

2.7.4 Lamprosomatinae Lacordaire, 1848

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Distribution. Worldwide, approximately 250 species are classified in 14 genera in four tribes: Cachiporrini (with a single monotypic genus from Brazil), Neochlamysini (two genera from the Afrotropical Region), Sphaerocharini (one genus from Brazil), and Lamprosomatini (ten genera). Within Lamprosomatini, only *Oomorphus* Curtis is widely distributed, with records from all biogeographic regions. *Oomorphoides* Monrós is known from the Oriental and Australasian Regions. *Lamprosoma* Kirby, *Dorisina* Monrós, *Lamprosomatoides* Monrós, *Lychnophaes* Lacordaire, and *Oyarzuna* Bechyné are Neotropical endemics. *Asisia* Bezdek, Löbl & Konstantinov and *Scrophoomorphus* Medvedev are endemic to the Oriental region, and *Xenoomorphus* Monrós is restricted to the Afrotropical Region [Chamorro & Konstantinov 2011; Monrós 1956, 1958, 1959; Seeno & Wilcox 1982].

Biology and Ecology (Fig. 2.7.4.1 A–C). Lamprosomatinae, like its sister-taxon Cryptocephalinae (collectively known as the Camptosomata), build portable fecal enclosures as larvae. Both subfamilies share similar life histories and oviposition behavior [Erber 1988; Chamorro, in press (this volume)]. However, although larval cryptocephalines are largely saprophagous, larval lamprosomatines actively and sometimes destructively feed on the bark of live trees (Monrós 1956), including their stems. Some species (i. e., *Lamprosoma azureum* Germar) have been considered as potential biological control agents of invasive plants (i. e., *Psidium cattleianum* Sabine, the strawberry guava, Myrtaceae, an invasive species in the Hawaiian Islands and southern Florida, USA). Documented hosts include Bombacaceae, Combretaceae, Fabaceae, Melastomataceae, and Myrtaceae. Possible associations with non-woody plants such as those in Compositae (i. e., *Artemisia* Linnaeus) have been indicated; however lamprosomatines appear to feed on woody plants. Larvae of *Lamprosoma chorisiae* Monrós carry cases that mimic the spines on the bark of their host, *Chorisia* spp.; the presence of the case-bearing larvae may only be detected by following their feeding trails. Feeding by this species usually takes places in the evening or at night, and the larvae may travel some distance from their well-concealed resting spot, a location where the larvae remain for most of the day and where they may eventually pupate (i. e., *Lamprosoma chorisiae*). Larval lamprosomatines may be preyed upon by parasitic Hymenoptera, for example those in Cryptinae Kirby (Ichneumonidae) [Caxambu & de Almeida 1999; Erber 1988; Kasap & Crowson 1976; Kimoto 1964; Monrós 1949, 1956; Reid 1990].

Morphology, Adults (Fig. 2.7.4.1 E–G). Length 1.8–8 mm (largest species are in *Lychnophaes* and the smallest in *Cachiporra* Chamorro & Konstantinov). Body between 1.5 times longer than wide (subcircular) to as long as wide (rounded); prothorax basally as wide as combined elytral bases but promptly narrowing anterad in dorsal view; greatly convex with pronotal lateral margins at approximately 90° angles to the anterolateral edge of elytra in lateral view; anteriorly blunt, posteriorly inclined, in transverse plane semicircular (ventrally flat); smooth dorsal surface without pronounced interstices. Color black to metallic, occasionally multicolored, usually reflective depending on visual angle.

Head declined, anteriorly flat, inserted into prothorax completely or up to frons with eyes completely to barely visible from above. Without transverse occipital ridge or stridulatory file. Frontal region with or without median groove. Eyes entire, not protuberant, finely faceted, without interfacetal setae; canthus of each eye absent to deeply developed. Antennal insertions not exposed from above; subantennal grooves present. Frontoclypeal strengthening ridge absent or weakly inversely V-shaped. Clypeal region trapezoidal. Labrum well-developed, subquadrate or narrowly rectangular and appearing almost absent; anterior edge usually truncate, concave or widely triangular. Antennae 11-segmented, shorter than pronotum, weakly clavate to capitate (*Cachiporra*); scape subglobular to elongate and longer than pedicel. Mandibles usually deltoid, moderately elongate, gradually curved mesally, enlarged in some males; mola and prosthema absent. Maxillae each with digitate, setose galea, quadrate lacinia, and digitate apical maxillary palpomere. Mentum transverse; ligula bilobed; apical labial palpomeres digitate; mentum transverse. Gular sutures widely separated and short. Tentorium with anterior arms and bridge absent. Cervical sclerites reduced.

Pronotum about 0.75–1.0 times as long as wide, broadly deltoid, widest basally; anterior sides concealed ventrad; posterior margin slightly narrower or as wide as combined elytral bases; lateral pronotal carinae not pronounced, entire to sinuate, not explanate or visible from above; anterior and posterior angles rounded or pointed; posterior angles bearing large seta; posterior edge weakly to strongly produced medially, not margined; disc entire, distinctly to weakly punctate. Prosternum absent directly in front of coxae, deltoid laterally, on same plane as visible section of mesoventrite; antennal grooves present along prosternal process; prosternal process complete, usually parallel-sided to deltoid, with apex (posterior margin) truncate (*Lychnophaes*, *Oomorphus*), concave (*Lamprosoma*), or pointed (*Neochlamys* Jacoby), or with apical bifurcation (*Sphaerocharis* Lacordaire). Notosternal

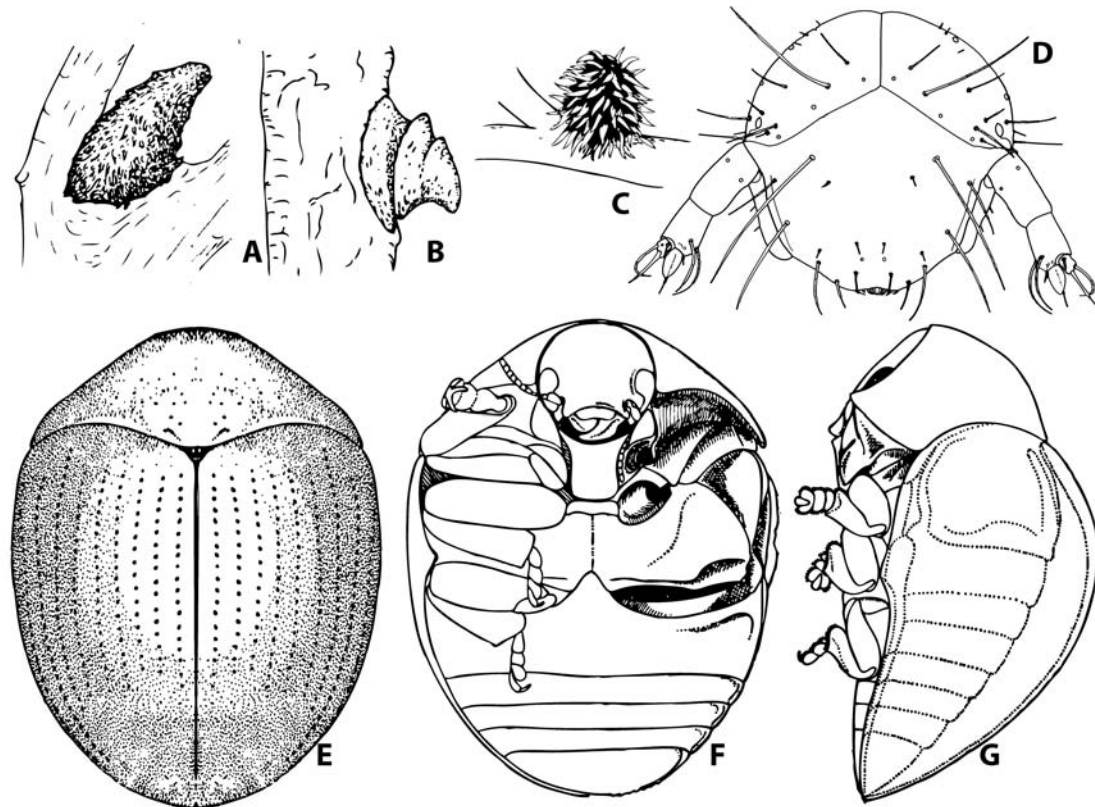


Fig. 2.7.4.1 Lamprosomatinae. A, *Lamprosoma seraphinum* (after Fiebrig 1910 & Erber 1988); B, *Lamprosoma* sp. (after Fiebrig 1910, Erber 1988); C, Lamprosomatinae egg (after Erber 1988); D, *Oomorphus concolor* larval head, anterior view (after Reid 1990); E–G, *Lychnophaes globulosus* (after Monrós 1956); E, dorsal view; F, ventral view; G, lateral view.

sutures distinct. Hypomera with variable surface sculpture, almost always smooth and concave to accommodate basal sections of prolegs. Procoxae not projecting below prosternum, without concealed lateral extensions; trochantins exposed within coxal cavity; procoxal cavities subcircular, very narrowly (e. g., *Neochlamys*, *Sphaerocharis*) to widely separated (e. g., *Lamprosoma*), open, without lateral extensions. Scutellar shield deltoid, medium sized (e. g., *Neochlamys*) to very small (e. g., *Oomorphus*), not elevated, anteriorly entire, posteriorly acutely pointed; rugosity present on anterior concealed part of mesoscutellum. Elytra about 1–1.5 times as long as wide and 1–3 times as long as pronotum; regularly (with eight to ten weak puncture rows) (e. g., *Lychnophaes*) or irregularly punctate (e. g., *Asisia*); punctures small; sutural striae flat; disc smooth; humeri weakly developed, without abrupt basal edge; elytral apices meeting at median suture, concealing all tergites, or exposing or partly exposing strongly pigmented pygidium; epipleurae well-defined, vertically oriented (visible in lateral view) or horizontally (hidden in lateral view), narrowing apically; elytral base (posterad of scutellar shield) never exposing metascutellum; elytral serration

absent, suture entire. Mesoventrite separated by complete sutures from mesanepisterna; anterior edge on same plane as metaventrite, large section of the mesoventrite flattened in Cryptoccephalinae; in Lamprosomatinae mesoventrite more or less angled and only apex on same plane as prosternum; these sections of the mesoventrite restricted to small overall portion of the entire mesothorax; without procoxal or prothoracic rests. Mesocoxae not conical or projecting, with exposed trochantins; cavities broadly separated (greater than widest diameter of each mesocoxa), subcircular, slightly oblique or not, partly closed laterally by mesepimera and small portion of mesanepisterna. Metaventrite with discrimen as long as entire sclerite (extending to metaventral process); katepisternal (transverse) suture absent; metanepisternum moderately elongate, anteriorly deltoid narrowing medially, broadening posterad sometimes becoming concave/angled to accommodate hind femora (e. g., *Lychnophaes*, *Lamprosoma*). Metacoxae moderately separated, horizontally oriented, extending laterally to meet metanepisterna; plates absent. Metendosternite with short stalk; long lateral arms usually wide at base; laminae well-developed and broad or

absent (e. g., *Sphaerocharis*); anterior process short (shorter than stalk), bearing variously separated anterior tendons. Hind wings with long apical field, anterior and posterior remnants of RP present; radial cell triangular, well-developed to apically open (radius-median crossvein missing); RP short or connected to posterior arm of radial cell; media (M) short; subcubital fleck absent; three to four anal veins present and cross-veins forming one to two anal cells; in some species, veins partially (anal region, e. g., *Oomorphus floridanus* Horn) or completely reduced (e. g., *Oomorphus japanus* Jacoby). Legs usually short and stout, retractable and hidden in dorsal view; trochanterofemoral joints strongly oblique with base of femora separate from coxae; pro- and metafemora may be keeled and bearing groove to accommodate tibiae; tibiae generally dorsoventrally flattened and distally widened, in some cases almost deltoid; inner surface smooth and flattened; tibial spurs absent; tarsi 5-5-5 in both sexes; basal three tarsomeres usually as long as wide; densely clothed beneath with adhesive microtrichia; penultimate tarsomere reduced and antepenultimate bilobed; pretarsal claws simple, appendiculate or deeply bifid; empodium not visible.

Abdomen with five free ventrites and tergites I–VII. Ventrite 1 almost more than twice as long as 2, usually longer than ventrites 2 and 3 combined, without postcoxal lines; intercoxal process narrowly rounded to almost truncate. Functional spiracles present on tergites II–VII. Tergite VII forming strongly pigmented pygidium, sometimes exposed (e. g., *Sphaerocharis*). Anterior edge of sternite VIII in males without median strut. Ventrite 5 with well-developed stridulatory file on distal border in Lamprosomatini and females with very weak apical fovea. Males with segment IX membranous and spiculum gastrale Y-shaped. Aedeagus of cucujiform type; tegmen Y-shaped; struts (remnants of tergite IX) either present or absent; penis flattened to rounded, slightly to strongly curved apically; tufts of setae usually absent. Sternite VIII in females lacking spiculum ventrale. Ovipositor short, rigid and oval; procitigers deltoid; paraprocts narrow to widely deltoid, approximately of equal size to coxites, sclerotized or less pigmented proximally, flattened; digitate lobes of variable form, apically setose; styli digitate and setose. Spermatheca strongly to moderately sclerotized, variably shaped, usually J-, C-, or S-shaped. Rectal sclerites (“Kotpresse”) present in female; ventrally with large, variously-shaped chitinpolster (e. g., *Lamprosoma*, *Cachiporra*, *Sphaerocharis*, *Pseudolychnophaes*, *Oomorphoides*) or with median chitinpolster and two lateral, usually narrow sclerites (e. g., *Xenoomorphus*); dorsally with large variously-shaped chitinpolster (e. g., *Lamprosoma*, *Oomorphoides*, *Cachiporra*) or with median chitinpolster and two lateral sclerites (e. g., *Pseudolychnophaes*, *Sphaerocharis*, *Xenoomorphus*) [Cham-

orro & Konstantinov 2011; Chamorro-Lacayo & Konstantinov 2004; Chamorro-Lacayo, Konstantinov & Moseyko 2006; Monrós 1956, 1958; Reid 1990; Schöller 2008].

Morphology, Eggs and Scatoshell (Fig. 2.7.4.1 C). Egg oval, with chorionic stalk. Color milky-white to yellowish-white. Surface of chorion micropustulate. Scatoshell cone-shaped, almost tassel-hat-shaped; resembling seeds, buds, horns; may contain bark or plant remnants [Caxambu & de Almeida 1999; Lee & Cheng 2007; Lee & Morimoto 1991; Monrós 1949].

Morphology, Larvae (Fig. 2.7.4.1 D). Body obviously J-shaped in lateral view, with last five abdominal segments increasingly dilated and apical segments bent anterad; head, pronotum, and legs strongly sclerotized; abdomen lightly pigmented. Larvae partly contained within bell-shaped case made of own feces and plant material, but head and legs exposed. Setation sparse, setae usually simple and elongate.

Head hypognathous, usually flattened anteriorly, without distinct circular ridged margin; entire head capsule in anterior view circular. Epicranial suture Y-shaped, with long epicranial stem (= coronal suture); frontal arms enclosing a broad V-shaped frontal area extending toward dorsal stemmata. Median endocarina ending before junction of frontal arms and epicranial stem. Surface of head generally smooth but with numerous setae. Usually with three to five stemmata clustered into two groups on each; total number of stemmata may vary, but on each side always segregated into two discrete groups, either above or below antennae; total number on both sides in some cases unequal (i. e., *Oomorphus concolor* with five on one side, three on another; *Lamprosoma* five and four). Frontoclypeal suture absent. Labrum fused to frontoclypeus, lacking median anterior projection (present in some Cryptocephalinae); clypeolabral fusion line weak; anterior clypeolabral margin generally concave to sinuate. Antennae elongate, approximately two-thirds the length of head (i. e., *Oomorphus*) to short (i. e., *Lamprosoma*), composed of two or three segments; inserted apically on antennomere 2 and slightly larger in size than antennomere 3; sensorium basally strongly sclerotized; apical part weakly sclerotized and narrowing. Mandibles symmetrical, adentate to tridentate, without mola; each with pronounced globate basolateral condyle. Ventral mouthparts retracted; maxillary articulating area slender to apparently obsolete. Cardines moderately oblique, divided; stipites distinctly longer than wide; outer lobe (mala) digitate, setose; inconspicuous inner lobe fused to stipites, bearing two or three stout setae; maxillary palps three-segmented, inserted on well-developed palpifer (described as palpomere 1 of four by Monrós [1949]); palpomere 3 with digitiform sensillum

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in groove on outer surface. Labium consisting of narrow prementum and prominent mentum and submentum; paramental sclerites present; ligula broad, simple, membranous, apically bearing three pairs of spiniform setae; shorter than two-segmented palps; palpomeres of equal length or segment 1 longer and usually broader than 2; palpiger present, transverse to elongate. Hypopharyngeal sclerome and bracon absent.

Pronotum sclerotized; prosternum without armature. Meso- and metathorax with asperities throughout; two pairs of egg-bursters on tubercles with long seta and spine associated with each present on meso- and metathorax (possibly also on abdominal segment I) in first instar. Quadrate sclerites associated with legs present. Legs well-developed, five-segmented, slightly unequal in size, hind legs longer than middle legs and these longer than forelegs; tarsungulus long, acute, claw-like, with single seta. Spiracles bicameral, not placed at ends of spiracular tubes.

Abdomen more than twice as long as thorax, with segments of similar length. Terga without sclerotized plates, not extending laterally beyond edges of sterna. Segment IX simple, not enclosed by sternum VIII. Last five to six segments curved anterad. Anal opening transverse, laterally less pigmented sclerites bearing dense patch of setae. Spiracles similar to those of thorax [Casari 2008; Caxambu & de Almeida 1999; Kasap & Crowson 1976; Monrós 1949; Reid 1990].

Morphology, Pupa. Exarate, yellowish-white to bright orange. Body tapering posteriorly. Head not visible from above. Antennae free, not hidden under prosternal grooves. Pronotum bell-shaped. Setae inserted on tubercles present or absent on head (epicranium), pronotum, mesonotum, metanotum, femora, and abdominal segments I–V and VI. Shape of tergites VI–VII variable. Posterolaterally directed projections on tergite VII absent. Elythrothecal lobe and urogomphi absent [Caxambu & de Almeida 1999; Monrós 1949; Reid 1990].

Phylogeny and Taxonomy. The subfamily was originally proposed by Lacordaire (1848) as the “Lamprosomidées” section (tribal-level) of the “Clythrides” (subfamily-level). Classification of Lamprosomatinae benefited from generic revision by Monrós (1956), which resulted in numerous taxonomic changes, most notably the recognition of Sphaerocharini as a tribe of Lamprosomatinae after more than 150 years of uncertainty and for the subsequent recognition of the tribe Neochlamysini.

Evidence suggests Lamprosomatinae to be the sister-taxon to a monophyletic Cryptocephalinae, a clade collectively known as the Camptosomata (Kasap & Crowson 1976; Suzuki 1996;

Lee 1993; Reid 1995, 2000; Schmitt 1996; Farrell 1998). Earlier studies hypothesized Fulcidacini (= Chlamysini) and Lamprosomatinae to be sister taxa (Monrós 1960; Suzuki 1996; Kasap & Crowson 1976), or Lamprosomatinae as the sister-taxon to a monophyletic Clytrini + Cryptocephalini (Lee 1993). However, these relationships remain uncorroborated. Lamprosomatinae are hypothesized to be monophyletic (Kasap & Crowson 1976; Duckett *et al.* 2004; Chamorro & Konstantinov 2011). Relationships among 11 of 14 lamprosomatine genera were recently analyzed based on morphological characters of the adults (Chamorro & Konstantinov 2011). Recognition of four tribes was confirmed with Cachiporrini sister to (Neochlamysini + (Sphaerocharini + Lamprosomatini)). With descriptions of numerous new species and genera, Monrós (1948, 1956, 1958) considerably enhanced our knowledge of the diversity of this group of insects. However, given the recent discovery of a new tribe from Brazil and countless new species remaining to be described, our understanding of the group will continue to improve.

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