

## CONTRIBUTION TO THE KNOWLEDGE OF THE CLICK BEETLES OF ULLUNG ISLAND (SOUTH KOREA) (COLEOPTERA, ELATERIDAE)

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**Abstract:** Fifteen species of click beetles, belonging to eleven genera, are listed from Ullung Island (South Korea). *Prosternon ullungensis* n. sp. is described and ten species of the genera *Pectocera*, *Prosternon*, *Agriotes*, *Ectinus*, *Elater*, *Ectamenogonus*, *Melanotus*, *Paracardiophorus* are recorded for the first time from the island.

**Key words:** Coleoptera, Elateridae, new species, new records, Ullung Island, Korea.

### Aportación al conocimiento de los elatéridos de la isla de Ullung (Corea del Sur) (Coleoptera, Elateridae)

**Resumen:** Se enumeran quince especies de elatéridos, pertenecientes a once géneros, de la isla de Ullung (Corea del Sur). Se describe *Prosternon ullungensis* n. sp. y se citan por primera vez de esta isla diez especies de los géneros *Pectocera*, *Prosternon*, *Agriotes*, *Ectinus*, *Elater*, *Ectamenogonus*, *Melanotus*, *Paracardiophorus*.

**Palabras clave:** Coleoptera, Elateridae, especie nueva, citas nuevas, Ullung Island, Corea.

**Taxonomy / Taxonomía:** *Prosternon ullungensis* sp. n.

### Introduction

Natural history of Ullung Island entomological faunal surveys.

Ullung-do, about 73 km<sup>2</sup> in the gross area and 984 m tall in the highest peak, is an island of tholoide by volcanic origin and lies from the East coast of Korea by 137km. The first volcanic eruptions occurred on the bottom of the sea approximately 2.7 million years ago, and then the colonization on the sea has been estimated about 1.8 million years ago. It is no any connected event with the mainland has been known (Kim, 1985). The climate is a mild oceanic, with 12°C in the average annual temperature and 1,485mm in the average annual rainfall, and more warm than the climate of mainland of Korea.

By the peculiar geographical and climatic conditions of the island, many entomological faunal surveys carried out. Since the first publication reported 19 lepidopteran species of which *Pterodecta felderi* (Bremer) was new to Korean fauna by Cho (1929), a total of 841 species, 608 genera, 153 families, 17 orders are recognized by about 55 faunistic study up to now (Lee *et al.*, 2006).

However, species diversity of the family Elateridae has been not well known. Only five species were recognized from Ullung Island in the present. Three species, *Aeoloderma agnatus* (Candèze), *Agrypnus cordicollis* (Candèze), *Melanotus legatus* Candèze, were firstly reported (Kwon *et al.*, 1996). And then, two species, *Agrypnus binodulus coreanus* Kishii, *Actenicerus pruinosus* (Motschulsky) were additionally recorded (Lee *et al.*, 2006).

In this study, we obtained 15 species belonging to 11 genera including one new to science from Ullung island as listed below. We have not seen specimens of *Agrypnus cordicollis* (Candèze) and *Actenicerus pruinosus* (Motschulsky). A new species belonging to the genus *Nipponoelater* is describing by our colleague R. Schimmel (in litteris).

### Material and methods

**Body measurements:** Body length is measured along the midline from the anterior margin of the frons to the apex of the elytra; the width is measured across the broadest part of the entire beetle.

**Pronotal measurements:** The pronotal length is measured along the midline; the width at the broadest part, which is most usually at the hind angles.

**Abbreviations:** The names of institutions, museums and private collections containing the studied material are abbreviated as follows:

**CPG** - Platia Collection, Gatteo (Italy);

**CRG** - Riese Collection, Genoa (Italy);

**MCSNG** - Genoa, Civic Museum of Natural History;

**NAAS** - Applied Entomology Division, Department of Agricultural Biology, National Academy of Agricultural Science (NAAS), Suwon, Korea.

The tribal placement of genera and species listed below follows Sánchez-Ruiz (1996).

### Results

#### Tribe Agrypnini Candèze, 1857

*Agrypnus binodulus coreanus* Kishii, 1961

MATERIAL EXAMINED. 1 ♂ - Korea : Ullung Island, Sadong, 6.VI.2000, T. Man Han (NAAS).

DISTRIBUTION. China; Japan (Tsushima); Korea.

#### Tribe Oophorini Gistel, 1856

*Aeoloderma agnatus* (Candèze, 1873)

MATERIAL EXAMINED. 1 ♂, 2 ♀ - Korea : Ullung Island, Naribunji, 6.VI.2000, T. Man Han. (NAAS).

DISTRIBUTION. Japan; China; Korea.

#### Tribe Pectocerini Gurjeva, 1974

*Pectocera fortunei* Candèze, 1873

MATERIAL EXAMINED. 1 ♀ - Korea: Ullung Island, Naribunji, 6.VI.2000, T. Man Han (NAAS).

DISTRIBUTION. China; Korea. New to Ullung Island.

#### Tribe Prosternini Gistel, 1856

*Prosternon ullungensis* n. sp.

Fig. 1, 11, 19, 19a, 28.

MATERIAL EXAMINED. Holotypus ♂ - Korea: Ullung Island, Mt Songin peak (37°40'N, 130°60'E), 948 m, 9-18.VII.2008, Li Jingke (CRG don. MCSNG); 1 Paratypus ♀ - same data as Ht (CPG).

DIAGNOSIS. The species for the large size is allied to *P. aurichalceum* (Stepanov, 1930) but can be separated by the nearly unicolour blackish body and the unicoloured blackish abdominal sternites, the more raised carina at posterior angles of pronotum, the sclerites of bursa copulatrix.

DESCRIPTION. Male. Moderately shiny; entirely blackish with first article of antennae, elytral humera, lateral conduit of elytra, epilpeura, legs, ferruginous; covered with dense, long, yellow-fulvous vestiture, on pronotum and elytra arranged to give to the surface a variegated appearance.

Head small, with eyes as wide as anterior margin of pronotum, frons flat, symmetrically and shallowly impressed at sides before the anterior margin, the latter obsolete and merged with clypeus; suprantennal carinae short, punctures very dense, contiguous and confluent. Antennae not reaching for about one article the apices of posterior angles of pronotum serrated from fourth article on; second segment subcylindrical, globous, just longer than wide, third subconical, slender, 2,5x longer than second and as long as fourth; fourth-tenth triangular, shortly pedunculate, 1,5-1,6x longer than wide, last a little longer than penultimate, ellipsoidal, constricted at apical third.

Pronotum 1,16x wider than long, widest at middle; strongly convex, abruptly sloping at sides and base, with a shallow, mid-longitudinal depression at basal slope and a mid-longitudinal slightly raised, very narrow, smooth line, from anterior margin to near the middle; sides strongly arcuate, from middle forwards regularly and strongly tapering to the anterior angles, the latter briefly truncate; backwards strongly tapering to the posterior angles, the latter short, truncate, not diverging with a short and raised carina; lateral margins entirely visible on dorsal view forming a very narrow conduit; puncturation very dense on all the surface, on disc punctures of approximately the same diameters, deep, simple or indistinctly umbilicate with very short shiny intervals, gradually denser to the sides becoming contiguous at lateral extremities and giving to the surface a dull appearance.

Scutellum quadrangular, ridged at base, sinuate laterally at first third then dilated and subrounded at apex, slightly impressed at center, with dense, contiguous punctures. Elytra 2,9x longer than pronotum, rather depressed on disc, with very pronounced humera, from fifth interstria suddenly sloping at sides; lateral extremities forming a clear conduit wider at apical third; striae well marked and with superficial punctures; interstriae flat in the first half then gradually more convex particularly at apical third with very dense and fine punctures.

Aedeagus as in fig. 1 (length 1,93).

Female. Very similar to male with shorter and moderately serrated antennae.

Bursa copulatrix as in fig. 11.

Size. Length 16,5-16,8 mm; width 5-5,1 mm.

ETYMOLOGY. The name is derived from the locality where the species lives, Ullung Island.

*Prosternon sericeum* (Gebler, 1824)

Fig. 2, 20, 29.

MATERIAL EXAMINED. 1 ♂ - Korea: Ullung Island, Mt Songin peak (37°40'N, 130°60'E), 948 m, 9-18.VII.2008, Li Jingke (CRG).

Aedeagus as in fig. 2 (length 1,43 mm).

DISTRIBUTION. Far East Russia; Mongolia; N China. North America. New to Korea and Ullung Island.

#### Tribe Agriotini Champion, 1896

*Agriotes obscurus* (Linnaeus, 1758)

Fig. 12, 21, 30.

MATERIAL EXAMINED. 1 ♀ - Korea: Ullung Island, Mt Songin peak (37°40'N, 130°60'E), 948 m, 5-10.VI.2008, Li Jingke (CRG).

Bursa copulatrix sclerified as in fig. 12.

DISTRIBUTION. Europe, Russia, Mongolia, N China, ? Japan (Kishii, 1999), N America (introduced). New to Korea and Ullung Island.

*Ectinus dahuricus dahuricus* (Candèze, 1863)

Fig. 3.

MATERIAL EXAMINED. 3 ♂♀. - Korea: Ullung Island, Mt Songin peak (37°40'N, 130°60'E), 948 m, 9-18.VII.2008, Li Jingke (CPG; CRG).

Aedeagus as in fig. 3 (length 1,37 mm).

DISTRIBUTION. Russia, China, N Korea. New to S Korea and Ullung Island.

*Ectinus piloselloides* (Schwarz, 1891)

Fig. 4, 13.

MATERIAL EXAMINED. 8 ♂♀ - Korea: Ullung Island, Mt Songin peak (37°40'N, 130°60'E), 948 m, 5-10.VI.2008, Li Jingke (CPG; CRG).

Aedeagus as in fig. 4 (length 1,37 mm).

Bursa copulatrix sclerified as in fig. 13.

DISTRIBUTION. Russia, China, Japan (Kishii, 1999). New to Korea and Ullung Island.

#### Tribe Elaterini Leach, 1815

*Elater solskyi* (W. Suzuki, 1995)

Fig. 5, 23, 23a.

MATERIAL EXAMINED. 1 ♂. - Korea: Ullung Island, Mt Songin peak (37°40'N, 130°60'E), 948 m, 9-18.VII.2008, Li Jingke (CRG).

Aedeagus as in fig. 5 (length 1,93 mm).

DISTRIBUTION. Far East Russia, N China, Korea. New to Ullung Island.

#### Tribe Ampedini Gistel, 1856

*Ampedus* sp. (*pomorum* group)

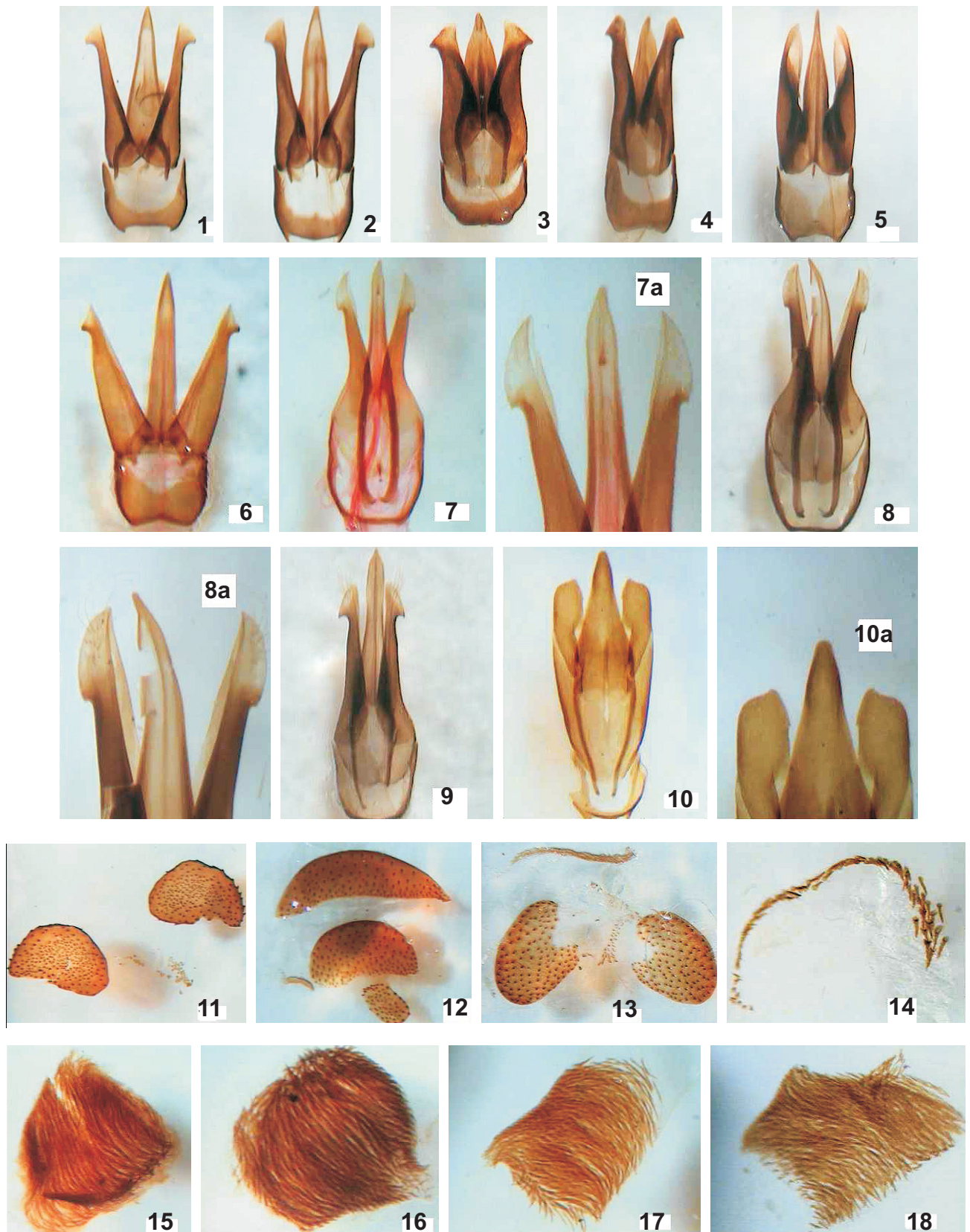
Fig. 6, 24, 32.

MATERIAL EXAMINED. Holotypus ♂ - Korea: Ullung Island, without exact locality, 15-18.VII.2008, T. Woo Kim (NAAS).

Aedeagus as in fig. 6 (length 1,25 mm).

Size. Length 10,7 mm; width 3,06 mm.

NOTES. This species belongs to the *pomorum* group according to Gurjeva, 1977; it resembles *A. fagi* (Lewis) and *A. alticola* Silfverberg from Japan and could belong to a new species but we don't know several other Japanese species and on the basis of a single specimen we prefer to not describe it.



**Fig. 1-10.** Male genitalia in dorsal view. 1. *Prosternon ullungensis* n. sp.; 2. *Prosternon sericeum* (Gebler); 3. *Ectinus dahuricus* (Candèze); 4. *Ectinus piloselloides* (Schwarz); 5. *Elater solskyi* (W. Suzuki); 6. *Ampedus* sp.; 7, 7a, 8, 8a *Melanotus legatus* Candèze; 9. *Melanotus matsumurai* Schenkling; 10, 10a. *Paracardiophorus corenaus* Kishii. **Fig. 11-18.** Sclerites of bursa copulatrix. 11. *Prosternon ullungensis* n. sp.; 12. *Agriotes obscurus* (Linnaeus); 13. *Ectinus piloselloides* (Schwarz); 14. *Ectamenogonus plebejus* (Candèze); 15-16-17. *Melanotus legatus* Candèze; 18. *Melanotus matsumurai* Schenkling.

### Tribe Megapenthini Gurjeva, 1973

*Ectamenogonus plebejus* (Candèze, 1873)

Fig. 14, 22, 31.

MATERIAL EXAMINED. 1 ♀ - Korea: Ullung Island, Mt Songin peak (37°40'N, 130°60'E), 948 m, 9-18.VII.2008, Li Jingke (CRG).

Bursa copulatrix sclerified as in fig. 14.

DISTRIBUTION. Japan, China, S Korea, Taiwan. New to Ullung Island.

### Tribe Melanotini Candèze, 1859

*Melanotus legatus* Candèze, 1860

Fig. 7, 7a, 8, 8a; 15, 16, 17, 25, 26, 33, 34.

MATERIAL EXAMINED. 13 ♂♀. - Korea: Ullung Island, Mt Songin peak (37°40'N, 130°60'E), 948 m, 9-18.VII.2008, Li Jingke; Naribunji, 6.VI.2000, T. Man Han; Sadong, 6.VI.2000, T. Man Han; with. Locality, 15-18.VII.2008, T. Woo Kim; Do-Dong, 15.VII.1977, J. Ok Lee; Do-Dong, 20.VI.1982, S.M. Lee; (CPG; CRG; NAAS).

Aedeagus as in fig. 7, 7a, 8, 8a (length 1,62-1,7mm).

DISTRIBUTION. Japan; China, Korea.

NOTES. *Melanotus legatus* Candèze is a rather variable species and we have found a certain degree of variability in the shape of pronotum, length of third articles of antennae, bursa copulatrix, aedeagus, also among the material of Ullung; of the species are actually described four subspecies, three from Japan and one from Korea (ssp. *leeanus* Kishii, 2002). As it is very difficult to separate the different described subspecies because of a high degree of variability we prefer to not include the specimens from Ullung in a particular subspecies.

*Melanotus matsumurai* Schenkling, 1927

Fig. 9, 18, 27, 27a.

MATERIAL EXAMINED. 5 ♂♀ - Korea: Ullung Island, Mt Songin peak (37°40'N, 130°60'E), 948 m, 5-10.VI.2008, Li Jingke; (CPG; CRG).

Aedeagus as in fig. 9 (length 2,18 mm).

Bursa copulatrix sclerified as in fig. 18.

DISTRIBUTION. Far East Russia; N China; Korea. New to Ullung Island

*Melanotus spernendus* Candèze, 1873

MATERIAL EXAMINED. 1 ♂ - Korea: Ullung Island, Jeo-Dong, 9.VII.1978, S.M. Lee (det. W. Suzuki, 1993) (NAAS).

NOTES. The specimen lacks the genitalia; it agree with specimens from Japan (det. Arimoto, det. Kishii).

DISTRIBUTION. Japan. New to Korea and Ullung Island.

### Tribe Cardiophorini Candèze, 1859

*Paracardiophorus coreanus* Kishii, 1977

Fig. 10, 10a, 35.

MATERIAL EXAMINED. 5 ♂ - Korea: Ullung Island, Chusan, 10.VIII.1971, C. W. Kim; Sadong, 6.VI.2000, T. Man Han ; without locality, 15-18.VII.2008, T. Woo Kim (NAAS).

Aedeagus as in fig. 10, 10a (length 1,06 mm).

DISTRIBUTION. N China; Korea. New to Ullung Island.

### Acknowledgements

We are indebted to the colleagues S. Riese of Genoa for providing the majority of material from the Ullung Island.

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► Fig. 19-27. First antennal articles. 19, 19a *Prosternon ullungensis* n. sp ♂♀; 20. *Prosternon sericeum* (Gebler); 21. *Agriotes obscurus* (Linnaeus); 22. *Ectamenogonus plebejus* (Candèze); 23, 23a (last articles) *Elater solskyi* (W. Suzuki); 24. *Ampedus* sp.; 25-26. *Melanotus legatus* Candèze; 27, 27a. *Melanotus matsumurai* Schenkling ♂♀. Fig. 28-35. 28. Habitus of adults in partial or total view. 28. *Prosternon ullungensis* n. sp ♂; 29. *Prosternon sericeum* (Gebler); 30. *Agriotes obscurus* (Linnaeus) ♀; 31. *Ectamenogonus plebejus* (Candèze) ♀; 32. *Ampedus* sp.; 33-34. *Melanotus legatus* Candèze; 35. *Paracardiophorus coreanus* Kishii.

