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10.9. Hobartiidae Sen Gupta and Crowson, 1966

Wioletta Tomaszewska and Adam Ślipiński

Distribution. This small family comprises two genera, *Hobartius* Sen Gupta & Crowson and *Hydnobioides* Sen Gupta & Crowson, and six species – five Australian and one Neotropical, known from Argentina and Chile. [Sen Gupta & Crowson 1966; Tomaszewska & Ślipiński 1995.]

Biology and Ecology. Comparatively little is known about the biology and habitats of Hobartiidae. Adults and larvae are mycophagous, usually collected from fungus infested logs of *Nothophagus*, *Eucalyptus* and *Araucaria*, feeding usually in soft and often rotting fruiting bodies of basidiomycete species, mostly from *Pleurotus*, *Piptoporus*, *Ganoderma* and unidentified Clavariaceae. Adults are also attracted to carrion traps. [Lawrence 1991; Tomaszewska & Ślipiński 1995.]

Morphology, Adults (Figs. 10.9.1, 2 A–D). Length 2.00–2.90 mm. Body broadly oval to elongate,

convex. Dorsal surface moderately shiny, yellowish-brown to almost black, pubescent. Vestiture consists in most cases of moderately long, suberect hairs.

Head slightly declined, distinctly transverse, narrowing anteriorly, not abruptly constricted posteriorly. Transverse occipital line absent. Frontal region moderately declined. Frontoclypeal suture sharply defined, straight. Clypeus transverse, flat, distinctly constricted at base. Eyes entire, large and protuberant, finely faceted, without interfacetal setae. Antennal insertions exposed, widely separated. Antennal grooves absent. Antenna 11-segmented with loose, 3-segmented club; in *Hydnobioides* antennomeres 5 and 7 asymmetrically enlarged (Fig. 10.9.2 C). Labrum free, visible externally; transverse, weakly sclerotized, with labral rods at least weakly divergent anteriorly. Mandible well-developed, broad, bidentate, weakly convex dorsally, with distinct dorsal tubercle but devoid of associated cavity (Fig. 10.9.2 B); mola large, strongly sclerotized, with transverse ridges; prostheca large, membranous, setose. Galea well-developed, distinctly broader than lacinia, densely setose at apex. Lacinia comparatively slender, with a few spines on inner edge; maxillary palp 4-segmented; palpomere 2 longer and wider than basal one and terminal palpomere longest, about 2 times as long as palpomere 3. Mentum transverse, trapezoidal; prementum strongly sclerotized; ligula with brush of short setae in *Hobartius* and with long setae in *Hydnobioides*; palp 3-segmented; palpomeres rather short and stout in *Hobartius* and more elongate and slender in *Hydnobioides*; palpomere 2 longer and wider than basal one; terminal palpomere at least twice as long as palpomere 2. Gular sutures widely separated. Tentorium with anterior arms closely approximate near midline, anteriorly membranous; corporotentorium broad, without median process. Cervical sclerites well-developed.

Prothorax transverse, narrowing anteriorly with lateral margins weakly crenulate to denticulate, bordered, and provided with projecting setae directed posteriorly; pronotal disc convex. Prosternum in front of coxae as long as mid length of coxal cavity; notosternal suture complete. Prosteron process rather narrow extends at least to posterior margin of front coxae. Procoxa not projecting, with concealed internal extensions. Procoxal cavity slightly to strongly transverse with broad lateral extensions, narrowly separated, externally broadly open, internally open. Trochantin exposed. Elytra completely covering abdomen; moderately convex, covered with short to long pubescence; irregularly punctuate; scutellary striole absent; flanges not apically widened; epipleuron narrow, incomplete apically. Scutellum transverse, pentagonal, punctured and pubescent. Mesoventrite smooth; intercoxal process less than half as broad as coxal diameter. Mesocoxa slightly transverse; its cavity outwardly open; mesotrochantin exposed; meso-metaventral junction with single, broad knob. Metaventrite flat,

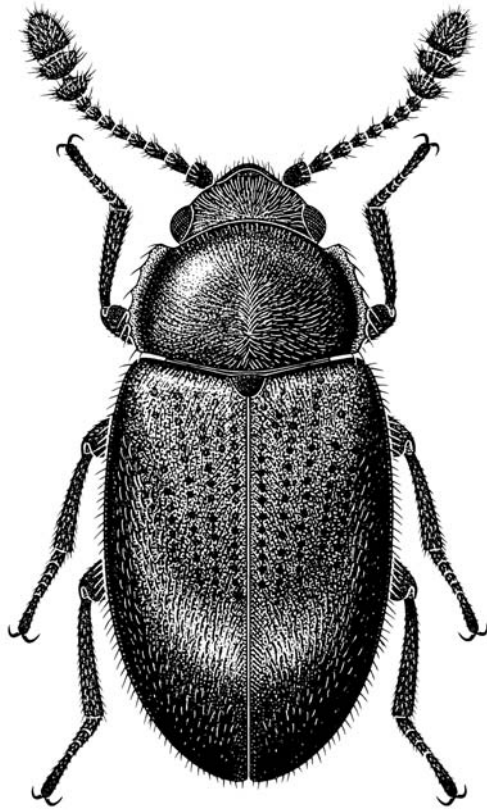


Fig. 10.9.1. *Hobartius eucalypti* (Blackburn), adult, dorsal (from Lawrence & Britton 1991; © CSIRO Australia), length = 2.2 mm.

simple, with moderately long discrimen extending at least for half length of metaventricle; post-coxal lines absent. Metacoxae narrowly separated, strongly transverse. Metendosternite with anterior arms widely separated; anterior tendons moderately long, approximate anteriorly. Hind wing with complete (*Hobartius*) or basally incomplete (*Hydnobioides*) radial cell and two or three free veins in

medial field; medial fleck absent. Legs moderately long; trochanterofemoral joint oblique with base of femur separate from coxa; femur about twice as wide as tibia; moderately densely setose; tibia widening apically, in *Hydnobioides* outer edge with stiff spine-like setae; tibial spurs double on all pairs of legs; short and glabrous; tarsal formula 5-5-5 in both sexes of *Hydnobioides*; 5-5-4 in males of *Hobartius*; tarsomeres simple, ventrally densely setose; in male of *Hobartius*, tarsomeres 1-3 of pro- and mesotarsi with long, dense setae on inner edge. Claws simple. Empodium small, bisetose.

Abdomen with five freely articulated ventrites and seven pairs of functional spiracles. Ventrites laterally with bordering line. Ventrite I longest, about as long as two following ventrites combined, without postcoxal lines; intercoxal process narrow, acute apically, received in a shallow fossa on metaventricle. Ventrites II-V equal in length. Male genitalia (Fig. 10.9.2 A) turned on side when retracted. Tegmen with basal portion attenuate forming elongate plate with fused (*Hobartius*) or partially separate (*Hydnobioides*) tegminal struts; apical portion well-developed with partially fused or articulated parameres, in *Hydnobioides* additionally with a pair of membranous structures ventral to parameres. Sternite IX with short rod-like strut (spiculum gastrale). Female genitalia (Fig. 10.9.2 D) with short ovipositor moderately sclerotized, with paired longitudinal bacula on paraprocts well-developed; styli elongate and terminal; sternite VIII with moderately long, basally forked strut (spiculum ventrale); internal female tract relatively simple, with bursa large, globular without sclerites; spermatheca small, bean-shaped and weakly sclerotized; attached at base of bursa near outlet of common oviduct, through very long and thin sperm duct. [Lawrence & Britton 1991, 1994; Sen Gupta & Crowson 1966; Tomaszewska & Ślipiński 1995.]

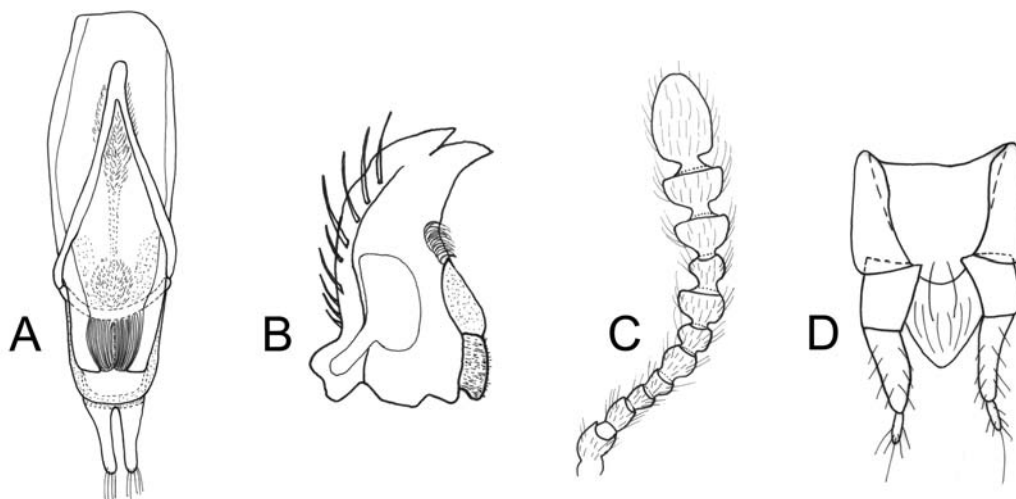


Fig. 10.9.2. A, *Hobartius eucalypti* (Blackburn), aedeagus, ventral; B-D, *Hydnobioides pubescens* Sen Gupta & Crowson: B, mandible, dorsal; C, antenna; D, ovipositor, ventral. (From Tomaszewska & Ślipiński 1995; © Biologica Silesiae).

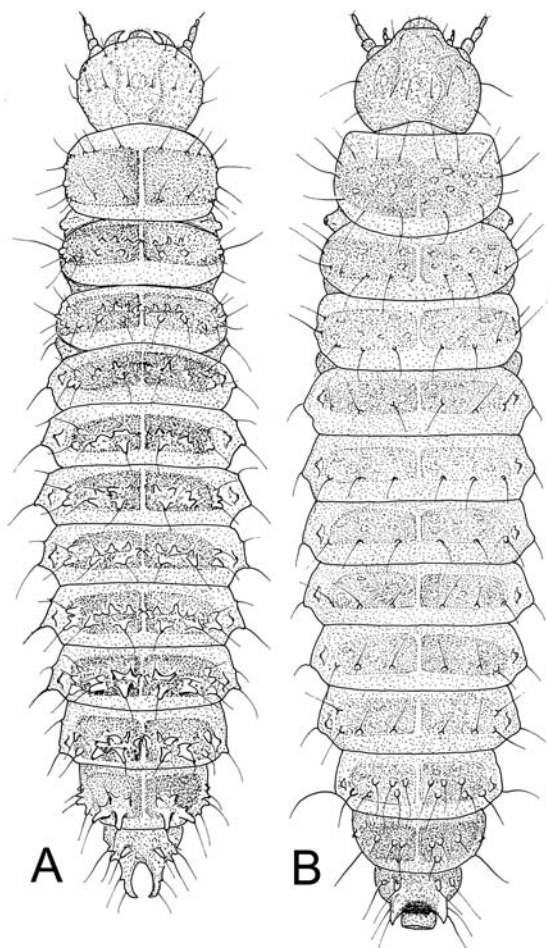


Fig. 10.9.3. A, *Hobartius*, sp., larva, dorsal, length = 4 mm; B, *Hydnobioides* sp. larva, dorsal, length = 4 mm. (From Tomaszewska & Ślipiński 1995; © Biologica Silesiae.)

Morphology, Larvae (Figs. 10.9.3 A–B). Length 4.0–4.5 mm. Body elongate, fusiform, somewhat flattened dorsoventrally. Lightly pigmented except for more heavily sclerotized mandibles, tips of urogomphi and claws. Vestiture consists of sparse, moderately long simple setae.

Head protracted and prognathous, well visible from above, transverse, slightly narrower than prothorax. Dorsal surface with irregular patterns of granules and transversely arranged tubercles bearing simple setae. Epicranial stem and median endocarina absent; frontal arms almost complete, distinctly separate at base, lyriform. Stemmata five in two rows, ventral row consisting of two less pigmented stemmata and dorsal row of three more strongly pigmented ones. Antenna 3-segmented, moderately long, situated on protracted membrane, close to mandibular articulation; sensorium on antennomere 2 ventro-mesal to antennomere 3, small, conical, less than half as long as antennomere 3; antennomere 1 transverse; antennomeres 2 and 3 elongate. Frontoclypeal suture absent. Clypeus transverse, submembranous. Labrum large and free, transverse, rounded anteriorly. Mandible

bidentate apically with additional ventral (crushing) tubercle; prostheca reduced; incisor edge serrate in *Hobartius* and smooth in *Hydnobioides*; molae slightly asymmetrical in *Hobartius*. Ventral mouthparts retracted; maxillary articulated area fairly large. Cardo oblique, stipes elongate; mala narrowing apically and apparently falcate in *Hobartius*, blunt in *Hydnobioides*, with sclerotized teeth at apex (two teeth in *Hobartius*, three in *Hydnobioides*); palp 3-segmented. Labium with mentum long and free, weakly narrowing basally and almost encircling apparently reduced prementum; palp 1-segmented. Hypopharynx sclerotized, hypopharyngeal sclerome narrow, transverse; hypopharyngeal bracon absent; hypopharyngeal ridges sclerotized; hypostomal rods moderately long, strongly sclerotized and strongly divergent.

Thorax widest across metathorax; prothorax slightly shorter than meso- and metathorax combined; terga strongly transverse, weakly divided along midline, bearing asperities and tubercles; tubercles bearing simple setae; tergal sclerites lightly sclerotized and not clearly limited. Obvious glands absent. Legs short with coxae moderately widely separated; trochanter somewhat elongate-oval; femur subcylindrical, slightly narrower at base, sparsely setose; tibiotarsus slightly shorter than femur, subcylindrical; claw with two short, closely situated setae.

Abdominal terga with strongly prominent and complex tubercles in *Hobartius*, with small conical tubercles in *Hydnobioides*; widest most often across segment II or III, bearing small pleural lobes. Segment IX with simple urogomphi, in *Hobartius* narrowly separated at bases and slightly curved, in *Hydnobioides* widely separated and strongly upturned. Segment X forming cylindrical pygopod. Spiracles annular-biforous born on short tubercles. [Lawrence 1991; Tomaszewska & Ślipiński 1995.]

Phylogeny and Taxonomy. Sen Gupta & Crowson (1966) described two new Australian genera, *Hobartius* and *Hydnobioides* in the tribe Hobartiini among a broadly defined family Boganiidae (including also Cavognathidae and phloeostichid Hymaeinae). The same authors later (Sen Gupta & Crowson 1969) split their family Boganiidae into Boganiidae in a narrower sense and Cavognathidae, and defined the family Phloeostichidae to include Hymaeinae, Phloeostichinae and Agapythinae. Hobartiids were then kept as a subfamily of Boganiidae (Sen Gupta & Crowson 1969). Sen Gupta & Crowson (1969) described a presumptive larva of *Hydnobioides pubescens* Sen Gupta & Crowson that was shown to be misidentified by Lawrence (1991). Lawrence (1991) formally recognized Hobartiidae as an independent family (in a sense of Hobartiini of Sen Gupta & Crowson) and characterized its larvae for the first time. This concept of the family was then followed by Lawrence & Britton (1991, 1994), Pakaluk *et al.* (1994) and Tomaszewska & Ślipiński (1995).

Although originally included in Boganiidae, Hobartiidae share very few characters with that family. The dorsal mandibular tubercle shared by adults of these groups was probably a major character to associate Hobartiidae with the boganiid-phloeostichid complex. However, this character is widely distributed in the cucujoid families and the homologies questionable. Comparative studies of mandibles of most cucujoid groups (A. Ślipiński, unpublished) show that these structures are probably non-homologous and were probably independently developed in many cucujoid lineages. Leschen (1996) in his revision of genera of Cryptophagidae, suggested a close relationship of Hobartiidae with Cryptophagidae, based on an incomplete epipleuron, which extends to the posterior edge of the metaventrite, and 1-segmented labial palps shared by larvae both families.

For over 50 years cucujoid workers have recognized two informal groups within the superfamily Cucujoidea. Of those groups, the Cerylonid Series (Crowson 1955), a group of eight closely related families appears to be monophyletic, while the remaining members of the superfamily are generally considered as the basal Cucujoidea (or lower Cucujoidea vide Leschen 1996). Adults of Hobartiidae share many characters, probably plesiomorphies, with basal Cucujoidea: (1) transverse procoxae with exposed trochantins; (2) mesocoxal cavities externally open; (3) mesotrochantin exposed; (4) wing with relatively complete radial cell; (5) heteromorous tarsi in males; (6) abdomen with seven pairs of functional spiracles; (8) characters of the ovipositor and male genitalia. Unfortunately these characters do not serve as good indicators for a phylogenetic placement of this group because of their high variability within cucujoids. Hobartiidae were placed as one of the very basal clades of the superfamily by Leschen *et al.* (2005), though the phylogenetic relationships of the basal lineages remain enigmatic.

Acknowledgements

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10.10. Cryptophagidae Kirby, 1837

Richard A. B. Leschen

Distribution. There are 60 recognized genera and about 600 described species occurring worldwide, with the highest diversity in temperate regions. The group is divided into two subfamilies and six tribes. The subfamily Cryptophaginae contains three tribes, and the most diverse is Cryptophagini, which has the highest number of its species in the Holarctic, and contains 22 genera including *Cryptophagus* Herbst (over 200 spp.), *Micrambe* Thomson (80 spp.), and *Henoticus* Thomson (32 spp.).