which could serve as useful markers for further investigation into evolution of polyandry in the genus *Apis*.

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Species of the Genus *Stethoconus* of Japan (Heteroptera, Miridae): Predaceous Deraeocorine Plant Bugs Associated with Lace Bugs (Tingidae)¹

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Species of the deraeocorine genus *Stethoconus* are well known predators preferably associated with lace bugs belonging to the family Tingidae. Although LINNAVUORI (1995) revised *Stethoconus* and recognized 10 species in the Old World, only a single species, *S. japonicus* SCHUMACHER, has been reported from Japan.

Recently, we obtained several specimens of the genus from Ishigaki and Iriomote Islands of the Ryukyus, southern Japan. Upon examination, we found that only one specimen was *S. japonicus*, and the remainder of the material was identical with *S. praefectus* (DISTANT), originally described from India. Previously, *S. praefectus* has been reported as a predator of *Stephanitis typica* (DISTANT), whereas the present record from Ishigaki Island indicates that *Stethoconus praefectus* is associated with *Stephanitis subfasciata* HORVÁTH on the tingid host plant, *Hernandia nymphaeifolia* (Hernandiaceae).

In this paper we report *Stethoconus praefectus* from Japan for the first time, and *S. japonicus* as new to Iriomote Island, with new host records. A brief note on biology and taxonomy of each species is also given.

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Fig. 1. A female of *Stethoconus praefectus* (A), and an adult (B) and colony of nymphs (C) of *Stephanitis subfasciata* on leaves of *Hernandia nymphaeifolia*.

Genus *Stethoconus* FLOR

Stethoconus FLOR, 1860, Rhync. Livl., p. 615, type species: *S. cyrtopeltis* FLOR, 1860; CARVALHO, 1958, Arq. Mus. nac., Rio de Janeiro, 45: 206; WAGNER and WEBER, 1964, Faune Fr., 67: 75; WAGNER, 1970–71, Entomol. Abhandlung. Tierk. Dresden, 37 (suppl.): 91; KERZHNER, 1988, Oprebel. Nasek. daln. vost. SSSR, 2: 793; SCHUH, 1995, Plant Bugs of the World, p. 645; LINNAVUORI, 1995, Acta. Univ. Carolinae, 39: 29.

Species included in this genus, without exception, exhibit specialized features within the Miridae (Fig. 1A). The unique dorsal habitus is considered to be mimic of tingids (e.g., strongly projected scutellum, reticular markings on the hemelytra; compare Fig. 1A with B and C). Since at least the Japanese species of *Stethoconus* are usually associated with tingid colonies (Fig. 1C), such cryptic mimicry may afford protection against natural enemies.

Stethoconus praefectus (DISTANT)

(Figs. 1A; 2A, C and E)

Apollodotus praefectus DISTANT, 1909, Ann. Mag. nat. Hist., (8) 4: 454.

Stethoconus praefectus: CARVALHO, 1952, Ann. Acad. Brazil Cienc., 24: 73; 1958, Arq. Mus. nac., Rio de Janeiro, 45: 206; SCHUH, 1995, Plant Bugs of the World, p. 645; LINNAVUORI, 1995, Acta Univ. Carolinae, 39: 36.

Specimens examined. Ryukyus: 2 ♂ 2 ♀, Anparu, mouth of Nagura Riv., Ishigaki Is., on *Hernandia nymphaeifolia* with *Stephanitis subfasciata*, 22–23. i. 1996, T. YASUNAGA; 1 ♂ 1 ♀, Iriomote Is., 10. iv. 1996, S. SUEYOSHI.

Distribution. Japan (the Ryukyus: Ishigaki and Iriomote Islands), India, Sri Lanka, Taiwan. This species now appears to be widely distributed over the Oriental Region.

Note. *Stethoconus praefectus* is similar in general appearance to *S. japonicus*, from which it is easily distinguished by the smaller body, anteriorly projected eyes

Fig. 2. *Stethoconus* spp. of Japan. A, C and E, *S. praefectus*; B, D and F, *S. japonicus*. A, B: female head in dorsal view; C, D: head, pronotum and scutellum in left lateral view; E, F: left forewing. Scale bars: 0.5 mm.

(Fig. 2A), prominently elevated scutellum (C), and generally darker markings on the forewing (F). *Stethoconus japonicus* has the usually larger body, wider head (Fig. 2B), denser dorsal vestiture, less projected scutellum (D), and paler coloration on the apical forewing (F).

In India *Stethoconus praefectus* was reported as a major predator of the coconut palm lace bug, *Stephanitis typica* (HENRY et al., 1986), a known pest of coconut, ginger, banana, etc. (TAKEYA, 1952). In Ishigaki Island *Stethoconus praefectus* is found together with *Stephanitis subfasciata* HORVÁTH, on its host plant, *Hernandia nymphaeifolia* (Hernandiaceae), growing near the coast. The present report on *Stethoconus praefectus* represents the northernmost distribution for this species as well as a new host record.

Stethoconus japonicus SCHUMACHER

(Fig. 2B, D and F)

Capsidae sp., NAWA, 1910, Ins. World (Konchu Sekai), 14: 414–416, pl. 16.

Stethoconus japonicus SCHUMACHER, 1917, Sitzungs.

Gesell. Naturf. Freunde Berlin, 6: 344; CARVALHO,

1958, Arq. Mus. nac., Rio de Janeiro, 45: 206; KERZHNER, 1970, Entomol. Obozr., 49: 643; HENRY et al., 1986, Proc. entomol. Soc. Wash., 88: 724; KERZHNER, 1988, Opredel. Nasek. daln. vost. SSSR, 2: 794; WHEELER and HENRY, 1992, Entomol. Soc. Am., p. 23; SCHUH, 1995, Plant Bugs of the World, p. 645; LINNAVUORI, 1995, Acta Univ. Carolinae, 39: 36.

Specimens examined. Honshu: 1 ♂, Minoo, Minoo C., Osaka Pref., 21. vii. 1995, light trap, K. Tenma; 1 ♀, Kitamata, Kawakami Vil., Nara Pref., 15. vi. 1993, light trap, Y. NAKATANI; 2 ♂, Mt. Wasamata, Kamikitayama, Nara Pref., 9. viii. 1995, light trap, T. HIROWATARI and Y. SAWADA; 1 ♂, Tamakiguchi, Doro Valley, Wakayama Pref., 15. vi. 1993, S. GOTOH. Kyushu: 1 ♀, Okinoshima Is., Fukuoka Pref., 25–28. vii. 1958, Y. HIRASHIMA, Y. MURAKAMI and Y. MIYATAKE; 4 ♂ 4 ♀, Nameshi, Nagasaki C., on azalea with *Stephanitis pyrioides*, 31. vii. 1996, T. YASUNAGA; 1 ♀, Kagoshima Pref., 14. vii. 1954, S. MIYAMOTO and Y. HIRASHIMA. Ryukyu: 1 ♂, Iriomote Is., 10. iv. 1996, S. SUEYOSHI.

Distribution. Japan (Honshu, Kyushu, Iriomote Is. = new record), Russian Far East (S. Primorskij Prov.), E. China, N. America. The progenitors of the New World populations are considered to have been introduced with shipments of ornamental azalea nursery stock from Japan (WHEELER and HENRY, 1992).

Note. A single specimen, which was collected from Iriomote Island and represents the new distribution for this species, is similar in size to *praefectus*, but we consider it conspecific with *japonicus*, based on the identical male genital structure.

Stethoconus japonicus is known to be an effective predator of economically damaging tingids, such as the azalea lace bug, *Stephanitis pyrioides* (SCOTT), and *S. nashi* ESAKI et TAKEYA on pears (ESAKI, 1932; HENRY et al., 1986; KERZHNER, 1988; NAWA, 1910). In North America, *Stethoconus japonicus* was observed to be a suitable candidate for biological control of *Stephanitis* lace bugs (NEAL et al., 1991; NEAL and HALDEMANN, 1992). This plant bug is common on the ornamental azaleas in Japan. According to Dr. TOMOKUNI (pers. commun.), *Stethoconus japonicus* was also found together with *Stephanitis takeyai* DRAKE et MAA on *Pieris japonica* (Ericaceae) in Fukushima Prefecture (= new host record).

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Relatively Larger Eggs Produced by Smaller Females of *Monochamus alternatus* (Coleoptera: Cerambycidae)¹

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Monochamus alternatus HOPE (Coleoptera: Cerambycidae) adults are the vector of the pinewood

nematode, *Bursaphelenchus xylophilus* (STEINER et BUHRER) NICKLE, the causal agent of pine wilt disease (MAMIYA and ENDA, 1972; MORIMOTO and IWASAKI, 1972). After the maturation feeding, adult females lay eggs singly under the bark of recently killed *Pinus densiflora* SIEB. et ZUCC. and *P. thunbergii* PARL. trees in Japan (e.g., TOGASHI and MAGIRA, 1981). At high densities, the larvae kill each other under the bark (e.g., TOGASHI, 1986, 1990). An experiment has shown that the winners are larger than the losers (ANBUTSU and TOGASHI, unpublished data). This suggests that the initial size of progeny is significant to early survival. Since adult females exhibit a large variation in body size (OCHI and KATAGIRI, 1974), the size of eggs deposited by different-sized females is of great interest. We examined the relationship between maternal size and the relative size of eggs deposited by females.

MATERIALS AND METHODS

A total of 30 *P. densiflora* trees killed by pine wilt disease were felled and cut into logs in a man-made stand in Tokuyama City, Yamaguchi Prefecture, and

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