20)

Diagnosis.— *Glyphidocera notae* is most similar to *G. lanae* but differs from the latter by having abdominal sex scales between terga 2–3 in male, and a broader valval cucullus.

Description.— Head: Scales on vertex and frontoclypeus grayish brown tipped with pale grayish brown; outer surface of labial palpus brown intermixed with pale grayish-yellow scales to apical margin of segment II, inner surface pale grayish yellow intermixed

with few brown scales; scape pale grayish brown intermixed with few brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale grayish brown.

Thorax: Tegula and mesonotum pale grayish brown. Legs brown intermixed with pale brownish-yellow scales to apical margins of all segments and tarsomeres [some specimens with hindlegs pale brownish yellow with banding absent]. Forewing (Fig. 322): Length 6.5–7.9 mm (n = 21), pale brownish yellow intermixed with few brown scales; cell with 2 large, brown spots, 1 near middle, 1 near distal end; one spot one CuP basal to midcell spot; marginal spots present or absent. Undersurface brown except, pale grayish-brown scales along costa. Hindwing: Pale gray intermixed sparsely with pale brownish-yellow scales.

Abdomen (Fig. 105): Male with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 106–107): Uncus elongate, wide at base, broadly constricted near midlength, broadly rounded apically, apex narrowly rounded and setose; gnathos setose, protuberant, narrow throughout length, upturned apically; tegumen slightly widened basally, dorsal strut of tegumen with arms convergent, fusing medially, gradually widening at constriction, beneath base of uncus; costa of valva broadly sloped downwards from a shallow depression slightly beyond a slanted, basal digitate process to apical furca; furca falcate; sacculus twisted apically, constricting valva slightly before midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus sparsely denticulate, bearing a stout, crescent-shaped, apical cornutus; cornutus slightly shortened on one side, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Cacao, 1000–1400 m, Lado Suroeste del Volcán Cacao, Prov[incia] Guan[acaste], COSTA RICA, C. Chaves, 25 Set.–11 Oct. 1990, L-N-323300, 375700”, “INBio: COSTA RICA: CRI000, 390173” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 934” [yellow label].

Paratypes (20 ♂): 9 ♂, Same label data as holotype except, “CRI000, 390180”, “Slide No. 935”; “CRI000, 590757”, “Slide No. 938”; “CRI000, 390188”, “Slide No. 942”; “CRI000, 390220”; “CRI000, 390356”; “CRI000, 390164”; “CRI000, 390218”; “CRI000, 577747”; “CRI000, 590634”; 2 ♂, “Set. 1991”, “CRI000, 357390”, “Slide No. 949”; “CRI000, 357305”, “Slide No. 937”; 6 ♂, “Abr. 1991”, “CRI000, 319517”, “Slide No. 933”; “CRI000, 319838”, “Slide No. 936”; “CRI000, 319437”; “CRI000, 328822”; “CRI000, 319697”; “CRI000, 319530”; “23 Oct.–9 Nov. 1990”, “CRI000, 316216”, “Slide No. 944”; “CRI000, 316269”; “CRI000, 315887”, (11 in INBio, 9 in USNM).

Distribution (Map 20): *Glyphidocera notae* is known from a single locality in north-western Costa Rica along the Cordillera de Guanacaste.



**MAP 20.** Distribution of *Glyphidocera notae* (●) and *G. cenae* (▲).

Etymology: The species epithet *notae* is derived from the Latin “nota,” meaning mark.

***Glyphidocera cenae*, new species**

(Figs. 108–110, 323, Map 20)

Diagnosis.— Relationships between *Glyphidocera cenae* and its congeners are difficult to determine because of the unique combination of features possessed by the former that include male abdomen absent of sex scales in male, a valva with a long falcate costal furca, and vesica of aedeagus with an apical cornutus with a bulbous base.

Description.— Head: Vertex and frontoclypeus with scales brown tipped with pale brown; labial palpus with outer surface brown intermixed with few brown scales tipped with pale-brown, and pale-brown scales; inner surface as above, except paler; scape of antenna brown intermixed with brown scales tipped with white and pale-brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere not protuberant, 5<sup>th</sup> and 6<sup>th</sup> flagellomeres slightly excavated; proboscis with brown scales tipped with pale brown.

Thorax: Tegula and mesonotum with brown scales tipped with pale brown. Legs brown intermixed with few pale-brown scales. Forewing (Fig. 323): Length 9.0 mm (n = 1), with brown scales tipped with pale brown; cell with 2 faint brown spots, 1 near middle, 1 near distal end. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 108): Male with sex scales absent.

Male Genitalia (Figs. 109–110): Uncus elongate, broadly constricted near ½ length, apically rounded, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut

of tegumen with arms convergent, fusing medially from posteroventral margin to base of uncus; valva with costa broadly downturned from a shallow depression slightly beyond a slanted, basal digitate process to apical furca; furca falcate, with a broad base; sacculus twisted apically, constricting valva near slightly before midlength, widening distoventrally, forming an elongate, broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a conical cornutus with an abruptly dilated base; cornutus with one side shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, "Sector Cerro Cocori, F[in]ca de E. Rojas, 150 m, Prov[incia] Limón, COSTA RICA, Oct. 1992, E. Rojas, L-N-286000, 567500", "INBio: COSTA RICA: CRI000, 784370" [bar code label], "INBio, ♂ Genitalia Slide by D. Adamski, No. 694" [yellow label].

Distribution (Map 20): *Glyphidocera ceneae* is known from one collecting site in north-central Costa Rica, inland from the Caribbean Sea near the border of Nicaragua.

Etymology: The species epithet *ceneae* is derived from the Latin "cena," meaning dinner.

#### ***Glyphidocera minarum*, new species**

(Figs. 111–113, 324, Map 21)

Diagnosis.— *Glyphidocera minarum* is most similar to *G. plumae* but differs from the latter by having a narrower base of the digitate process of the valva, a wider valval cucullus, and a larger apical cornutus of the aedeagal vesica.

Description.— Head: Vertex and frontoclypeus pale yellow; labial palpus with outer surface brown intermixed with few pale-yellow scales, segment II with pale-yellow scales to near apical margin; inner margin pale yellow intermixed with few brown scales; scape of antenna brown intermixed with pale-yellow scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere distally dilated, protuberant and curved, forming a deep concavity opposite deeply excavated flagellomeres 5–6; proboscis pale yellow.

Thorax: Tegula and mesonotum brown. Legs brown with pale-yellow scales to apical margins of all segments and tarsomeres. Forewing (Fig. 324): Length 6.9 mm (n = 1), pale brown intermixed with few brown scales [most specimens are slightly rubbed]. Undersurface brown. Hindwing: Elongate pale-yellow scales except, with brown scales between basal half of Rs and anterior part of cell.

Abdomen (Fig. 111): Male with 4 transverse, irregular rows of sex scales on intersegmental areas between terga 2–3 and terga 3–4. Sex scales between terga 2–3 about of equal size as sex scales between terga 3–4.

Male Genitalia (Figs. 112–113): Uncus elongate, wide at base, slightly constricted at 1/3, laterally rounded apically, apex attenuate and setose; gnathos sparsely setose, protuber-

ant, wide basally, abruptly narrowed, forming a knoblike, apical process; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a wide base, fusing medially and broadly from posteroventral margin to base of uncus; valva nearly straight from a shallow depression slightly beyond a slanted, basal, digitate process to apical furca; furca falcate, with a wide base; sacculus twisted apically, constricting valva before midlength, widening distoventrally, forming an elongate and broadly widened cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing an elongate, conical, apical cornutus; cornutus abruptly dilated basally, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, Aug. 1993, INBio-OET” “18 Agosto 1993, Arboleola, L/05/063”, “INBio: COSTA RICA: CRI001, 234693” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 897” [yellow label].

Distribution (Map 21): *Glyphidocera minarum* is known from one collecting site in north-central Costa Rica, north of San José.



**MAP 21.** Distribution of *Glyphidocera minarum* (●) and *G. ciatae* (▲). White triangle within a black circle indicates a shared locality.

Etymology: The species epithet *minarum* is derived from the Latin “minarus,” meaning threats.

### ***Glyphidocera ciatae*, new species**

(Figs. 114–116, 325, Map 21)

Diagnosis.— *Glyphidocera ciatae* is most similar to *G. lupae* but differs from the latter by having a wider and more setose gnathos, a longer digitate process of the valva, a wider cucullus of the valva, and a smaller apical cornutus of the aedeagal vesica.

Description.— Head: Scales of vertex and frontoclypeus with brown scales tipped with pale brown; outer surface of labial palpus pale brown intermixed with few brown scales, inner surface pale brown; scape of antenna pale brown, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere distally dilated, protuberant and curved, forming a deep concavity opposite deeply excavated flagellomeres 5–6; concavity nearly closed by setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brown.

Thorax: Scales of tegula and mesonotum brown tipped with pale brown. Legs brown intermixed with pale-brown scales to near apical margins of all segments and tarsomeres. Forewing (Fig. 325): Length 7.1 mm (n = 1), pale brown intermixed with brown scales; cell and surrounding areas paler than marginal areas. Undersurface brown. Hindwing: Pale brown from base, gradually darkening to apex.

Abdomen (Fig. 114): Male with 4 transverse, irregular rows of sex scales on intersegmental areas between terga 2–3 and terga 3–4. Sex scales between terga 2–3 appear slightly larger than sex scales between terga 3–4.

Male Genitalia (Figs. 115–116): Uncus elongate, wide at base, slightly constricted near 1/3, parallelsided apically, apex acuminate and setose; gnathos setose, protuberant, moderately wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a wide base, fusing halfway between posteroventral margin and base of uncus; valva with costa nearly straight throughout length, apical furca falcate, about as long as width of distal valva; base of costa bearing a slanted, digitate process; sacculus twisted apically, constricting valva slightly before midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, with a conical cornutus; cornutus with a shortened side, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, Mar. 1996, INBio-OET” “21 Marzo 1996, L/04/192, Biblioteca”, “INBio: COSTA RICA: CRI002, 058367” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 912” [yellow label].

Distribution (Map 21): *Glyphidocera ciatae* is known from one collecting site in north-central Costa Rica, north of San José.

Etymology: The species epithet *ciatae* is derived from the Latin word for box - *ciata*.

### ***Glyphidocera lupae*, new species**

(Figs. 117–119, 326, Map 22)

Diagnosis.— *Glyphidocera lupae* is most similar to *G. ciatae* but differs from the latter by having a spatulate gnathos, a shorter digitate process of the valva, a narrower valval cucullus, and a larger apical cornutus of the aedeagal vesica.



Description.— Head: Vertex and frontoclypeus pale brownish yellow; outer surface of labial palpus pale yellowish brown intermixed with few brown scales, outer surface pale yellowish brown; scape and flagellum of antenna pale yellowish brown; male 4<sup>th</sup> flagellomere distally dilated, protuberant and curved, forming a deep concavity opposite deeply excavated flagellomeres 5–6; concavity nearly closed by setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brownish yellow.

Thorax: Tegula and mesonotum pale brownish yellow. Legs pale brownish yellow or pale brownish yellow intermixed with few brown scales. Forewing (Fig. 326): Length 6.1–6.9 mm (n = 4), pale brownish yellow or pale brownish yellow intermixed with few brown scales; cell with 2 spots, 1 near middle, 1 near distal end [specimens with spots present or absent]; marginal spots present or absent. Undersurface pale brownish yellow intermixed with few brown scales. Hindwing: Pale brownish yellow.

Abdomen (Fig. 117): Male with 4 transverse, irregular rows of equal-sized sex scales on intersegmental membrane between terga 2–3 and terga 3–4.

Male Genitalia (Figs. 118–119): Uncus elongate, wide at base, parallelsided apically, apex slightly rounded and setose; gnathos sparsely setose, protuberant, wide basally, gradually narrowed to a spatulate apex; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing midway between posteroventral margin of tegumen, gradually widening to base of uncus; costa of valva nearly straight, apical furca falcate; base of costa bearing a slanted, digitate process; sacculus twisted apically, constricting valva slightly before midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, with several small spinelike cornuti, and bearing an elongate, conical, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Monumento Nacional Guayabo, Prov[incia] Carta[go], COSTA RICA, 1100 m, 28 Set.–21 Nov. 1994, G. Fonseca, L-N-217400, 570000, # 3285”, “INBio: COSTA RICA: CRI002, 024744” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 523” [yellow label].

Paratypes (3 ♂): 1 ♂, Same label data as holotype except, “Nov. 1994, # 3287”, “CRI002, 092549”, “Slide No. 519”; “Parque Nacional Braulio Carrillo, Estac. Carrillo, 700 m, San José, COSTA RICA, Julio 1990, I Curso Microlepidoptera”, “CRI000, 171159”, “Slide No. 843”, “CRI000, 171119”, “Slide No. 845”, (2 in INBio, 1 in USNM).

Distribution (Map 22): *Glyphidocera lupae* is known from two collecting sites in north-central Costa Rica along the Cordillera Central.

Etymology: The species epithet *lupae* is derived from the Latin “lupa,” meaning a she-wolf.



**MAP 22.** Distribution of *Glyphidocera lupae* (●) and *G. plumae* (▲). White triangle within a black circle indicates a shared locality.

***Glyphidocera plumae*, new species**

(Figs. 120–122, 327, Map 22)

**Diagnosis.**— *Glyphidocera plumae* is most similar to *G. minarum* but differs from the latter by having a wider base of the digitate process of the valva, a narrower valval cucullus, and a smaller apical cornutus of the aedeagal vesica.

**Description.**— **Head:** Scales of vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus pale brown intermixed with few brown scales, inner surface pale brown; scape pale brown intermixed with few brown scales, flagellum pale brown; male 4<sup>th</sup> flagellomere not protuberant, 5<sup>th</sup> and 6<sup>th</sup> flagellomeres slightly excavated; proboscis pale brown.

**Thorax:** Tegula and mesonotum pale brown. Legs pale brown [many scales missing]. **Forewing** (Fig. 327): Length 7.6 mm (n = 1), pale yellow intermixed with pale brown and few brown scales. Undersurface pale brown. **Hindwing:** Pale brown.

**Abdomen** (Fig. 120): Male with 4 transverse, irregular rows of sex scales on intersegmental areas between terga 2–3 and terga 3–4. Sex scales between terga 2–3 appear equal in size as sex scales between terga 3–4.

**Male Genitalia** (Figs. 121–122): Uncus elongate, wide at base, broadly constricted above base, broadly rounded apically, apex acuminate and setose; gnathos setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing from posteroventral margin, and gradually widening to base of uncus; valva with costa straight from a shallow depression slightly beyond a slanted, basal, digitate process to apical furca; furca falcate, with a wide base; sacculus twisted apically, constricting valva near midlength, widening distoventrally,

forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a small conical, apical cornutus, with a large dilated and hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, Feb. 1996, INBio-OET” “26 Feb. 1996, L/04/164, Biblioteca”, “INBio: COSTA RICA: CRI002, 057272” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 913” [yellow label].

Distribution (Map 22): *Glyphidocera plumae* is known from one collecting site in north-central Costa Rica, north of San José.

Etymology: The species epithet *plumae* is derived from the Latin “pluma,” meaning feather.

### ***Glyphidocera burpurae*, new species**

(Figs. 123–125, 328, Map 23)

Diagnosis.— Relationships between *Glyphidocera burpurae* and its congeners are difficult to determine because of the unique combinations of features possessed by the former that include, with 4 short, transverse, irregular rows of sex scales on medial surface of intersegmental area between terga 2–3 in male, a wide gnathos, a valva with a basally widened and falcate costal furca, and an elongate and narrow apical cornutus of the aedeagal vesica.

Description.— Head: Scales of vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus brown intermixed with few pale-brown scales, segment II with pale-brown scales along apical margin; inner surface pale brown intermixed with few brown scales; scape of antenna brown intermixed with few pale-brown scales, flagellum with alternating bands of pale-brown and brown scales; male 4<sup>th</sup> flagellomere distally dilated, protuberant and curved, forming a deep concavity opposite deeply excavated flagellomeres 5–6; proboscis pale brown.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with pale-brown scales along apical margins of all segments and tarsomeres. Forewing (Fig. 328): Length 5.0–5.2 mm (n = 3), brown intermixed with pale-brown scales; cell with 2 faint brown spots, 1 spot near middle, 1 spot near distal end. Undersurface brown. Hindwing: Darker brown than forewing.

Abdomen (Fig. 123): Male with 4 short, transverse, irregular rows of sex scales on medial surface of intersegmental area between terga 2–3.

Male Genitalia (Figs. 124–125): Uncus elongate, wide at base, gradually narrowed near 1/4, parallsided apically, apex narrowly rounded and setose; gnathos protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially and narrowly from posteroventral mar-

gin to base of uncus; costa of valva slightly upturned from a shallow depression beyond a basal digitate process to apical furca; furca falcate, with a wide base, and a small toothlike process beneath on posteroventral margin; sacculus twisted apically near midlength, constricting valva, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus sparsely denticulate, bearing a conical, apical cornutus; cornutus with a shortened side near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Sirena, 0–100 m, P[arque] N[acional] Corcovado, Prov[incia] Punt[arenas], COSTA RICA, G. Fonseca, Jun. 1991, L-S-270500, 508300”, “INBio: COSTA RICA: CRI000, 646538” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 790” [yellow label].

Paratypes (2 ♂): 1 ♂, Same label data as holotype except, “CRI000, 587986”, “Slide No. 788”; 1 ♂, “May”, “CRI000, 646539”, “Slide No. 796”, (1 in INBio, 1 in USNM).

Distribution (Map 23): *Glyphidocera burpurae* is known from one coastal collecting site in southeastern Costa Rica, south of the Osa Peninsula.



MAP 23. Distribution of *Glyphidocera burpurae* (●) and *G. animae* (▲).

Etymology: The species epithet *burpurae* is derived from the Latin “burpura,” meaning royalty.

### *Glyphidocera animae*, new species

(Figs. 126–128, 329, Map 23)

Diagnosis.— *Glyphidocera animae* is most similar to *G. comae* but differs from the latter

by having a basally wider tegumen, a wider dorsal strut of the tegumen, and a less protuberant furcal bifurcation of the valval costa.

Description.— Head: Scales of vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus brown intermixed with pale-brown scales to near apical margin of segment II, inner surface pale brown intermixed with few brown scales; scape of antenna brown intermixed with pale-brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere not protuberant, 5<sup>th</sup> and 6<sup>th</sup> flagellomeres slightly excavated; proboscis pale brown.

Thorax: Tegula and mesonotum with brown scales tipped with pale brown. Legs brown intermixed with pale-brown scales along apical margins of all segments and tarsomeres. Forewing (Fig. 329): Length 5.7–5.8 mm (n = 2), pale brown intermixed with few brown scales; cell with 2 large brown spots, 1 spot near middle, 1 spot near distal end. Undersurface brown. Hindwing: Grayish brown.

Abdomen (Fig. 126): Male with 3 transverse rows of sex scales on intersegmental membrane between terga 2–3 and 4 transverse rows of sex scales on intersegmental membrane between terga 3–4. Sex scales between terga 2–3 appear at least twice the diameter of sex scales between terga 3–4.

Male Genitalia (Figs. 127–128): Uncus elongate, wide at base, broadly constricted near midlength, apical half broadly rounded, gradually narrowing to an acuminate and setose apex; gnathos protuberant, broad basally, slightly narrowed distally, apex emarginate medially; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing from a widened base, and atrophied dorsally; costa of valva broadly rounded medially, upturned distally to dorsal furca; apex bifurcate, V-shaped, each furca about equal in size; sacculus twisted apically, constricting valva slightly before middle, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with many small, spinelike cornuti, and bearing an elongate, apical cornutus; cornutus with one side shortened near 1/4 length, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Quepos, 120 m, P[arque] N[acional] Manuel Antonio, Prov[incia] Punt[arenas], COSTA RICA, G. Varela & R. Zuniga, Oct. 1990, L-S-370900, 449800”, “INBio: COSTA RICA: CRI000, 274812” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 607” [yellow label].

Paratype 1 ♂, “Est. Queb. Bonita, 50 m, Res. Biol. Carara, Prov. Punt., COSTA RICA, R. Zuniga, Jun. 1991, L-N-194500, 469850”, “CRI000, 433588”, “Slide No. 650.”

Distribution (Map 23): *Glyphidocera animae* is known from two collecting sites along coastal, south-central Costa Rica.

Etymology: The species epithet *animae* is derived from the Latin “anima,” meaning breeze.

*Glyphidocera diciae*, new species

(Figs. 129–131, 330, Map 24)

Diagnosis.— Relationships between *Glyphidocera diciae* and its congeners are difficult to determine because of the unique combinations of features possessed by the former that include, with 4 irregular transverse rows of sex scales on intersegmental membrane between terga 2–3 in male, one transverse row of sex scales between terga 3–4 in male [sex scales between terga 2–3 about twice diameter of sex scales between terga 3–4], dorsal strut of tegumen with arms convergent from a widened base fusing dorsally near 1/3 distance between posteroventral margin and base of uncus, and a small toothlike process between the furcal bifurcation of the costal valva.

Description.— Head: Marginal scales of vertex and frontoclypeus dark brown, median scales dark brown tipped with grayish yellow; outer surface of labial palpus dark brown with few grayish-yellow scales to near apical margin of segment II, inner surface dark brown intermixed with grayish-yellow scales mostly along apical margin of segment II, and basal margin of segment III; scape of antenna dark brown, with grayish-yellow scales along apical margin; basal 4 flagellomeres dark brown, remaining flagellomeres brown; male 4<sup>th</sup> flagellomere distally dilated, protuberant and curved, forming a shallow concavity opposite deeply excavated flagellomeres 5–6; concavity nearly closed by setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis dark brown.

Thorax: Tegula and mesonotum dark brown intermixed with dark-brown scales tipped with brown. Foreleg and midleg dark brown intermixed with grayish-yellow scales along apical margins of all segments and tarsomeres; hindleg as above except, tarsomeres grayish yellow. Forewing (Fig. 330): Length 8.1 mm (n = 1), dark brown intermixed with grayish-yellow scales; cell with 2 dark-brown spots, 1 near middle, 1 near distal end. Undersurface brown intermixed with grayish-yellow scales along costa. Hindwing: Brown intermixed with sparse rows of narrow, spatulate, pale grayish-brown scales.

Abdomen (Fig. 129): Male with 4 irregular, transverse rows of sex scales on intersegmental membrane between terga 2–3 and with 1 irregular, transverse row of sex scales between terga 3–4. Sex scales between terga 2–3 about twice diameter of sex scales between terga 3–4.

Male Genitalia (Figs. 130–131): Uncus elongate, wide at base, broadly constricted near midlength, broadly rounded apically, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide throughout length, apex emarginate medially; tegumen slightly widened basally; dorsal strut with arms convergent from a wide base, fusing at 1/3 length, dorsally extending widely to base of uncus; costa of valva slightly emarginate medially from a shallow depression beyond a basal, digitate process to a slightly upturned dorsal furca; apex widely bifurcate, with a small medial toothlike process between furcae; furcae divergent, equal in size; base of costa bearing a digitate process, abruptly downturned apically; sacculus twisted apically, constricting valva slightly near midlength, wid-

ening distoventrally, forming an elongate cucullus; cucullus membranous and setose, with a narrow outer margin; vesica of aedeagus with several small, stout, conical cornuti, and bearing an elongate, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Cacao, Prov[incia] Guana[caste], COSTA RICA, 1100 m, 7–18 Feb. 1995, M. Madrigal, L-N-323100, 375800, # 4709”, “INBio: COSTA RICA: CRI002, 187125” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 941” [yellow label].

Distribution (Map 24): *Glyphidocera diciae* is known from a single collecting site in north-western Costa Rica along the Cordillera de Guanacaste.



**MAP 24.** Distribution of *Glyphidocera diciae* (▲) and *G. comae* (●). Outlying circles indicate adjacent multiple localities.

Etymology: The species epithet *diciae* is derived from the Latin “*dicia*,” meaning power.

### ***Glyphidocera comae*, new species**

(Figs. 132–134, 331, Map 24)

Diagnosis.— *Glyphidocera comae* is most similar to *G. animae* but differs from the latter species by having a basally narrower tegumen, a basally narrower dorsal strut of the tegumen, and a more protuberant furcal bifurcation of the valval costa.

Description.— Head: Scales on vertex and frontoclypeus grayish orange tipped with pale grayish orange; outer surface of labial palpus dark brown intermixed with grayish-orange scales to near apical margin of segment II, inner surface pale grayish orange inter-

mixed with few brown scales; scape of antenna dark brown, or brown intermixed with few grayish-orange scales, flagellum with alternating bands of pale grayish-orange and brown scales; male 4<sup>th</sup> flagellomere distally dilated, protuberant and curved, forming a shallow concavity opposite deeply excavated flagellomeres 5–6; concavity nearly closed by setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale grayish orange.

Thorax: Tegula and mesonotum with scales grayish orange tipped with pale grayish orange. Legs grayish orange intermixed with pale grayish-orange scales to near apical margins of all segments and tarsomeres. Forewing (Fig. 331): Length 6.0–6.8 mm (n = 8), grayish orange intermixed with pale grayish-orange and brown scales; cell and surrounding areas paler than marginal areas; cell with 2 large brown spots, 1 spot near middle, 1 spot near distal end; basal streak, on CuP posterior to midcell spot; marginal spots present or absent. Undersurface brown intermixed with few pale grayish-orange scales along costa. Hindwing: Pale grayish orange.

Abdomen (Fig. 132): Male with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3, and 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 3–4. Sex scales between terga 2–3 are about 3 times larger than the sex scales between terga 3–4.

Male Genitalia (Figs. 133–134): Uncus elongate, wide at base, broadly constricted at 1/3, apically widened to nearly width of base, apex widely acuminate and setose; gnathos setose, protuberant, narrow throughout length, apex rounded; tegumen nearly parallelsided throughout length; dorsal strut of tegumen with arms convergent, fusing from a widened base, extending narrowly to base of uncus; costa of valva nearly straight from a shallow depression beyond a basal digitate process to an upturned and slightly constricted dorsal furca; apex bifurcate, furcae widely divergent, forming a V-shaped inner margin; sacculus twisted apically, constricting valva near midlength, widening distoventrally forming an elongate and narrowly rounded cucullus, cucullus membranous and setose; vesica of aedeagus with several small, stout, conical cornuti, and bearing an elongate, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “P[arque] N[acional] Manuel Antonio, 80 m, Quepos, Prov[incia] Puntarenas, COSTA RICA, Oct. 1992, G. Varela, L-S-370900, 448800”, “INBio: COSTA RICA: CRI000, 935555” [bar code label], “INBio, Genitalia Slide by D. Adamski, No. 568” [yellow label].

Paratypes (7 ♂): 3 ♂, Same label data as holotype except, “R. Zuniga, Ene. 1991”, “CRI000, 366948”, “Slide No. 617”; “120 m, G. Varela & R. Zugina, Nov. 1990, L-S-370900, 449800”, “CRI000, 226893”, “Slide No. 548”; “Dic. 1990, L-S-370900, 449800”, “CRI000, 228205”, “Slide No. 613”; 4 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, Jan. 1993, INBio-OET”, “11 Ene. 1993, Bosque secundario, L0006”, “CRI001, 219245”, “Slide No. 868”; “17 Octubre 1993, Bosque primario, L/01/076”, “CRI001, 239939”, “Slide No. 866”; “1 Julio 1994, Lab. Area, L/04/112”, “CRI001,



244402”, “Slide No. 867”; “11 Marzo 1996, L/00/181, STR 2050 m”, “CRI001, 250751”, “Slide No. 909”, (4 in INBio, 3 in USNM).

Distribution (Map 24): *Glyphidocera comae* is known from three collecting sites in Costa Rica; one north-central site north of the Cordillera Central, and two nearby sites in the south-central part of the country along the coast.

Etymology: The species epithet *comae* is derived from the Latin word for hair - coma.

### ***Glyphidocera gazae*, new species**

(Figs. 135–137, 332, Map 25)

Diagnosis.— *Glyphidocera gazae* can be distinguished from its congeners by a unique combination of features including the male abdomen lacking sex scales, gnathos small, dorsal strut of tegumen widened basally and narrowed gradually to base of uncus, furcae of valval costa widened, and cucullus slightly upturned from valval constriction near distal end.

Description. Head: Scales on vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus brown intermixed with pale-brown scales to margin of segment II, segment III brown; inner margin pale brown intermixed with few brown scales; scape of antenna brown intermixed with few pale-brown scales, flagellum with alternating bands of pale-brown and brown scales; male 4<sup>th</sup> flagellomere distally dilated, protuberant and curved, forming a deep concavity opposite deeply excavated flagellomeres 5–6; proboscis brown.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with few pale-brown scales to near apical margins of all segments and tarsomeres. Forewing (Fig. 332): Length 6.0–7.0 mm (n = 6), pale brown intermixed with brown scales; cell with a small brown spot near distal end. Undersurface brown. Hindwing: Pale yellow intermixed with few pale grayish-brown scales.

Abdomen (Fig. 135): Male with sex scales absent.

Male Genitalia (Figs. 136–137): Uncus elongate, wide at base, broadly constricted near 1/3, broadly rounded distally, apex acuminate; gnathos protuberant, wide basally, gradually narrowed distally, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a widened base, extending dorsally to base of uncus; costa of valva slightly emarginate broadly from a shallow depression beyond a basal digitate process to a slightly upturned dorsal furca; apex bifurcate, each furca about equal in size, divergent; base of costa bearing a slanted, subapically downcurved digitate process; sacculus twisted apically, constricting valva near midlength, slightly widening distoventrally forming an elongate and shallowly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing an elongate, apical cornutus; cornutus with one side shortened near base, slightly exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Pitilla, 700 m, 9 km, S S[an]ta Cecilia, Prov[incia] Guan[acaste], COSTA RICA, C. Moraga, Abr. 1991, L-N-330200, 380200”, “INBio: COSTA RICA: CRI000, 484530” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 760” [yellow label].

Paratypes (5 ♂): 1 ♂, Same label data as holotype except, “19–23 Jun. 1993, P. Rios, # 2175”, “CRI001, 835087”, “Slide No. 764”; 1 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, Jan. 1994, INBio-OET”, “10 Enero 1994, Bosque secundario, L/06/-91”, “CRI001, 258948”, “Slide No. 896”; 1 ♂, “28 Junio 1994, Lab. Area, L/04/106”, “CRI001, 243664”, “Slide No. 915”; 1 ♂, “19 Feb. 1996, Arboleda, L/05/059”, “CRI001, 250075”; 1 ♂, “11 Marzo 1996, L/00/180, STR 1850 m”, “CRI001, 250759”, (3 in INBio, 2 in USNM).

Distribution (Map 25): *Glyphidocera gazae* is known from two collecting sites in Costa Rica; one site in the north-west along the Cordillera de Guanacaste and one site in the north-central part of the country, north of the Cordillera Central.



MAP 25. Distribution of *Glyphidocera gazae* (●) and *G. virgulae* (▲). White triangle within a black circle indicates a shared locality.

Etymology: The specific epithet *gazae* is derived from the Latin “gaza,” meaning royal treasure.

***Glyphidocera virgulae*, new species**

(Figs. 138–140, 283, 333, Map 25)

Diagnosis.— *Glyphidocera virgulae* is most similar to *G. personae* but can be distin-

guished by its wider base of the dorsal strut of the tegumen, longer digitate process of the valva, and more protracted outer margin of the valval cucullus.

Description.— Head: Vertex dark brown; frontoclypeus dark brown intermixed with few yellow scales; outer surface of labial palpus with segments I–II dark brown intermixed with yellow scales, segment III dark brown; inner surface with segments I–II yellow, segment III dark brown; scape of antenna yellow, basal 8–10 flagellomeres yellow, remaining flagellomeres dark brown; male 4<sup>th</sup> flagellomere distally dilated, protuberant and curved, forming a deep concavity opposite deeply excavated flagellomeres 5–6; proboscis yellow.

Thorax: Tegula and mesonotum dark brown. Legs dark brown intermixed with yellowish-brown scales to near apical margins of all segments and tarsomeres. Forewing (Fig. 333): Length 4.0–5.7 mm (n = 31), dark brown. Undersurface dark brown. Hindwing: Dark brown.

Abdomen (Fig. 138): Male with 5 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3 and one transverse row of sex scales on intersegmental membrane between terga 3–4. Sex scales between terga 2–3 at least twice as large as the sex scales between terga 3–4.

Male Genitalia (Figs. 139–140): Uncus elongate, wide at base, broadly constricted near 1/3, broadly rounded apically, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing from a wide base, extending dorsally and widely to base of uncus; costa of valva slightly upturned from shallow depression beyond basal, digitate process to dorsal furca; apex bifurcate, each furca small, widely separate, and about equal in size; sacculus twisted apically, constricting valva slightly beyond midlength, widening distoventrally, forming a broadly rounded and distally protracted cucullus; cucullus membranous and setose; vesica of aedeagus with several small spinelike cornuti, and bearing a large, conical apical cornutus; cornutus with one side shortened, exposing a hollow, basal cavity.

Female Genitalia (Fig. 283): Papillae anales elongate, slightly wider basally than apically; apophysis posterioris and apophysis anterioris about equal in length; eighth sternum about equal in width as eighth tergum; eighth tergum with posterior and anterior margins nearly straight, eighth sternum with posterior margin slightly emarginate medially, anterior margin broadly emarginate; antrum posteriorly enlarged from a constricted anterior part; posterior margin nearly straight, posterolateral margins angular; anterior end with a pair of elongate, spinelike processes within cavity formed from outer wall; ductus bursae short; corpus bursae denticulate within anterior half and slightly wider anteriorly; ductus seminalis large, coiled from base to distal end, coils gradually decreasing in size distally; ductus seminalis with a long, 8-coiled, internal support; side opposite ductus seminalis slightly bulbous with an elongate, platelike, support at base.

Holotype, ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, Feb. 1996, INBio-OET”, “19 Feb. 1996, L/00/156, CES 300 m”,

"INBio: COSTA RICA: CRI001, 250557" [bar code label], "INBio, ♂ Genitalia Slide by D. Adamski, No. 860" [yellow label].

Paratypes (30 ♂): 10 ♂, 12 ♀, Same label data as holotype except, "9 Feb. 1996, L/00/133, CCC 650 m", "CRI001, 249994"; "17 Feb., L/04/153, Biblioteca", "CRI002, 057811", "CRI002, 057812", "♀ Slide No. 862"; "CRI002, 057813" (♀); "22 Feb., L/04/102", "CRI001, 257931"; "11 Marzo, L/00/180, STR 1850 m", "CRI001, 250820"; "L/05/183, Arboleda", "CRI002, 057875"; "L/04/182, Biblioteca", "CRI002, 057742"; "CRI002, 057740" (♀); "L/05/183, Arboleda", "CRI002, 057887", "♀ Slide No. 863"; "13 Marzo, L/04/186, Biblioteca", "CRI002, 058076" (♀); "L/00/187, STR 450 m", "CRI002, 058143"; "19 Marzo, L/00/191, CCC 650 m", "CRI002, 058450" (♀); "21 Marzo, L/00/193, STR 250 m", "CRI002, 058562"; "10 Abril, L/00/211, CES 350 m", "CRI002, 059770"; "22 Abril, L/00/223, SOR 700 m", "CRI002, 061705" (♀); "CRI002, 061708" (♀); "L/00/220, Biblioteca", "CRI002, 060977" (♀); "24 Abril, L/04/226", "CRI061523"; "L/00/227, STR 500 m", "CRI002, 060593" (♀); "9 Ene. 1993, Bosque secundario, L0003", "CRI001, 218927"; "3 Julio 1994, L/00/115", "CRI001, 244388"; 5 ♂, 2 ♀, "Est. Pitilla, 700 m, 9 km, S. Sta. Cecilia, P. N. Guanacaste, Prov. Guan., COSTA RICA, 18 Abr. a 19 May. 1993, P. Rios, L-N-330200, 380200", "CRI001, 398038", "Slide No. 748"; "23–26 Jun., Taller Microlepidoptera, # 2183", "CRI001, 835612"; "Ago. 1992, P. Rios", "CRI000, 844778" (♀); "2–19 Mar., 1992", "CRI000, 727106"; "Ago. 1991, C. Moraga", "CRI000, 537997"; "Nov. 1990, C. Moraga & P. Rios", "CRI000, 313728"; "6–19 Set. 1993, P. Rios, # 2345", "CRI001, 613449", "♀ Slide No. 749"; 1 ♂, "Río San Lorenzo, 1050 m, Tierras Morenas, Z. P. Renorio, Prov. Guanacaste, COSTA RICA, Abril 1992, F. Quesada, L-N-287800, 427600", "Slide No. 506", (21 in INBio, 10 in USNM).

Distribution (Map 25): *Glyphidocera virgulae* is known from two collecting sites in north-western Costa Rica along the Cordillera de Guanacaste and one site in the north-central part of the country, north of the Cordillera Central.

Etymology: The species epithet *virgulae* is derived from the Latin word "virgula" which means wand.

### ***Glyphidocera personae*, new species**

(Figs. 141–143, 334, Map 26)

Diagnosis.— *Glyphidocera personae* is similar to *G. virgulae* but differs from the latter by having a narrower base of the dorsal strut of the tegumen, a shorter digitate process of the valva, and a less protracted outer margin of the valval cucullus.

Description.— Head: Vertex brown; frontoclypeus grayish yellow; outer surface of labial palpus brown intermixed with few grayish-yellow scales, segment II with grayish-yellow scales along apical margin; inner surface pale grayish yellow intermixed with few brown scales; scape of antenna grayish yellow intermixed with few brown scales, flagel-

lum with alternating bands of grayish-yellow and brown scales; male 4<sup>th</sup> flagellomere distally dilated, protuberant and curved, forming a deep concavity opposite deeply excavated flagellomeres 5–6; proboscis pale grayish brown.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with few pale grayish-yellow scales to apical margins of all segments and tarsomeres. Forewing (Fig. 334): Length 5.0–5.1 mm (n = 2), brown intermixed with grayish-yellow and dark-brown scales; cell and surrounding areas paler than marginal areas; cell with 2 dark-brown spots, 1 spot near middle, 1 spot near distal end. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 141): Male with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3, and 1 transverse, irregular row of sex scales between terga 3–4. Sex scales between terga 2–3 appear three times larger than sex scales between terga 3–4.

Male Genitalia (Figs. 142–143): Uncus elongate, wide at base, broadly constricted near midlength, broadly rounded apically, apex acuminate; gnathos setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen convergent from a wide base, fused dorsally midway between posteroventral margin and base of uncus; costa of valva nearly straight from shallow, basal depression beyond a basal, digitate process to an upturned dorsal furca; apex bifurcate, U-shaped margin between furcae, each furca equal in size and parallel; sacculus twisted apically, constricting valva slightly beyond midlength, widening distoventrally forming an elongate and distally protracted cucullus; cucullus membranous and setose, with outer margin broadly rounded; vesica of aedeagus denticulate, with many stout, conical cornuti, and bearing a large, conical, apical cornutus; cornutus with a bulbous basal part with one shortened side, exposing a large, hollow, cavity.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, Apr. 1996, INBio-OET” “22 Abril 1996, L/00/223”, “INBio: COSTA RICA: CRI002, 060743” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 861” [yellow label].

Paratype 1 ♂, “Sector Cerro Cocori, Fca. de E. Rojas, 150 m, Prov. Limón, COSTA RICA, E. Rojas, 31 Ene.–21 Feb. 1992, L-N-286000, 567500”, “CRI000, 785447”, “Slide No. 706.”

Distribution (Map 26): *Glyphidocera personae* is known from two collecting sites in north-central Costa Rica, north of the Cordillera Central.

Etymology: The species epithet *personae* is derived from the Latin “persona,” meaning mask.



**MAP 26.** Distribution of *Glyphidocera personae* (●) and *G. contionis* (▲). White triangle within a black circle indicates a shared locality.

***Glyphidocera contionis*, new species**

(Figs. 144–146, 335, Map 26)

**Diagnosis.**— *Glyphidocera contionis* is most similar to *G. umbrae* but differs from the latter by having a larger pair of costal furcae of the valva, costal furcae that are oriented dorsally, and a narrower valval cucullus.

**Description.**— Head: Vertex and upper frons grayish brown, lower frons pale gray; labial palpus with segments I–II grayish brown intermixed with few pale-yellow scales to near apical margin, segment III grayish brown; inner surface with segments I–II pale yellow, segment III grayish brown intermixed with few pale-yellow scales; scape of antenna pale yellow intermixed with few grayish-brown scales; scape of antenna pale yellow intermixed with few grayish-brown scales, flagellum with alternating bands of pale-yellow and grayish-brown scales; 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; proboscis pale yellow.

**Thorax:** Tegula and mesonotum grayish brown. Legs grayish brown intermixed with few pale-yellow scales to near apical margin of all segments and tarsomeres. Forewing (Fig. 335): Length 5.8 mm (n = 1), grayish brown intermixed with pale-yellow scales and few pale grayish-brown; a small pale-yellow spot near base; costa, cell, and outer marginal scales pale yellow. Undersurface pale grayish brown. Hindwing: Grayish brown.

**Abdomen (Fig. 144):** Male with 3 transverse, irregular rows of sex scales on intersegmental areas between terga 2–3 and terga 3–4. Sex scales between terga 2–3 slightly larger than sex scales between terga 3–4.

**Male Genitalia (Figs. 145–146):** Uncus elongate, wide at base, slightly constricted near 1/3, nearly parallelsided to a narrowly rounded apex; gnathos sparsely setose, protu-

berant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing near 1/3 length between posteroventral margin and base of uncus, atrophied dorsally; valva with costa nearly straight from a basal digitate process to midlength, gradually sloped to an upturned dorsal furca; apex widely bifurcate with margin between furcae nearly U-shaped, furcae upturned, about equal in size, ventral furca slightly curved inwardly; base of costa with a slightly stalked, nearly straight, digitate process; sacculus twisted apically, constricting valva near midlength, slightly widening distoventrally, forming an elongate cucullus; cucullus membranous and setose, with outer margin broadly rounded; vesica of aedeagus with several small, stout, cornuti, and bearing a large, conical, apical cornutus; cornutus a bulbous basal part with a shortened side, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, "Sector Cerro Cocori, F[in]ca de E. Rojas, 150 m, Prov[incia] Limón, COSTA RICA, E. Rojas, Ene. 1992, L-N-286000, 567500", "INBio: COSTA RICA: CRI000, 333815" [bar code label], "INBio, ♂ Genitalia Slide by D. Adamski, No. 686" [yellow label].

Distribution (Map 26): *Glyphidocera contionis* is known from one collecting site in the north-western part of Limón in northern Costa Rica.

Etymology: The species epithet *contionis* is derived from the Latin "contio," meaning an assembly.

### ***Glyphidocera umbrae*, new species**

(Figs. 147–149, 336, Map 27)

Diagnosis.— *Glyphidocera umbrae* is most similar to *G. contionis* but differs from the latter by having smaller costal furcae of valva, costal furcae oriented dorsolaterally, and a wider valval cucullus.

Description.— Head: Vertex brown; frontoclypeus grayish yellow; outer surface of labial palpus with segment I grayish yellow, basal half of segment II brown, distal half grayish brown, segment III brown; inner surface with segments I–II grayish yellow intermixed with few brown scales, segment III brown; scape of antenna grayish yellow intermixed with few brown scales, flagellum with alternating bands of grayish-yellow and brown scales; male with 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; proboscis pale grayish yellow.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with pale grayish-yellow scales to apical margins of all segments and tarsomeres. Forewing (Fig. 336): Length 5.0–5.2 mm (n = 2), brown intermixed with few dark-brown scales; cell with one large dark-brown spot near distal end. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 147): Male with 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3 and terga 3–4. Sex scales between terga 2–3 appear twice the size as those between terga 3–4.

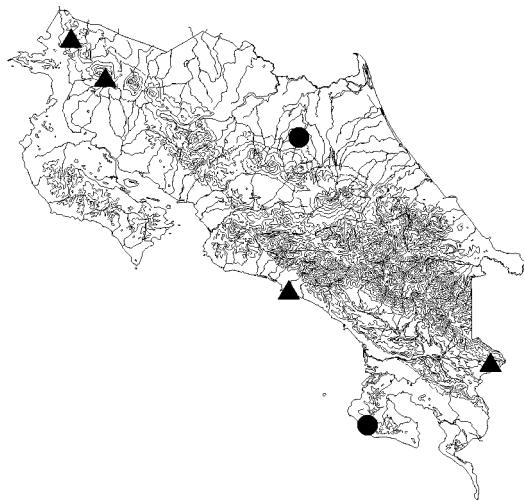
Male Genitalia (Figs. 148–149): Uncus elongate, wide at base, broadly constricted near 1/3, nearly parallelsided apically, apex narrowly rounded; gnathos sparsely setose, protuberant, moderately widened throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing from posteriorventral margin, and slightly atrophied dorsally; costa of valva shallowly emarginate medially from a basal, digitate process to a slightly raised distal part; apex widely bifurcate, each furca parallel; dorsal furca about 1/2 size of ventral furca; margin between furcae U-shaped; sacculus twisted apically, constricting valva near midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus sparsely denticulate, bearing a large, apical cornutus; cornutus with a bulbous base with one side shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Magsasay, P[arque] N[acional] Braulio Carrillo, 200 m, Prov[incia] Here[dia], COSTA RICA, R. Aguilar, Nov. 1990, L-N-264600, 531100”, “INBio: COSTA RICA: CRI000, 226764” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 766” [yellow label].

Paratype 1♂, “Est. Sirena, P. N. Corcovado, 0–100 m, Prov. Punt., COSTA RICA, G. Fonseca, Dic. 1990, L-S-270500, 508300”, “CRI000, 700751”, “Slide No. 798.”

Distribution (Map 27): *Glyphidocera umbrae* (●) and *G. illiterata* Meyrick (▲).



MAP 27. Distribution of *Glyphidocera umbrae* (●) and *G. illiterata* Meyrick (▲).



Etymology: The species epithet *umbrae* is derived from the Latin “umbra,” meaning shade.

***Glyphidocera illiterata* Meyrick, 1929**

(Figs. 150–152, 281, 337, Map 27)

*Glyphidocera illiterata* Meyrick, 1929: 509; Becker, 1984: 41 (checklist).

Diagnosis.— *Glyphidocera illiterata* can be distinguished from its congeners by a unique combination of features that include a short valva, a stout digitate process of the valva, costal furcae of valva widely separate, and dorsal furca of costa about midway between digitate process of valva and ventral furca.

Description.— Head: Vertex dark brown; frontoclypeus dark brown intermixed with few pale-brown scales; outer surface of labial palpus dark brown intermixed with few pale-brown scales to near apical margin of segment II, inner margin dark brown intermixed with few pale-brown scales; scape of antenna dark brown intermixed with few pale-brown scales, flagellum dark brown; male with 4<sup>th</sup> flagellum dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; proboscis dark brown.

Thorax: Tegula and mesonotum dark brown. Legs dark brown intermixed with few pale-brown scales to near apical margins of all segments and tarsomeres. Forewing (Fig. 337): Length 5.2–7.0 mm (n = 15), dark brown intermixed with few brown and pale-brown scales; cell with one large, dark-brown spot near distal end. Undersurface dark brown. Hindwing: Pale brown basally, gradually darkening to brown towards apex.

Abdomen (Fig. 150): Male with 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3 and terga 3–4.

Male Genitalia (Figs. 151–152): Uncus elongate, wide at base, broadly constricted medially, broadly rounded apically, slightly keeled dorsally, apex narrowly rounded; gnathos protuberant, narrow throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing near midlength between posteroventral margin and base of uncus, dorsally divergent slightly and atrophied; costa of valva short, slightly sloped broadly from a shallow depression beyond a short, digitate process to dorsal furca; apex widely bifurcate, distance between furcae about as long as costa; dorsal furca curved outwardly, ventral furca twice as large as dorsal furca, and curved dorsolaterally; sacculus twisted apically slightly beyond midlength, constricting valva, widening distoventrally forming a broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with many stout, conical cornuti, and bearing a large crescent-shaped, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia (Fig. 281): Papillae anales elongate, slightly wider basally than apically; apophysis posterioris and apophysis anterioris about equal in size; eighth sternum

slightly narrower than eighth tergum; eighth sternum with posterior and anterior margins broadly rounded, anterior margin more emarginate medially; eighth tergum with posterior and anterior margins broadly rounded; antrum enlarged posteriorly from a constricted anterior part; posterior margin nearly straight, posterolateral margin angular; anterior part with a pair of short, spinelike processes inside cavity formed from outer wall; ductus bursae short; corpus bursae denticulate, slightly enlarged anteriorly; ductus bursae large, coiled throughout length, coils gradually decreasing in size apically; ductus seminalis with a long, 8-coiled, internal support; side opposite ductus seminalis with an elongate, plate-like, internal support.

Type Examined: Holotype, ♂, “Balboa, Panama, Canal Zone, at light, 19.6.[19]24, St. George Expedn., C.L. Collenette.” “BM Slide No. 5645.” [BMNH].

Other Specimens examined: (11 ♂, 4 ♀) 1 ♂, “Est[ación] Las Pailas, 800 m, P[arque] N[acional] Rincón de la Vieja, Prov[incia] Guan[acaste], COSTA RICA, 24 Nov. a 26 Ene. 1993, J. Sihezlar, G. Rodriguez, L-N-306300, 388600”, “CRI001, 211921”, “♂ Slide No. 495”; 1 ♂, “23 Oct. a 12 Nov. 1992, C. Cano”, “CRI000, 920403”, “Slide No. 500”; 1 ♂, 1 ♀, “Agua Buena, P. N. Guanacaste, Prov. Guana., COSTA RICA, 200 m, 7–12 Feb. 1994, E. Lopez, L-N-334800, 364100, 2692”, “CRI001, 747346”, “♀ Slide No. 496”; “CRI001, 747377”, “Slide No. 494”; 1 ♂, “Quepos, 80 m, P. N. Manuel Antonio, Prov. Punt., COSTA RICA, R. Zuniga, Abr. 1991, L-S-370900, 448800”, “CRI000, 593398”, “Slide No. 618”; 1 ♂, 2 ♀, “Fca. Cafrosa, 1300 m, Est. las Mellizas, P. N. Amistad, Prov. Punt., COSTA RICA, M. Ramirez, Mar 1991, L-S-316100, 596100”, “CRI000, 355262”, “Slide No. 682”; “CRI000, 355393”, “♀ Slide No. 684”; “CRI000, 355278”, “♀ Slide No. 685”; 5 ♂, 1 ♀, Same label data as above except, “Abr.”, “CRI000, 475034”, “Slide No. 683”; 1 ♂, “CRI000, 474676”; 1 ♂, “CRI000, 474630”; 1 ♂, “CRI000, 475017”; 1 ♂, “CRI000, 475106”; 1 ♂, “CRI000, 474553”; 1 ♂, Same label data as above except, “June 1991”, “CRI000, 663689”, (7 in INBio, 7 in USNM).

Distribution (Map 27): In Costa Rica, *Glyphidocera illiterata* is known from four collecting sites from the northwestern part of the country, along the Cordillera de Guanacaste, southeast to the coast in south-central Costa Rica, east to the border near Panamá, along the Cordillera de Talamanca. *G. illiterata* is also known in Panamá from specimens described by Meyrick (1929).

### ***Glyphidocera olivae*, new species**

(Figs. 153–155, 284, 338, Map 28)

Diagnosis.— Relationships between *Glyphidocera olivae* and its congeners are difficult to determine because the former possesses a combination of features that include abdominal sex scales in males between terga 2–3 and terga 3–4 that are subequal in size [fewer sex scales between terga 3–4 than between 2–3], dorsal strut of tegumen with arms fused medially from the posterolateral margin to the base of the uncus, costal furca of the valva protuberant and subequal in size, and the outer margin of the valval cucullus narrowly rounded.

Description.— Head: Vertex pale brownish yellow or pale brownish yellow intermixed with brown scales; frontoclypeus pale brownish yellow; outer surface of labial palpus brown intermixed with pale brownish-yellow scales to apical margin of segment II, segment III pale brownish yellow intermixed with few brown scales; inner surface pale brownish yellow intermixed with few brown scales; scape of antenna brown intermixed with few pale brownish-yellow scales, flagellum with alternating bands of brown and pale brownish-yellow scales; male with 4<sup>th</sup> flagellum dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; proboscis pale brownish yellow.

Thorax: Tegula and mesonotum brownish yellow intermixed with few brown scales. Legs brown intermixed with pale brownish-yellow scales to apical margins of all segments and tarsomeres. Forewing (Fig. 338): Length 4.3–5.5 mm (n = 100), pale brownish yellow intermixed with brownish-orange, brown, and dark-brown scales; cell and surrounding areas paler than marginal areas; cell with 2 brown spots, 1 large spot near middle, and 1 spot near distal end [some specimens with spots present or absent]; dark-brown marginal spots present or absent, if present spots may be fused or separate. Undersurface brown intermixed with brownish-yellow scales along costa. Hindwing: Brownish gray.

Abdomen (Fig. 153): Male with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3 and terga 3–4.

Male Genitalia (Figs. 154–155): Uncus elongate, wide at base, broadly constricted near midlength, broadly rounded apically, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, medially fused widely from posteroventral margin to base of uncus; costa of valva nearly straight from shallow depression beyond a basal, digital process to a slightly upturned dorsal furca; apex bifurcate, with inner margin between furcae narrowly rounded; dorsal and ventral furcae subequal in size, dorsal furca wide, broadly rounded apically, ventral furca narrow, acuminate; sacculus twisted apically, constricting valva near midlength, widening distoventrally, forming a broadly rounded, outwardly protuberant cucullus; cucullus membranous and setose; vesica of aedeagus with many stout, conical cornuti, and bearing a large, conical, apical cornutus; cornutus with a slightly bulbous base, one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia (Fig. 284): Papillae anales elongate, slightly wider basally than apically; apophysis posterioris and apophysis anterioris about equal in length; eighth sternum slightly narrower than eighth tergum; eighth sternum with posterior margin broadly rounded, anterior margin broadly emarginate; eighth tergum with posterior margin broadly rounded, anterior margin broadly emarginate; antrum enlarged posteriorly from a constricted anterior part, posterior margin nearly straight, posterolateral margin angular; anterior end with a pair of elongate, spinelike processes within cavity formed from outer wall; ductus bursae short, sparsely denticulate; corpus bursae slightly enlarged on anterior end,

sparsely denticulate; ductus seminalis large, coiled throughout length, each coil decreasing in size distally, and with a long, 10-coiled, internal support; side opposite ductus bursae with a moderate, platelike internal support.

Holotype, ♂, “Sector Cerro Cocori, F[in]ca de E. Rojas, 150 m, Prov[incia] Limón, COSTA RICA, E. Rojas, Dic. 1991, L-N-286000, 567500”, “INBio: COSTA RICA: CRI000, 361312” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 665” [yellow label].

Paratypes (84 ♂, 15 ♀): 24 ♂, 1 ♀, Same label data as holotype except, “CRI000, 361293”; “CRI000, 361192”; “CRI000, 361283”; “Ene. 1992”; “CRI000, 333685”; “CRI000, 333818”; “31 Ene. - 21 Feb. 1992”, “CRI000, 785312”; “Set. 1991”, “CRI000, 598920”; “CRI000, 598934”; “Oct. 1991”, “CRI001, 399551”; “CRI001, 399434”; “CRI001, 399604”; “CRI001, 399410”; “CRI001, 399469”; “CRI001, 399472”; “CRI001, 399548”; “Nov. 1991”, “CRI000, 460108”; “CRI000, 460127”; “CRI000, 460161”; “CRI000, 594188”; “CRI000, 594133”; “Apr. 1991”, “CRI000, 452354”; “1992”, “CRI000, 786416”; “Jul. 1991”, “CRI000, 643102”; “Mar. 1992”, “CRI000, 363507”; “1991”, “CRI000, 181586” (♀); 41 ♂, 3 ♀, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, June 1994, INBio-OET”, 11 Ene. 1993, Bosque secundario, L0006”, “CRI001, 219248”; “10 Ene. 1994, L/06/091”; “14 Ene. 1993, Arboleda, L0011”, “CRI001, 219679”; “14 Ene. 1993”, “CRI001, 219675”; “13 Ene. 1993, Bosque primario, L0010”, “CRI001, 219590”; “15 Ene. 1993, Plantación abandonada, L0012”, “CRI001, 223188”; “14 Febrero 1994, Arboleda, L/05/103”, “CRI001, 242193”; “10 Febrero 1994, Bosque secundario, L/06/099”, “CRI001, 242128”; “10 Feb. 1993, L/00/136, STR 2000 m”, “CRI001, 251212”; “26 Feb. 1996, L/05/167, Arboleda”, “CRI002, 057246”; “6 Feb. 1996, Arboleda, L/05/124”, “CRI001, 249818”; “CRI001, 249820”; “22 Feb. 1996, L/04/162, Biblioteca”, “CRI001, 257945”; “15 Feb., STR 250 m, L/00/148”, “CRI001, 251021”, “Slide No. 931”; “15 Feb. 1996, Biblioteca, L/04/147”, “CRI001, 251054”, (♀); “26 Feb., L/04/164”, “CRI002, 056782” (♀); “11 Marzo 1996, L/00/180, STR 1850 m”, “CRI001, 250761”, “L/05/183, Arboleda”, “CRI002, 057885”; “25 Marzo, L/05/198, Arboleda”, “CRI002, 058611”; “21 Marzo, L/04/192, Biblioteca”, “CRI002, 058399”; “6 Marzo, L/04/176”, “CRI001, 250914”; “11 Marzo, L/00/181, STR 2050 m”, “CRI001, 250735”, “19 Marzo, L/04/188”, “CRI001, 257349”, “Slide No. 875”; “6 Marzo, L/00/179, CCC 650 m”, “CRI002, 058156”, “Slide No. 880”; “29 Abril, L/00/229, STR 300 m”, “CRI002, 061894”; “24 Abril, L/00/227, STR 500 m”, “CRI002, 060601”; “8 Abril, L/04/205, Biblioteca”, “CRI002, 059423”; “L/04/205”, “CRI002, 059427”; “29 Abril, L/00/229, STR 300 m”, “CRI002, 061892”; “15 Abril, L/04/212”, “CRI002, 059851”; “10 Abril, L/00/209, SOR 600 m”, “CRI002, 059979”; “15 Abril, L/04/212, Biblioteca”, “CRI002, 059882”; “8 Abril, L/05/204, Arboleda”, “CRI002, 059526”; “15 Abril, L/05/214”, “CRI002, 060234”, “Slide No. 876”; “29 Abril, L/04/228, Biblioteca”, “CRI002, 061938”, “Slide No. 879”; “17 Abril, L/05/216, Arboleda”, “CRI002, 060348” (♀); “29 Junio 1994, Lab. area, L/04/108”, “CRI001, 243739”; “27 Junio, L/04/104”, “CRI001,

244078”; “30 Junio, L/04/110”, “CRI001, 243796”; “27 Junio, Arboleda, L/05/105”, “CRI001, 244188”; “27 Junio, L/05/105”, “CRI001, 244187”; “29 Junio, Bosque primario, L/01/109”, “CRI001, 248895”; “19 Julio 1993, Arboleda, L/05/055”, “CRI001, 229219”; “11 Agosto, 1993, Bosque primario, L/02/058”, “CRI001, 234610”; 15 ♂, 8 ♀, “Est. Pitilla, 700 m, 9 km, S Sta. Cecilia, Prov. Guan., COSTA RICA, C. Moraga & P. Rios, Nov. 1990, L-N-330200, 380200”, “Cri000, 313526”; “10 Set. – 22 Oct.”, “CRI000, 580129”; “CRI000, 182123”, (♀); “CRI000, 182081” “♀ Slide No. 746”; “Nov.”, “CRI000, 530441”; “CRI000, 313454”, (♀); “CRI000, 313486”, “♀ Slide No. 747”; “P. Rios, May 1991”, “CRI000, 582675”; “CRI000, 648911”, (♀); “C. Moraga, Jun. 1991”, “CRI000, 699967”, “Slide No. 745”; “CRI000, 699953”, “Slide No. 744”; “Jul. 1991”, “CRI000, 300189”, (♀); “Ago. 1991”, “CRI000, 538006”; “Set. 1991”, “CRI000, 460355”; “CRI000, 460364”; “CRI000, 460369”, (♀); “4–13 Dic. 1991”, “CRI000, 527178”; “CRI000, 527182”, (♀); “3–9 Feb. 1992”, “CRI000, 537621”; “19 May – 3 Jun. 1993, P. Rios”, “CRI001, 354084”; “CRI001, 354070”; “19–23 Jun. 1993, C. Moraga, # 2897”, “CRI001, 869033”; “# 2175”, “CRI001, 834963”; 1 ♂, 2 ♀, “Sector Cerro Cocori, Fca. de E. Rojas, 150 m, Prov. Limón, COSTA RICA, Oct. 1991, E. Rojas, L-N-286000, 567500”, “CRI001, 399527”, “Slide No. 664”; “Abr. 1992”, “CRI000, 786290”, “♀ Slide No. 667”; “Oct. 1991”, “CRI001, 399471”, “♀ Slide No.666”; 1 ♂, “Est. Queb. Bonita, 50 m, Res. Biol. Carara, Prov. Punt., COSTA RICA, R. Zuniga, Mar. 1991, L-N-194500, 469850”, “CRI000, 648499”, “Slide No. 651”; 1 ♂, 1 ♀, “Est. Magsasay, P. N. Braulio Carrillo, 200 m, Prov. Here., COSTA RICA, M. Zumbado, Oct. 1990, L-N-264600, 531100”, “CRI000, 180692”, “♀ Slide No. 489”; “CRI000, 180622”; 1 ♂, “Fca. San Gabriel, 2 km SW Dos Rios, 600 m, Prov. Alaj., COSTA RICA, I Curso Microlepidoptera, Jul. 1990, L-N-318800, 383500”, “CRI000, 475403”, “Slide No. 503”, (81 in INBio, 18 in USNM).



**MAP 28.** Distribution of *Glyphidocera olivae* (●) and *G. fidem* (▲). White triangle within a black circle indicates a shared locality.

Distribution (Map 28): *Glyphidocera olivae* is known from north-western Costa Rica along the Cordillera de Guanacaste, east to collecting sites north of the Cordillera Central, and south to near the mouth of the Golfo de Nicoya.

Etymology: The specific epithet *olivae* is derived from the Latin “oliva” or olive.

***Glyphidocera fides*, new species**

(Figs. 159–161, 285, 340, Map 28)

Diagnosis.— Relationships between *Glyphidocera fides* and its congeners are difficult to determine because the former possesses a combination of features that include male abdomen with sex scales between terga 2–3 and 3–4 [fewer scales between terga 3–4 than between terga 2–3], a widened and densely setose gnathos; dorsal strut of tegumen with arms fused medially from posterolateral margin to base of uncus, digitate process of valva slightly curved laterally, costal furcae of valva equal in size, and apicoventral angle of valval cucullus broadly rounded.

Description.— Head: Vertex and frontoclypeus brown; outer surface of labial palpus brown intermixed with few brownish-yellow scales to near apical margin of segment II; inner surface with segments I–II pale brownish-yellow, segment III brown intermixed with few pale-brownish-yellow scales; scape and flagellum of antenna brown; male with 4<sup>th</sup> flagellum dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of 4<sup>th</sup> flagellomere; proboscis pale brownish yellow.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with pale brownish-yellow scales along apical margins of all segments and tarsomeres. Forewing (Fig. 340): Length 5.2–6.1 mm (n = 18), brown intermixed with few pale-brown scales; cell and surrounding areas paler than marginal areas; cell with 1 or 2 dark-brown spots, 1 spot near middle [may be present or absent], 1 spot near distal end. Undersurface brown. Hindwing: Brown

Abdomen (Fig. 159): Male with 6 transverse, irregular rows of sex scales on intersegmental membrane between segments 2–3. Intersegmental membrane between terga 3–4 with 2 rows of sex scales along dorsolateral area, and slightly widened medial area between terga 3–4. Sex scales within widened medial area are more sparsely distributed than sex scales on dorsolateral surface.

Male Genitalia (Figs. 160–161): Uncus elongate, slightly constricted above a wide base, slightly rounded distally, apex rounded and setose; gnathos densely setose, protuberant, wide throughout length, slightly upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially, extending narrowly from posteroventral margin to base of uncus; costa of valva nearly straight from a shallow depression beyond a basal, digitate process to a gradually raised dorsal furca; apex widely

bifurcate, inner margin between furcae U-shaped; each furca about equal in size, parallel, and pointed dorsolaterally; sacculus twisted apically slightly beyond midlength, constricting valva, widening distoventrally forming a broad cucullus; cucullus membranous and densely setose; vesica of aedeagus denticulate, bearing a large, conical, apical cornutus; cornutus basally bulbous, with one side slightly shortened, exposing a hollow, basal cavity.

Female Genitalia (Fig. 285): Papillae anales elongate, slightly wider basally than distally; apophysis posterioris and apophysis anterioris about equal in size; eighth sternum slightly narrower than eighth tergum; eighth sternum with posterior margin broadly rounded, anterior margin broadly emarginate; eighth tergum with posterior margin broadly rounded, anterior margin broadly emarginate; antrum enlarged posteriorly from a constricted anterior part, posterior margin with a shallow median notch, posterolateral margin broadly rounded, anterior end with a pair of elongate, spinelike processes within cavity formed from outer wall; ductus bursae short; ductus seminalis large, 4-coiled and denticulate basally, ductlike and membranous distally; ductus bursae with a moderately shortened 4-coiled, internal support; side opposite ductus bursae with an elongate and widened, internal, platelike support.

Holotype, ♂, “Quepos, 80 m, P[arque] N[acional] Manuel Antonio, Prov[incia] Punt[arenas], COSTA RICA, R. Zuniga, Abr. 1991, L-S-370900, 448800”, “INBio: COSTA RICA: CRI000, 601719” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 533” [yellow label].

Paratypes (7 ♂, 10 ♀): 3 ♂, 4 ♀, Same label data as above except, “CRI000, 601744”, “Slide No. 534”; “CRI000, 593437”; “CRI000, 601717”, “♀ Slide No. 535”; “CRI000, 593384” (1 ♀); “CRI000, 593325” (1 ♀); “Ene.”, “CRI000, 564638”, “Slide No. 610”; “CRI000, 648446”, “♀ Slide No. 536”; 3 ♂, 6 ♀, “Est. Queb. Bonita, 50 m, Res. Biol. Carara, Prov. Punt., COSTA RICA, R. Zuniga, Ene. 1991, L-N-194500, 469850”, “CRI000, 580554”, “Slide No. 628”; “CRI000, 580500”, “Slide No. 643”; “CRI000, 580579”, “♀ Slide No. 640”; “Mar.”, “CRI000, 648569”, “Slide No. 641”; “Abr.”, “CRI000, 315703”, “♀ Slide No. 630”; “Feb.”, “CRI000, 680112”, “♀ Slide No. 646”; “Jun.”, “CRI000, 433567”, “♀ Slide No. 631”; “CRI000, 433603”, “♀ Slide No. 644”; “CRI000, 349049”, “♀ Slide No. 645”; 1 ♂, “Est. Los Almendros, Prov. Guana., COSTA RICA, 300 m, 26–0 Abr. 1995, E. E. Lopez, L-N-334850, 369500, # 4790”, “CRI002, 202091”, “Slide No. 505”, (10 in INBio, 7 in USNM).

Distribution (Map 28): *Glyphidocera fidem* is known from collecting sites in northwestern Costa Rica along the Cordillera de Guanacaste, east to the south-central part of the country along the Pacific Coast.

Etymology: The species epithet *fidem* is derived from the Latin “fides,” meaning truth.

*Glyphidocera pilae*, new species

(Figs. 162–164, 341, Map 29)

Diagnosis.— *Glyphidocera pilae* is most similar to *G. glaebae* but differs from the latter by having a shorter gnathos, more widely separate costal furcae of valva, and dorsal furca of valval costa oriented dorsally.

Description.— Head: Vertex and frontoclypeus pale yellow; labial palpus with outer and inner surfaces pale yellow; scape of antenna pale yellow, flagellum with alternating bands of pale-yellow and pale-brown scales; male with 4<sup>th</sup> flagellum dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of 4<sup>th</sup> flagellomere; proboscis pale yellow.

Thorax: Tegula and mesonotum pale yellow. Legs pale yellow intermixed with few pale-brown scales. Forewing (Fig. 341): Length 7.0 mm (n = 1), pale yellow intermixed with brown scales; cell with 2 recurrent spots, 1 near base, 1 on distal end; several small brown spots on Cubitus and one brown spot on CuP; marginal scales brown. Undersurface pale brown. Hindwing: Pale brown, except pale-yellow scales in anal area.

Abdomen (Fig. 162): Male with few sex scales along medial area of intersegmental membrane between terga 2–3, and 4 transverse, irregular rows of sex scales on intersegmental areas between terga 3–4.

Male Genitalia (Figs. 163–164): Uncus elongate, wide at base, slightly narrowing apically, abruptly curved near 2/3, apex narrowly rounded setose; gnathos short, apically truncate; tegumen near parallelsided throughout length; dorsal strut of tegumen with arms convergent, fusing about 1/4 length between posteroventral margin and base of uncus, dorsally atrophied; costa of valva broadly emarginate medially from a shallow, basal digitate process to slightly upturned dorsal furca; apex widely bifurcate, dorsal furca triangular and pointed, about twice as large as a slightly downcurved ventral furca; base of costa bearing a straight, digitate process; sacculus twisted apically, constricting valva near midlength, widening distoventrally, forming an elongate and broadly rounded, narrow cucullus; cucullus membranous and setose; vesica of aedeagus with many stout, conical cornuti, and bearing a large conical, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, June 1994, INBio-OET”, “29 Junio 1994, Bosque primario, L/01/109”, “INBio: COSTA RICA: CRI001, 243889” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 981” [yellow label].

Distribution (Map 29): *Glyphidocera pilae* is known from a single collecting site in north-central Costa Rica.

Etymology: The species epithet *pilae* is derived from the Latin “pila,” meaning ball.





**MAP 29.** Distribution of *Glyphidocera pilae* (●) and *G. glaebae* (▲). White triangle within a black circle indicates a shared locality.

***Glyphidocera glaebae*, new species**

(Figs. 165–167, 342, Map 29)

**Diagnosis.**— *Glyphidocera glaebae* is most similar to *G. pilae* but differs by having a longer gnathos, costal furcae of valva more narrowly separate, and dorsal furca of valval costa oriented laterally.

**Description.**— **Head:** Vertex and frontoclypeus pale brownish yellow; outer surface of labial palpus brown intermixed with pale brownish-yellow scales to near apical margin of segment II, inner surface pale brownish yellow intermixed with few brown scales; scape of antenna pale brownish yellow intermixed with few brown scales, flagellum with alternating bands of pale brownish-yellow and brown scales; male 4<sup>th</sup> flagellum dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of 4<sup>th</sup> flagellomere; proboscis pale brownish yellow.

**Thorax:** Tegula and mesonotum pale brownish yellow intermixed with few brown scales. Legs brown intermixed with pale brown, and pale brownish-yellow scales to apical margins of all segments and tarsomeres [some specimens with banding on legs absent]. Forewing (Fig. 342): Length 6.5–7.0 mm (n = 10), brownish yellow intermixed with few brown scales; cell with 2 small spots, 1 spot near middle, 1 spot near distal end [some specimens with a small basimedial spot, and marginal spots present or absent]. Undersurface pale brown intermixed with pale brownish-yellow scales along costa. Hindwing: Pale brownish yellow.

Abdomen (Fig. 165): Male with one short row of sex scales along medial area of intersegmental membrane between terga 2–3, and with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 3–4.

Male Genitalia (Figs. 166–167): Uncus elongate, wide at base, broadly constricted near ½ length, broadly rounded apically, apex narrowly rounded and setose; gnathos protuberant, slightly narrowed throughout length, rounded apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing from a wide base, gradually widening dorsally to base of uncus; costa of valva nearly straight from a shallow depression beyond a basal digitate process to a slightly raised dorsal furca; apex bifurcate, dorsal furca 3–4 times larger than ventral furca; sacculus twisted apically near midlength, widening distoventrally, forming an elongate and broadly rounded, narrow cucullus; cucullus membranous and setose; vesica of aedeagus sparsely denticulate, bearing a large, conical, apical cornutus; cornutus with one side shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Sector Cocori, 30 km N de Cariari, Finca E. Rojas, A.C. Tortuguero, Prov[incia] Limón, COSTA RICA, 100 m, May 1994, E. Rojas, L-N-286000, 567500, # 2917”, “INBio: COSTA RICA: CRI001, 879738” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 691” [yellow label].

Paratypes (9 ♂): “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, Jan. 1993, INBio-OET”, “13 Ene. 1993, Bosque primario, L0010”, “CRI001, 219540”, “Slide No. 971”; “13 Mayo 1993, Bosque primario, L/01/032”, “CRI001, 231794”, “Slide No. 986”; “L/01/060, 18 Agosto 1993, Bosque primario”, “CRI001, 230129”, “Slide No. 985”; “11 Agosto 1993, Bosque primario, L/02/058”, “CRI001, 234640”, “Slide No. 987”; “18 Agosto 1993, Bosque primario, L/02/062”, “CRI001, 234838”, “Slide No. 857”; “28 Junio 1994, Bosque secundario, L/06/107”, “CRI001, 243952”, “Slide No. 983”; “6 Feb. 1996, STR 250 m, L/00/123”, “CRI001, 249774”, “Slide No. 972”; “7 Feb. 1996, L/00/127, CES 450 m”, “CRI002, 057351”, “Slide No. 977”; “22 Feb. 1996, L/04/162, Biblioteca”, “CRI002, 057184”, “Slide No. 980”, (5 in INBio, 4 in USNM).

Distribution (Map 29): *Glyphidocera glaebae* is known from two collecting sites in north-central Costa Rica, north of the Cordillera Central.

Etymology: The species epithet *glaebae* is derived from the Latin “glaeba,” meaning soil.

### ***Glyphidocera tibiae*, new species**

(Figs. 168–170, 287, 343, Map 30)

Diagnosis.— *Glyphidocera tibiae* is similar to *G. novercae* but differs from the latter by having an absence of sex scales between abdominal terga 2–3 in male, a wider dorsal furca of the valval costa, and a less protuberant ventral furca.

Description.— Head: Scales on vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus dark brown intermixed with pale-brown scales to apical margin of segment II, segment III pale brown intermixed with dark-brown scales; inner surface pale brown intermixed with few brown and dark-brown scales; scape of antenna pale brown intermixed with few dark-brown scales, flagellum with alternating bands of pale-brown and brown scales; male 4<sup>th</sup> flagellum dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of 4<sup>th</sup> flagellomere; proboscis brown.

Thorax: Tegula and mesonotum brownish yellow intermixed with few dark-brown scales. Legs dark brown intermixed with pale brownish-yellow scales to apical margins of all segments and tarsomeres. Forewing (Fig. 343): Length 7.8–8.8 mm (n = 11), brownish yellow intermixed with few dark-brown scales; cell with Radius and Cubitus irregularly overlaid with dark-brown scales, and few dark-brown scales within [some rubbed specimens with dark-brown scales absent]. Undersurface brown intermixed with pale brownish-yellow scales along costa. Hindwing: Pale brown.

Abdomen (Fig. 168): Male with with 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 3–4.

Male Genitalia (Figs. 169–170): Uncus elongate, wide at base, broadly constricted near midlength, slightly widened laterally, apex setose, acuminate, and recurved; gnathos sparsely setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing from posteroventral margin to base of uncus; costa of valva nearly straight from shallow depression slightly beyond a basal, digitate process to an inwardly curved dorsal furca; apex bifurcate, each furca widely divergent; dorsal furca large; ventral furca, a broadly rounded lobe; sacculus twisted apically, constricting valva slightly beyond midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a narrowly elongate, apical cornutus; cornutus with one side slightly shortened, exposing a hollow, basal cavity.

Female Genitalia (Fig. 287): Papillae anales elongate, wider basally than apically; apophysis posterioris and apophysis anterioris about equal in length; eighth sternum narrower than eighth tergum; eighth sternum with posterior margin broadly rounded, anterior margin broadly emarginate; eighth tergum with posterior margin nearly straight, anterior margin broadly emarginate; antrum enlarged posteriorly from a constricted anterior end, posterior margin nearly straight, posterolateral margin angular, anterior end with a pair of elongate, spinelike processes inside cavity formed from outer wall; ductus bursae short; corpus bursae slightly enlarged anteriorly, sparsely denticulate; ductus seminalis long, coils decreasing in size distally; ductus seminalis with a short, 5-coiled internal support; side opposite ductus bursae slightly swollen, with a moderately long, internal support.

Holotype, ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, Mar. 1993, INBio-OET”, “20 Mar. 1993, Bosque primario, L/01/022”,

“INBio: COSTA RICA: CRI001, 230676” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 858” [yellow label].

Paratypes (9 ♂, 1 ♀): 8 ♂, 1 ♀, Same label data as holotype except, “17 Mar. 1993, L/02/018”, “CRI001, 225854”, “Slide No. 975”; “13 Apr. 1993, L/02/026”, “CRI001, 231205”, “Slide No. 970”; “18 Junio 1993, L/02/046”, “CRI001, 233143”, “♀ Slide No. 859”; “17 Octubre 1993, Lab. clearing, L/04/077”, “CRI001, 239675”, “Slide No. 974”; “10 Enero 1994, Bosque primario, L/02/090”, “CRI001, 258996”, “Slide No. 856”; “29 Junio 1994, L/01/109”, “CRI001, 243869”, “Slide No. 984”; “4 Julio 1994, Lab. area, L/04/118”, “CRI001, 244514”, “Slide No. 978”; “6 Feb. 1996, STR 250 m, L/00/123”, “CRI001, 249773”, “Slide No. 973”; “19 Feb. 1996, L/00/157”, “CRI001, 250418”, “Slide No. 920”; 1 ♂, “Est. Pitilla, 700 m, 9 km S Sta. Cecilia, Prov. Guan., COSTA RICA, C. Moraga & P. Rios, Dic. 1990, L-N-330200, 380200”, “CRI000, 280964”, “Slide No. 750”, (6 in INBio, 4 in USNM).

Distribution (Map 30): *Glyphidocera tibiae* is known from two collecting sites in Costa Rica; one in the north-west along the Cordillera de Guanacaste and one in the north-central part of the country, north of the Cordillera Central.



MAP 30. Distribution of *Glyphidocera tibiae* (●).

Etymology: The species epithet *tibiae* is derived from the Latin “tibia,” meaning a reed pipe.

***Glyphidocera novercae*, new species**

(Figs. 171–173, 344, Map 31)

Diagnosis.— *Glyphidocera novercae* is most similar to *G. tibiae* but differs from the latter

by having sex scales between abdominal terga 2–3 in male, a narrower dorsal furca of the valval costa, and a more protuberant ventral furca.

Description.— Head: Vertex and frontoclypeus pale brownish yellow; outer surface of labial palpus with segments I–II brown intermixed with pale brownish-yellow scales, segment III pale brownish yellow; inner surface pale brownish yellow; scape of antenna pale brownish yellow intermixed with few brown scales, flagellum with alternating bands of pale brownish-yellow and pale-brown scales; male 4<sup>th</sup> flagellum dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of 4<sup>th</sup> flagellomere; proboscis pale brownish yellow.

Thorax: Tegula and mesonotum pale brownish yellow. Foreleg and midleg brown intermixed with pale brownish-yellow scales to near apical margins of all segments and tarsomeres or pale brownish yellow; hindleg pale brownish yellow. Forewing (Fig. 344): Length 6.1–8.0 mm (n = 9), pale brownish yellow intermixed with brown scales; cell with 2–3 brown spots, 2 spots, near middle [or coalescent, forming one large spot], 1 small spot near distal end; base with a short, medial streak present or absent [rubbed specimens with all spots absent]. Undersurface brown intermixed with pale brownish-yellow scales along costa. Hindwing: Pale yellow.

Abdomen (Fig. 171): Male with 3 irregular rows of sex scales within median area between terga 2–3, and 4 transverse, irregular rows of sex scales between terga 3–4.

Male Genitalia (Figs. 172–173): Uncus elongate, wide at base, broadly constricted near 1/3, widened apically; apex setose, acuninate, and recurved; gnathos setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing from posteroventral margin, extending widely to base of uncus; costa of valva slightly sloped dorsally from a shallow depression beyond a basal, digitate process to an upturned dorsal furca; apex widely bifurcate, each furca divergent; dorsal furca about twice length of ventral furca; ventral furca about twice as wide as dorsal furca; sacculus twisted apically constricting valva slightly beyond midlength, widening distoventrally forming an angular-shaped cucullus; cucullus membranous and setose; vesica denticulate, bearing an elongate, and narrow apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Pitilla, 700 m, 9 km, S S[an]ta Cecilia, P[arque] N[acional] Guanacaste, Prov[incia] Guanacaste, COSTA RICA, C. Moraga, 2–9 Mar. 1992, L-N-330200, 380200”, “INBio: COSTA RICA: CRI000, 414812” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 751” [yellow label].

Paratypes (8 ♂): 3 ♂, Same label data as holotype except, “Abr. 1991”, “CRI000, 484628”, “Slide No. 956”; “Jul. 1991”, “CRI000, 300183”, “Slide No. 958”; “Ene. 1995, L-N-329950, 380450, # 4354”, “CRI002, 131713”, “Slide No. 957”; 1 ♂, “Monumento Nacional Guayabo, Amistad, Prov. Carta., COSTA RICA, 1100 m, Jun. 1994, G. Fonseca,

L-N-217400, 570000, # 2989”, “CRI001, 880995”, “Slide No. 814”; 2 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, Jan. 1996, INBio-OET”, “13 Ene. 1996, Bosque primario, L0010”, “CRI001, 219541”, “Slide No. 982”; “17 Abril 1996, L/04/218, Biblioteca”, “CRI002, 060458”, “Slide No. 979”; 2 ♂, “Est. Sirena, P.N. Corcovado, 0–100 m, Prov. Punt., COSTA RICA, G. Fonseca, Nov. 1990, L-S-270500, 508300”, “CRI000, 445864”, “Slide No. 813”; “Oct. 1990”, “CRI000, 179015”, (4 in INBio, 4 in USNM).

Distribution (Map 31): *Glyphidocera novercae* is known from five collecting sites in Costa Rica; two nearby sites in the northwest along the Cordillera de Guanacaste, two sites in the north-central part of the country along the Cordillera Central, and one coastal site in the southeast.



**MAP 31.** Distribution of *Glyphidocera novercae* (●). Outlying circles indicate multiple adjacent localities.

Etymology: The species epithet *novercae* is derived from the Latin word for step-mother - noverca.

### ***Glyphidocera caveae*, new species**

(Figs. 174–176, 345, Map 32)

Diagnosis.— *Glyphidocera caveae* is most similar to *G. staerae* but differs from the latter by having a wider digitate process of valva, more widely separate costal furcae of the valva, a wider valval cucullus, and a stout apical curnutus of the aedeagal vesica.

Description.— Head: Vertex and frontoclypeus pale yellowish brown; labial palpus with outer surface of segments I–II brown intermixed with pale yellowish-brown scales to near apical margin, segment III brown intermixed with pale yellowish-brown scales; inner surface pale yellowish brown intermixed with few brown scales; scape of antenna pale yellowish brown intermixed with few brown and dark-brown scales, flagellum with alternating bands of pale yellowish-brown and pale-brown scales; 4<sup>th</sup> flagellum dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of 4<sup>th</sup> flagellomere; proboscis pale yellowish brown.

Thorax: Tegula and mesonotum pale yellowish brown. Legs pale brown intermixed with pale yellowish-brown scales to apical margins of all segments and tarsomeres. Forewing (Fig. 345): Length 8.1 mm (n = 1), pale yellowish brown intermixed with reddish-brown and dark-brown scales; several dark-brown spots within cell; 1 spot near base, 2 spots in recurrent line near middle, and 2 spots in diagonal line on distal end; marginal spots present or absent. Undersurface pale brown. Hindwing: Pale brown, with pale yellowish-brown scales on anal area.

Abdomen (Fig. 174): Male with two short, irregular rows of sex scales on medial intersegmental area between terga 2–3, and two transverse rows of sex scales between terga 3–4.

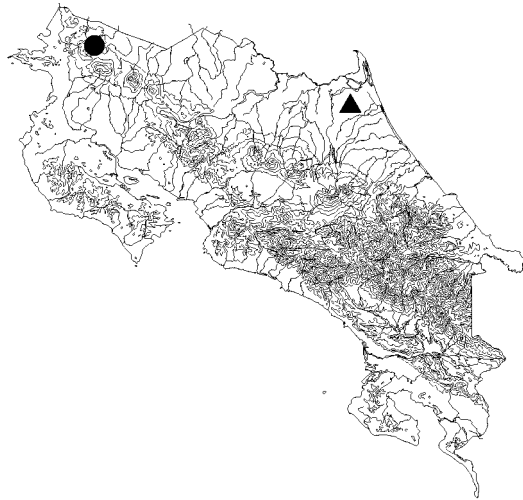
Male Genitalia (Figs. 175–176): Uncus elongate, wide at base, constricted near middle, apical 1/2 triangular-shaped, apex setose, acuminate, and slightly recurved; gnathos sparsely setose, protuberant, wide throughout length, upturned apically; tegumen slightly narrowed basally; dorsal strut of tegumen with arms convergent and fused, atrophied dorsally; valva with costa gradually upturned from a shallow depression beyond a slightly curved, basal, digitate process to dorsal furca; apex widely bifurcate, dorsal furca narrower than ventral furca; sacculus twisted apically, constricting valva near midlength, widening distoventrally, forming an elongate and angular cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a moderately long, conical, apical cornutus; cornutus with a shortened side near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Estac[ión] Pitilla, 700 m, 9 km S Santa Cecilia, Guanac[aste] P[a]r[que], COSTA RICA, Dic. 1989, C. Moraga & P. Rios, L-N-330200, 380200”, “INBio: COSTA RICA: CRI000, 190629” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 955” [yellow label].

Distribution (Map 32): *Glyphidocera caveae* is known from one collecting site in north-western Costa Rica along the Cordillera de Guanacaste.

Etymology: The specific epithet *caveae* is derived from “cavea,” the Latin word for cavity.



MAP 32. Distribution of *Glyphidocera caveae* (●) and *G. staerae* (▲).

***Glyphidocera staerae*, new species**

(Figs. 177–179, 346, Map 32)

Diagnosis.— *Glyphidocera staerae* is most similar to *G. caveae* but differs by having a narrower digitate process of valva, more narrowly separate costal furcae of the valva, a narrower cucullus, and a longer and more narrow apical curnutus of the aedeagal vesica.

Description.— Head: Vertex and frontoclypeus pale yellow; outer and inner surfaces of labial palpus pale yellow; scape of antenna pale yellow intermixed with few pale-brown scales, flagellum pale yellow; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale yellow.

Thorax: Tegula and mesonotum pale yellow. Legs pale yellow. Forewing (Fig. 346): Length 6.9 mm (n = 1), pale yellow intermixed with few pale-brown scales; cell with 3 spots; 1 near midcell and 2 on distal end near and parallel with crossvein. Undersurface pale yellow. Hindwing: Pale yellow basally, gradually darkening to apex.

Abdomen (Fig. 177): Male with two irregular rows of sex scales on medial intersegmental membrane between terga 2–3, and with three transverse, irregular rows of sex scales between terga 3–4.

Male Genitalia (Figs. 178–179): Uncus elongate, wide at base, broadly constricted near midlength, triangular-shaped apically, apex setose, acuminate, and recurved; gnathos protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a wide base, fusing dorsally, extending to base of uncus; costa gradually upturned from a shallow depression beyond a basal digi-



tate process to dorsal furca; apex bifurcate, dorsal furca pointed and three times longer than ventral furca; ventral furca with a rounded apex; base of costa bearing a long, stalked, slightly curved, digitate process; sacculus twisted apically, constricting valva near midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing an elongate, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, "Sector Cerro Cocori, F[in]ca de E. Rojas, 150 m, Prov[incia] Limón, COSTA RICA, E. Rojas, Dic. 1991, L-N-286000, 567500", "INBio: COSTA RICA: CRI000, 361054" [bar code label], "INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 484" [yellow label].

Distribution (Map 32): *Glyphidocera staerae* is known from one collecting site in the north-western part of Limón in northern Costa Rica.

Etymology: The species epithet *staerae* is derived from the Latin "statera," meaning scales.

### ***Glyphidocera amitae*, new species**

(Figs. 180–182, 347, Map 33)

Diagnosis.— *Glyphidocera amitae* is most similar to *G. zamiae* but differs from the latter by having costal furcae of the valva more narrowly divergent from base, a narrower cucullus, and small cornuti within the vesica of the aedeagus.

Description.— Head: Vertex and frontoclypeus grayish brown; labial palpus with outer surface grayish brown intermixed with pale brownish-yellow scales, inner surface pale brownish yellow intermixed with few grayish-brown scales; scape of antenna grayish brown intermixed with few brown scales, flagellum with alternating bands of grayish-brown and pale brownish-yellow scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale grayish brown.

Thorax: Tegula and mesonotum grayish brown. Legs pale brownish yellow. Forewing (Fig. 347): Length 8.8 mm (n = 1), pale brown intermixed with few pale brownish-yellow scales; cell with 2 faint grayish brown spots, 1 spot near middle, 1 spot on distal end near crossvein. Undersurface pale grayish brown. Hindwing: Pale brown.

Abdomen (Fig. 180): Male with pair of sex scale clusters, each with 6–7 transverse, irregular rows of scales, on intersegmental areas between terga 2–3 and terga 3–4.

Male Genitalia (Figs. 181–182): Uncus elongate, wide at base, broadly constricted about 1/3, slightly rounded distally, apex narrowly rounded; gnathos sparsely setose, protuberant, narrow throughout length, upturned apically; tegumen slightly widened basally;

dorsal strut of tegumen with arms convergent, fusing from posteroventral margin to base of uncus; costa of valva nearly straight from shallow depression slightly beyond a basal, digitate process to an upturned dorsal furca; apex widely bifurcate, inner margin V-shaped; dorsal furca wide, with a rounded apex, ventral furca acuminate, slightly longer than dorsal furca; base of costa bearing a curved and slanted, digitate process; sacculus twisted apically, constricting valva slightly beyond midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica with denticulate, bearing a elongate, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Buen Amigo, San Luis Monteverde, Prov[incia] Punta[renas], COSTA RICA, 1000–1350 m, Set. 1994, Z. Fuentes, L-N-250850, 449250, # 3224”, “INBio: COSTA RICA: CRI002, 022083” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 517” [yellow label].

Distribution (Map 33): *Glyphidocera amitae* is known from one collecting site in the cloud forests of Monteverde in west-central Costa Rica along the southern part of the Cordillera de Tilarán.



MAP 33. Distribution of *Glyphidocera amitae* (●) and *G. zamiae* (▲).

Etymology: The species epithet *amitae* is derived from the Latin “amita,” meaning aunt.

***Glyphidocera zamiae*, new species**

(Figs. 183–185, 348, Map 33)

Diagnosis.— *Glyphidocera zamiae* is most similar to *G. amitae* but differs from the latter

by having costal furcae of the valva more widely divergent from base, a wider cucullus, and larger cornuti within the vesica of the aedeagus.

Description.— Head: Vertex and frontoclypeus pale brown; [labial palpus missing]; scape and flagellum of antenna pale brown; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brown.

Thorax: Tegula and mesonotum pale brown. Legs pale yellowish brown. Forewing (Fig. 348): Length 8.9 mm (n = 1), pale brown intermixed with brownish-yellow scales, with no characteristic markings. Undersurface pale brown. Hindwing (Fig. 00): Pale brown.

Abdomen (Fig. 183): Male with two pairs of sex scale clusters on intersegmental membrane between terga 2–3 and terga 3–4; each cluster with 6 transverse, irregular rows of sex scales.

Male Genitalia (Figs. 184–185): Uncus elongate, wide at base, broadly constricted near 1/3, slightly rounded apically, apex acuminate; gnathos sparsely setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing and extending from a narrow base to base of uncus; valva with costa nearly straight from shallow depression beyond a basal digitate process to dorsal furca; apex widely bifurcate, furcae divergent from a widely rounded inner margin; dorsal and ventral furcae about equal in length, dorsal furca with a rounded apex, ventral furca with a more narrowed apex; costal base bearing a straight, slanted, digitate process; sacculus twisted apically, constricting valva near 2/3 length, forming a short, broadly rounded, and protracted cucullus; cucullus membranous and setose; vesica with many stout and spinelike cornuti, and bearing an elongate, apical cornutus; cornutus shortened on one side near midlength, exposing a hollow, cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Sirena, 0–100 m, P[arque] N[acional] Corcovado, Prov[incia] Punt[arenas], COSTA RICA, G. Fonseca, Set. 1991, L-S-270500, 508300”, “INBio: COSTA RICA: CRI000, 357469” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 815” [yellow label].

Distribution (Map 33): *Glyphidocera zamiae* is known from a single collecting site on the Osa Peninsula in south-eastern Costa Rica.

Etymology: The species epithet *zamiae* is derived from the Latin “zamia,” meaning harm.

### ***Glyphidocera cenulae*, new species**

(Figs. 186–188, 349, Map 34)

Diagnosis.— *Glyphidocera cenulae* is most similar to *G. laricae* but differs from the latter

by having a larger gnathos, a larger digitate process of the valva, subequal costal furcae of the valva, a wider cucullus, and a smaller apical cornutus of the aedeagal vesica.

Description.— Head: Vertex and frontoclypeus grayish brown; labial palpus with outer surface grayish brown intermixed with few pale brownish-yellow and dark-brown scales, inner surface pale brownish yellow; scape of antenna grayish brown intermixed with few pale brownish-yellow scales, flagellum with alternating bands of pale grayish-brown and brownish-yellow scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale grayish brown.

Thorax: Tegula and mesonotum grayish brown. Legs pale grayish brown intermixed with grayish-brown scales, tarsomeres with pale brownish-yellow scales to near apical margin. Forewing (Fig. 349): Length 7.9 mm (n = 1), grayish brown intermixed with pale grayish-brown scales, with no characteristic markings. Undersurface pale grayish brown. Hindwing: Pale grayish brown intermixed with few grayish-brown and pale brownish-yellow scales.

Abdomen (Fig. 186): Male with two pairs of sex scale clusters on intersegmental membrane between terga 2–3 and terga 3–4, each cluster with 3 transverse, irregular rows of sex scales; scales between terga 2–3 appear slightly smaller than sex scales between terga 3–4.

Male Genitalia (Figs. 187–188): Uncus elongate, wide at base, broadly constricted near 1/4, broadly widened apically, apex attenuate; gnathos protuberant, narrow throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent but separate to base of uncus; costa of valva nearly straight from a shallow depression beyond a basal, digitate process to an upturned dorsal furca; apex widely bifurcate, dorsal furca twice as wide as ventral furca; base of costa bearing a slanted, digitate process, abruptly curved apically; sacculus twisted apically, constricting valva slightly beyond middle, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with microdentacles, and bearing and a small, conical, apical cornutus.

Female Genitalia: Unknown.

Holotype, ♂, “Cerro Tortuguero, P[arque] N[acional] Tortuguero, 0–100 m, Prov[incia] Limón, COSTA RICA, J. Solano, Abr. 1991, L-N-285000, 588000”, “INBio: COSTA RICA: CRI000, 443977” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 632” [yellow label].

Distribution (Map 34): *Glyphidocera cenulae* is known from one collecting site in northern Costa Rica near the north-western coast of Limón.

Etymology: The species epithet *cenulae* is derived from the Latin “cenula,” meaning a small dinner.



MAP 34. Distribution of *Glyphidocera cenulae* (●) and *G. laricae* (▲).

***Glyphidocera laricae*, new species**

(Figs. 189–191, 350, Map 34)

Diagnosis.— *Glyphidocera laricae* is most similar to *G. cenulae* but differs from the latter by having a smaller gnathos, a smaller digitate process of the valva, equal costal furcae of the valva, a narrower valval cucullus, and a larger apical cornutus of the aedeagal vesica.

Description.— Head: Vertex and frontoclypeus pale brown; labial palpus with outer surface brown intermixed with few pale brownish-yellow scales, inner surface pale brownish yellow; scape pale brownish yellow, flagellum with alternating bands of pale-brown and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brownish yellow.

Thorax: Tegula and mesonotum pale brown. Legs with segments pale brownish yellow, tarsomeres pale brown intermixed with few brown scales and pale brownish-yellow scales along apical margin. Forewing (Fig. 350): Length 6.8 mm (n = 1), brownish yellow intermixed with few pale-brown and brown scales, with no characteristic markings. Undersurface brown. Hindwing: Pale brown, scales on anal area mostly pale brownish yellow.

Abdomen (Fig. 189): Male with two pairs of sex scale clusters on intersegmental membrane between terga 2–3 and terga 3–4; each cluster with 3 transverse, irregular rows of sex scales. [Sex scales on paired clusters between terga 2–3 have been rubbed off during dissection]

Male Genitalia (Figs. 190–191): Uncus elongate, wide at base, broadly constricted

near 1/3, widely rounded apically, apex acuminate and setose; gnathos setose, narrow, protuberant, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a widened base, extending to base of uncus; costa of valva nearly straight from a shallow depression beyond a basal digitate process to a slightly upturned dorsal furca; apex widely bifurcate, each furca about equal in size; base of costa bearing a slanted, digitate process, abruptly curved apically; sacculus twisted apically, constricting valva near midlength, forming elongate, slightly rounded, cucullus; cucullus membranous and setose; vesica of aedeagus with denticulate, bearing a small, conical, apical cornutus.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Sirena, P[arque] N[acional] Corcovado, 0–100 m, Prov[incia] Punt[arenas], COSTA RICA, G. Fonseca, Abr. 1991, L-S-270500, 508300”, “INBio: COSTA RICA: CRI000, 475998” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 807” [yellow label].

Distribution (Map 34): *Glyphidocera laricae* is known from a single collecting site on the Osa Peninsula in south-eastern Costa Rica.

Etymology: The species epithet *laricae* is derived from the Latin “larica,” meaning breast-plate.

### ***Glyphidocera barbae*, new species**

(Figs. 192–194, 351, Map 35)

Diagnosis.— *Glyphidocera barbae* is most similar to *G. pali* but differs from the latter by having a dorsal strut of tegumen widened basally (and atrophied dorsally), and more widely separate costal furcae of the valva.

Description.— Head: Vertex and frontoclypeus brown; outer and inner surfaces of labial palpus brown intermixed with pale-brown scales to apical margin of segment II, segment III pale brown intermixed with few brown scales; scape of antenna brown, flagellum with alternating bands of pale-brown and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brown.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with pale-brown scales to apical margins of all segments and tarsomeres. Forewing (Fig. 351): Length 6.0–6.2 mm (n = 2), brown intermixed with pale-brown scales; cell with 2 small, brown spots, one spot near middle, one spot near distal end. Undersurface brown. Hindwing: Brown with pale-brown scales between CuP and anal margin.

Abdomen (Fig. 192): Male with a two pairs of elliptical-shaped sex scale clusters on intersegmental membrane between terga 2–3 and terga 3–4; each cluster with 3 transverse,

irregular rows of sex scales. Sex scales between terga 2–3 are twice as large as the sex scales between terga 3–4.

Male Genitalia (Figs. 193–194): Uncus elongate, wide at base, broadly constricted near  $\frac{1}{2}$ , broadly rounded subapically, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing dorsally and atrophied beneath base of uncus; costa of valva nearly straight from a shallow depression beyond a basal digitate process to an upturned dorsal furca; apex widely bifurcate, margin between furcae narrowly rounded; furcae divergent, dorsal furca slightly longer than ventral furca; sacculus twisted apically constricting valva near midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with several spinelike cornuti, and bearing an elongate, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Cerro Tortuguero, 0–120 m, P[arque] N[acional] Tortuguero, Prov[incia] Limón, COSTA RICA, Jul. 1992, R.Delgado, L-N-285000, 588000”, “INBio: COSTA RICA: CRI000, 735797” [bar code label], “INBio, Genitalia Slide by D. Adamski, No. 606” [yellow label].

Paratype 1 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, Feb. 1996, INBio-OET”, “19 Feb. 1996, L/04/158, Biblioteca”, “CRI001, 250584”, “Slide No. 923.”

Distribution (Map 35): *Glyphidocera barbae* (●) and *G. pali* (▲). White triangle within a black circle indicates a shared locality.



**MAP 35.** Distribution of *Glyphidocera barbae* (●) and *G. pali* (▲). White triangle within a black circle indicates a shared locality.

Etymology: The species epithet *barbae* is derived from the Latin word for beard - barba.

***Glyphidocera pali*, new species**

(Figs. 195–197, 352, Map 35)

Diagnosis.— *Glyphidocera pali* is most similar to *G. barbae* but differs by having the dorsal strut of the tegumen with a narrower base (lateral arms fused medially and extending from posteroventral margin to base of uncus) and a more narrowly separate costal furcae of valva.

Description.— Head: Vertex and frontoclypeus grayish brown; outer and inner surfaces of labial palpus pale yellowish brown intermixed with few brown and dark-brown scales; scape of antenna pale yellowish brown intermixed with few brown scales, flagellum with alternating bands of pale grayish-brown and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale yellowish brown.

Thorax: Tegula and mesonotum pale grayish brown. Legs pale yellowish brown intermixed with few brown scales, apical margins of all tarsomeres pale yellowish brown. Forewing (Fig. 352): Length 7.1 mm (n = 1), pale yellowish brown intermixed with few brown scales, with a faint brown spot near distal end of cell. Undersurface pale brown. Hindwing: Pale brown, scales within anal area slightly darker.

Abdomen (Fig. 195): Male with two elliptical-shaped, pairs of sex scale clusters on intersegmental membrane between terga 2–3 and terga 3–4; each cluster with 2 transverse rows of sex scales. Sex scales between terga 2–3 are slightly larger than the sex scales between terga 3–4.

Male Genitalia (Figs. 196–197): Uncus elongate, wide at base, broadly slightly constricted near midlength, broadly rounded distally, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing from a widened base, extending narrowly to base of uncus; costa of valva nearly straight from a shallow depression beyond a basal, digitate process to an upturned dorsal furca; apex bifurcate, inner margin V-shaped; furcae divergent, dorsal furca narrowly rounded apically, ventral furca pointed; base of costa bearing a long, slanted, digitate process; sacculus twisted apically, constricting valva near midlength, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with many stout, conical cornuti, and bearing an elongate, apical cornutus; cornutus with a shortened side near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.



Holotype, ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, Feb. 1994, INBio-OET”, “10 Febrero 1994, Bosque primario, L/01/096”, “INBio: COSTA RICA: CRI001, 259675” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 865” [yellow label].

Distribution (Map 35): *Glyphidocera pali* is known from one collecting site in east-central Heredia in northern Costa Rica.

Etymology: The species epithet *pali* is derived from the Latin “palus,” meaning quagmire.

### ***Glyphidocera placentae*, new species**

(Figs. 198–200, 353, Map 36)

Diagnosis.— *Glyphidocera placentae* can be distinguished from its congeners by a unique combination of features that includes sex scales between terga 2–3 of the male abdomen, gnathos densely setose, dorsal strut of tegumen with tergal arms forming a short medial sinus between posteroventral margin and base of uncus, and costal furcae of valva nearly equal in size.

Description.— Head: Vertex and frontoclypeus pale brown; labial palpus with outer surface pale brown intermixed with few brown scales, inner surface pale yellowish brown intermixed with few pale-brown scales; scape of antenna pale brown intermixed with few brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6 [setiform scales of apex of protuberance of 4<sup>th</sup> flagellomere missing]; proboscis pale brown.

Thorax: Tegula and mesonotum pale brown. Legs pale brown intermixed with few brown scales, pale yellowish-brown along apical margin of all segments and tarsomeres. Forewing (Fig. 353): Length 6.0 mm (n = 1), pale yellowish brown intermixed with pale brownish-orange and few brown scales; cell with 4 faint brown spots; 2 spots in diagonal line near distal end, 1 spot near midlength on Radius, and 1 spot near base. Undersurface pale brown. Hindwing (Fig. 00): Pale brown.

Abdomen (Fig. 198): Male with 3 transverse, irregular rows of sex scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 199–200): Uncus elongate, wide at base, broadly constricted near 1/3, slightly rounded apically, apex narrowly rounded and setose; gnathos densely setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent basally and dorsally, forming an elliptical-shaped sinus beneath base of uncus; valva with costa nearly straight from a shallow depression beyond a basal, digitate process to dorsal furca; apex widely bifurcate, inner margin between furcae broadly rounded; furcae divergent, about equal in size; base

of costa bearing a stalked, slanted, digitate process with a wide base; sacculus twisted apically, constricting valva near midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with many stout, conical cornuti, and bearing an elongate, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Sirena, P[arque] N[acional] Corcovado, 0–100 m, Prov[incia] Punt[arenas], COSTA RICA, G. Fonseca, Oct. 1990, L-S-270500, 508300”, “INBio: COSTA RICA: CRI000, 179187” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 1082” [yellow label], “PARATYPE, *Glyphidocera guaroa*, Adamski” [blue label].

Distribution (Map 36): *Glyphidocera placentae* is known from a single collecting site on the Osa Peninsula in south-eastern Costa Rica.



MAP 36. Distribution of *Glyphidocera placentae* (●) and *G. formae* (▲).

Etymology: The species epithet *placentae* is derived from the Latin “placenta,” meaning a small cake.

#### ***Glyphidocera formae*, new species**

(Figs. 201–203, 354, Map 36)

Diagnosis.— *Glyphidocera formae* is similar to *G. vappae* but differs by a slightly larger and more widely separate costal furcae of the valva, a longer apical curnutus of the aedeagal vesica, and vesica of aedeagus with several small cornuti.

Description.— Head: Vertex and frontoclypeus pale brownish yellow; outer surface of labial palpus brown intermixed with few pale brownish-yellow scales to apical margin of segment II; inner surface pale brownish yellow intermixed with few brown scales; scape of antenna pale brownish yellow, flagellum with alternating bands of pale brownish-yellow and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brownish yellow.

Thorax: Tegula and mesonotum pale brownish yellow. Legs brown intermixed with pale brownish-yellow scales to apical margins of all segments and tarsomeres, or as above except, pterothoracic legs or hindleg pale brownish yellow. Forewing (Fig. 354): Length 5.3–6.9 mm (n = 36), pale brownish yellow intermixed with brownish-orange and brown scales; cell and surrounding areas paler than marginal areas; cell with 2 small, brown spots, 1 spot near middle, 1 spot near distal end; marginal spots present or absent. Under-surface brown intermixed with pale brownish-yellow scales along costa. Hindwing: Brown.

Abdomen (Fig. 201): Male with 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3. Anterior row of sex scales and a few scales along the posteromedian margin appear smaller than sex scales occupying the middle rows.

Male Genitalia (Figs. 202–203): Uncus elongate, wide at base, broadly constricted near 1/3, slightly rounded apically, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, moderately wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, medially fused from posteroventral margin, extending narrowly to base of uncus; costa of valva nearly straight from a shallow depression beyond basal, digitate process to dorsal furca; apex widely bifurcate, each furca large, about equal in size, parallel; sacculus twisted apically, constricting valva near midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with several stout, conical and spinelike cornuti, and bearing an elongate, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Sector Cerro Cocori, F[in]ca de E. Rojas, 150 m, Prov[incia] Limón, COSTA RICA, Oct. 1991, E. Rojas, L-N-286000, 567500”, “INBio: COSTA RICA: CRI001, 399570” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 710” [yellow label].

Paratypes (35 ♂): 3 ♂, Same label data as holotype except, “Nov.”, “CRI000, 501469”, “Slide No. 689”; “CRI000, 364130”, “Slide No. 698”; “Mar.”, “CRI000, 363645”, “Slide No. 711”; 1 ♂, “Est. Magsasay, P. N. Braulio Carrillo, 200 m, Prov. Here., COSTA RICA, A. Fernandez, Oct. 1990, L-N-264600, 531100”, “PARATYPE, *Glyphidocera guaroa*, Adamski”, “Slide No. 1071”; 31 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150

m, 10°26'N, 84°01'W, Mar. 1996, INBio-OET", "11 Marzo 1996", "L/05/183, Arboleda", "CRI002, 057874", "Slide No. 889"; "L/00/181, STR 2050 m", "CRI001, 250749", "Slide No. 921"; "L/00/180, STR 1850 m", "CRI001, 250765"; "CRI001, 250756"; "4 Marzo, L/00/173, CES 600 m", "CRI002, 057034"; "6 Marzo, L/00/179, CCC 650 m", "CRI002, 057669"; "19 Marzo, L/00/191", "CRI002, 058453"; "L/00/189, CES 300 m", "CRI001, 257462"; "CRI001, 257458"; "CRI001, 257460"; "L/00/191, CCC 650 m", "CRI002, 058493"; "21 Marzo, L/00/194, SOR 500 m", "CRI001, 257215"; "8 Abril 1996, L/00/207, STR 2550 m", "CRI002, 059842", "Slide No. 870"; "CRI002, 059773"; "CRI002, 059776"; "CRI002, 059814"; "22 Abril, L/00/221, CES 200 m", "CRI002, 061218", "L/00/223, SOR 700 m", "CRI060894"; "24 Abril, L/00/227, STR 500 m", "CRI002, 060584"; "9 Feb., L/00/134, SSO 80 m", "CRI001, 251187"; "8 Ene. 1993, Arboleda, L0001", "CRI001, 218973", "Slide No. 900"; "13 Abril, Bosque primario, L/02/026", "CRI231201"; "14 Junio, L/01/040", "CRI001, 228275"; "17 Octubre, L/01/076", "CRI001, 239933"; "11 Noviembre, L/03/081", "CRI001, 236964"; "10 Febrero 1994, Bosque secundario, L/03/097", "CRI001, 259619"; "CRI001, 259614"; "CRI001, 259623"; "1 Julio 1994, L/00/111", "CRI001, 262196"; "4 Julio, Bosque primario, L/02/117", "CRI001, 244461"; "28 Feb. 1996, L/00/169, STR 375 m", "CRI001, 250676", (25 in INBio, 10 in USNM).

Distribution (Map 36): *Glyphidocera formae* is known from three collecting sites in north-central Costa Rica, north of the Cordillera Central.

Etymology: The species epithet *formae* is derived from the Latin word for beauty - forma.

### ***Glyphidocera vappae*, new species**

(Figs. 1, 204–206, 286, 355, Map 37)

Diagnosis.— *Glyphidocera vappae* is most similar to *G. formae* but differs from the latter by having slightly smaller and more narrowly separate costal furcae of the valva, a shorter apical curnutus of the aedeagal vesica, and absence of cornuti within vesica of aedeagus.

Description.— Head: Vertex and frontoclypeus brownish yellow; outer surface of labial palpus dark brown intermixed with brownish-yellow scales to apical margin of segment II, segment III dark brown intermixed with few brownish-yellow scales; inner surface of segment I–II pale brownish-yellow scales intermixed with few dark-brown scales, segment III dark brown intermixed with few pale brownish-yellow scales; scape of antenna brownish yellow or brownish yellow intermixed with few dark-brown scales, flagellum with alternating bands of brownish-yellow and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis brownish yellow.

Thorax: Tegula and mesonotum brownish yellow or brownish yellow intermixed with few dark-brown scales. Legs brownish yellow intermixed with brown scales, apical margins of all segments and tarsomeres brownish yellow. Forewing (Figs. 1, 355): Length 6.0–7.1 mm ( $n = 52$ ), brownish yellow intermixed with few brownish-orange and few dark-brown scales; cell and surrounding areas paler than marginal areas; cell with 2 dark-brown spots, 1 spot near middle, 1 spot near distal end; middle spot large or small, present or absent; distal spot small; a small spot on CuP basiposterior to midcell spot present or absent; margin brownish yellow or demarcated with dark-brown scales. Undersurface brown intermixed with brownish-yellow scales along costal margin; venation with  $R_3$ ,  $R_4$ , and  $R_5$  approximate to dorsoanterior part of cell;  $M_2$  and  $M_3$  approximate to dorsoanterior part of cell;  $M_1$  absent;  $CuA_1$  and  $CuA_2$  branched distad of Cubitus beyond cell, extending in a slight curve to margin; CuP slightly evident basally. Hindwing (Fig. 1): Brownish gray; venation with  $R_s$  and  $M_1$  stalked about 1/3 length beyond end of cell;  $M_2$  closer to  $M_3$  than to  $M_1$ ;  $M_3$  branched with  $CuA_1$  beyond cell, about 1/4 distance as  $R_s$  and  $M_1$ ;  $CuA_2$  arising from cell about 2/3 length of Cubitus; 1A and 2A separate basally, forming an elliptical support.

Abdomen (Fig. 204): Male with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 205–206): Uncus elongate, wide at base, broadly constricted near 1/3, narrowly parallel-sided apically, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially from posteroventral margin, extending to base of uncus; costa of valva nearly straight from shallow depression beyond basal, digitate process to dorsal furca; apex widely bifurcate, margin between furcae U-shaped; dorsal and ventral furcae large, divergent, equal in size, greatly extended beyond outer margin of cucullus; sacculus apically twisted, constricting valva slightly before midlength, widening distoventrally, forming an elongate, broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus sparsely denticulate, bearing a large crescent-shaped, apical cornutus; cornutus with one side slightly shortened, exposing a hollow, basal cavity.

Female Genitalia (Fig. 286): Papillae anales elongate, wider basally than apically; apophysis posterioris and apophysis anterioris about equal in length; eighth sternum and eighth tergum about equal in width; eighth sternum with posterior margin broadly rounded, anterior margin broadly emarginate; eighth tergum with posterior margin nearly straight, anterior margin broadly emarginate; antrum enlarged posteriorly from a constricted anterior end, posterior margin slightly rounded, posterolateral margin angular; anterior end with a pair of elongate, spinelike processes inside cavity formed from outer wall; ductus bursae short; corpus bursae slightly enlarged anteriorly, sparsely denticulate; ductus seminalis short, about 5-coiled, each coil decreasing in size distally; ductus seminalis with a short, 4-coiled internal support; side opposite ductus bursae slightly swollen, with a large, internal support.

Holotype, ♂, “Sector Cerro Cocori, F[in]ca de E. Rojas, 150 m, Prov[incia] Limón, COSTA RICA, E. Rojas, 31 Ene. – 21 Feb. 1992, L-N-286000, 567500”, “INBio: COSTA RICA: CRI000, 785137” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 470” [yellow label], “PARATYPE, *Glyphidocera guaroa*, Adamski” [blue label].

Paratypes (51 ♂): 23 ♂, Same label data as holotype except, “CRI000, 785313”, Slide No. 1033”; “CRI000, 775096”, “Slide No. 1034”; “Ene. 1993”, “CRI001, 402859”, “Slide No. 1035”; “Feb. 1993”, “CRI000, 998790”, “Slide No. 425”; “Mar. 1992”, “CRI000, 363593”, “Slide No. 1039”; “CRI000, 363629”, “Slide No. 1040”; “26 Jun. a 16 Jul. 1992”, “CRI000, 703169”, “Slide No. 1047”; “Jul. 1993, # 2252”, “CRI001, 699131”, “Slide No. 472”; “Abr. 1992”, “CRI000, 785511”, “Slide No. 1043”; “CRI000, 785518”, “Slide No. 1044”; “CRI000, 786302”, “Slide No. 1045”; “CRI000, 785544”, “Slide No. 1042”; “CRI000, 786366”, “Wing Slide No. 429”; “Set. 1993”, “CRI001, 141370”, “Slide No. 1049”; “Oct”, “CRI000, 819686”, “Slide No. 1050”; “9 a 30 Nov.”, “CRI000, 931463”, “Wing Slide No. 491”; “CRI000, 931418”, “Slide No. 1059”; “Nov. 1991”, “CRI000, 460144”, “Slide No. 1054”; “CRI000, 501470”, “Slide No. 1051”; “CRI000, 501449”, “Slide No. 1052”; “CRI000, 460169”, “Slide No. 1060”; “Dic. 1991”, “CRI000, 361205”, “Slide No. 1055”; “CRI000, 361269”, “Slide No. 1058”; 13 ♂, “Est. Magsasay, P. N. Braulio Carrillo, 200 m, Prov. Here., COSTA RICA, R. Aguilar, Abr. 1991, L-N-264600, 531100”, “CRI000, 275099”, “PARATYPE, *Glyphidocera guaroa* Adamski”, “Slide No. 1066”; “May 1991, M.A. Zumbado”, “CRI001, 300398”, “Slide No. 1073”; “Oct 1990”, “CRI000, 180818”, “Slide No. 1068”; “CRI000, 180807”, “Slide No. 1069”; “A. Fernandez, Oct. 1990”, “CRI000, 179675”, “Slide No. 1070”; “R. Aguilar, Dic. 1990”, “CRI000, 701559”, “Slide No. 1072”; “Nov. 1990”, “CRI000, 226705”, “Slide No. 1023”; “CRI000, 226693”, “Slide No. 1064”; “CRI000, 226773”, “Slide No. 1024”; “CRI000, 226735”, “Slide No. 1035”; “CRI000, 226721”, “Slide No. 1062”; “CRI000, 226729”, “Slide No. 1063”; “Nov. 1990, A. Fernandez”, “CRI000, 453154”, “Slide No. 1065”; 4 ♂, Cerro Tortuguero, 0–120 m, P. N. Tortuguero, Prov. Limón, COSTA RICA, Jul. 1992, R. Delgado, L-N-285000, 588000”, “CRI000, 735815”, “Slide No. 602”; “Ene. 1993”, “CRI001, 352695”, “Slide No. 597”; “Mar.”, “CRI001, 353223”, “Slide No. 587”; “Mar. 1991, J. Solano”, “CRI000, 197452”, “Slide No. 599”; 3 ♂, “Est. Pitilla, 700 m, 9 km, S. Sta. Cecilia, P. N. Guanacaste, Prov. Guan., COSTA RICA, 19 May – 3 Jun. 1993, P. Rios, L-N-330200, 380200”, “CRI001, 353855”, “Slide No. 773”; “P. Rios & C. Moraga, Oct. 1990”, “CRI000, 197960”, “PARATYPE, *Glyphidocera guaroa* Adamski”, “Slide No. 1074”; “19 – 23 Jun. 1993, # 2175”, “CRI001, 835123”, “Slide No. 479”; 2 ♀, “P. N. Manuel Antonio, 80 m, Quepos, Prov. Punt., COSTA RICA, Mar. 1993, G. Varela, L-S-370900, 448800”, “CRI001, 409698”, “♀ Slide No. 427”, “PARATYPE, *Glyphidocera guaroa* Adamski”; “Jul. 1992”, “CRI000, 950374”, “♀ Slide No. 426”; 1 ♂, “Est. Esquinas, Pen. de Osa, Prov. Punta., COSTA RICA, 200 m, Set. 1993, M. Segura, L-S-301400, 542200, # 2372”, “CRI001, 661959”, “Slide No. 526”, “PARATYPE, *Glyphidocera guaroa* Adamski”; 1 ♂, “Monumento Nacional Guayabo, Prov. Carta., COSTA

RICA, 1100 m, 28 Set. – 21 Nov. 1994, G. Fonseca, L-N-217400, 570000, # 3285”, “CRI002, 024721”; 1 ♂, “Fca. San Gabriel, 2 km, SW Dos Rios, 600 m, Prov. Alaj., COSTA RICA, I Curso Microlepidoptera, Jul. 1990, L-N-318800, 383500”, “CRI000, 475377”, “Slide No. 522”; 1 ♂, “Est. Queb. Bonita, 50 m, Res. Biol. Carara, Prov. Punt., COSTA RICA, R. Zuniga, Ene. 1991, L-N-194500, 469850”, “CRI000, 580522”, “Slide No. 609”; 1 ♂, “COSTA RICA, Prov. Limón, Sector Cedrales de la Rita, 3 km N del Puente Rio Suerte, Ruta Puerto Lindo, 10 m, Jul. 1996, E. Rojas, L-N-278600, 566500, # 7900”, “CRI002, 454558”, “Slide No. 846”; 1 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, June 1994, INBio-OET”, “29 Junio 1994, Bosque primario, L/01/109”, “CRI001, 243844”, “Slide No. 918”, (36 in INBio, 15 in USNM).

Distribution (Map 37): *Glyphidocera vappae* appears cosmopolitan in Costa Rica and likely is distributed more widely throughout Central America and possibly into South America.



MAP37. Distribution of *Glyphidocera vappae* (●). Outlying circles indicate adjacent multiple localities.

Etymology: The species epithet *vappae* is derived from the Latin “vappa,” meaning sour vine.

### ***Glyphidocera positurae*, new species**

(Figs. 207–209, 356, Map 38)

Diagnosis.— Relationships between *Glyphidocera positurae* and its congeners are difficult to determine because of the unique combination of features possessed by the former that include an abdomen with large sex scales between terga 2–3 in male, costal furcae of valva

equal in size and constricted basally, and vesica of aedeagus with a small conical apical cornutus.

Description.— Head: Vertex and frontoclypeus pale brown; outer surface of labial palpus pale brown intermixed with few pale-brown scales, inner surface pale brown; scape of antenna pale brown, flagellum with alternating bands of pale-brown and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brown.

Thorax: Tegula and mesonotum pale brown. Legs brown intermixed with pale-brown scales to apical margins of all segments and tarsomeres. Forewing (Fig. 356): Length 5.9 mm (n = 2), pale brown intermixed with few brown scales; cell with 3 brown spots, 1 spot near middle, 2 spots near distal end. Undersurface brown. Hindwing: Brownish gray.

Abdomen (Fig. 207): Male with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 208–209): Uncus elongate, wide at base, broadly constricted at 1/3, broadly widened near middle, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a wide base, fusing dorsally, extending widely to base of uncus; costa of valva slightly emarginate medially, broadly rounded distally to a constricted subapical part; apex bifurcate, each furca widely divergent, about equal in size; sacculus twisted apically slightly before midlength, constricting valva, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with many small conical cornuti, and bearing a small, conical, apical cornutus.

Female Genitalia: Unknown.

Holotype, ♂, “Sector Cerro Cocori, F[in]ca de E. Rojas, 150 m, Prov[incia] Limón, COSTA RICA, E. Rojas, Abr. 1992, L-N-286000, 567500”, “INBio: COSTA RICA: CRI000, 786299” [bar code label], “INBio, Genitalia Slide by D. Adamski, No. 481” [yellow label].

Paratype 1♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, Feb. 1996, INBio-OET”, “15 Feb. 1996, Arboleda, L/05/149”, “CRI002, 057550”, “Slide No. 922.”

Distribution (Map 38): *Glyphidocera positurae* is known from two collecting sites in north-central Costa Rica, north of the Cordillera Central.

Etymology: The species epithet *positurae* is derived from the Latin “positura,” meaning posture.





MAP 38. Distribution of *Glyphidocera positurae* (▲) and *G. zophocrossa* Meyrick (●).

***Glyphidocera zophocrossa* Meyrick, 1929**

(Figs. 210–212, 357, Map 38)

*Glyphidocera zophocrossa* Meyrick, 1929: 530; Becker, 1984: 41 (checklist).

Diagnosis.— *Glyphidocera zophocrossa* is most similar to *G. guaroa* from which it can be distinguished by having the dorsal strut of tegumen constricted near midlength and the dorsal furca of costal valva extending beyond the ventral furca.

Description.— Head: Vertex and frontoclypeus pale brownish yellow; outer surface of labial palpus brown intermixed with pale brownish-yellow scales to apical margin of segment II, inner surface pale brownish yellow intermixed with few brown scales; scape of antenna pale brownish yellow intermixed with few brown scales, flagellum with alternating bands of pale brownish-yellow and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brownish yellow.

Thorax: Tegula and mesonotum brown basally, pale brownish yellow distally. Legs brown intermixed with pale brownish-yellow scales to apical margins of all segments and tarsomeres. Forewing (Fig. 357): Length 5.9–6.0 mm (n = 3), pale brownish yellow intermixed with pale yellow and few brown scales; cell with 2 small, brown spots, 1 spot near middle, 1 spot near distal end [specimens with spots present or absent]. Undersurface brown with pale brownish-yellow scales along costa and between CuP and anal margin. Hindwing: Pale gray.

Abdomen (Fig. 210): Male with 5 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 211–212): Uncus elongate, broadly constricted above a wide base, gradually widened apically, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing midway between posteroventral margin, gradually widening to base of uncus; costa of valva gradually upturned broadly from basal process to dorsal furca; apex widely bifurcate, furcae slightly convergent apically; dorsal furca falcate, large, about 6 times longer than ventral furca; sacculus twisted apically, constricting valva slightly beyond midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica denticulate, bearing a large crescent-shaped apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Type Examined: Lectotype ♂, designated by Clarke, “Trinidad, .2.28.”, “BM Slide No. 6117.” [BMNH].

Other Specimens Examined: (3 ♂): “COSTA RICA, Prov[incia] Limón, Sector Cedrales de la Rita, 3 km N del Puente Río Suerte, Ruta Puerto Lindo, 10 m, Oct. 1996, E. Rojas, L- 278600, 566500, # 44661”, “CRI002, 492676”, “Slide No. 852”; “CRI002, 492671”, “Slide No. 853”; “CRI002, 492794”, (2 in INBio, 1 in USNM).

Distribution (Map 38): *Glyphidocera zophocrossa* is known from one collecting site in north-central Costa Rica, north of the Cordillera Central, and from specimens collected from Trinidad off the coast of Venezuela (Meyrick, 1929).

### ***Glyphidocera guaroa* Adamski, 2002**

(Figs. 213–215, 358, Map 39)

Diagnosis.— *Glyphidocera guaroa* is most similar to *G. zophocrossa* but differs from the latter by having a dorsal strut of the tegumen that is parallel-sided from the posteroventral margin of the tegumen to the base of the uncus, and dorsal furca of valval costa that does not extend beyond the ventral furca.

Description.— Head: Vertex brownish yellow, or brownish yellow intermixed with brown scales; frontoclypeus brownish yellow; outer surface of labial palpus brown intermixed with brownish-yellow scales to apical margin of segment II, inner surface brownish yellow intermixed with few brown scales; scape of antenna brownish yellow intermixed with few brown scales, flagellum with alternating bands of brownish-yellow and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis brownish yellow.

Thorax: Tegula and mesonotum brownish yellow. Legs brownish yellow intermixed with brown scales, apical margins of all segments and tarsomeres brownish yellow. Forew-

ing (Fig. 358): Length 5.2–7.0 mm (n = 83), brownish yellow intermixed with brownish-orange and few dark-brown scales; cell and surrounding areas paler than marginal areas; cell with 2 spots, 1 spot near middle, 1 spot near distal end [rubbed specimens have spots faint or absent]; marginal spots absent or fused. Undersurface brown intermixed with brownish yellow scales along costal margin. Hindwing: Brownish gray.

Abdomen (Fig. 213): Male with 5 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 214–215): Uncus elongate, wide at base, broadly constricted near 1/3, narrowly rounded apically, apex rounded and setose; gnathos setose, protuberant, gradually narrowed from base to apex, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially, extending widely from posteroventral margin to base of uncus; costa of valva gradually sloped dorsally from a shallow depression beyond basal, digitate process to dorsal furca; apex widely bifurcate, with inner margin broadly rounded; dorsal furca long, ventral furca wide and falcate, extending slightly beyond outer margin of cucullus; sacculus apically twisted, constricting valva slightly before midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a large, conical, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

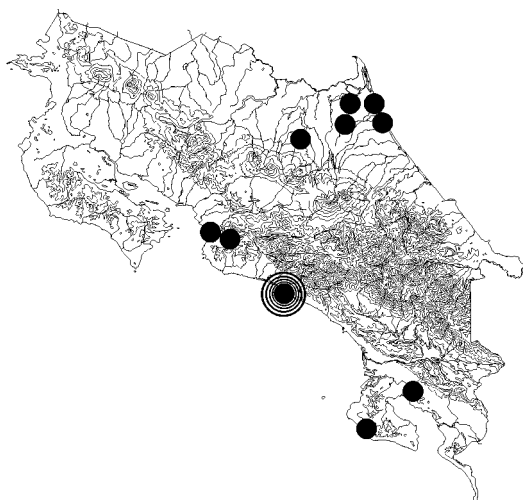
Holotype, ♂, “Quepos, 30 m, P[arque] N[acional] Manuel Antonio, Prov[incia] Punt[arenas], COSTA RICA, G. Varela & R. Zuniga, Oct. 1990, L-S-370500, 449000”, “INBio: COSTA RICA: CRI000, 274960” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 490”, “HOLOTYPE, *Glyphidocera guaroa*, Adamski” [red label].

Paratypes (82 ♂): 33 ♂, “Same label data as holotype except, “Ene. 1991, R. Zuniga, L-S-370900, 448800”, “CRI000, 564348”, “Slide No. 991”; “CRI000, 564336”, “Slide No. 992”; “CRI000, 564463”, “Slide No. 993”; “CRI000, 564637”, “Slide No. 994”; “CRI000, 366906”, “Slide No. 995”; “CRI000, 366794”, “Slide No. 465”; “Feb. 1991”, “CRI000, 625779”, “Slide No. 996”; “CRI000, 347231”, “Slide No. 997”; “CRI000, 347206”, “Slide No. 998”; “CRI000, 346903”, “Slide No. 999”; “CRI000, 625780”, “Slide No. 1000”; “CRI000, 347168”, “Slide No. 1001”; “CRI000, 346923”, “Slide No. 1002”; “CRI000, 347090”, “Slide No. 1006”; “Set. 1992, G. Varela”, “CRI000, 815605”, “Slide No. 1013”; “CRI000, 935656”, “Slide No. 1015”; “# 2463”, “CRI001, 998326”, “Slide No. 1014”; “G. Varela & R. Zuniga”, “CRI000, 227948”, “Slide No. 1017”; “CRI000, 228703”, “Slide No. 1018”; “CRI000, 229104”, “Slide No. 1019”; “CRI000, 229072”, “Slide No. 1020”; “CRI000, 229266”, “Slide No. 1021”; “Oct. 1990, L-S-371500, 449450”, “CRI000, 223069”, “Slide No. 1016”; “G. Varela & R. Zuniga, Dic. 1990”, “CRI000, 583981”, “Slide No. 466”; “CRI000, 228770”, “Slide No. 1022”; “R. Zuniga, Mar. 1991”, “CRI000, 648407”, “Slide No. 1004”; “Mar. 1993, G. Varela”, “CRI001, 409702”, “Slide No. 1003”; “May 1991, R. Zuniga”, “CRI001, 319472”, “Slide

No. 1012"; "CRI001, 319436", "Slide No. 1005"; "G. Varela, Ago., # 2307", "CRI001, 656013", "Slide No. 1007"; "CRI001, 656008", "Slide No. 1008"; "CRI001, 656082", "Slide No. 1010"; "1992", "CRI000, 940614", "Slide No. 1011"; 9 ♂, "Sector Cerro Cocori, Fca. De E. Rojas, 150 m, Prov. Limón, COSTA RICA, E. Rojas, 31 Ene. – 21 Feb. 1992, L-N-286000, 567500", "CRI000, 775089", "PARATYPE, *Glyphidocera guaroa* Adamski", "Slide No. 471"; "Mar. 1992, L-N-286000, 567500", "CRI000, 363635", "Slide No. 1037"; "CRI000, 363719", "Slide No. 1038"; "CRI000, 181437", "Slide No. 1041"; "Apr.", "CRI000, 785501", "Slide No.482"; "May 1992", "CRI000, 373560", "Slide No. 1046"; "Set. 1991", "CRI000, 598938", "Slide No. 1048"; "Nov. 1991", "CRI000, 460128", "Slide No. 1056"; "CRI000, 460151", "Slide No. 1057"; "# 2549", "CRI001, 856571", "Slide No. 1053"; 19 ♂, "Est. Sirena, 0–100 m, P. N. Corcovado, Prov. Punt., COSTA RICA, G. Fonseca, Set. 1991, L-S-270500, 508300", "CRI000, 357571", "PARATYPE, *Glyphidocera guaroa* Adamski", "Slide No. 1077"; "CRI000, 357617", "Slide No. 1078"; "CRI000, 357507", "Slide No. 1080"; "Oct. 1990", "CRI000, 179079", "Slide No. 1081"; "CRI000, 643420", "Slide No. 1083"; "Nov. 1999", "CRI000, 445886", "Slide No. 881", "Nov. 1990", "CRI000, 183423", "Slide No. 1084"; "Dic. 1992", "CRI000, 783813", "Slide No. 1088", "CRI000, 297295", "Slide No. 1089"; "C. Saborio", "CRI000, 526635", "Slide No. 1090"; "G. Fonseca, Mar. 1992", "CRI000, 780383", "Slide No. 1092"; "CRI000, 780480", "Slide No. 1094"; "Abr. 1991", "CRI000, 475866", "Slide No. 1095"; "CRI000, 475887", "Slide No. 1096"; "May 1991", "CRI000, 587949", "Slide No. 1026"; "CRI000, 588114", "Slide No. 1027"; "CRI000, 587822", "Slide No. 1028"; "1992", "CRI000, 914822", "Slide No. 1029"; "June 1991", "CRI000, 646447", "Slide No. 1031"; 6 ♂, "Cerro Tortuguero, 0–120 m, P. N. Tortuguero, Prov. Limón, COSTA RICA, Jul. 1991, J. Solano, L-N-285000, 588000", "CRI001, 314572", "PARATYPE, *Glyphidocera guaroa* Adamski", "Slide No. 582"; "Jun. 1992, R. Delgado", "CRI000, 708981", "Slide No. 583"; "CRI001, 314577", "Slide No. 573"; "CRI000, 708883", "Slide No. 584"; "Abr. 1991, J. Solano", "CRI000, 596286", "Slide No. 585"; "Jun. 1991, # 1684", "CRI001, 674856", "Slide No. 581"; 8 ♂, "Est. Queb. Bonita, 50 m, Res. Biol. Carara, Prov. Punt., COSTA RICA, R. Zuniga, Apr. 1991, L-N-194500, 469850", "CRI000, 446662", "Slide No. 572", "PARATYPE, *Glyphidocera guaroa* Adamski", "Slide No. 572"; "CRI000, 315599", "Slide No. 590"; "Jun. 1991", "CRI000, 349039", "Slide No. 578"; "Ago. 1990", "CRI000, 181226", "Slide No. 580"; "CRI000, 180979", "Slide No. 579"; "CRI000, 181234", "Slide No. 589", "CRI000, 181223", "Slide No. 592"; "Set. 1993, J. Saborio, L-N-194500, 469850, # 2354", "CRI001, 655297", "Slide No. 591"; 2 ♂, "Est. Bijagual, 500 m, Res. Biol. Carara, Prov. S. José, COSTA RICA, R. Zuniga, Set. 1990, L-N-192250, 474760", "CRI000, 296233", "Slide No. 518"; "CRI000, 299679", "Slide No. 525"; 1 ♂, "Est. Cuatro Esquinas, P. N. Tortuguero, 0 m, Prov. Limón, COSTA RICA, J. Solano, Oct. 1990, L-N-280000, 590500", "CRI000, 178755", "Slide No. 848"; 1 ♂, "Est. Esquinas, Pen. de Osa, Prov. Punt., COSTA RICA, 200 m, Ago. 1993, M. Segura, L-S-301400, 542200, # 2314", "CRI001,

131018”, “Slide No. 528”; 1 ♂, “Sector Cedrales de la Rita, Prov. Limón, COSTA RICA, 10 m, Set. 1995, E. Rojas, L-N-278600, 566500, # 6123”, “CRI002, 308798”, “Slide No. 847”; 1 ♂, “Est. Magsasay, P. N. Braulio Carrillo, 200 m, Prov. Here., COSTA RICA, R. Aguilar, Nov. 1990, L-N-264600, 531100”, “CRI000, 226738”, “Slide No. 1061”, “PARATYPE, *Glyphidocera guaroa* Adamski”, (62 in INBio, 20 in USNM).

Distribution (Map 39): *Glyphidocera guaroa* is known from several north-central sites in Costa Rica and coastal sites in south-central to the eastern part of the country.



**MAP 39.** Distribution of *Glyphidocera guaroa* Adamski (·). Outlying circles indicate multiple adjacent localities.

Remarks: In the original description of *Glyphidocera guaroa*, Adamski (2002) erroneously figured the wing venation and male and female genitalia of *G. vappae*.

### ***Glyphidocera rubetae*, new species**

(Figs. 216–218, 359, Map 40)

Diagnosis.— *Glyphidocera rubetae* can be distinguished from its congeners by a unique combination of characters that includes the dorsal strut of the tegumen with arms fused medially from the base of the posteroventral margin to midlength (forming a widened, pigmented, angular area from midlength to base of uncus), the digitate process of valva widened basally, the dorsal furca of valval costa long and extending beyond ventral furca, and the outer margin of the valval cucullus narrowly rounded.

Description.— Head: Scales on vertex and frontoclypeus brown tipped with pale brown; outer and inner surfaces of labial palpus brown intermixed with pale-brown scales to segment II; scape brown intermixed with pale-brown scales, flagellum with alternating

bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis brown.

Thorax: Tegula and mesonotum with brown scales tipped with pale brown. Legs brown intermixed with pale-brown scales to apical margins of all segments and tarsomeres. Forewing (Fig. 359): Length 5.0–6.0 mm (n = 5), brown intermixed with pale-brown and pale brownish-yellow scales; cell and surrounding areas paler than marginal areas; cell with 2 brown spots, 1 spot near middle, 1 spot near distal end [rubbed specimens with spots faint or absent]. Undersurface brown. Hindwing: Pale brown.

Abdomen (Fig. 216): Male with 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 217–218): Uncus elongate, wide at base, broadly constricted near 1/3, broadly rounded apically, apex narrowly rounded and setose; gnathos setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms fused medially from base of posteroventral margin to midlength, extending dorsally, gradually widening to base of uncus; costa of valva broadly rounded from shallow depression beyond a slanted, basal, digitate process to a falcate dorsal furca; apex bifurcate, margin between furcae deeply dissected; sacculus twisted apically, constricting valva near midlength, widening distoventrally forming a broadly rounded and narrow cucullus; cucullus membranous and setose; vesica of aedeagus densely denticulate, bearing a large, crescent-shaped, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Sector Cerro Cocori, F[in]ca de E. Rojas, 150 m, Prov[incia] Limón, COSTA RICA, E. Rojas, Nov. 1991, L-N-286000, 567500”, “INBio: COSTA RICA: CRI000, 364110” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 705” [yellow label].

Paratypes (4 ♂): 2 ♂, Same label data as holotype except, “Dic. 1991”, “CRI000, 361186”, “Slide No. 709”; “CRI000, 760981”, “Slide No. 715”; 1 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, Oct. 1993, INBio-OET”, “12 Octubre 1993, Bosque secundario, L/03/073”, “CRI001, 239727”, “Slide No. 887”; 1 ♂, “Est. Hitoy-Cerere, Res. Biol. Hitoy Cerere, R. Cerere, 200 m, Prov. Limón, COSTA RICA, M. Barrelier, Oct. 1990, L-N-184200, 643300”, “CRI000, 314028”, “Slide No. 849”, (2 in INBio, 2 in USNM).

Distribution (Map 40): *Glyphidocera rubetae* is known from two collecting sites from north-central Costa Rica north of the Cordillera Central and one site in the north-eastern part of the country, north of the Cordillera de Talamanca near the Panamanian border.

Etymology: The species epithet *rubetae* is derived from the Latin “rubeta,” meaning toad.



MAP 40. Distribution of *Glyphidocera rubetae* (●) and *G. harenae* (▲).

***Glyphidocera harenae*, new species**

(Figs. 219–221, 360, Map 40)

Diagnosis.— *Glyphidocera harenae* is most similar to *G. crepidae* but differs from the latter by having an abdomen with more rows of sex scales between terga 2–3 in male, a complete dorsal strut of tegumen, a longer valva, costal furcae of valva near parallel, and vesica of aedeagus without spinelike cornuti.

Description.— Head: Scales on vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus brown intermixed with pale-brown scales to apical margin of segment II, inner margin pale brown intermixed with few brown scales; scape brown intermixed with few pale-brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brown.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with few pale-brown scales to apical margins of all segments and tarsomeres. Forewing (Fig. 360): Length 5.0–6.1 mm (n = 3), brown intermixed with few pale-brown scales; cell with 1 faint, brown spot near distal end. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 219): Male with 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 220–221): Uncus elongate, broadly constricted near 1/3, gradually widened apically, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut with arms convergent, fusing medially from posteroventral margin, extending dorsally to midlength, gradually widening to base of uncus; valva with costa gradually

upturned broadly from a shallow depression beyond a slanted, basal, digitate process to a raised dorsal furca; apex bifurcate, furcae large, widely divergent, parallel; sacculus twisted apically constricting valva near midlength, widening distoventrally, forming a broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus densely denticulate, bearing a large, sickle-shaped, apical cornutus; cornutus with one side slightly shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Sirena, P[arque] N[acional] Corcovado, 0–100 m, Prov[incia] Punt[arenas], COSTA RICA, G. Fonseca, Mar. 1991, L-S-270500, 508300”, “INBio: COSTA RICA: CRI000, 447830” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 799” [yellow label].

Paratypes (2 ♂): Same label data as holotype except, “Mar. 1992”, “CRI000, 780697”, “Slide No. 792”; “CRI000, 621786”, “Slide No. 801”, (1 in INBio, 1 in USNM).

Distribution (Map 40): *Glyphidocera harenae* is known from one coastal collecting site in south-eastern Costa Rica, south of the Osa Peninsula.

Etymology: The species epithet *harenae* is derived from the Latin “harena,” meaning sand.

#### ***Glyphidocera crepidae*, new species**

(Figs. 222–224, 361, Map 41)

Diagnosis.— *Glyphidocera crepidae* is most similar to *G. harenae* but differs from the latter by having an abdomen with fewer rows of sex scales between terga 2–3 in male, an incomplete dorsal strut of tegumen, a shorter valva, costal furcae of valva not parallel [ventral furca apically upturned abruptly], and vesica of aedeagus with many spinelike cornuti.

Description.— Head: Vertex and frontoclypeus brown intermixed with few pale-brown scales; labial palpus with outer surface of segments brown intermixed with few pale brownish-yellow scales to apical margin on segments I–II, segment III brown intermixed with few pale brownish-yellow scales; inner surface as above except with more pale brownish-yellow scales on segments I–II; scape of antenna brown intermixed with few pale brownish-yellow scales, flagellum with alternating bands of brown and pale brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brownish yellow.

Thorax: Tegula and mesonotum brown. Legs with segments brown intermixed with pale brownish-yellow scales, tarsomeres brown with pale brownish-yellow scales to apical margin. Forewing (Fig. 361): Length 5.1 mm (n = 1), brown intermixed with pale brownish-yellow scales; cell with 3 brown spots, 1 spot near middle, 2 spots slightly coalescent,



at distal end parallel with crossvein; marginal spots brown. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 222): Male with 2 transverse rows of sex scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 223–224): Uncus elongate, wide at base, slightly constricted above, parallelsided apically, apex narrowly rounded and setose; gnathos densely setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing from posteroventral margin to 1/3 length, dorsally atrophied; valva with costa slightly sloped dorsally from a shallow depression beyond a slanted, basal, digitate process to dorsal furca; apex widely bifurcate, inner margin U-shaped; dorsal furca falcate, ventral furca abruptly angled apically, slightly broader than dorsal furca; sacculus twisted apically, constricting valva at midlength, forming a ventrally protracted cucullus; cucullus membranous and setose; vesica of aedeagus with many moderately elongate, spinelike cornuti, and bearing a large, crescent-shaped, apical cornutus; cornutus with one side slightly shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, June 1994, INBio-OET”, “28 Junio 1994, Bosque secundario, L/06/107”, “INBio: COSTA RICA: CRI001, 243975” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 904” [yellow label].

Distribution (Map 41): *Glyphidocera crepidae* is known from one collecting site in east-central Heredia in northern Costa Rica.



**MAP 41.** Distribution of *Glyphidocera crepidae* (▲) and *G. vestita* Walsingham (●).

Etymology: The species epithet *crepidae* is derived from the Latin “crepida,” meaning slipper.

***Glyphidocera vestita* Walsingham 1911**

(Figs. 225–227, 362, Map 41)

*Glyphidocera vestita* Walsingham, 1911: 112; Becker 1984: 41 (checklist).

Diagnosis.— *Glyphidocera vestita* is most similar to *G. speculae* but differs by having fewer rows of sex scales between terga 2–3 on the abdomen of the male, a tegumen that is wider basally, a narrower costal furcae of valva, a more protracted apicoventral margin of the valval cucullus, an apical cornutus with a bulbous base, and the presence of many spinelike cornuti on vesica of aedeagus.

Description.— Head: Scales on vertex and frontoclypeus brown tipped with pale brown; outer and inner surfaces of labial palpus brown intermixed with pale-brown scales to apical margin of segment II; scape of antenna brown intermixed with few pale-brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis brown.

Thorax: Tegula and mesonotum with brown scales tipped with pale brown or brown. Legs brown intermixed with pale-brown to apical margins of all segments and tarsomeres. Forewing (Fig. 362): Length 5.5–6.1 mm (n = 14), brown intermixed with pale-brown scales and few brownish-yellow scales; cell and surrounding areas paler than marginal areas; cell with 2 small, faint spots, 1 spot near middle, 1 spot near distal end [rubbed specimens with spots faint or absent]. Undersurface brown. Hindwing: Pale brown.

Abdomen (Fig. 225): Male with 4 transverse rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 226–227): Uncus elongate, constricted near ½ length, broadly rounded and upturned apically, apex acuminate and setose; gnathos protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially, extending dorsally, gradually widening narrowly to base of uncus; costa of valva nearly straight from a shallow depression beyond a curved, basal, digitate process to an upturned dorsal furca; apex widely bifurcate, inner margin U-shaped; dorsal furca large, falcate, ventral furca extending slightly beyond outer margin of cucullus; sacculus twisted apically, constricting valva slightly before midlength, widening distoventrally forming an broadly rounded, slightly protracted cucullus; cucullus membranous and setose; vesica of aedeagus with many moderately large, spinelike cornuti, and bearing a large, conical, apical cornutus; cornutus bulbous basally, with one side shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Types Examined: Holotype ♂, “Panama: Canal Zone, Tabernilla, VI.1907, A, Busck, (5810). Paratype ♂, same label data as holotype except, “33632”, “BM Slide No. 30123.”

Other Specimens Examined: (14 ♂), 9 ♂, "Sector Cerro Cocori, Finca de E. Rojas, Prov[incia] Limón, COSTA RICA, 150 m, Set. 1993, E. Rojas, L-N-286000, 567500, # 2347", "CRI001, 141294", "Slide No. 704"; "Ago., # 2291", "CRI001, 135862", "Slide No. 696"; "Oct.", # 2395", "CRI001, 642573", "Slide No. 712"; "Jul. 1991", "CRI000, 643115", "Slide No. 699"; "Nov. 1991", "CRI000, 460134", "Slide No. 708"; "Nov. 1991", "CRI000, 460100", "Slide No. 703"; "CRI000, 361367", "Slide No. 700"; "Oct. 1992", "CRI000, 819733", "Slide No. 695"; "26 Jun. a 16 Jul. 1992", "CRI000, 703098", "Slide No. 707"; 1 ♂, "Est. Cuatro Esquinas, P. N. Tortuguero, 0 m, Prov. Limón, COSTA RICA, J. Solano, Oct. 1990, L-N-280000, 590500", "Slide No. 850"; 1 ♂, "Estacion Pitilla, 9 km S de Santa Cecilia, Prov. Guana., COSTA RICA, 700 m, 4-24 Abr. 1995, M. Moraga, L-N-329950, 380450, # 4627", "CRI002, 141080", "Slide No. 771"; 1 ♂, "Est. Queb. Bonita, 50 m, Res. Biol. Carara, Prov. Punt., COSTA RICA, R. Zuniga, Mar. 1991, L-N-194500, 469850", "CRI000, 648556", "Slide No. 642"; 1 ♂, "Parque Nacional Manuel Antonio, Quepos, Prov. Punta., COSTA RICA, 8 m, Oct. 1993, G. Varela, L-S-370900, 448800, # 2463", "CRI001, 998230", "Slide No. 810"; 1 ♂, "Est. Sirena, 0-100 m, P. N. Corcovado, Prov. Puntarenas, COSTA RICA, G. Fonseca, May 1992, L-S-270500, 508300", "CRI000, 914883", "Slide No. 793", (7 in INBio, 6 in USNM).

Distribution (Map 41): In Costa Rica, *Glyphidocera vestita* is known from north-western to north-central Costa Rica, south to the Pacific Coast from the Province of San José east to Puntarenas. *G. vestita* is also known from Panamá (Walsingham, 1911).

### ***Glyphidocera speculae*, new species**

(Figs. 228-230, 363, Map 42)

Diagnosis.— *Glyphidocera speculae* is most similar to *G. vestita* but differs from the latter by having an abdomen with more rows of sex scales between terga 2-3 in male, a tegumen that is narrower basally, wider costal furcae of valva, a more angular apicoventral margin of cucullus, and an apical cornutus without a bulbous base, and the absence of within vesica.

Description.— Head: Vertex and frontoclypeus pale orange intermixed with few pale-yellow scales; outer margin of labial palpus with segments I-II brown intermixed with pale-orange scales to apical margin, segment III brown with few pale-orange scales on apical half; inner surface pale orange intermixed with few brown scales; scape of antenna pale orange intermixed with few brown scales, flagellum with alternating bands of brown and pale-orange scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5-6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale orange.

Thorax: Tegula brown basally, pale orange distally; mesonotum pale orange. Legs pale yellow intermixed with pale-orange and few brown scales, pale yellow to apical margin of

all segments and tarsomeres. Forewing (Fig. 363): Length 6.9 mm ( $n = 1$ ), pale orange intermixed with pale-yellow scales, and brown scales along costa and from near distal end of cell to margin. Undersurface brown. Hindwing: Pale brown.

Abdomen (Fig. 228): Male with 5 transverse, irregular rows of sex scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 229–230): Uncus elongate, wide at base, broadly constricted at 1/3, slightly rounded distally, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide basally, gradually narrowing apically, upturned apically; tegumen narrow, slightly widened basally; dorsal strut of tegumen with arms convergent basally and dorsally, forming an elliptical-shaped sinus between points of constriction, dorsally atrophied; valva with costa slightly sloped from a shallow depression beyond a slanted, basal, digitate process to dorsal furca; apex widely bifurcate, furcae slightly divergent, dorsal furca large, falcate, ventral furca extending slightly beyond outer margin of cucullus; sacculus twisted apically, constricting valva near midlength, widening distoventrally, forming an elongate and slightly angular cucullus; cucullus membranous, setose; vesica denticulate, bearing a moderately large, hornlike, apical cornutus; cornutus with one side slightly shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Sirena, P[arque] N[acional] Corcovado, Prov[incia] Punta[renas], COSTA RICA, 0–100 m, Nov. 1993, G. Fonseca, L-S-270500, 508300, # 2490”, “INBio: COSTA RICA: CRI001, 625857” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 1086” [yellow label], “PARATYPE, *Glyphidocera guaroa*, Adamski” [blue label].

Distribution (Map 42): *Glyphidocera speculae* (▲) and *G. ambrosiae* (●). Outlying circles indicate multiple adjacent localities.



**MAP 42.** Distribution of *Glyphidocera speculae* (▲) and *G. ambrosiae* (●). Outlying circles indicate multiple adjacent localities.

Etymology: The species epithet *speculae* is derived from the Latin “specula,” meaning watchtower.

***Glyphidocera ambrosiae*, new species**

(Figs. 231–233, 364, Map 42)

Diagnosis.— *Glyphidocera ambrosiae*, *G. luxuriae*, and *G. coturnicis* are similar by sharing sex scales between abdominal terga 2–3 in male, a wide gnathos, a dorsal strut of tegumen that is widened basally, a valval cucullus with a broadly rounded apicoventral margin, and costal furcae of the valva that are divergent. However, *G. ambrosiae* differs from the latter species by having a longer valval cucullus and a vesica of aedeagus with an apical cornutus with a bulbus base.

Description.— Head: Scales on vertex and frontoclypeus dark brown tipped with pale brown; outer surface of labial palpus dark brown intermixed with few pale-brown scales to apical margin of segment II, inner margin brown intermixed with few dark-brown and pale-brown scales; scape of antenna dark brown intermixed with few pale-brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis brown.

Thorax: Tegula and mesonotum brown intermixed with few dark-brown scales. Legs brown intermixed with pale-brown scales to apical margins of all segments and tarsomeres. Forewing (Fig. 364): Length 5.8–6.9 mm (n = 19), pale brown intermixed with brown and dark-brown scales, cell and surrounding areas paler than marginal areas; cell with 2 large, dark-brown oblique spots, 1 spot near middle, 1 spot near distal end; one short, dark-brown median streak near base. Undersurface brown intermixed with pale-brown scales along costa. Hindwing: Pale brown.

Abdomen (Fig. 231): Male with 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 232–233): Uncus elongate, wide at base, broadly constricted near 1/3, broadly rounded apically, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing about 2/3 length from a wide base, extending dorsally, gradually widening to base of uncus; costa of valva nearly straight from a shallow depression slightly beyond a straight, basal, digitate process to a gradually upturned dorsal furca; apex widely bifurcate, each furca parallel; dorsal furca large, falcate; ventral furca extending slightly beyond outer margin of cucullus; sacculus twisted apically, constricting valva near midlength, widening distoventrally forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aede-

gus denticulate, bearing a large, apical cornutus; cornutus apically conical with a slightly bulbous base, one side slightly shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Quepos, 80 m, P[arque] N[acional] Manuel Antonio, Prov[incia] Punt[arenas], COSTA RICA, R. Zuniga, Feb. 1991, L-S-370900, 448800”, “INBio: COSTA RICA: CRI000, 625757” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 542” [yellow label].

Paratypes (18 ♂): 6 ♂, Same label data as above except, “CRI000, 346910”, “Slide No. 547”; CRI000, 347099”, “Slide No. 615”; “G. Varela & R. Zuniga, Nov. 1990”, “CRI000, 180343”, “Slide No. 616”; “Dic.”, “CRI000, 228198”; “R. Zuniga, Ene.”, “CRI000, 564315”, “Slide No. 611”; “CRI000, 366886”, “Slide No. 614”; “CRI000, 228198”, “Slide No. 544”; 1 ♂, “Est. Los Alemendros, Prov. Guana., COSTA RICA, 300 m, 4–12 Set. 1994, E. Lopez, N-334800, 369800, # 3209”, “CRI002, 019698”, “Slide No. 809”; 1 ♂, “Monumento Nacional Guayabo, Amistad, Prov. Carta., COSTA RICA, 1100 m, Jul. 1994, G. Fonseca, L-N-217400, 570000, # 3126”, “CRI001, 888574”, “Slide No. 511”; 2 ♂, “Est. Bijagual, 500 m, Res. Biol. Carara, Prov. S. José, COSTA RICA, R. Zuniga, Set. 1994, L-N-192250, 474760”, “CRI000, 299658”, “Slide No. 515”; “CRI000, 542103”, “Slide No. 509”; 5 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, Jan. 1993, INBio-OET”, “8 Ene. 1993, Arboleda, L001”, “CRI001, 218976”, “Slide No. 864”; June 1994”, “28 Junio 1994, Bosque secundario, L/06/107”, “CRI001, 243954”, “Slide No. 988”; “8 Abril 1996, L/00/207, STR 2550 m”, “CRI002, 059844”, “Slide No. 990”; “29 Abril 1996, L/00/229, STR 300 m”, “CRI002, 061889”, “Slide No. 883”; “8 Abril 1996, L/00/207. STR 2550 m”, “CRI002, 059841”, “Slide No. 989”; 1 ♂, “Cerro Tortuguero, P. N. Tortuguero, 0–100 m, Prov. Limón, COSTA RICA, J. Solano, Abr. 1991, L-N-285500, 588000”, “CRI000, 444295”, “Slide No. 608”; “Jul. 1991”, “CRI001, 314579”, “Slide No. 604”; “R. Delgado, Oct. 1991”, “CRO000, 630702”, “Slide No. 603”, (12 in INBio, 6 in USNM).

Distribution (Map 42): *Glyphidocera ambrosiae* is known from north-western Costa Rica along the Cordillera de Guanacaste, east to the Cordillera Central, and from the Caribbean Coast south to the Pacific Ocean.

Etymology: The species epithet *ambrosiae* is derived from the Latin “ambrosia,” which means “food of the gods.”

### ***Glyphidocera luxuriae*, new species**

(Figs. 234–236, 365, Map 43)

Diagnosis.— *Glyphidocera luxuriae*, *G. ambrosiae*, and *G. coturnicis* share sex scales between abdominal terga 2–3 in the male, a wide gnathos, a dorsal strut of tegumen wide basally, a valval cucullus with a broadly rounded apicoventral margin, and costal furcae valva divergent. However, *G. luxuriae* differs from the latter two by having larger abdomi-

nal sex scales between terga 2–3 in male, a shorter valval cucullus, costal furcae of valva more divergent, an absence of an apical cornutus within the vesica of the aedeagus, and a vesica with several spinelike cornuti.

Description.— Head: Vertex and frontoclypeus pale yellowish brown; outer margin of labial palpus brown intermixed with pale yellowish-brown scales to apical margin of segment II, inner surface pale yellowish brown intermixed with some brownish-orange scales; scape pale yellowish brown, flagellum brown; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale yellowish brown.

Thorax: Tegula and mesonotum brown. Legs with segments pale yellowish brown intermixed with brown scales to apical margin, tarsomeres brown intermixed with pale yellowish-brown scales to apical margin. Forewing (Fig. 365): Length 4.1 mm (n = 1), brown scales intermixed with pale-brown scales, outer marginal scales brown. Undersurface brown. Hindwing: Pale brown, slightly darkening to apex.

Abdomen (Fig. 234): Male with 3 transverse, irregular rows of sex scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 235–236): Uncus elongate, wide at base, constricted near 1/3, broadly rounded apically, apex acuminate; gnathos sparsely setose, protuberant, wide throughout length, upturned apically, tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing near midlength, extending dorsally to base of uncus; costa of valva broadly rounded medially from a shallow depression beyond a slanted, basal, digitate process to an abruptly upturned dorsal furca; apex widely bifurcate, dorsal furca nearly erect, ventral furca extending slightly beyond outer margin of cucullus; sacculus twisted apically, constricting valva slightly beyond midlength, widening distoventrally, forming a broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with many spinelike cornuti of varying lengths.

Female Genitalia: Unknown.

Holotype, ♂, “Cerro Tortuguero, 0–120 m, P[arque] N[acional] Tortuguero, Prov[incia] Limón, COSTA RICA, Ene. 1993, R. Delgado, L-N-285000, 588000”, “INBio: COSTA RICA: CRI001, 352791” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 605” [yellow label].

Distribution (Map 43): *Glyphidocera luxuriae* is known from one collecting site in northern Costa Rica near the north-western coast of Limón.

Etymology: The species epithet *luxuriae* is derived from the Latin word “luxuria” or luxury.



MAP 43. Distribution of *Glyphidocera luxuriae* (▲) and *G. coturnicis* (●).

***Glyphidocera coturnicis*, new species**

(Figs. 237–239, 366, Map 43)

Diagnosis.— *Glyphidocera coturnicis*, *G. luxuriae*, and *G. ambrosiae* share sex scales between abdominal terga 2–3 in the male, a dorsal strut of tegumen wide basally, a valval cucullus with a broadly rounded apicoventral margin, and costal furcae of valva divergent. However, *G. coturnicis* differs from the latter two species by having straight costal furcae of the valva and an elongate and narrow cornutus of the aedeagal vesica.

Description.— Head: Scales of vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus dark brown or brown intermixed with pale-brown scales to apical margin of segment II, inner surface pale brown intermixed with few brown scales; scape of antenna brown intermixed with few pale-brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere not protuberant, 5<sup>th</sup> and 6<sup>th</sup> flagellomeres slightly excavated; proboscis brown.

Thorax: Tegula and mesonotum with brown scales tipped with pale brown. Legs brown intermixed with pale-brown scales to apical margins of all segments and tarsomeres. Forewing (Fig. 366): Length 5.0–6.1 mm (n = 16), pale brown intermixed with brown scales; one short, dark-brown median streak near base; cell with 2 large, dark-brown oblique spots, 1 spot near middle, 1 spot near distal end [rubbed specimens with spots faint or missing]. Undersurface brown intermixed with pale-brown scales along costa. Hindwing: Pale brown.

Abdomen (Fig. 237): Male with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 238–239): Uncus elongate, wide at base, broadly constricted



near 1/2, widely rounded apically, apex narrowly rounded and setose; gnathos setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing near 2/3 length, extending dorsally to base of uncus; costa of valva nearly straight from a shallow depression beyond a slanted, basal, digitate process to a slightly upturned dorsal furca; apex widely bifurcate; furcae widely divergent, dorsal furca longer than ventral furca; sacculus twisted apically near midlength, widening distoventrally, forming a broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing an elongate and narrow, apical cornutus; cornutus with one side shortened near 1/3 length, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Quepos, 140 m, P[arque] N[acional] Manuel Antonio, Prov[incia] Punt[arenas], COSTA RICA, G. Varela & R. Zuniga, Oct. 1990, L-S-371500, 449450”, “INBio: COSTA RICA: CRI000, 223005” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 612” [yellow label].

Paratypes (14 ♂, 1 ♀): 1 ♂, “Sector Cerro Cocori, Fca. de R. Rojas, 150 m, Prov. Limón, COSTA RICA, E. Rojas, Ene. 1992, L-N-286000, 567500”, “CRI000, 333010”, “Slide No. 701”; 1 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, June 1994, INBio-OET”, “29 Junio 1994, Bosque primario, L/01/109”, “CRI001, 243845”, “Slide No. 901”; 1 ♂, “Est. Bijagual, 500 m, Res. Biol. Carara, Prov. San José, COSTA RICA, Ene. 1991, R. Zuniga, L-N-191250, 474760”, “CRI000, 452515”, “Slide No. 808”; 11 ♂, 1 ♀, “Est. Sirena, 0–100 m, P. N. Corcovado, Prov. Punt., COSTA RICA, G. Fonseca, Jun. 1991, L-S-270500, 508300”, “CRI000, 646473”, “Slide No. 804”; “Mar.”, “CRI000, 447807”, “Slide No. 803”; “Set.”, “CRI000, 357742”; “CRI000, 357486”; “Jun.”, “CRI000, 646541”; “May”, “CRI000, 588113”; “CRI000, 563473”, “Slide No. 806”; “Jun.”, “CRI000, 646450”, “Slide No. 1030”, “PARATYPE, *Glyphidocera guaroa* Adamski”; “Feb. 1992”, “CRI000, 621674”, “Slide No. 1091”; “Jun. 1992”, “CRI000, 708208”, “Slide No. 1032”; “Dic.”, “CRI000, 783807”, “Slide No. 1087”; “Nov. 1990”, “CRI000, 183251”, “Slide No. 1085”, (8 in INBio, 6 in USNM).

Distribution (Map 43): *Glyphidocera coturnicis* is known throughout north-central and south-central Costa Rica, east to a coastal site within the Corcovado National Park.

Etymology: The species epithet *coturnicis* is derived from the Latin word for quail - coturnix.

### ***Glyphidocera sapphiri*, new species**

(Figs. 240–242, 367, Map 44)

Diagnosis.— *Glyphidocera sapphiri*, *G. fabulae*, and *G. arenae* share abdominal sex scales between terga 2-3 in male, an elongate valval cucullus, and an elongate and narrow apical cornutus within the vesica of the aedeagus. However, *G. sapphiri* differs from the latter

two species by having shorter rows of sex scales between terga 2–3 in male, a narrower base of the dorsal strut of the tegumen, and costal furcae of valva of equal size.

Description.— Head: Vertex and frontoclypeus dark brown; outer surface of labial palpus dark brown intermixed with few pale-yellow scales to apical margin of segment II, outer surface pale yellow intermixed with few brown and dark-brown scales; scape of antenna dark brown intermixed with few pale-yellow scales, flagellum dark brown; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a small digitate process of 4<sup>th</sup> flagellomere; proboscis pale yellow.

Thorax: Tegula and mesonotum dark brown. Legs dark brown intermixed with few pale-yellow scales near midlength and apical margins of all segments and tarsomeres. Forewing (Fig. 367): Length 5.9–6.1 mm (n = 4), dark brown intermixed with few dark-brown scales tipped with pale brown; cell with 2 large, dark-brown spots, 1 spot near middle, 1 spot near distal end. Undersurface dark brown. Hindwing: Dark brown except, white scales medially along anterior margin.

Abdomen (Fig. 240): Male with 3 short, transverse rows of sex scales on median part of intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 241–242): Uncus elongate, wide at base, broadly constricted near ½, apical half triangular-shaped, apex acuminate; gnathos sparsely setose, protuberant, widened throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing from posteroventral margin to base of uncus; costa of valva nearly straight from base bearing an elongate, digitate process to an upturned dorsal furca; apex bifurcate, widely U-shaped, each furca equal in size, nearly parallel; sacculus twisted apically, constricting valva slightly beyond midlength, widening distoventrally, forming an elongate and slightly angular cucullus; cucullus membranous and setose; vesica of aedeagus with many stout, conical cornuti, and bearing an elongate, conical, apical cornutus; cornutus with one shortened side near 1/3 length, exposing a large hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Pitilla, 700 m, 9 km S S[an]ta Cecilia, P[arque] N[acional] Guanacaste, Prov[incia] Guan[acaste], COSTA RICA, C. Moraga, Jul. 1991, L-N-330200, 380200”, “INBio: COSTA RICA: CRI000, 300212” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 722” [yellow label].

Paratypes (3 ♂): 2 ♂, Same label data as holotype except, “2–9 Mar. 1992”, “CRI000, 414782”, “Slide No. 726”; “CRI000, 414785”, “Slide No. 772”; 1 ♂, “Est. Cacao, 1000–1400 m, Lado suroeste del Volcán Cacao, Prov. Guan., COSTA RICA, C. Chaves, 25 Set. – 11 Oct. 1990, L-N-323300, 375700”, “CRI000, 390322”, “Slide No. 952”, (2 in INBio, 1 in USNM).

Distribution (Map 44): *Glyphidocera sapphiri* is known from two collecting sites in north-western Costa Rica along the Cordillera de Guanacaste.



MAP 44. Distribution of *Glyphidocera sapphiri* (●) and *G. fabulae* (▲).

Etymology: The specific epithet *sapphiri* is derived from the Latin “sapphirus” or sapphire.

***Glyphidocera fabulae*, new species**

(Figs. 243–245, 368, Map 44)

Diagnosis.— *Glyphidocera fabulae*, *G. sapphiri*, and *G. arenae* share abdominal sex scales between terga 2–3 in male, an elongate valval cucullus, and an elongate and narrow apical cornutus within the vesica of the aedeagus. *G. fabulae* can be distinguished from those two species by having an abdomen with more rows of sex scales between terga 2–3 in male, a wider gnathos, a wider base of the dorsal strut of the tegumen, a wider valval cucullus, and a large, upturned dorsal furca of the valval costa.

Description.— Head: Scales on vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus with segment I and basal half of segment II brown, distal half of segment II and segment III pale brown intermixed with few brown scales; inner surface pale brown intermixed with few brown scales; scape of antenna brown intermixed with few pale-brown scales, flagellum with alternating bands of pale brown and brown; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6 [many setiform scales associated with 4<sup>th</sup> flagellomere are missing]; proboscis pale brown.

Thorax: Tegula and mesonotum brown. Legs pale brown intermixed with few brown scales; a pale banding appears near distal margins of all segments and tarsomeres. Forewing (Fig. 368): Length 6.9–7.0 mm (n = 2), brown intermixed with brown scales tipped with pale brown; cell with 2 large, faint, brown spots, 1 spot near middle, 1 spot near distal

end. Undersurface brown intermixed with pale-brown scales along costal margin. Hind-wing: Brown.

Abdomen (Fig. 243): Male with 4 transverse rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 244–245): Uncus elongate, wide at base, broadly constricted near 1/3, near parallelsided apically, apex acuminate and setose; gnathos setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a wide base, extending dorsally, widely to base of uncus; costa of valva shallowly emarginate broadly from a shallow depression beyond a basal, digitate process and a broadly upturned dorsal furca; apex bifurcate, each furca widely divergent; dorsal furca about 3 times larger than ventral furca; sacculus twisted apically, constricting valva slightly beyond midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with many stout, cornuti, bearing an elongate, conical, apical cornutus; cornutus with one side shortened near 1/3 length, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] S[an]ta Rosa, 300 m, P[arque] N[acional] Guanacaste, Prov[incia] Guan[acaste], COSTA RICA, I Curso Microlepidoptera, Jul. 1990, L-N-313000, 359800”, “INBio: COSTA RICA: CRI000, 306838” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 513” [yellow label].

Paratype 1 ♂, “Finca El Rodeo, Prov. San José, COSTA RICA, 810 m, Nov. 1992, K. Janeway, L-N-211000, 507000, # 5933”, “CRI002, 305949”, “Slide No. 508.”

Distribution (Map 44): *Glyphidocera fabulae* is known from two collecting sites in Costa Rica; one in the north-western part of Costa Rica south-west of the Cordillera de Guanacaste, and one site in the south-central part of the country south of the Cordillera Central.

Etymology: The species epithet *fabulae* is derived from the Latin “fabula,” meaning story.

### ***Glyphidocera arenae*, new species**

(Figs. 246–248, 369, Map 45)

Diagnosis.— *Glyphidocera arenae*, *G. fabulae*, *G. sapphiri* share abdominal sex scales between terga 2–3 in male, an elongate valval cucullus, and an elongate and narrow apical cornutus within the vesica of the aedeagus. *G. arenae* can be distinguished from the latter two species by having a dorsal strut of the tegumen with the arms narrowly convergent to midlength between the posteroventral margin and the base of the uncus (fusing dorsally near base of uncus) and the costal furcae of the valva wider apart.

Description.— Head: Scales on vertex and frontoclypeus grayish brown tipped with pale grayish brown; outer surface of labial palpus brown intermixed with pale-brown

scales to apical margin of segment II, inner surface pale brown intermixed with few brown scales; scape of antenna pale brown intermixed with few brown scales, flagellum with alternating bands of pale-brown and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6 [setiform scales associated with 4<sup>th</sup> flagellomere are missing]; proboscis pale brown.

Thorax: Tegula and mesonotum with grayish-brown scales tipped with pale grayish brown. Legs brown intermixed with pale-brown scales to distal margins of all segments and tarsomeres. Forewing (Fig. 369): Length 6.3–6.5 mm (n = 3), pale brown intermixed with few brown scales; basal area with one small brown spot near middle; cell with 2 brown spots, 1 large oblique spot near middle, 1 small spot near distal end; midcell spot coalescent with a small, brown spot on CuP. Undersurface brown intermixed with pale-brown scales along costal margin. Hindwing: Brownish gray.

Abdomen (Fig. 246): Male with 3 transverse rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 247–248): Uncus elongate, wide at base, broadly constricted near 1/3, nearly parallelsided apically, apex acuminate and setose; gnathos setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a wide base, fusing slightly beyond midlength, extending dorsally to base of uncus; costa of valva slightly emarginate broadly from shallow depression beyond basal digitate process to a slightly upturned dorsal furca; apex widely bifurcate, slightly divergent; dorsal furca about 3 times larger than ventral furca; sacculus twisted apically, constricting valva near midlength, widening distoventrally, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing an elongate, conical, apical cornutus; cornutus with one side slightly shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Quepos, 120 m, P[arque] N[acional] Manuel Antonio, Prov[incia] Punt[arenas], COSTA RICA, G. Varela & R. Zuniga, Dic. 1990, L-S-370900, 449800”, “INBio: COSTA RICA: CRI000, 583843” [bar code label], “INBio, Genitalia Slide by D. Adamski, Sex ♂, No. 543” [yellow label].

Paratypes (2 ♂): Same label data as holotype except, “Nov. 1990”, “CRI000, 180482”, “Slide No. 537”; “R. Zuniga, Ene. 1991, L-S-370900, 448800”, “Slide No. 541”, (1 in INBio, 1 in USNM).

Distribution (Map 45): *Glyphidocera arenae* is known from two nearby coastal collecting sites in south-central Costa Rica.

Etymology: The species epithet *arenae* is derived from the Latin “arena.”



**MAP 45.** Distribution of *Glyphidocera arenae* (●) and *G. ancillae* (▲). Outlying circles indicate multiple adjacent localities.

***Glyphidocera ancillae*, new species**

(Figs. 249–251, 370, Map 45)

**Diagnosis.**— *Glyphidocera ancillae* is most similar to *G. ranae* but differs from the latter by having a smaller gnathos, a smaller digitate process of the valva, a more recurved dorsal furca of the valval costa, and a more elongate and narrow apical cornutus of the aedeagal vesica.

**Description.**— **Head:** Vertex and frontoclypeus brown; outer surface of labial palpus with segments I-II brown intermixed with pale-brown scales to apical margin, segment III brown; inner surface of labial palpus pale brown; scape of antenna brown intermixed with few pale-brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brown.

**Thorax:** Tegula and mesonotum brown. Legs pale brown. Forewing (Fig. 370): Length 6.2 mm (n = 1), brown, with no distinguishable markings. Undersurface brown. Hindwing: Brown.

**Abdomen** (Fig. 249): Male with 3 transverse, irregular rows of sex scales on intersegmental area between terga 2–3.

**Male Genitalia** (Figs. 250–251): Uncus elongate, wide at base, broadly constricted near midlength, widened subapically, gradually tapered to a narrowly rounded apex; gnathos sparsely setose, protuberant, narrowed apically from a wide base, slightly upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially between posteriorventral margin and base of uncus; costa of valva nearly

straight from a shallow depression beyond a slightly curved, basal, digitate process to an abruptly recurved dorsal furca; apex widely bifurcate, furcae divergent, dorsal furca at least twice as large as ventral furca; base of costa with a slightly curved, digitate process; sacculus twisted apically, constricting valva near midlength, forming an elongate, broadly curved, and protracted cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing an elongate and narrow cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Pitilla, 700 m, 9 km S S[an]ta Cecilia, P[arque] N[acional] Guanacaste, Prov[incia] Guanacaste, COSTA RICA, P. Rios, 2–19 Mar. 1992, L-N-330200, 380200”, “INBio: COSTA RICA: CRI000, 727168” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 763” [yellow label].

Distribution (Map 45): *Glyphidocera ancillae* is known from one collecting site in north-western Costa Rica near the Cordillera de Guanacaste.

Etymology: The species epithet *ancillae* is derived from the Latin “ancilla,” meaning maid-servant.

#### ***Glyphidocera ranae*, new species**

(Figs. 252–254, 371, Map 46)

Diagnosis.— *Glyphidocera ranae* is most similar to *G. ancillae*; it can be distinguished from the latter by having a larger gnathos, a larger digitate process of the valva, a slightly recurved dorsal furca of the valval costa, and the vesica of aedeagus with an apical cornutus with a bulbous base.

Description.— Head: Vertex and frontoclypeus brown; outer surface of labial palpus brown intermixed with few pale-brown scales to apical margin of segment II, inner surface pale brown intermixed with few brown scales; scape of antenna brown, flagellum with alternating bands of pale brown and brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a digitate protuberance of 4<sup>th</sup> flagellomere; proboscis pale brown.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with pale-brown scales to apical margins of all segments and tarsomeres. Forewing (Fig. 371): Length 5.9–6.2 mm (n = 7), pale brown intermixed with pale grayish-orange, brown, and few dark-brown scales; cell with 2 brown spots, 1 large spot near middle, 1 small spot near distal end [spots are faint in some specimens]. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 252): Male with 3 transverse rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 253–254): Uncus elongate, wide at base, broadly constricted at

1/3, slightly widened apically, apex narrowly rounded and setose; gnathos sparsely setose, protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing from a widened base from poster-oventral margin to base of uncus; costa of valva slightly sloped dorsally from shallow depression beyond a slanted, basal, digitate process to an upturned dorsal furca; apex widely bifurcate from a narrowly rounded inner margin; dorsal furca about 3 times larger than ventral furca; sacculus twisted apically constricting valva near midlength, widening distoventrally forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a large, conical, apical cornutus; curnutus with a bulbous base, with one side slightly shorter, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Pitilla, 700 m, 9 km S S[an]ta Cecilia, Prov[incia] Guan[acaste], COSTA RICA, C. Moraga & P. Rios, Dic. 1990, L-N-330200, 380200”, “INBio: COSTA RICA: CRI000, 652704” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 776” [yellow label].

Paratypes (6 ♂): 3 ♂, Same label data as holotype except, “Set., 1991”, “CRI000, 460293”, “Slide No. 775”; “CRI000, 580151”, “Slide No. 765”; “Oct. 1990”, “CRI000, 380795”, “Slide No. 768”; 2 ♂, Cerro Tortuguero, 0–120 m, P. N. Tortuguero, Prov. Limón, COSTA RICA, Nov. 1992, R. Delgado, L-N-285000, 588000”, “CRI000, 992205”, “Slide No. 588”; “Mar. 1993”, “CRI001, 353218”; “Slide No. 652”; 1 ♂, “Est. Sirena, P. N. Corcovado, 0–100 m, Prov. Punt., COSTA RICA, G. Fonseca, Oct. 1990, L-S-270500, 508300”, “CRI000, 179053”, “Slide No. 805”, (3 in INBio, 3 in USNM).

Distribution (Map 46): *Glyphidocera ranae* (●) and *G. sollertiae* (▲). White triangle within a black circle indicates a shared locality.



**MAP 46.** Distribution of *Glyphidocera ranae* (●) and *G. sollertiae* (▲). White triangle within a black circle indicates a shared locality.



Etymology: The species epithet *ranae* is derived from the Latin word for frog - rana.

***Glyphidocera sollertiae*, new species**

(Figs. 255–257, 372, Map 46)

Diagnosis.— *Glyphidocera sollertiae*, *G. gloriae*, and *G. coquae* share abdominal sex scales between terga 2–3 in the male, a densely setose gnathos, an angular dorsal furca of the valval costa, and an elongate apical cornutus of the aedeagus. However, *G. sollertiae* differs from the latter two by having a smaller gnathos, a base of dorsal strut of tegumen with two pigmented, short, streaks emerging from point slightly beyond middle, a smaller digitate process of valva; a dorsal furca of valval costa extending beyond ventral furca, and a larger apical cornutus of the aedeagal vesica.

Description.— Head: Vertex and frontoclypeus brown; outer surface of labial palpus dark brown intermixed with few grayish-orange scales to apical margin of segment II; inner surface with segment I and basal half of segment II grayish orange, distal half of segment II and segment III dark brown intermixed with few grayish-orange scales; scape of antenna dark brown intermixed with few grayish-orange scales, flagellum with alternating bands of pale grayish-orange and dark-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale grayish orange.

Thorax: Tegula and mesonotum brown. Legs dark brown intermixed with pale grayish-brown scales along apical margins of all segments and tarsomeres. Forewing (Fig. 372): Length 6.2–8.7 mm (n = 9), dark brown intermixed with few pale grayish-orange scales; cell with 2 dark brown spots, 1 spot near middle, 1 spot near distal end; midcell spot slightly larger than spot near distal end. Undersurface brown with pale grayish-orange scales along costa. Hindwing: Brown.

Abdomen (Fig. 255): Male with 5 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 256–257): Uncus elongate, wide at base, nearly parallelsided from above base to subapical part, slightly widened subapically, apex narrowly rounded and setose; gnathos setose, short, moderately narrow throughout length; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially from posteroventral margin and atrophied dorsally, dorsal strut with a pair of narrow pigmented lateral streaks from base; costa of valva nearly straight from a shallow depression beyond a slanted, basal, digitate process to dorsal furca; apex bifurcate, furcae widely separate and nearly parallel; dorsal furca upturned along basal 1/3, angled laterally, forming an aristate apex; ventral furca about 2/3 length of dorsal furca; sacculus twisted apically constricting valva slightly before midlength, widening distoventrally forming an elongate, broadly

rounded, and distally protracted cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a large crescent-shaped, apical cornutus; cornutus with one side shortened slightly before midlength, exposing a large hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Pitilla, 700m, 9 km, S S[an]ta Cecilia, Prov[incia] Guan[acaste], COSTA RICA, C. Chaves, Set. 1990, L-N-330200, 380200”, “INBio: COSTA RICA: CRI000, 626488” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 734” [yellow label].

Paratypes (8 ♂): 5 ♂, Same label data as holotype except, “C. Moraga, Abr. 1991”, “CRI000, 484534”, “Slide No. 754”; “CRI000, 484539”, “Slide No. 755”; “CRI000, 484581”, “Slide No. 723”; “P. Rios, Ago. 1991”, “CRI000, 558977”, “Slide No. 724”; “CRI000, 414795”, “Slide No. 725”; 1 ♂, “Est. Magsasay, P. N. Braulio Carrillo, 200 m, Prov. Here., COSTA RICA, A. Fernandez, Dic. 1990, L-N-264600, 531100”, “CRI000, 229558”, “Slide No. 767”; 1 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, Jan. 1993, INBio-OET”, “10 Ene. 1993, Bosque primario, L0004”, “Slide No. 894”; 1 ♂, “Cerro Tortuguero, 0–120 m, P. N. Tortuguero, Prov. Limón, COSTA RICA, May 1991, J. Solano, L-N-285000, 588000”, “CRI001, 398585”, “Slide No. 629”, (5 in INBio, 3 in USNM).

Distribution (Map 46): *Glyphidocera sollertiae* is known from four collecting sites in Costa Rica, from the north-western part of the country along the Cordillera de Guanacaste, eastward to the north-central area north of the Cordillera Central to the Caribbean Coast.

Etymology: The species epithet *sollertiae* is derived from the Latin “sollertia,” meaning skill.

### ***Glyphidocera gloriae*, new species**

(Figs. 258–260, 373, Map 47)

Diagnosis.— *Glyphidocera gloriae*, *G. sollertiae*, and *G. coquae* share abdominal sex scales between terga 2–3 in the male, a densely setose gnathos, an angular dorsal furca of the valval costa, and an elongate apical cornutus of the aedeagus. The male genitalia of *G. gloriae* differs from those of *G. sollertiae* and *G. coquae* by having a dorsal strut of the tegumen with a more narrowed base, a smaller dorsal furca of the valval costa, and a more rounded apicoventral margin of the valval cucullus.

Description.— Head: Scales on vertex brown tipped with pale brown; frontoclypeus brown; outer surface of labial palpus brown intermixed with few pale brownish-yellow scales along apical margin of segment II; inner surface with segments I–II pale brownish yellow intermixed with few brown scales, segment III brown intermixed with few pale brownish-yellow scales; scape of antenna brown intermixed with few pale brownish-yellow scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup>

flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a few setiform scales on apex of protuberance of 4<sup>th</sup> flagellomere; proboscis pale brownish yellow.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with pale brownish-yellow scales along apical margins of all segments and tarsomeres. Forewing (Fig. 373): Length 6.0–6.5 mm (n = 2), brown intermixed with few pale brownish-yellow scales; cell and surrounding areas paler than marginal areas, with two brown spots, 1 large spot near middle, 1 smaller spot near distal end. Undersurface brown. Hindwing: Brown.

Abdomen (Fig. 258): Male with 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 259–260): Uncus elongate, wide at base, broadly constricted near midlength, broadly rounded apically, apex narrowly rounded and setose; gnathos densely setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing medially near base of posteroventral margin, extending dorsally and slightly widening to base of uncus; costa of valva broadly emarginate medially from a shallow depression beyond a slightly curved, basal, digitate process to dorsal furca; apex bifurcate; dorsal furca upturned along basal 1/3, angled laterally, forming an aristate apex; furcae widely separate, about equal in lengths, parallel; sacculus twisted apically slightly before midlength, widening distoventrally, forming an elongate, broadly rounded and distally protracted cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing a large, sickle-shaped, apical cornutus; cornutus with one side shortened near midlength, exposing a large, hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “F[in]ca Cafrosa, 1300 m, Est[acion] Las Mellizas, P[arque] Internacional La Amistad, 1300 m, Prov[incia] Punt[arenas], COSTA RICA, M. Ramirez & G. Mora, Oct. 1990, L-S-316100, 596100”, “INBio: COSTA RICA: CRI000, 355328” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 668” [yellow label].

Paratype 1 ♂, “Est. Bijagual, 500 m, Res. Biol. Carara, Prov. S. Jose, COSTA RICA, R. Zuniga, Set. 1990, L-N-192250, 474760”, “CRI000, 299474”, “Slide No. 512.”

Distribution (Map 47): *Glyphidocera gloriae* is known from south-central Costa Rica near the mouth of the Golfo de Nicoya, east to the Panamanian border south of the Cordillera de Talamanca.

Etymology: The species epithet *gloriae* is derived from the Latin word “gloria” or glory



**MAP 47.** Distribution of *Glyphidocera gloriae* (●) and *G. coquae* (▲). White triangle within a black circle indicates a shared locality.

***Glyphidocera coquae*, new species**

(Figs. 261–263, 374, Map 47)

Diagnosis.— *Glyphidocera coquae*, *G. sollertiae*, and *G. gloriae* share abdominal sex scales between terga 2–3 in the male, a densely setose gnathos, an angular dorsal furca of the valval costa, and an elongate apical cornutus of the aedeagus. However, *G. coquae* differs from the latter two species by having a wider and more angular valval cucullus, a larger ventral furca of the valval costa, and a narrower apical cornutus of the aedeagus.

Description.— Head: Scales on vertex and frontoclypeus grayish brown tipped with pale grayish brown; outer surface of labial palpus dark brown intermixed with brown and few pale-brown scales along apical margin of segment II; inner margin pale brown intermixed with few brown scales; scale of antenna dark brown intermixed with few pale-brown scales, flagellum with alternating bands of brown and pale grayish-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6; concavity nearly closed by a digitate protuberance of 4<sup>th</sup> flagellomere; proboscis grayish brown.

Thorax: Tegula and mesonotum grayish brown. Legs grayish brown intermixed with pale grayish-brown scales along apical margins of all segments and tarsomeres. Forewing (Fig. 374): Length 6.4–7.0 mm (n = 3), grayish brown intermixed with pale-brown and brown scales; cell with 2 large, faint spots, 1 spot near middle, 1 spot near distal end. Undersurface grayish brown. Hindwing: Grayish brown.

Abdomen (Fig. 261): Male with 4 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 262–263): Uncus elongate, broadly constricted near 1/3, slightly widened apically, apex narrowly rounded and setose; gnathos densely setose, protuberant, widened throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a wide base, extending dorsally, gradually widening to base of uncus; costa of valva slightly emarginate broadly from a shallow depression beyond a slightly slanted, basal, digitate process to dorsal furca; apex bifurcate; dorsal furca upturned along basal 1/3, angled laterally, forming an aristate apex; furcae parallel, about equal in size; sacculus twisted apically, constricting valva slightly before midlength, widening distoventrally, forming an elongate, broadly rounded, and distally protracted cucullus; cucullus membranous and setose; vesica of aedeagus denticulate, bearing an elongate and narrow, apical cornutus; cornutus with one side shortened near 1/3 length, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “F[in]ca Cafrosa, Est[ación] Las Mellizas, P[arque] N[acional] Amistad, 1300 m, Prov[incia] Punt[arenas], COSTA RICA, M. Ramirez & G. Mora, Oct. 1990, L-S-316100, 596100”, “INBio: COSTA RICA: CRI000, 182740” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 669” [yellow label].

Paratypes (2 ♂): Same label data as holotype except, “CRI000, 068113”, “Slide No. 670”; “M. Ramirez, May, 1991”, “CRI000, 456879”, “Slide No. 671”, (1 in INBio, 1 in USNM).

Distribution (Map 47): *Glyphidocera coquae* is known from one collecting site along the south-eastern border of Costa Rica near Panama.

Etymology: The species epithet *coquae* is derived from the Latin word for cook - coqua.

### ***Glyphidocera vocis*, new species**

(Figs. 264–266, 375, Map 48)

Diagnosis.— *Glyphidocera vocis* is most similar to *G. clavae* but differs from the latter by having a wider uncus, a smaller gnathos, a longer digitate process of the valva, costal furcae of the valval costa near parallel, and absence of an apical cornutus of the aedeagal vesica.

Description.— Head: Vertex and frontoclypeus pale yellow; outer surface of labial palpus pale yellow intermixed with few brown scales, inner surface pale yellow; scape pale yellow, flagellum with alternating bands of pale-yellow and pale-brown bands; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a shallow concavity opposite slightly excavated flagellomeres 5–6 [setiform scales associated with 4<sup>th</sup> flagellomere missing]; proboscis pale yellow.

Thorax: Tegula and mesonotum pale yellow intermixed with few brown scales. Legs pale yellow. Forewing (Fig. 375): Length 6.8 mm (n = 1), pale yellow intermixed with few

brown scales; 3 brown spots within cell, 1 spot near midcell, 2 spots near distal end parallel with crossvein. Undersurface brown. Hindwing: Pale brown.

Abdomen (Fig. 264): Male with 3 transverse, irregular rows of sex scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 265–266): Uncus elongate, wide at base, broadly constricted near 1/3, widening near midlength, gradually narrowing to a sparsely setose and acuminate apex; gnathos sparsely setose, short, moderately widened throughout length; tegumen nearly parallelsided; dorsal strut of tegumen with arms convergent along posteroventral margin, extending dorsally and atrophied; valva with costa nearly straight from a shallow depression beyond a curved, basal, digitate process to dorsal furca; apex widely bifurcate, margin between furcae U-shaped; furcae parallel, ventral furca slightly longer than dorsal furca; base of costa with an elongate, slightly curved, digitate process; sacculus twisted apically, constricting valva slightly before midlength, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with many stout, conical cornuti.

Female Genitalia: Unknown.

Holotype ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, Mar. 1996, INBio-OET”, “19 Marzo 1996, L/04/188, Biblioteca”, “INBio: COSTA RICA: CRI001, 257384” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 906” [yellow label].

Distribution (Map 48): *Glyphidocera vocis* is known from one collecting site in east-central Heredia in northern Costa Rica.



MAP 48. Distribution of *Glyphidocera vocis* (●) and *G. clavae* (▲).

Etymology: The species epithet *vocis* is derived from the Latin “vox,” meaning voice.

***Glyphidocera clavae*, new species**

(Figs. 267–269, 376, Map 48)

Diagnosis.— *Glyphidocera clavae* is most similar to *G. vocis* but differs from the latter by having a narrower uncus, a larger gnathos, a shorter digitate process of the valva, divergent costal furcae of the valva, and presence of an apical cornutus of the aedeagus.

Description.— Head: Scales on vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus brown intermixed with few pale-brown scales along apical margins of segments I–II; inner surface pale brown intermixed with few brown scales; scape of antenna brown, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6 [many setiform scales associated with 4<sup>th</sup> flagellomere missing]; proboscis pale brown.

Thorax: Tegula and mesonotum brown. Legs brown intermixed with pale-brown scales along margins of all segments and tarsomeres. Forewing (Fig. 376): Length 6.9 mm (n = 2), pale brown intermixed with brown scales; cell with 2 brown spots, 1 spot near middle, 1 spot near distal end. Undersurface brown. Hindwing: Grayish brown.

Abdomen (Fig. 267): Male with 3 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3.

Male Genitalia (Figs. 268–269): Uncus elongate, wide at base, broadly constricted near midlength, broadly rounded apically and setose, apex narrowly rounded; gnathos protuberant, wide throughout length, upturned apically; tegumen slightly widened basally; dorsal strut of tegumen absent; costa of valva gradually sloped dorsally from a shallow depression beyond a slanted, basal, digitate process to dorsal furca: apex bifurcate, furcae apically rounded, with dorsal furca nearly at right angle to ventral furca; sacculus twisted apically slightly beyond midlength, constricting valva, forming a broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with many spinelike cornuti, and bearing a small, crescent-shaped, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Sector Cocori, 30 km al N de Cariari, Prov[incia] Limón, COSTA RICA, 100 m, Nov. 1993, E. Rojas, L-N-286000, 567500, # 2474”, “INBio: COSTA RICA: CRI001, 652468” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 692” [yellow label].

Paratype 1 ♂, same label data as holotype except, “Dic. 1991”, “CRI000, 361216”, “Slide No. 693.”

Distribution (Map 48): *Glyphidocera clavae* is known from one collecting site in north-central Costa Rica.

Etymology: The species epithet *clavae* is derived from the Latin word for club.

*Glyphidocera reginae*, new species

(Figs. 156–158, 339, Map 49)

Diagnosis.— Relationships between *Glyphidocera reginae* and its congeners are difficult to determine because the former possesses a unique combination of features that include an atrophied dorsal strut, a long digitate process of the valva (with an abruptly curved apex); costal furcae of valval costa small and subequal in size; vesica of aedeagus with an elongate and narrow apical cornutus.

Description.— Head: Scales on vertex and frontoclypeus brown tipped with pale brown; outer surface of labial palpus with segments I–II brown intermixed with few pale-brown scales to apical margin, segment III brown intermixed with few pale-brown scales; inner surface pale brown intermixed with few brown scales; scape of antenna brown intermixed with few pale-brown scales, flagellum with alternating bands of brown and pale-brown scales; male 4<sup>th</sup> flagellomere not protuberant, 5<sup>th</sup> and 6<sup>th</sup> flagellomeres slightly excavated; [proboscis missing].

Thorax: Tegula and mesonotum pale brown. Foreleg brown intermixed with pale-brown scales to apical margins of all segments and tarsomeres [pterothoracic legs missing]. Forewing (Fig. 339): Length 7.7 mm (n = 1), pale brown intermixed with few brown scales; cell with 2 small spots, 1 spot near middle, 1 spot near distal end; a few marginal spots present. Undersurface brown intermixed with pale-brown scales along costa. Hindwing: Pale brown.

Abdomen (Fig. 156): Male with 2 transverse rows of sex scales on intersegmental membrane between terga 2–3 and between terga 3–4. Sex scales between terga 2–3 about twice as large as sex scales between terga 3–4.

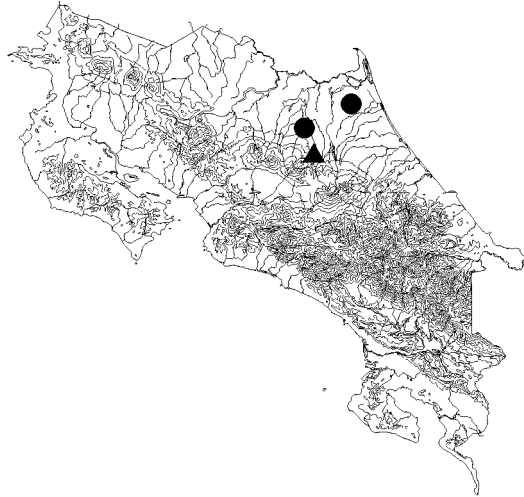
Male Genitalia (Figs. 157–158): Uncus elongate, wide at base, broadly constricted near midlength, narrowly rounded apically, apex narrowly rounded and setose; gnathos protuberant, wide throughout length, apically upturned; tegumen nearly parallelsided throughout length; dorsal strut of tegumen with arms convergent, fusing medially, atrophied dorsally; costa of valva broadly emarginate from shallow depression beyond a basal digitate process dorsal furca; apex narrowly bifurcate; dorsal furca about 3 times larger than ventral furca, margin beneath ventral furca shallowly serrate; costa of valva bearing an elongate, apically curved, digitate process; sacculus twisted apically near midlength, constricting valva, widening distoventrally, forming elongate a narrowly rounded cucullus; cucullus membranous and setose; vesica of aedeagus sparsely denticulate, bearing an elongate, conical, apical cornutus; cornutus with one side slightly shortened, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Est[ación] Carrillo, 700 m, P[arque] N[acional] Braulio Carrillo, Prov[incia] S[an] J[osé], COSTA RICA, I curso Microlepidoptera, Jul[io], 1990, L-N-236700, 541800”, “INBio: COSTA RICA: CRI000, 067350” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 844” [yellow label].



Distribution (Map 49): *Glyphidocera reginae* is known from one collecting site in north-central Costa Rica, along the Cordillera Central.



MAP 49. Distribution of *Glyphidocera reginae* (▲) and *G. spathae* (●).

Etymology: The species epithet *reginae* is derived from the Latin “regina,” meaning queen.

***Glyphidocera spathae*, new species**

(Figs. 270–272, 377, Map 49)

Diagnosis.— *Glyphidocera spathae*, *G. scuticae*, and *G. cotis* share abdominal sex scales between terga 2–3 in male, divergent costal furcae of the valva, and presence of several spinelike cornuti on the vesica of the aedeagus. *G. spathae* differs from the latter two species by having a setose gnathos, and dorsal strut of the tegumen with the arms constricted at midlength between the base of posteroventral margin and the base of uncus.

Description.— Head: Scales on vertex and frontoclypeus brown tipped with grayish yellow; outer surface of labial palpus dark brown intermixed with few grayish-yellow scales along apical margins of segments I–II; outer surface pale grayish yellow intermixed with few dark-brown scales; scape of antenna dark brown intermixed with few grayish-yellow scales, flagellum with alternating bands of brown and grayish-yellow scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6 [setiform scales associated with 4<sup>th</sup> flagellomere missing]; proboscis pale grayish yellow.

Thorax: Tegula and mesonotum with brown scales tipped with pale grayish yellow. Legs dark brown intermixed with few pale grayish-yellow scales along apical margins of all segments and tarsomeres. Forewing (Fig. 377): Length 6.0–6.3 mm (n = 2), grayish yellow.

low intermixed with brown and dark-brown scales; costal margin dark brown intermixed with grayish-yellow scales; cell with 2 dark-brown, oblique spots, 1 spot near middle, 1 spot near distal end; marginal spots fused. Undersurface brown. Hindwing: Gray.

Abdomen (Fig. 270): Male with 5 transverse, irregular rows of sex scales on intersegmental membrane between terga 2–3. Anterior row of sex scales appear about ½ the size as the posterior 4 rows of sex scales.

Male Genitalia (Figs. 271–272): Uncus elongate, wide at base, broadly constricted near 1/3, widened subapically, apex acuminate and setose; gnathos protuberant, setose, wide throughout length, apically upturned and densely setose; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent, fusing basally from a wide base, extending dorsally, gradually widening to base of uncus; costa of valva nearly straight from shallow depression beyond a slanted, basal, digitate process to apex; apex bifurcate; furcae slightly divergent, ventral furca slightly longer than dorsal furca; sacculus twisted apically slightly beyond midlength, constricting valva, forming a broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with many spinelike cornuti, bearing a large, crescent-shaped, apical cornutus; cornutus with one side shortened near midlength, exposing a large, hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Sector Cerro Cocori, F[in]ca de E. Rojas, 150 m, Prov[incia] Limón, COSTA RICA, E. Rojas, Dic. 1991, L-N-286000, 567500”, “INBio: COSTA RICA: CRI000, 550182” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 714” [yellow label].

Paratype 1 ♂, “COSTA RICA, Heredia, Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, Jan. 1993, INBio-OET”, “Ene. 1993, Arboleda, L0001”, “CRI001, 218977”, “Slide No. 899.”

Distribution (Map 49): *Glyphidocera spathae* is known from two collecting sites in north-central Costa Rica, north of the Cordillera Central.

Etymology: The species epithet *spathae* is derived from the Latin “spatha,” meaning spatula.

### ***Glyphidocera scuticae*, new species**

(Figs. 273–275, 378, Map 50)

Diagnosis.— *Glyphidocera scuticae*, *G. spathae*, and *G. cotis* share abdominal sex scales between terga 2–3 in male, divergent costal furcae of the valva, and presence of several spinelike cornuti on the vesica of the aedeagus. *G. scuticae* can be distinguished from the latter two by having an abdomen with more sex scales between terga 2–3 in male, a dorsal strut of the tegumen with a small and elongate sinus above the base, and the costal furcae of the valva more divergent.

Description.— Head: Vertex and frontoclypeus with grayish-brown scales, each tipped with pale grayish brown; outer surface of labial palpus brown intermixed with pale grayish-brown scales, inner surface pale grayish brown intermixed with few brown scales; scape of antenna brown intermixed with pale grayish-brown scales, flagellum with alternating bands of brown and pale grayish-brown scales; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6 [many setiform scales associated with 4<sup>th</sup> flagellomere missing]; proboscis pale grayish brown intermixed with brown scales.

Thorax: Tegula and mesonotum with brown scales tipped with pale grayish brown. Legs brown intermixed with few pale grayish-brown scales along apical margins of all segments and tarsomeres. Forewing (Fig. 378): Length 6.8 mm (n = 1), pale grayish-brown scales intermixed with brown scales; mostly brown scales along costa and distal 1/3; cell with a linear streak near distal end along crossvein. Undersurface brown. Hindwing: Pale brown.

Abdomen (Fig. 273): Male with 3 transverse, irregular rows of scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 274–275): Uncus elongate, wide at base, broadly constricted near midlength, gradually widened apically, apex acuminate and setose; gnathos protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent fusing medially along posteroventral margin, extending dorsally to base of uncus, with an elliptical sinus within basal part; costa of valva slightly upturned from a shallow depression beyond a slanted, basal, digitate process to dorsal furca; apex widely bifurcate; furcae divergent, each furca about equal in size; base of costa with a narrowly elongate, straight, digitate process; sacculus twisted apically, constricting valva slightly beyond midlength, forming a broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with many spinelike cornuti, and bearing a large, crescent-shaped, apical cornutus; cornutus with one side shortened near midlength, exposing a hollow, basal cavity.

Female Genitalia: Unknown.

Holotype, ♂, “Sector Cerro Cocori, F[in]ca de E. Rojas, Prov[incia] Limón, COSTA RICA, E. Rojas, Mar. 1991, L-N-286000, 567500”, “INBio: COSTA RICA: CRI000, 181435” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 713” [yellow label].

Distribution (Map 50): *Glyphidocera scuticae* is known from one collecting site in the north-western part of Limón in northern Costa Rica.

Etymology: The species epithet *scuticae* is derived from the Latin “scutica,” meaning whip.



MAP 50. Distribution of *Glyphidocera scuticae* (●) and *G. cotis* (▲).

***Glyphidocera cotis*, new species**

(Figs. 276–278, 379, Map 50)

Diagnosis.— *Glyphidocera cotis*, *G. scuticae*, and *G. spathae* share abdominal sex scales between terga 2–3 in male, a divergent costal furcae of the valva, and presence of several spinelike cornuti on the vesica of the aedeagus. *G. cotis* differs from the latter two species by having an abdomen with larger sex scales between terga 2–3 in male, an uncus with a wider base, dorsal strut of tegumen wider basally, digitate process of the valva wider basally, margin of valval costa broadly crenulate, and absence of an apical cornutus within the vesica of the aedeagus.

Description.— Head: Vertex and frontoclypeus pale yellow; outer surface of labial palpus with segments I–II brown intermixed with pale yellow along apical margins, segment III pale yellow intermixed with few brown scales; inner surface pale yellow; scape and basal flagellomeres 1–6 pale yellow, distal flagellomeres brown; male 4<sup>th</sup> flagellomere dorsally protuberant and curved, forming a deep concavity opposite slightly excavated flagellomeres 5–6 [many setiform scales associated with 4<sup>th</sup> flagellomere missing]; proboscis pale yellow.

Thorax: Tegula and mesonotum brown. Legs pale yellow intermixed with few brown scales, pale yellow along apical margins of all segments and tarsomeres. Forewing (Fig. 379): Length 4.3 mm (n = 1), brown intermixed with few grayish brown scales, with no characteristic markings. Undersurface brown. Hindwing: Pale gray.

Abdomen (Fig. 276): Male with 3 transverse, irregular rows of sex scales on intersegmental area between terga 2–3.

Male Genitalia (Figs. 277–278): Uncus elongate, wide at base, slightly widened basally, parallelsided nearly entire length, gradually narrowed rounded apex; gnathos

sparsely setose, protuberant, wide throughout length, apically upturned; tegumen slightly widened basally; dorsal strut of tegumen with arms convergent from a widened base, fusing about 2/3 length between posteroventral margin to base of uncus, dorsally atrophied; costa of valva broadly crenulate from a shallow depression beyond slanted, basal, digitate process to dorsal furca; apex widely bifurcate; furcae about equal in size, ventral furcae slightly wider than dorsal furca; base of costa bearing a stout, slanted, digitate process; sacculus twisted apically, constricting valva slightly beyond midlength, forming an elongate and broadly rounded cucullus; cucullus membranous and setose; vesica of aedeagus with many spinelike, cornuti.

Female Genitalia: Unknown.

Holotype, ♂, “COSTA RICA, Heredia, Est[ación] Biol[ógica] La Selva, 50–150 m, 10°26'N, 84°01'W, Apr. 1996, INBio-OET”, “24 Abril 1996, L/04/226”, “INBio: COSTA RICA: CRI002, 060925” [bar code label], “INBio, ♂ Genitalia Slide by D. Adamski, No. 902” [yellow label].

Distribution (Map 50): *Glyphidocera cotis* is known from one collecting site in east-central Heredia in northern Costa Rica.

Etymology: The species epithet *cotis* is derived from the Latin “cos,” meaning whetstone.

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