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A taxonomic study of the Dryininae (Hymenoptera: Dryinidae) of Japan, with description of a new species of *Pseudodryinus*

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Abstract

The Japanese Dryinidae were studied and 11 species recognized. The following 10 species were recorded for the first time from Japan: *Thaumatodryinus alienus* Olmi, *Dryinus bellicus* Olmi, *D. chenae* Xu, Olmi & He, *D. browni* Ashmead, *D. expolitus* Xu, Olmi & He, *D. indicus* (Kieffer), *D. krombeini* Ponomarenko, *D. pyrillae* (Kieffer), *D. pyrillivorus* Olmi, and *D. sinicus* Olmi. *Pseudodryinus shihoae*, **new species,** is described from Honshu. *Thaumatodryinus alienus* and *D. indicus* were reared for the first time from *Geisha distinctissima* (Walker).

Key words: parasitoids; host records; new species

Introduction

Dryininae (Hymenoptera) are parasitoids and often prey on planthoppers (Hemiptera: Fulgoromorpha). They are one of the largest subfamilies of Dryinidae, and include 298 extant species (Olmi, personal communication) belonging to five genera (Olmi & Bechly, 2001). This subfamily is distributed worldwide, but is more species-rich in tropic and subtropic regions. There are currently 51 extant species in three genera recorded from the Oriental Region (Olmi, 1984, 1986, 1987, 1990, 1992, 1993, 1997; He & Xu, 2002). In contrast, only three extant species of *Dryinus* have been recorded from the Eastern Palaearctic Region: *D. browni* Ashmead, *D. latus* Olmi and *D. koreanus* (Moczar) (Olmi, 1984, 1997; He & Xu, 2002). The former two species, however, are also known as Oriental species, because both were originally described from the Philippines and recorded from many Oriental areas. At present, the third species has been collected only from the Eastern Palaearctic Region.

Although there were no previous records of Dryininae in Japan, one species was newly described by Olmi (2009). One of the reasons why this subfamily has been unrecognized for a long time is the poor sampling from subtropic islands, especially the Ryukyus. Only two species have been recorded, *G. tambiniae* Esaki & Hashimoto from Amami-ô-shima (Esaki & Hashimoto, 1935) and *H. apicalis* recorded from Iriomote-jima (Sugiura *et al*., 2004), although many dryinid wasps should be found at these locations.

In recent years, the author has examined a number of specimens belonging to Dryininae collected in Japan, and most were collected from the Ryukyus. After careful examination, the specimens were recognized as the following three genera: *Thaumatodryinus* R. Perkins, *Dryinus* Latreille and *Pseudodryinus* Olmi.

Material and methods

The material used in this study is from the following institutions: ELKU, Entomological Laboratory, Kyushu University, Fukuoka, Japan; ELMU, Entomological Laboratory, Faculty of Agriculture, Meijo University,

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Nagoya, Japan; NHM, The Natural History Museum, London, United Kingdom; NIAES, Laboratory of Insect Systematics, National Institute for Agro-Environmental Science, Tsukuba, Japan; TUA, Laboratory of Insect Resources, Tokyo University of Agriculture, Atsugi, Japan.

The terms and abbreviations used in the descriptions follow those established by Olmi (1984, 1994, 1999). The following abbreviations are used in descriptions: F, female; M, male; FI – FVIII, flagellomere numbers; POL, distance between the inner edges of the two lateral ocelli; OL, distance between the inner edges of a lateral ocellus and the median ocellus; OOL, distance from the outer edge of a lateral ocellus to the compound eye; OPL, distance from the posterior edge of a lateral ocellus to the occipital carina. The following abbreviations are used for localities, collecting methods and rearing data: Col., collected; Emr., emerged; Isl., Island; Isls., Islands; MsT, Malaise trap; Pup., pupated; YPT, yellow pan trap.

Taxonomy

Family Dryinidae Haliday, 1833

Subfamily Dryininae Haliday, 1833

Thaumatodryinus Perkins, 1905

Remarks. *Thaumatodryinus* is a relatively rare genus. The most important taxonomic character of females is the presence of tufts of setae on FIII-VIII (Olmi, 1984, 1993; Olmi & Bechly. 2001). There have been eight extant species recorded from the Oriental Region (Xu *et al.*, 2001). However, no extant species has been recorded from the Palaearctic Region. Host information for this genus is limited, but some species have been reared from the fulgoroid family Flatidae in the Nearctic, Neotropic and Australian Regions (Guglielmino & Olmi, 1997).

Thaumatodryinus alienus Olmi, 1987

Thaumatodryinus alienus Olmi, 1987: 416. Type locality: Gunung Mulu, Sarawak, Borneo (MALAYSIA).

Material examined. 1F, Airagawa-rindô, Iriomote-jima Isl., Ryukyus, JAPAN, 24°20’26’’ N, 123°54’45 E, 11. V, 2008, K. Watanabe leg. (ELKU); 1F, Funaura, Iriomote-jima Isl., Ryukyus, JAPAN, 24°41’ N 123°61’ E, Col. 11. V, 2008, Pup. 20. V, Emr. 1. VIII, reared from *Geisha distinctissima* (Walker), T. Mita leg., (ELKU).

Distribution. JAPAN (new record): Southern Ryukyus (Iriomote-jima Isl.); MALAYSIA.

Host. FLATIDAE: *Geisha distinctissima* (Walker) (new host record, JAPAN).

Remarks. The specimens collected from Japan are larger than the holotype collected from Malaysia. Body length of the type is 4.0 mm, whereas it ranges from 5.0 to 5.3 mm in Japanese specimens. The coloration of the Japanese specimens is much darker than the type. The frontal line is absent in the type, whereas a short frontal line is visible in front of the anterior ocellus. The scutellum is granulated with numerous keels in the type, whereas it is simply granulated in Japanese specimens. This is the first report of the host of *Thaumatodryinus* from the Oriental Region.

Dryinus Latreille, 1804

Remarks. *Dryinus* is the most common genus of Dryininae in the world. The females can be distinguished from those of other genera in this subfamily by a combination of the following characters: absence of tufts of

setae on the flagellum; thin fifth segment of the fore tarsus, which is less than two times as broad as the enlarged claw; palpal formula 6/3; shorter enlarged claw, which is as long as, or shorter than, the fore tibia; and a shorter FI that is as long as, or shorter than, the pedicel (Olmi, 1984, 1993; Olmi & Bechly, 2001). There are 22 extant species recorded from the Palaearctic Region and 42 extant species from the Oriental Region. Their hosts have been recorded from many taxa of the Fulgoromorpha (Guglielmino & Olmi, 1997).

Dryinus bellicus Olmi, 1987

Dryinus bellicus Olmi, 1987: 427; He & Xu, 2002: 280. Type locality: Tai Po, Hong Kong (P. R. China).

Material examined. 1 paratype F, (first label) "CHINA, Hainan I., Tien Fong Mts., 17.v.83, Bouček", (second red label) "PARATYPUS ♀, *Dryinus bellicus* n. sp., 1986 M. OLMI DET." (NHM). 1F, Fusatoruba, Iriomote-jima Isl., Ryukyus, JAPAN, 26. XII. 2006, T. Ishizaki leg. (ELKU); 1F, Kampira Falls, Iriomote-jima Isl., Ryukyus, JAPAN, 24.21 N, 123.48 E, Col. 12. V. 2008, Pup. 18. V, Emr. 20. VI, reared from the nymph of an Issid species?, T. Mita leg. (ELKU).

Distribution. JAPAN (new record): Southern Ryukyus (Iriomote-jima Isl.); P. R. CHINA.

Host. Unknown,

Remarks. The body length of Japanese specimens ranges from 2.6 to 3.5 mm, whereas that of Chinese specimens and the holotype ranges from 4.1 to 4.7 mm. The host has not been recorded yet; however, a female from Kampira Falls was reared from the nymph of a fulgoromorphan planthopper, probably belonging to Issidae.

Dryinus browni Ashmead, 1905

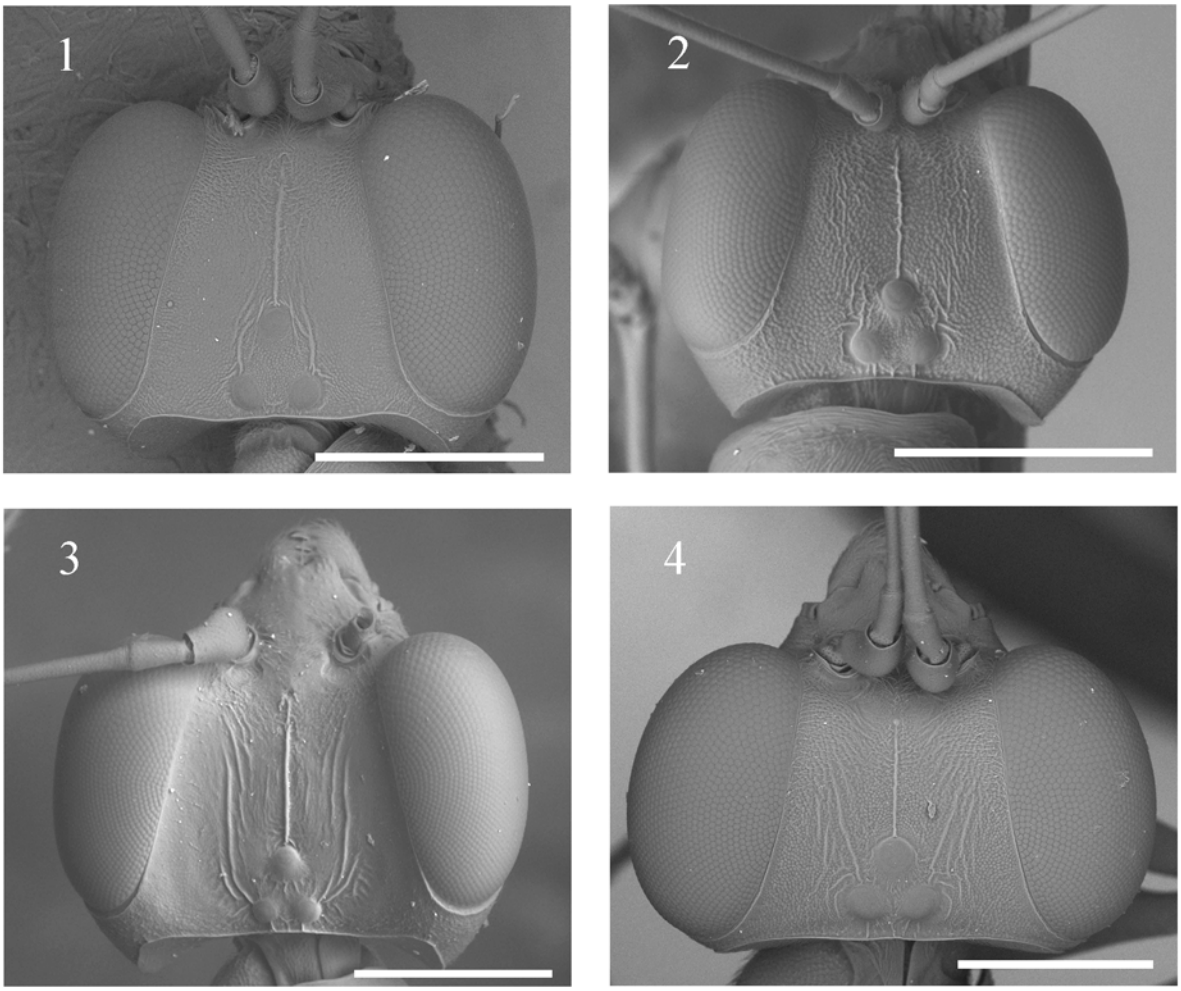
Dryinus browni Ashmead, 1905: 109; Olmi, 1984: 817; Guglielmino & Olmi, 1997: 227; Xu & He, 2002: 267. Type locality: Manila (PHILIPPINES).
Paradryinus terryi R.C.L. Perkins, 1912: 10 (syn. by Olmi, 1984).
Lestodryinus browni (Ashmead): Kieffer, 1914: 24.
Dryinus szepligettii Kieffer (partim): Ponomarenko, 1981: 879.
Dryinus lycormae Yang, 1994: 38 (syn. by Xu & He, 2002).

Material examined. 1F, Higashi-inohara, Kimitsu, Chiba, Honshu, JAPAN, 7. VIII. 2001, M. Uchida (ELKU); 1F, Shiramizu, Ishigaki-jima Isl., Ryukyus, JAPAN, 10. May. 2004, T. Mita leg. (ELKU); 2F, same locality as above, except 6. V. 1993, M. Hayashi leg. (ELKU).

Distribution. JAPAN (new record): Honshu (Chiba), Southern Ryukyus (Ishigaki-jima Isl.); P. R. CHINA; PHILIPPINES; LAOS; MALAYSIA; SRI LANKA.?

Host. FULGORIDAE: *Zanna dohrni* (Stål) (SRI LANKA); *Lycorma delicatula* (White) (CHINA).

Remarks. Descriptions of the morphological characters of *D. browni* and *D. santoni* Ashmead seem very similar to each other. Olmi (1997) proposed *D. lycormae* Yang as a junior synonym of *D. santoni*. In contrast, He & Xu (2002) proposed *D. lycormae* as a junior synonym of *D. browni*. In both cases, the type locality of each species is Oriental, but only adults reared from *L. delicatula* were collected from Palaearctic China. The author treats the dryinid species from Palaearctic Japan as D. browni because the specimen has an important specific character status, the flattened antennae. However, further study is needed to settle this problem. *L. delicatula* is included in the fauna of Japanese insects (Hirashima, 1989), although its distributional record from Japan is doubtful (Kamitani, personal communication). As a Japanese population, *D. browni* is distributed in both the Palaearctic and Oriental regions of Japan. Specimens collected from Ishigaki-jima differ from other specimens in the following two characters: the testaceous margin of the pronotum and the smooth median part of the scutum.



FIGURES 1–4. Heads of *Dryinus* spp. in dorsal view (female). Each bar represents 0.5 mm. 1: *D. krombeini*. 2: *D. pyrillae*. 3: *D. pyrillivorus*. 4: *D. sinicus*.

Dryinus chenae Xu, Olmi & He, 2007

Dryinus chenae Xu, Olmi & He, 2007: 453. Type locality: Jianfengling National Nature Reserve, Hainan Isl. (P. R. CHINA).

Material examined. 1F, Omoto, Ishigaki-jima Isl., Ryukyus, JAPAN, 22. X. 2004, Light trap, M. Hayashi leg. (ELKU).

Distribution. JAPAN (new record): Southern Ryukyus (Ishigaki-jima Isl.); P. R. CHINA.

Host. Unknown.

Remarks. The specimen collected from Japan is larger than the holotype. Body length of the type is 5.1 mm, compared with 6.1 mm for the Japanese specimen. The coloration of the Japanese specimen is much darker: pronotum is entirely black (posterior collar of the type is testaceous); metasoma is black with brown hypopygium (the type is brown); legs are black excluding dark brown fore femur and fore tibia, and ferruginous tarsi (the type is testaceous with black coxae). The specimen from Japan was collected by light trap. This is the second record of *D. chenae*.

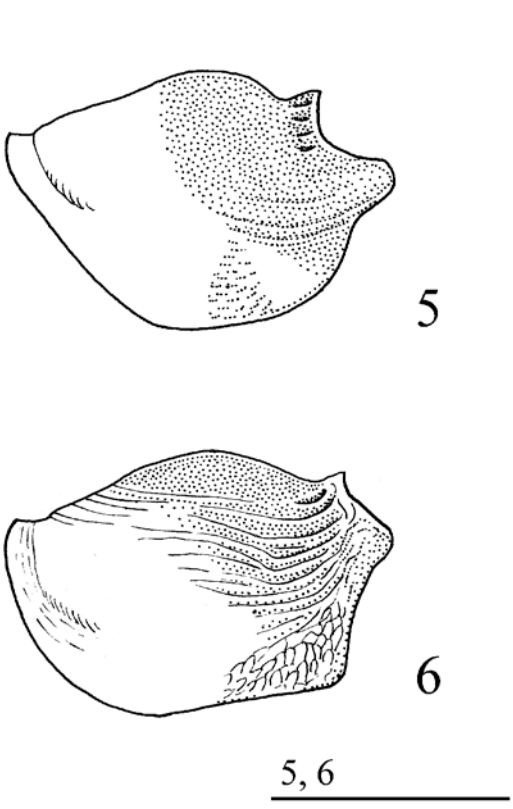
***Dryinus expolitus* Xu, Olmi & He, 2007**
(Figs. 5–8)

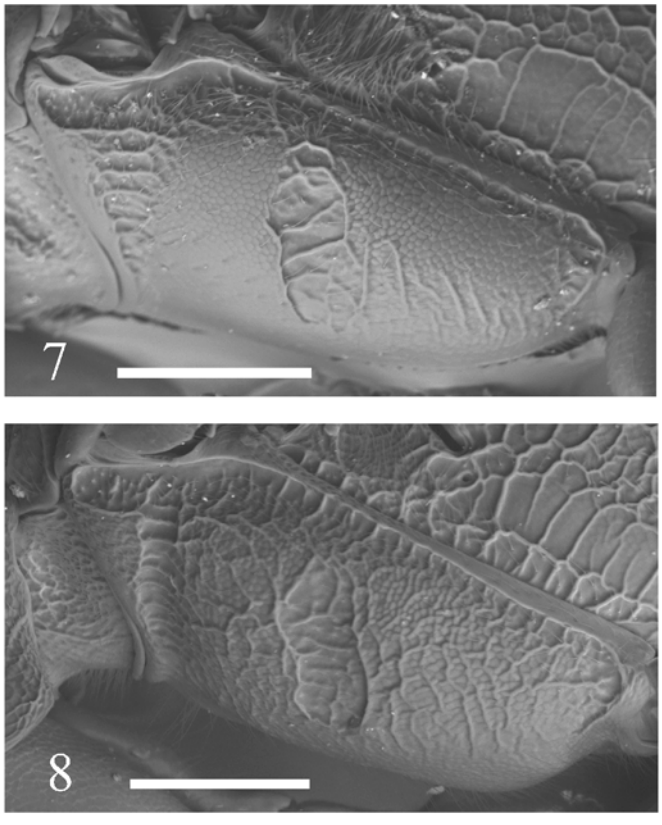
Dryinus expolitus Xu, Olmi & He: 454. Type locality: Jianfengling National Nature Reserve, Hainan Isl. (P. R. China).

Material examined. 1F, Kamakura, Kanagawa, JAPAN, 11. IX, 1948, H. Nagase leg. (ELKU); 1F, same locality as above, except 2. IX. 1950 (ELKU); 1F, Jokoji, Seto, Aichi, JAPAN15. IX. 2000, M. Suzuki leg. (YPT) (ELMU); 1F, Mt. Tachibana-yama, Fukuoka, Kyushu, JAPAN, 27. VI. 1976, K. Ueda leg. (ELKU); 1F, Imakira-dake, Takara-jima Isl., Tokara Isls., Ryukyus, JAPAN, 1. VI. 2005, J. Kantô leg. (ELKU); 1F, Komi, Iriomote-jima Isl., Ryukyus, JAPAN, 26. XII. 2006, T. Ishizaki leg. (ELKU); 1F, Takeda-rindô, Ishigaki-jima Isl., Ryukyus, JAPAN, 14. VI. 2005, M. Satô leg. (ELKU); 1F, Shiramizu, Ishigaki-jima Isl., Ryukyus, JAPAN, 1–3. VII. 1993, K. Konishi leg. (NIAES); 1F, Banna Park, Ishigaki-jima Isl., Ryukyus, JAPAN, 3–7. III. 1995, T. Matsumura leg. (Mst) (NIAES); 1F, Ôtomi-rindô, Iriomote-jima Isl., Ryukyus, JAPAN, 19. VI. 2005, M. Satô leg. (ELKU); 1F, Ôtomi-rindô, Iriomote-jima Isl., Ryukyus, JAPAN, 8. IV. 2005, H. Kojima leg., captured by fogging, from *Castanopsis cuspidata* (Thumb.) (ELKU); 1F, Ushiku-mori, Iriomote-jima Isl., Ryukyus, JAPAN, 9. III. 1964, Y. Kurosawa leg. (Mst) (ELKU); 1F, Mt. Urabu-dake, Yonaguni-jima Isl., Ryukyus, JAPAN, 2. I. 2007, T. Ishizaki leg. (ELKU).

Distribution. JAPAN (new record): Honshu (Kanagawa; Aichi); Kyushu (Fukuoka); Northern Ryukyus (Tokara Isls.: Takara-jima Isl.); Southern Ryukyus (Ishigaki-jima Isl.; Iriomote-jima Isl.; Yonaguni-jima Isl.); P. R. CHINA.

Host. Unknown.





FIGURES 5–8. *Dryinus expolitus* (female). 5: Pronotum in lateral view (Southern Ryukyus). 6: Ditto (Honshu). 7. Mesepisternum (Southern Ryukyus). 8. Ditto (Honshu).

Remarks. The specimens collected from Japan are smaller than the holotype. Body length of the type is 6.3 mm, whereas it ranges from 3.8 to 5.3 mm in Japanese specimens; FIII of the type is 6.9x as long as the

scape, compared with 3.3 to 4.4x in Japanese specimens. Specimens collected in the Southern Ryukyus are distinctive due to a combination of the following two characters: pronotum without striae around the disc (Fig. 5) and a shiny and granulated mesepisternum (Fig. 7), whereas the type and specimens from Northern Japan show a striate pronotum (Fig. 6) and reticulated mesepisternum (Fig. 8). A female from Iriomote-jima was collected from *Castanopsis cuspidata* (Fagaceae) using a fogging method. This species occurs in Oriental Japan (the Southern Ryukyus) and Palaearctic Japan (Honshu and Kyushu).

Dryinus indicus (Kieffer, 1914)

Mesodryinus indicus Kieffer, 1914: 311. Type locality: Pusa (INDIA).
Dryinus indicus (Kieffer, 1914): Olmi, 1984: 810; Guglielmino & Olmi, 1997: 227–228; He & Xu, 2002: 256.
Dryinus flavus Xu & He, 1994: 267 (syn. by He & Xu, 2002).

Material examined. 1 F, Mt. Hiko-san, Fukuoka, Kyushu, JAPAN, 25–26. VII. 1979, K. Maetô leg. (NIAES); 1F, same locality as above except 2–3. V. 1983, K. Konishi leg. (NIAES); 1F, Mt. Takachiho, Kirishima, Kyushu, JAPAN, 13–16. VII. 1962, S. Ide leg. (ELKU); 2F, Mt. Tachiu-dake (1000 m), Yaku-shima Isl., Ryukyus, JAPAN, 17. VII. 1970, K. Yamagishi leg. (ELMU); 1F, same locality as above, except Mt. Miyanoura, 18. X–30. XI. 1999, T. Murata (MsT) (ELMU); 1F, same locality and collector as above, except 10. VII–8. VIII. 2000 (MsT) (ELMU); 2F, same locality and collector as above, except 3. IX–10. X. 2000 (MsT) (ELMU); 1F, Mt. Nanatsu-yama, Nakano-shima Isl., Tokara Isls., Ryukyus, JAPAN, 5.V. 2004, T. Mita leg. (ELKU); 1F and 1 M, Yona, Okinawa Isl., Ryukyus, JAPAN, 25–27. V. 1974, M. Satô leg., mating couple are mounted on a single triangle paper board (ELKU); 1F, Ôsato, Ishigaki-jima Isl., Ryukyus, JAPAN, 24°40’ N, 124°24’ E, Col. 9. V. 2008, Pup. 12. V, Emr. 2. VI, Ex. from: *Geisha distinctissima* (Walker), T. Mita leg. (ELKU).

Distribution. JAPAN (new record): Kyushu (Fukuoka; Kagoshima); Ryukyus (Yaku-shima Isl.; Nakano-shima Isl.; Okinawa-jima Isl.; Ishigaki-jima Isl.); P. R. CHINA; INDIA; BANGLADESH.

Host. LOPHOPIDAE: *Pyrilla perpusilla* (Walker) (INDIA), *Pyrilla* sp. (INDIA); FLATIDAE: *Flatida marginella* (Olivier) (BANGLADESH), *Geisha distinctissima* (Walker) (new record, JAPAN).

Remarks. The total body length of specimens collected from Japan ranges from 4.8 to 5.4 mm. The body colour is testaceous according to the original description of the dried holotype. However, the colour of a living female that emerged from *Geisha distinctissima* was pale green and changed to testaceous following postmortem dehydration.

Dryinus krombeini Ponomarenko, 1981
(Fig. 1)

Dryinus krombeini Ponomarenko, 1981: 879; Olmi, 1984: 802. Type locality: Udawattakele, Kandy District (SRI LANKA).

Material examined. 1F, Mt. Tachiu-dake (1000 m), Yaku-shima Isl., Ryukyus, JAPAN, 17. VII. 1970, K. Yamagishi leg. (ELMU).

Distribution. JAPAN (new record): Northern Ryukyus (Yaku-shima Isl.); VIETNAM; THAILAND; PHILIPPINES; SRI LANKA.

Host. Unknown.

Remarks. The head of the female collected in Japan is darker than specimens from other countries, while the frons and malar space are fully black and the clypeus is black with a testaceous margin.

***Dryinus pyrillae* (Kieffer, 1911)**
(Fig. 2)

Lestodryinus pyrillae Kieffer, 1911: 108; Pruthi & Mani, 1942: 423. Type locality: Pusa, Bihar (INDIA).
Richardsidryinus pyrillae (Kieffer): Olmi, 1984: 925.
Dryinus pyrillae (Kieffer): Olmi, 1990: 267; Guglielmino & Olmi, 1997: 228; He & Xu, 2002: 272.
Dryinus trifasciatus Kieffer: Ponomarenko, 1981: 879 (mis. det., proposed by Olmi, 1984).
Dryinus lankanus Olmi, 1984: 821 (syn. by Olmi, 1990).

Material examined. 1F, Ôtomi, Iriomote-jima Isl., Ryukyus, JAPAN, 15–23. III. 1995, T. Matsumura leg. (MsT) (NIAES).

Distribution. JAPAN (new record): Southern Ryukyus (Iriomote-jima Isl.); P. R. CHINA; INDIA; SRI LANKA; PAKISTAN.

Host. LOPHOPIDAE: *Pyrilla aberrans* (Kirby) (INDIA), *P. perpusilla* (Walker) (INDIA), *P. pusana* Distant (INDIA).

Remarks. Legs of the Japanese specimen are darker than those of other specimens: mid and hind coxae, femora, and distal half of tibiae are brown, whereas those of other specimens are simply testaceous. The lateral longitudinal keels on the frons are visible in other specimens, whereas there is no longitudinal keel except for a frontal line in the Japanese specimen.

***Dryinus pyrillivorus* Olmi, 1986**
(Fig. 3)

Dryinus pyrillivorus Olmi, 1986: 66; Olmi, 1992: 42; Guglielmino & Olmi, 1997: 228; He & Xu, 2002: 270. Type locality: Cuddalore (INDIA).
Richardsidryinus gauldi Olmi, 1987: 49 (syn. by Olmi, 1992).
Dryinus kaihuanus Yang & Ma, 1995: 263 (syn. by He & Xu, 2002).

Material examined. 1F, Mt. Kubura-dake, Yonaguni-jima, Ryukyus, JAPAN, 9–11. VI. 2005, T. Ishizaki & M. Satô leg. (YPT) (ELKU).

Distribution. JAPAN (new record): Southern Ryukyus (Yonaguni-jima Isl.); P. R. CHINA; PHILIPPINES; BRUNEI; INDIA.

Host. LOPHOPIDAE: *Pyrilla* sp. (INDIA).

Remarks. Metanotum of the Japanese specimen is completely reticulated, whereas other specimens have a granulated area.

***Dryinus sinicus* Olmi, 1987**
(Fig. 4)

Dryinus sinicus Olmi, 1987: 425; Xu & He, 2002: 265. Type locality: Tien Fong Mountains, Hainan Isl. (P. R. CHINA).

Material examined. Holotype: F, (first label) “CHINA, Hainan I., Tien Fong Mts., 16.V.83 Boucek”, (second label) “HOLOTYPUS ♀, *Dryinus sinicus* n.sp., 1986 M. OLMI DET.” (NHM); 1F, Mt. Funaki-yama, Haha-jima, Ogasawara Isls., JAPAN, 9. IX. 2004, H. Fukutomi leg. (ELKU).

Distribution. JAPAN (new record): Ogasawara Isls. (Haha-jima Isl.); P. R. CHINA.

Host. Unknown.

Remarks. A female collected from Haha-jima has three rows of lamellae on the inner margin of the fifth segment of the fore tarsus. This condition is not found in the holotype. Such infraspecific variation is also known for other species of Dryinidae (Olmi, personal communication).

***Pseudodryinus* Olmi, 1989**

Remarks. *Pseudodryinus* is a small genus. Females can be distinguished from those of other genera in this subfamily by the following combination of characters: palpal formula 5/3, 4/3, 3/2; and a single subapical tooth on the enlarged claw (Olmi, 1990; Olmi & Bechly, 2001). There are two extant species recorded from the Oriental Region, and there is no extant species, but a single fossil species, from the Palaearctic Region (Olmi, 1990, 1993, Peinad *et al.*, 2006). The hosts are unknown.

***Pseudodryinus shihoae* Mita, New Species**
(Figs. 9–14)

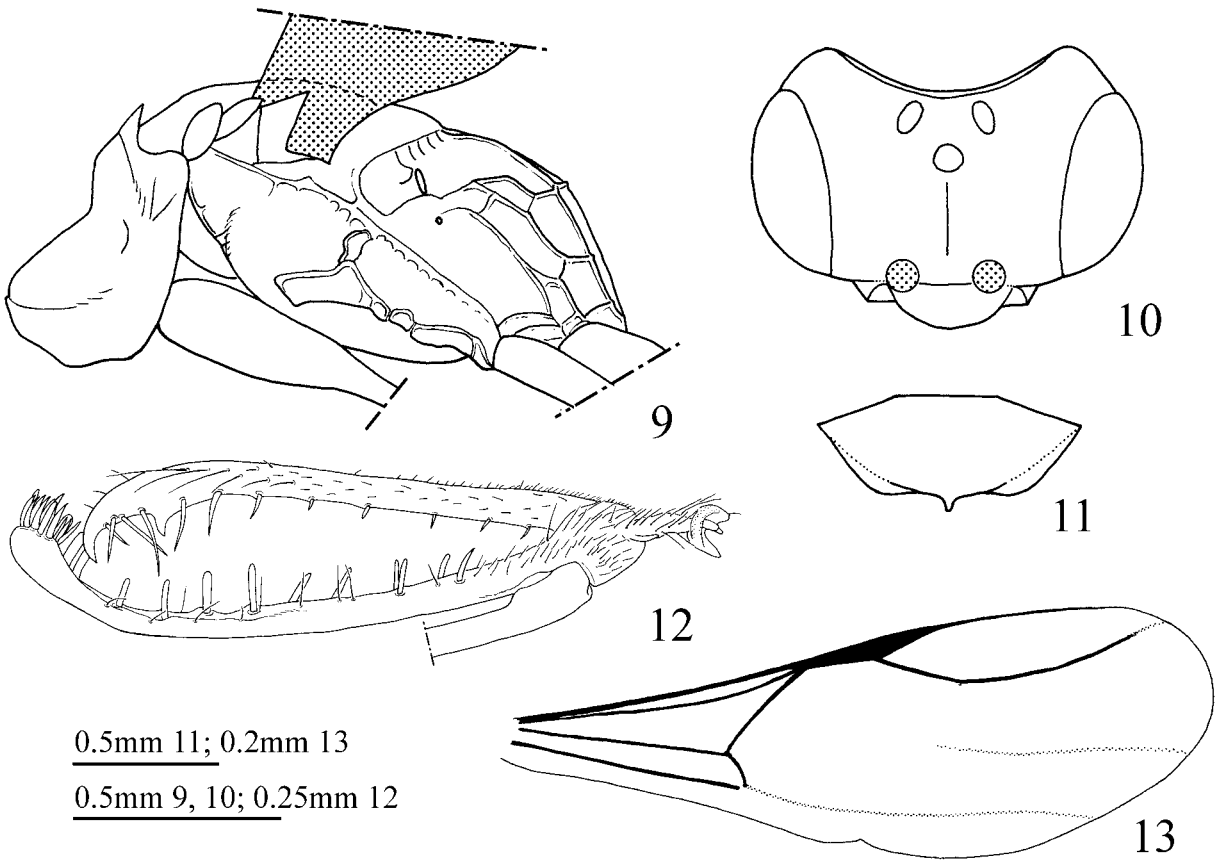
Description of the holotype (female). Head (Fig. 10) 0.61x as long as wide, flat, largely smooth, but anterior half of frons scattered with minute punctures and setae; frontal carina visible but anteriorly indistinct; shortest distance between eyes 0.41x as long as maximum head breadth in dorsal view; malar space and gena densely scattered with minute punctures and setae; ocellar region slightly swollen; posterior margin of vertex widely excavated; occipital carina incomplete, visible only behind ocellar region and eyes. Eye oval, 2.67x as long as wide in dorsal view. POL: 4; OL: 2; OOL: 7; OPL: 1; greatest breadth of anterior ocellus longer than OL (3:2). Mandible with four teeth of identical size. Clypeus (Fig. 11) with apical margin rounded and bearing small process; surface largely smooth and scattered with several small punctures. Maxillary palpus with five segments; labial palpus with three segments. Antenna filiform; FI 1.18x as long as maximum head breadth in dorsal view; length of antennal segments = 7.5: 4.5: 40.0: 23.0: 18.5: 12.0: 7.5: 6.0: 5.5: 9.0; total length of antenna 3.93 times as long as maximum head breadth in dorsal view.

Pronotum (Fig. 9) as long as wide, smooth, with two weak anterior and posterior impressions; disc widely excavated, smooth; anterior collar laterally expanded, laminated and smooth; posterior collar smooth; pronotal tubercle reaching tegula. Scutum 0.48x as long as broad; median area anteriorly rounded, smooth; lateral area rounded, smooth; notaulus distinct, converging at posterior margin of scutum. Scutellum smooth. Mesepisternum sparsely scattered with small punctures: surface among punctures smooth; precoxal suture well developed, converging with posterior oblique suture (Fig. 9). Metanotum half as long as scutum, smooth. Metapleuron smooth excluding carinate area around propodeal spiracle; metapleural spiracle (Fig. 9) small, rounded. Dorsal surface of propodeum 0.58x as long as wide, dorsally 1.11x, laterally 0.88x as long as posterior surface, with two median longitudinal keels, pair of lateral keels, and pair of postero-lateral areolae: surface among keels sculptured; transverse carina strong; posterior surface with two distinct longitudinal keels and transverse keels: surface between longitudinal keels transversely striate; surface among keels irregularly striate.

Forewing (Fig. 13) hyaline, covered with testaceous setae: setae on median cell sparser; radial vein moderately curving and reaching apical margin. Foreleg slender; length of coxa: trochanter: femur: tibia = 32: 37: 37: 34; tarsal segments in ratio = 11.5: 3.0: 5.0: 23.5: 33.0; basal part of third segment producing a hook. Fifth segment of fore tarsus (Fig. 12) with inner margin bearing two rows of 10 (3+7) lamellae; distal apex with group of ten lamellae; proximal projection: distal part = 10: 1. Rudimentary claw present. Enlarged claw (Fig. 12) bearing large subapical tooth; inner margin with row of eight lamellae, and four lamellae between subapical tooth and distal apex. Metacoxa smooth.

Metasoma with hypopygium covered with sparsely located, long and erect setae; dorsal half without short setae; ventral half covered with densely located, short and decumbent setae.

Colour. Body testaceous; ocellar region dark brown; teeth of mandible reddish; antenna testaceous excluding whitish FIV–VIII; anterior margin of pronotum dark brown; dorsal surface of propodeum anteriorly with large dark brown spot; basal part of posterior surface with brown nuances; first tergum mostly dark brown excluding posterior margin; anterior margin of subsequent terga dark brown; hypopygium brown.



FIGURES 9–13. *Pseudodryinus shihoae* Mita, **sp. n.** (holotype). 9. Head in dorsal view. 10. Mesosoma in lateral view. 11. Clypeus. 12. Chela (right). 13. Forewing (right).

Measurements. Head 0.94 mm long excluding clypeus, 0.61 mm broad; eye 0.44 mm in maximum diameter; mesosoma 1.41 mm in full length; pronotum 0.51 long, 0.51 mm wide; scutum 0.30 mm long, 0.62 mm broad; scutellum 0.19 mm long; metanotum 0.14 mm long; propodeum 0.49 mm broad, dorsal surface 0.28 mm long; forewing 2.43 mm long; metasoma 2.11 mm long; total body length 4.1 mm.

Male. Unknown.

Type series. Holotype: F, (first label) "[Japan] Miyama-no-Taki, Kure-Shi, Hiroshima Pref., 22–23. viii. 2002, Shiho Arai leg.", (second red label) "HOLOTYPE *Pseudodryinus shihoae* Mita, 2009" (ELKU) (Type No. 3267). Paratype: 1F, "Japan: Aichi, Toyota, Takiwaki, 19–25 VIII. 2002, MT (Y. Kurahashi)" (ELMU).

Distribution. JAPAN: Western Honshu (Aichi; Hiroshima).

Host. Unknown.

Etymology. Dedicated to Ms. Shiho Arai who collected the holotype.

Remarks. The paratype differs from the holotype in the following two characters: wholly testaceous propodeum and smaller body length (3.8 mm). The holotype and paratype were collected by flight interception trap. This species is similar to *P. sinensis* Olmi collected in Taiwan considering the testaceous body colour and position of ocelli, but is easily distinguishable from the latter by the following three characters: incomplete occipital carina (complete in *P. sinensis*); posteriorly converging notauli (faintly separated in *P. sinensis*); and the sculptured lateral region of the dorsal surface of the propodeum (smooth in *P. sinensis*). A fossil species, *P. parisiensis* Peinado, Nel & Waller from the Paris basin (Early Eocene amber) was known only as Palaearctic *Pseudodryinus* (Peinado *et. al.*, 2006). This new species represents the second record and first extant species from the Palaearctic Region.

FIGURE 14. *Pseudodryinus shihoae* Mita, **sp. n.** (paratype), general habitus.

Supplementary comments on the fauna of Dryininae in Japan

In conclusion, 11 species belonging to three genera of Dryininae were recognized. All species reported in this paper except *P. shihoae* **sp. n.** belong to the Oriental species (Olmi, 1984, 1986, 1987; Xu *et al*., 2007), and they occur in Oriental Japan (Central and Southern Ryukyus). Four species, *D. browni*, *D. expolitus*, *D. indicus* and *D. krombeini*, are also distributed in Palaearctic Japan (Honshu, Kyushu, and Yaku-shima). This fact may indicate the existence of further Oriental taxa belonging to other subfamilies.

Key to the females of the Dryininae species of Japan

1 Palpal formula 6/3 2
- Palpal formula 5/3 (Pseudodryinus) ..... *P. shihoae* Mita, New Species
2 Antenna with tufts of setae; enlarged claw with two subapical teeth (*Thaumatodryinus*) ..... *T. alienus* Olmi
- Antenna without tufts of setae; enlarged claw with one subapical tooth (*Dryinus*) ..... 3.
3 Frons smooth; occipital carina incomplete; body testaceous ..... *D. indicus* (Kieffer)
- Frons covered with more or less distinct surface sculpture; occipital carina complete; body mostly black 4
4 Frons strongly reticulated, rugose ..... *D. chenae* Xu, Olmi & He
- Frons smooth, granulated, with or without longitudinal carina 5
5 Frons narrow, narrower than scutellum ..... *D. bellicus* Olmi
- Frons broad, much broader than scutellum 6
6 Occipital carina laterally strongly sinuate; temple long, distance longer than greatest diameter of anterior ocellus (Figs. 2, 3) 7
- Occipital carina laterally straight or weakly sinuate; temple short, distance shorter than greatest diameter of anterior ocellus (Figs. 1, 4) 8

7 Frons strongly granulated (Fig. 2) ..... *D. pyrillae* (Kieffer)
- Frons weakly or not granulated (Fig. 3) ..... *D. pyrillivorus* Olmi
8 Frons with numerous longitudinal keels (Fig. 4) 9
- Frons without longitudinal keel (except frontal line) (Fig. 1) 10
9 Antennae with FIV–VI flat, strongly broadened ..... *D. browni* Ashmead
- Antennae with FIV–VI cylindrical, not broadened ..... *D. sinicus* Olmi
10 Frons weakly excavated (Fig. 1) ..... *D. krombeini* Ponomarenko
- Frons strongly excavated (as Fig. 3) ..... *D. expolitus* Xu, Olmi & He

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References

Esaki, T. & Hashimoto, S. (1935) *Report on the Leaf-hoppers Injurious to the Rice Plant and Their Natural Enemies* No. 6 (for the year 1934). Entomological Laboratory, Department of Agriculture, Kyushu Imperial University, Fukuoka. 41pp. with 1 plate.

Guglielmino, A. & Olmi, M. (1997) A host-parasite catalog of world Dryinidae (Hymenoptera: Chrysidoidea). *Contribution on Entomology, International*, 2(2), 165–298.

He, J. & Xu, Z. (2002) Hymenoptera Dryinidae. *Fauna Sinica*, 29. Science Press, Beijin, 464 pp.

Morimoto, K. (1989) 21 HEMIPTERA. *In*: Hirashima, Y. (Supervisor), *A check list of Japanese insects*. Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan, pp. 82–188.

Olmi, M. (1984) A revision of the Dryinidae (Hymenoptera). *Memoirs of the American Entomological Institute*, 37, 1–1913.

Olmi, M. (1986) New species and genera of Dryinidae (Hymenoptera Chrysidoidea). *Frustula Entomologica N. S.*, 7–8(20–21), 63–105.

Olmi, M. (1987) New species of Dryinidae (Hymenoptera, Chrysidoidea). *Fragmenta Entomologica*, 19(2), 371–456.

Olmi, M. (1990) Supplement to the revision of the world Dryinidae (Hymenoptera Chrysidoidea). *Frustula Entomologica N.S.*, 12(25), 1989, 109–395.

Olmi, M. (1992) Descriptions of new taxa of Dryinidae (Hymenoptera Chrysidoidea). *Frustula Entomologica N.S.* 15(28), 19–62.

Olmi, M. (1993) A new generic classification for Thaumatodryninae, Dryninae and Gonatopodinae, with descriptions of new species (Hymenoptera Drynidae). *Bolletino Zoologia Agraria e di Bachicoltura*, Ser. II, 25(1), 57–89.

Olmi, M. (1994) The Dryinidae and Embolemidae (Hymenoptera: Chrysidoidea) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica*, 30. Bill, Leiden, 100pp.

Olmi, M. (1997) New Embolemidae and Dryinidae. *Frustula Entomologica N.S.*, 20(33), 30–118.

Olmi, M. (1999) Hymenoptera Dryinidae-Embolemidae. *Fauna d'Italia*, 37, Edizioni Calderini, Bologna, 425 pp.

Olmi, M. (2009) A contribution to the study of the Palaearctic Dryinidae, including descriptions of two new species from Japan and South Korea (Hymenoptera: Chrysidoidea). *Entomologist's Gazette*, 59.

Olmi, M. & Bechly, G. (2001) New parasitic wasps from Baltic amber (Insecta: Hymenoptera: Dryinidae). *Stuttgarter Beiträge zur Naturkunde*, Serie B (Geologie und Paläontologie), 306, 1–56.

Peinado, J., Nel, A. & Waller, A. (2006) A dryinid wasp in Early Eocene amber from the Paris basin (Hymenoptera: Dryinidae). *Zootaxa*, 1168, 31–41.

Ponomarenko, N. (1981) Dryinids (Hymenoptera, Dryinidae) of the fauna of Sri Lanka. *Revue d'Entomologie de l'URSS* (*Entomologicheskoe Obozrenie*), 60, 879–882.
Sugiura, N., Kinjo, M. & Katada, S. (2004) Discovery of *Haplogonatopus apicalis*, *Agenioideus lascivus*, and *Megachile disjunctiformis* from Iriomote Island, Ryukyus, Japan. *Tsunekibachi*, 2, 11–12. (in Japanese)
Xu, Z., He, J. & Olmi, M. (2001) A new species of *Thaumatodryinus* Perkins from China (Hymenoptera: Dryinidae). *Oriental Insects*, 35, 63–65.
Xu, Z., Olmi, M. & He, J. (2007) Two new species of *Dryinus* Latreille (Hymenoptera: Dryinidae) from China. *Florida Entomologist*, 90(3), 453–456.