

- . Sternum subtriangular or wedge shaped, without anterior and posterior expansions. **Adacini**
7. Width of posterior expansion much less than length of sternum.
 **Triaenonychini**
- . Width of posterior expansion equal to or greater than the length of the sternum.
 **Triaenobunini**

Distribution: USA, Canada, Aleutian Islands (Umnak and Atka), Japan, Korea, Tasmania, continental Australia, New Zealand, subantarctic islands Crozet, Auckland, and Campbell, Madagascar, Chile, Argentina, and southern Brazil. Some triaenonychid genera are distributed across the Austral continents; the possibly nontriaenonychids of the Boreal temperate region also cross continents (Paranonychinae; see Shear, 1986).

Relationships: In Chapter 3 it is proposed to split Triaenonychidae, as traditionally conceived, into at least two different families. The Boreal genera should be grouped with Travuniidae, while the Austral genera represent Triaenonychidae *sensu stricto* and may include the strange Synthetonychiidae (Kury, 2002).

Main references:

- **Systematics:** Pocock (1902b), Roewer (1915b, 1931), Hickman (1958), Briggs (1971a), Suzuki (1975b, 1976e).
- **Natural History:** Lawrence (1938), Hunt (1972), Maury (1988).

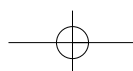
Zalmoxidae Sørensen, 1886

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Etymology: Zalmoxis is the name of a Thracian Dacian god.

Characterization:

- Size: Small Laniatores.
- Dorsum and Venter: Dorsal scutum campaniform, tending to pyriform (see Figures 4.45a–c.g). Ocularium well developed, unarmed or with small tubercles, far removed from frontal margin of carapace (Figures 4.45a–g). Frontal hump of carapace absent. Scutal area I usually longer than the others. Mesotergal grooves often V shaped. Scutal areas unarmed or with transverse rows of setiferous tubercles (*Traiania*) and armed with paramedian spines; free tergites and sternites unarmed or with transverse row of pointed tubercles (or median spiniform apophyses, as in *Stygnoleptes analis*).
- Chelicerae (Figure 4.45e): Weakly developed, basichelicerite short, with bulla clearly marked, hand small.
- Pedipalps (Figure 4.45f): Segments short and stout, never elongate. Femur with two ventrobasal spines and a mesal subdistal spine. Patella with mesal subdistal spine. Tibia and tarsus with mesal ventral and ectal ventral rows of



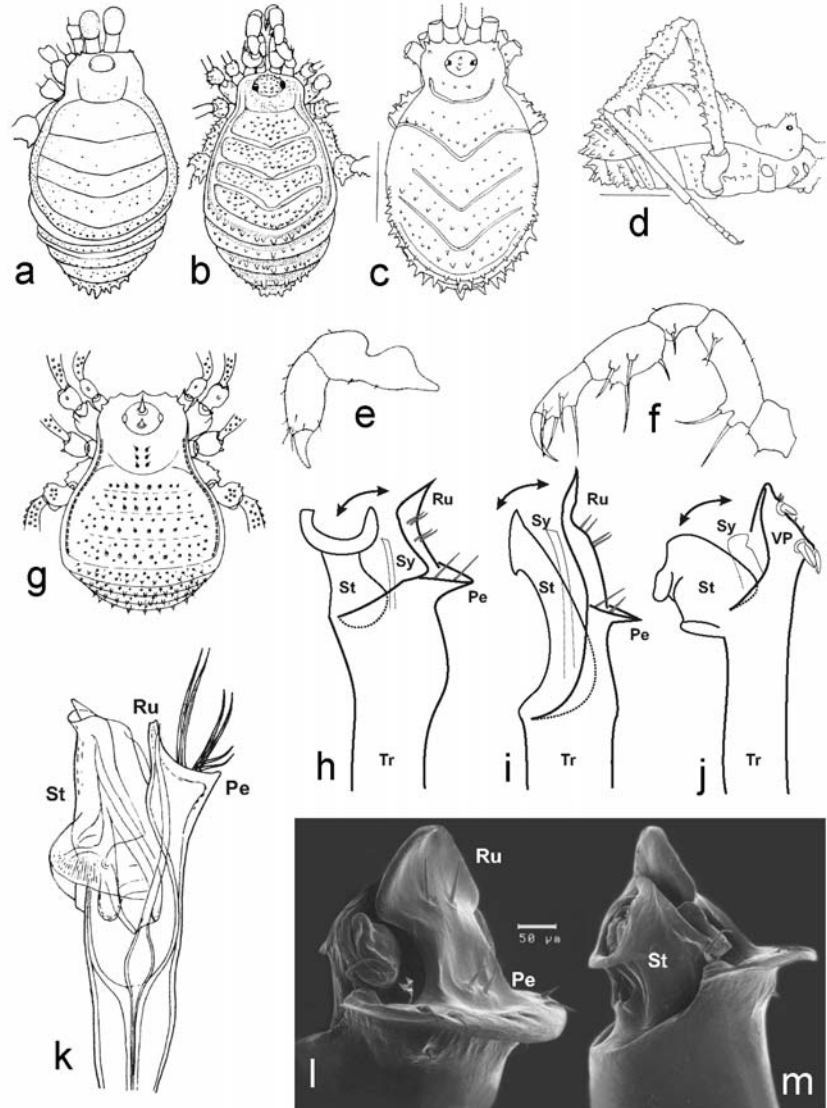
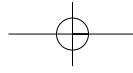
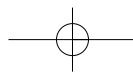
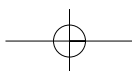


Figure 4.45. Zalmoxidae. (a) *Protodiasia saltensis* from Argentina, male, habitus dorsal (from Ringuélet, 1959). (b) *Ethobunus cubensis* from Cuba, male, habitus dorsal (from Šilhavý, 1979). (c–d) *Zalmoxis lavacaverna* from Australia, male, habitus, dorsal/lateral views (from Hunt, 1993). (e–f) *Cersa kratochvili* from Cuba, chelicera/pedipalp, lateral views (from Šilhavý, 1979). (g) *Spheroforma familiaris* from Venezuela, male, habitus dorsal (from González-Sponga, 1987). (h–j) Zalmoxidae, Fissiphalliidae, Icaeleptidae, respectively, schematic view of movement of penis (from Kury & Pérez G., 2002). (k) *Minuides milleri* from Cuba, distal part of penis, lateral (from Šilhavý, 1978). (l–m) *Gjellerupia* sp. from Papua New Guinea, distal part of penis, ventrolateral and dorsolateral (photo: P. Fong).

two to four spines. Some species with tibia incrassate in males and lanceolate setae, as in genus *Absonus* from Venezuela.

- Legs: Usually rather short, densely covered with minute granules. Leg IV with different manifestations of sexual dimorphism in all podomeres but coxa and tarsus. Coxa IV without dorsoapical spine. Tarsal formula: 3(2):6–8(3):5–6:6. Tarsal process present in a few species from Venezuela.
- Genitalia (Figures 4.45h,k–m): Capsula externa visible, well developed and modified into a **stragulum** (new name, from Latin *strāgulum*, a spread, covering, bedspread), articulated to the truncus like a jackknife. Morphology of



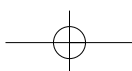


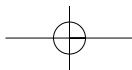
the capsula interna unknown in most species, in some of them simple without two laminar conductors. Lamina ventralis divided into two tagmata: (1) the distal **rutrum** (from Latin *rūtrum*, a spade, shovel), which is hammer shaped or spade shaped, usually bearing two pairs of paramedian setae, and (2) the basal **pergula** (from Latin *pergūla*, a projection or shed in front of a house, used as a booth, stall, shop), which is a girdle bearing two to four pairs of erect setae, which may be very elongate (e.g., in *Minuides*). The stylus is exposed by the bascule movement of the stragulum.

- Color: From dark brown to dark yellow background with varied darker mottling to pale yellowish in small edaphic species.
- Sexual dimorphism: Some species such as *Soledadiella macrochelae* and *Phalangoduna granosa* show hypertelic sexually dimorphic chelicera. Leg IV with stronger spines in male femur IV. Femur IV may be variedly curved and with different parts thickened in males. Patella IV in a few species clavate with stout spines in male. Tibia IV of male incrassate distally with two ventral parallel rows of spines. Metatarsus IV occasionally sinuous in male. Leg IV elongate in males (*Pachylicus*, some *Ethobunus*), pedipalpal tibia swollen, basitarsus III swollen, femur III incrassate, with porose (glandular?) area as in Kimulidae. Šilhavý (1978) described a new type of stridulatory apparatus for a new Cuban species of *Minuides*; nevertheless, we have had the opportunity to study Šilhavý's type and see that the "stridulatory apparatus" was in fact the porous area that appears also in the ocularium of the species. These porous regions are found in diverse Zalmoxoid/Samoid species (such as the *Baculigerus* group in Escadabiidae and *Costabrimma* spp).

Distribution: Disjunct distribution. Many species in Neotropics, from Costa Rica to Brazil. Southern limit is uncertain; on the Atlantic coast it appears to be northern Rio de Janeiro State. In Australasia, from Papua New Guinea to Pacific islands and Australia. Afrotropical: Seychelles and Mauritius, but the species from Madagascar do not belong here. Not recorded from mainland Africa. In Indo-Malaya mostly in the Philippines and Indonesia.

Relationships: Zalmoxidae are surely closely related to Fissiphalliidae and Icaleptidae (Figure 4.45j) because of the presence of a stragulum. Fissiphalliidae (Figure 4.45i) clearly show the modification of the ventral plate into a pergula and a rutrum, the main synapomorphic character of Zalmoxidae. The decision to keep Fissiphalliidae as a family was adopted because of the peculiar form of the enlarged fingerlike stragulum, which is only an autapomorphy at that level. The recognition of higher-level synapomorphies uniting Fissiphalliidae with Zalmoxidae, but no currently recognized synapomorphy for Zalmoxidae, only potentially threatens the unity of this family. In order to detect monophyletic groups inside Zalmoxidae, it is necessary to evaluate the importance of details of pergula + rutrum such as their shape and position, as well as the form of the stragulum. If exclusive derived character states for Zalmoxidae are not found, the adequate decision would be to merge





Fissiphalliidae into Zalmoxidae. Meanwhile, hundreds of obscure species with tiny, complex, and hard-to-interpret male genitalia are waiting for study, one of the hardest challenges to opilionologists.

Main references:

- **Systematics:** Sørensen (1886), Roewer (1912b, 1923), González-Sponga (1987), Staręga (1989), Kury & Cokendolpher (2000), Kury (2003).
- **Natural history:** González-Sponga (1987).

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