

**PLATYPLECTRUS MEDIUS, NEW SPECIES, AND NEW RECORDS
OF EUPLECTRUS FROM SOUTH KOREA
(INSECTA: HYMENOPTERA: EULOPHIDAE)**

Chao-dong Zhu and Da-Wei Huang

Institute of Zoology, Chinese Academy of Sciences, Beijing, 100080, China.

Email: huangdw@panda.ioz.ac.cn

ABSTRACT. – *Platyplectrus medius*, a new species of Eulophidae from South Korea, is described. Compared with the other species of the genus, it is closest to *P. flavus* Wijesekara and Schauff. We also report other new records of *Euplectrus* Westwood. *Euplectrus maculiventris* Westwood is removed from synonymy with *E. bicolor* (Swederus). Relationships between species reported in this study and others are discussed.

KEY WORDS. – *Platyplectrus medius*, *Euplectrus*, new species, new records, South Korea, Hymenoptera, Eulophidae, taxonomy.

INTRODUCTION

Recently, we presented a set of papers devoted to the Eulophinae in China and adjacent countries (Zhu et al. 1999, 2000a, b; Zhu & Huang, 2001a, b). Special attention was paid to species of the tribe Euplectrini, the hind tibia of which has at least one spur longer than the first tarsomere. A key to genera of Euplectrini in China and a revision of Chinese *Euplectromorpha* Girault were presented recently by Zhu & Huang (2001a). Members of this tribe have been also reported from other countries or regions in East and Southeast Asia including China - Taiwan, India, Indonesia, Japan, Philippines, Sri Lanka, South Korea, and Thailand. In this tribe, *Euplectrus* Westwood and *Platyplectrus* Ferrière are dominant genera which are widely distributed. *Euplectrus* includes 89 species, while *Platyplectrus* includes 35 species worldwide (Noyes, 1998). For both genera, there have no updated key to species in East and Southeast Asia since Ferrière (1941).

Here we describe *Platyplectrus medius*, a new species, and report three species of *Euplectrus* newly recorded from South Korea. Paik (1990) reported *E. bicolor* (Swederus) from South Korea. We also report this species from additional localities in South Korea. We also compare *Euplectrus bicolor* (Swederus) with European, Japanese and Chinese material, and extend its distributional range, report three species of *Euplectrus* from South Korea and some other

countries, and report differences between *E. bicolor* and *E. maculiventris* Westwood.

MATERIAL AND METHODS

Depositories. – This study is based on specimens deposited in the following collections: 1) Institute of Zoology, Chinese Academy of Sciences (IZCAS); 2) The Natural History Museum, London, UK (BMNH); 3) Insect Collection, Taiwan Agricultural Research Institute (TARI); 4) Systematic Entomology, Faculty of Agriculture, Hokkaido University (SEHU).

Terminology and measurements. – Morphological terms follow Gibson et al. (1997). Absolute measurements, in millimeters (mm) are used for the body and fore wing length. For all other dimensions, relative measurements are used.

SYSTEMATICS

FAMILY EULOPHIDAE

Platyplectrus medius, new species
(Figs. 1-21)

Material examined. – Holotype – female (IZCAS) Suwon City, Kyunggi Prov., South Korea, coll. Quk-Seo. Ku., 25 Apr. 1994.

Paratypes – 6 females (IZCAS), Suwon City, Kyunggi Prov., South Korea, coll. Quk-Seo. Ku., 22 Apr. 1994.

Diagnosis. – 1) pronotum without distinct transverse carina anteriorly; 2) sublateral grooves on scutellum united posteriorly; 3) scutellum completely reticulate; 4) occiput rounded behind posterior ocelli, without occipital carina; 5) axilla bare; 6) two longitudinal carinae present on metasternum.

Description. – Holotype female – From the frontal view: head (Fig. 1) wider than high; vertex smooth, rounded into face anteriorly; face almost smooth, with area close to vertex weakly reticulate; toruli nearly at the lower margin of eyes; epistomal sulcus groove-shaped, smooth inside (Figs. 2, 3a); eyes setose, with inner margins nearly parallel; both corners of clypeus with distinct flaps at base of mouth parts (Fig. 3b); inner margins of mandibles with dense setae forming brushes (Fig. 3c); glossa with many small, regularly arranged, quadrate plates (Fig. 3d). From the posterior view: occipital carina absent from behind posterior ocelli; occiput with irregular, engraved reticulations extensively; post occipital carina strong, continuous with pleurostomal carina (Fig. 4); one pair of pits present midway between foramen magnum and base of mouth parts (Fig. 5); cardo and stipes smooth, while mentum weakly reticulate; maxillary palpi 2-segmented, labial palpi 1-segmented, cylindrical, with long setae at apex of each palpus (Fig. 5). Antenna: anelli 2-segmented, with 1st segment bare, while the 2nd setose (Fig. 6); funicle 4-segmented, with 1st segment more than 1.5 times length of width, 2nd subquadrate, 3rd and 4th quadrate (Fig. 7); clava 3-segmented (Fig. 8).

From the dorsal view: pronotum extensively with engraved reticulations, without distinct, transverse carina anteriorly; mid lobe of mesoscutum with engraved reticulations, with scattered setae on anterior half, with only 2 pairs of stronger setae on posterior half; a longitudinal carina present on mid lobe of mesoscutum, distinct at least from posterior margin of mesoscutum to anterior margin of setose region (Fig. 9); axillae weakly advanced, reticulate, without setae (Figs. 9, 10); scutellum distinctly engraved reticulate between sublateral grooves, with two pairs of strong setae; sublateral grooves on scutellum wide, in contact with each other posteriorly on scutellum; a few short carinae present in sublateral grooves at juncture between scutellum and axillae; most of sublateral grooves with same type of reticulations as those on scutellum (Fig. 11); dorsellum distinctly reticulate, with an unusually broad groove between posterior margin of dorsellum and propodeum, in which groove,

several longitudinal short carinae present (Fig. 11a); median carina on propodeum strong, with clearly raised cup anteriorly; a broad groove present between median panel of propodeum and callus or along posterolateral margins of propodeum (Fig. 11b); median panel and callus of propodeum smooth, while posterolateral margins and posterior end of propodeum reticulate; propodeal spiracle large, elliptical, very close to anterior margin of propodeum. From the lateral view (Fig. 12): acropleural sulcus smoothly continuous with mesopleural sulcus; mesopleural sulcus indistinct medially, joining transepisternal sulcus along posterior one-third of latter (Fig. 12a); mesopleuron extensively smooth, with upper part of upper mesepisternum weakly reticulate; no sulcus present along anterior margin of mesopleuron to join acropleural sulcus and transepisternal sulcus; transepimeral sulcus almost absent, with only one small depression (Fig. 12b). From the ventral view: ventral parts of propleura in contact with each other medially; posterior margin of propleura in a line (Fig. 13); lower part of transepisternum smooth, with a distinct longitudinal groove medially and a transverse groove posteriorly (Fig. 14); strong setae present along posterior transverse groove on lower part of transepisternum; two longitudinal carinae present on metasternum medially (Fig. 14a); transverse carina between metasternum and ventral part of propodeum form an angle medially; short median carina present on ventral part of propodeum (Fig. 14b).

Fore wing (Fig. 15): costal cell broad; speculum medium sized, closed on lower side. Fore legs (Fig. 16): one spur shorter than 1st tarsomere and pegs present at apex of tibia; one oblique line of pegs present on the 1st tarsomere of foreleg. Mid legs (Fig. 17): one spur as long as 1st tarsomere present at apex of tibia. Hind legs (Figs. 18, 19): one spur nearly as long as total length of 1st and 2nd tarsomere and another as long as 1st tarsomere present at apex of tibia (Fig. 19a); pegs distinct at apex of tibia, but absent from any tarsomere (Fig. 19b).

From the dorsal view (Fig. 20): petiole transverse, smooth; first tergite of metasoma smooth, longest, around one-third total length of metasoma. Ventral view of metasoma see Fig. 21.

Measurements. – Length: body 2.4–3.0 mm, forewing 2.2–2.8 mm.

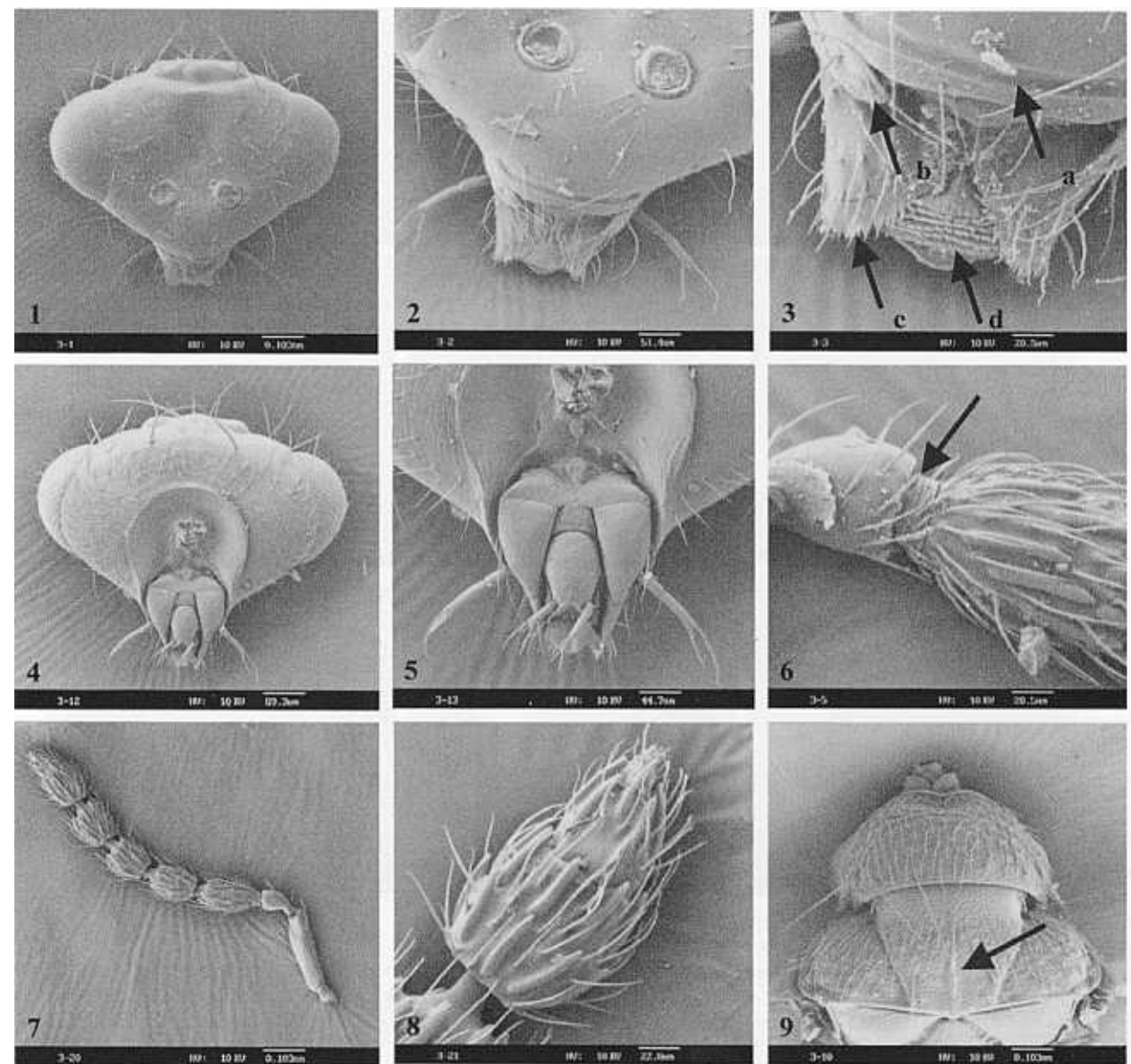
Coloration. – Body predominantly yellow, except the following parts of exceptions: occiput around post-occipital carina black; scutellum completely yellow to extensively black; anterior part of sublateral grooves

on scutellum between mid lobe of scutellum and axillae always black; dorsellum and propodeum completely yellow to extensively dark; mesopleuron partly to extensively black; hind coxae partly to completely black; metanotum yellow with 3rd and 4th tergites always dark; small dark patches present on lateral parts of metanotum.

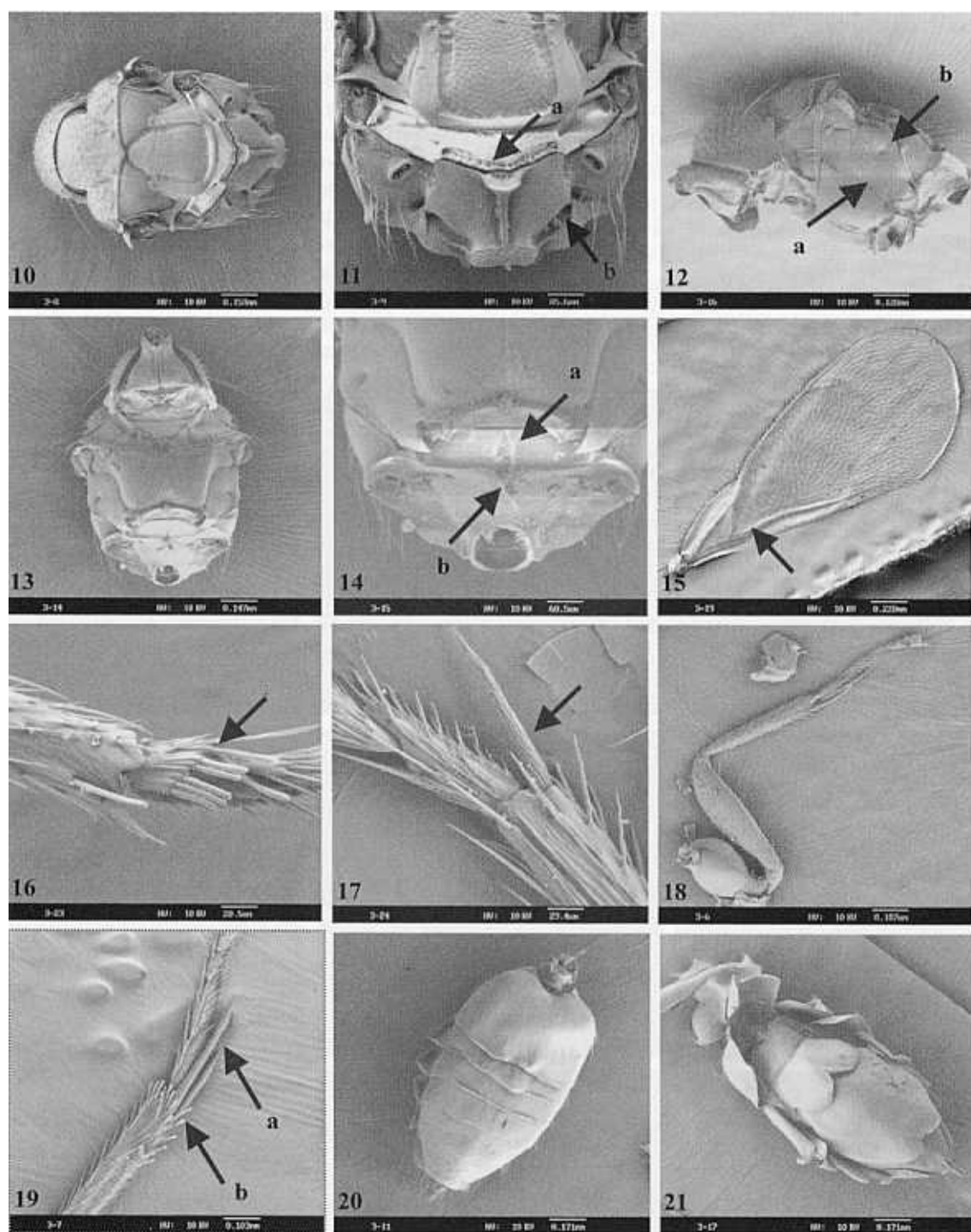
Male. – Unknown.

Etymology. – This species is named for unusual longitudinal median carina on mid lobe of mesoscutum (medius = median).

Remarks. – *Platyplectrus medius* is closest to *P. flavus* Wijesekara & Schauff (1994), and both species share the following characters: longitudinal carina present on mid lobe of mesoscutum; occipital carina absent; post occipital carina present; pronotum without transverse carina anteriorly; antenna with two anelli; petiole transverse. But it can be differentiated from the latter by having: median carina on propodeum cup-shaped at apex, not developed into translucent protuberance at anterior end of propodeum; body yellow with occiput and anterior part of sublateral grooves on scutellum always black; first funicular segment nearly 1.5 times as long as wide, while other ones subquadrate.



Figs. 1-9. *Platyplectrus medius*, new species: 1. head in frontal view; 2. lower face in frontal view; 3. mouth parts in frontal view – a. groove-shaped epistomal sulcus, b. flaps overlapping base of mandible, c. dense setae on inner margin of mandible; 4. head in posterior view; 5. mouth parts in posterior view; 6. pedicel, anelli, and first funicular segment; 7. antenna; 8. clava; 9. pronotum and mesoscutum in dorsal view.



Figs. 10-21. *Platyplectrus medius*, new species: 10. mesosoma and propodeum in dorsal view; 11. posterior parts of scutellum, dorsellum, and propodeum in dorsal view – a. broad groove along posterior end of dorsellum, b. broad groove between median panel and callus of propodeum; 12. mesosoma and propodeum in lateral view – a. mesopleural sulcus meeting with transepisternal sulcus at posterior half of latter, b. transepimeral sulcus reduced, small depression shaped; 13. mesosoma and propodeum in ventral view; 14. posterior parts of lower mesepisternum, metanotum, and propodeum in ventral view – a. two carinae on ventral part of metanotum, b. transverse carinae between metanotum and ventral part of propodeum forming an angle; 15. forewing; 16. apex of fore tibia and first tarsomere; 17. apex of mid tibia and first tarsomere; 18. hind leg; 19. apex of hind tibia and first tarsomere – a. one hind tibial spur nearly as long as 1st plus 2nd tarsomere, another nearly the length of 1st, b. regular pegs at apex of hind tibia; 20. petiole and metasoma in dorsal view; 21. metasoma in ventral view.

***Euplectrus bicolor* (Swederus, 1795)**

Pteromalus bicolor Swederus, 1795: 204. Transferred into *Eulophus* by Walker, 1839: 173; into *Euplectrus* by Haliday, 1844: 297. Liao et al., 1987: 117-118 [in part]. *Elachertus albiventris* Spinola, 1811: 151. Transferred into *Eulophus* by Haliday, 1842; into *Euplectrus* by Walker, 1872b: 112. Synonymized by Bouček & Askew, 1968: 15.

Euplectrus intactus Walker, 1872a: 102. Synonymized by Bouček & Askew, 1968: 15.

Material examined. – Deposited in IZCAS: 2 females, South Korea: Kangwon Prov.; 4 females, 2 males, Beijing; 1 female, Tianjin; 5 females, 3 males, Nei Mongol; 1 female, 10 males, Liaoning; 9 males, 8 females, Jilin; 9 males, 19 females, Heilongjiang; 2 females, Fujian; 16 males, 2 females, Shandong; 1 female, Henan; 1 female, Hubei; 2 females, Hunan; 1 female, Sichuan; 24 females, 2 males, Gansu; 10 females, Gansu.

External material deposited in SEHU: 1 female, South Korea: Mt. Sudo-San; 1 male, 4 females, Czech; 40 females, 5 males, Japan: various regions; 1 female, CANADA: Quebec.

Determined specimens deposited in BMNH compared: 1 female, B. Cooke col. 84-52; 1 female, SWEDEN SK. Kivik, 16 Jul.1938, D.M.S.P. & J.F.P., B.M. 1938-414; 2 females, ENGLAND: Berks, Ascot, coll. A. Montagne, 2 Sep.1975, ex. *Mamestra brassicae*, det. Z. Bouček 1977; 1 male, 2 females, ENGLAND: Berks, Silwood Park, coll. A. Montagne, 14 Aug.1975, ex. *Mamestra brassicae*, det Z. Bouček 1977.

Diagnosis. – Gaster broadly black at apex and on sides; female head black with only supraclypeal area and clypeus yellow or reddish brown, male with part of gena also yellow; scutellum strongly striate longitudinally; mid lobe of mesoscutum regularly reticulate, without longitudinal median carina; three pairs of setae present on mid lobe of mesoscutum.

Remarks. - This species is morphologically closest to *E. liparidis* Ferrière, 1941, but the latter is quite different in having: 1) metasoma yellow at apex and with a broad dark band before apex; 2) both sexes with supraclypeal area, clypeus, and at least part of gena yellow.

We examined all specimens Liao et al. (1987) reported from China as *E. bicolor* and compared them to the loans of determined specimens of *Euplectrus* from BMNH. We found out there are more than one species among them.

Host range. – Lepidoptera: Geometridae, Gracillariidae, Noctuidae, Pyralidae, Tortricidae.

Distribution. – New records: China- Beijing, Tianjin, Nei Mongol, Fujian, Shandong, Henan, Hubei, Hunan, Guangdong, Hainan, Sichuan, Yunnan, Gansu; Canada, Korea. Other regions reported include: 1) China: Anhui, Heilongjiang, Liaoning, Jilin, Shandong; 2) Australian/Pacific – Australia; 3) Palearctic – Bulgaria, Czech, Denmark, France, Germany, Hungary, Italy, Japan, Korea, Russia, Somali, Sweden, Turkey, Turkmenistan, U. K.; 4) Afrotropical – Seychelles Islands; 5) Nearctic – U. S. A.; 6) Neotropical - Caribbean.

***Euplectrus euplexiae* Rohwer, 1921**

Euplectrus euplexiae Rohwer, 1921: 135.

Material examined. – Deposited in IZCAS: 1 female, Ssangyong, Kangwon Prov., South Korea, coll. Quk-Seo. Ku, 24 May.1995; 1 female, Jiangxi, Yichun, 18 Sep.1973; 3 females, Jiangxi, Linchuan, Hedong, coll. Chang Peng-yang, 13 Oct.1989, ex. *Spodoptera exigua* (Hubner); 2 females, Jiangxi, Dengjiabu, coll. Zhang Zhong-ying, 10 Oct.1992, ex. *Margaronia pyloalis* Walker; 2 females, Jiangxi, Yichun, Aoyang coll, Liu Bao-hua, 5 Apr.1980; 1 female, Hainan, Lingshui, Diaoluo Shan, coll. Li Chang-fang, 14 Apr.1984; 2 females, Hainan, Lingshui, Diaoluo Shan, coll. Li Chang-fang, 17 Apr.1984.

Deposited in SEHU: 1 female, Uganda: Kibale, Forest nr. Fort Portal, coll. H. Falke, Mar.1973.

Determined specimens deposited in BMNH compared: 2 females paratypes, India: Haryana, Nissar, coll. K. B. Rustongi, 4 Aug.1978, ex. semilooper on greengram; 1 female, India: Missar, coll. K. B. Rustongi, 4 Aug.1978, No.29, ex. *Plusia orichalcea* on moon, C.I.E.A. 13696, det. Z. Bouček in 1982.

Diagnosis. – Scutellum reticulate; F2-4 slightly longer than broad; two minute setae present between posterior ocelli; legs including coxae yellow; first hind tarsomere elongate, more than eight times as long as broad; mid lobe of mesoscutum regularly reticulate, with only 3 pairs of setae, without short median carina posteriorly; head black, yellow at clypeus, supraclypeal area, and at least part of gena.

Remarks. - Wijesekara & Schauff (1994) presented a diagnosis and a SEM picture of this species. They stated it has incomplete median carina distinct on posterior 0.33 of mid lobe of mesoscutum. In Ferrière (1941), this species is said to have no median line on mesoscutum. We have examined several determined female specimens by Bouček and found out the median carina absent from mid lobe of mesoscutum. According to Ferrière's (1941) description, we considered *E. euplexiae* is very close to *E. hargreavesi*.

Host range. – Lepidoptera: *Condica capensis*, *Condica conducta*, *Euplexia capensis*, *Helicoverpa armigera*, *Selepa docilis*, *Spodoptera mauritia* (Noctuidae). Newly recorded from *Plusia orichalcea* (Fabricius), *Spodoptera exigua* (Hubner) (Noctuidae) and *Margaronia pyloalis* Walker (Pylalidae).

Distribution. – New records: China- Jiangxi, Hainan; Uganda; South Korea. Other countries in Oriental regions reported: India.

Euplectrus liparidis Ferrière, 1941

Euplectrus liparidis Ferrière, 1941: 43.

Material examined. – Deposited in IZCAS: 5 males, Beijing, Changping, Qinglongqiao, coll. Zhu Chao-dong, 26 Sep.1998; 2 females, Beijing, Yingtaogou, coll. Huang Da-Wei, 9 Jul.1984; 2 females, Beijing, Badaling, coll. Huang Da-Wei, 16 May 1984; 1 females, Jiangsu, Nanjing, coll. Zhu Chao-dong, 11 Sep.1997; 1 female, Jiangxi, Liantang, 25 Jul.1984, ex. Larvae of *Plusia agnata* Staudinger; 1 male, 3 females, Jiangxi, Liantang, ex. Larvae of *Plusia agnata*, coll. Shen R.-W., 12-29 Jul.1984; 1 females, Qinghai, Huzhu, Beishan, coll. Zhu Chao-dong, 8 Jul.1997.

Deposited in SEHU: 1 female, Japan: Honshu, Ibaraki, Tsuchiura, coll. M. J. Sharkey, 21 Sep.1989, marsh & woods; 1 female, Czech: Moravia, Tvrdonic riv. Kyjovka, coll. L. Masner, 7 Aug.1991, screen sweep, floodrest, fraxinetum; 1 female, Canada: Quebec, Gateneau Park, Hull, coll. E. Ikeda, 28 Jul.1995.

Deposited in BMNH compared: 2 females paratypes, Algeria: Algiers, Bou Zegza Mts., coll. M. Delassus, Sep.1936, ex. *Liparidis dispar*.

Diagnosis. – Gaster yellow at apex and with a broad band dark before apex; both sexes with supraclypeal area, clypeus, and at least part of gena yellow; scutellum strongly striate longitudinally; mid lobe of mesoscutum regularly reticulate, with incomplete median carina posteriorly; five pairs of setae present on mid lobe of mesoscutum.

Remarks. - *Euplectrus liparidis* from Beijing, Qinghai in China, and Canada have gaster dark at base, on sides, near and at apex. One from Jiangsu has gaster only dark at base, and very narrowly on sides. Two specimens respectively from Czech, Japan, and South Korea agree well with paratypes.

In Ferrière's (1941) key to species of *Euplectrus*, *E. liparidis* is in same couplet of *E. hargreavesi*. But he relied much on the coloration of head, hind coxae, and metasoma and paid little attention to the strongly

striated scutellum. *E. bicolor* is the only another species in this genus having strongly striated scutellum. Basing on this study, we considered that, *E. liparidis* is more widely distributed other than Afrotropical regions and it is closely related to *E. bicolor*.

Host range. – Lepidoptera: *Lymantria dispar* (Lymantriidae). Newly recorded from larvae of *Plusia agnata* Staudinger (Noctuidae).

Distribution. – New records: China - Beijing, Jiangsu, Jiangxi, Qinghai; Canada; Japan; South Korea. Other countries in Palaearctic regions – Algeria, Czech, Slovakia, and Italy (Ferrière 1941; Bouček & Askew 1968; Herting, 1976; Trjapitzin, 1978).

Euplectrus maculiventris Westwood, stat. rev.

Euplectrus maculiventris Westwood, 1832: 128. Transferred into *Eulophus* by Haliday, 1842. Synonymized with *Euplectrus bicolor* (Swederus) by Bouček & Askew, 1968: 15.

Material examined. – Deposited in IZCAS: 1 female, Beijing, Badaling, coll. Huang Da-Wei, 16 May.1984; 1 female, Henan, Luchuan, Longyuwan, coll. Xiao Hui, 14 Jul.1996, 1400 m; 1 female, Sichuan, Youyang Xian, coll. Wang Shu-yong, 17 Jul.1989, 1250 m; 4 males, Sichuan, Nanping, Jiuzhaigou, coll. Wang Shu-yong, 7 Nov.1983, 2300 m; 1 male, Sichuan, Luding Xian, coll. Zhu Chao-dong, 12 Aug.1997; 1 female, Yunnan, Lijiang Diqu, Baishui, coll. Li Chang-fang, 7 Jul.1984, 2850 m; 1 female, Yunnan, Yongsheng, Liude, coll. Li Chang-fang, 8 Jul.1984, 2300 m; 1 male, Yunnan, Dieqing Zhou, Xiaozhongdian, coll. Li Chang-fang, 31 Jul.1984, 3200 m; 1 male, Yunnan, Dieqing Zhoucoll, Li Chang-fang, 4 Aug.1984, 2300 m.

Deposited in TARI: 1 female, C. Taiwan, Nantou Xian, Meifeng, coll. Lin K.-S. & Wang C.-H, 26 Aug. 1980, 2150 m.

Deposited in SEHU: 1 female, Czech: Central Bohemia, Praha-kunratice, coll. L. Masner, 17-24 Jul.1992; 6 females, Czech: Moravia, Palava nr. Mikulov, coll. L. Masner, 9 Aug.1991, 400 M; 2 males, 2 females, Czech: Moravia, Tvrdonice riv. Kyjovka, coll. L. Masner, 7 Aug.1991; 2 females, Japan: Kyushu, Fukuoka, Mt. Hiko, coll. M. J. Sharkey, 9-10 May.1989, 700 m; 1 female, Japan: Honshu, Ibaraki, Tsukuba, coll. M. J. Sharkey, 6-26 May.1989; 1 female, Japan: Honshu, Ibaraki, Tsukuba, coll. M. J. Sharkey, 11-18 Sep.1989; 1 female, Japan: Hokkaido, Sapporo, Jozankei, coll. K. Metoa & M. J. Sharkey, 20-31 Jul.1989, 350 m; 1 female, Malaysia: Sarawak, Sematin, coll. A. T. Pinnamore & C. Baxfield, 23 Feb.1987; 1 male, 1 female, South Korea: Mt. Sudo-San, Kyongsangbuk-Du, coll. K. Yamagishi, 23 Aug.1990, 400 m.

Determined specimens deposited in BMNH compared: 1 male, England: Berks, Wytham Wood, coll. Bouček, 26 Jul. 1964, det. Z. Bouček 1974; 1 female, Le Puy, coll. H. Maneval, 2 May. 1933, det. Ferrière as *Euplectrus bicolor*; Z. Bouček 1974 as *Euplectrus maculiventris*.

Diagnosis. – Mid lobe of mesoscutum distinctly reticulate, with additional setae to 3 pairs of longer setae anterolaterally, with median carina posteriorly; scutellum entirely with distinct reticulation; hind tarsi normal, 4th segment not much longer than 2nd one; gaster dark at apex; head with supraclypeal area, clypeus, and at least part of gena yellow or reddish brown.

Remarks. – Examination of *Euplectrus maculiventris* Westwood determined by Z. Bouček shows some differences between *E. bicolor* and *E. maculiventris*: latter species with scutellum distinctly reticulate, while *E. bicolor* with scutellum strongly striate longitudinally at least laterally. Extensive comparisons among long series of specimens found in China, Japan, Czech, South Korea, and several other countries confirmed our findings. We disagree with Bouček & Askew (1968) and treat *E. maculiventris* as a valid species.

Host range. – Unknown.

Distribution. – Newly recorded from China: Beijing, Henan, Taiwan, Sichuan, Yunnan; Czech; Japan; Malaysia; South Korea. Other regions are: 1) Nearctic – U. S. A.; 2) Palearctic – U. K..

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