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Review of *Tumidiclava* Girault (Hymenoptera: Trichogrammatidae) from Xingjiang, China, with description of two new species and taxonomic notes on other Holarctic taxa

ZHULIDEZI AISHAN[1], SERGUEI V. TRIAPITSYN[2] & HONG-YING HU[1*]

[1]*College of Life Science and Technology, Xinjiang University, Urumqi, Xinjiang, P.R. China.*
E-mail: 307917017@qq.com; hoohyi-69@163.com
[2]*Entomology Research Museum, Department of Entomology, University of California, Riverside, California, USA*

Abstract

Four species of *Tumidiclava* Girault are recorded from Xinjiang Uyghur Autonomous Region, China. Two new species, *T. buerjinica* Triapitsyn & Aishan **sp. nov.** and *T. tamariska* Hu & Aishan **sp. nov.**, are described; the former is also known from Turkmenistan and the latter from Israel. One Palaearctic species, *T. subcaudata* Nowicki, is newly recorded from China, and a key to females of the Chinese species is given. Taxonomic notes and illustrations are provided on these and also other described taxa of *Tumidiclava* from the Holarctic region, both sexes of which are keyed including the type species of the genus, *T. pulchrinotum* Girault (USA), whose male is newly described. Lectotypes are designated for *Orthoneura bimaculata* Blood & Kryger, 1928 and *T.* (*Orthoneurella*) *minuscula* Nowicki, 1940 and a neotype is designated for *Orthoneura bimaculata* Blood, 1923.

Key words: Chalcidoidea, egg parasitoid, taxonomy, Palaearctic, Nearctic

Introduction

Tumidiclava Girault (Hymenoptera: Trichogrammatidae) was described by Girault (1911) based on one Nearctic species, *T. pulchrinotum* Girault, from Illinois, USA. Females of *Tumidiclava* are distinguished by the antennal club which is rather swollen and has a terminal process (Doutt & Viggiani 1968). Currently, this cosmopolitan genus includes 18 described, valid species in the world (Noyes 2014) but it is poorly known, with only a few keys available for several countries or regions, including Lin (1991, 1994) for China, Yousuf & Shafee (1988) and Yousuf *et al.* (1998) for India, and Fursov (2007) for Europe. Here we report four species of *Tumidiclava* collected from Xinjiang Uyghur Autonomous Region, China, including two new species that are described and illustrated. Another Palaearctic species, *T. subcaudata* Nowicki, is newly recorded from China. Additional distribution records for the described Palaearctic species of *Tumidiclava* are given based on examination of specimens in several European museum collections as well as in the Entomology Research Museum, University of California at Riverside, California, USA, which is the depository of the largest collection of Trichogrammatidae in the world. Its holdings of *Tumidiclava* are quite large (about two full drawers of specimens on points, cards, and slides), although material from the Palaearctic region is quite limited. Nevertheless, we have identified all the previously described species of the genus from several European countries and that has allowed us to properly compare our material from China with these taxa. Also examined was the holotype of *T. pulchrinotum*; we identified several non-type specimens of this species from Illinois and some other states in the USA, and these were compared with the known Palaearctic species, for which all the available type material was studied. A few additional, undescribed species were also identified from various countries in the Palaearctic region but these are not described because of the very limited material available.

Because China is situated in two biogeographical ecozones (Palaearctic and Oriental), we provide two keys to the species of *Tumidiclava*—one for China, and the other for the entire Holarctic region.

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Material and methods

All specimens studied from Xinjiang were collected by sweeping. All the measurements were taken from slide-mounted specimens at 100×, 200×, or 400× magnification with an Olympus biological microscope and an eyepiece reticle. Specimens were photographed using Nikon Ci and Nikon E200 microscope; Figs 4, 5, 7, 8, 11–24 are phase contrast microscope photographs and Figs 1–3, 6, 9, 10, are biological microscope photographs.

Abbreviations used are: PLS—placoid sensillum or sensilla (Pinto 2006); FWL—fore wing length; FWW—fore wing width; FWFS—fore wing fringe seta length; HWL—hind wing length; HWW—hind wing width; HWFS—hind wing fringe seta length.

Terminology for morphological features mainly follows Doutt & Viggiani (1968) and Pinto (2006). All the specimens from Xinjiang are deposited in the Insect Collection of College of Life Science and Technology, Urumqi, Xinjiang, China [ICXU]. The Holarctic species are from the Entomology Research Museum, University of California, Riverside, California, USA [UCRC].

Taxonomy

Tumidiclava Girault, 1911

Tumidiclava Girault 1911: 6–8. Type species: *Tumidiclava pulchrinotum* Girault, by original designation.
Orthoneura Blood 1923: 257–258. Type species: *Orthoneura bimaculata* Blood, by monotypy.
Orthoneura Blood & Kryger 1928: 211 (an objective junior synonym of *Orthoneura* Blood, 1923). Type species: *Orthoneura bimaculata* Blood & Kryger, 1928, by original designation.
Orthoneurella Blood & Kryger 1929: 322, *nom. nov. pro Orthoneura* Blood, 1923 *nec Orthoneura* Macquart, 1829 (Syrphidae). Listed as a synonym of *Tumidiclava* by Doutt & Viggiani 1968: 549.
Tumidiclava (*Orthoneurella*) Blood & Kryger: Nowicki 1936: 141 (probably a subgenus of *Tumidiclava*); Nowicki 1940: 655 (a subgenus of *Tumidiclava*).
Tumidiclava Girault: Doutt & Viggiani 1968: 549 (comments, list of species); Yousuf & Shafee 1988: 106–107 (diagnosis, key to Indian species); Lin 1991: 47–48 (diagnosis, key to species in Fujian); Lin 1994: 85–86 (diagnosis, key to Chinese species); Yousuf *et al.* 1998: 5–6 (diagnosis, key to Indian species); Pinto & George 2004: 532–533 (mentioned); Pinto 2006: 111–112 (diagnosis, distribution, diversity, hosts); Fursov 2007: 964 (in generic key), 984–985 (brief diagnosis, key to the 3 described European species).

Diagnosis. Antenna with 2 anelli; funicle absent; female club 2–4 segmented, with an elongate terminal process at apex; male club 2–5 segmented, without a terminal process. Fore wings slightly more than twice as long as wide (moderately wide), disc usually densely setose but sometimes with a few or sparse setae; venation relatively short, marginal vein broad and short, stigmal vein rudimentary, postmarginal vein absent. Male genitalia without digiti and claspers.

Key to species of *Tumidiclava* (females) from Xinjiang, China

1 Antenna with club 2-segmented, fore wing disc with only 2 rows of setae arranged as a "V" (Figs 2, 3)...*T. buerjinica* **sp. nov.**
- Antenna with club 3-segmented (Figs 7, 11, 15), fore wing disc sparsely or densely setae, the setae irregularly arranged (Figs 9, 12, 16) 2
2 Fore wing disc sparsely setae (Fig. 12) . . . . . .*T. tamariska* **sp. nov.**
- Fore wing disc more densely setae (Figs 9, 16) 3
3 Club about as long as scape. . . . . *T. minoripenis* Lin
- Club notably longer than scape 4
4 Midlobe of mesoscutum with 2 setae . . . . . *T. simplicis* Lin
- Midlobe of mesoscutum with 4 setae 5
5 Fore wing with venation extending nearly half wing length (Fig. 9) . . . . . .*T. subcaudata* Nowicki
- Fore wing with venation extending about one-third fore wing length (Fig. 16). . . . . *T. tenuipenis* Lin

Synopsis of the Chinese species of *Tumidiclava*

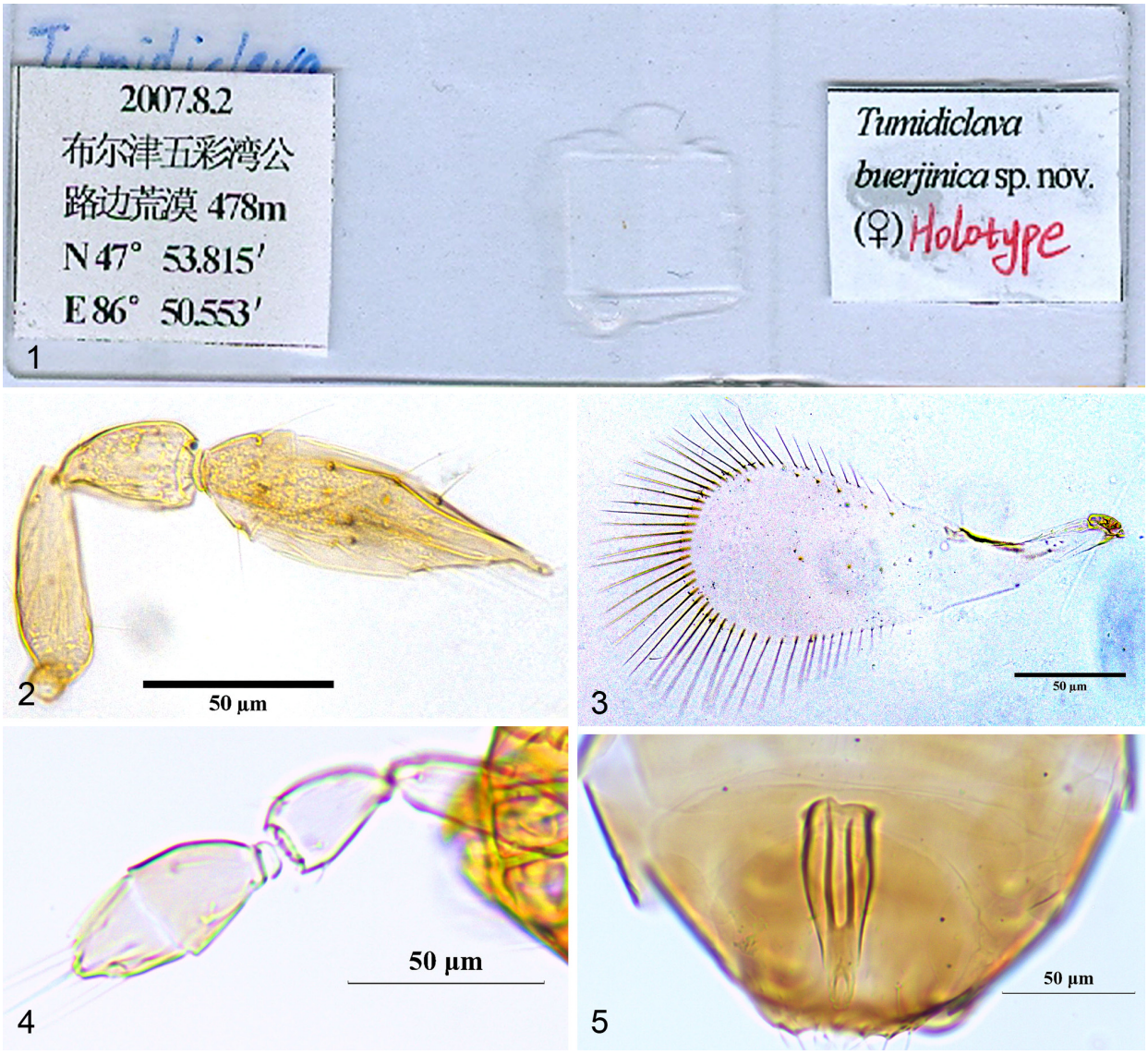
***Tumidiclava buerjinica* Triapitsyn & Aishan, sp. nov.**
(Figs 1–6)

Type material. Holotype ♀ [ICXU] (on slide, Fig. 1). **CHINA.** XINJIANG, Buerjin, 47°53.815′N, 86°50.553′E, 2.viii.2007, H.-y. Hu group.

Paratypes: same data as holotype [4♀ on slides, ICXU]. **TURKMENISTAN.** MARY, Karakum Desert near Mary Oasis (exact location could not be recorded at that time), 15.vi.1992, S.V. Triapitsyn (on *Atriplex* sp.) [1♀, 1♂ on slides, UCRC].

Description. FEMALE (holotype and paratypes from Xinjiang)**.** Body light brown, except ocelli and eyes red, legs yellowish-brown. Body length 0.38–0.46 mm (n = 4).

Head yellowish brown, subcircular in frontal view; eye 0.66× height of head (0.59–0.71×). Maxillary palp short, 1-segmented. Antenna (Fig. 2) thick, scape and pedicel almost equal in width, scape 3.14× as long as wide (2.63–3.29×); pedicel pyriform, 1.75× as long as wide (1.30–1.75×); scape length/pedicel length = 1.57 (1.57–1.77); second anellus difficult to observe (next to basal claval segment); club conical, 2-segmented, 2.92× as long as wide (2.92–3.50×), apical claval segment 3.38× as long as basal segment, apical segment with 2 PLS, terminal process short, its length/club length = 0.108 (4/37).



FIGURES 1–5. *Tumidiclava buerjinica*. Figs 1–3, holotype ♀: 1, holotype slide; 2, antenna; 3, fore wing. Figs 4 and 5, paratype ♂: 4, antenna; 5, genitalia.

FIGURE 6. *Tumidiclava buerjinica*, paratype ♂, body.

Mesoscutum with stripe-like sculpture; midlobe with 4 setae. Fore wing (Fig. 3) 2.50× as long as wide (2.22–3.00×), hyaline; venation short, extending 0.34× FWL, disc with only 2 rows of setae (radius and r-m cross-vein), arranged as a "V". Fringe setae rather long, FWFS/FWW = 0.64 (0.64–0.69). Hind wing shorter, with 1 complete linear setal track. First tarsal segments of all legs short, second and third segments equal in length.

Metasoma longer than mesosoma; ovipositor short and hidden, arising from fifth gastral sternite, ovipositor/hind tibia length = 1 (0.9–1.1).

Measurements (µm) of the holotype. Body 430; mesosoma 90; gaster 300; ovipositor 110. Antenna: scape 50; pedicel 37.5; clava 85. Fore wing 350: 150; longest marginal seta 80. Hind wing 350:20; longest marginal seta 70.

Variation (paratype from Turkmenistan). Venation thicker and disc cilia sparser than that of specimens from China,

MALE (paratype from Turkmenistan)**.** Body length 0.42 mm; its color similar to that of female. Apterous. Antenna (Fig. 4) thick, scape length/pedicel length = 1.58, scape 3.17× as long as wide; pedicel 1.5× as long as wide; second anellus larger than first; club oval, 2-segmented, 1.33× as long as wide, two segments almost equal in length, apical segment with 2 PLS. Genitalia (Fig. 5), with two chelate structures far away, and slightly introflexed.

Diagnosis. Females of *T. buerjinica* are characterized by their 2-segmented antennal club, and the fore wing disc having only 2 rows of setae (radius and r-m cross-vein) arranged as a "V". The male is apterous (Fig. 6), with the mesosoma reduced, and its club is 2-segmented. Both sides of the male genitalia have a pair of sickle-shaped structures (Fig. 5). This unique combination of features easily distinguishes *T. buerjinica* from all other described species of the genus.

Etymology. The species is named after the collection locality of its holotype.

Distribution. China (Xinjiang) and Turkmenistan.

Hosts. Unknown.

Comments. Although most *Tumidiclava* are characterized by at least moderately densely setose fore wings, Pinto (2006) reported one species from Turkmenistan with almost glabrous fore wing discs. We found such specimens in UCRC (both nicely slide-mounted by Gary Platner) and these (one female and one male) without any doubt represent the species mentioned by Pinto (2006). These were collected in 1992 by the second author of this communication in a sandy Karakum Desert near the Mary Oasis in Turkmenistan and are conspecific to our specimens of *T. buerjinica* from Xinjiang.

Tumidiclava subcaudata Nowicki, 1936
(Figs 7–9)

Tumidiclava subcaudata Nowicki 1936: 139–141.
Tumidiclava subcaudata Nowicki: Doutt & Viggiani 1968: 549 (list); Fursov 2007: 984 (illustrations), 985 (key, brief diagnosis, description of the male, distribution); Viggiani 2011: 104 (list).

Material examined. CHINA. XINJIANG: Emin, 46°47.07′N, 83°22.15′E, 30.vii.2007, H.-y. Hu group [1♀, ICXU]. Zhaosu, 43°22.18′N, 81°51.45′E, 29.vii.2006, H.-y. Hu group [4♀, ICXU]. **KYRGYZSTAN.** CHUY, Kashka-Suu Ravine, ca. 32 km S of Bishkek, 42°38'50''N 74°30'50''E, 1759 m, 12.viii.1998, C.H. Dietrich [1 ♀, UCRC].

Redescription (based on specimens from China and Kyrgyzstan). FEMALE. Body dark brown except eyes red, femora brown, and tibiae and tarsi yellow except metatarsus slightly brown. Body length 0.85–1.12 mm (n = 5).

Head brown, oblate in frontal view; eye 0.54× height of head (0.11–0.67×). Maxillary palp short, 1-segmented. Antenna (Fig. 7) rather long, with scape 3.27× as long as wide (2.08–3.8×); pedicel a little wider than scape and 2.01× as long as wide (1.5–2.27×); scape length/pedicel length = 1.56 (1.48–1.67); first anellus large, second small and hidden in basal cavity of club; club 3-segmented, 2.46× as long as wide (2.32–2.68×), first claval segment the shortest, apical segment the longest and with 7 PLS, terminal process longer than second segment, its length/club length = 0.229 (11/48).

Mesoscutum with reticulate sculpture (Fig. 8); midlobe with 4 setae. Fore wing (Fig. 9) 2.20× as long as wide (2.14–2.27×), with brown area behind apex of submarginal vein; venation long, extending 0.46× FWL, disc densely setae, setae irregularly arranged. Fringe setae short, FWFS/FWW = 0.11 (0.10–0.12). Hind wing with 1 complete linear setal track. First tarsal segments of all legs short, second and third segments equal in length.

Metasoma longer than mesosoma; ovipositor long and slightly exserted, arising from the fourth gastral sternite, ovipositor/hind tibia length = 1.8 (1.7–1.9).

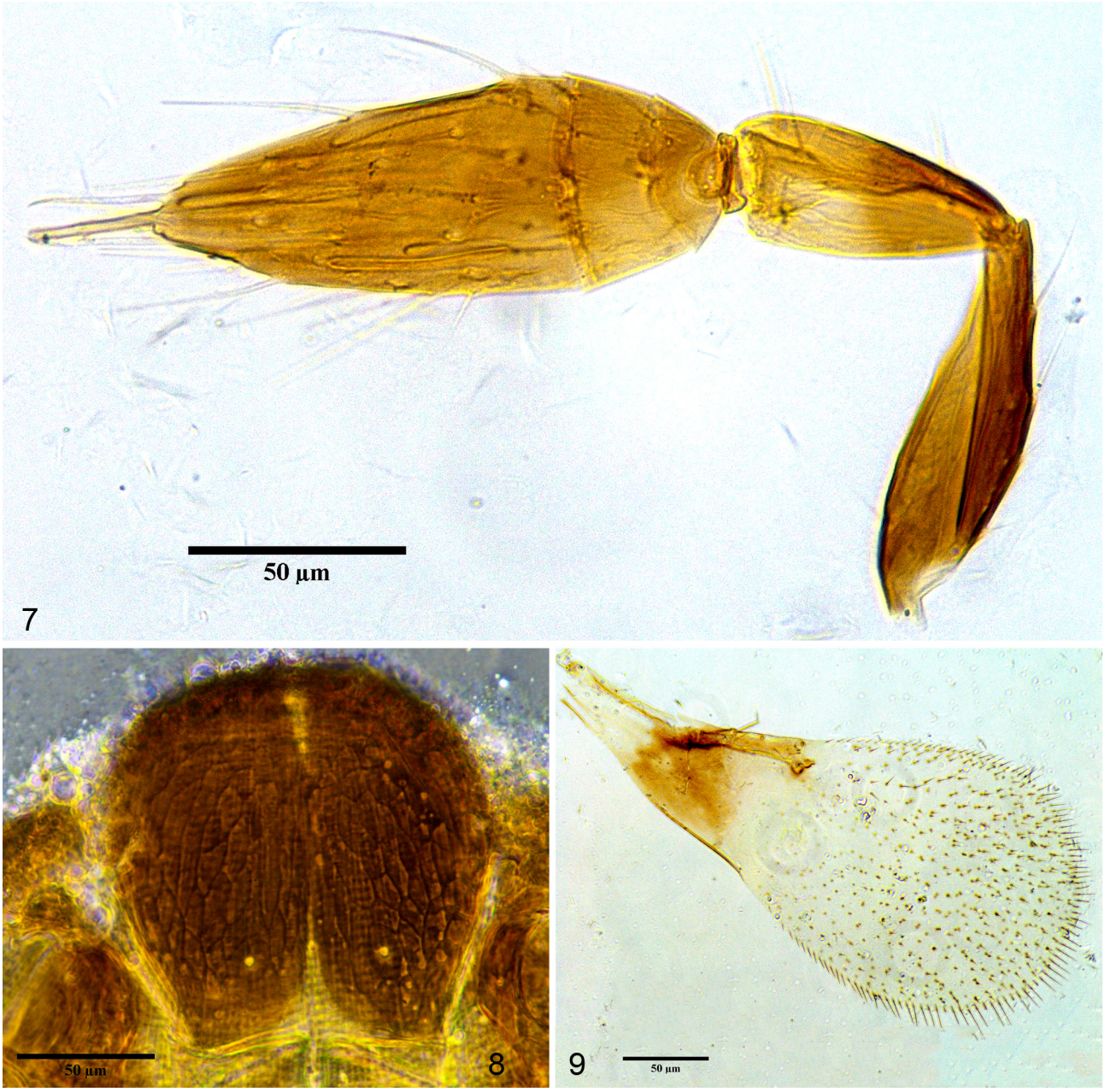
MALE. Effectively, albeit briefly, described by Fursov (2007) in his key; his material was not available to us. The males listed below under "Comments", identified as this species by S. Novicky, need remounting and thus until then are unsuitable for redescription.

Distribution. China (Xinjiang) (new record), Hungary (Erdös 1956), Kyrgyzstan (new record), Poland (new record), Russia (European part) (Fursov 2007), and Ukraine (Nowicki 1940 [as Poland]; Nikol'skaya & Trjapitzin 1978; Fursov 2007).

Hosts. Unknown.

Comments. This species was described originally by Nowicki from the holotype female collected at "Krzemieniec, Volhynia (South Eastern Poland)" (Nowicki 1936, p. 141), which is now Kremenets, Ternopil Oblast of Ukraine. Viggiani (2011) mentioned 15 specimens of *T. subcaudata* in the S. Novicky collection at Dipartimento di Entomologia e Zoologia Agraria "Filippo Silvestri", Università degli Studi di Napoli "Federico II", Portici, Napoli, Campania, Italy (DEZA). S. V. Triapitsyn examined these specimens during a visit, but, unfortunately, the holotype was not among them and thus can be considered lost because it could neither be found in the Natural History Museum, London, England, UK (BMNH), where a much smaller part of the S. Novicky (Nowicki) collection of Trichogrammatidae is also deposited. After the non-type specimens of *T. subcaudata* in DEZA are properly remounted from the completely dried water-soluble solution in Canada balsam, a neotype can be designated from one of the females, if necessary. The data on these specimens, which are mounted on microslides in the typical style of S. Novicky (Viggiani 2011), are as follows [DEZA]: 1 female, labeled: "Soplicon 16.7.42. *Tumidic. subcaud* ♀" (the locality is unclear); 1 female, labeled: "Pinlack 24.8.42. *Tum. subc* ♀" (the

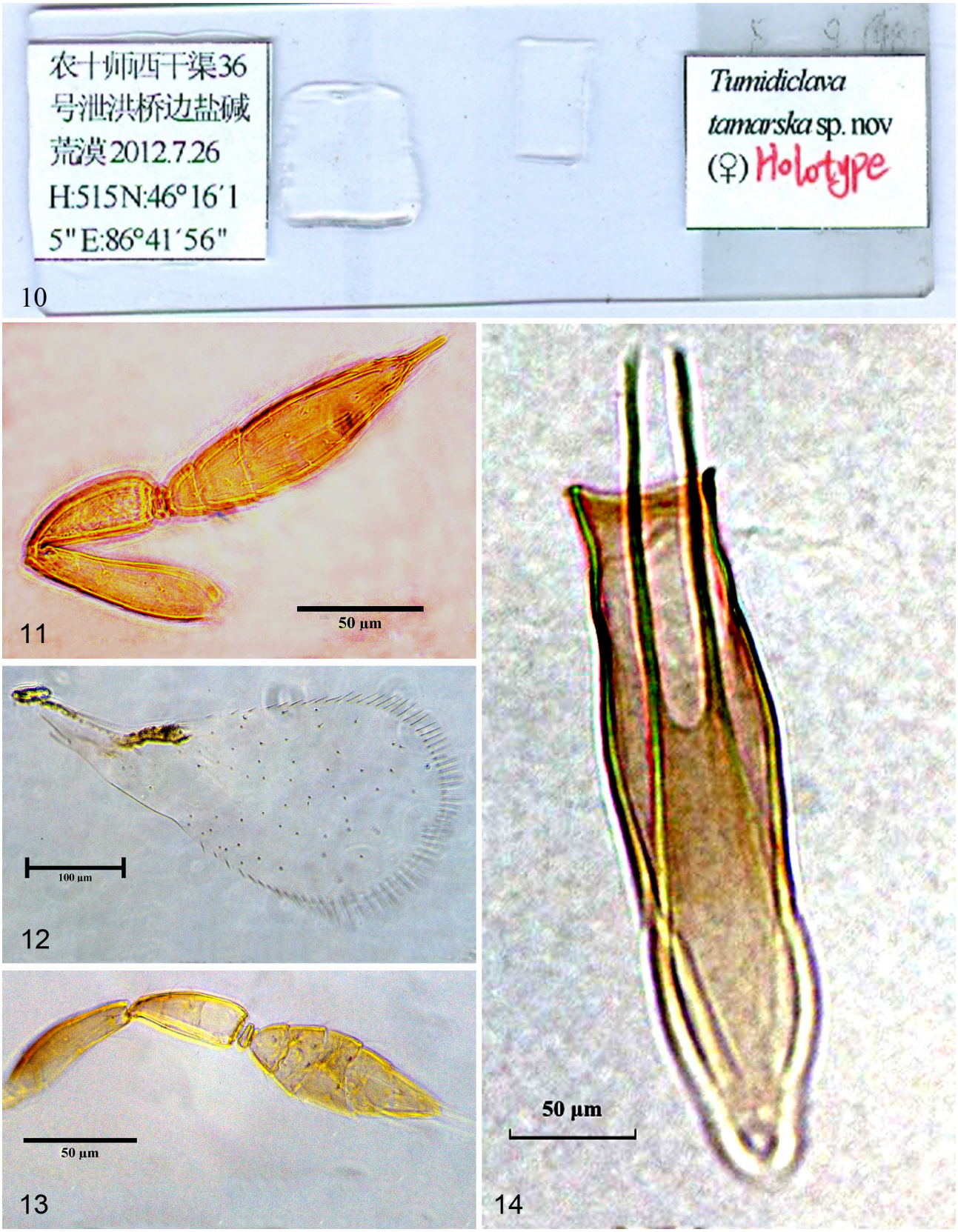
locality is unclear); 1 male, labeled: “Soplicon 16.7.42. *Tum sub.* ♂”; 1 female, labeled on the underside: “E.K.D. ♀ 1.VII.40. *Tumidiclava subcau-* ♀ at N” (specimens were collected by S. Novicky using an aspirator on window panes in cars of the electric train Warsaw – Grodzisk Mazowiecki (Masovian Voivodeship, Poland); it is an abbreviation standing for “Elektryczne Koleje Dojazdowe” in Polish, the suburban railway line that operated during 1922–1947); 1 female, labeled on the underside: “E.K.D. ♀ 2.VII.40. *Tum. subc.* ♀ at N” (on the same pin with the previous one); 4 males on the same pin, labeled: “Fort Mo-kation 4.10.40. *Tum. sub.* ♂” (except one "8.8.40", the locality is unclear); 6 females on the same pin, labeled: “Hortobágy 12.VII.1937 leg. Nowicki” ("Nagy Hortobágy" was one of the well-known collecting localities of S. Novicky; it is in Hortobágy National Park, Hungary).



FIGURES 7–9. *Tumidiclava subcaudata* Nowicki ♀ (Zhaosu, Xinjiang, China): 7, antenna; 8, mesosoma; 9, fore wing.

***Tumidiclava tamariska* Hu & Aishan, sp. nov.**
(Figs 10–14)

Type material. Holotype ♀ [ICXU] (on slide, Fig. 10). **CHINA.** XINJIANG: Beitun, Xiganqu, 46°16.15′N, 86°41.56′E, 26.vii. 2012, H.-y. Hu group.



FIGURES 10–14. *Tumidiclava tamariska*. Figs 10–12, holotype ♀: 10, holotype slide; 11, antenna; 12, fore wing. Figs 13 and 14, paratype ♂: 13, antenna; 14, genitalia.

Paratypes (on slides). **CHINA.** XINJIANG: Bachu, 39°50.68′N, 78°32.41′E, 21.vi. 2008, H.-y. Hu group [1♀, ICXU]. Beitun, Xiganqu, 46°16.15′N, 86°41.56′E, 26.vii. 2012, H.-y. Hu group [23♀, 15♂, ICXU]. Bole, 44°30.08′N, 83°19.49′E, 25.vii. 2006, H.-y. Hu group [6♀, 2♂, ICXU]. Shihezi, 44°59′N, 86°06′E, 19.vii. 2005, H.-y. Hu group [2♀, 6♂, ICXU]. **ISRAEL.** Negev Desert, Sde Boker Kibbutz, 2-22.x.1988, F. Brouwer [1♀ on slide, UCRC].

Description. FEMALE (specimens from China and Israel)**.** Body yellowish-brown except eyes red, legs yellow. Body length 0.55–0.63 mm (n = 7).

Head brown, subcircular in frontal view; eye 0.68× height of head (0.57–0.80). Maxillary palp short, 1-segmented. Antenna (Fig. 11) rather long, with scape long, 4.28× as long as wide (4.00–4.43×); pedicel pyriform, 2.50× as long as wide (2.00–2.50×); scape length/pedicel length = 1.50 (1.47–1.55); second anellus small and appressed to club; club 3-segmented, 3.58× as long as wide (2.92–4.00×), first segment the shortest, apical segment the longest and with 3–4 PLS, terminal process as long as second claval segment, its length/ club length = 0.14 (6/42).

Mesoscutum with reticulate sculpture; midlobe with 4 setae. Fore wing (Fig. 12) 2.00× as long as wide (1.9–2.1×), hyaline; venation short, extending 0.30× FWL, disc sparsely setae, with setae irregularly arranged. Fringe setae short, FWFS/FWW = 0.20 (0.14–0.20). Hind wing with 1 complete linear setal track. First tarsal segments of all legs short, second and third segments equal in length.

Metasoma longer than mesosoma; ovipositor short and slightly exerted, arising from fourth gastral sternite, ovipositor/hind tibia length = 1.15 (1.17–1.25).

Measurements (μm) of the holotype. Body 610; mesosoma 180; gaster 300; ovipositor 37.5. Antenna: scape 70; pedicel 50; clava 110. Fore wing 390: 200; longest marginal seta 40. Hind wing 370; 30; longest marginal seta 60.

MALE (specimens from China). Body length 0.60–0.62 mm; body color and morphological features similar to female. Antenna (Fig. 13) slightly thick, scape length/pedicel length = 1.36 (1.15–1.44), scape 3.65× as long as wide (3.14–4.00×); pedicel 1.98× as long as wide; second anellus larger than first; club 5-segmented, 3.06× as long as wide (2.83–3.50×), with 2 PLS, one on the third club segment, another on the fourth to fifth club segment. Genitalia (Fig. 14) cylindrical, aedeagus and apodemes equal in length.

Diagnosis. *Tumidiclava tamariska* is most similar to *T. longiclavata*. Females of this new species are easily distinguished by the unique combination of the club having long segments, particularly the second and third segments (Fig. 11), and the fore wings having sparse, short, inconspicuous discal setae (Fig. 12).

Etymology. The species name is a noun in apposition which is derived from the common name of *Tamarix*, tamarisk.

Distribution. China (Xinjiang) and Israel.

Hosts. Unknown.

Comments. Most of the specimens of this species were collected in Beitun, Xiganqu saline desert. Vegetation at this locality is predominated by Tamaricaceae, plant hosts of various leafhoppers (Hemiptera: Cicadellidae) and also the leaf beetle *Diorhabda elongata* Brullé (Coleoptera: Chrysomelidae). At least one of these two might be the potential host of *T. tamariska*, numerous specimens of which were collected on *Tamarix chinensis*.

Tumidiclava tenuipenis **Lin, 1991**

(Figs 15–16)

Tumidiclava tenuipenis Lin 1991: 50, 51 (illustrations).
Tumidiclava tenuipenis Lin: Lin 1994: 88–89 (redescription, illustrations).
Tumidiclava tenuipennis [sic] Lin: Noyes 2013 (database).

Material examined. CHINA. XINJIANG, Tekesi, 44°58′N, 81°01′E, 27.vii. 2006, H.-y. Hu group [3♀, ICXU].

Redescription (based on non-type specimens from Xinjiang)**.** FEMALE**.** Body brown, except ocelli and eyes red, legs yellow. Body length 0.54–0.65 mm (n = 3).

Head brown, subcircular in frontal view; eye 0.61× height of head (0.60–0.62×). Maxillary palp short, 1-segmented. Antenna (Fig. 15) thick, scape 3.3× as long as wide (3.0–3.5×); pedicel narrow, 2.15× as long as wide (2.00–2.32×); club 3-segmented, thick, 2.32× as long as wide (2.13–2.53×), first (basal) segment the shortest,

apical segment the longest and with 6 PLS, terminal process as long as second claval segment, its length/club length = 0.108 (4/37).

Mesoscutum with reticulate sculpture; midlobe with 4 setae. Fore wing (Fig. 16) relatively broad, 2.38× as long as wide (2.26–2.50×), with a brown area behind apex of submarginal and base of marginal veins; venation short, extending 0.33×FWL, disc densely setae, setae irregularly arranged. Fringe setae short, FWFS/FWW = 0.23 (0.21–0.25). Hind wing with 3 complete linear setal tracks.

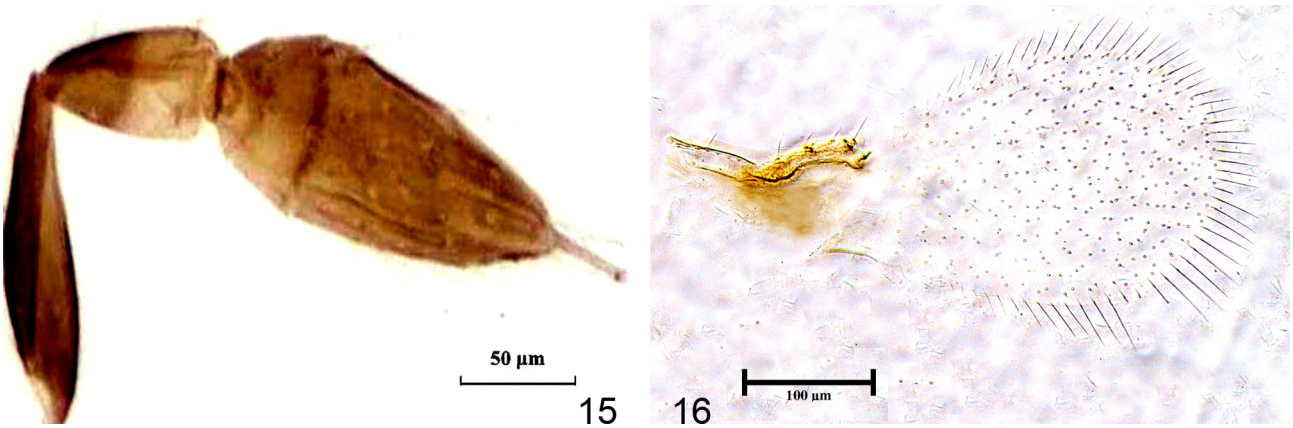
Metasoma longer than metasoma; ovipositor long and slightly exerted, arising from fourth gastral sternite, ovipositor/hind tibia length = 1.15 (1.00–1.25).

MALE. Unknown from Xinjiang but known from Fujian, China.

Distribution. China (Xinjiang [new record], Fujian) (Lin 1991, 1994).

Hosts. Unknown.

Comments. This species was described originally from the holotype collected in Chongan County, Fujian, China and several paratypes from Fujian. The holotype (not examined) is deposited in the Biological Control Research Institute, Fujian Agricultural College, Fuzhou, Fujian, China (Lin 1991).



FIGURES 15 and 16. *Tumidiclava tenuipenis* Lin ♀ (Tekesi, Xinjiang, China): 15, antenna; 16, fore wing.

Notes on other described Holarctic species of *Tumidiclava*

Key to species of *Tumidiclava* (both sexes) from Holarctic region

(Includes the male of *T. tenuipenis* Lin which is known only from Fujian, China)

1	Female (antennal club with a terminal process at apex)	2
-	Male (antennal club without a terminal process at apex)	8
2	Antenna with club 2-segmented (Fig. 2)	*T. buerjinica* **sp. nov.**
-	Antenna with club 3-segmented (Figs 7, 11, 15, 24, 28)	3
3	Fore wing disc sparsely setae (Fig. 12)	*T. tamariska* **sp. nov.**
-	Fore wing disc more densely setae (Figs 9, 16, 25, 29)	4
4	Fore wing hyaline, at most with a slight infuscation behind venation	5
-	Fore wing with a strong infuscation behind venation	6
5	Mesoscutum with two dark spots relatively short, not with distal pair of setae	*T. pulchrinotum* Girault
-	Mesoscutum with two dark spots relatively long, with distal pair of setae	*T. bimaculata* (Blood)
6	Venation extending to at least 0.44 length of fore wing (Figs 9, 25)	7
-	Venation extending to at most 0.38 length of fore wing (Fig. 16)	*T. tenuipenis* Lin
7	Longest fringe setae on fore wing relatively short, 0.11× maximum wing width (Fig. 9)	*T. subcaudata* Nowicki
-	Longest fringe setae on fore wing relatively long, 0.25× maximum wing width (Fig. 25)	*T. minuscula* Nowicki
8	Antenna with club 2-segmented (Fig. 4); apterous	*T. buerjinica* **sp. nov.**
-	Antenna with club 3- or 5-segmented (Figs 13, 22, 27); macropterous	9
9	Antenna with club 3-segmented (Fig. 27)	10
-	Antenna with club 5-segmented (Figs 13, 22)	12
10	Mesoscutum with 2 distinct dark spots	*T. pulchrinotum* Girault
-	Mesoscutum more or less uniformly colored, without distinct dark spots	11
11	Longest fringe setae on fore wing relatively short, 0.23× maximum wing width (Fig. 16)	*T. tenuipenis* Lin

-	Longest fringe setae on fore wing relatively long, more than 0.26× maximum wing width (Fig.25)	*T. minuscula* Nowicki
12	VII-VIII gastral tergites with 2 blade-like projections	*T. subcaudata* Nowicki
-	VII-VIII gastral tergites without such projections	.13
13	Mesoscutum with 2 distinct dark spots	*T. bimaculata* (Blood)
-	Mesoscutum uniformly colored	*T. tamariska* **sp. nov.**

Tumidiclava bimaculata (Blood, 1923)

(Figs 17–23)

Orthoneura bimaculata Blood 1923: 254 (list), 257–258.

Orthoneura bimaculata Blood & Kryger 1928: 212–213 [an objective junior synonym of *Tumidiclava bimaculata* (Blood, 1923)], 219 (illustration of a male, habitus), 222 (illustrations, details).

Orthoneurella bimaculata (Blood): Nowicki 1936: 141 (mentioned, as probably forming a subgenus of *Tumidiclava*).

Tumidiclava (*Orthoneurella*) *bimaculata* (Blood): Nowicki 1940: 657 (distribution).

Tumidiclava bimaculata (Blood): Doutt &Viggiani 1968: 549 (list), 550 (illustrations); Fursov 2007: 984–985 (illustrations, key, brief diagnosis, distribution).

Type material examined. Lectotype female [BMNH] of *Orthoneura bimaculata* Blood & Kryger, 1928, here designated to avoid the existing ambiguity about the type specimens of this nominal species. Also, in order to avoid any uncertainty about the identity of this species, the same female is also designated here as the neotype of *Orthoneura bimaculata* Blood, 1923, type specimens of which are lost (and probably these unknown syntypes of both sexes had not been marked or even properly preserved). The lectotype is on a slide (Fig. 17) labeled: 1. "B. N. BLOOD PREPARER TRICHOGRAMMINAE *Orthoneura bimaculata* ♀ TYPE 5.1530a [in red, added later]"; 2. [in India ink on glass] "*Tumidiclava*"; 3. "THIS SPECIMEN HAS NO TYPE STATUS" (both a correct and an incorrect statement by an unknown researcher or curator because it is a syntype of *Orthoneura bimaculata* Blood & Kryger, 1928 but could not be a syntype of *Orthoneura bimaculata* Blood, 1923 as it was collected in 1924); [in pencil] "Published in 1923"; 5. "Kings Weston, Bristol 1.VII.1924".

The lectotype (Fig. 18) is complete, uncleared, perfectly spread out. The type locality is Kings Weston Down (near Bristol), Bristol, England, UK (Blood & Kryger 1928). Paralectotype: 1 male (Fig. 19) [BMNH] on slide (Fig. 20), labeled similarly to the lectotype except for "♂", "5.1530b" in red (added later), and the collecting date "27.VI.1924".

Other material examined. AUSTRIA. LOWER AUSTRIA, Spitzerberg (S slope, ca. 2.5 km S of Hundsheim), 48°05'48''N 16°56'29''E, 190–250 m, 17.vi.2007, C. Thuróczy, S.V. Triapitsyn [1♀, UCRC]. **HUNGARY.** Budapest, Sashegy, 30.vi.1917, L. Biró [1♀, BMNH]. **ITALY.** CAMPANIA, Napoli Prov., Portici, Parco Gussone, 3–4.vi. 2003, J. Munro, A. Owen, J.D. Pinto [1♂, UCRC]. LAZIO, Roma Prov.: Near Maccarese Cemetery, 41°52.836'N 12°16.190'E, 40 m, 11.vi.2003, M. Bologna, J. Munro, A. Owen, J.D. Pinto [1♀, UCRC]. Mignone River (near Rota), 42°9.68197′N, 12°0.605′E, 150 m, 9.vi. 2003, M. Bologna, J. Munro, A. Owen, J.D. Pinto [1♂, UCRC]. **UNITED KINGDOM.** ENGLAND: London Borough of Croydon (as Surrey on the labels): Coulsdon, Happy Valley Park, 1.viii.1982, J. S. Noyes [2 specimens of undetermined sex, BMNH]; Coulsdon Common, Farthing Downs, 25.viii.1984, J. S. Noyes [5 specimens of undetermined sex, BMNH]. London Borough of Hounslow (as Middlesex on the label), Hanworth, 2.viii.1970, Z. Bouček [1♀, BMNH]. London (borough unknown), Richmond Park, 2.ix.1984, J. S. Noyes [1♂, BMNH]; Hampshire Co., Hollom Down, 51°06'52.5"N 1°37'02.3"W, 86 m roadside A30 Hwy., 30.viii.2014, S. V. Triapitsyn [1 female, UCRC].**UKRAINE.** CHERKASY OBLAST, Kanevsky Nature Reserve, 6.viii.1984, V. Fursov [1♀, BMNH]. **COUNTRIES UNKNOWN.** Localities unclear: 7.vii.1942, S. Novicky [1♀, DEZA]; 20.v.1945, S. Novicky [1♀, BMNH].

Diagnosis. FEMALE (based on specimens from Austria and Italy)**.** Two dark spots on mesoscutum relatively long (Fig. 21), bearing distal pair of setae; fore wing with marginal vein straight.

MALE (based on specimens from Italy). Antenna (Fig. 22) rather short, with 2 small anelli, the second anellus appressed to club; club 5-segmented, with 5 PLS, claval segments almost of equal length.

Distribution. Austria (new record), Czech Republic (Kalina 1989), France (Nowicki 1940), Hungary (Nowicki 1940), Italy (new record), Ukraine (Fursov 2007), and United Kingdom (England) (Blood 1923; Blood & Kryger 1928; Fursov 2007).

Hosts. Unknown.

FIGURES 17–23. *Tumidiclava bimaculata* Blood (Spitzerberg, Lower Austria, Austria): 17, ♀ lectotype slide; 18, ♀ lectotype; 19, ♀ paralectotype; 20, ♂ [BMNH] on slide; 21, ♀ head and mesoscutum; 22, ♂ antenna; 23, ♂ genitalia.

Comments. *Orthoneura bimaculata* Blood, 1923 was described from an unspecified number of specimens of both sexes from around Bristol, England, UK (Blood 1923). In the far more detailed description, Blood & Kryger (1928) specified the number of type specimens of *Orthoneura bimaculata* Blood & Kryger, 1928 (two syntypes, a male and female on slides, in BMNH). Additional non-type specimens were deposited by them in the Zoological Museum, Natural History Museum of Denmark, University of Copenhagen, Copenhagen, Denmark (ZMUC). According to Lars B. Vilhelmsen (personal communication), only one microscopic slide (number 17.4, labeled "*Orthoneura* Soc. Ent. Med. Engl. Kings West. Down") was found in ZMUC that undoubtedly belongs to the material mentioned by Blood & Kryger (1928). It is an incomplete specimen of unknown sex of which only the head, wings, and a few leg segments remain.

Tumidiclava minuscula Nowicki, 1940

(Figs 24–26)

Tumidiclava (*Orthoneurella*) *minuscula* Nowicki 1940: 655–657.
Tumidiclava minuscula Nowicki: Doutt & Viggiani 1968: 549 (list); Yousuf *et al.* 1998: 7 (mentioned); Fursov 2007: 985 (key, brief diagnosis, distribution).
Orthoneurella minuscola [sic] Nowicki: Viggiani 2011: 104 (list, misspelled).

Type material examined. Lectotype of *Tumidiclava* (*Orthoneurella*) *minuscula* Nowicki [DEZA] here designated to avoid the existing ambiguity about the type status of the specimens standing under this name in the S. Novicky main collection of Trichogrammatidae. The lectotype is the fifth microslide from the top on the same pin with 6 other microslides, in the completely dried water-soluble mounting medium, and is labeled: "Le Rouret AM VI.VII.35 ♀ *Orthoneurella minuscula* cotype".

The lectotype needs to be remounted in Canada balsam; its condition is rather poor at this point although it appears to be more or less complete. It fits the original description of Nowicki (1940). Paralectotypes [DEZA]: 5 specimens on the same pin with the lectotype, as follows: 1 female (the top microslide), labeled: "Le Rouret A.M. VI-VII.35 ♀ *Tumidiclava minuscula*"; an empty microslide, from which the specimen is lost (the second microslide from the top), labeled: ”Le Rouret A.M. VI-VII.35 ♀ *Tumidiclava minuscula*"; 1 male (the third microslide from the top), same label except for the male symbol; 1 female (the fourth microslide from the top), labeled: ”Le Rouret A.M. VI.VII.35 *Tumidiclava minuscula* cotype ♀";1 male (the sixth microslide from the top), labeled: ”Le Rouret A.M. VI.VII.35 *Tumidiclava minuscula* cotype ♂"; 1 male (the seventh microslide from the top), labeled: ”Le Rouret A.M. VI.VII.35 *Orthoneurella minuscula* cotype ♂".

Other material examined. ITALY. LAZIO, Roma Prov., Castelporziano Presidential Estate, Ponte Guidoni, 41°45.415’N 12°23.851’E, 80 m, 11–12.vi.2003, M. Bologna, J. Munro, A. Owen, J.D. Pinto [3♀, UCRC]. SICILY, 10 km NW of Geraci Siculo, 8.vi. 1992, J.D. Pinto [1♀, UCRC]. **KYRGYZSTAN**. TALAS, Kara Buura Ravine (20 km S of Kyzyl-Adyr), 42°26’23’’N 71°3316’’E, 1300 m, 15.vi.1999, C.H. Dietrich [1♀, UCRC]

Diagnosis. FEMALE (based on specimens from Italy)**.** Body brown, except head yellow, ocelli dark, and eyes red, legs yellow.

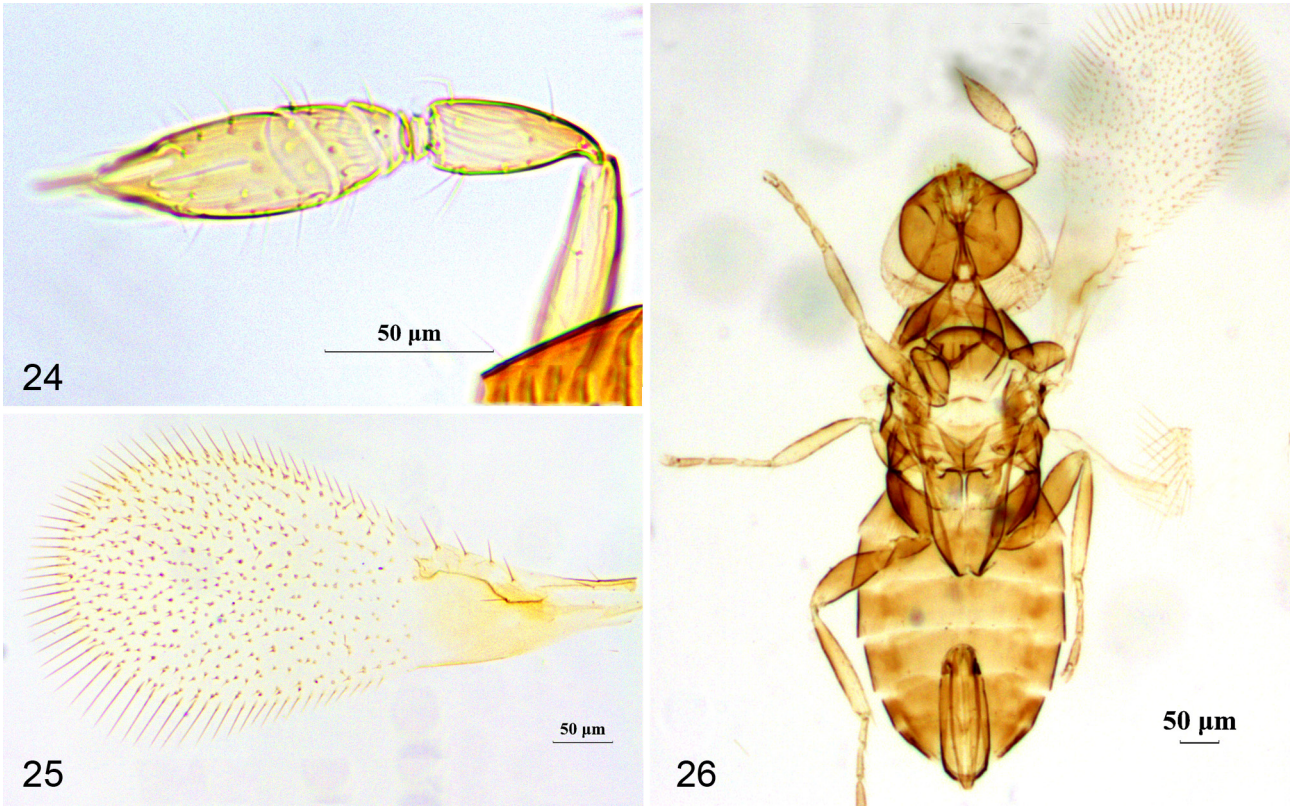
Antenna (Fig. 24): club slightly longer than wide, basal segment the shortest, apical segment the longest and with 4 PLS, terminal process as long as second claval segment. Fore wing (Fig. 25) with a brown area behind apex of submarginal vein and base of marginal veins; disc densely setae, setae irregularly arranged. Ovipositor (Fig. 26) long and slightly exerted, arising from fourth gastral sternite.

MALE**.** See Nowicki (1940).

Distribution. France (Nowicki 1940), Hungary (Erdös 1956), Italy (new record), Kyrgyzstan (new record), and Slovakia (Kalina 1989).

Hosts. Unknown.

Comments. This species was described originally from a short series of syntypes of both sexes (although in the legend to the illustration of the pair of wings Nowicki (1940) mentioned a male “Type”) from Le Rouret (Alpes-Maritimes, France, the collection locality of the lectotype and the paralectotypes listed above) and also Hyères (near Toulon, Var, France); one female from the latter locality has not been found. Examination of the type specimens and also the good original description leaves no doubt about the correct identification of the examined non-type specimens from Italy and Kyrgyzstan.



FIGURES 24–26. *Tumidiclava minuscula* Nowicki ♀ (Roma Prov, Lazio, Italy): 24, antenna; 25, fore wing; 26, body.

Tumidiclava pulchrinotum **Girault, 1911**
(Figs 27–32)

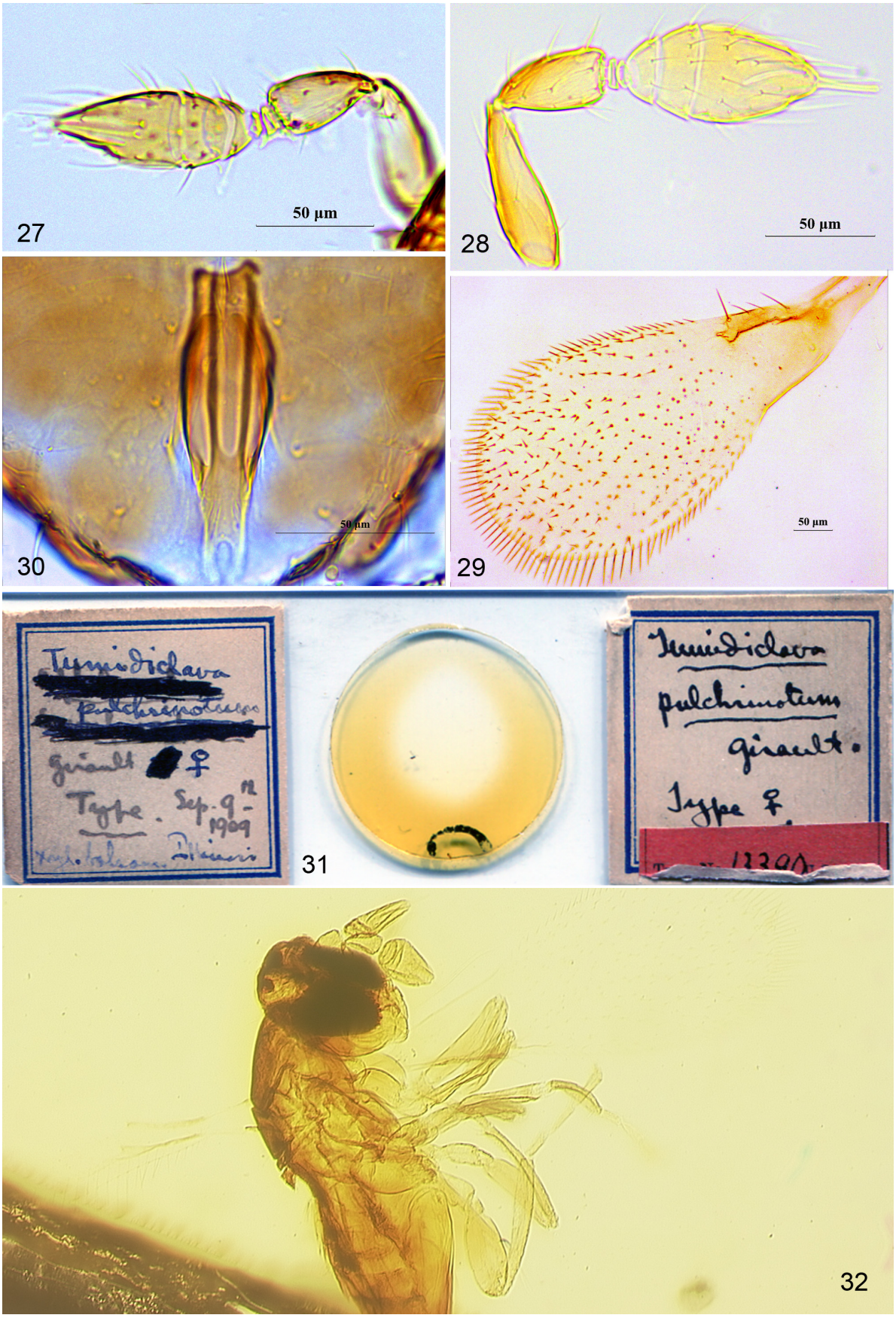
Tumidiclava pulchrinotum Girault 1911: 8–9.
Tumidiclava pulchrinotum Girault: Peck 1963: 77 (catalog); Doutt &Viggiani 1968: 549 (list); Pinto 2006: 111 (distribution).

Type material examined. Holotype female (Fig. 31) [National Museum of Natural History, Washington, District of Columbia, USA (USNM) on slide (Fig. 32) labeled: 1. "*Tumidiclava pulchrinotum* Girault. Type ♀. Type No. 13390 [red]"; 2. "*Tumidiclava* [an unknown word crossed out in black ink] *pulchrinotum* [an unknown word crossed out in black ink] Girault ♀ Type Sep. 9th – 1909 xylol – balsam Illinois [in blue ink]".
The holotype is located at the lower edge of the coverslip and is semi-circled with India ink; it is mounted under the same coverslip with an *Anaphes* sp. (Hymenoptera: Mymaridae). The holotype is complete and mounted semi-laterally, but is in poor condition, especially all the wings are not clearly visible.

Other material examined. USA. ILLINOIS: Champaign Co., Urbana, 3.ix.1983, J.T. & D.E. Huber [2♀, UCRC]. Cook Co., Chicago, Clayton Smith Forest Preserve, 31.vii.1989, J.D. Pinto [1♀, UCRC]. Kane Co., 1 mi. S of Algonquin on Fox River, 18.vi.1991, H. Andersen [1♀, UCRC]. Washington Co., Du Bois, 4.ix.1983, J.T. & D.E. Huber [2♀, 2♂, UCRC]. MISSOURI: Wayne Co., Williamsville, 16.vii-8.viii.1988, J.T. Baker [1♀, UCRC]. PENNSYLVANIA: Bradford Co., Wilawana, 23.vi.1990, R.H. Crandall [1♀, UCRC].

Diagnosis. FEMALE (based on holotype and non-type specimens from USA)**.** Body color generally opaque black to yellowish, eyes and ocelli dark garnet. Antenna (Fig 28): apical segment of club the longest and with 3 PLS, terminal process longer than second claval segment. Fore wing (Fig. 29) with a light brown area behind apex of submarginal vein and base of marginal vein. Ovipositor long and slightly exserted, arising from end of third gastral sternite.

MALE (based on non-type specimens from Illinois, USA). Body length about 0.6 mm. Antenna (Fig. 27) short, with club 3-segmented, scape length/ pedicel length = 1.22, scape 2.75× as long as wide; pedicel 2.00× as long as wide; two small anelli subequal, the second anellus appressed to club, 2.67× as long as wide, and at least 3 PLS, all claval segments almost of equal length. Genitalia (Fig. 30) with apodemes half of aedeagal length.



FIGURES 27–32. *Tumidiclava pulchrinotum* Girault (Urbana, Illinois, USA): 27, ♂ antenna; 28, ♀ antenna; 29, ♀ fore wing; 30, ♂ genitalia; 31, holotype ♀ slide; 32, holotype ♀ slide.

Distribution. USA (Girault 1911) and Uruguay (De Santis 1979). Lin (1994) also listed it from Australia, without providing any reference(s). The non-North American country records need verification. According to Pinto (2006), this species is broadly distributed in North America.

Hosts. Unknown.

Comments. This species was described from the holotype from Centralia, Illinois, USA (as "Type"), one paratype female from Urbana, Illinois (as a "Cotype"), and one non-type female from Centralia.

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