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# A Systematic Study of the Subgenus *Seladonia* of the Genus *Halictus* in Asia (Hymenoptera, Apoidea, Halictidae) I *

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**Abstract.** A systematic study of the subgenus *Seladonia* Robertson, 1918 of the genus *Halictus* (Hymenoptera, Apoidea, Halictidae) is made based on mateial collected from Asia. Until now, 37 species were recorded from Asia. In the present study we treat material collected from a total of 13 countries such as Japan, N. Korea, S. Korea, Mongolia, China, Taiwan, India. Redescription for each species includes remarks, geographical distribution and floral associations with figures including genitalia is presented. In this paper 3 species are treated.

Key words: taxonomy, Hymenoptera, Halictidae, *Halictus*, *Seladonia*, revision, Asia.

## Introduction

The subgenus *Seladonia* Robertson, 1918 of the genus *Halictus* belongs to the family Halictidae and includes 88 known species (Michener, 1978) of dark green, blue or brassy metallic, medium to small sized bees. The subgenus *Seladonia* is characterized by the male metasomal sterum flat, not peculiarly depressed and the male gonostylus divided in two slender, not massive and triangular parts, with a clump of coarse setae on inner surface. It has the most widespread distribution in the subgenera of *Halictus* and is found in the Holarctic region, south in the Western Hemisphere to Brazil, in Africa to the Cape of Good Hope, and into India and Southeast Asia.

With respect to Asian *Seladonia*, Rossi (1792) described *Halictus subauratus* from Kashmir as the first record of this subgenus from Asia. Smith (1849, 1853) described 3 species from India and he (1873, 1879) also recorded *H. aerarius* from Japan and 1 species from Ceylon. Morawitz (1873, 1876, 1880)) described 4 species from Caukasus, Turkestan and Mongolia. Cameron (1897, 1908) described 3 species from India. Vachal (1894, 1895, 1902) recorded 3 species from Burma, Iran and India. Pérez (1903) described 1 species from Ussuri. Blüthgen (1920, 1923, 1926, 1933) described 5 species from Afghanistan, Mongolia, India and Transbaikal. Cockerell (1929) described 4 species from Thailand. Ebmer (1972, 1978, 1980, 1982, 1996) described 5 species

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from Mongolia, Afghanistan, China, Mongolia and Ussuri. Sakagami and Ebmer (1979) described 1 subspecies from Japan. Until now, 37 species were recorded from Asia, among them valid names are 26 at present. Four species occur also in Europe. Ebmer (1988) tried to make species groupings in the subgenus and recognized seven species groups.

In the present paper, we report the result of a systematic study of the subgenus *Seladonia* from Asia. We redescribe each species with figures including genitalia and distributional map. Among them we treat 3 species in the present paper.

## Materials, Methods and Terminology

We treated 16 Asian species of the subgenus *Seladonia* out of a total 26 known species from Asia. They were collected from Japan, North Korea, South Korea, China, Mongolia, India, Sri Lanka, Burma, Nepal, Thailand, Pakistan, Afghanistan, Iran, Turkmenistan, Kazakhstan. The specimens examined in this study are mainly based on the collections of the Entomological laboratory, Kyushu University and the late Dr. Sakagami's collection, Sapporo, Japan.

About 1,100 specimens were examined under a Nikon stereomicroscope. Structures of male genitalia and associated sterna were taken out from the seventh sternum after softening in a jar with phenol solution for the 24 hours or so, and cleared in cold solution of 10% KOH for 12 hours or less, then washed with water for several minutes and preserved in 95% ethanol for later drawing.

Illustrations of male genitalia and associated sterna were made at the same scale.

The morphological terms in description followed Michener (1978), Sakagami and Ebmer (1987). The terms (in parentheses) and their abbreviations used are as follows:

1. BL (Body length): Measured from base of antennal fossae to the apex of pygidial plate. The shortest and longest measurements are given.
2. HL, HW (Head length and width): Length from the apicomedian margin of the clypeus to the vertex of head; width from the compound eyes at lower level of antennal fossae, the ratio (HL/HW) is given.
3. CPL (Clypeal length): Measured from the apicomedian margin of the clypeus to the supraclypeal suture.
4. CAL (Clypealveolar distance): Distance between level of lower rims of antennal sockets and lower margin of clypeus.
5. APL (Apical part of clypeal length): Length of part exceeding lower orbital line.
6. EW (Eye width): Width in lateral view of eye.
7. GW (Genal width): Width in profile view of genal area.
8. WL (Wing length): Measured in a straight line from the base of tegula to the tip of the forewing. The shortest and longest measurements are given.
9. OOD (Ocellocular distance): Distance between the lateral ocellus and the inner margin of compound eye at the shortest line.
10. POD (Postocellar distance): Distance between the lateral ocelli.
11. OCD (Ocelloccipital distance): Distance between the lateral ocellus and the vertex.
12. FL1, FL2 and FL3 (Flagellar segments 1, 2 and 3): Measured along lower surface of flagellar segments 1, 2 and 3.

13. MsW (Mesosomal width): Measured between the outer rim of the tegulae.
14. MtW (Metasomal width): Width in maximal metasomal tergum.
15. MOD: Maximum interorbital distance.
16. UOD: Upper interorbital distance.
17. LOD: Lower interorbital distance.
18. IOD: Interocellar distance.
19. Tessellation: Tessellate surfase is checkered with regular close-set ridge. It divided into the state "weak", "fine" and "dense" tessellation.
20. PP: Punctures.
21. IS: Interspace of punctures.

Floral association means that tspecimens of the species were collected from the flowers of plant species.

## 1. *Halictus (Seladonia) aerarius* Smith

(Figs. 1: A-E, 2: A-E, 3: A-H)

*Halictus aerarius* Smith, 1873, Trans. ent. Soc. London,1873: 201[male, Japan, in list]; Dalla Torre, 1896, Cat. Hym., 10: 51; Cockerell, 1918, Ann. Mag. nat. Hist., (9) 2: 390 [in list]; Gussakovskij, 1932, Ark. Zool., 24A (10): 64. [in list]; Tosawa, 1932, List Ins. Minoo Park, Osaka: 101; Bluthgen, 1934, Ark. Zool., 27A (13): 3. [notes]; Yasumatsu, 1934, Mushi, 7: 62 [in list]; Yasumatsu & Narisada, 1935, Mushi, 8: 65 [in list]; Yasumatsu, 1937, Fukuoka Hakubutsugaku Zasshi, 2: 65 [in list]; Okabe, 1939, Trans. Kansai ent. Soc., (8): 22 [in list]; Yasumatsu, 1950, Icon. Ins. Jap., 2nd ed.: 1483, f. 4283 [female & male, illustrated]; Ishikawa, 1954, Sci. Res. Ozegahara Moor, Tokyo: 716; Hirashima, 1957, Sci. Bull., Fac. Agr., Kyushu Univ., 16: 3 [in catalogue]; Tadauchi, 1989, Check List Jap. Insects, 680.

*Halictus (Chloralictus) aerarius* Cockerell, 1909, Ann. Mag. nat. Hist., (8) 4: 315 [male, in key].

*Halictus (Seladonia) aerarius*: Ebmer, 1978, Ann. Hist-nat. Mus. Nat. Hung., 70: 308 [N. Korea, in list]; Ebmer, 1978, Bonn. zool. Beitr., 29: 190 [Northeast China, in list]; Ebmer, 1988, Senckenbergiana biol., 68: 346 [notes]; Ebmer, 1996, Linz. biol. Beitr., 28: 269 [Ussuri, in list].

*Halictus confluens* Morawitz, 1889, Horae Soc. ent. Ross., 24 (1890): 368-369 [female, China].

*Halictus alexoides* Strand, 1910, Berl. ent. Zeitschr., 54: 194-195, [female, Japan]; Blüthgen, 1926, Deutsch. ent. Zeitschr., 1925: 397 [synonymy].

*Halictus pseudoconfluens* Strand, 1910, Berl. ent. Zeitschr., 54: 199 [female & male, China]; Blüthgen, 1922, Deutsch. ent. Zeitschr., 1922: 54 [synonymy].

*Halictus pseudoconflarus* (sic!) Wu, 1941, Cat. Ins. Sin., 6: 273.

*Halictus nikkoensis* Cockerell, 1911, Proc. U. S. Nat. Mus., 40 (1818): 241 [female, Japan]; Blüthgen, 1926, Deutsch. ent. Zeitschr., 1925: 405 [synonymy].

*Halictus leucopogon* Strand, 1914, Arch. Naturg., 79A: 170-171 [female & male, Taiwan]; Blüthgen, 1923, Deutsch. ent. Zeitschr., 1925: 241 [synonymy].

*Halictus tsushimae* Friese, 1916, Deutsch. ent. Zeitschr., 1916: 32-33 [female & male, Japan, Tsushima]; Blüthgen, Deutsch. ent. Zeitschr., 1922: 66 [synonymy].

*Halictus (Seladonia) eruditus* Cockerell, 1924, Ann. Mag. nat. Hist., (9) 14: 581 [female, Siberia]; Bluthgen, 1926, Deutsch. ent. Zeitschr., 1925: 408 [synonymy].

*Redescription.*

**Female.** BL 5.80 - 9.15 mm, WL 4.0 - 6.2 mm (n=10).

*Color*: Generally clear, golden green reflections, especially on face, mesoscutum, scutellum and metasomal terga; non-metallic parts rather brownish than blackish; mandible with apical half reddened; flagellum beneath brownish, scape and pedicel blackish; lateral lobe of pronotum yellowapically; t egula yellowish brown transparent; veins and pterostigma yellowish; tibia and tarsi brownish; tibial spurs yellow; posterior margins of metasomal terga yellowish transparent.

*Pilocity* : Generally yellowish white to pale fulvous, 200 - 300μ on vertex, 150 - 200μ on face, 210 - 260μ on pronotum, 200 - 250μ on mesoscutum centrally, 230 -

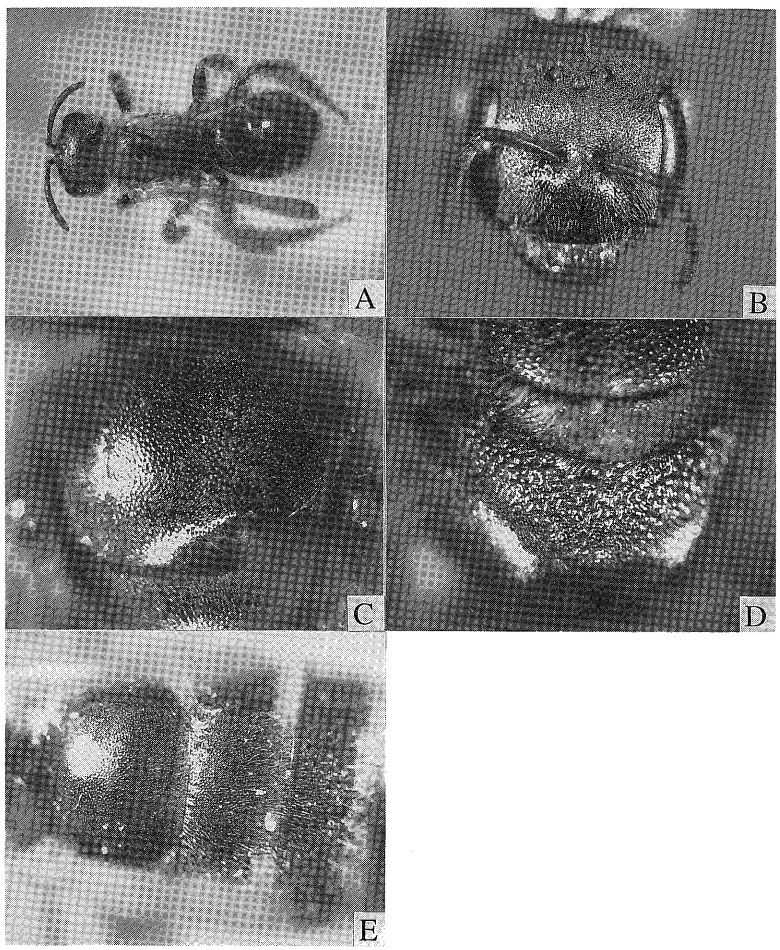


**Fig. 1.** *Halictus (Seladonia) aerarius* Smith, female. A: whole body; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

280μ on mesoscutellum marginally; tomental hairs behind lateral lobe of pronotum small; tegula with yellowish short hairs anteriorly; basilateral patch on T1 small to moderate; metasomal terga with broad apical bands of yellowish white hairs, T1 interrupted, T2-4 complete, surface with short yellowish hairs; marginal sternal hairs 270 - 300μ.

*Structure*: *Head*: HW : HL = 1.88 : 2.15; HW : MsW : MtW = 1.88 : 1.76 : 1.92. Vertex flat in smaller specimens and flatter in larger specimens in frontal view, shiny and smooth, more or less roughened with roughened PP. Mean ratio of IOD : OOD : OCD = 0.28 : 0.41 : 0.26. Eyes with inner marigins subpararelled, MOD : UOD : LOD = 1.37 : 1.20 : 1.18. Postocellar PP, 15 - 20μ ø, rather ill-defined, ocellocular PP, 15 - 25μ ø IS = 0.2, postocellar depression relatively conspicuous. Frons distinctly convex; frontal carina relatively long, longer than carina-ocellus distance. Paraocular area with epistomal angle roundly obtuse, lower margin slightly ascending laterad, PP, 15 - 25μ ø, IS= 0.1 - 0.5 above, 25 - 30μ ø, IS = 0.2 - 1 below. Supraclypeus notably higher than clype-

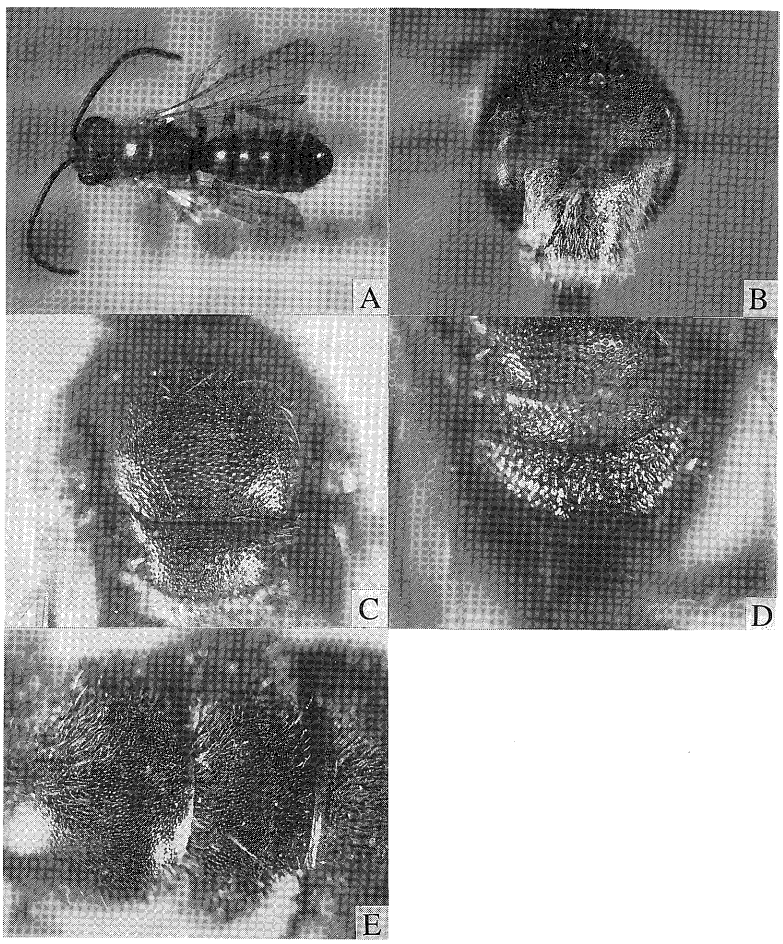


**Fig. 2.** *Halictus (Seladonia) aerarius* Smith, male. A: whole body; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

us with PP, 8 - 30μ ø, IS = 1 - 2.5. Clypeus flat, CPL : CAL : APL = 0.40 : 0.67 : 0.23, smooth and shiny with sparse PP, 15 - 30μ ø, IS = 1 - 3.5. Genal area broader than eye, EW : GW = 0.44 : 0.75, surface with small PP, shiny and smooth near eye and shagreened behind. *Mesosoma*: Pronotum with many long lateral ridges; lateral surface weakly shiny and shagreened. Mesoscutum smooth and shiny with distinct PP, 15 - 25μ ø, IS = 0.5 -2.5, scutellum medially not depressed longitudinally, with denser and smaller PP anteromedially. Scutellum : metanotum : propodeal dorsum = 0.40 : 0.21 : 0.31. Propodeal side homogeneously tessellate with indistinct sparse PP, with lineolation below; propodeal dorsum with enclosure slightly depressed, ridges irregular, occupying basal 3/4, and apical 1/4 tessellate or rugosed, lateral field weakly tessellate and weakly shiny, broadly impunctate except above; propodeal declivity weakly tessellate with sparse PP. Tegula nearly smooth broadly. Inner hind tibial spur with 2 - 3 relatively long and round-tipped teeth. *Metasoma*: T1 smooth and shiny with small, dense PP basally, 8 - 15μ ø, IS = 0.5 - 2, sparser PP on apical narrow area, T2, 3 weakly tessellate and little more roughened with sparser PP, 8 - 20μ ø IS = 0.5 - 1.5. Pygidial plate U-shaped. Metasomal sterna weakly tessellate with small indistinct PP.

**Male.** BL 6.60 - 8.00 mm, WL 4.35 - 5.15 mm (n=10).

*Color*: As in female, non-metallic parts rather brownish than blackish; mandible with apical half reddened; flagellum beneath brownish orange except apical 2 segments, scape and pedicel blackish; lower 1/3 of clypeus, labrum, median part of mandible except narrow apical and basal parts and pronotal lobe apically lemon yellow; tegula brownish semitransparent with yellowish patch visible beneath; legs brownish, apices of femora, tibiae except middle parts and all tarsi lemon yellow; fore tibiae inward and below slightly brownish; posterior margin of metasomal terga broadly yellowish transparent.

*Pilocity*: Relatively paler and tomental patch well developed as in female; hairs 200 - 250μ on vertex, 200 - 330μ on face, 300 - 330μ on pronotum, 230 - 350μ on mesoscutum centrally, 390 - 430μ on mesoscutellum marginally, and sternal hairs posteriorly 230 - 370μ ; metasomal terga with apical bands of yellowish white hairs, T1-3 broadly interrupted, T4 narrowly interrupted, surface with very short yellowish hairs.

*Structure*: *Head*: HW : HL = 1.70 : 1.86; HW : MsW : MtW = 1.70 : 1.60 : 1.75. Vertex round in frontal view, shiny and smooth, postocellar PP more or less roughened, 20 - 25μ ø IS = 0.1 - 0.5, ocellocular PP distinct, 25 - 28μ ø, IS = 0.1 - 1. Flagellar segments F1-3 Ls : F10 L : F2 W = 0.13 : 0.26 : 0.28 : 0.29 : 0.19. Supraclypeus mildly convex, smooth and shiny with PP irregular in size and distribution medially 8 - 20μ ø, IS = 0.5 - 3. Clypeus nearly flat, upper margin rather horizontal, smooth and shiny with sparse PP, 10 - 25μ ø, IS = 1 - 5, CPL : CAL : APL = 0.48 : 0.83 : 0.29. Genal area broader than eye, EW : GW = 0.40 : 0.57. *Mesosoma*:: Pronotum with stronger and longer lateral ridges than in female. Mesoscutum smooth and shiny with distinct PP, 15 - 25μ ø, IS = 0.2 - 1, scutellum medially not depressed longitudinally, with similar PP. Scutellum : metanotum : propodeal dorsum = 0.40 : 0.23 : 0.27. Propodeal side with PP, 15 - 20μ ø, relatively sparse, IS = 0.5 - 1.5, finely reticulate, with lineolation below; propodeal enclosure with stronger ridges than in female, basal 3/4 anastomosing and apical 1/4 paralleled; lateral field nearly smooth and shiny, narrowly impunctate above, broadly distinctly punctate with lineolation below; propodeal declivity smooth and shiny with distinct PP. Tegula as in female. Hind tibia : hind basitarsus : hind distitarsus = 1.27 : 0.73 : 1.10. *Metasoma*: T1 smooth and shiny

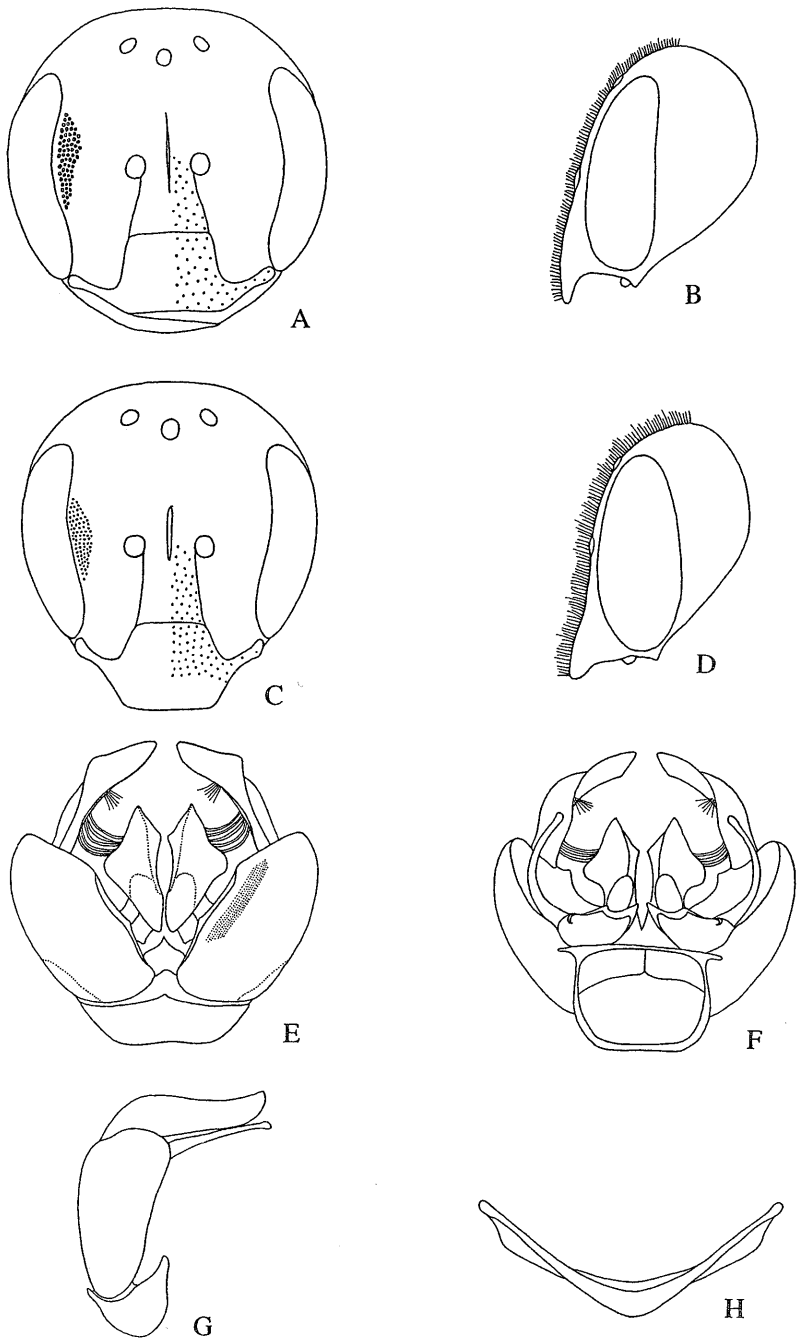


**Fig. 3.** *Halictus (Seladonia) aerarius* Smith. A: frontal view of the head, female; B: lateral view of the head, female; C: frontal view of the head, male; D: lateral view of the head, male; E: dorsal view of the male genitalia; F: ventral view of the male genitalia; G: right lateral view of the genitalia; H: sterna 7 and 8 of the male.

all over with anterior declivity with very sparse PP, disc with dense PP, 8 - 17μ ø, IS = 0.1 - 1.5, marginal area with very sparse PP or nearly impunctate narrowly; T2,3 similar to T1 with PP a litte roughened. T7 smooth and shiny with round apex without carination. S7 not elongated with round apex, S8 medially mildly projecting, apex not sharply pointed. *Genitalia*: Gonostylus with apex pointed, sublaterally gently convex, tufted hairs relatively stout; modified hairs of moderate long; dorsal lobe not existed, ventral lobe slender, distinctly shorter than main body.

*Specimens examined*: Japan: Aomori Pref.: 1 female, Mt. Iwaki, 4. vii. 1962 (M. Yamada); 1 male, Fukutami, Kuroishi, 6. ix. 1984, (M. Yamada); Hirosaki: (M. Yamada): 2 males, 14. ix. 1980; 3 females, 28. vii. 1981; 1 female, 6. viii. 1981; 3 males, 24. viii. 1981; 1 female, 5. ix. 1981; 1 male, 13. ix. 1981; 1 female, 15. ix. 1981. Nagano Pref.: 1 female, Shimojomura, 2. ix. 1959 (K. Fukushima); 29 females, Shimojomura, 19. viii. 1965; 1 female, Otari, 9. viii. 1965. Wakayama Pref.: Kibi, (M. Matsuura): 6 females, 1. vi. 1969; 13 females, 22. vi. 1969; 38 females, 6. vii. 1969; 27 females, 13. vii. 1969; 8 females, 24. vii. 1969; 31 females, 9. viii. 1969; 11 females, 20. viii. 1969; 14 females, 31. viii. 1969; 7 females, 4. ix. 1969; 7 females, 11. ix. 1969. Hyogo Pref.: Sasayama, Tanba, (S. Taniguchi): 1 female, 14. v. 1952; 1 female, 3. vii. 1952; 1 female, 29. x. 1952 ; 1 female, 13. iv. 1956; 1 female, 21. v 1956; 2 females, 3. x. 1956. Yamaguchi Pref.: 10 females, Sengokudai, Hagi, 23. v. 1960 (Y. Hirashima). Fukuoka Pref., Mt. Hikosan, 1 female and 10 males, 1. x. 1959 (Y. Hirashima). Nagasaki Pref.: Omura : 1 female, 7. vi. 1967 (R. Ogushi); 1 female, 10. x. 1967 (R. Ogushi); 101 females, 1969; 29 females and 5 males, Omura; 44 females and 8 males, 1966 (R. Ogushi). Tsushima Is.: 3 males, Azamo, 29-30. x. 1962 (S. Miyamoto); 1 female, Mt. Mitake, 15-18. vii. 1968 (S. Miyamoto & A. Nakanishi). Taiwan: 3 females, 3 males, Pintung Pref., Checheng, 27. ix. 1984.

*Remarks*: This species is separated from the other species of this subgenus in both sexes by the green reflections very distinct, pronotum with many stronger and longer lateral ridges. It is characteristic by the gonostylus without dorsal lobe in male. We include this species in this subgenus, but will examine it with respect to the position of the subgenus in near future.

*Distribution*: Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima Is., Yakashima Is.); Ussuri, Siberia; South Korea; North Korea; China; Taiwan.

*Floral association*: Japan: *Cayratia japonica, Indigofera pseudo-tinctoria, Aster fastigiatus, Adenophora triphylla, Ampelopsis brevipedunculata, Deutzia Sieboldiana, Aster Yomena.*

### 2. *Halictus (Seladonia) leucaheneus* Ebmer

(Figs. 4: A-E; 5: A-E; 6: A-H)

*Halictus (Seladonia) leucaheneus* Ebmer, 1972, Mitt. Zool. Mus. Berlin, 48: 225-227 [female, Turkestan]; Ebmer, 1978, Bonn. zool. Beitr., 29: 189 [male, Northeast China]; Ebmer, 1982, Mitt. zool. Mus. Berlin, 58: 204 [in list, Mongolia]; Ebmer, 1988, Senckenbergiana biol., 68: 359 [notes].

*Redescription.*

**Female**. BL 8.2 - 8.6 mm, WL 6.1 - 6.3 mm (n = 2).

*Color*: Generally paler, golden to grass green reflections, especiallly on mesoscutum; non-metallic parts rather brownish than blackish; flagella below dark brown, scape and pedicel blackish; mandible with apical margin reddened; lateral lobe of pronotum yellow apically; tegula yellowish brown transparent; veins and pterostigma yellowish; base and apices of tibia, apices of tarsi yellow yellow, other parts of legs chestnut brownish; tibial spurs yellow; posterior margins of metasomal terga brownish transparent.

*Pilosity*: Generally yellowish white, 150 - 230μ on vertex, 170 - 240μ on face, ± 115μ on mesoscutum centrally, 230 - 280μ on propodeum, 260 - 280μ on mesoscutellm marginally; tomental hairs behind lateral lobe of pronotum rather developed; tegula with yellowish short hairs anteriorly; basilateral pathch on T1 small to moderate; metasomal terga with broad apical bands of yellowish white hairs, T1 - 4 complete, surface with short yellowish hairs; sternal hairs 180 - 300μ.

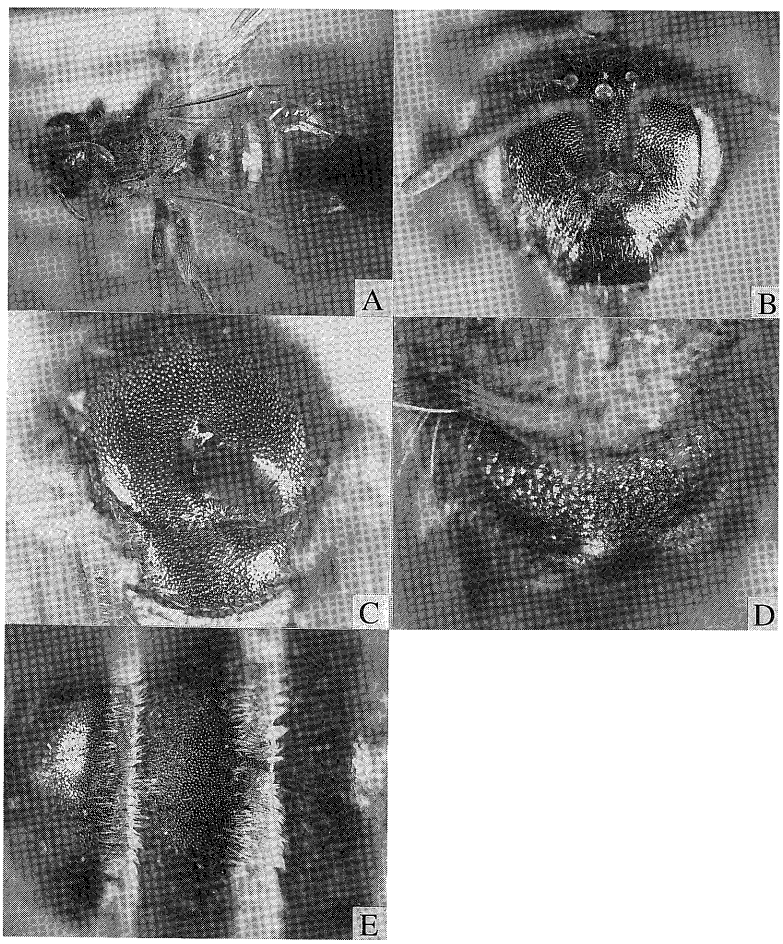


**Fig. 4.** *Halictus (Seladonia) leucaheneus* Ebmer, female. A: whole body; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

*Structure*: *Head*: HW : HL = 2.27 : 2.10; HW : MsW : MtW : = 2.27 : 2.15 : 2.53. Vertex flat in frontal view, shiny and smooth, more or less roughened with roughened PP. Mean ratio of IOD : OOD : OCD = 0.40 : 0.47 : 0.27. Eyes with inner margins subpararelled, MOD : UOD : LOD = 1.60 : 1.40 : 1.47. Postocellar PP, 25 - 30μ ø, rather ill-defined; ocellocular PP, 20 - 30μ ø, IS 0.2 - 1.0 postocellar depression relatively conspicuous. Frons mildly but distinctly convex; frontal carina relatively short, shorter than carina-ocellus distance. Paraocular area with epistomal angle roundly obtuse, lower margin slightly ascending laterad. PP, 25 - 30μ ø above, 20 - 25μ ø below, IS = 0.2 - 1.5. Supraclypeus slightly higher than =clypeus, with PP, 15 - 30μ ø, IS = 0.2 - 3 and shining above. Clypeus subapically slightly depressed CPL : CAL : APL = 0.47 : 0.90 : 0.23, smooth and shiny with sparse PP, 25 - 30μ ø and IS = 0.2 - 2 or slightly wider, especially below, 3 ø or more. Genal area distinctly narrower than eye, EW : GW = 0.51 : 0.37, surface with small PP, shiny and smooth. *Mesosoma*:

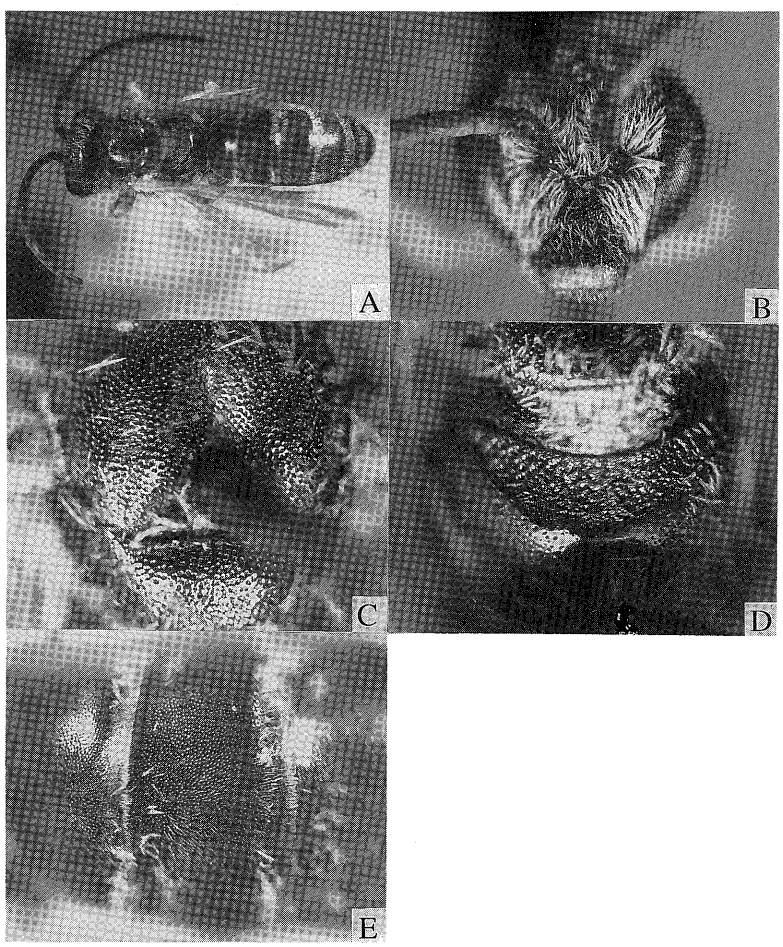


**Fig. 5.** *Halictus (Seladonia) leucaheneus* Ebmer, male. A: whole body; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

Pronotum without lateral ridge and lateral surface coriaceous and shagreened. Mesoscutum smooth and shiny with distinct PP, 20 - 30μ ø, IS = 0.2 - 1ø, sometimes 1.5, scutellum medially not depressed longitudinally, with denser and smaller PP anteromedially. Scutellum : metanotum : propodeal dorsum = 0.51 : 0.31 : 0.43. Propodeal dorsum with enclosure mildly depressed, ridges irregular, ridges occupying basal 3/4, and apical 1/4 tessellate or rugosed, lateral field rather broadly impunctate and smooth and shiny. PP of propodeal declivity above laterally very fine. Inner hind tibial spur with 4 - 5 relatively long and round-tipped teeth. *Metasoma*: T1 smooth and shiny with small dense PP basally, 7 - 10μ ø, rarely 12μ ø, IS = 1.0 - 2.5ø, sparser PP on apical narrow area, T2, 3 weakly tessellate and a little more roughened with sparser PP, 6 - 10μ ø IS = 1 - 2ø. Metasomal sterna weakly tessellate with small and sparse PP.

**Male.** BL 8.10 mm, FL 6.10 mm (n=1).

*Color* : As in female, non-metallic parts rather brownish than blackish; about lower half of clypeus, labrum, median part of mandible and pronotal lobe apically lemon yellow; flagellum beneath yellowish brown, scape and pedicel blackish; Tegula brownish, transparent; Legs with femora and middle part of tibia yellowish brown, apices of femora, tibiae and tarsi lemon yellow.

*Pilosity*: Relatively paler and tomental patch well developed as in female; hairs 150 - 250μ on vertex, 220 - 250μ on face, 230 - 270 on pronotum, 150 - 200μ on mesoscutum centrally and 200 - 300μ on mesoscutellum marginally; metasomal terga with apical bands of sparser yellowish white hairs, T1-2 broadly interrupted, T 3-4 narrowly interrupted, surface with very short yellowish hairs.

*Structure*: *Head*: HW : HL = 1.93 : 2.06, HW : MsW : MtW : = 1.93 : 1.80 : 1.76. Vertex round in frontal view, shiny and smooth, postocellar PP rather distinct, 10 - 25μ ø, IS = 0.5 - 2.5, smooth and shining, ocellocular with PP, ±28μ ø, homogeneous and distinct, IS = 0.2 - 1. Flagellar segments F1-3Ls : F10 L : F2 W = 0.26 : 0.40: 0.40: 0.35 : 0.21. Supraclypeus well convex, with relatively dense PP, 25 - 30μ ø, IS = 0.1 - 1.5μ ø, smooth and shining. Clypeus nearly flat, smooth and shiny with sparse PP, 20-30μ ø, IS = 0.2 - 3, CPL : CAL : APL = 0.55 : 0.93 : 0.33. Genal area narrower than eye, EW : GW = 0.50 : 0.46. *Mesosoma*: Pronotum as in female. Mesoscutum smooth and shiny with distinct PP, 20 - 30μ ø, IS = 0.2 - 1.5, scutellum medially not depressed longitudinally, with variable PP, 10 - 28μ ø. Scutellum : metanotum : propodeal dorsum = 0.46 : 0.27 : 0.40. Propodeal side with PP, 15 - 25μ ø, relatively dense, IS = 0.2 - 1, with lineolation below; propodeal enclosure with mildly depressed; basal 2/3 rugesed and apical 1/3 tessellate, propodeal declivity smooth and shiny with distinct PP. Tegula as in female. Hind tibia : hind basitarsus : hind distitarsus = 1.67 : 1.13 : 0.90. *Metasoma*: T1 smooth and shiny all over with anterior declivity with rather dense PP, disc with dense PP, 6 - 15μ ø, I S = 0.1 - 1.5, rarely 2, marginal area with small sparse PP; T2,3 similar to T1 with PP a litte roughened. *Genitalia*: Gonostylus tall and slender, medially gently convex, apex notable dilated outward; tufted hairs and modified hairs relatively stout; dorsal lobe distinctly shorter than main body, subapically dilated, apex rounded; ventral lobe distinctly shorter than main body, apically pointed.

*Specimens examined*: Mongolia: 1 female, St. Ic.,l, 24. vii. 1979, MVR-Exped. 1979, Bajanchongor Aimag, Ich- bogd, 25 km S, Bogd, S-Ufer Orognuur, Belflache 1350 m NN (Dorn). Kazakhstan: 1 male and 1 female, 20 km SE Aksay env., 16-19. vi. 1992 (J. Halada).

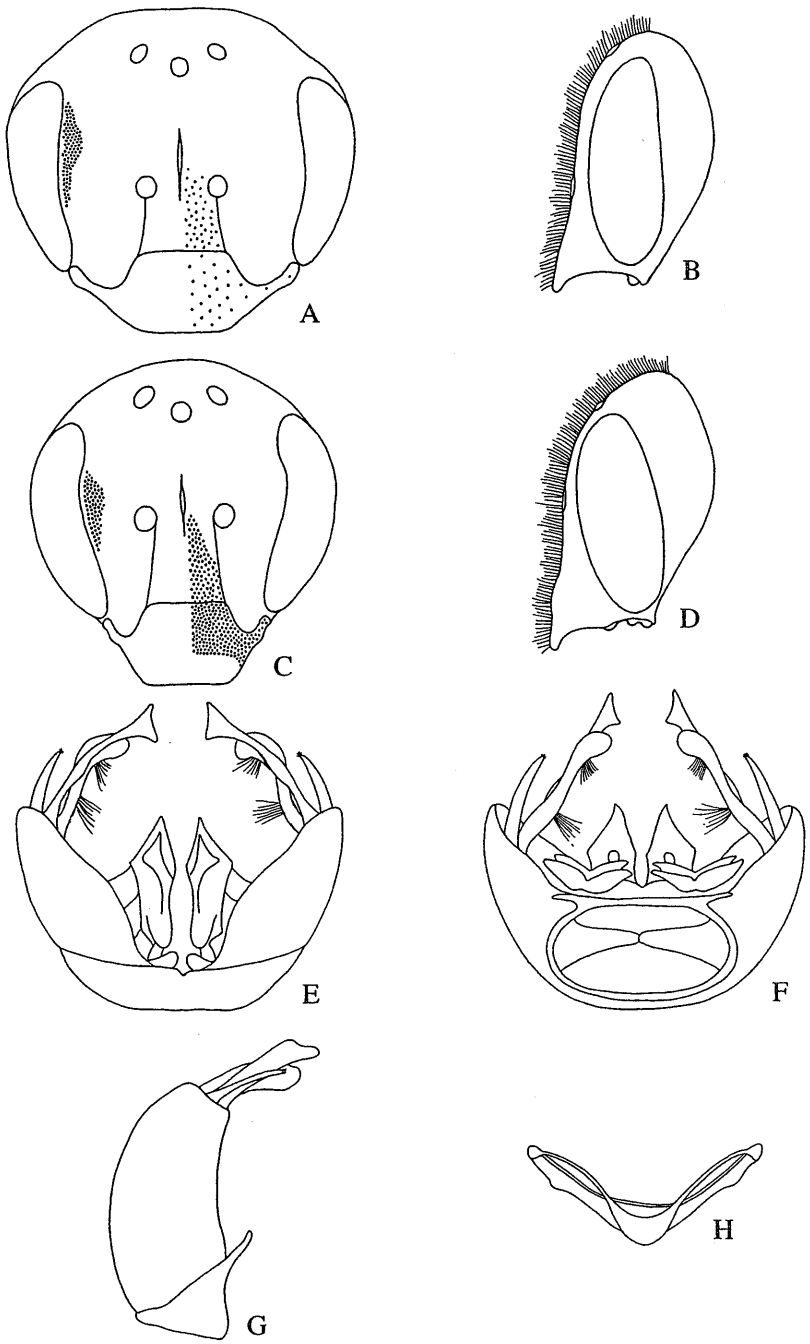


**Fig. 6.** *Halictus (Seladonia) leucaheneus* Ebmer. A: frontal view of the head, female; B: lateral view of the head, female; C: frontal view of the head, male; D: lateral view of the head, male; E: dorsal view of the male genitalia; F: ventral view of the male genitalia; G: right lateral view of the genitalia; H: sterna 7 and 8 of the male.

*Remarks*: This species is recognized in both sexes by the propodeal enclosure not rugosed all over, and the metasomal terga with broad apical bands of yellowish white hairs, T1-4 complete.

*Distribution* : Mongolia ; China; Kazakhstan; Turkestan.

*Floral association* : Not available.

### 3. *Halictus (Seladonia) magnus* Ebmer

(Figs. 7: A-E; 8: A-E; 9: A-H)

*Halictus (Seladonia) magnus* Ebmer, 1980, Linz. biol. Beitr., 12: 498-500 [female & male, China: Kiangsu]; Ebmer, 1988, Senckenbergiana biol., 68: 345 [notes].

*Redescription.*

**Female.** BL 10.06 mm, FL 6.74 mm (n=1).

*Color*: Generally paler, very weakly green reflections, especially on mesoscutum and scutellum, metasomal terga dark reddened; non-metallic parts rather blackish; mandible with apical part brownish; flagellum apical segments yellowish brown, beneath brownish black, scape and pedicel blackish; lateral lobe of pronotum yellow apically; tegula yellowish brown transparent; veins and pterostigma brownish yellow; legs brown, tibial spurs brown; metasomal terga reddish black, posterior margins yellowish transparent.

*Pilocity* : Generally yellowish white, 200 - 270μ on vertex, 250 - 330μ on face, 280 - 330μ on pronotum, 300 - 350μ on mesoscutum centrally, 330 - 380μ on mesoscutellum marginally and sternal scopa 350 - 380μ; tomental hairs behind lateral lobe of pronotum much; tegula with yellowish relatively long hairs anteriorly; basilateral patch on T1 small; metasomal terga with broad apical bands of yellowish white hairs, T1 interrupted, T2-4 complete, surface with short yellowish hairs.

*Structure*: *Head*: HW : HL = 2.67 : 2.40; HW : MsW : MtW = 2.67 : 2.63 : 3.03. Vertex flat in frontal view, with roughened PP and IS shagreened. Mean ratio of IOD : OOD: OCD = 0.40: 0.57: 0.35. Eyes with inner marigins subpararelled, MOD : UOD : LOD = 1.93: 1.80 : 1.67. Postocellar PP, ±20μ ø, rather ill-defined, ocellocular PP, 20 - 25μ ø, IS = 0.1 - 0.5, rarely 1, postocellar depression relatively conspicuous. Frons distinctly convex; frontal carina as carina-ocellus distance. Paraocular area with epistomal angle roundly obtuse, lower margin slightly ascending laterad, PP, 25 - 30μ ø, IS= 0.1 - 0.5 above, 20 - 30μ ø, IS shagreened, 0.2 - 1 below. Supraclypeus notabl higher than clypeus, with PP, 20 - 35μ ø, IS = 1 - 2.5. Clypeus flat, CPL : CAL : APL = 0.60 : 1.00 : 0.45, smooth and shiny with dense PP, 20 - 25μ ø, IS = 0.2 - 2. Genal area broader than eye, EW : GW = 0.57 : 0.73, surface with small PP, shiny and smooth. *Mesosoma*: Pronotum with lateral ridge weakly and short, lateral surface coriaceous and less shiny. Mesoscutum smooth and shiny with distinct PP, 22 - 28μ ø, IS = 0.1 - 0.5, scutellum medially not depressed longitudinally, with denser and smaller PP anteromedially. Scutellum : metanotum : propodeal dorsum = 0.53 : 0.37 : 0.47. Propodeal side homogeneously tessellate with indistinct sparse PP, with lineolation below; propodeal dorsum with enclosure slightly depressed, ridges irregular, occupying basal 3/4 rugosed and apical 1/4 tessellate, lateral field weakly tessellate and weakly shiny, broadly impunctate except above; propodeal declivity weakly tessellate with sparse PP. Tegula nearly smooth broadly. Inner hind tibial spur with 2 - 3 relatively long and

round-tipped teeth. *Metasoma:* T1 smooth and shiny with small, dense PP basally, 10 - 15μ ø, IS = 0.2 - 1.5, sparser PP on apical narrow area, T2, 3 weakly tessellate and little more roughened with sparser PP, ±15μ ø, IS = 0.1 - 1.0. Pygidial plate U-shaped. Metasomal sterna weakly tessellate with small indistinct PP.

**Male.** BL 9.45 mm, FL 6.40 mm (n=1).

*Color*: As in female, very weakly green reflections, non-metallic parts rather blackish; mandible with apical part reddish brown; flagellum apical segments yellowish brown, beneath brownish black, scape and pedicel blackish; lateral lobe of pronotum reddish brown apically; tegula brownish transparent; veins and pterostigma brownish yellow; legs yellowish brown, apex of femora, inward of tibia and tarsus yellowish, tibial spurs yellowish brown; metasomal terga reddish brown, posterior margins brownish black.

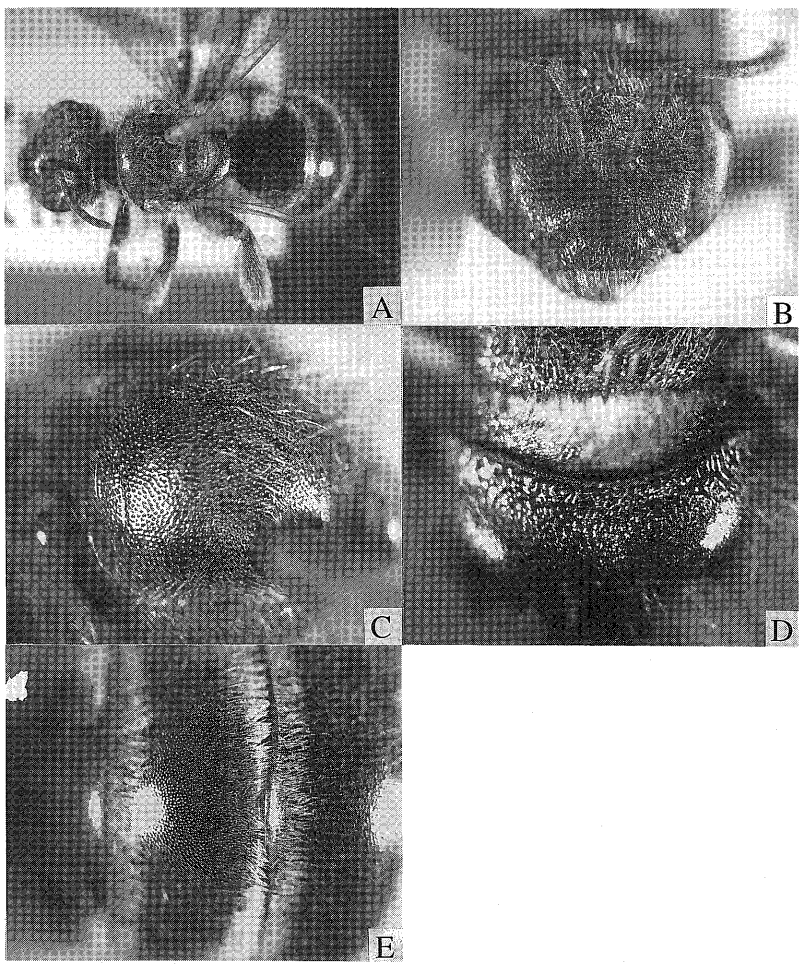


**Fig. 7.** *Halictus (Seladonia) lmagnus* Ebmer, female. A: whole body; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

*Pilocity*: Relatively paler, hairs 230 - 310μ on vertex, 200 - 280μ on face, 270 - 300μ on pronotum, 200 - 250μ on mesoscutum centrally, 280 - 310μ on scutellum marginally, and sternal scopa 200 - 230μ; metasomal terga with apical bands of brownish white hairs, T1- 4 broadly interrupted, surface with relatively short and sparsely yellowish hairs.

*Structure: Head*: HW : HL = 2.33 : 2.53; HW : MsW : MtW = 2.33 : 2.26 : 2.30. Vertex slightly convex in frontal view, shagreened and weakly shiny, postocellar PP roughened, 25 - 30μ ø, IS = 0.1 - 1, ocellocular PP distinct, 28 - 30μ ø, IS = 0.1 - 0.5. Antennal area notably depressed. Flagellar segsegments F1-3 Ls : F10 L : F2 W = 0.20 : 0.33 : 0.47 : nothing : 0.21. Supraclypeus slightly convex, with roughened PP, 20 - 30μ ø, IS = 0.1 - 1. Clypeus flat, smooth and shiny, including apical margin with PP, 15 - 30μ ø, IS = 0.1 - 2.5; CPL : CAL : APL = 0.60 : 1.17 : 0.47. Genal area broader than eye, EW : GW = 0.54 : 0.71. *Mesosoma*: Pronotum without lateral ridges. Meso-

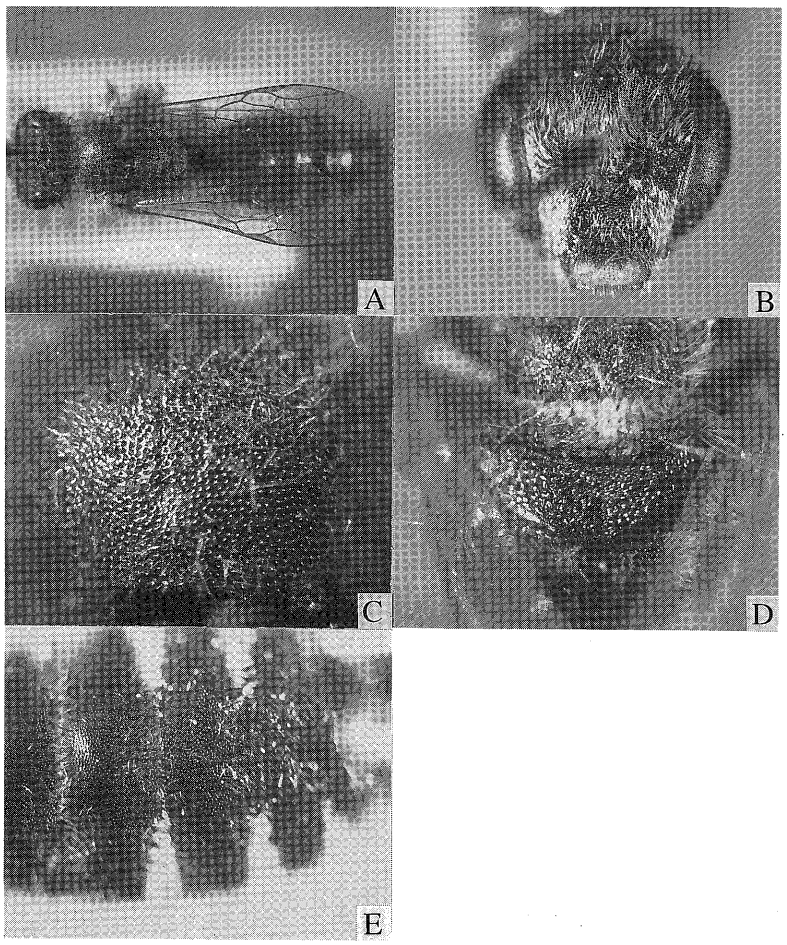


**Fig. 8.** *Halictus (Seladonia) lmagnus* Ebmer, male. A: whole body; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

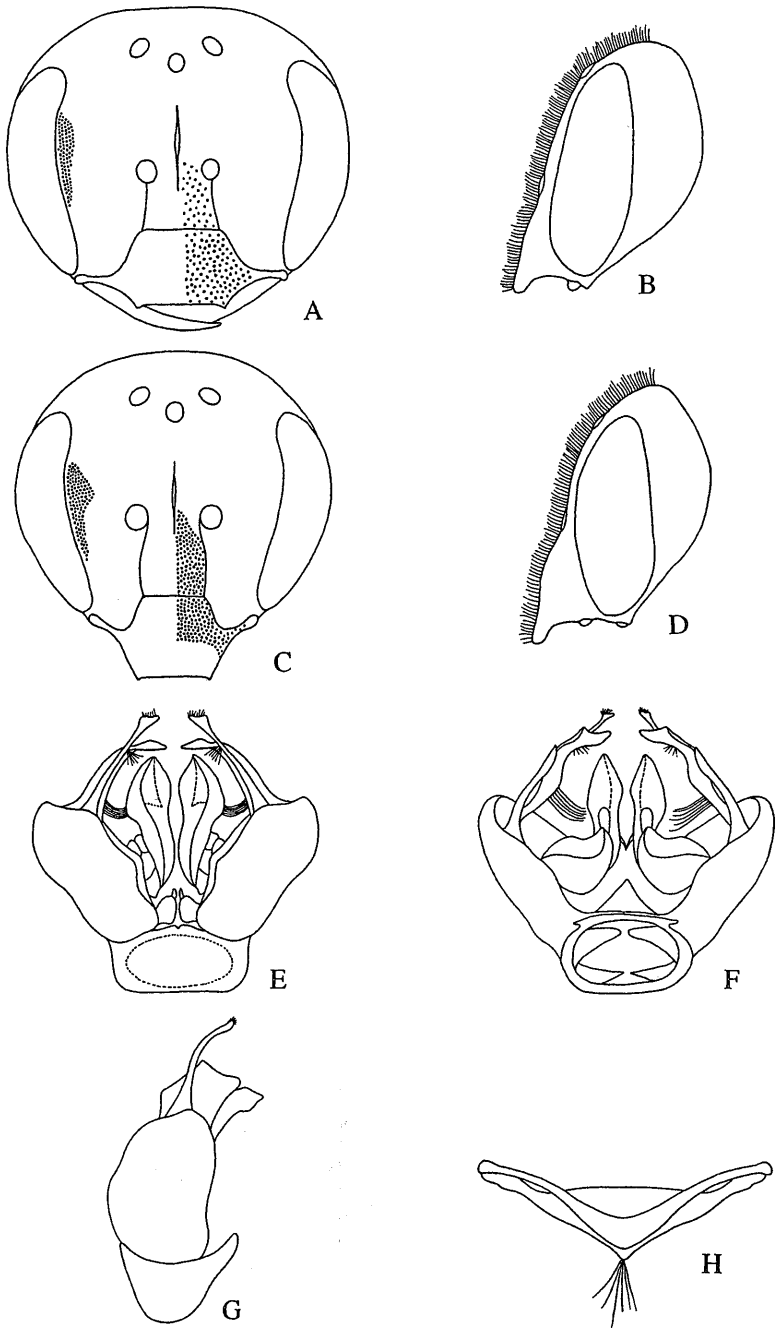


**Fig. 9.** *Halictus (Seladonia) magnus* Ebmer. A: frontal view of the head, female; B: lateral view of the head, female; C: frontal view of the head, male; D: lateral view of the head, male; E: dorsal view of the male genitalia; F: ventral view of the male genitalia; G: right lateral view of the genitalia; H: sterna 7 and 8 of the male.

scutum smooth and shiny with distinct PP, 25 - 30μ ø, IS = 0.1 - 1, scutellum medially not depressed longitudinally, with similar PP. Scutellum : metanotum : propodeal dorsum = 0.47 : 0.33 : 0.40. Propodeal side very roughened, with many longitudinal ridges; propodeal enclosure with stronger ridges than in female; lateral field shagreened, narrowly impunctate above; propodeal declivity smooth and shiny with distinct PP. Tegula as in female. Hind tibia : hind basitarsus : hind distitarsus = 1.67 : 1.20 : 1.27. *Metasoma*: T1 smooth and shiny all over, anterior declivity with very sparse PP, disc with dense PP, 8 - 10μ ø, IS = 0.1 - 2.5;T2 similar to T1 with PP roughened. T3- 5 smooth and shiny with round apex without carination. S7 not elongated with round apex, S8 medially mildly projecting, apex not sharply pointed. *Genitalia*: Gonostylus with apex pointed, sublaterally gently convex, tufted hairs relatively fine; modified hairs of moderate long and mildly curved; dorsal lobe shorter than main body, apically pointed, ventral lobe slender, apical parts dilated.

*Specimens examined*: Paratypes: China: 1 female and 1 male, Proyins Kiangsu (Kolthoff).

*Remarks* : This species is separated from the other species of *Seladonia* by the larger sized body, the metasomal terga reddish black, apical margin of clypeus with distinct PP.

*Distribution* : China.

*Floral association* : Not available.