

ON NEW GENERA AND SPECIES OF INTERTIDAL
ALEOCHARINAE (COLEOPTERA: STAPHYLINIDAE)
AND GONIACERINAE (PSELAPHIDAE) FROM
SINGAPORE AND JAPAN

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ABSTRACT. - Three new halobiont staphylinid beetles are described - *Linoglossa murphyi* from mangroves in Singapore, *Bryothinusa sakishimana* from mangroves in Okinawa and *Boreiorhadinus pacificus* from algal wrack in Hokkaido. A new halobiont pselaphid beetle *Halohermatus regulus* is from a coral reef in Okinawa. The genera *Boreiorhadinus* (near *Halorhadinus* Sawada) and *Halohermatus* (near *Reichenbachia* Leach) are established as new.

INTRODUCTION

This paper assembles descriptions of four new inter-tidal Coleoptera-Staphylinoidea from the Indo-Pacific region. Two Staphylinidae Aleocharinae are from mangrove forest (in Singapore and in the Ryukyu Islands south of Japan); a tropical habitat previously little explored for insects but now known to be rich in undescribed species (Sawada, 1989; Tanokuchi, 1989). The halobiont Staphylinidae of Japan are better known (Sawada, 1955, 1971) but new taxa continue to be discovered and another Aleocharine from Hokkaido requiring a new genus is described here.

Fully halobiont Pselaphidae are rarely reported and a new genus and species from under fragments of coral on an Okinawan reef is of special interest.

In the following descriptions of new Staphylinidae, conventions follow those established by the author in earlier papers on the group. A useful reference is Yosii & Sawada (1976) where, for example, the coding for abdominal macrochaetotaxy (tergites II-VI) is explained (loc. cit.: 15, Fig. 7F).

Type specimens of all species are deposited in the personal collection of the author (KS) and some paratypes of *Linoglossa murphyi* are in the Zoological Reference Collection (ZRC), National University of Singapore.

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TAXONOMY

FAMILY STAPHYLINIDAE

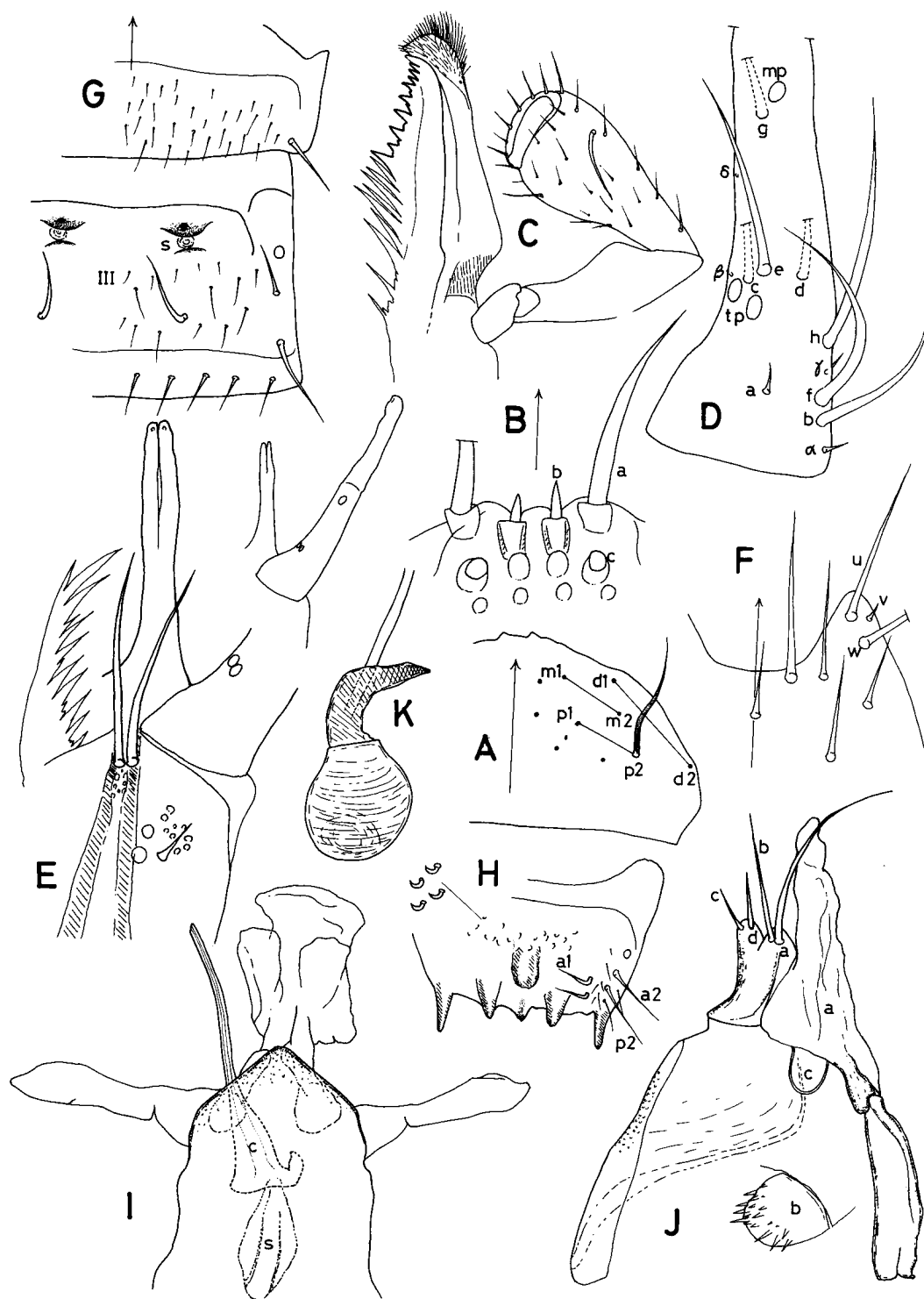
SUBFAMILY ALEOCHARINAE

Linoglossa murphyi, new species

(Figs. A-K)

Material examined. - Holotype - male, allotype - female, 4 paratypes (KS), 2 paratypes (ZRC), mangroves at Mandai Kechil, Singapore, leg. D. H. Murphy, 14.ii.1987.

Description. - Male - Length ca. 2.60 mm (head 0.30 mm long x 0.41 mm wide; pronotum 0.35 mm x 0.46 mm; elytra 0.40 mm x 0.61 mm). Glossy reddish brown in ground colour, elytra more or less infusate leaving the anterior portion, the distal segments of antennae paler in colour, legs brownish. Body well-sclerotized and with very short, inconspicuous setae. Head broad, rather abruptly constricted basally and with moderately large, dense punctures all over. Eyes small in relation to the postgena. Antenna long with segments I to III similarly elongate, IV longer than wide and much shorter than III, VII about as long as wide, X distinctly transverse. Labrum (Fig. A) short, very broadly rounded in front; among 6+6 major setae *pl* is close to the level of *m2*, *d2* is posterior to *p2*, proximal row of setae subequal to medial row in length, 4+4 secondary setae are present; from labral margin (Fig. B) *a* is stout and divergent, *b* spiniform, *c* inconspicuous. Mandibles narrowly elongate and sharply pointed at apices, the right one has a fine mola. Maxillary palpus (Fig. C) 4-segmented with segment II stout, fairly dilated distally, III much more dilated than II, IV short and relatively broad. Galea (Fig. C) narrow, long and with a densely ciliate distal lobe. Lacinia (Fig. C) corneous, a row of some seven short marginal teeth is present, more proximally several longer spines occur. Labial palpus (Fig. E) styliform, *a* is reduced to a setula, on the same level with *f*, *c* close to the level of *d*, *h* is posterior to *tp*, *e* is close to *tp* in position. Glossa (Fig. E) long, slightly dilated medially, surpassing the top of segment II and deeply bifid to the middle. Mentum (Fig. F) deeply emarginate in the anterior margin, *v* is just before the apex of the produced antero-external corner, *u* is on the same level with *v*. Prementum (Fig. E) narrow, gradually divergent behind and with a few pseudopores, paired distal setae are short and standing close together. Paraglossa well-developed with many long spines. Pronotum broadly rounded anteriorly and abruptly narrowed behind, the posterior half of disc broadly depressed, the depression becoming deep posteriorly, the disc furnished with distinct granules, those on the depressed part finer and denser, lateral erect setae conspicuous. Elytra longer than the pronotum and deeply emarginate postero-externally, the disc is much more roughly granulate than in the pronotum. Hind wings well-developed. Macrochaetotaxy of abdominal tergites as 01-12-12-12-12-22, with *pl* advanced in position. Abdomen thick, parallel-sided and nearly glabrous above, tergites III to V obviously depressed basally, in the bottom of the depressions peculiarly there are two small rounded sensillae (*s* in Fig. G) which are partly concealed by an extension derived from the anterior integument. Tergite VIII (Fig. H) medially raised to form a flat broad elevation, in the middle of the posterior margin with a small pointed tooth, and on each side with a larger one, the lateral margin with a small pointed tooth, and on each side with a larger one, the lateral margin itself projected as a longer spine; there are 4+4 major setae in which the inner ones are strongly recurved, among short secondary setae those on the central part of disc are modified as a thick, curved setula. Prosternum carinate



Figs. A-K. *Linoglossa murphyi*, new species. A, B, labral chaetotaxy and its marginal sensillae; C, maxilla I; D, labial palpal chaetotaxy; E, labium; F, mentum; G, tergites II, III; H, tergite VIII, female; I, apical lobe and copulatory piece in ventr. v.; J, lateral lobe; K, spermatheca.

in the middle. Mesosternum simple, its process acute and met by apex of metasternum. Legs long, meso- and metatarsi have the basal segments subequally short and with no empodia. Median lobe of aedeagus (Fig. I) 0.34 mm long, ventrally apical lobe is briefly triangularly pointed at apex and on each side before the base with a rounded dilation that is fenestrate when seen from the ventral side. In lateral view median lobe is somewhat projected in the middle, abruptly bent down before the middle of apical lobe where the lateral dilation is located. Copulatory piece (Fig. I) long filiform, nearly straight and dilated basally, the basal right corner produced to a short process which is bent upwards; posterior to the corpus there is a large oblong sclerite (s in Fig. I) with two longitudinal fissures. Lateral lobe (Fig. J) fairly broad and dilated basally, in the middle a rounded, spinulose element (s in Fig. J) is present; velum is converted to a large elongate lobe (a); distal segment (Fig. J) short, lightly bilobed at apex where there are four setae which may be designated as *a*, *b*, *c*, *d* respectively; *a* is very long compared to *b*, *c*, *d*, which are subequally short.

Female: Sexual characters - abdominal segments not modified; spermatheca (Fig. K) short, well-sclerotized, bursa bulbous and without umbilicus, duct broad, curved and tapering apically.

Etymology. - This species is dedicated to Associate Professor D. H. Murphy of the Department of Zoology, National University of Singapore for his kind help in collecting the species and to commemorate his 60th birthday.

Remarks. - In the gross features of labium and labrum the species is closely allied to the East Indian *Linoglossa angustata* (Motschulsky, 1858), but differs in the much longer proximal row of setae in labrum (Fig. A), in seta *h* of labial palpus (Fig. E) which is situated not on the level of *e* like *L. angustata* but on the level of *tp*, and in the different copulatory piece of aedeagus. Also, the short segment IV of antenna, broadly depressed pronotum, rugosely granulate elytra and the presence of the discoidal sensillae of the abdominal tergites III to V (Fig. G) are characteristic.

***Bryothinusa sakishimana*, new species**
(Figs. A-M)

Material examined. - Holotype - male, allotype - female and 4 paratypes (KS), mangroves at Komi, Iriomote Is, Japan, leg. K. Sawada, 12.ix.1990.

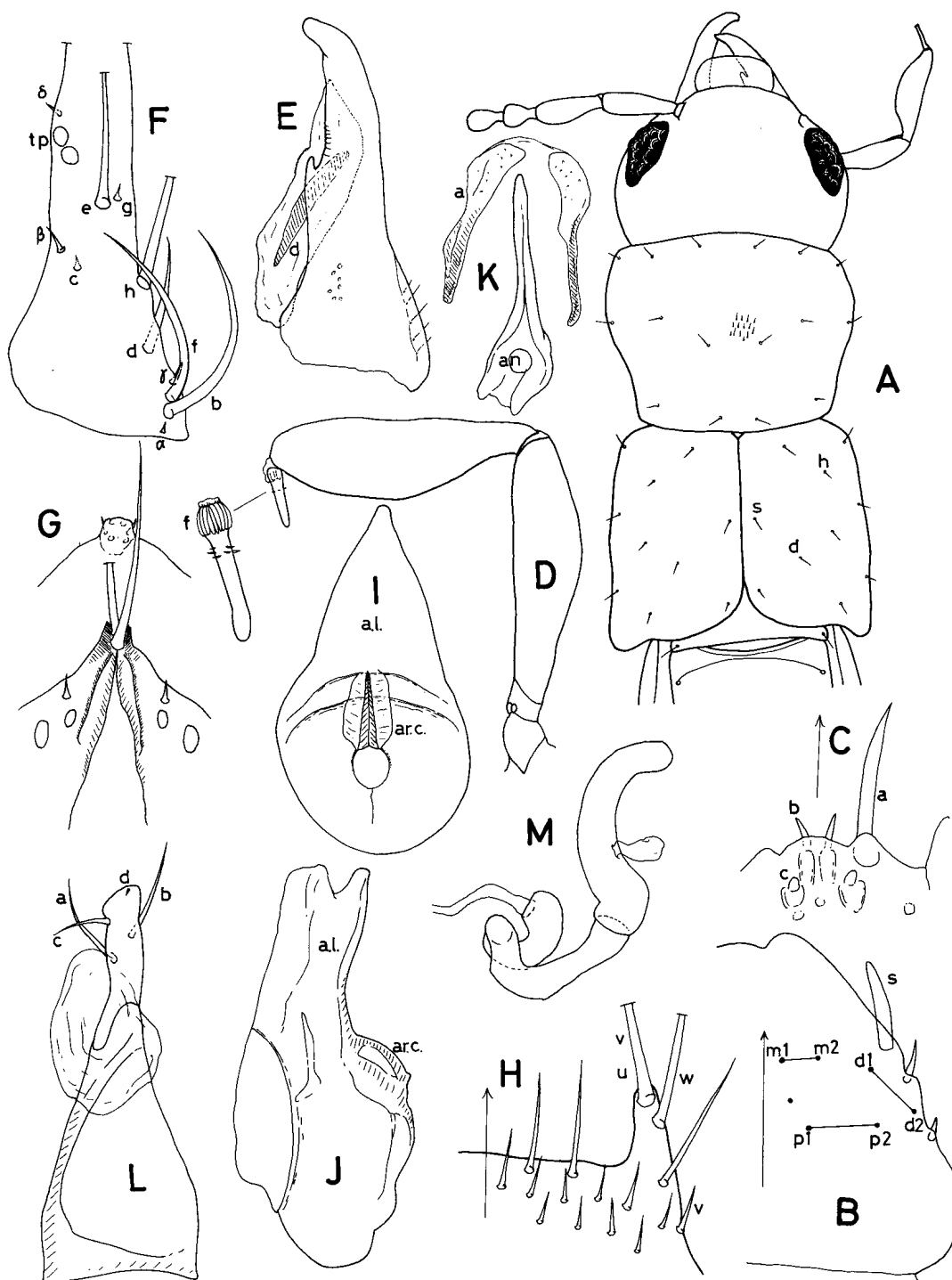
Description. - Male: Length ca. 1.60 mm (head 0.22 mm long x 0.32 mm wide; pronotum 0.28 mm x 0.35 mm; elytra 0.28 mm x 0.35 mm). Ground colour glossy brown, elytra often paler in colour, abdomen blackish towards the extremity. Body delicate and rather convex in the foreparts. Head (Fig. A) large, broader than long, evenly convex above and sericeous throughout. Eyes large, a little shorter than the post-gena from above. Antenna relatively short and only slightly dilated distally; segments I, II similarly formed; segments III, IV very small, moniliform; segment V to X gradually decreasing in width. Postgena without margins below. Cervical carina not divergent. Labrum (Fig. B) nearly as in *B. nakanei* (Sawada, 1955), but the spiniform element in the lateral margin (s in Fig. B) is larger and pointed at apex. Mandibles straightly projecting and briefly hooked before the rounded apices; the right one (Fig. E) has an obtuse, stout molar basally; prosthema (p in Fig. E) is distinctly narrowly sclerotized in the middle. Maxillary palpus (Fig. D) 4-segmented and very slender; segments II, III similarly formed,

segment IV very short, obtuse at apex and with well-developed filamentous sensillae (f in Fig. D), the radiating leaflets present anterior to the sensillae. Lacinia and galea very narrowly elongate as in other congeners, the former is sharply curved at apex and with the anterior spine much shorter than others. Labial palpus (Fig. F) very long, spiniform, its apical part lightly incurved and verrucose, the chaetotaxy as follows: β is close to the level of h , whereas δ is close to tp , γ is very close to f , a is absent, c , g are reduced to a setula, the former is on the level of h . Glossa (Fig. G) very short, broader than long and with two barely visible setulae. Prementum (Fig. G) narrowly triangular in outline, divergent posteriorly, the distal setae short and longitudinal in arrangement; one setal, two real pores are present, in which the latter are larger and ill-defined. Mentum (Fig. H) is nearly as in *B. nakanei*, but in this species the lateral corner is more produced, setae u , w are simple, not dilated basally. Pronotum (Fig. A) broader than long, broadly rounded anteriorly, sinuately constricted basally and with very short, dense secondary setae giving it a sericeous appearance, macrosetae similarly short and inconspicuous. Elytra as long as the pronotum, weakly dilated behind and fairly emarginate postero-externally. All macrosetae strongly reduced, sutural ones (s) 2+2, discals (D) 2+2, infrahumerals (h) 3+3 and laterals (l) 3+3 arranged as in Fig. A. Hind wings reduced to be twice the elytral length. Macrochaetotaxy of abdominal tergites as 01-02-02-02-02-12. Abdomen subparallel-sided, flattened above, tergites III to VI weakly depressed basally. Tergite VIII not modified, but smoothly emarginate in the posterior margin; the microsculpture imbricate basally, then becoming roughened posteriorly; the major setae are short, 4+4 in number and arranged as usual. Legs short; tarsal formula as 4, 4, 5, all tarsi have short segment I and curved bifurcate empodia. Prosternum gently convex above and with a pair of small pores in the middle. Mesosternum not carinate and only briefly pointed behind. Median lobe of aedeagus (Figs. I, J) is 0.23 mm long, ventrally triangular in outline and bulbous basally, in lateral view spical lobe is nearly straightly produced anteriorly and lightly sinuate before the base. Copulatory piece (Fig. K) filiform, not tapering and ending in an obtuse apex. There are membranous, finely tuberculate distal apophyses (a in Fig. K) whose basal portion becomes narrowed and sclerotized. Lateral lobe (Fig. L) elongate, abruptly dilated basally. Velum broad; middle apodeme nearly not differentiated; distal segment (Fig. L) is elongate and subtruncate at apex, setae a, b similarly long, c shorter and placed anterior to b , d tends to be a setula.

Female: Abdominal segments not modified; spermatheca (Fig. M) elongate and modified; bursa tubularly elongate, curved and without umbilicus, duct long, irregularly twisted and then enlarged at the end.

Etymology. - Sakishima on which the trivial name is based, is a local name of the South Ryukyu Islands including Iriomote.

Remarks. - In many crucial characters the species is closely allied to *B. nakanei* (Sawada, 1955) from the Tokara Islands, south of Kyushu. The labial palpus (Fig. F) is, however, more prolonged, and γ is removed more proximally to the level of h . Segment II of maxillary palpus (Fig. D) is shorter, nearly as long as III. The aedeagus (Figs. I, J) is nearly straightly produced and with more pointed apex. The copulatory piece (Fig. K) is not acicular as in the cited species and with different apophyses. Besides, the body is much smaller, and paler in colour. The large head, the pronotum sinuately constricted basally, the mandibles with obtuse apices and the considerably reduced hind wings are features peculiar to the present species.



Figs. A-M. *Bryothinusa sakishimana*, new species. A, habitus; B, C, labral chaetotaxy and its marginal sensillae; D, right maxillary palpus; E, right mandible; F, right labial palpus; G, glossa and prementum; H, mentum; I, J, median lobe in ventr. and lat. v.; K, copulatory piece; L, lateral lobe; M, spermatheca.

***Boreorhadinus*, new genus**

Type species. - *Boreorhadinus pacificus*, new species

Diagnosis. - Apterous; labrum (Fig. B) nearly quadrate in outline and with fairly long proximal row of setae; mandibles (Fig. C) distinctly dentate; glossa (Fig. F) prolonged, not setose and entire at apex; lacinia (Fig. D) corneous, with large and small teeth distally and finely spinous proximally; labial palpus (Fig. E) styliform, most of setae being basally congregated, and with segment III much shorter than segments I, II combined.

Remarks. - In the gross features of the labium, *Boreorhadinus* is, without doubt, closely related to *Halorhadinus* Sawada, 1971. In *Boreorhadinus* however, the mandibles possess distinct teeth along the masticatory margin, the hind wings are absent and the spermatheca is short and not coiled. In the elongate, undivided glossa, short segments of tarsi, and in the same abdominal tergal macrochaetotaxy (01-22-22-...), the genus is also near *Silusa* Erichson, 1839, but differs in the short segment III of labial palpus, toothed mandibles and different form of the lacinia.

***Boreorhadinus pacificus*, new species**

(Figs. A-L)

Material examined. - Holotype - male, allotype - female, 6 paratypes (KS), wrack at Akkeshi, east Hokkaido, Japan, leg. K. Sawada, 9.viii.1990.

Description. - Male: Length ca. 1.90 mm (head 0.32 mm long x 0.30 mm wide; pronotum 0.30 mm x 0.32 mm; elytra 0.20 mm x 0.34 mm). Pale reddish brown in ground colour, subopaque, abdomen intensively pigmented with brown and becoming paler in the apical segments. Body flat above, narrowly elongate and gradually dilated posteriorly. Head (Fig. A) large, ovate in outline, more or less flattened from the middle to frons, finely coriaceous with short secondary setae throughout. Cervical carina not divergent. Eyes strongly reduced to a small spot near the antennal insertion. Labrum (Fig. B) strongly transverse, nearly quadrate in outline, chaetal arrangement modified: among three rows of setae proximal row is the longest and nearly horizontal in arrangement, whereas distal one is the shortest and located at the antero-external corner, *m2* is strongly reduced compared to *m1*, among 6+6 secondary setae 4 are located close to the lateral margin; at the antero-external corner a long spiniform sensilla (*s* in Fig. B) is present; in labral margin *a* is setaceous, standing rather close to each other, not divergent distally, *b* near by *a*, *c* inconspicuous. Both mandibles (Fig. C) distally incurved to form a broad apical hook, and with distinct, somewhat irregular dentition in the masticatory margin. Maxillary palpus (Fig. D) 4-segmented segment II fairly dilated in the middle, III a little more dilated than in the preceding one, IV not acicular with the obtuse apex, filamentous sensillae inconspicuous. Galea (Fig. D) narrowly prolonged and with a row of long hairs along its inner margin; lacinia (Fig. D) corneous, narrow, subparallel-sided and ending in a large, pointed apical hook, subapically a similarly large tooth is present, and the margin between this tooth and the apical hook is with some six small teeth, posteriorly the corpus beset with a row of long and short marginal spines. On labial palpus (Fig. E) segment III is narrower, much shorter than I, II united. With respect to this character it is near *Diaulota* Casey and *Genoplecte* Sawada, but the chaetotaxy is utterly different in being concentrated proximally, i.e. α is as usual, β is separated from *tp*, γ on the level of *f*, which is posterior to *tp*, δ close to *e* in position, *a* is absent,

b is remote from the basal margin of segment I, *h* is posterior to *e*. Glossa (Fig. F) long, gently constricted in the middle and then quite obtuse at apex. Prementum devoid of pseudopores, median area narrowly separated, lateral area has two real, one setal pores in the middle. Mentum (Fig. G) broadly deeply emarginate in front, *u*, *w* standing close together. Pronotum (Fig. A) about as long as wide, weakly retracted behind, the lateral margin gently arcuate over its full length, disc broadly depressed in the middle and furnished with very short secondary setae, those along the midline directed anteriorly. The lateral erect setae are equal, short and four in number. Elytra (Fig. A) clearly shorter than the pronotum, not emarginated postero-externally, the macrosetae (shown to be oligochaetosis, 3+3 (s 1, h 1, 1 1) in number). Hind wing completely reduced. Macrochaetotaxy of abdominal tergites as 01-22-22-23-23... Abdomen gradually dilated towards tergite VII, and very finely punctured all over; tergites III to VII weakly depressed basally, and with lateral erect setae quite effaced. Tergite VIII not modified, with nearly truncate posterior margin; major setae on disc 4+4 in number, short, and mutually equidistant in arrangement; microsculpture mostly imbricate in pattern. Sternites IV to VII more or less constricted at base. Prosternum carinate posteriorly. Mesosternal process very short. Metasternum with its process quite effaced. Legs very short; pro- and mesotibiae densely spinulose; tarsal formula 4, 4, 5, in which all basal segments are similarly short; empodium absent. Median lobe of aedeagus (Figs. H,I) 0.31 mm long; in lateral view apical lobe suddenly bent down, dilated subapically and then ending in rather pointed apex. Basal portion of the corpus not dilated. In ventral view apical lobe somewhat constricted in the middle so that the apical corner is angulated, the pointed apex carinate dorsally. Costa *ar.c.* well-developed, prolonged, raised and gently divergent distally, *m.c.* broad, short. Copulatory piece is in situ short, thick, complicated and with an incurved arm in the right at apex. Lateral lobe (Fig. J) modified, the lateral margin deeply incised in the middle and with the basal corner produced. Distal segment nearly triangular in outline; among four major setae *a* is basal, *b* is medio-dorsal in position, *c*, *d* are strongly reduced to setulae at apex.

Female: Sexual characters - spermatheca (Fig. L) short, angularly curved, bursa elongated, with no umbilicus within.

Remarks. - In this species the broadly truncate labrum (Fig. B), distally retracted labial palpus (Fig. E) and the irregularity of the mandibular teeth are characteristic.

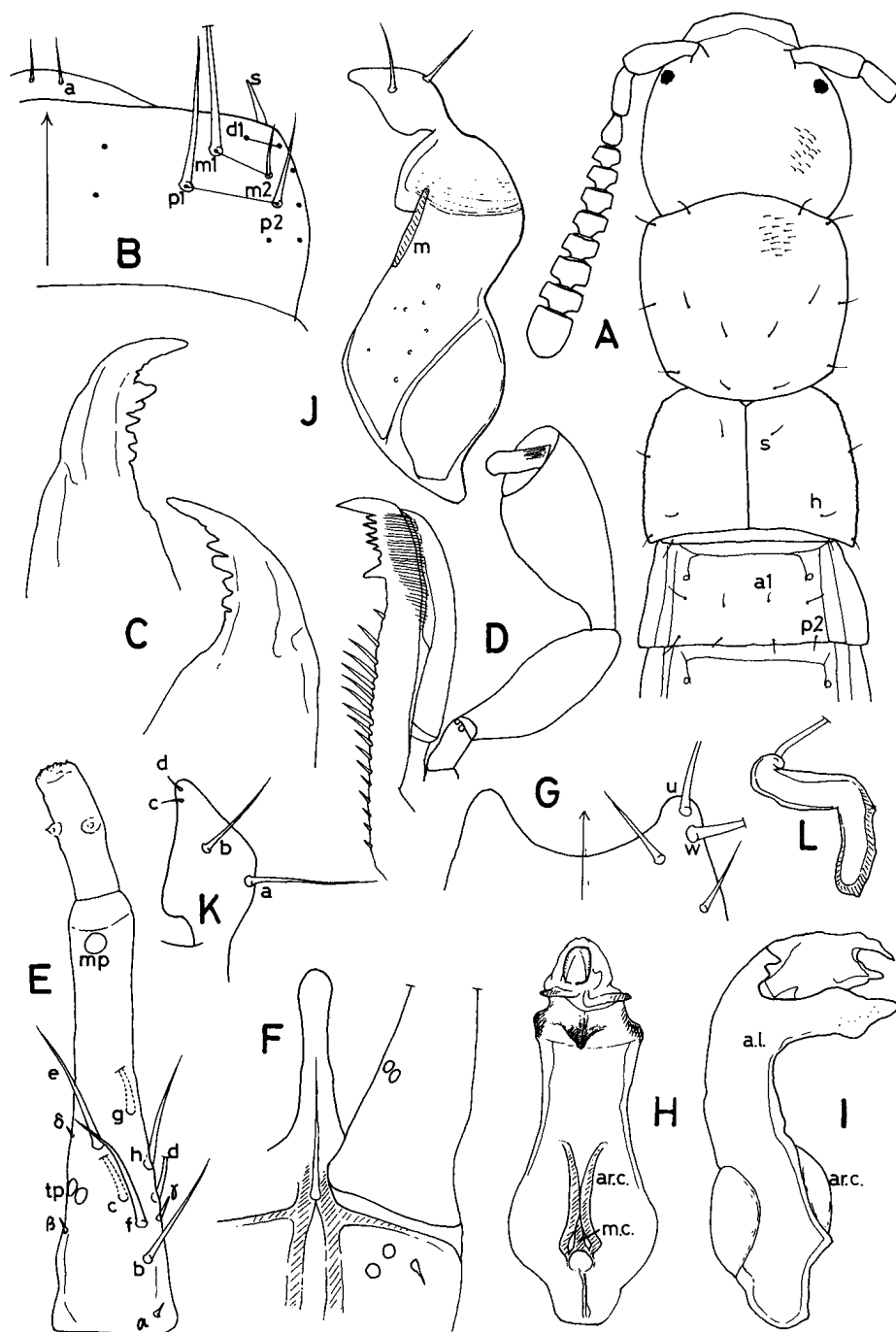
FAMILY PSELAPHIDAE

SUBFAMILY GONIACERINAE

Halohermatus, new genus

Type species. - *Halohermatus regulus*, new species

Diagnosis. - Stigmata I and II situated on the dorsal surface; maxillary palpus (Fig. B) with elongate, subparallel segments II and IV; on the latter the sensillae (Fig. C) are all setaceous and restricted mostly to the apical part of the segment. On tergite III two well-developed long carinae (Fig. A) are present. Male secondary sexual characters (Fig. A) exist in the frons of head and in tuberculate pro- and mesotrochanters. Tarsus (Fig. D) 3-segmented, segment II much longer than III. Claw unusually prolonged, fully longer than segment III and with short basal plicae.



Figs. A-L. *Boreorhadinus pacificus*, new genus, new species. A, habitus; B, labral chaetotaxy; C, mandibles; D, maxilla I; E, right labial palpus; F, glossa and prementum; G, mentum; H, I, median lobe in ventr. and lat. v.; J, K, lateral lobe and its distal segment; L, spermatheca.

Etymology. - *Halos* means the sea, *hermatos*, a small mound in Greek; thus *Halohermatus* is derived from the projecting frons of the male.

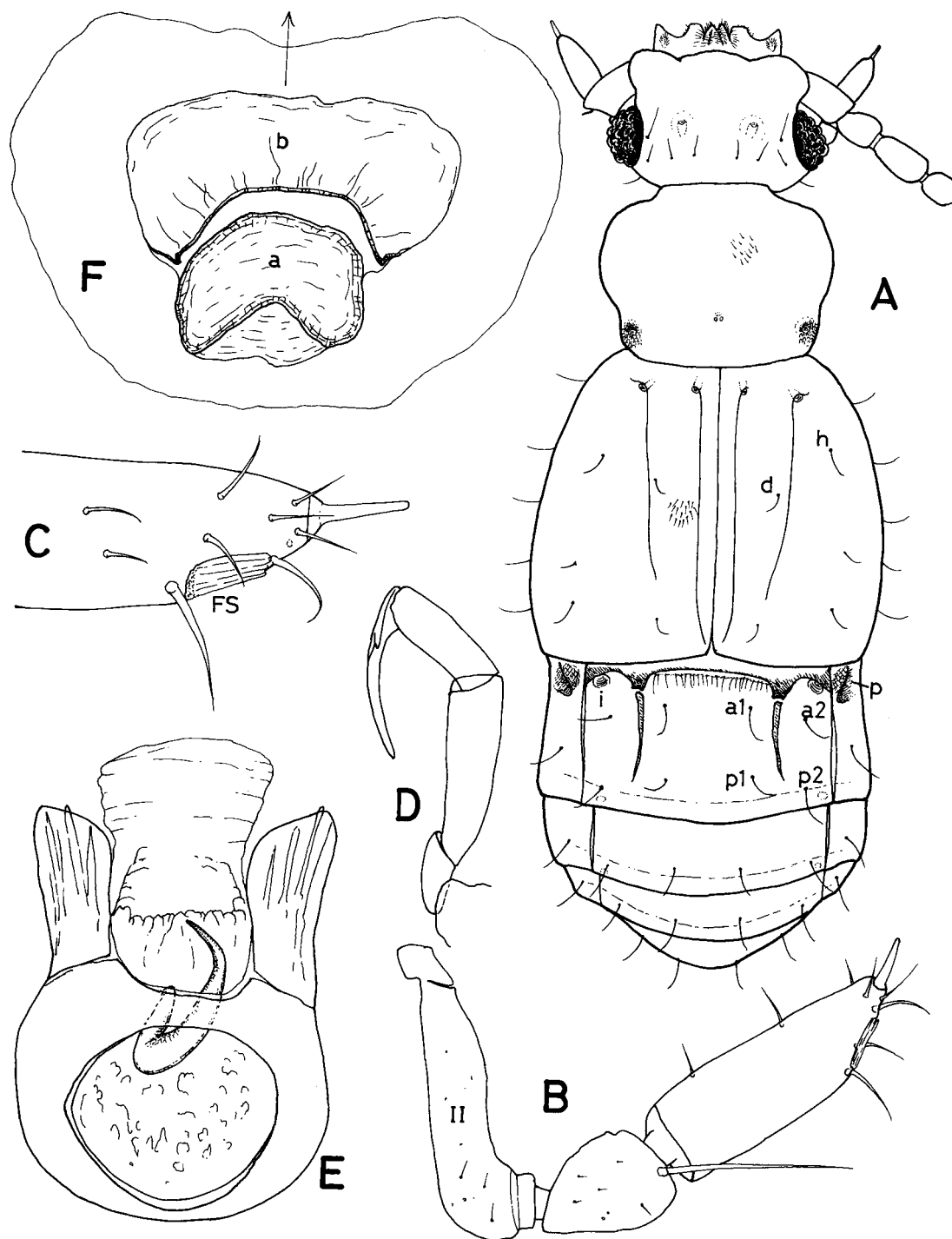
Remarks. - As the mesocoxal cavities are contiguous, the basal fovea on pronotum is very small and the elytron has only two basal pores, *Halohermatus* is near *Reichenbachia* Leach, 1826 (see Jeannel, 1949: 89, 1950: 319). The new genus differs, however, in the broad, apically truncate head with slender maxillary palpus, the cordate pronotum with fairly constricted base, and in male sexual characters. Also, all tarsi have very claws.

***Halohermatus regulus*, new species**

(Figs. A-F)

Material examined. - Holotype male, allotype female, 2 paratypes (KS), intertidal zone at Ohtomi, Iriomote Is., Japan, leg. K. Sawada, 11.ix.1990; 3 paratypes, on coral-reef at Miyara Bay, Ishigake Is., Japan, leg. K. Sawada, 13.ix.1990.

Description. - Male: Length up to 2.1 mm (head 0.32 mm long x 0.45 mm wide; pronotum 0.46 mm x 0.50 mm; elytra 0.64 mm x 0.77 mm). Reddish brown throughout, weakly shining. Body stout, more or less flattened above and with short, dense setae all over. Head (Fig. A) transverse. Post-gena short, abruptly constricted to the base. Frons broad, very short and gently convex above. Antennal tubercle normally developed, discal paired pores broadly depressed, disc only finely punctured. There are two vertical and three circum-ocular macrosetae arranged as in Fig. A. Anteriorly the short frons is modified, with the central part finely incised and shortly costate; on each side a broadly truncate, short lobe is present, laterally deeply emarginate and with a pointed lateral process. Eyes well-developed with rather fine facets. Antenna long, slender and with two-segmented, loose club at apex, segment III fairly elongate when compared with II and IV, VIII the smallest, oblong. Maxillary palpus (Fig.B) slender as a whole; segment II long, subparallel, with its inner margin broadly sinuate along its full length, III thick, short, IV nearly parallel, about as long as II and with filamentous sensillae (FS) which are very thin, situated before the apex of the segment. Chaetotaxy as follows: in exterior view, there is one long macroseta before FS, and is a similar one behind them, the apical spinule is elongate, well-defined. Pronotum (Fig. A) gently convex above, broadly rounded anteriorly and rather suddenly constricted in the basal one-third, where a large lateral foveoid depression is present; in the middle before the base a smaller fovea exists, the surface has very fine punctures, together with short secondary setae all over. Elytra much broader than the pronotum, gently rounded bilaterally. There are two basal pores, both of which have long striae. Along the discal stria two short macrosetae (*d* in Fig. A) occur and three similar ones on the infrahumeral region (*h*), along the lateral margin some five longer macrosetae are seen. Hind wings fully developed. Abdomen (Fig. A) gently convex above, finely punctured and with broad paratergites. Tergite III more than twice as long as IV, on the disc with two long carinae distant from each other as much as a length of the segment. At the base of each carina a short thickening exists, the base between them is apparently depressed, and without any pores. Lateral stigma converted to well-sclerotized, annulate structures not obviously connected with a functional trachea and consequently better named "metastigma". True stigma open on tergites VI and VII as in other species. On the base of paratergite III the short plica (*p* in Fig. A) is surrounded by a depression. Macrosetae on tergites as 22-02-02 ... in which *a1*, *p1* are anterior to the levels of *a2*, *p2* respectively. Aedeagus (Fig.E) 0.20 mm long, symmetrical. In dorsal view the basal capsule is large, ovate in outline and with a large fenestra in the middle. Styles broadly elongate, more or



Figs. A-F. *Halohermatus regulus*, new genus, new species. A, habitus; B, C, right maxillary palpus and its chaetotaxy in ventr. and dors. v.; D, mesotarsus; E, aedeagus in dors. v.; F, female genitalia.

less dilated distally and obliquely truncate, internally striate, with a fine projection beyond the apex. Copulatory piece long, tapering, curved and recurved at the base to a short obtuse process. Inner sac well-developed and broadly extending beyond the apices of styles.

Female: Sexual characters - antennal segment III a little shorter and narrower; pro- and mesotrochanters without tubercle; genitalia (Fig. F) composed of the large, heavily sclerotized, rather thick central disk (a) and the broad, translucent anterior lobe (b), the posterior margin of the latter is deeply emarginate for receiving the corpus.

Etymology. - The specific epithet *regulus* denotes a king in Latin.

Remarks. - The broad head with well-developed, finely faceted eyes, pronotum gently convex above, and elytra fairly broad with fine punctures are characteristic features.

Acknowledgements. - Hearty thanks are directed to Associate Professor D. H. Murphy for furnishing me with some of the material. I am also much indebted to Dr. L. Zerche of the Institut für Pflanzenschutzforschung Kleinmachnow in Everswalde for giving me the opportunity to examine the type specimens of *Linoglossa bifeveolata* Kraatz and of *L. angustata* (Motsch.). The study is partly supported by the Shukugawa Gakuin Jr. College Scientific Foundation (S.G.S.F. No. 1990-4).

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