

Four New Species of the Genus *Melanotus* Eschscholtz (Coleoptera: Elateridae) from Korea I

한국산 빛살방아벌레속 (딱정벌레목: 방아벌레과)의 4신종

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Abstract - Four new species of the genus *Melanotus* Eschscholtz are described here with photos and illustrations. They are *Melanotus suwonensis* sp. nov., *M. niger* sp. nov., *M. augustianus* sp. nov. and *M. hallasanae* sp. nov.

Key Words - Systematics, *Melanotus*, Elateridae, Coleoptera, Korea

초 록 - 방아벌레과 빛살방아벌레속 (*Melanotus* Eschscholtz)에 속하는 4신종에 대하여 형태적 기술, 그림 및 사진과 함께 보고한다.

검색어 - 분류, 빛살방아벌레속, 방아벌레과, 딱정벌레목, 한국

The genus *Melanotus* Eschscholtz, 1829 is a largest group within the subfamily Melanotinae with about 300 nominal species throughout the world except New Zealand (Stibick, 1979; Hayek, 1990). Most species in this group are dark brown or black. Adults are between 5~20 mm in length with most commonly between 10~14 mm. The subfamily Melanotinae itself can be easily recognized by its pectinate tarsal claws, but the determination within this group is not easy because most species have homologous external characteristics. For this reason, taxonomic works of this group have been relatively hindered and also many synonyms have been produced.

In Korea, four species under the genus *Melanotus* have been reported until 1994 (Ent. Soc. Kor. & Kor. Soc. Appl. Ent.), and Lee (1995) added *Melanotus carbonarius* Candéze from Cheju-do.

As a result of nationwide survey, I found four species as new to science. In this study, specimens were avail-

able from the insect collection of National Institute of Agricultural Science and Technology (NASTI), College of Agriculture and Life Sciences (SNU), Seoul National University and College of Agriculture, Kyungpook National University (KPNU). Detail descriptions and photos for all species are given. The abbreviations used are as follows; L/W (length /width), BL/BW (body length/body width), M/L (length of median lobe/length of alateral lobe of male genitalia).

Description

***Melanotus suwonensis* sp. nov.**
수원빛살방아벌레 (신칭) (Fig. 1: a, e)

Male (13.5-16.5)/(3.85-4.5)mm BL/BW

Body elongate fusiform, a little convex medio-longitudinally, as well as underside, widest at the hind angle of pronotum and elytral humeri, sides subparallel, but

narrowing gradually posteriorly and convergent anteriorly. Colour blackish brown entirely. Pubescence long, dense, recumbent and tawny wholly.

Head flattened with distinct and dense punctures, frontal margin rounded at the middle and well carinated; interocular area about 2.7 (1.6:0.6 mm) times as broad as the width of each eye in dorsal view; frontal groove narrow, faced anterior-inferiorly, surface with obsolescent punctures.

Antennae long moderately, at least last segment extended behind the hind angle of pronotum; first segment elongate suboval without puncture; second (0.22/0.18 mm L/W) short and globular as wide as long; third (0.38/0.21 mm L/W) more elongate, somewhat dilated apically, 1.8 times as long as wide and 1.7 times as long as second; fourth (0.56/0.33 mm L/W) elongate triangle, 1.6 times as long as wide and 1.4 times as long as third; fourth to tenth segments serrate and gradually narrowing apically, eleventh (0.88/0.21 mm L/W) elongate fusiform, about 4.2 times as long as wide.

Pronotum subtrapezoid, sides subparallel at basal half and gradually narrowing anteriorly, medio-longitudinal length shorter (3.2 mm) than the width in the middle; posterior angles projected backward subparallelly, each bears short carina, reaching to the base of hind angle, the length of carina about 1.0 mm, apex pointed sharply; disc weakly convex above; surface clearly and densely punctured, interspaces between punctures wrinkled laterally; sublateral basal furrows deep and long moderately.

Scutellum tongue-shaped and flattened; the punctures not distinct; anterior margin truncated, posterior end convergent but a little truncated in the middle, widest at base, subparallel at basal half, then gradually convergent; relative median length and basal width as 0.7/0.5 mm L/W.

Elytra convex medio-longitudinally, widest at base and parallel to the middle and then gradually narrowing posteriorly; relative sutural length including scutellum and humeral width as 11.0/4.25 mm L/W. Strial furrows shallow with distinct and periodical punctures; strial interstices smooth with uniform and small punctures.

Prosternum, trapezoid, convex medio-longitudinally; anterior lobe rounded ahead; surface punctured clearly and densely; prosternal sutures double-lined, each furrowed at anterior half. Prosternal process gradually bent inward from the procoxal cavity, well ridged medio-longitudinally. Propleura wrinkled with elongate punctures, posterior end truncated. Hind coxal plate gradually

enlarged inward without tooth. Claws of legs with 8 conspicuous teeth.

Male genitalia (Fig. 1e); relative length of median lobe and lateral lobe as 0.87/0.82 mm M/L; apico-lateral barbs degenerated. Median lobe gradually tapering from the base to apex, apex pointed narrowly.

Female (13.5-15.0)/(3.75-4.0) mm BL/BW

Very similar to male except following points: Antennae shorter than male, barely attaining the hind angles of pronotum, fourth to tenth segments more serrate; punctures of pronotum smaller than male.

Specimen examined. [**Holotype**] ; <NASTI> - 1 ♂, **Mt. Yögi, Suwon, KG, Korea, 15. VI. 1991, S. H. Lee.** [Paratypes] ; <NASTI> - 1 ♂, Suwon, KG, 25. VI. 1969, C.H. Kim; 7 ♂ ♀, Mt. Yögi, KG, 4. V. 1991, S.H. Lee; 1 ♂, Mt. Yögi, KG, 20. V. 1991, S.H. Lee; 1 ♂, Mt. Yögi, KG, 22. V. 1991, S.H. Lee; 1 ♂, Mt. Yögi, KG, 1. VI. 1991, S.H. Lee; 2 ♂ ♀, Mt. Yögi, KG, 3. VI. 1991, S.H. Lee; 1 ♂, Mt. Yögi, KG, 5. VI. 1991, S.H. Lee; 5 ♂ ♀, Mt. Yögi, KG, 8. VI. 1991, S.H. Lee; 3 ♂ ♀, Mt. Yögi, KG, 10. VI. 1991, S.H. Lee; 1 ♂, Mt. Yögi, KG, 12. VI. 1991, S.H. Lee; 1 ♂, Mt. Yögi, KG, 15. VI. 1991, S.H. Lee; 1 ♀, Nonsan, CN, 1. VII. 1991, S.H. Lee; 1 ♀, Mt. Yögi, KG, 2. VII. 1991, S.H. Lee; 3 ♂ ♀, Mt. Yögi, KG, 5. VII. 1991, S.H. Lee; 5 ♂ ♀, 1 ♀, Mt. Yögi, KG, 10. VII. 1991, S.H. Lee; 1 ♂, Mt. Yögi, KG, 11. VII. 1991, S.H. Lee; 1 ♀, Mt. Yögi, KG, 12. VII. 1991, S.H. Lee; 1 ♂, 1 ♀, Mt. Yögi, KG, 13. VII. 1991, S.H. Lee; 1 ♂, Mt. Yögi, KG, 15. VII. 1991, S.H. Lee; 1 ♂, Mt. Yögi, KG, 16. VII. 1991, S.H. Lee; 1 ♀, Mt. Yögi, KG, 23. VII. 1991, S.H. Lee; 1 ♂, Mt. Yögi, KG, 8. VIII. 1991, S.H. Lee; 1 ♂, Mt. Yögi, KG, 21. V. 1992, S.H. Lee; 5 ♂ ♀, Mt. Yögi, KG, 29. V. 1992, S.H. Lee; 1 ♂, Mt. Yögi, KG, 30. V. 1992, S.H. Lee; 6 ♂ ♀, Mt. Yögi, KG, 3. VI. 1992, S.H. Lee; 1 ♂, Mt. Yögi, KG, 14. VI. 1992, S.H. Lee; 1 ♂, Mt. Yögi, KG, 15. VI. 1992, S.H. Lee; 1 ♂, Mt. Yögi, KG, 2. VII. 1992, S.H. Lee; 1 ♂, Mt. Yögi, KG, 6. VII. 1992, S.H. Lee; 1 ♂, 2 ♀ ♀, Mt. Yögi, KG, 7. VII. 1992, S.H. Lee; 1 ♂, Mt. Yögi, KG, 9. VII. 1992, S.H. Lee; 1 ♂, Mt. Yögi, KG, 15. VII. 1992, S.H. Lee; 2 ♂ ♀, Mt. Yögi, KG, 16. VII. 1992, S.H. Lee; 2 ♂ ♀, Mt. Yögi, KG, 26. VIII. 1992, S.H. Lee; 6 ♂ ♀, Mt. Yögi, KG, 20. V. 1993, S.H. Lee; 3 ♂ ♀, Mt. Yögi, KG, 23. V. 1993, S.H. Lee; 2 ♂ ♀, Mt. Yögi, KG, 24. V. 1993, S.H. Lee; 2 ♂ ♀, Mt. Yögi, KG, 27. V. 1993, S.H. Lee; 1 ♂, Mt. Yögi, KG, 29. V. 1993, S.H. Lee; 1 ♂ 1 ♀, Mt. Yögi, KG, 31. V. 1993, S.H. Lee; 3 ♂ ♀, Mt. Yögi, KG, 4. VI. 1993, S.H. Lee; 2 ♂ ♀, Mt. Yögi, KG, 9. VI. 1993, S.H.

Lee; 1 ♂, Mt. Yögi, KG, 11. VI. 1993, S.H. Lee; 4 ♂♂, Mt. Yögi, KG, 12. VI. 1993, S.H. Lee; 2 ♂♂, Mt. Yögi, KG, 17. VI. 1993, S.H. Lee; 2 ♂♂, Mt. Yögi, KG, 18. VI. 1993, S.H. Lee

Distribution - Korea (Central).

Etymology - This new species was named *M. suwonensis* because most specimens examined were collected from Suwon, Korea except one from Nonsan.

Remarks - This species is similar to *M. legatus* and *M. propexus* at an exterior view. I compared it with more than 760 specimens of those two species from South Korea, North Korea and Japan. This beetle could be clearly separated from *M. legatus* and *M. propexus* by its broad pronotum and the simple parameres of lateral lobe of male genitalia.

Melanotus niger sp. nov.

검정빛살방아벌레 (신칭) (Fig. 1 : b, f)

Male. (13.1-16.0)/(3.7-4.3)mm BL/BW

Body elongate fusiform, widest at elytral humeri, shining all over the body. Colour black wholly, but legs and antennae a little pale (blackish brown). Pubescence yellowish brown wholly and recumbent.

Head flattened with many distinct circular punctures; inter-ocular area about 5 times (1.5 : 0.3 mm) as broad as the width of each eye in dorsal view; frontal groove narrowed in the middle, surface punctured feebly. Frontal margin of disc well-carinated, pointed roundly.

Antennae long moderately, last segment extended behind angles of pronotum; first segment elongate suboval with many distinct small punctures; second (0.2/0.19 mm L/W) short and globular, as wide as long; third (0.29/0.23 mm L/W) more elongate, somewhat dilated apically, 1.3 times as long as wide, and 1.5 times as long as second; fourth (0.56/0.35 mm L/W) triangle, 1.6 times as long as wide, and 1.9 times as long as third; fourth to tenth segment strongly serrate, gradually narrowing apically; eleventh (0.75/0.25 mm L/W) subfusiform about 3 times as long as wide.

Pronotum a little flattened, (3.4/4.0 mm L/W) medio-longitudinal length shorter than the width in the middle; side subparallel at basal half, but narrowing anteriorly; posterior angles projected backward, each bears a distinct carina, the length of carina 1.3 mm, apex pointed sharply, punctures of disc large, distinct and circular; interspaces between punctures smooth and shining; sublateral-basal furrows short and deep.

Scutellum subtrapezoid, sides parallel, basal margin truncated and the posterior margin rounded, surface flattened with some obscure punctures; relative median length and basal width as 0.7/0.5 mm L/W.

Elytra widest at humeri, subparallel at basal $\frac{2}{3}$, then gradually narrowing posteriorly; relative sutural length including scutellum and humeral width as 10.5/4.1 mm L/W, substraight at humeral base. Strial furrows shallow with distinct and periodical punctures; strial interstices smooth with uniform small punctures.

Prosternum, subtrapezoid, convex medio-longitudinally; surface punctured clearly and densely with median glabrous area; prosternal sutures double lined, each furrowed at anterior $\frac{1}{3}$. Prosternal process bent inward strongly at procoxal cavity, well ridged medio-longitudinally. Propleura truncated posteriorly with many elongate punctures. Hind coxal plate gradually enlarged inward without tooth. Claws of legs with 8 conspicuous teeth.

Male genitalia (Fig. 1f); relative length of median lobe and lateral lobe as 1.13/1.00 mm M/L; parameres long, a little shorter than median lobe, apico-lateral barbs well-developed and projected post-laterally, the end of barb pointed sharply, relative lateral slanting length and the width of barb as 0.31/0.18 mm L/W. Apex of median lobe pointed narrowly.

Specimens examined. [Holotype] ; <NASTI> - 1 ♂, Taekwanryöng, KW, Korea, ?. VIII. 1987, S.B. Ahn. [Paratypes] ; <NASTI> - 1 ♂, Koryo (Kwangnüng), 10. IV. 1923, Y. Hasegawa; 1 ♂, Suwon, KG, 1. V. 1970; 1 ♂, Haenam, JN, ?. VII. 1988, S.H. Kim, <KPNU> - 1 ♂, Kaya, KN, 15. VI. 1974, Y.J. Kwon; 1 ♂, Mt. Taebaek, KB, 17. VI. 1974, S.M. Lee; 1 ♂, Mt. Pukhan, Seoul, 16. VII. 1976, S.M. Lee; 1 ♂, Mt. Songni, CB, 9. VI. 1977, S.M. Lee; 1 ♂, Mt. Sörak, KW, 16. VI. 1978, S.M. Lee; 1 ♂, Mt. Sörak, KW, 28. VI. 1978, S.M. Lee; 1 ♂, Mt. Sörak, KW, 4. VI. 1981, S.M. Lee; 1 ♂, Mt. Obong, KB, 20. V. 1982, Y.J. Kwon; 1 ♂, Mt. Pukhan, KG, 29. V. 1983, Y.J. Kwon; 1 ♂, Mt. Chuhül, 5. VI. 1983, Y.J. Kwon; 1 ♂, Mt. P'algong, KB, 26. V. 1985, Y.J. Kwon; 1 ♂, Mt. Sörak, KW, 23. V. 1989, Y.J. Kwon; 2 ♂♂, Mt. Tögyu, 28. V. 1991, Y.J. Kwon; 4 ♂♂, Mt. Kariwang KW, 2. VI. 1991, Y.J. Kwon; 1 ♂, Mt. Chiri, JN, 12. VI. 1983, Y.J. Kwon; 1 ♂, Mt. Pukhan, Seoul, 29. V. 1983, Y.J. Kwon; 2 ♂♂, Mt. P'algong, KB, 29. V. 1985, Y.J. Kwon, <KWNU> - 1 ♂, Hongch'ön, KW, 20. V. 1988; 1 ♂, Sogümgang, KW, 24. V. 1988, K.T. Park; 1 ♂, Ch'unsöng, KW, 5. VI. 1989; 1 ♂, Mt. Myöngji, KG,

13. VI. 1989, V. Hyun

Distribution - Korea (South).

Etymology - This beetle is named as *M. niger* because body is entirely black.

Remarks - This species is similar to *M. correctus* common in Japan, but more robust in external shape. Male genitalia is also very different from the Japanese species. The punctures on the surface of body are more large and distinct.

***Melanotus hallasanae* sp. nov.**

한라빛살방아벌레 (신칭) (Fig. 1 : c, g)

Male 13.0-14.0/3.6-3.9 mm BL/BW

Body elongate fusiform, widest at elytral humeri, shining all over the body. Colour black wholly. Pubescence yellowish brown wholly and recumbent.

Head flattened and somewhat depressed triangularly; anterior margin well-carinated and pointed in the middle; surface with many distinct circular punctures; interocular area about 3.5 (1.4/0.4 mm) times as broad as the width of each eye in dorsal view; frontal groove narrowed in the middle.

Antennae; last segment attaining the apex of pronotal hind angle; first segment elongate suboval; second (0.18/0.2 mm L/W) short and globular, as long as wide; third (0.25/0.23 mm L/W) a little more elongate, dilated apically, 1.1 times as long as wide, and 1.4 times as long as second; fourth (0.56/0.35 mm L/W) triangle, 1.6 times as long as wide and 2.3 times as long as third; fourth to tenth segment serrate, gradually narrowing apically; eleventh (0.69/0.21 mm L/W) subfusiform, about 3.3 times as long as wide.

Pronotum a little flattened, medio-longitudinal length shorter than the width in the middle (3.3/3.7 mm L/W); sides rounded, gradually convergent anteriorly; posterior angles projected backward, each bears a well-developed carina, the length of carina 1.3 mm, apex pointed sharply, punctures of disc middle size; interspaces between punctures smooth and shining; sublateral basal furrow deep.

Scutellum elongate, sides subparallel, anterior margin truncated and posterior margin rounded, surface depressed with many small shallow punctures; relative median length and basal width as 0.7/0.35 mm L/W.

Elytra widest at humeri, subparallel at basal $\frac{2}{3}$, then gradually narrowing posteriorly; relative sutural length including scutellum and humeral width as 10.3/3.9 mm L/W, substraight at humeral base; Strial furrows shallow

with distinct and periodical punctures; strial interstices smooth with uniform small punctures.

Prosternum, subtrapezoid, convex medio-longitudinally; surface punctured clearly and densely; prosternal sutures double-lined, each furrowed at anterior half. Prosternal process bent inward strongly at the procoxal cavity, well ridged medio-longitudinally. Propleura truncated posteriorly with many elongate punctures. Hind coxal plate gradually enlarged inward without tooth. Claws of legs with 8 conspicuous teeth.

Male genitalia (Fig. 1g); the relative length of median lobe and lateral lobe as 1.16/1.07 mm M/W; lateral lobes robust and long, reaching almost the end of median lobe, apico-lateral barbs well-developed and projected backward strongly, the end of lateral barb pointed sharply, relative lateral slanting length and the width of barb as 0.35/0.16 mm L/W. Apex of median lobe pointed narrowly.

Specimens examined. [Holotype] ; <KPNU> - ♂, Mt. Halla, CJ, 2 VI 1989, Y.J. Kwon. [Paratypes] ; <KPNU> - 3 ♂♂, Mt. Halla, CJ, 2 VI 1989, Y.J. Kwon.

Distribution - Korea (Cheju Is.).

Etymology - I named this species as *M. hallasanae* according to the name of mountain Halla in Cheju Island, from which the type series were collected.

***Melanotus augustianus* sp. nov.**

건석빛살방아벌레 (신칭) (Fig. 1 : d, h)

Male (12.0-12.5)/(3.4-3.5)mm BL/BW.

Body elongate fusiform, widest at elytral humeri. Colour blackish brown, but legs, antennae and elytra pale, reddish brown. Pubescence ash colour wholly and recumbent.

Head flattened, anterior margin well-carinated and pointed roundly in the middle, depressed in anterior $\frac{1}{3}$; surface punctured clearly; interocular area about 6.5 times (1.3 : 0.2 mm) as broad as the width of each eye in dorsal view; frontal groove a little narrowed in the middle.

Antennae long moderately; last segment exceed the hind angles of pronotum; first segment elongate suboval; second (0.19/0.18 mm L/W) short and globular; third (0.25/0.2 mm L/W) a little elongate, dilated apically, 1.3 times as long as wide, and 1.3 times as long as the second; fourth (0.50/0.28 mm L/W) triangle, 3.6 times as long as wide and 2 times as long as the third; fourth to

tenth segment serrate, gradually narrowing apically; eleventh (0.63/0.23 mm L/W) subfusiform, about 2.7 times as long as wide.

Pronotum a little convex, medio-longitudinal length shorter than the width in the middle; sides subparallel at basal half, then gradually convergent anteriorly; posterior angles projected backward, each bears a well-developed carina (1.0 mm long), apex pointed bluntly; punctures of disc circular and distinct with a pair of glabrous area in the middle; interspaces between punctures smooth and shining; sublateral basal furrow short and vestigial.

Scutellum tongue-shaped, widest at basal margin, gradually narrowing posteriorly, posterior margin pointed roundly; surface flattened with many obscure punctures; relative median length and basal width as 0.6/0.4 mm L/W.

Elytra widest at humeri, subparallel at basal half, then gradually narrowing posteriorly; relative sutural length including scutellum and humeral width as 9.5/3.5 mm L/W; striae shallow with distinct and periodical punctures; striae interstices smooth with uniform small punctures.

Prosternum, subtrapezoid, convex medio-longitudinally; surface punctured clearly and densely; prosternal sutures doubled-lined, each grooved at anterior half. Prosternal process bent inward strongly from the procoxal cavity to apex; well-ridged medio-longitudinally. Propleura truncated posteriorly with many elongate punctures. Hind coxal plate gradually enlarged inward without tooth. Claws of legs 7 conspicuous teeth.

Male genitalia (Fig. 1h); relative length of median lobe and lateral lobe as 1.0/0.87 mm M/L; each lateral lobe angled laterally, the apex of angle pointed backward, the lateral margin rounded; relative lateral slanting length and the width of barb as 0.26/0.15 mm L/W. Apex of median lobe pointed narrowly.

Specimens examined. [**Holotype**] ; <KPNU> - ♂, Mt. P'algong KB, 6 VI 1985, Y.J. Kwon. [Paratype] ; <KPNU> - 1 ♂, Mt. Chiri, 18 VIII 1989, Y. J. Kwon

Distribution - Korea (South).

Etymology - The species name was derived from the baptismal name of Dr. K. S. Woo, an entomologist and professor of Seoul National University.

Remarks - This species resembles *M. niger* sp. nov. and Japanese species, *M. correctus* but body size is smaller than *M. niger*, male genitalia is different at the shape of lateral lobe from *M. correctus* and *M. niger*, and distinguished easily because body colour is brown while the other two species are wholly black.

Acknowledgements - I am grateful to Prof. K.S. Woo, College of Agriculture & Life Science, Seoul National University and Prof. Yong Jung Kwon, Department of Agricultural Biology, Kyunpook National University for the loan of many specimens. I also thank Drs. Takashi Kishii, Biological Laboratory Heian High School, Kyoto, Japan, Wataru Suzuki, Laboratory of Entomology, Tokyo University of Agriculture, Japan, Hitoo Ohira, Entomological Laboratory, Aichi University of Education, Okazaki, Japan, and Giuseppe Platia, Italy, C.M.F. Hayek, Dept. of Entomology, British Museum (Natural History), London for sending many materials, reprints and valuable informations in reply to my inquiry.

Literature Cited

- The Entomological Society of Korea & Korean Society of Applied Entomology. 1994. Check list of insects from Korea. 744pp.
- Hayek, C.M.F. 1990. A Reclassification of the *Melanotus* group of genera (Coleoptera: Elateridae). Bull. Br. Mus. nat. Hist. (Ent.) 59(1): 37~115.
- Lee, S.H. 1995. Elateridae of Chejudo (Coleoptera). I. Subfamilies Pyrophorinae and Melanotinae. Ins. Koreana Suppl. 5: 73~82.
- Stibick, J.N.L. 1979. Classification of the Elateridae (Coleoptera), Relationships and Classification of the subfamilies and tribes. Pacific Insects, Vol. 20(2-3): 145~186.

(Received January 5, 1998; Accepted August 27, 1998)

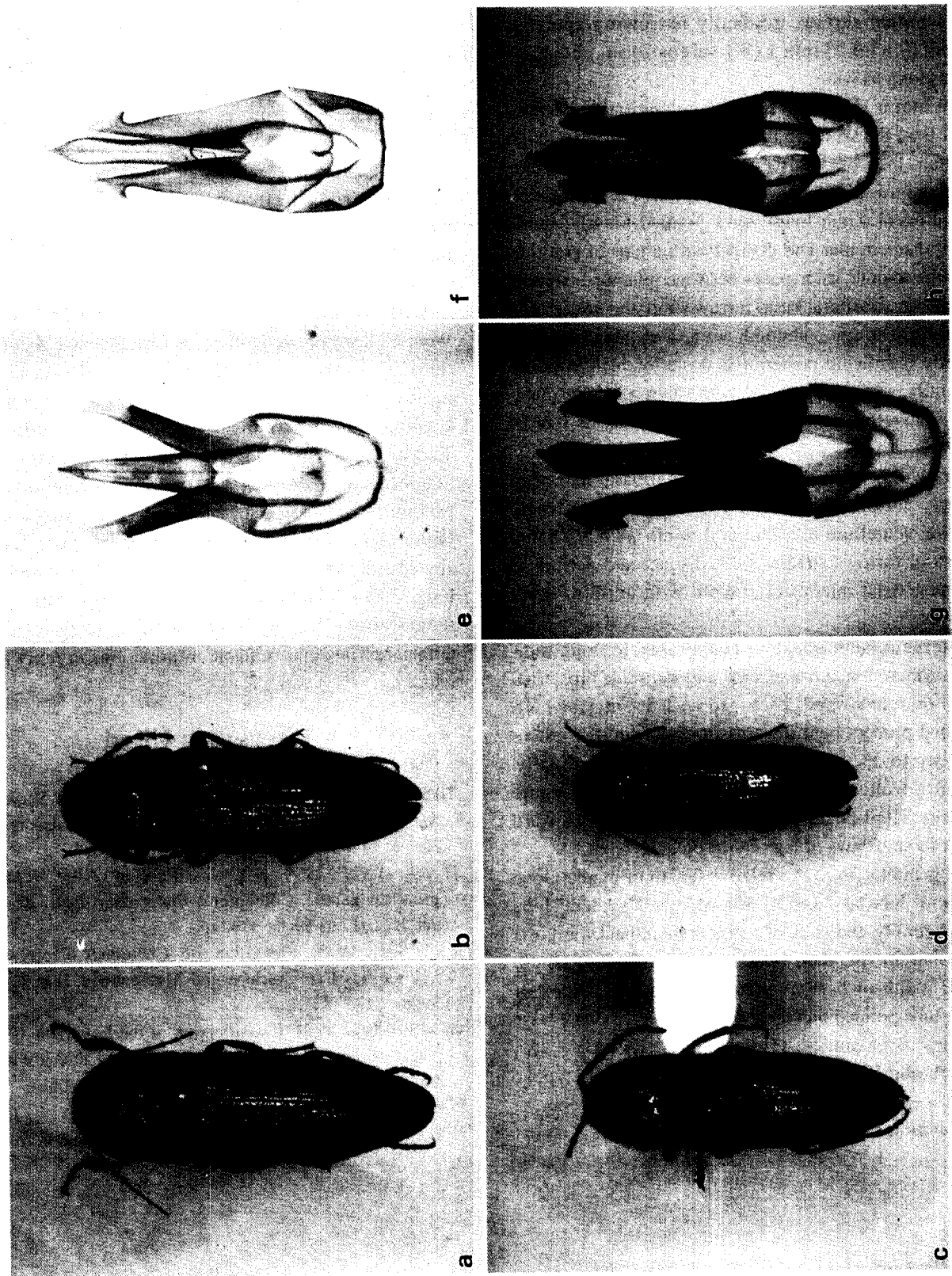


Fig. 1. Adult male (a. *Melanotus suwonensis* sp. nov.; b. *Melanotus niger* sp. nov.; c. *Melanotus hallasanae* sp. nov.; d. *Melanotus augustianus* sp. nov.) and male genitalia (e. *Melanotus suwonensis* sp. nov.; f. *Melanotus niger* sp. nov.; g. *Melanotus hallasanae* sp. nov.; h. *Melanotus augustianus* sp. nov.)