国立科博専報，（44），2006年3月28日
Mem. Natn. Sci. Mus., Tokyo, (44), March 28, 2006

A Revision of Winter Cuculliine Moths of the Genus *Rhynchaglaea* (Lepidoptera: Noctuidae) in East and Southeast Asia

Mamoru Owada[1], Hideki Kobayashi[2], Wang Min[3], Chien-Ming Fu[4], Han-Rong Tzuoo[5], Cheng-Shing Lin[6], Mei-Ling Chan[6], Ta Huy Thinh[7], Chen Liu-sheng[3] and Hiroshi Yoshimoto[8]

[1] Department of Zoology, National Science Museum, Tokyo, 3–23–1 Hyakunin-cho, Shinjuku-ku, Tokyo, 169–0073 Japan
[2] 1–11–1–26 Hirakishi, Toyohira, Sapporo, 062–0931 Japan
[3] Laboratory of Insect Ecology, South China Agricultural University, Guangzhou, Guangdong 510642, P. R. China
[4] 8, Tayuan 7th St., Taiping, Taichung 441, Taiwan, R.O.C.
[5] 9, 133 Lane, Chung Hsiao 3rd Rd., Puli, Nantou 545, Taiwan, R.O.C.
[6] Department of Zoology, National Museum of Natural History, Kuan Chen Rd., Taichung 404, Taiwan, R.O.C.
[7] Institute of Ecology and Biological Resources, Vietnamese Academy of Science and Technology, Hanoi, Vietnam
[8] Tokyo High School, 2–39–1 Unoki, Ota-ku, Tokyo, 146–0091 Japan

Abstract. The genus *Rhynchaglaea* from East and Southeast Asia is revised. The following nine species are discriminated: *Rhynchaglaea scitula* (Butler, 1879) distributed in Japan and Korea; *R. perscitula* Kobayashi & Owada, sp. nov. from Taiwan and Guangdong; *R. labiscitula* Kobayashi & Owada, sp. nov. from Taiwan and Vietnam; *R. hemixantha hemixanthas* Sugi, 1980 from Taiwan, Guangdong (new record), Guangxi (new record), and Vietnam (new record); *R. fuscipennis* Sugi, 1958 from Japan and Korea; *R. taiwana* Sugi, 1980 from Taiwan, Guangdong (new record), Guangxi (new record), Vietnam (new record), and Nepal; *R. luteomixta* Hreblay & Ronkay, 1998 from Taiwan, Guangdong (new record), and Guangxi (new record); *R. terngjyi* B. S. Chang, 1991 from Taiwan; and *R. nanlingensis* Owada & Wang, sp. nov. from Guangdong and Guangxi. Three allopatric sibling species groups are recognized, i.e., the *scitula-perscitula* and *fuscipennis-taiwana* groups, separated by the strait between the Ryukyus and Taiwan, and the *terngjyi-nanlingensis* group, which is separated by the Taiwan Channel and not distributed in Japan.
Key words: Revision, Lepidoptera, Noctuidae, *Rhynchaglaea*, new species, East Asia, Southeast Asia.

Introduction

The genus *Rhyncaglaea*, a typical member of the winter noctuid moths, was erected by Hampson (1906) for *Xylophasia scitula* Butler, 1879 described from Yokohama, Japan. The type species of the genus was well known as an extraordinarily variable moth, and Draudt (1934) stated that "I have before me, from Hoene's collection from Japan, some 200 specimens of this exceedingly variable species. No two specimens are identical! No purpose would be served by denominating all these forms." Sugi (1958) added a similar new species, *R. fuscipennis*, which is almost sympatric with *R. scitula*, by examination of the male genitalia. These moths inhabit the zone of evergreen broadleaved trees in Japan. Besides, he described two new species, *R. taiwana* and *R. hemixantha*, from Taiwan (Sugi, 1980).

Unfortunately, several authors confused the identities of Taiwanese species of *Rhynchaglaea* after that time. Yoshimoto (1988) recorded "*R.*

scitula" (nec Butler, 1897), which will be described as a new species in this paper. Chang (1991) illustrated mixture of two species, "*R. scitula* sensu Yoshimoto, 1988" and *R. taiwana*, under the name of *R. taiwana*, and described *R. shyrshana*, which is a junior synonym of *R. taiwana*. Sugi (1992) corrected Chang's confusion (1991), though he retained in his checklist the status of "*R. scitula* sensu Yoshimoto".

Through our intensive surveys on the winter moths in East and Southeast Asia, we found that Taiwanese "*R. scitula* sensu Yoshimoto" differs from the Japanese species and is distributed in Guangdong as well. These two sibling species are clearly allopatric between the Ryukyu Islands and Taiwan. In addition to these, one more related undescribed species was found from Taiwan and northern Vietnam as described herein as a new species. It is difficult to distinguish these three species by the wing maculation alone. *Rhynchaglaea terngjyi* Chang, 1991 is endemic to southern mountains of Taiwan, and we found a sister species in the opposite side in continental China, Guangdong and Guangxi.

In this paper, we are going to revise the genus *Rhynchaglaea*, and to describe these three new species, with collecting data of all the specimens of known species in our collections and that of TFRI, Taipei, and to discuss their relationship and distribution.

This study is supported in part by the Grants-in-aid Nos. 13575015, 09041167, 06041116 and 01041099 for Field Research of the Monbusho International Scientific Research Program, Japan.

Acronyms for depository of specimens examined are as follows: IEBR, Institute of Ecology and Biological Resources, Hanoi; NMNS, National Museum of Natural Science, Taichung; NSMT, National Science Museum, Tokyo; SCAU, South China Agricultural University, Guangzhou; TFRI, Taiwan Forestry Research Institute, Taipei.

Rhynchaglaea scitula (Butler, 1879)

(Figs 1–6)

Xylophasia scitula Butler, 1879: 359.

Rhynchaglaea scitula: Hampson, 1906: 435; Sugi, 1982: 731, pl. 180, figs 1–6; Sugi, 1990: 123; Sohn *et al.*, 2005: 150–151, figs 5, 9.

Rhynchaglaea kumamotonis Matsumura, 1926: 54, pl. 1, fig. 30.

Rhynchaglaea scitula albibasis Draudt, 1934: 148, pl. 18-e.

Diagnosis. This species is very similar in coloration to the following two new species, but allopatric with them. In Japan and Korea, *R. fuscipennis* is distributed almost sympatrically with this species, but they are easily recognized on the shape of the forewing termen, i.e., strongly serrate in *R. scitula* and almost straight or weakly serrate in *R. fuscipennis*. In the male genitalia of this species (Fig. 31), the cucullus is very long and covered densely with blackish hairs in dorsal portion; the harpe and costal process are very long and slender; the aedeagus is straight, with a stout cornutus. In the female genitalia of this species (Fig. 40), the papillae anales are markedly slender; the cervix bursa is long-ovate.

Specimens examined. Honshu: Tokyo, Imperial Palace, Kami-Dokanbori, 1♂, 24.II.1997, 1♂, 12.III.1997, M. Owada leg., ditto, Fukiage-gyoen, 1♀, 16.XII.1997, M. Owada & T. Kaminishi leg., 1♀, 6.II.1998, M. Owada leg., 1♂, 8.II.2000, M. Owada leg., 1♀, 27.XII.2001, M. Owada *et al.* leg., 1♂, 28.I.2002, M. Owada *et al.* leg.; Tokyo, Akasaka Imperial Gardens, 1♂2♀, 16.II.2002, Y. Kishida *et al.* leg., 1♂, 17.XII. 2003, M. Owada *et al.* leg.; Tokyo, Shibuya, Tokiwamatsu Imperial Villa, 1♀, 15.IV.2003, Malaise trap; Tokyo, Minato, Institute for Nature Study, 1♂, 12.III.2000, M. Owada & U. Jinbo leg.; 1♂, Tokyo, Mt. Takao, 16.IV.1960, T. Ebato leg., 1♀, 3.XII.1989, H. Kobayashi leg., 2♂, 580 m, 2.I.1995, M. Owada leg.; Tokyo, Sayama, 1♀, 29.II.1992, H. Kobayashi leg.; Tokyo, Itsukaichi, Yokozawa, 250 m, 1♂, 3.I.1994, M.

Owada leg.; Kanagawa, Tanzawa, Inukoshiji, 700 m, 1♂, 5.XII.1989, H. Kobayashi leg.; Kanagawa, Oiso, Mt. Komayama, 4♂2♀, 29.XII. 1992, M. Owada leg., ditto, 168 m, 4♀, 29.XII. 1993, H. Kobayashi leg., ditto, 150 m, 1♀, 9.II.2003, M. Owada leg.; Kanagawa, Hakone, Ohiradai, 6♂4♀, 3.XII.1988, M. Owada leg.; ditto, 200 m, 1♂1♀, 1.XII.1990, H. Kobayashi leg.; Shizuoka, Izu, Yumigahama, 10 m, 4♀, 17.II.1996, H. Kobayashi leg.; Shizuoka, Izu, Amagi, 750 m, 1♂, 23.III.1996, H. Kobayashi leg.; Shizuoka, Osuka, Mt. Ogasayama, 170 m, 1♂, 11.II.2003, M. Owada leg.; Gifu, Kinkazan, Inaba-jinja, 60 m, 1♂, 10.XII.1994, M. Owada leg.; Mie, Miyama, Choshigawa Riv., 1♀, 21.III. 1995, M. Owada leg.; Wakayama, Mt. Gomadansan, 1,200 m, 2♂3♀, 24.III.1995, M. Owada leg.; Wakayama, Susami, Kotonotaki, 200 m, 1♂1♀, 23.III.1995, M. Owada leg.; Osaka, Sakai, Mozu, 14♂4♀, 5.III.1974, 52♂5♀, 3.III.1975, M. Owada leg.; Hyogo, Kobe, Nunobikinotaki, 1♂, 2.II.2002, M. Owada leg., ditto, 200 m, 1♂1♀, 2.II.2002, H. Kobayashi leg. **Tsushima:** Izuhara, Uchiyama, Yatateyama, 200 m, 1♂1♀, 9.XII.1992, H. Kobayashi leg.; Mt. Taterayama, 2♂, 19.XII.1992, M. Owada leg. **Kyushu:** Saga, Mt. Taradake, Nakayama, 550 m, 3♂, 13.IV.2002, H. Kobayashi leg.; Saga, Takeo, Nagashima, 40 m, 1♂1♀, 19.I.2003, H. Kobayashi leg.; Kumamoto, Mt. Kozonoyama, 180 m, 1♀, 13.I.2003, 5♂2♀, 17.II.2003, 2♂, 8.III.2003, 7♂3♀, 22.III.2003, H. Kobayashi leg.; Kumamoto, Toyono, Yamazaki, 100 m, 2♂1♀, 2.II.2003, H. Kobayashi leg.; Kumamoto, Nankan, Mt. Otsuyama, 200 m, 1♂, 25.I.2003, 1♂, 21.III.2003, 10♂, 24.III.2003, genitalia slide No. HK948♂, H. Kobayashi leg.; Kumamoto, Takamori, Kamishikimi, 650 m, 1♂1♀, 22.XII.2002, H. Kobayashi leg.; Kumamoto, Itsuki, Otaki, 600 m, 3♂3♀, 10.II.2003, H. Kobayashi leg.; Kumamoto, Yabe, Naidaijin, 900 m, 1♂, 8.IV.2002, H. Kobayashi leg.; Kumamoto, Kikuyocho, Totsugi, 1♂2♀, 200 m, 15.XII.2002, H. Kobayashi leg.; Kumamoto, Takamori, Kamishikimi, 650 m, 2♂, 22.XII.2002, H. Kobayashi leg. **Yakushima Is.:** Kigensugi, 1,150 m, 1♀, 1.III.1997, M. Owada leg. **Amamioshima Is.:** Sumiyougawa Riv., 240 m, 96♂34♀, 13–14.I.1991, K. Horie & M. Owada leg.; Mt. Yuwandake, 400 m, 2♂, 12.I.1991, M. Owada leg., ditto, 320 m, 1♂2♀, 20.II.1998, M. Owada leg. **Okinawa Is.:** Kunigami, Nishimei-dake, 250 m, 1♂, 15.I.2002, H. Kobayashi leg.; Kunigami, Higashi, Takae, 1♀, 14.II.1994, M. Kimura leg.; Kunigami, Hiji, 2♂3♀, 6.I.1995, 1♂5♀, 3.II.1995, 1♂1♀, 23.II.1995, M. Kimura leg., ditto, 250 m, 1♂1♀, 14.I.2002, H. Kobayashi leg.; Kunigami, Aha-rindo, 300 m, 2♂1♀, 25.I.1993, M. Owada leg.; Kunigami, Mt. Yonahadake, 350 m, 1♂, 26.I.1993, M. Owada leg. **Iriomote Is.:** Maryudono-taki, 1♂2♀, 21.XII. 1995, M. Kimura leg.; Nakama-kawa, 1♀, 20.XII.1995, M. Kimura leg. All in NSMT.

Distribution. Japan: Honshu, Shikoku, Kyushu, Tsushima, Yakushima Is., the Ryukyus (Amami-oshima Is., Okinawa Is., Iriomote Is.) and Korea: Jeonnam.

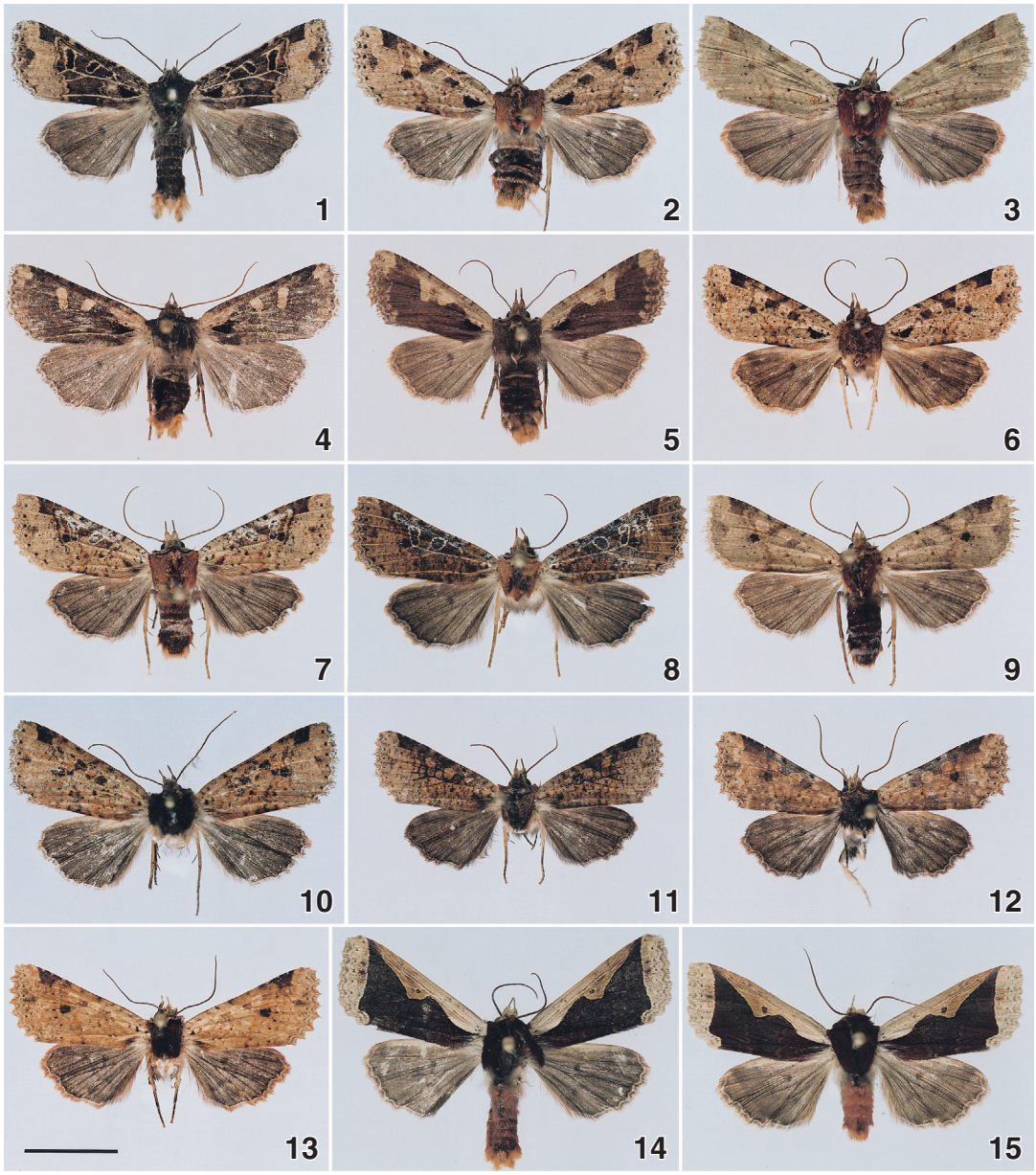
Rhynchaglaea perscitula Kobayashi & Owada, sp. nov.

(Figs 7–10)

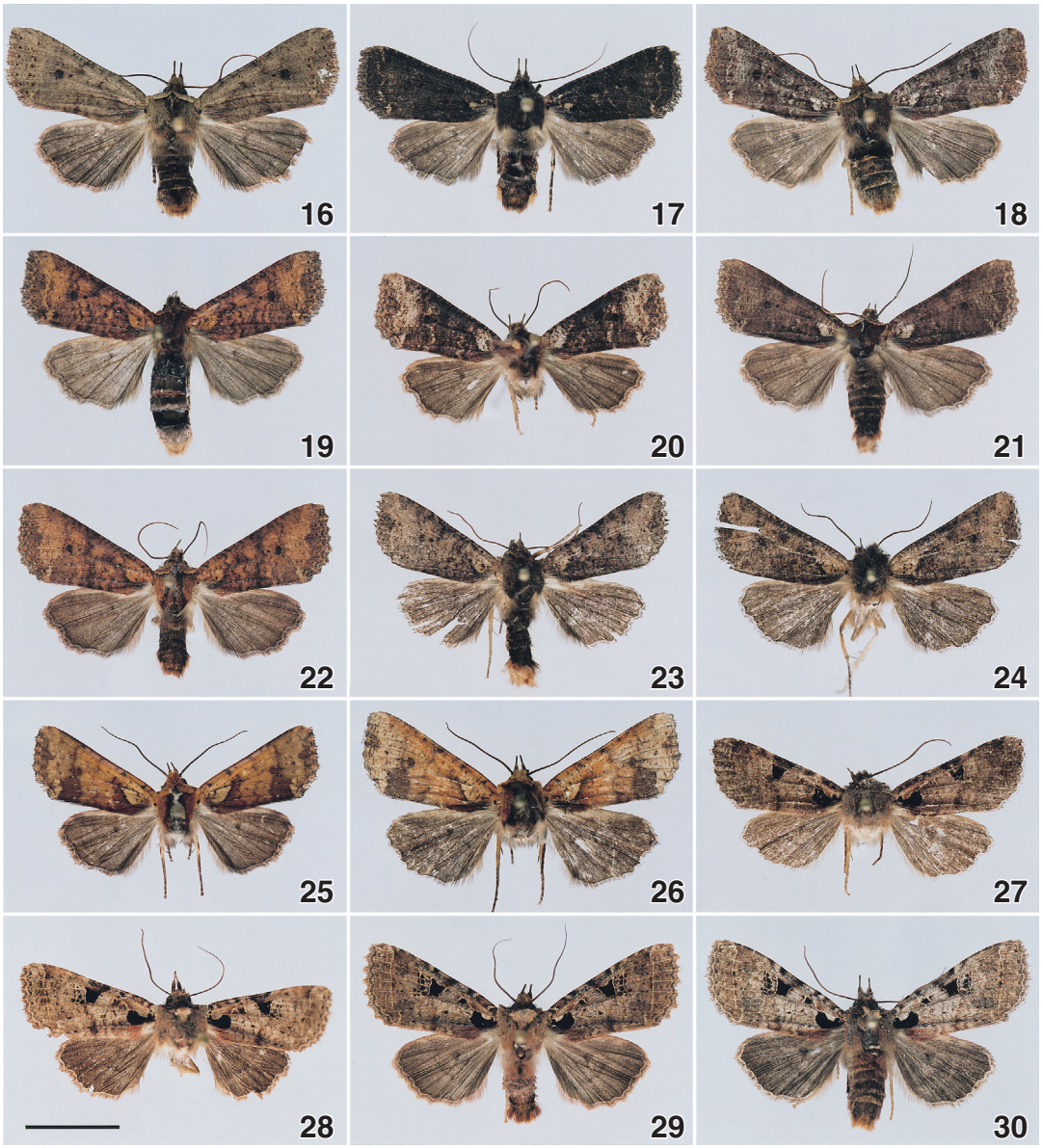
Rhynchaglaea scitula: Yoshimoto, 1988: 308; Sugi, 1992: 197; Fu & Tzuoo, 2002: 102, pl. 27, fig. 1, pl. 34, fig. 5. [Nec Butler, 1879]

Rhynchaglaea taiwana: Chang, 1991: 171–172, part, figs [1–3] on p. 171., fig. 116 (male genitalia) on p. 332. [Nec Sugi, 1980]

Description. *Male.* Wingspan 30–33 mm. Forewing length 14–16 mm. Antenna filiform. Forewing with termen strongly serrate. Ground colour variable individually from light brown to dark brown, costal area white in some specimens, veins conspicuous with light colour in some, concolorous in others; terminal line light brown, black point in every cell in subterminal line; post- and antemedial lines not clear in most specimens, represented by zigzag, double lines with or without dark brown backup in some specimens; reniform stigma rather small and thin, concolorous with each ground colour or darker



Figs 1–15. *Rhynchaglaea* spp. 1–6, *R. scitula* (Butler, 1879): 1–2, Mt. Komayama, Honshu, ♂ & ♀; 3, Hakone, Honshu, ♀; 4, Kumamoto, Kyushu, ♂; 5, Amami-oshima Is., ♀; 6, Iriomote Is. 7–10, *R. perscitula* Kobayashi & Owada, sp. nov.: 7, Anmashan, Taiwan, ♂, holotype; 8, Szuyuan-yakou, Taiwan, ♂; 9, Shan-Baling, Taiwan, ♀; 10, Nanling Nature Reserve, Guangdong, ♂. 11–13, *R. labiscitula* Kobayashi & Owada, sp. nov.: 11, Nanshan-xi, Taiwan, ♂, holotype; 12, Mt. Piaoak, Vietnam, ♂; 13, Sapa, Vietnam, ♀. 14–15, *R. hemixantha hemixantha* Sugi, 1980: 14, Nanling Nature Reserve, Guangdong, ♂; 15, Lalashan, Taiwan, ♀. Scale: 10 mm.



Figs 16–30. *Rhynchaglaea* spp. 16–19, *R. fuscipennis* Sugi, 1958: 16, Saitama, Honshu, ♀; 17, Kobe, Honshu, ♀; 18, Mt. Ogasayama, Honshu, ♀; 19, Mt. Komayama, Honshu, ♀. 20–24, *R. taiwana* Sugi, 1980: 20, Lalashan, Taiwan, ♂; 21, Suleng, Taiwan, ♂; 22, Anmashan, Taiwan, ♂; 23, Nanling Nature Reserve, Guangdong, ♂; 24, Mao'ershan, Guangxi, ♂. 25–26, *R. luteomixta* Hreblay & Ronkay, 1998: 25, Suleng, Taiwan, ♂; 26, Mao'ershan, Guangxi, ♂. 27–28, *R. terngjyi* Chang, 1991: 27, Terngjy (Tengchih), Taiwan, ♂, paratype; 28, same locality, ♀. 29–30, *R. nanlingensis* Owada & Wang, sp. nov.: 29, Nanling Nature Reserve, Guangdong, ♂, holotype; 30, same locality, ♀. Scale: 10 mm.

or white; orbicular stigma small, almost round or slightly oval, same coloration as reniform stigma. Hindwing fuscous with a dark discal spot and light coloured terminal line with dark backing. Underside with a black discal spot; postmedial line black, clear, while it is very vague or vestigial in *R. scitula*.

Female. Wingspan 31–36 mm. Forewing length 15–17 mm. Maculation same as male.

Male genitalia (Fig. 32). Uncus slender, pointed. Peniculus protruding. Costal process of valva asymmetrical, i.e., right process distinctly thicker and shorter than the left. Most of other parts symmetrical. Cucullus long triangular, with blackish hair. Harpe slender, long, and curved. Peniculus protruding abruptly. Juxta rather large, almost triangular with round corners. Aedeagus slightly curved ventrad, with a horn-like cornutus and a hairy patch.

Female genitalia (Fig. 41). Papillae anales markedly slender; ductus bursae long; cervix bursa large, round.

Diagnosis. In the forewing maculation, three patterns described hereunder are stable in this species. A dark trapezium patch is present on the costa near apex; a vague dark spot is present on M_2 near termen; a black spot on M_1 is touching outside of the reniform stingma.

It is difficult to separate this species from *R. scitula* by their coloration. In the male genitalia, the asymmetrical costal processes of valva are distinct, i.e., the right process is distinctly thicker and shorter than the left, while these processes are symmetrical in *R. scitula*. The cucullus is long triangular, shorter than that of *R. scitula*. The aedeagus slightly curved ventrally, while it is straight in *R. scitula*. The cornutus is rather short and stout, and the hairy patch is smaller and the hair is weaker. In the female genitalia, the shape of cervix bursae is different, i.e., round in *R. perscitula* and long ovate in *R. scitula*.

Type series. Holotype—male (Fig. 7), Taiwan, Taichung, Anmashan, 2,100 m, 14.I. 1992, H. Kobayashi leg., preserved in NSMT. Paratypes—**Taiwan:** same locality as holotype, 1♂, 12.I.1992; Taoyuan, Lalashan, 1,500 m, 7♂, 20–22.I.1991, M. Owada leg.; Taoyuan, Shan-Baling, 1,000 m, 5♂3♀, 14.I.1993, H. Kobayashi leg.; Taoyuan, Siling (Suleng), 1,000–1,200 m, 1♂, 15.I.1994, H. Kobayashi leg., 5♂7♀, 25.I.1992, M. Owada leg.; Ilan, Yuanshan, Fushan, 600 m, 1♀, 16–17.I.1992, M. Owada leg.; Ilan, Szyuan-yakou, 1,800–2,000 m, 2♂, 10.XII.1993, H. Kobayashi leg., 7♂14♀, 19.XII. 1996, 22♂10♀, 11.XII.1998, H. Kobayashi & M. Owada leg.; Taichung, Tayuling, 1♀, 9–10.III. 1980, T. Tanabe leg.; Taichung, Anmashan, 2,600 m, 1♂, 23.XII.2000, 2,600 m, 1♂2♀, 31.I. 2001, 2,100 m, 2♂, 1.II.1997, 2,100 m, 1♀, 14.II. 1997, 2,600 m, 1♂2♀, 16.II.2001, C. M. Fu leg., 4♂3♀, 4.I.1997, 1♂, 14.II.1997, 1♂, 14.III.1997, 1♂, 11.XI.1996, 1♂, 7.XII.1996, H. R. Tzuoo leg.; Taichung, Pahsienshan, 1,000 m, 1♂, 16.III. 1996, C. M. Fu leg., 3♀, 12.III.2005, M. Owada leg.; Nantou, Shishan, 2,375 m, 1♀, 23.II.2003, H. R. Tzuoo leg.; Nantou, Meifeng, 1♂, 30.III.–1.IV.1995, C. S. Lin & W. T. Yang leg.; Nantou, Tsuifeng, 1♂1♀, 28.XII.1994, H. R. Tzuoo leg.; Chiayi, Shyrshan, 1♀, 18.III.1991, B. S. Chang leg.; Chiayi, Tatachia-anpu, 1♂, 15.XII.1990, 1♂, 16.III.1991, B. S. Chang leg. **Guangdong:** Shaoguan, Nanling Nature Reserve, 600–1,000 m, 1♂1♀, 11–14.III.2004, Wang Min *et al.* leg. Preserved in the collections of NMNS, NSMT, SCAU, TFRI, Fu, and Tzuoo.

Distribution. Taiwan and Guangdong.

Notes. *Rhynchaglaea perscitula* was identified by some researchers as *R. scitula*. The external appearance of this new species is very similar to *R. scitula* with the wide variation range of individuals in both species. The basic formation of genitalia is identical except for some parts as described above. Judging from the similarity of the genitalia, *R. scitula* and *R. perscitula* will be allopatric sibling species. *Rhynchaglaea scitula* is distributed from central Honshu to Iriomote Island of the Yaeyama Group of the Ryukyus, and is not found in Taiwan, where *R. perscitula* is abundant. It is worth noting that *R. perscitula* is distributed in the continental China, and the width of the strait is larger than that between Iriomote Is. and Taiwan.

Rhynchaglaea labiscitula Kobayashi & Owada, sp. nov.

(Figs 11–13)

Description. *Wings of Taiwanese specimens* (Fig. 11). Male. Wingspan 29–30 mm.Forewing length 14–15 mm. Antenna filiform. Patagium dark brown. Tegula dark brown. Forewing ground colour fuscous brown, with termen serrate. A dark brown trapezoidal maculation present on costa near apex. Orbicular and reniform stigmata encircled with dark brown line and concolorous with the ground colour inside, a dark brown marking between them, and similar marking present outside of the reniform stigma. On the underside of hindwing, postmedial line crenulate, clear.

Wings of Vietnamese specimens (Figs 12–13). Male. Wingspan 27–30 mm. Forewing length 13–15 mm. Antenna filiform. Patagium light brown, with margin black. Tegula brown. Crest tinged with grey. Forewing ochre, with termen serrate. A dark brown trapezoidal maculation on costa near apex. A black spot on M_3, touching slender reniform stigma. Orbicular stigma lying between two dark maculae. Underside of hindwing with postmedial line crenulate, clear.

Female. Wingspan 31–32 mm. Forewing tinged slightly with orange. Maculation same as in male.

Male genitalia (Fig. 33). Uncus slender, pointed. Peniculus rectangular, protruding abruptly. Juxta rather large, with its base wide. Costal margin sunken at middle. Costal projection thin and short, acutely pointed, protruding slightly out of valva ventrally. Cucullus wide and short. Harpe slender, long, and curved. Aedeagus slightly curved ventrad, coecum penis thick. Cornutus curved, rather thin, a hairy patch present at middle.

Female genitalia (Fig. 42). Papillae anales slender, posterior apophyses long, antrum short, U-shaped. Cervix bursae sclerotized, long ovate.

Diagnosis. *Rhynchaglaea labiscitula* is very similar to *R. scitula* and *R. perscitula*, but is distinctly smaller. On the underside of the hindwing, the postmedial line of this species is clearly distinct, while it is not so bold but clear in *R. perscitula* and is vague or vestigial in *R. scitula*. In the male genitalia, this species is easily distinguished from them by the following features: the costal process much shorter; the harpe shorter, the cucullus wider and not so hairy; the cornutus curved. In the female genitalia, the papillae anales of this species are not so slender, the antrum is short U-shaped.

Type series. Holotype—male (Fig. 4), Taiwan, Nantou, Nanshan-xi, 900 m, 13–14.I.1994, H. Kobayashi leg., preserved in NSMT. Paratypes—**Taiwan:** 2♂, the same data as holotype. **N. Vietnam:** Vinh Phu, Tam Dao, 930 m, 2♂, 12, 16–17.I.1996, M. Owada leg.; Laocai, Sapa, 1,300 m, 2♀, 17–18.XII.2001, K. Suzuki leg.; Cao Bang, Mt. Piaoac, 1,200 m, 1♂, 11–13. XII.2001, K. Suzuki leg. Preserved in IEBR, NMNS, and NSMT.

Distribution. Taiwan and Vietnam.

Notes. It is doubtless that this species is related to the preceding two species, which are considered to be sibling species. The shape of papillae anales of this species is not so slender, and this feature is intermediate between those of the preceding and the following species, *R. hemixantha*.

In Taiwan, only one locality is known, Nanshan-xi, 900 m in alt., Nantou County, which is rather a lower place than the main habitat of *R. perscitula*.

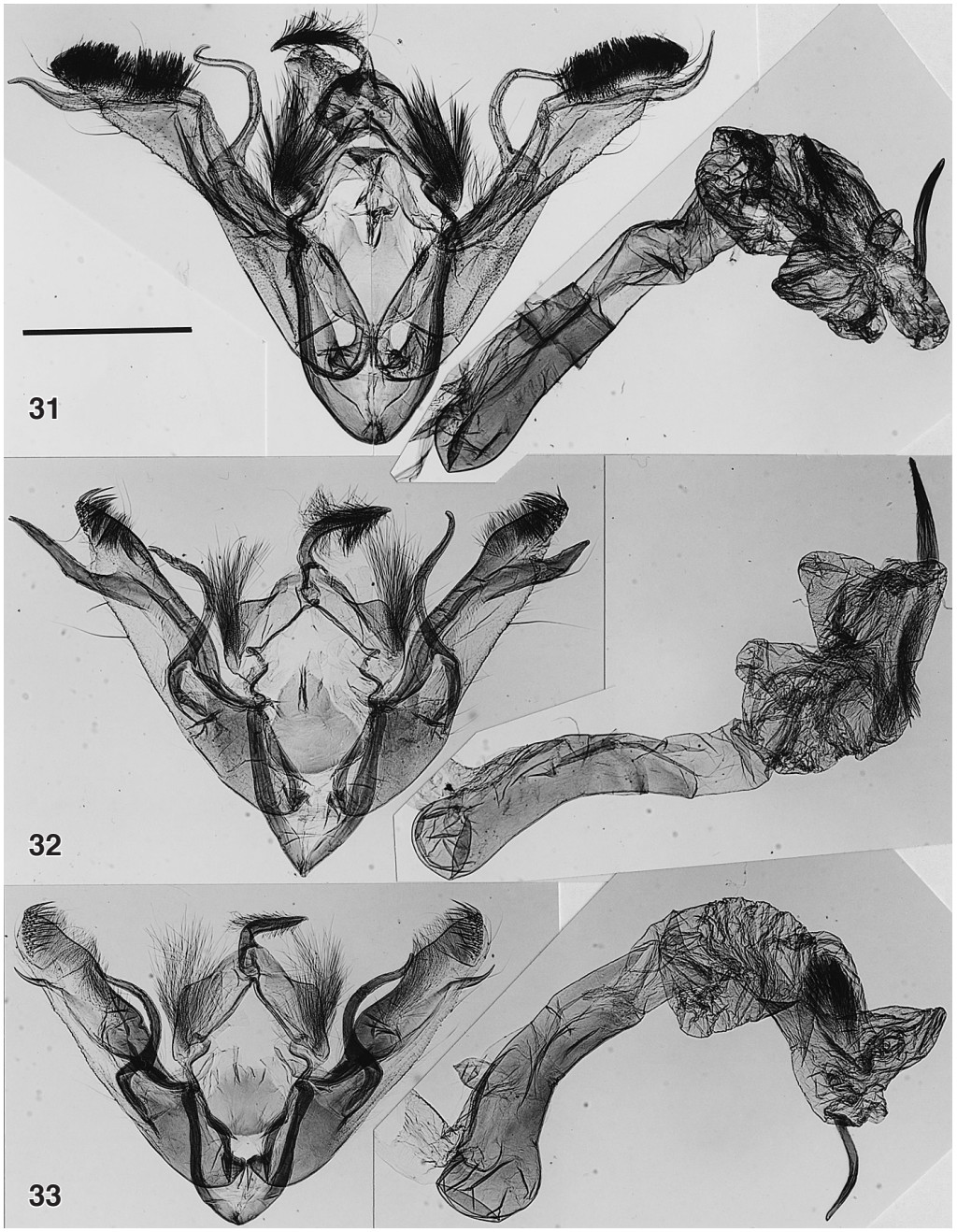
Rhynchaglaea hemixantha hemixantha Sugi, 1980

(Figs 14–15)

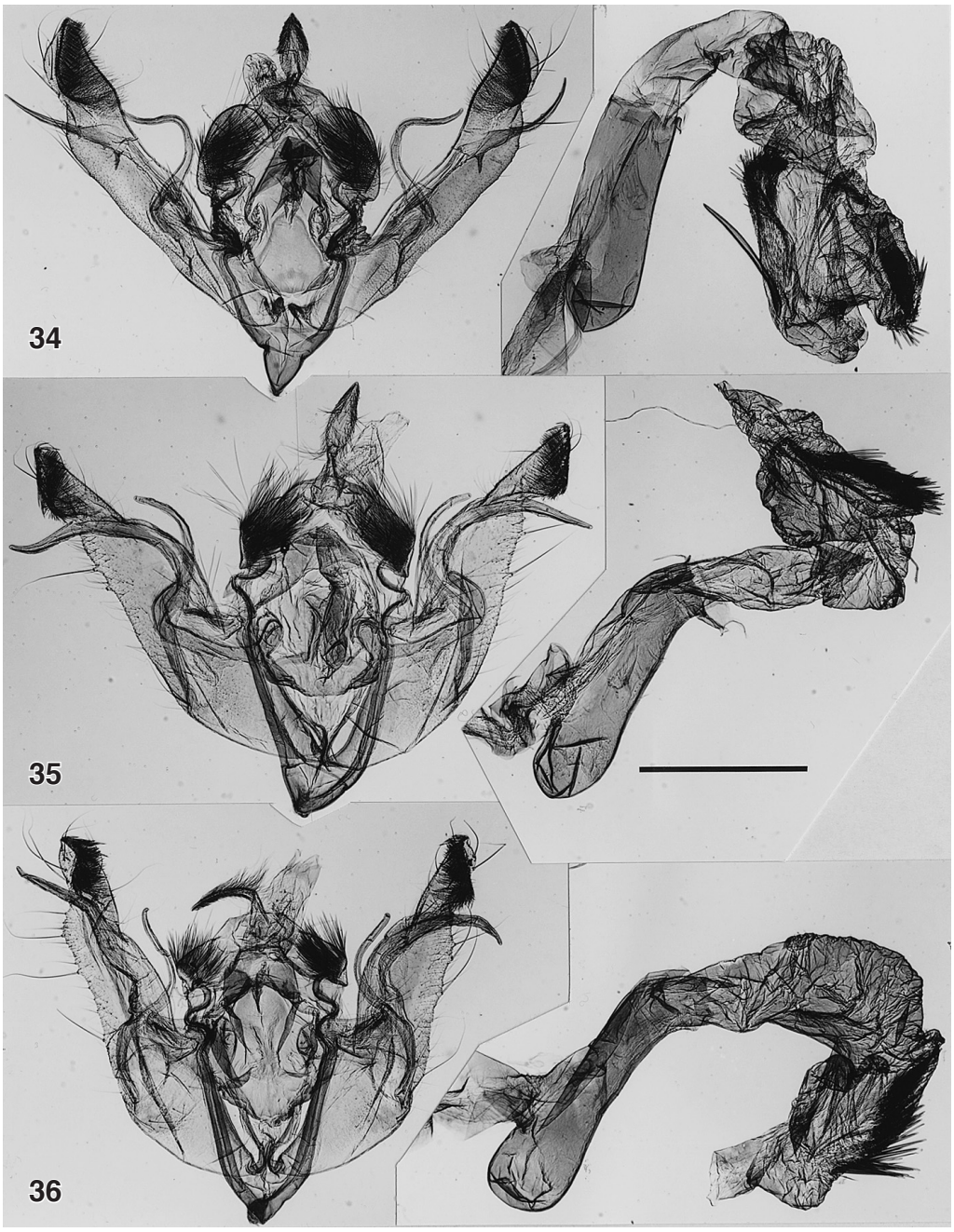
Rhynchaglaea hemixantha Sugi, 1980: 200, fig. 3 (adult), fig. 12 (male genitalia); Chang, 1991: 173, figs; Sugi, 1992:197; Fu & Tzuoo, 2002: 103, pl. 27, fig. 3.

Rhynchaglaea henixantha hemixantha: Hreblay & Ronkay, 1998: 223, 299, fig. 1123 (male genitalia).

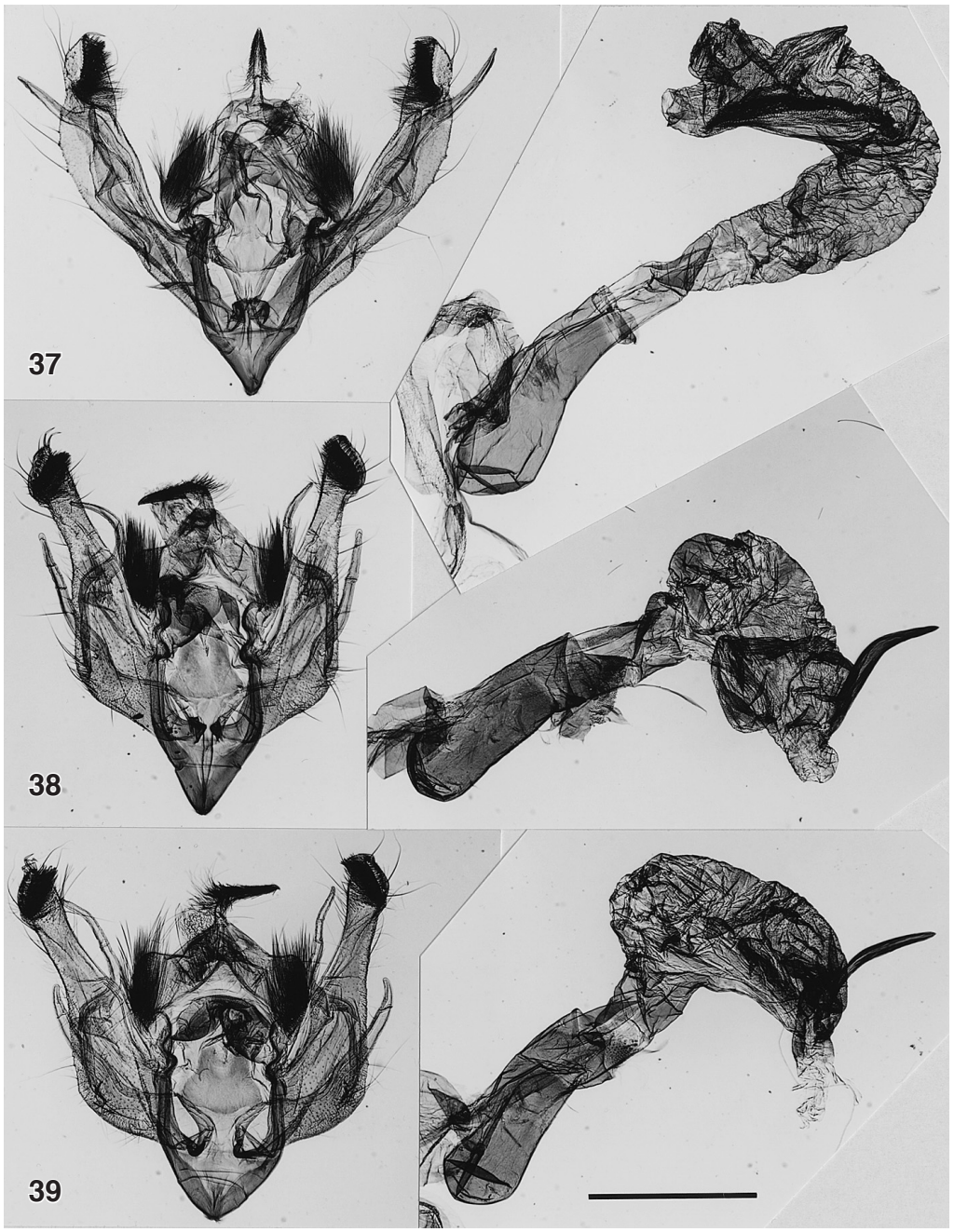
Diagnosis. The pattern of wing maculation of this species (Figs 14–15) is so distinct that there is no possibility of misidentification. In very rare cases, however, the similar pattern is



Figs 31–33. Male genitalia of *Rhynchaglaea*. 31, *R. scitula* (Butler, 1879), Tokyo, Honshu; 32, *R. perscitula* Kobayashi & Owada, sp. nov., Anmashan, Taiwan, holotype; 33, *R. labiscitula* Kobayashi & Owada, sp. nov., Nanshan-xi, Taiwan, holotype. Scale: 2 mm.



Figs 34–36. Male genitalia of *Rhynchaglaea*. 34, *R. henixantha* Sugi, 1980, Nanling Nature Reserve, Guangdong; 35, *R. fuscipennis* Sugi, 1958, Tsushima; 36, *R. taiwana* Sugi, 1980, Mao'ershan, Guangxi. Scale: 2 mm.



Figs 37–39. Male genitalia of *Rhynchaglaea*. 37, *R. luteomixta* Hreblay & Ronkay, 1998, Mao'ershan, Guangxi; 38, *R. terngjyi* Chang, 1991, Terngjy, Taiwan, paratype; 39, *R. nanlingensis* Owada & Wang, sp. nov., Nanling, Guangdoung, paratype. Scale: 2 mm.

found in the variable species, *R. scitula* (Fig. 5) and *R. fuscipennis*. The male genitalia of this species (Fig. 34) are also similar to those of the preceding three species, but the uncus is much broader. In the female genitalia of this species (Fig. 43), the papillae anales are normally shaped, not slender, and the antrum is longer.

Specimens examined. Taiwan: Hualien, Tayuling, 2,560 m, 5♂1♀, 24–25.III.1980, T. Shimomura leg.; Taoyuan, Fuhsing, Suleng, 1,200 m, 1♂, 25.I.1992, M. Owada leg.; Ilan, Yuanshan, Fushan, 500 m. 2♂, 16–17.I.1992, M. Owada leg.; Taoyuan, Lalashan, 1,500 m, 1♂1♀, 20–22.I.1991, M. Owada leg.; Taichung, Tahsuehshan Mts., Anmashan, 2,000–2,300 m, 1♀, 11–14.I.1992, M. Owada leg.; Taoyuan, Fuhsing, Hsuanyuan, 900 m, 1♀, 15.I.1992, M. Owada leg.; Ilan, Fushan, 1♂, 18.II.1993, 1♂, 12.III. 1993, Y. B. Fan leg., 1♂, 1.III.1995, 2♂, 31.III. 1995, A. Werneke leg., 1♀, 28.II.1995, W. T. Jou leg., 1♀, 31.III.1995, Y. C. Sen leg.; Taichung, Anmashan, 1♀, 8.III.1997, H. R. Tzuoo leg.; Hualien, Tayuling, 1♂, 8–9.III.1978, 1♂, 9–10. III.1980, T. Tanabe leg., 2,560 m, 4♂1♀, 24–25. III.1980, H. Yoshimoto leg.; Nantou, Nanshan-xi, 900 m, 1♂1♀, 13–14.I.1994, H. Kobayashi leg.; Nantou, Shishan, 2,375 m, 1♀, 23.II.2003, H. R. Tzuoo leg.; Nantou, Lianhuachi, 1♀, 14.III.1990, Y. B. Fan leg.; Nantou, Jenai, Huisun, 1 ex., 9.III.1984, B. S. Chang leg.; Nantou, Meifeng, 2♂, 30.III.–1.IV.1995, C. S. Lin & W. T. Yang leg.; Nantou, Wushe, 1♀, 26–28.II.1991, C. S. Lin leg.; Chiayi, Chunchi, Fenchifu, 1♂, 21–24. II.1995, C. S. Lin & M. L. Chang leg.; Chiayi, Alishan, 1♂1♀, 24.III.1993, Y. B. Fan leg.; Chiayi, Alishan, Shyrshan, 2,600 m, 3 exs., 18.III. 1991, 1 ex., 20.IV.1991, B. S. Chang leg.; Kaohsiung, Taoyuan, Tianchyr, 2,300 m, 1 ex., 24.III. 1991, H. Y. Wang leg.; Kaohsiung, Taoyuan, Teng-Zhi, 1♀, 4.II.2003, H. R. Tzuoo leg.; Kaohsiung, Liukuei, Shanping, 800 m, 8–10.III.2005, M. Owada leg. **Guangxi:** Guilin, Nanling Mts., Mao'ershan, 500–1,400 m, 8♂1♀, 26–29.III. 2005, Wang Min *et al.* leg. **Guangdong:** Shaoguan, Nanling Nature Reserve, 700–1,200 m, 3♂2♀, 25–30.XII.2002, 14♂1♀, 20–24.II. 2003, 1♂1♀, 29–31.III.2003, 3♂1♀, 11–14.III. 2004, Wang Min *et al.* leg.; Huizhou, Nankunshan, 900–1,000 m, 1♂, 2–3.I.2004, Wang Min *et al.* leg. **N. Vietnam:** Cao Bang, 2♂1♀, II.2001. Preserved in the collections of IEBR, NMNS, NSMT, SCAU, TFRI, Fu, and Tzuoo.

Distribution. Taiwan, Guangdong, Guangxi, and N. Vietnam.

Notes. Hreblay and Ronkay (1998) separated the Nepalese population from Taiwanese nominotypical population, and named it *Rhynchaglaea hemixantha leucocollaris* (Hreblay & Ronkay, 1998: 223, 299, figs 1121 (male genitalia), 1122 (female genitalia), pl. 152, fig. 20). The characteristics of the subsp. *leucocollaris* were enumerated by them as follows: larger size (wingspan 25–39 mm, that of *R. h. hemixantha* 31–34 mm), paler, always whitish-ochreous costal stripe and collar and more distinct orbicular and reniform stigmata usually filled with ground colour; uncus somewhat broader.

In our joint researches, we newly found this species in mainland China, Guangdong and Guangxi, and northern Vietnam. The specimens of these areas are not separated in the coloration and size from those of Taiwan. In the male genitalia we examined, the uncus is also similar to that of the nominotypical subspecies. Therefore, we identify them with *R. h. hemixantha*. Judging from the illustration by Hreblay and Ronkay (1998, fig. 1121), it can be surmised that the juxta of ssp. *leucocollaris* does not like a bell found in the nominotypical subspecies, but like a thumb on a round base. Anyway, it is clear that these two taxa are conspecific.

Because of the similarity of the male and female genitalia, this species is related closer to the preceding three species than to the following species.

Rhynchaglaea fuscipennis Sugi, 1958

(Figs 16–19)

Rhynchaglaea fuscipennis Sugi, 1958: 207, pl. 28, fig. 8 (male genitalia), pl. 31, fig. 11 (adult); Sugi, 1982: 731, pl. 180, figs 7–13; Peregovits *et al.*, 1995: 182; Kononenko *et al.*,

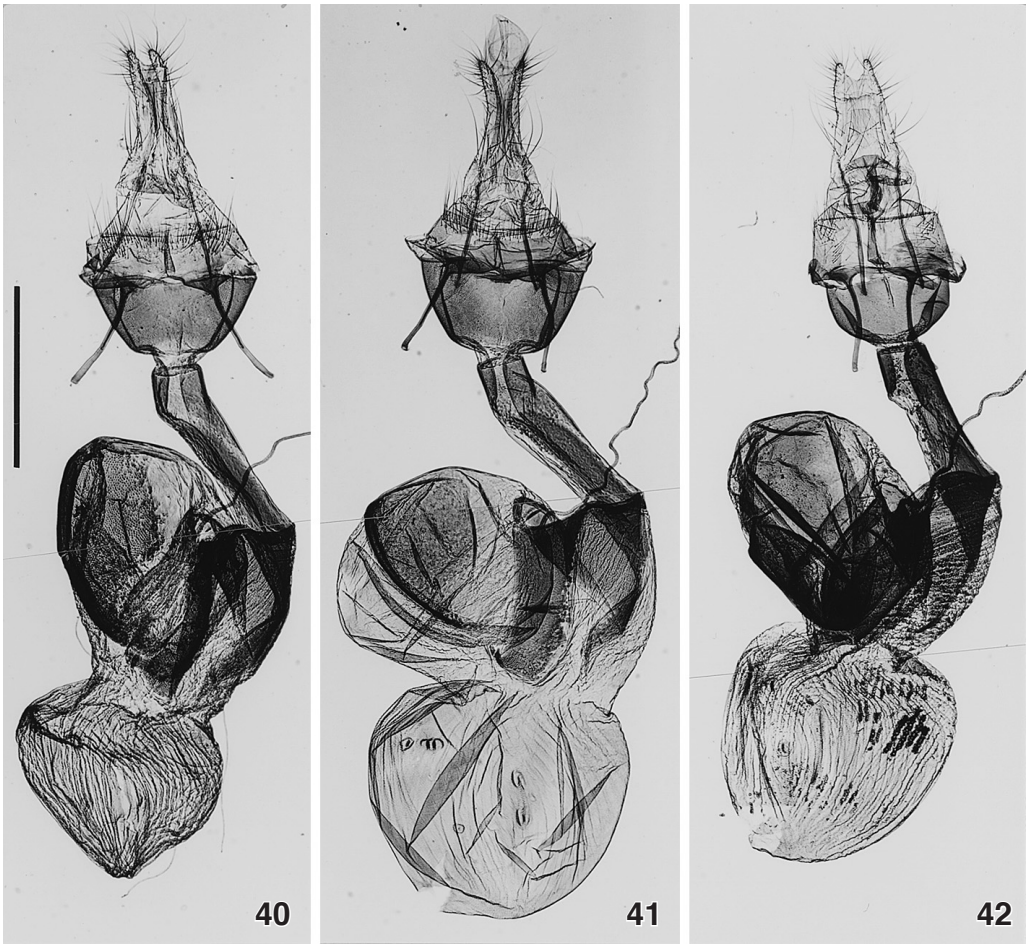
1998: 287, 450, fig. 766.

Diagnosis. This species is easily separated from the sympatric species, *R. scitula*, by the forewing termen straight or a little serrate, while it is strongly serrate in *R. scitula*. This feature is unique in the species of *Rhynchaglaea*. Differences in the genitalia are enumerated in the diagnosis of *R. scitula*.

Specimens examined. Honshu: Tokyo, Imperial Palace, Kami-Dokanbori, 1♀, 17.XII.1996, M. Owada & T. Kaminishi leg., 1♂1♀, 24.II. 1997, M. Owada leg., 1♂1♀, 12.III.1997, M. Owada leg.; Tokyo, Imperial Palace, Fukiagegyoen, 1♀, 6.II.1998, M. Owada leg., 1♂, 8.II. 2000, M. Owada *et al.* leg., 2♀, 6.IV.2001, Y. Arita *et al.* leg., 1♂, 21.II.2002, M. Owada *et al.* leg., 1♂, 10.XII.2004, M. Owada & Y. Kishida leg.; Tokyo, Akasaka Imperial Gardens, 10♂5♀, 16.XII.2002, Y. Kishida *et al.* leg., 1♂, 15.IV. 2003, Y. Arita *et al.* leg., 1♀, 17.XI.2003, M. Owada *et al.* leg., 1♀, 3.XII.2003, M. Owada *et al.* leg., 1♂, 2.III.2004, Y. Arita *et al.* leg., 1♂, 9.III.2004, M. Owada & S. Keino leg.; Tokyo, Shibuya, Tokiwamatsu Imperial Villa, 1♂, 5.II. 2003, Malaise trap; Tokyo, Mt. Takao, 1♂1♀, 30. III.1964, 2♂, 20.III.1988, 2♂, 4.XII.1988, 4♂, 580 m, 30.XII.1992, 4♂, 2.I.1995, M. Owada leg., 1♂, 16.IV.1969, T. Ebato leg.; Tokyo, Machida, Aihara, 1♂, 17.XII.1995, M. Owada leg.; Tokyo, Ome, Nagabuchi, 250 m, 1♂, 9.I. 1994, M. Owada leg.; Ibaraki, Moriya, Higashi-Negiri, 15 m, 1♂, 13.II.1995, M. Owada leg.; Saitama, Akigase-koen, 7.5 m, 1♀, 8.II.2003, M. Owada leg.; Yamanashi, Minobu, 1♂, 23.X.1980, T. Ebato leg., 3♂4♀, 26.XI.2005, H. Kobayashi, Y. Kishida & M. Owada leg.; Kanagawa, Oiso, Mt. Komayama, 3♂6♀, 29.XII.1992, M. Owada leg., ditto, 168 m, 2♂1♀, 29.XII.1993, H. Kobayashi leg.; Kanagawa, Hakone, Ohiradai, 1♂3♀, 3.XII.1988, M. Owada leg., ditto, 200 m, 1♀, 1.XII.1990, H. Kobayashi leg.; Kanagawa, Tanzawa, Inukoshiji, 700 m, 1♀, 5.XII.1989, H. Kobayashi leg.; Shizuoka, Haibara, Katsuta, 1♀, 16.II.1972, T. Sakurai leg.; Shizuoka, Mt. Fujisan, Umagaeshi, 1,000 m, 1♀, 9.IV.1991, H. Kobayashi leg.; Shizuoka, Osuka, Mt. Ogasayama, 170 m, 1♀, 11.II.2003, M. Owada leg.; Aichi, Nagoya, Yagoto, 1♂, 15.II.1971, K. Yamagishi leg.; Gifu, Kinkazan, Inaba-jinja, 60 m, 8♂4♀, 10.XII.1994, M. Owada leg.; Mie, Miyama, Choshigawa Riv., 3♀, 21.III.1995, M. Owada leg.; Wakayama, Mt. Gomadansan, 1,200 m, 10♂3♀, 24.III.1995, M. Owada leg.; Wakayama, Hongu, Otogawa Riv., 200 m, 5♀, 2.III.1995, M. Owada leg.; Wakayama, Susami, Kotonotaki, 200 m, 3♀, 23.III.1995, M. Owada leg.; Osaka, Sakai, Mozu, 9♂3♀, 3–8.III.1975, M. Owada leg.; Hyogo, Kobe, Nunobikinotaki, 200 m, 37♂25♀, H. Kobayashi leg., 3♂5♀, 12.XII.1994, 32♂20♀, 2.II.2002, M. Owada leg. **Tsushima:** Toyotama, Waita, 1♂2♀, 17.XII.1992, H. Kobayashi & M. Owada leg. **Kyushu:** Saga, Takeo, Nagashima, 40 m, 9♂3♀, 19.I.2003, H. Kobayashi leg.; Kumamoto, Itsuki, Otaki, 600 m, 4♂2♀, 10.II.2003, H. Kobayashi leg.; Kumamoto, 180 m, 4♂, 13.I.2003, 8♂5♀, 17.II.2003, 2♂4♀, 22.III.2003, H. Kobayashi leg.; Kumamoto, Toyono, Yamazaki, 100 m, 2♂, 2.II.2003, H. Kobayashi leg.; Kumamoto, Nankan, Mt. Otsuyama, 200 m, 2♂, 25.I.2003, 1♂, 24.III.2003, 1♀, 6.IV.2003, H. Kobayashi leg.; Kumamoto, Itsuki, Otaki, 600 m, 3♀, 10.II.2003, 1♂1♀, 30.III.2003, H. Kobayashi leg.; Kumamoto, Itsuki, Tankaino, 1,100 m, 1♂1♀, 2.III.2003, H. Kobayashi leg.; Kumamoto, Kikuyo, Totsugi, 200 m, 1♂, 7.II.2003, H. Kobayashi leg. **Okinawa Is.:** Kunigami, Hiji, 250 m, 2♂1♀, 14.I.2002, H. Kobayashi leg., 1♀, 11.II.1996, M. Kimura leg.; Kunigami, Aha-rindo, 300 m, 1♂, 25.I.1993, M. Owada leg. All in NSMT.

Distribution. Japan: Honshu, Shikoku, Kyushu, Tsushima, the Ryukyus (Okinawa Is.) and Korea: Cheju Is.

Notes. As in the relationship between *R. scitula* and *R. perscitula*, this species and the following species, *R. taiwana*, form another sibling group in the genus *Rhynchaglaea*. In the male genitalia of this species, the juxta is very long, the cucullus is shorter, the sacculus is well developed, and a stout cornutus is absent, while in *R. scitula* and *R. perscitula*, the juxta is short, the



Figs 40–42. Female genitalia of *Rhynchaglaea*. 40, *R. scitula* (Butler, 1879), Okinawa Is.; 41, *R. perscitula* Kobayashi & Owada, sp. nov., Teng-zhi, Taiwan, paratype; 42, *R. labiscitula* Kobayashi & Owada, sp. nov., Sa Pa, Vietnam, paratype. Scale: 2 mm.

cucullus is elongate, the sacculus is not developed, and the stout cornutus is present. In the female genitalia of this species, the papillae anales are short and wide, the ductus bursae is short, and the cervix bursae is piled on the ductus bursae, while in *R. scitula* and *R. perscitula*, the papillae anales are long and acute, the ductus bursae is long, and the cervix bursae is not piled on the ductus bursae.

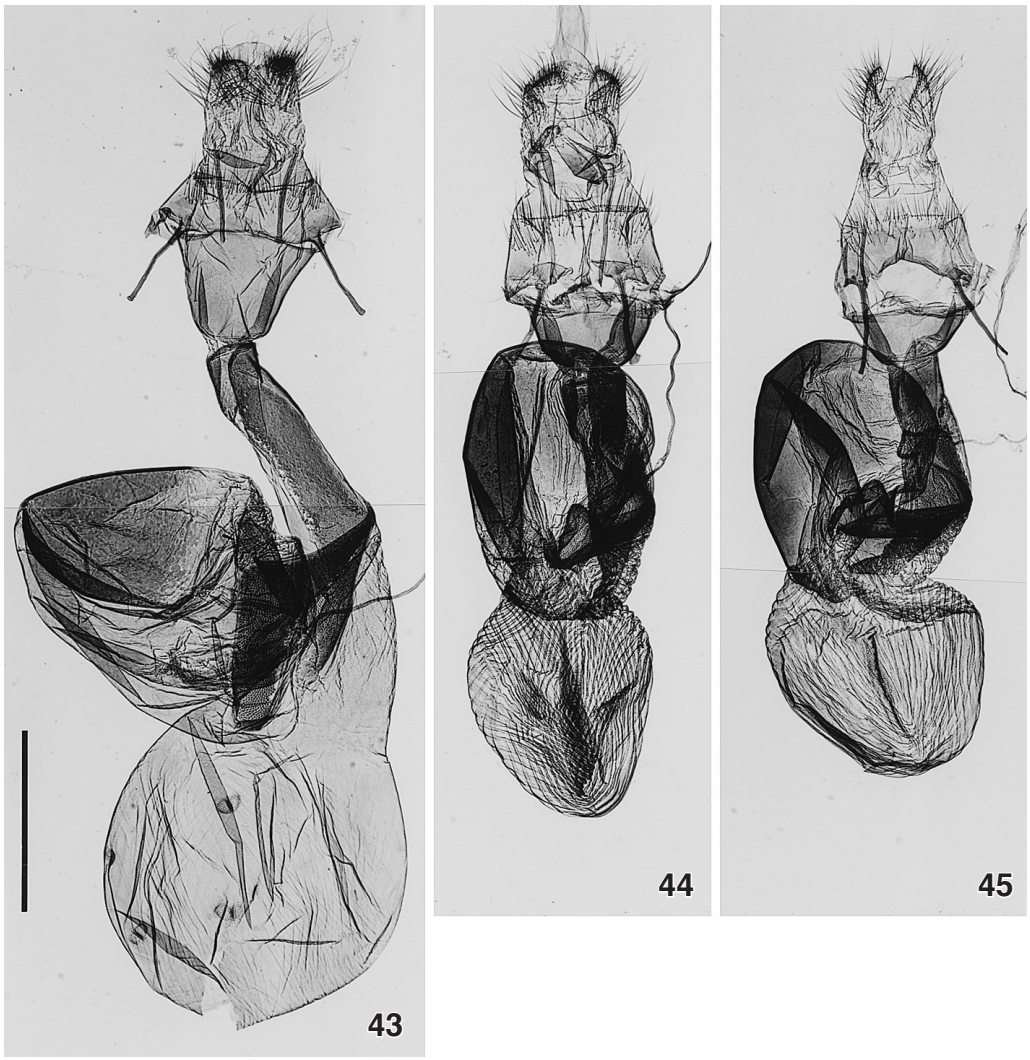
Rhynchaglaea taiwana Sugi, 1980

(Figs 20–24)

Rhynchaglaea taiwana Sugi, 1980: 201, fig. 15; Yoshimoto, 1988: 308; Chang, 1991: 171–172, part, figs [4–5], 332; Sugi, 1992: 197; Yoshimoto, 1993: 132, pl. 62, fig. 14; Hreblay & Ronkay, 1998: 224, figs 1127 (male genitalia), 1128 (female genitalia); Hreblay & Ronkay, 1999: 546.

Rhynchaglaea shyrshana Chang, 1991: 175, 333, fig. 119 (male genitalia). [Synonymized by Sugi, 1992: 197]

Diagnosis. This species is very similar to the preceding species, *R. fuscipennis*. The variability of the wing maculation in the two species is also similar. In the forewing of this species, however,

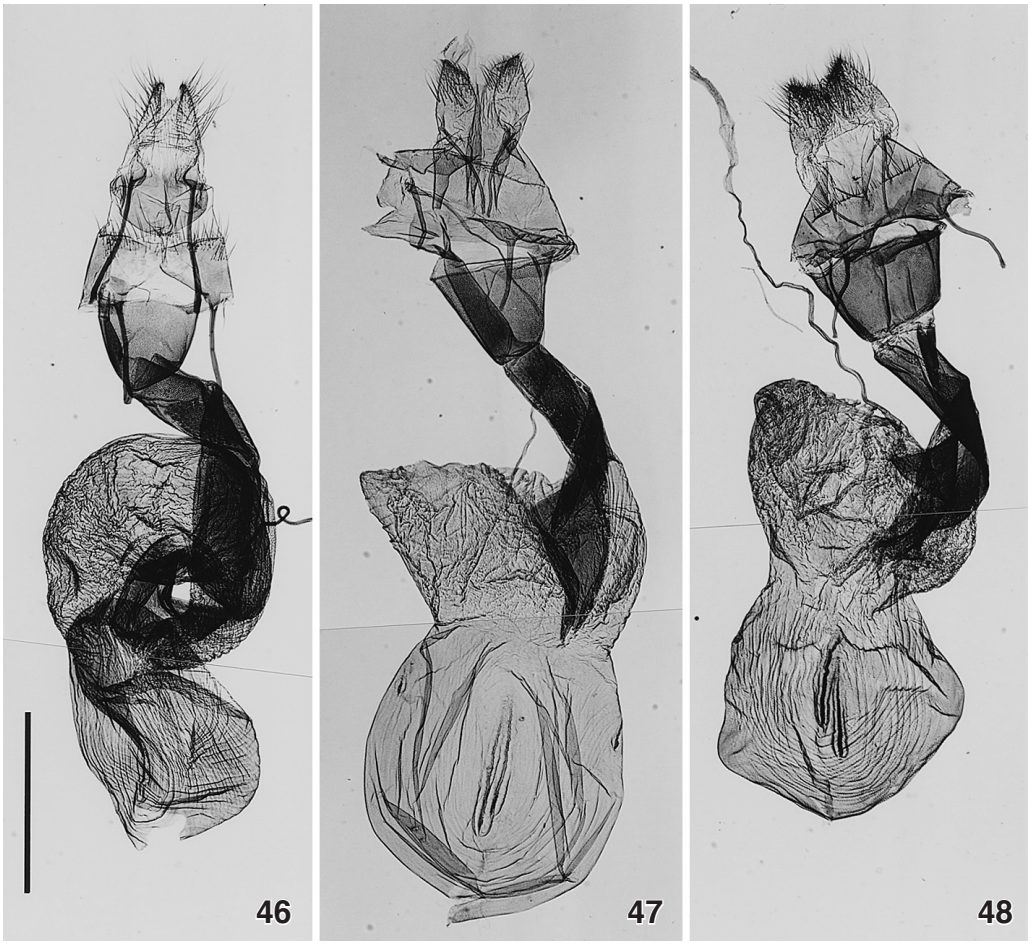


Figs 43–45. Female genitalia of *Rhynchaglaea*. 43, *R. h. hemixantha* Sugi, 1980, Nanling Nature Reserve, Guangdong; 44, *R. fuscipennis* Sugi, 1958, Tsushima; 45, *R. taiwana* Sugi, 1980, Lalashan, Taiwan. Scale: 2 mm.

the termen is strongly serrate, while it is straight or a little serrate in *R. fuscipennis*. In the male genitalia of this species (Fig. 36), the uncus is slender, the juxta has a distinct median ridge, and the basal swell of the sacculus is short and broad, while the uncus is broad, the juxta is smooth on surface, and the basal swell of the sacculus is rather long and bifurcate in *R. fuscipennis* (Fig. 35). The female genitalia of this species (Fig. 45) are almost identical with those of *R. fuscipennis* (Fig. 44), but the cervix bursae is rather large and round.

Specimens examined. Type series of *Rhynchaglaea shyrshana*. Holotype, male, Taiwan, Chiayi, Alishan, Shyrshan, 18.III.1991, B. S. Chang leg., 1282–42733; paratypes, 2♂, same data as holotype, in the collection of NMNS, Taichung.

Other specimens. **Taiwan:** Taoyuan, Fuhsing, Suleng, 5♂1♀, 25.I.1993, M. Owada leg.; Taichung, Anmashan, 1♀, 1.IV.1996, 2♂1♀, 18.I. 1997, 2♀, 1.II.1997, 1♂, 8.III.1997, 1♀, 2.IV.



Figs 46–48. Female genitalia of *Rhynchaglaea*. 46, *R. luteomixta* Hreblay & Ronkay, 1998, Suleng, Taiwan; 47, *R. terngjyi* Chang, 1991, Tengchih, Taiwan; 48, *R. nanlingensis* Owada & Wang, sp. nov., Mao'ershan, Guangxi, paratype. Scale: 2 mm.

1997, 1♂1♀, 23.XII.2000, 2♀, 31.I.2001, C. M. Fu leg.; Taichung, Taiping, 450 m, 1♀, 25.I.1993, C. M. Fu leg.; Taichung, Tahsuehshan, Mts. Anmashan, 2,000–2,300 m, 2♂1♀, 11–14.I.1992, M. Owada leg, genitalia slide No. HK956♂; Taoyuan, Lalashan, 1,500 m, 2♀, 20–22.I.1991, M. Owada leg.; Ilan, Yuanshan, Fushan, 500 m, 1♂, 16–17.I.1992. M. Owada leg.; Ilan, Szyuanyakou, 1,800–2,000 m, 2♂, 11.XII.1998, M. Owada leg., 3♀, 9.XII.1996; Hualien, Tayuling, 1 ex., 5.III.1991, B. S. Chang leg.; Hualien, Tayuling, 1♀, 9–10.III.1980, T. Tanabe leg.; Nantou, Nanshan-xi, 900 m, 2♂, 13–14.I.1994, H. Kobayashi leg.; Nantou, Shishan, 2,375 m, 1♂1♀, 23.II.2003, H. R. Tzuoo leg.; Nantou, Lienhuachuh, 1♂, 22.I.1990, Y. B. Fan leg.; Taichung, Anmashan, 2,100 m, 1♂, 12.I.1992, H. Kobayashi leg.; Taichung, Pahsenshan, 1,000 m, 3♂, 12.III.2005, M. Owada leg.; Taoyuan, Shan-Baling, 1,000 m, 3♀, 14.I.1993, H. Kobayashi leg.; Chiayi, Alishan, Tatachia-Anpu, 1 ex., 16. III.1991, B. S. Chang leg.; Chiayi, Alishan, Teataajie Saddle (=Tatachia-Anpu), 1 ex., 14. XII.1991, B. S. Chang leg.; Chiayi, Alishan, 1♂, 24.III.1993, Y. B. Fan leg; Kaohsiung, Taoyuan, Tianchyr, 1♀, 24.III.1991, H. Y. Wang leg. **Guangdong:** Shaoguan, Nanling Natioinal Nature Reserve, 600–1,400 m, 7♂5♀, 25–30.XII.

2002, 18♂2♀, 20–24.II.2003, 4♂3♀, 29–31.III. 2003, 6♂2♀, 11–14.III.2004, genitalia slide HK983♂, 6♂4♀, 27–29.III.2004, Wang Min *et al.* leg.; Huizhou, Nankunshan, 900–1,000 m, 1♂, 2–3.I.2004, Wang Min *et al.* leg. **Guangxi:** Guilin, Nanling Mts., Mao'ershan, 500–1,400 m, 1♂, 26–29.III.2005, Wang Min *et al.* leg. **N. Vietnam:** Cao Bang, 2♂1♀, II.2001. All in the collections of IEBR, NMNS, NSMT, SCAU, and TFRI.

Distribution. Taiwan, Guangdong (new record), Guangxi (new record), N. Vietnam (new record), and Nepal.

Notes. This species is closely related to the preceding species, *R. fuscipennis* distributed in Japan and Korea, and was already recorded from Nepal by Hreblay & Ronkay (1999). In this paper, we record it from Guangdong and Guangxi, southern China, and northern Vietnam. These two species form a sibling group, and their distributional ranges are allopatric.

Rhynchaglaea luteomixta Hreblay & Ronkay, 1998

(Figs 25–26)

Rhynchaglaea luteomixta Hreblay & Ronkay, 1998: 223, 300, fig. 1126 (male genitalia), pl. 152, fig. 21 (male holotype).

Diagnosis. The wing maculation of this species is not so variable and rather similar to those of *R. fuscipennis* (Fig. 19) and *R. taiwana* (Fig. 22). The ground colour of forewing is tinged with reddish ochre and dark brown triangular shades are present at the dorso-basal and dorso-distal portions, respectively. The termen of forewing is strongly serrate, while it is straight or a little serrate in *R. fuscipennis*. In the male genitalia of this species (Fig. 37), the uncus is slender and simple, the valva is slender, the harpe is short and nearly straight, the costal process is well developed and nearly straight, and a stout cornutus is absent. In the female genitalia (Fig. 46), the papillae anales are rather slender, the ductus bursae has a kink, and the cervix bursae is large and round, and not so heavily sclerotized.

Specimens examined. Taiwan: Taoyuan, Fuhsing, Suleng, 1,000 m, 1♂1♀, 23.I.1992, M. Owada leg.; Taoyuan, Lalashan, 1,500 m, 1♀, 20–22.I.1992, M. Owada leg.; Ilan, Fushan, 2♂, 28.II.1995, S. S. Lu leg.; 1♀, 16.III.2004, Y. B. Fan leg., 1♀, 30.III.1995, A. Warneke leg. **Guangdong:** Shaoguan, Nanling Natioinal Nature Reserve, 600–1,400 m, 1♂, 27–29.III.2004, Wang Min *et al.* leg. **Guangxi:** Guilin, Mao'ershan, 1♂, 26–29.III.2005, Wang Min *et al.* leg. All in the collections of NMNS, NSMT, SCAU, and TFRI.

Distribution. Taiwan, Guangdong (new record), and Guangxi (new record).

Notes. This species was described on the basis of four males captured at two localities of Taoyuan County, Taiwan, in the middle of March, 1996. We found two female specimens, collected in Taoyuan at the end of January, in the NSMT collection, and the female genitalia are first illustrated herewith (Fig. 46). In addition to these specimens, we are able to add one more locality, Fushan in Ilan, from the collection of TFRI. This species is also distributed in Guangdong and Guangxi, southern China.

This species is similar to the *scitula-perscitula* sibling species in the slender papillae anales, and also similar to the *fuscipennis-taiwana* sibling species in lacking a stout cornutus. The short straight harpe and the kinked ductus bursae differ markedly from those of the latter.

Rhynchaglaea terngjyi Chang, 1991

(Figs 27–28)

Rhynchaglaea terngjyi Chang, 1991: 174, 332 (male genitalia); Sugi, 1992: 197.

Diagnosis. Wingspan is 31–32 mm and forewing length is 14 mm in male (Fig. 27). In female (Fig. 28) wingspan 33 mm and forewing length 15 mm. Male and female genitalia are as shown in Fig. 38 and Fig. 47, respectively. The wing maculation of this species is distinct among the species of *Rhynchaglaea*. In the male geni-

talia, the process of costa is absent, and the long straight process of sacculus is present. In the female genitalia, the membranous cervix bursa is unique.

This species is somewhat similar in external appearance to Nepalese *R. nigromaculata* and Vietnamese *R. discoidea*, in which the costal process of the male genitalia is also absent. They may be related to some extent, but are not so close. In the male genitalia of *R. nigromaculata* (Hreblay & Ronkay, 1998, fig. 1124), the harpe is very long and curved, and the ampula and process of sacculus are absent. In the male genitalia of *R. discoidea* (Hreblay, Peregovits & Ronkay, 1999, fig. 57), the uncus is markedly broad and the ampula and process of sacculus are also absent.

Specimens examined. Type series of *Rhynchaglaea terngjyi*. Holotype, male, Kaohsiung, Taoyuan, Terngjy, 22.III.1991, H. Y. Wang leg., 1282–42718; paratypes, 5♂, same data as holotype, in NMNS, Taichung.

Other specimen. **Taiwan:** Kaohsiung, Tengchih, 1♀, 20–25.III.1989, C. S. Lin leg., in NMNS.

Notes. *Rhynchaglaea terngjyi* was described on the basis of six males captured in the southern part of Taiwan, Terngjy, 1,500 m, Kaohsiung. The name of the type locality "Terngjy" is now spelled Tengzhi, Tengjhih, or Tengchih (see Fu & Tzuoo, 2004, p. 14). An additional female specimen was collected by C. S. Lin at the type locality, and the genitalia, dissected by L. Ronkay, are illustrated in this paper (Fig. 47). We have not detected other record so far, and this species may be restricted to southern mountains of Taiwan.

Rhynchaglaea nanlingensis Owada & Wang, sp. nov.

(Figs 29–30)

Description. *Male* (Fig. 29). Wingspan 30–33 mm. Forewing length 15–16 mm. Antenna filiform. Patagium and thorax fuscous brown. Forewing ground color fuscous brown, with termen serrate. Subterminal line ochre, starting obliquely from costa, straight from R_4 to CuA_2, then retracted inwards, ending near tornus. Postmedial and antemedial lines indistinct. Reniform stigma tiled with five small black tiles; orbicular stigma concolorous with the ground colour, a large trapezoidal black mark present between the stigmata. A small black point touching the proximal side of the orbicular stigma. Dorso-basal black mark large and conspicuous. Hindwing dark fuscous brown, termen crenulate, cilia light brown.

Female (Fig. 30). Wingspan 32–33 mm. Forewing length 15–16 mm. Wing maculation almost same as that of male.

Male genitalia (Fig. 39). Uncus slender, simple, and hairy. Peniculus protruding abruptly, rectangular. Juxta rather large, almost triangular with round corners. Valva narrowly tapering in distal one third, cucullus rather small, with about twelve coronal spines. Small triangular projection present at middle of costa; harpe slender, long and a little curved; costal process absent, process of sacculus long, nearly straight, extending to before cucullus. Aedeagus slightly curved ventrad, with a long horn-like cornutus.

Female genitalia (Fig. 48). Papillae anales short. Antrum short and wide, ductus bursae long, kinked at middle; cervix bursae not sclerotized, rather round, consisting of thick furrowed membrane.

Diagnosis. This species is very similar to the preceding species, *R. terngjyi*, and considered to be a sibling species of it. Their male genitalia are almost identical, but the process of sacculus of this species is evidently shorter than that of *R. terngjyi*, i.e., the apex slightly extends beyond the middle of valva in *R. nanlingensis*, and is closer to the cucullus in *R. terngjyi*. We examined four male genitalia of this species and two of *R. terngjyi*, and found the stability of this feature. In addition to this, the basal part of valva is broader and the length of valva is shorter in proportion in this species. In the female genitalia, the ductus bursae is a little shorter than that of *R. terngjyi*, and the shape of cervix bursae is a littler different.

Type series. Holotype—male (Fig. 29), S. China, Guangdong, Shaoguan, Nanling Nature

Reserve, 1,500 m, 25–30.XII.2002, Wang Min *et al.* leg., in SCAU, Guangzhou. Paratypes—**Guangdong:** 1♂, same lacality and date as holotype, same locality, 3♂, 20–24.II.2003, 1♀, 29–31.III.2003, 6♂, 11–14.III.2004, Wang Min *et al.* leg. **Guangxi:** Guilin, Mao'ershan, 500–1,400 m, 6♂2♀, 26–29.III.2005, Wang Min *et al.* leg. All in the collection of SCAU.

Distribution. Guangdong and Guangxi, S. China.

Notes. This species can be considered a subspecies of *R. terngjyi*, in view of the total similarity of external and genitalic features. In this study, however, we regard the stable difference in the process of sacculus as a good specific feature. They are considered to be allopatric sibling species separated by the Taiwan Channel and not distributed in Japan. It is worth noting that the other two sibling species groups, the *scitula-perscitula* group and the *fuscipennis-taiwana* group, are separated by the strait between the Ryukyu Islands and Taiwan.

List of the other species of *Rhynchaglaea*

In the genus *Rynchaglaea*, there are three more species, which are not dealt with in this study.

Rhynchaglaea nigromaculata Hreblay & Ronkay, 1998: 221–223, figs 1124–1125 (male and female genitalia), pl. 152, fig. 22 (adult, paratype). Distribution: Nepal.

Rhynchaglaea discoidea Hreblay, Peregoviz & Ronkay, 1999: 50–53, figs 57–58 (male and female genitalia), 145 (adult, holotype). Distribution: Vietnam and Thailand.

Rhynchaglaea megascripta Hreblay & Ronkay, 1998: 222–223, fig. 1120 (male genitalia), pl. 152, fig. 19 (adult, holotype). Distribution: Nepal.

Acknowledgements

We wish to express our hearty thanks to the following researchers and gentlemen for their kind aid in our field and museum investigations: Mr Gong Yuening, the director of the Nanling National Nature Reserve, Shaoguan, Dr Jung-Tai Chao, Messrs Wen-Chi Yeh and Yi-Ming Chen, TFRI, Taipei, Dr Chun-lin Li, National Taiwan University, Taipei, Messrs Yasunori Kishida, Katsumi Yazaki, Kiyoshi Horie, Koji Suzuki, Tokyo, Dr Utsugi Jinbo, Tokyo University, Dr Hideo Nakajima, Yokohama, Mr Masaaki Kimura, Naha, and students in the Laboratory of Insect Ecology, SCAU, Guangzhou. We also indebted to Dr Shun-Ichi Uéno, NSMT, Tokyo, for reading the manuscript of this paper.

References

Butler, A. G., 1879. Description of new species of Lepidoptera from Japan. *Annals & Magazine of Natural History*, (5), **4**: 349–374, 437–457.

Chang, B. S., 1991. Illustrations of Moths of Taiwan, (5). 366 pp. Taiwan Museum, Taipei. (In Chinese)

Draudt, M., 1934–1938. Noctuidae. *In*: Seitz, A. (ed.) *Macrolepidoptera of the World*, 3 (*Suppl.*). Pp. 96–333. Alfred Kernen, Stuttgart.

Fu, C. M. & H. R. Tzuoo, 2002. Moths of Anmashan, Part 1. 163 pp., 36 pls. Taichung Nature Research Society, Taichung.

Fu, C. M. & H. R. Tzuoo, 2004. Moths of Anmashan, Part 2. 263 pp., pls 37–60. Taichung Nature Research Society, Taichung.

Hampson, G., 1906. Family Noctuidae, subfamily Cuculliinae. *Catalogue of the Lepidoptera Phalaenae in the Collection of the British Museum*, **6**: [i]–xiv, 1–532, 1 table, pls 96–107.

Hreblay, M., L. Peregovits & L. Ronkay, 1999. New genera and species of Noctuidae from Vietnam, Thailand and Nepal. *Acta Zoologica Academiae Scientiarum Hungaricae*, **45**: 1–96.

Hreblay, M. & L. Ronkay, 1998. Noctuidae from Nepal. *In*: Haruta, T., (ed.) Moths of Nepal, Part 5. *Tinea*, **15** (Suppl. 1): 117–310, pls 144–157.

Hreblay, M. & L. Ronkay, 1999. Neue trifide Noctuidae aus himalayanischen Raum und der sudostasiatischen Region (Lepidoptera: Noctuidae). *Esperiana*, **7**: 485–620, pls 14–21.

Kononenko, V. S., S. B. Ahn & L. Ronkay, 1998. Illustrated catalogue of Noctuidae in Korea. *In*: Park, K. T., (ed.) *Insects of Korea, Series 3*. 507 pp. Korea Research Institute of Bioscience and Biotechnology & Center for Insect Systematics, Chuncheon.

Matsumura, S., 1926. New species of Noctuidae from Japan and Corea. *Insecta Matsumurana*, **1**: 53–62.

Peregovits, L., L. Ronkay & A. Vojnits, 1995. Zoological collectings by the Hungarian Natural History Museum

in Korea, No. 128. A report of the collecting in the nineteenth expedition. *Folia Entomologica Hungarica*, **56**: 179–183.

Sohn, J. C., L. Ronkay & S. W. Choi, 2005. First report of five noctuid species (Lepidoptera, Noctuidae) from Korea. *Journal of Asia-Pacific Entomology*, **8**: 147–152.

Sugi, S., 1958. Notes on some genera and species of the Japanese Cuculliinae (Lepidoptera, Noctuidae). *Tinea*, **4**: 200–222, 6 pls.

Sugi, S., 1980. New gerera and new species of Cuculliinae (Lepidoptera, Noctuidae). *Tyô to Ga*, **30**: 196–204.

Sugi, S., 1982. Noctuidae, excluding Herminiinae. *In*: Inoue, H., S. Sugi, H. Kuroko, S. Moriuti, A. Kawabe & [M. Owada] (eds) *Moths of Japan.* Vol. 1, pp. 669–913; Vol. 2, pls 164–223. Kodansha, Tokyo. (In Japanese)

Sugi, S., 1990. Records of *Rhynchaglaea scitula* (Butler) (Noctuidae) from Okinawa and Iriomote, the Ryukyus. *Japan Heterocerists' Journal*, (157): 123. (In Japanese)

Sugi, S., 1992. Cuculliinae (Noctuidae). *In*: Heppner, J. B. & H. Inoue (eds) *Lepidoptera of Taiwan*, Vol. 1. Pp. 197–198. Association for Tropical Lepidoptera, Gainesville, Florida.

Yoshimoto, H., in Y. Kishida & H. Yoshimoto, 1988. Notes on some moths from Taiwan VIII. *Japan Heterocerists' Journal*, (145): 307–310. (In Japnasese with English summary)

Yoshimoto, H., 1993. Noctuidae. *In*: Haruta, T. (ed.) Moths of Nepal, Part 2. *Tinea*, **13** (Suppl. 3): 124–141, pls 61–62.

東および東南アジアに生息する冬期に活動するキリガ，チャマダラキリガ属（鱗翅目，ヤガ科）の研究

大和田守・小林秀紀・王　敏・傅　建明・左　漢榮・林　政行・詹　美鈴
Ta Huy Thinh・陳　刘生・吉本　浩

東および東南アジアのチャマダラキリガ属 *Rhynchaglaea* の以下の種の再検討を行った．チャマダラキリガ *R. scitula*（Butler, 1879），分布：日本，韓国； *R. perscitula* Kobayashi & Owada, sp. nov., 分布：台湾，中国広東省；*R. labiscitula* Kobayashi & Owada, sp. nov., 分布：台湾，ベトナム；*R. hemixantha hemixantha* Sugi, 1980, 分布：台湾，中国広東・広西省（新記録），ベトナム（新記録）；クロチャマダラキリガ *R. fuscipennis* Sugi, 1958, 分布，日本，韓国；*R. taiwana* Sugi, 1980, 分布：台湾，中国広東・広西省（新記録），ベトナム（新記録），ネパール；*R. luteomixta* Hreblay & Ronkay, 1998, 分布：台湾，中国広東・広西省（新記録）；*R. terngjyi* Chang, 1991, 分布：台湾；*R. nanlingensis* Owada & Wang, sp. nov., 分布：中国広東・広西省．この中には異所的な姉妹種群が3組認められ，2組（the *scitula-perscitula* and *fuscipennis-taiwana* groups）は, 台湾と琉球列島で分かれ，もう1組（the *terngjyi-nanlingensis* group）は台湾海峡が分布の境界で，日本には分布していない．