

Superfamily Hygrobatoida KOCH, 1842

1842 Hygrobatides KOCH, Übersicht des Arachnidensystems: 3(1): 7.

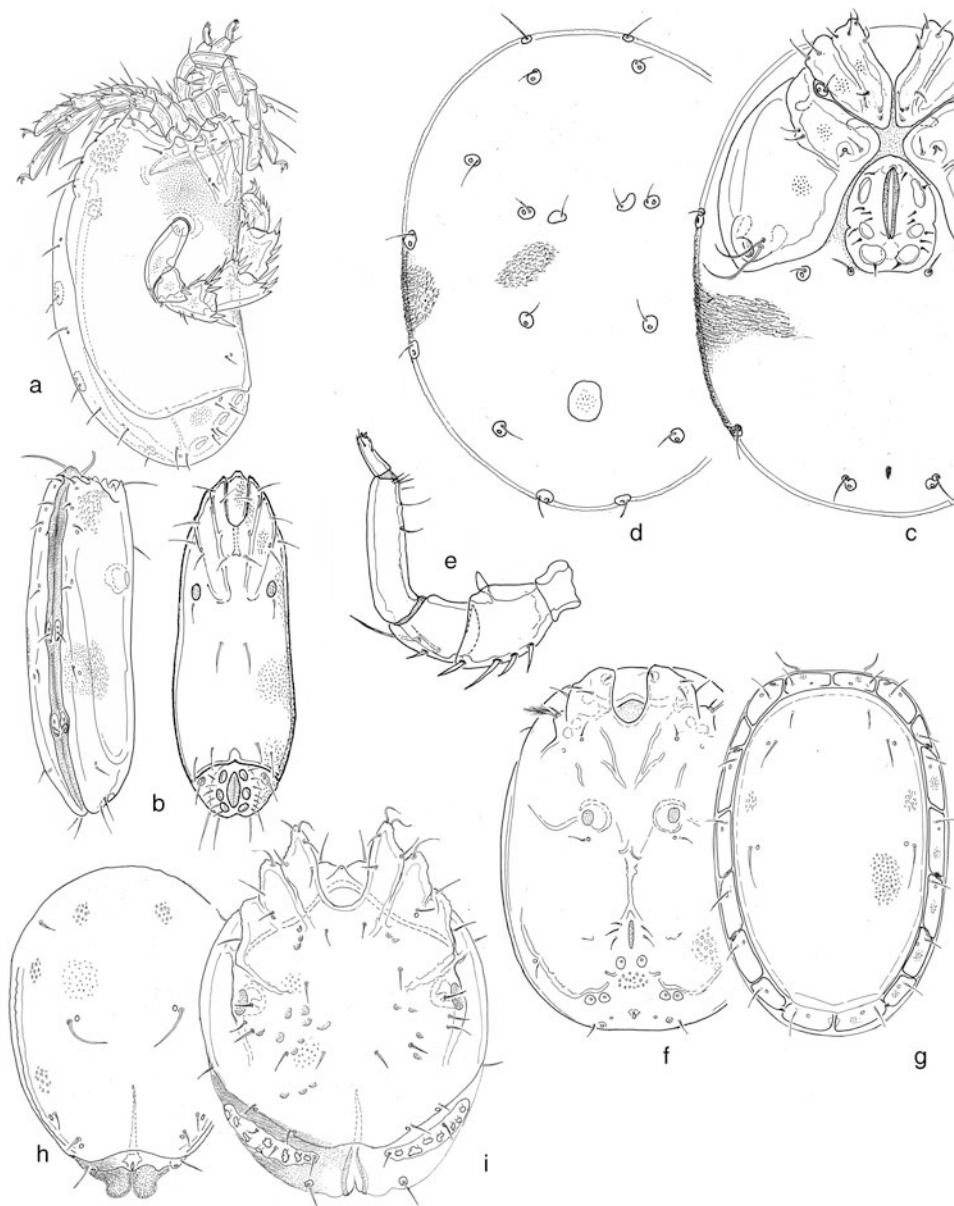
Diagnosis: Acetabula usually present (except for the marine Pontarachnidae and *Haloaxonopsis* PEŠIĆ, SMIT & SABOORI, 2012, a monotypic aturid genus known only from saline streams in southern Iran with secondarily reduced acetabula), usually disk-shaped and arranged on plates flanking the gonopore. Without movable genital flaps that can cover the gonopore. Lateral eyes not on a common eye plate, located at anterolateral idiosoma margin. Palps neither chelate nor uncate. Chelicera typically two-segmented.

Discussion: Probably a polyphyletic grouping. For detailed comments on the phylogenetic systematics in “higher” water mites (Lebertioidea + Hygrobatoida + Arrenuroidea) see discussion of Lebertioidea in Vol. II. At the larval stage, all hygrobatoid mites are adapted for swimming and attach to their insect hosts under water. Larvae have Cx-II and -III, often also Cx-I fused on their respective sides (and occasionally medially).

Most hygrobatoid families are represented in the area covered. Exceptions are the monotypic Omartacaridae COOK, 1963 (several species adapted to interstitial life; the Americas and Australia), and Astacocrotonidae THOR, 1927 (one species found parasitic at the adult stage, on a decapod crustacean; Australia).

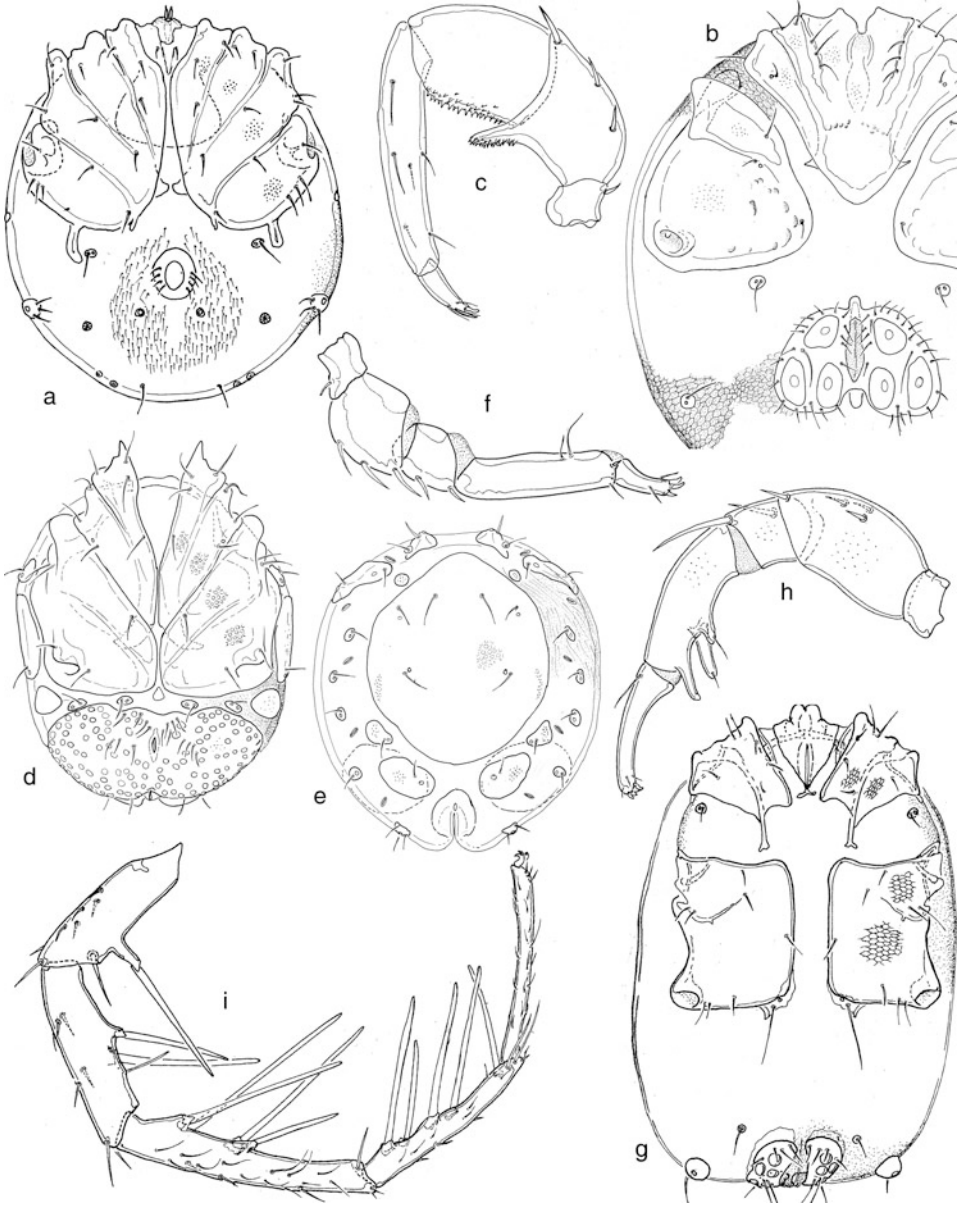
Key to families

- 1 Idiosoma laterally compressed, higher than wide (9-1 a); membranous integument restricted to a narrow dorsal area containing small dorsal sclerites (9-1 b). Frontipodopsidae (page 93)
- Idiosoma not laterally compressed, as wide as high or wider than high (9-1 c-d, f). 2
- 2 (1) P-2 ventrally with a single, sometimes peg-like seta located directly on the segment (9-1 e) or on a socket (e.g., 9-46 a-b); all European species without dorsal and ventral shields, posteroventrally with soft integument (9-1 c), dorsally with one small or middle-sized plate (9-1 d). Limnesiidae (page 165)
- P-2 without a single ventral seta (however, groups of setae, or various types of protrusions may be present - 9-2 c, 9-4 c); idiosoma sclerotization various. 3
- 3 (2) Idiosoma with dorsal and ventral shields; the dorsal shield may be complete (9-1 h) or consist of a large central plate surrounded by small platelets (9-1 f); the genital field may be surrounded by a membranous area; often, suture lines between fused coxal plates partly obsolete (9-1 g, i) and idiosoma flattened dorsoventrally. 4
- Idiosoma with soft integument or bearing regularly-arranged plates; if a complete dorsal shield is present, genital field and surrounding platelets remain separate from each other and from coxae, not included into a homogenous ventral shield (9-2 a-b); Cx-I+II and Cx-III+IV separated by membranous integument or fused to each other, but with suture lines well visible (9-2 a-b, d, g); idiosoma various in shape. . . . 5
- 4 (3) Dorsum with a central plate surrounded by a ring of small platelets (9-1 f); insertions of IV-L close to each other (separation <50% width of idiosoma – 9-1 g). Lethaxonidae (page 161)
- Dorsum with a continuous shield or with paired glandular platelets in various numbers – in the latter case, these platelets never completely surrounding a central plate (9-2 e); insertions of IV-L distanced from each other (separation > 50% width of idiosoma – 9-1 i). Aturidae (page 7)
- 5 (3) Posterior margin of Cx-IV with lateral and medial long apodemes (9-2 a); no typical acetabula developed (marine species). Pontarachnidae (page 225)
- Posterior margin of Cx-IV not extending into lateral apodemes (9-2 b, d); medial apodemes if present short (9-44 c); genital field with acetabula (fresh-, rarely brackish water species). 6
- 6 (5) A pair of glandularia perforating the surface of Cx-IV, Cx-I in most cases completely fused medially (9-2 b); legs without typical swimming setae (long, fine, arranged in rows); P-2 often with digitiform extensions, peg-like protrusions or denticulation (e.g., 9-2 c, 9-28 d, 9-42 f, l). Hygrobatidae (page 95)



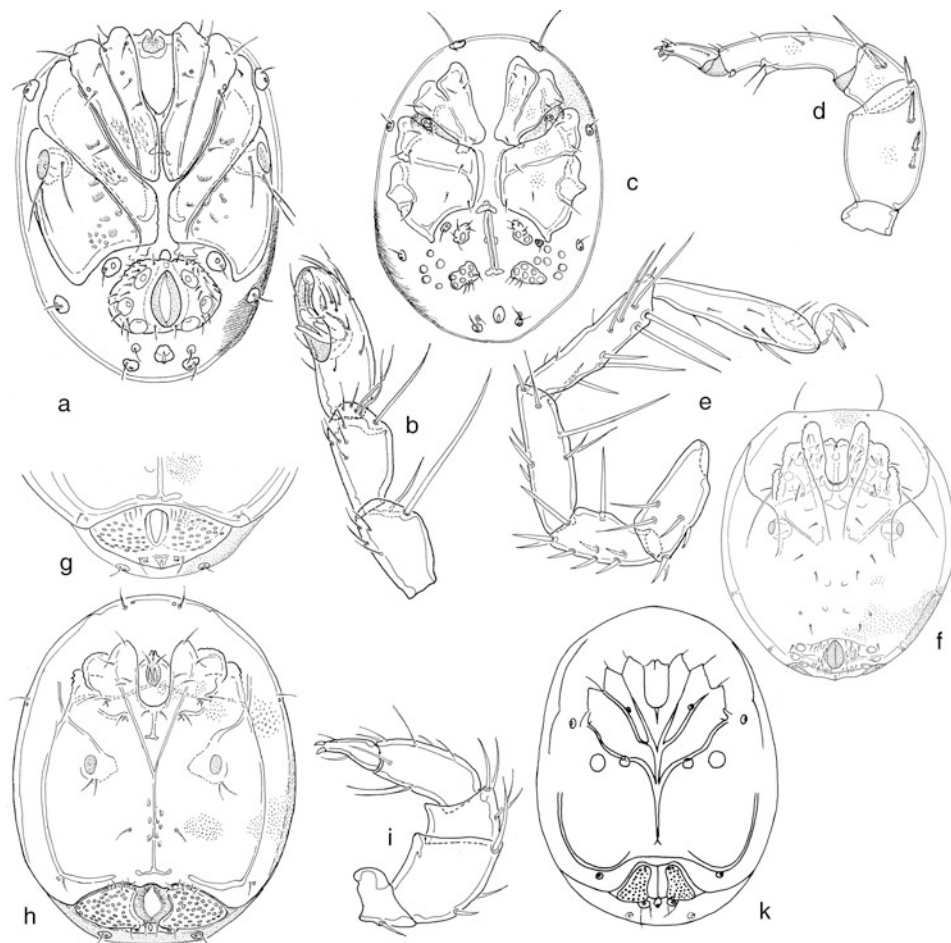
9-1: a-b, *Frontipodopsis reticulatifrons* male; a, lateral view; b, dorsal view (left) and ventral view (right); c-e, *Limnesia arevaloi* male; c, ventral view; d, dorsal view; e, palp medially; f-g, *Lethaxona pygmaea*; f, female, dorsal view; g, male, ventral view; h-i, *Aturus barbatulus* female (GERECKE 2014b); h, dorsal view; i, ventral view.

- Surface of Cx-IV not perforated by a pair of glandularia (but glandularia may be fused to the posterior margin of Cx-IV), Cx-I medially separated by membranous integument (9-2 d, g) or, if fused, generally with a suture marking the fusion line (rare exceptions in Feltriidae); legs with or without typical swimming setae; P-2 generally lacking ventral protrusions or denticles (exception: *Pseudofeltria*). . . 7



9-2: a, *Pontarachna punctulum* male, ventral view; b-c, *Hygrobatoides fluviatilis* male; b, ventral view; c, palp; d-f, *Feltria armata* (GERECKE 2012); d, male venter; e, female dorsum; f, female palp; g-i, *Unionicola crassipes*; g, male, ventral view; h, palp; i, I-L-4-6.

- 7 (6) Two pairs of glandularia arranged in a transverse (9-21 *l*) or oblique (9-2 *d*) line in the interspace between Cx-IV and genital field; dorsum with one to several larger unpaired plate(s) surrounded by minor paired platelets (9-2 *e*) or with a dorsal shield (9-21 *a*, *i*); P-4 generally lacking digitiform ventral protrusions or tubercles (9-2 *f*); legs without swimming setae; small, flattened, rheobiontic species. Feltriidae (page 73)



9-3: a-b, *Wettina podagrica* male; a, ventral view; b, I-L-4-6; c-e, *Piona conjugula* female; c, ventral view; d, palp; e, I-L-4-6; f, *Axonopsis inferorum* male, venter; g-i *Albia stationis*; g, male genital field; h, female venter; i, male palp; k, *Albia davidsi*, female venter (from SMIT & VAN DER HAMMEN 1992).

- Glandularia posterior to Cx-IV not arranged in a line in the interspace between Cx-IV and genital field (9-2g, 9-3a); dorsum often with soft integument or isolated small platelets, rarely with a dorsal shield (9-50f); P-4 often with digitiform protrusions or tubercles (9-2h); legs of most species with swimming setae. 8
- 8 (7) Posterior margin of Cx-IV straight (9-2g) or with knob-shaped central extensions (e.g., 9-64d), neither with a concave median area, nor enclosing a genital bay (9-2g); basal and central segments of I-L often enlarged, with pairs of protuberances with grooved or fluted setae (9-2i); in general, male legs without secondary sexual characters; claws simple, sickle-shaped, without ventral lamella. Unionicolidae (page 229)
- Posterior margin of Cx-IV triangular or with pointed central extensions and medially concave, forming a more or less distinct genital bay (9-3a, c); I-L lacking protuberances and blade-like setae (9-3b); male IV-L, often also III-L, with secondary sexual characters (e.g., 9-48c-d); in most cases claws with clawlets and ventral lamella. 9

- 9 (8) I-L-6 conspicuously enlarged, with strong claws (in length about $\frac{1}{2}$ I-L-6), ventral clawlet tongue-shaped, longer than pointed principal claw (9-3 b); Cx-IV triangular in shape, suture Cx-III/IV directed posteriorly, medial margin of Cx-III+IV formed exclusively by Cx-III (9-3 a); male legs without secondary sexual characters; genital field with 3 pairs of acetabula. Wettinidae (page 251)
- I-L-6 not extremely enlarged (but in some species with strongly convex ventral margin – 9-52 b), claws normal in size and shape (9-3 e); Cx-III+IV various in shape, medial margin formed by Cx-III and Cx-IV (9-3 c) or only by Cx-III (9-48 h); male III-L (e. g., 9-53 f, i) and IV-L (e. g., 9-48 c-d) with secondary sexual characters; genital field with 3 or more pairs of acetabula. Pionidae (page 177)

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Chelicerata

Acari III

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