Appendix 5. List and description of characters used for the cladistics analysis.

Note: When figures are from this study, it is referred as "Fig." or "Figs" in the text (with "F" in capital) whereas "fig." or "figs" refer to Jocqué 1991a. The reference is mentioned if other figures are cited.

Carapace

1. Carapace profile

0. cephalic area slightly domed, thoracic area lower (Fig. 1A; figs. 53, 290)
1. cephalic area flat, thoracic area strongly sloping (Fig. 1B; fig. 316)
2. flat on its entire length including major part of thoracic area (Fig. 1C; fig. 222; Miller *et al*. 2010b, fig 1A)
3. slightly domed (ratio height/length < 0.3) (Fig. 1D; fig. 162)
4. strongly domed (ratio height/length > 0.3) (Fig. 1E; figs 118, 125, 152)

The shape of the carapace is strongly related with the life style. Burrowing species do apparently need a higher carapace than free-living ones. Zodariids that build so called 'igloo shaped retreats' use less effort than those that remove sand and debris to construct a burrow. Although a 'flat' carapace usually has its highest point near the fovea, just as a domed one, it is considered flat when its length exceeds three times its height.

2. Carapace strongly elongate (ratio L/W > 2)

0. absent
1. present (Fig. 1F)

3. Carapace, highest point in lateral view

0. highest point clearly in anterior part (Fig. 1A)
1. highest point around middle

In *Penestomus*, the carapace is completely flat on its entire length. It is therefore coded as 1.

4. Carapace with posterior part concave in lateral

0. absent or shallow
1. deep, with sinuous profile (Fig. 1G ; figs 290, 296)

The concavity corresponds with the position of the fovea

5. Carapace, deep cephalic groove

0. absent
1. present (Fig. 1H; fig. 360)

This character is an autapomorphy for *Palfuria*. It is less pronounced in female.

6. Carapace, anterior shape

0. clypeus straight or sloping forward (Figs 1E, G, H)
1. carapace strongly protruding (Fig. 1I)

7. Carapace perforations

0. absent
1. present (Figs 1J, K; Jocqué 1987, figs 43-47)

In a few taxa of the femoral organ clade, the cephalothorax has tiny perforations.

8. Carapace surface

0. smooth
1. finely reticulated or rugose (Fig. 1L)
2. deeply granulated (Fig. 1H; Jocqué 2009, figs 131, 132)

The texture of the tegument varies from almost texture-less to deep granulations. The cephalic area may be smoother than surrounding sides.

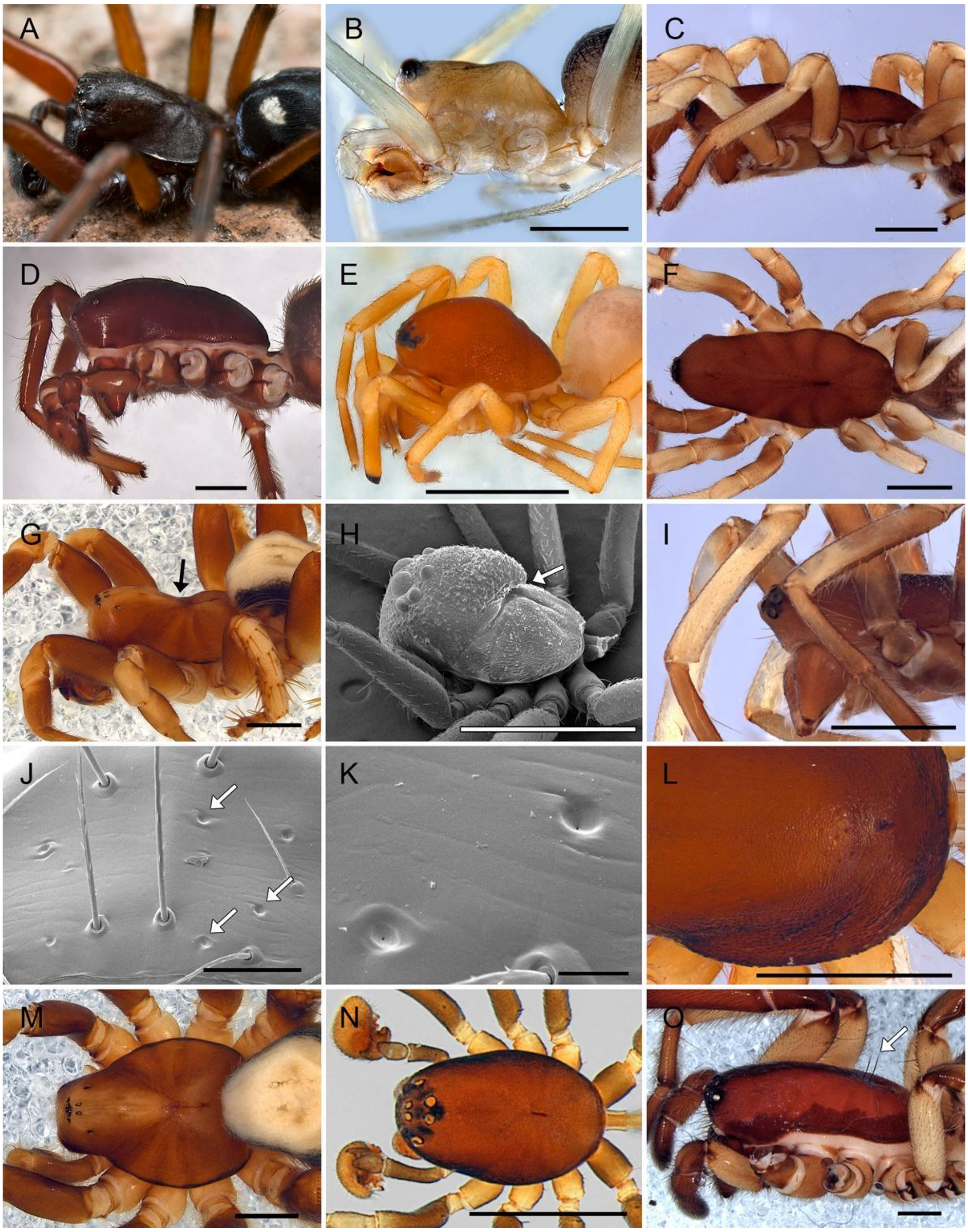

Figure 1. A. ***Nurscia albomaculata*****, male (*****in vivo*****), (DNA Z308, RBINS IG:33337/18), lateral view. B.** ***Acanthinozodium sahelense*****, male (RMCA_ARA_144790), carapace, lateral view. C.** ***Chariobas cylindraceus*****, female (RMCA_ARA_137653), carapace, lateral view. D.** ***Palindroma morogorom*****, male Pt (ZMUC), carapace, lateral view. E.** ***Suffascar albolineatus*****, female (CAS), lateral view. F.** ***Chariobas*** **cf.** ***cylindraceus*****, juvenile (DNA Z023, RMCA_ARA_245372), carapace, dorsal view. G.** ***Psammoduon deserticola*****, male (RMCA_ARA_133729), carapace, lateral view, the arrow points to the concave part. H.** ***Palfuria sp*****., male (DNA Z224, RMCA_ARA_223072), carapace, lateral view, the arrow points to the cephalic groove. I.** ***Chariobas cylindraceus*****, female (RMCA_ARA_137653), detail of carapace, lateral view. J.** ***Dusmadiores*** **sp., female (DNA Z032, RMCA_ARA_245375), detail of the clypeus, anterior view, the arrows point to some perforations. K. Same as previous, detail or the perforations. L.** ***Suffascar fianara*****, female (CAS 9003473), dorsal view. M.** ***Psammoduon deserticola*****, male (RMCA_ARA_133729), carapace, dorsal view. N.** ***Suffrica chawia*****, male (RMCA_ARA_221982), carapace, dorsal view. O.** ***Cicynethus subtropicalis*****, female (DNA Z212, RMCA_ARA_211745), carapace lateral view, the arrow points to the erect setae in front of the fovea. Scale bars: B-I, M-O = 1 mm; J = 50µm; K = 10 µm; L = 0.5 mm.**

9. Carapace, shape in dorsal view

0. pear shaped, cervical grooves conspicuous (fig. 52)
1. oval or ovoid, cervical grooves absent or faint (Fig. 1N; fig. 64)
2. sub-rectangular (Miller *et al*. 2010b, figs 13A, C)

10. Carapace, hair cover

0. present
1. hairless or with very few tiny setae

11. Carapace, silvery setae

0. absent
1. present (Jocqué 2009, figs 114, 133)

The character is present in *Penestomus* (Penestomidae) and, in Zodariidae, it seems restricted to some Cryptotheline taxa such as *Capheris*, *Cryptothele*, *Caesetius*, *Storenomorpha*, *Thaumastochilus* ...

12. Carapace, row of long setae in front of fovea

0. absent
1. present (Jocqué 1987, figs 27, 31)

Setae on the middle line between fovea and eye area are common in Zodariidae but it is only coded present when they are almost as long as the height of the carapace at the level of the fovea.

13. Carapace, pair of erect setae in front of fovea

0. absent
1. present (Fig. 1N; fig. 254)

Setae on the middle line between fovea and eye area are common in Zodariidae. In some taxa there is a unique pair of setae, clearly longer than other hairs and situated just in front of the fovea.

14. Carapace, fovea

0. clearly visible, slit like (Figs 1F, 1N)
1. a circular depression (Miller *et al*. 2010b, fig. 13C)
2. absent or faint (Fig. 2A; Jocqué 1987, figs 9, 11)

Usually the fovea is well marked and sometimes coincides with a shallow or deep depression. In some taxa of the Zodariinae the fovea is inconspicuous.

15. Carapace, subocular pit

0. absent
1. present (Fig. 2B; Marusik & Omelko 2012, fig. 1A)

Only *Cryptothele* has a shallow depression just behind the PME (sees Marusik & Omelko 2012). However it may be a useful character for the future.

16. Carapace, eye number

0. eight
1. six

Only *Trygetus* has six eyes, however it may be a useful character for the future.

17. Carapace, posterior eye row as seen from above

0. straight or slightly curved (Figs 1F, 2C; figs 207, 277)
1. clearly procurved (Fig. 1N; figs 117, 355)
2. clearly recurved (Fig. 1M; figs 289, 269)

18. Carapace, anterior eye row as seen from front

0. straight or slightly curved (Fig. 2D; Miller et al. 2010b, fig. 1C)
1. curved, with median tangents of the ALE not passing through the AME (Fig. 2E; figs 54, 66, 153)
2. forming a quadrangle with distance between ALE at least twice the distance between the AME (Fig. 2F; figs 46, 73)
3. forming a quadrangle with distance between ALE less than twice the distance between the AME (Fig. 2G; figs 262, 279)

Figure 2. **A.** ***Heradida speculigera*****, female Ht (RMCA_ARA_132618), carapace, dorso-lateral view. B.** ***Cryptothele sp*****., female (QM S90504), carapace, dorsal view, the arrow points to the subocular depression. C.** ***Palindroma morogorom*****, female Pt (ZMUC), details of carapace and ocular area, dorsal view. D.** ***Zodarion italicum*****, female (RBINS IG:33337/20), carapace, dorso-frontal view. E.** ***Suffascar fianara,*** **male Ht (CAS 9003430), carapace, frontal view. F.** ***Palindroma morogorom*****, male Pt (ZMUC), carapace, frontal view. G.** ***Ballomma haddadi*****, female Pt (RMCA_ARA_132641), carapace, frontal view. H.** ***Antillorena polli*****, female (DNA Z305, RBINS IG:33337/16), carapace, frontal view. I.** ***Cyrioctea spinifera*****, female (MACN-Ar, from Morphbank.net), carapace, frontal view. J.** ***Psammorygma sp*****., female (DNA Z010, NCA AcAT 2009/3351), carapace, frontal view. K.** ***Cyrioctea marken*****, male (RMCA_ARA_245374), anterior part of carapace, dorsal view. L.** ***Leprolochus spinifrons*****, female (DNA Z309, CHNUFPI-PNSCo 0060), anterior part of carapace, dorsal view. Scale bars: A, D, L = 0.5 mm; B, C, E-K = 1mm.**

19. Carapace, eye color

0. all eyes pale
1. AME dark (Fig. 2D; Jocqué & Henrard 2015a, figs 1A, B)

20. Carapace, eye rows formula

0. 4-4 (fig. 82) or 2-4-2 (fig. 73)
1. 2-2-4 (fig. 277) or 4-2-2 (fig. 269)

21. Carapace, eye distance

0. far apart
1. in close group (Fig. 2H; figs. 46, 223; Jocqué 2008, fig. 3)

Eyes are considered to be in a close group when each eye is less than its diameter away from the nearest neighboring eye and when the width of the entire eye group is less than half the carapace width.

22. Carapace, distance between AME

0. less than their diameter apart (Figs 2D-H)
1. their diameter or further apart (Fig. 2I)

23. Carapace, distance between PME

0. between 1 and 2 times their diameter apart (Figs 2B, E)
1. less than their diameter apart (Figs 2G, H)
2. twice their diameter or further apart (Fig. 2D)

24. Carapace, distance between PME and AME

0. less than twice the diameter of the smallest eyes apart (Fig. 2G)
1. twice the diameter of the smallest eye or further apart (Fig. 2B)

25. Carapace, distance between PLE and PME

0. between one to two times the diameter of the smallest eye apart (Figs 2B, C, E)
1. less than the diameter of the smallest eye apart (Figs 2A, D)
2. more than two times the diameter of the smallest eye apart (Fig. 1M)

26. Carapace, distance between PLE and AME

0. two times the diameter of the smallest eye or further apart (Figs 1M, 2B, C)
1. between 1 and 2 times the diameter of the smallest eye apart (Figs 1N, 2I)
2. less than the diameter of the smallest eye apart (Figs 2A, D, E)

27. Carapace, distance between PLE and ALE

0. less than the diameter of the smallest eye apart (Figs 2D, E)
1. between one and two times the diameter of the smallest eye apart (Fig. 2K)
2. twice the diameter of the smallest eye or further apart (Figs 1M, 2B, C)

28. Carapace, distance between ALE and AME

0. between one and two times the diameter of the smallest eye apart (Fig. 2F)
1. less than the diameter of the smallest eye apart (Figs 2A, D, E)
2. twice the diameter of the smallest eye or further apart (Fig. 2J)

29. Carapace, distance between ALE

0. two times the diameter of an eye or further apart (Figs 2D, E, I)
1. between one and two times the diameter of an eye apart (Figs 2F, H, J)
2. less than the diameter of an eye apart (Fig. 2G)

30. Carapace, PME shape

0. PME rounded
1. PME oval (fig. 395; Jocqué & Henrard 2015a, fig. 4F)

31. Carapace, AME size

0. sub-equal or slightly larger than other eyes, less than twice the diameter of the PME (Fig. 2C; figs 124, 143)
1. the largest, up to 2 times the diameter of the PME (Fig. 2E; fig. 315, Jocqué & Henrard 2015a, fig. 4F)
2. clearly the smallest of all eyes (Figs 1N, 2A, G; figs 113, 200, 223)

32. Carapace, clypeus height

0. low: less than two times the diameter of ALE (Fig. 2I);
1. high: more than two times diameter of ALE (Fig. 2F);

33. Carapace, clypeus, cluster of setae

0. absent or with a few scattered hairs
1. present, with a dense group of setae (Fig. 2I; figs 163, 297)

34. Carapace, clypeal hood

0. absent
1. present (Miller et al. 2010b, fig. 1C)

35. Carapace, transverse row of spines in eye region

0. absent
1. present between AER and PER (Figs 2I, K; Platnick 1986, figs 1-3; Platnick & Jocqué 1992, fig. 1)
2. present in front of eyes (Fig. 2L; Jocqué 1988a, figs 3, 9, 11-13)

Sternum

36. Sternum, shape

0. shield shaped (Fig. 3A; median part the widest or as wide as anterior part) (figs 74, 147, 375, 238)
1. triangular (anterior part, near the margin, the widest) (Fig. 3B; fig. 280)
2. oval (Fig. 3C; fig. 47; Jocqué 2013, figs 1C, 1F)
3. diamond shaped or elongate oval (Figs 3D, E; fig. 238)

37. Sternum, length

0. longer than wide (Figs 3D, E; figs 280, 147, 238)
1. as wide as long or wider than long (Figs 3A-C; fig. 367)

Most zodariids have a sternum that is approximately as wide as long given a five percent leeway. In certain genera like *Cyrioctea*, different states may occur.

38. Sternum, rebordered margins

0. absent
1. present (Fig. 3A; Jocqué 1987, 16)

39. Sternum, anterior margin with modification in connection with endites

0. absent
1. with concavities accommodating posterior part of the endites (Fig. 3B; fig. 208, Jocqué 2009, fig. 5)
2. with small indentations (fig. 286)

The sternum can be provided with a concavity on either side of the anterior margin accommodating the posterior part of the endites.

40. Sternum, anterior margin with concavity accommodating the labium

0. absent
1. narrow (Fig. 3F; Chami-Kranon & Ono 2007, fig. 15)
2. wide (Jocqué & Baert 2005, fig. 14)

41. Sternum, ventral boss

0. absent
1. present (Fig. 3G; fig. 195; Baehr 2005, figs 3, 12, 14)

42. Sternum, intracoxal triangular extensions

0. absent
1. present (Fig. 3H; figs 120, 329; Jocqué & Henrard 2015a, fig. 1C)

In some genera, the sternum presents triangular extensions that fit the basal excavations of the coxa.

43. Sternum, intercoxal triangular extensions

0. absent
1. present, together with char. 42 (Fig. 3F; Chami-Kranon & Ono 2007, fig. 15)
2. present, without char. 42

44. Sternum, precoxal sclerites

0. absent
1. with extra sclerites (Fig. 3I; fig. 272)
2. with extra triangular sclerites fitting the coxae (Fig. 3B; fig. 280)

Many species of the Cryptotheline have extra sclerites between the sternum and the coxae, their number may vary from two to eight but varies even within the same genus.

In some genera (*Capheris*, *Systenoplacis*) they fit the basal excavations of the coxae and should not be confounded with char. 42.

45. Sternum, depressions in front of coxae

0. absent
1. present (Fig. 3F)

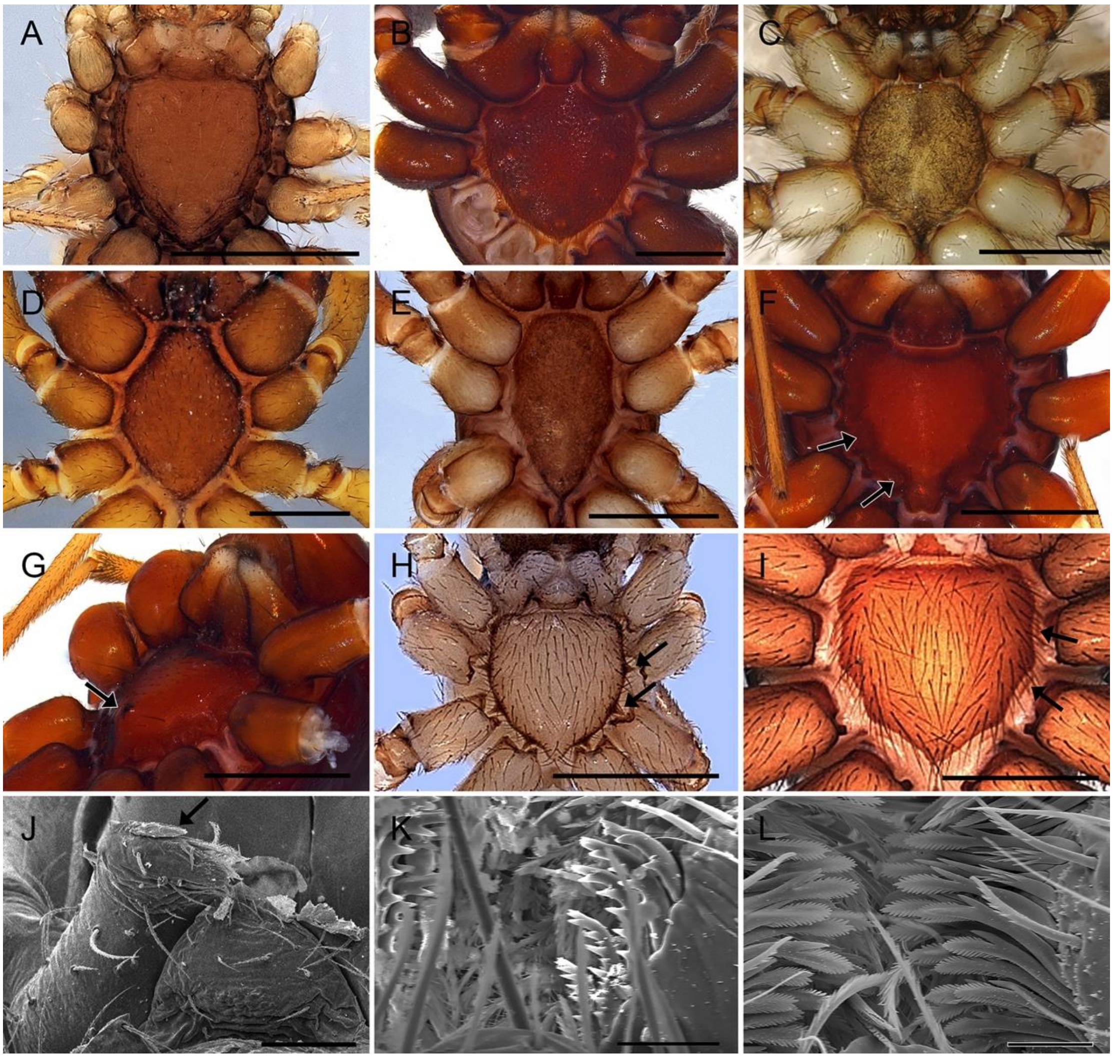

Figure 3. Sternum and mouthparts in ventral view. A. *Akyttara homunculus*, female (RMCA_ARA_242493). B. *Capheris abrupta*, male (DNA Z211, RMCA_ARA_225691). C. *Cyrioctea spinifera*, female (MACN-Ar, from Morphbank.net). D. *Thaumastochilus termitomimus*, female (DNA Z295, RMCA_ARA_215886). E. *Chariobas cylindraceus*, female (RMCA_ARA_137653). F. *Heradion paradiseum*, male (MHNG VN-12/03c). G. Same as previous, slightly lateral view. The arrow points to the ventral boss. H. *Acanthinozodium crateriferum*, female (RMCA_ARA_243548). The arrows show the intracoxal triangular extensions. I. *Cicynethus subtropicalis*, female (DNA Z212, RMCA_ARA_211745). The arrows show the precoxal sclerites. J. *Mallinus nitidiventris*, male (DNA Z223, RMCA_ARA_216253), endites and labium. The arrow points to the scale-like extension on the endite. K. *Suffascar fianara*, female (DNA Z304, RMCA_ARA_245353), modified, uniseriate setae on the endites. L. *Suffasia kanchenjunga*, female (coll. Martens N°324), modified, biseriate setae on the endites. Scale bars: A, F, G, = 0.5 mm; B-E, H, I = 1 mm; J = 0.1 mm; K, L = 20 µm.

Mouth parts

Labium and endites

46. Mouth parts, labium shape

0. triangular (fig. 108, 184), arrow shaped or oblong (figs 55, 84)
1. diamond-shaped (fig. 280)

47. Mouth parts, endites with basolateral extension

0. absent (figs. 185, 194)
1. present (figs. 280, 286, 292; Jocqué 2009, figs. 5, 8)

The base of the endites may be enlarged to accommodate the palpal coxa. The insertion is then directed forward instead of laterad.

48. Mouth parts, endites with serrula

0. present (Miller *et al*., 2010b, fig. 2a)
1. absent

The absence of a serrula appears to be a synapomorphy of the Zodariidae and is very rare among other spiders. The character may be difficult to discern with the stereomicroscope as the curved chitinous frontal margin of the endites may appear as a black line, giving the impression of a serrula.

49. Mouth parts, endites with apical scale like extension

0. absent
1. present (Fig 3J)

50. Mouth parts, endites with meso-apical modified setae

0. absent
1. uniseriate (Fig. 3K)
2. biseriate with ventral tooth (Henrard and Jocqué 2015, fig. 40; Henrard & Jocqué, 2017, figs 3C, D)
3. biseriate with dorsal tooth (Fig. 3L; Henrard & Jocqué, 2017, figs 3A, B)

Chelicerae

51. Mouth parts, chelicerae, dorsal side of paturon

0. with scattered hairs or mediodorsal group of hairs (Figs 2D, G; figs 153, 317)
1. with dense thick hair cover evenly dispersed (Figs 2H, I; figs 54, 126)
2. with anteromesal group of hairs, rare elsewhere (Fig. 2E; figs 119, 194)

The chelicerae may be densely haired as in *Cyrioctea*, *Lachesana* and other genera, or almost devoid of hair as in *Mallinella* or *Storosa*. In the last case a mediodorsal group of hairs remains. This, however, does not give the impression of a densely haired appendage.

52. Mouth parts, chelicerae with thick spinules on dorsal side of paturon

0. absent
1. present (fig. 338; Jocqué & Henrard 2015b, fig. 11D)

This feature is apparently an autapomorphy for *Palaestina*.

53. Mouth parts, chelicerae with anteromesal cusp

0. absent
1. present, with one small tooth (Fig. 4A)
2. present, with articulated teeth (Fig. 4B; Lise 1994, fig. 39)

54. Mouth parts, chelicerae with teeth on retromargin (posterior margin)

0. with 2 teeth or more (Fig. 4C; Miller *et al*. 2010b, fig. 2D)
1. with 1 tooth only (Fig. 4D)
2. without teeth

55. Mouth parts, chelicerae with teeth on promargin (anterior margin)

0. with 3 teeth or more (Fig. 4C; Miller *et al*. 2010b, fig. 2D)
1. with 2 teeth (Figs 4D, G, H)
2. with 1 tooth only
3. without teeth

56. Mouth parts, chelicerae with peg teeth on promargin

0. absent
1. present (Figs 4E, I)

Ordinary teeth are absent or small in more derived taxa but are replaced by peg teeth in some genera. These are blunt, rounded conical with “root” sometimes visible in transparency and with a furrow at their base (Fig. 4E). This character has been given great systematic importance (Forster & Platnick, 1984) as it occurs in only a few families. Their presence in derived Zodariidae proves the plasticity of the character.

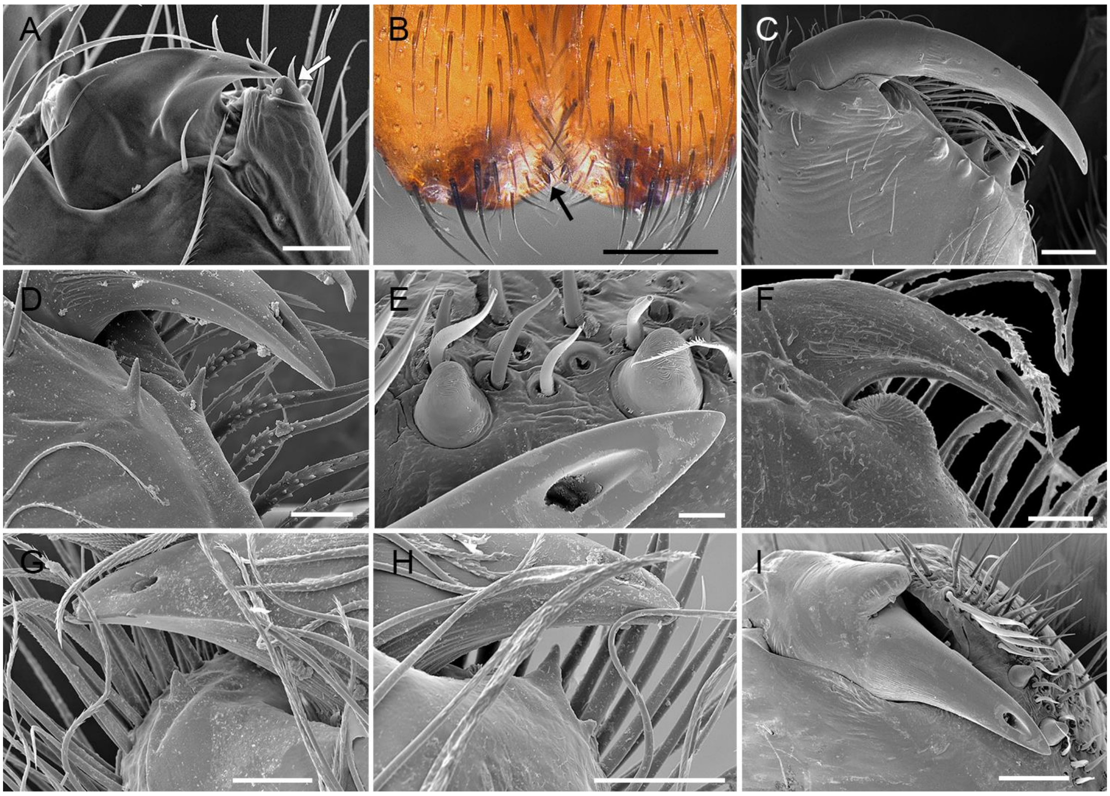

Figure 4. Anterior part of chelicerae. A. *Dusmadiores sp*., female (DNA Z032, RMCA_ARA_245375), ventral view, the arrow points to the unique tooth on the anteromesal cusp. B. *Leprolochus spinifrons*, female (DNA Z309, CHNUFPI-PNSCo 0060), dorsal view, the arrow points to the articulated teeth on the anteromesal lamina. C. *Coelotes terrestris*, female (DNA Z131, RBINS IG:33337/07), ventral view. D. *Ishania sp*., female (DNA Z245, MCZ 79944), ventral view. E. *Hermippus loricatus*, male (RMCA_ARA_245362), peg teeth on promagin of chelicerae. F. *Suffascar fianara*, female (DNA Z304, RMCA_ARA_245353), ventral view. G. *Cryptothele* sp., male (QM S90504), ventral view. H. *Cryptothele* sp., female (QM S90504), ventral view. E. *Hermippus loricatus*, male (RMCA_ARA_245362), fang with proximal tooth shaped extension. Scale bars: A, D-F = 20 µm; B, C = 0.2 mm; g, h = 50 µm; I = 0.1 mm.

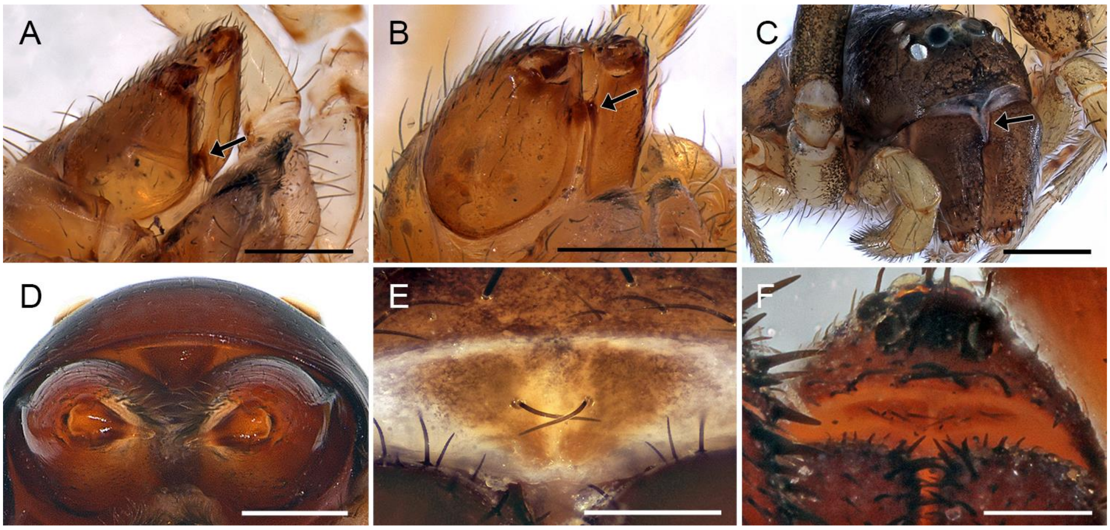

Figure 5. Chelicerae and Chilum. A. *Diores malaissei*, male (RMCA_ARA_234481), chelicerae, ventrolateral view. The arrow shows where the chelicerae are fused. B. *Zodarion italicum*, female (RBINS IG:33337/13), same as previous. D. *Zodarion nigrifemur*, female (RBINS IG:33337/20), chelicerae, antero-lateral view, the arrow points to the intercheliceral triangle. D. *Heradion paradiseum*, male (MHNG VN-12/03c), chelicerae and chillum, ventral view. E. *Selamia reticulata*, female (DNA Z075, RBINS IG:33337/05), detail of the chilum, ventral view. F. *Thaumastochilus termitomimus*, female (DNA Z295 RMCA_ARA_215886), chilum, ventral view. Scale bars: A-C, K = 0.5 mm; D = 0.2 mm; E = 0.1 mm.

57. Mouth parts, chelicerae with boss on fang furrow

0. absent
1. present at base of fang (Fig. 4F)

In the endemic genera *Suffascar* from Madagascar, the fang furrow is characterized by the lack of teeth and provided instead with a basal swelling (Henrard & Jocqué 2017, figs 5H, I, 12H, 18I).

58. Mouth parts, chelicerae with intercheliceral triangle

0. absent (Figs 2E, 2H; figs 46, 54, 163)
1. present (Figs 2D, 5C; figs 345, 366, 397)

In a few taxa the chelicerae are widely separated at the base thus forming a triangular space as seen from the front.

59. Mouth parts, chelicerae mobility

0. chelicerae free (Figs 2E, 2H)
1. chelicerae fused basally (Fig. 5A)
2. chelicerae fused near the middle or in the distal half (Fig. 5B)

Chelicerae are most often independent but may be fused. This is clearly seen from the ventral side and is indicated by a rectangular sclerotization.

60. Mouth parts, chelicerae with mesal field of spinules

0. absent
1. present (Jocqué 1991b, figs 24, 25; Jocqué & Henrard 2015b, fig. 11D)

The paturon may be provided with a field of spinules on the flat inner face facing the other paturon.

61. Mouth parts, cheliceral condyle

0. present (figs. 125, 254, 255)
1. absent (figs. 316, 317)

62. Mouth parts, inner face of chelicerae

0. rounded
1. flat

The transect of a paturon is oval in most spiders. This is also the case in most zodariids. In a few taxa it is roughly triangular because the inside is flat.

63. Mouth parts, fang shape

0. long and slender (Fig. 4C)
1. short and thick (Figs 4A, F, I)

In many zodariids the fang is very short with the proximal part thick and usually slightly longer than the thin distal part.

64. Mouth parts, fang with proximal tooth shaped extension

0. absent
1. present (Fig. 4I)

This structure appears to be an autapomorphy for the African representatives of *Hermippus*.

Chilum

65. Chilum shape

0. single (Fig. 5D; fig. 119)
1. double (Fig. 5F; fig. 244)
2. absent or poorly developed

The chilum is a variable sclerite situated between the clypeus and the chelicerae. The plesiomorphic state in the Zodariidae is a double sclerite with poorly delimited lateral margins and provided with some setae. In derived taxa the sclerite is absent. In some taxa such as *Selamia* or *Caesetius*, the chilum may be incised at the base but it is not considered as double (Fig. 4K).

66. Chilum with setae

0. absent
1. present (Figs 5E, F)

67. Chilum projecting in the centre

0. absent
1. present

Some taxa have a well delimited single sclerite, which may be projecting, in the centre.

68. Chilum, inferior margin

0. convex
1. straight or concave

In those cases where the chilum is double, the inferior margin concerns both sclerites.

Legs

69. Legs, length formula

0. 1423 or 1432
1. 4321 or 4312
2. 4123 or 4132
3. 1243

70. Legs, tarsal claws number

0. three claws on all legs
1. three claws on legs I and II, two claws or unpaired claw strongly reduced on legs III and IV
2. two claws on all legs

71. Legs, unpaired tarsal claw with teeth

0. present on all legs (Figs 6A, B)
1. absent (Fig. 6C)
2. present on anterior legs only (Grismado & Platnick 2008, fig. 77)

72. First legs with bipectinate prolateral claw

0. absent
1. present (Fig. 6D)

In a few genera of the femoral organ clade (i.e. *Microdiores*, *Dusmadiores* and *Mastidiores*), the prolateral claw on the first leg pairs has a double row of teeth.

73. Legs with tarsal claws in concavity

0. present (fig. 19; Ramírez *et al*. 2014, figs 8C, H, J, L, M, O)
1. absent

In a number of taxa such as those belonging to the Storenomorphinae (*sensu* Jocqué 1991a) in the Zodariidae the claws are standing in a concavity.

74. Legs, tarsal claw teeth (on posterior leg)

0. ventral (Fig. 6A)
1. in an oblique row: lateral at tip but ventral at base (Fig. 6E)
2. lateral (Fig. 6G)

Tarsal claw teeth standing on the lateral side of the claw facing each other is a synapomorphy of the Zodariidae (even though this state also occurs independently in other dionychan spider families such as the Liocranidae, Ammoxenidae, Trochanteriidae, … See Ramírez 2014). In a few genera the row is oblique and the most proximal teeth stand in the axis of the claw.

75. Legs, tarsal claw teeth (on anterior leg)

0. ventral (Fig. 6C)
1. in an oblique row: lateral at tip but ventral at base (Fig. 6F; fig. 16)
2. lateral (Fig. 6H)

"*Penestomus egazini* has a zodariid-like conformation on the anterior legs, and ventral teeth on the posterior ones" (Ramírez *et al*. 2014, figs 8D–E).

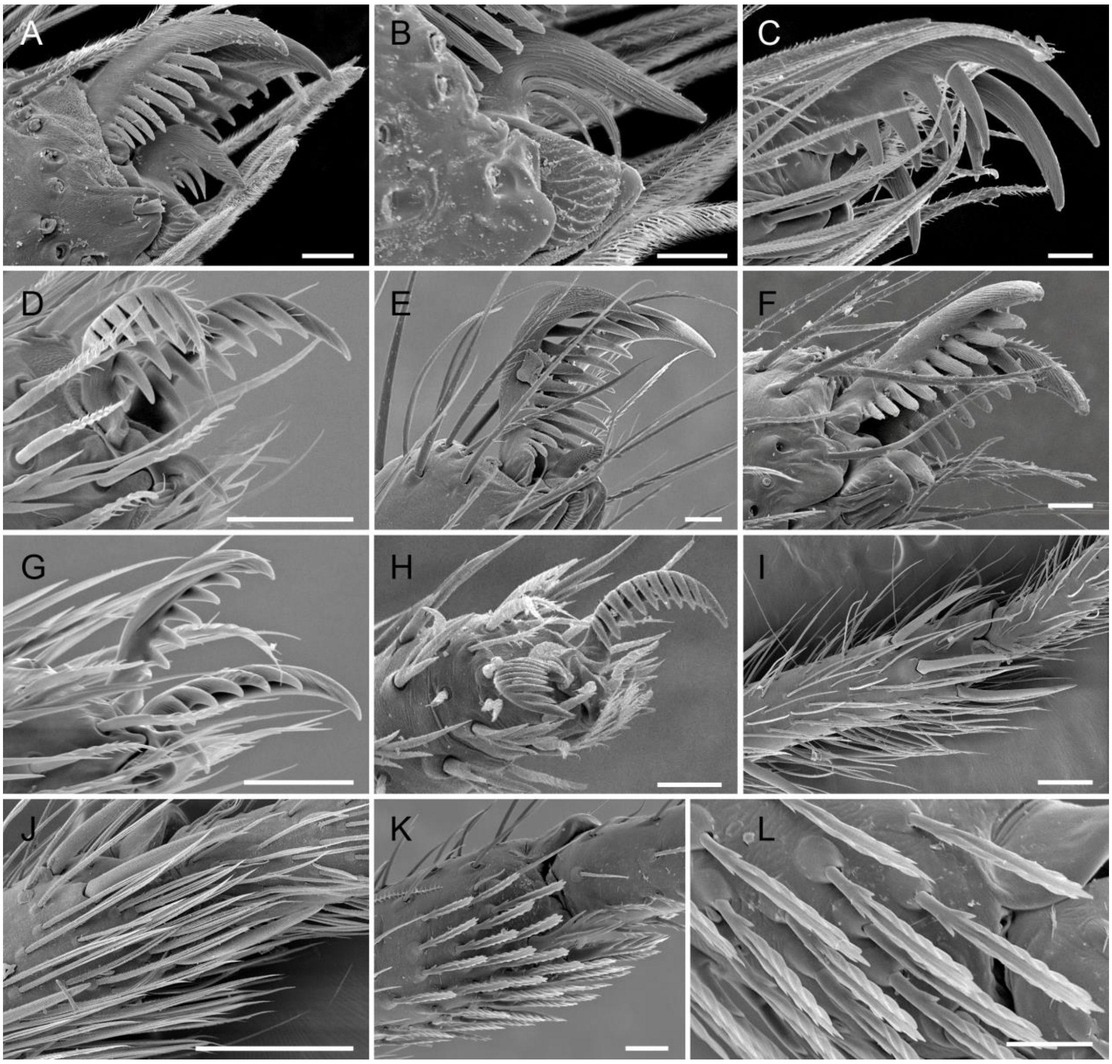

Figure 6. SEM view of tarsal claws and preening brush of metatarsi. A. *Nurscia allbomaculata*, male (DNA Z308, RBINS IG:33337/18), claw II, lateral view. B. *Amaurobius fenestralis*, female (coll. AH), unpaired claw on tars I, lateral view. C. *Cyrioctea marken*, male (RMCA_ARA_245374), claw I, lateral view. D. *Dusmadiores sp*., female (DNA Z032, RMCA_ARA_245375), claw II, prolateral view. E. *Ishania sp.*, female (DNA Z248, MCZ 79764), claw IV, lateral view. F. *Amphiledorus sp*., male juv. (DNA Z236, RBINS IG:33337/10), claw II, ventro-lateral view. G. *Dusmadiores sp*., female (DNA Z032, RMCA_ARA_245375), claw III, prolateral, slightly ventral view. H. *Mallinus nitidiventris*, male (DNA Z223, RMCA_ARA_216253), claw II, frontal view. I. *Coelotes terrestris*, female (DNA Z131, RBINS IG:33337/07), metatars III, lateral view. J. *Amaurobius fenestralis*, female (coll. AH), preening brush with cylindrical setae on distal part of metatars III, lateral view. K. *Suffrica gus*, male (CAS), preening brush on metatars II, lateral view. L. As previous, detail of the chisel shaped setae, lateral view. Scale bars: A-H, K, L = 20 µm; I, J = 0.2 mm.

76. Legs with preening brush on metatarsi II or III

0. absent or poorly developed (Fig. 6I)
1. well developed with normal cylindrical setae (Fig. 6J; Jocqué 2009 figs 13, 14)
2. well developed with chisel shaped setae (Figs 6K, L; figs. 6, 7; Jocqué & Baert 2005, figs 7, 8)

The shape of the preening brush setae, if present, are very particular in a number of genera and characterized by a chisel shape in the sense that they are cylindrical at the base and flat in the distal part. Cylindrical setae are usually provided with short barbs.

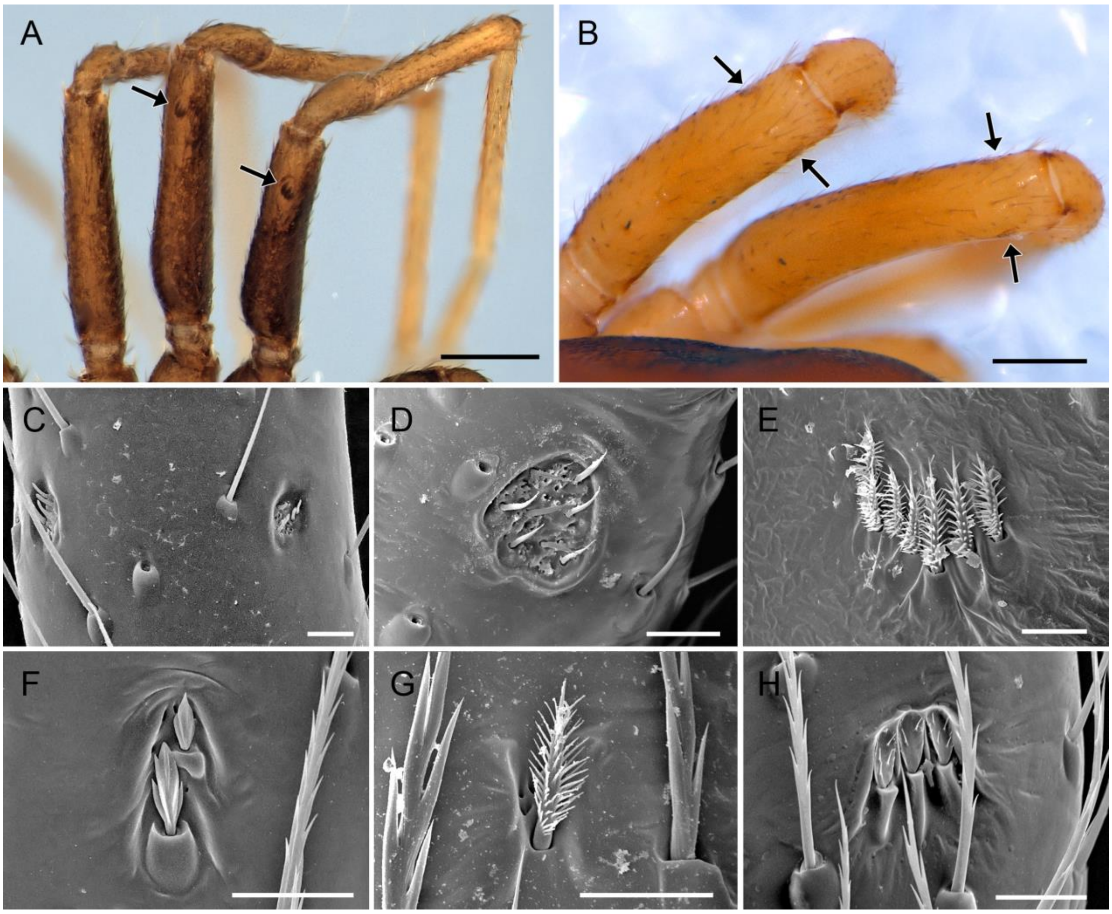

Figure 7. Femoral organs. A. *Heradida speculigera*, male (RMCA_ARA_174705), left legs I-III, dorsal view. The arrows point to the femoral organs. B. *Suffascar nonus*, female Ht (CASENT), left legs I-III, dorsal view. The arrows point to the position of the dual femoral organs. C. *Asceua sp*., male (CAS 9042498), distal part of femur I with the dual femoral organ, dorsal view. D. *Suffrica gus*, female Pt (RMCA_ARA_245359), femoral organ I, prolateral view. E. *Zodarion nitidum*, female (DNA Z268, (SMF-109), femoral organ I, prolateral view. F. *Dusmadiores sp*., female (DNA Z032, RMCA_ARA_245375), femoral organ III, prolateral view. G. *Mallinus nitidiventris*, male (DNA Z223, RMCA_ARA_216253), femoral organ II, prolateral view. H. *Akyttara homunculus*, male (RMCA_ARA_234411), femoral organ II, prolateral view. Scale bars: A, B = 0.2 mm; C-H = 20 µm.

77. Legs, femoral organ formula

0. 0000
1. 1111
2. 0111
3. 1110
4. 1100 (Fig. 7A)
5. 2222 (Fig. 7B; Henrard & Jocqué 2015, fig. 18; 2017, figs 4c, e, f)

The presence of a femoral organ is an important character that defines the two major ‘femoral organ clades’. Yet the distribution of the femoral organ(s) on the legs and its shape vary quite a lot. Only a few genera combine the presence of chisel shaped hairs in the preening brush (char. 76-2) with double femoral glands and are part of the “dual femoral organ clade” (see Henrard & Jocqué 2015 and 2017). These have a few very simple conical setae in a shallow circular depression provided also with small pores. Taxa with a unique, though more complex femoral organ are part of the “Single femoral organ clade” (= Zodariinae sensu Jocqué 1991a).

78. Legs, femoral organ (on leg I)

0. absent
1. one
2. two

79. Legs, femoral organ (on leg II)

0. absent
1. one
2. two

80. Legs, femoral organ (on leg III)

0. absent
1. one
2. two

81. Legs, femoral organ (on leg IV)

0. absent
1. one
2. two

82. Legs, femoral organ structure

0. setae in shallow circular depression (Figs 7C, D)
1. group of modified setae on flat cuticle (Fig. 7E)
2. few modified airs in grooves or alveolus (Figs 7F-H)

83. Legs, femoral organ, shape of setae

0. conical, simple or slightly incised (Figs 7C, D)
1. barbed (Figs 7E, G, H)
2. grooved (Fig. 7F)
3. flat, club shaped with barbs (Fig. 7H)

84. Legs, femoral organ, number of setae

0. more than three (Figs 7D, E)
1. one to three (Figs 7F, H)
2. strictly one on each femoral organ (Fig. 7G)

The number of setae surrounding the gland openings may vary between species, legs and even between the right and the left leg of the same specimen, but the difference does usually not exceed one seta. In *Zodarion*, the size of the organ (expressed as the number of setae) may increase with the development stage and with the size of the specimen (Pekár & Šobotník, 2007). We have chosen the highest number of setae found on a particular specimen.

85. Legs with tibial process

0. absent
1. present, well visible (Figs 8A, B; Jocqué & Henrard 2015b, figs 17A-E)
2. inconspicuous, hidden under the T-Mt joint (Fig. 8C; Jocqué & Henrard 2015b, figs 19 E, F)

86. First legs shape

0. same as the other legs
1. much stronger than other legs (Fig. 8D; Jocqué 1994, fig. 4)

87. Leg II, tibia modified

0. cylindrical and straight
1. compressed laterally and slightly curved (Fig. 8D; Jocqué 1994, fig.1)

This is apparently an adaptation to species that live in tubular retreats and therefore less pronounced in males.

88. Legs, femora I strongly compressed subapically

0. absent
1. present (Fig. 8D)

As the previous character, it is probably typical for species living in a tubular retreat and thus less pronounced in males.

89. Legs with hinged hairs

0. absent
1. few
2. numerous

Hinged hairs (Figs 8E, F) are large dark setae with a particular hinge socket that allows a large array of positions. More than one hinged hair per leg is considered numerous.

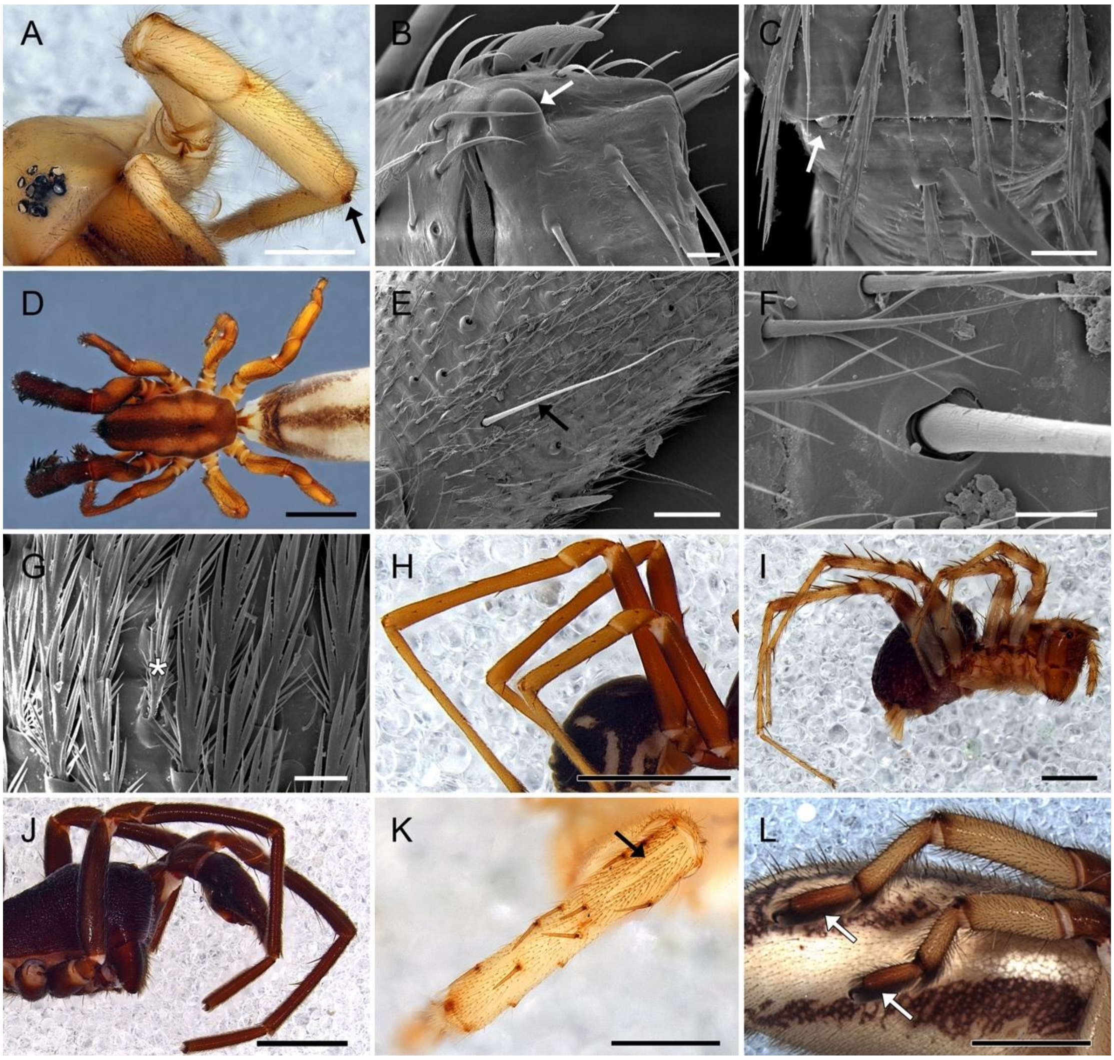

Figure 8. Femoral organs. A. *Antillorena polli*, female (DNA Z305, RBINS IG:33337/16), carapace and leg I, frontal view. The arrow points to the position of the tibial process. B. *Tenedos hoeferi*, male (DNA Z257, MPEG ARA-020771), distal part of left legs III, frontal view. The arrow shows the tibial process. C. *Parazodarion raddei*, male (DNA Z107, RMCA_ARA_233874), distal part of tibia III, dorsal view. The arrow shows the tibial process. D. *Thaumastochilus termitomimus*, female (DNA Z295, RMCA_ARA_215886), habitus, dorsal view. E. *Amaurobius fenestralis*, female (coll. AH), proximal part of tibia I, dorsal view. The arrow shows the hinged setae. F. Same as previous, detail of the hinged hair base. G. *Ranops sp*., male (NMBA 14608), femoral organ III (star) and incised hairs, prolateral view. H. *Heradion paradiseum*, male (MHNG VN-12/03c), hind legs, lateral view. I. *Leprolochus spinifrons*, female (DNA Z131, RBINS IG:33337/07), habitus, lateral view. J. *Capheris abrupta*, male (DNA Z211, RMCA_ARA_225691), carapace and front legs, lateral view. K. *Antillorena polli*, female (DNA Z305, RBINS IG:33337/16), patella and tibia III, dorsal view. L. *Cicynethus subtropicalis*, female (DNA Z212, RMCA_ARA_211745), hind legs, lateral view. The arrows show the tarsal scopulae. Scale bars: A, H, I, K = 1 mm; B, C, F, G = 20 µm; D, J, L = 2 mm; E = 0.1 mm.

90. Legs with flattened incised hairs

0. absent
1. present, but sparse or absent on femora
2. present, dense (Fig. 8F)

A type of hairs that is common in derived zodariids.

91. Legs, spination (on legs III and IV)

0. reduced in number (Figs 1E, 8H)
1. completely developed (Figs 1G, 8I)
2. absent (Fig. 8L)

The fully developed spination on the hind legs consists of two or three dorsal spines on the femora, one or a few spines on the patellae, two or three dorsal, pro- and retrolateral and five or more ventral spines on the tibiae, six or more dispersed spines and a distal whorl on the metatarsi. In a number of taxa the number is reduced, often to a few dorsal femoral spines, and in some taxa there are no spines at all.

92. Legs with reduced spines or spinules (on legs III and IV)

0. absent
1. present (Fig. 8H)

The size of these spines is so reduced that they look like spinules

93. Anterior leg pairs, spination and hair cover

0. few spines, similar to that on legs III and IV (Fig. 1E)
1. much stronger than on legs III and IV (Fig. 8D)
2. much weaker and less dense than on legs III and IV (Fig. 1G)
3. many spines, similar to that on legs III and IV (Fig. 8I)

In most taxa with fully developed spination on legs III and IV, the anterior legs have fewer spines but this may be reversed in some cases. For instance, in *Cyrioctea* or *Lachesana* the spination and hair cover on the hind legs is clearly more developed. In Titanoecidae only males, unlike females, have more spines on the first leg and are therefore scored 0. The character is obvious in a dorsal view of the patella and tibia !

94. Legs, tibia and/or metatarsus of male (on anterior pair)

0. with rows of short spines or spinules
1. with ventral rows of long spines (Fig. 8J)
2. without ventral spine rows

95. Legs, patella III and IV with dense hair cover and dorsal bald stripe

0. absent
1. present (Fig. 8K).

For state 1, hair cover and spines on patella III and IV may be much denser than patella I and II and provided dorsally with a clear hairless strip.

96. Legs with claw tufts

0. absent
1. present

97. Legs scopula

0. absent or poorly developed
1. present and well developed
2. strongly developed, dense (Fig. 8L)

98. Legs, tarsus, spiniform ventral cover

0. absent
1. present (Fig. 9A; fig. 4)

Scopulae are often absent but sometimes the ventral side of the tarsus may be provided with rows of thin spines and/or spiniform setae, a cover called here ‘spiniform’, often more pronounced on Ta III and IV.

99. Legs with patellar crack

0. absent
1. present (Fig. 9B; Jocqué & Dippenaar-Schoeman 1992, fig. 5)

A number of genera have a ring-shaped area in the patella that allows autotomy. Most specimens in collections therefore lack several legs from the base of the patella onwards.

100. Legs, shape of anterior tarsi

0. cylindriform
1. fusiform or slightly widened toward tip

The anterior tarsi may be either cylindriform and as wide at the base as at the tip or fusiform. In that case they are widest in the middle but in some cases the tarsi are wider at the tip than at the base.

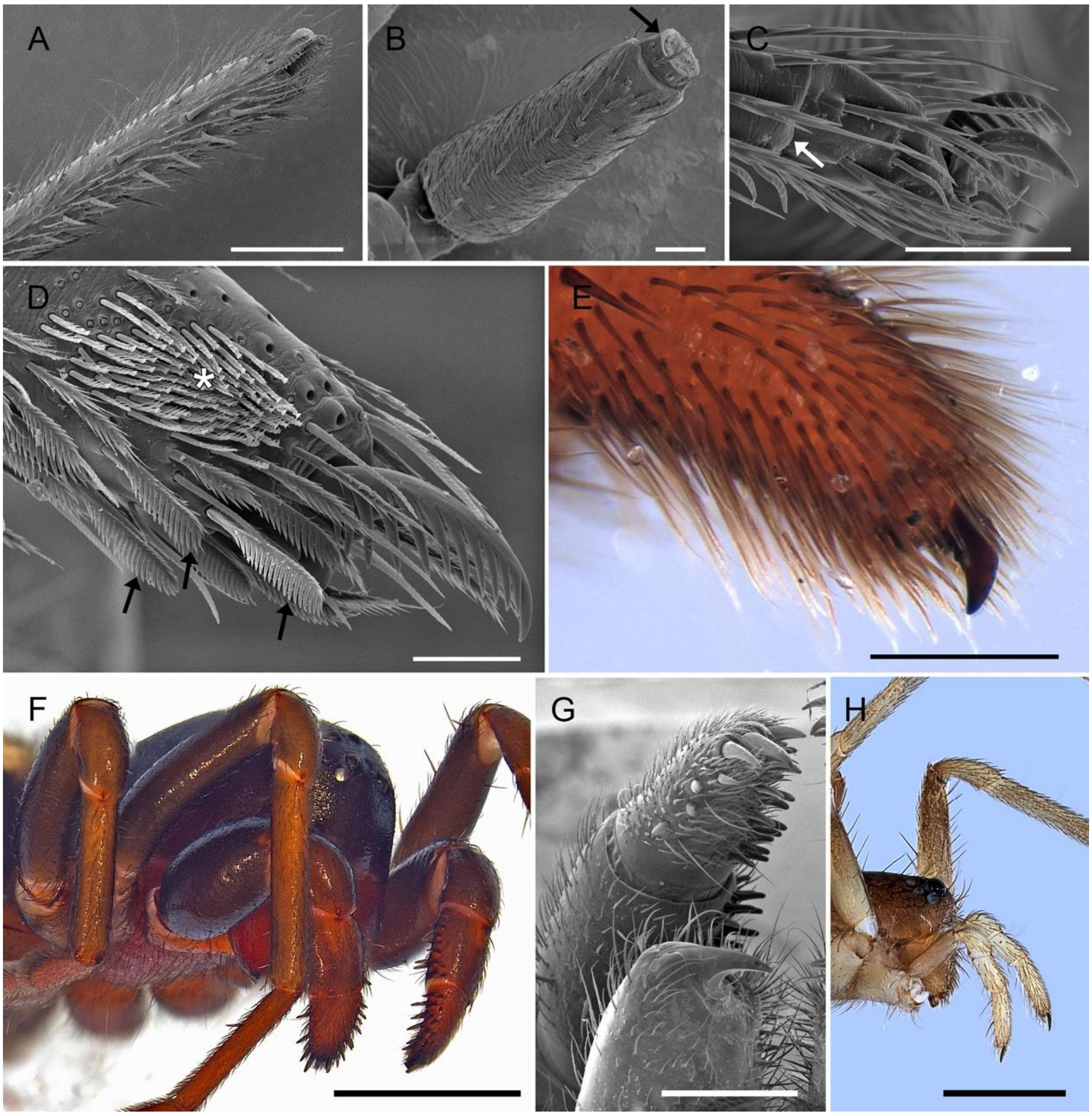

Figure 9. A. *Lachesana* cf. *blackwalli*, female (DNA Z289, RBINS IG:33337/15), tars III, lateral view. B. *Akyttara homunculus*, female (RMCA_ARA_242493), femur I, dorsal view. The arrow shows the patellar crack. C. *Heradida speculigera*, female (RMCA_ARA_132618), distal part of tars III, lateral view. The arrow shows the subdistal suture. D. *Diores milloti*, female (CAS 9031122), distal part of palpal tarsus, dorsal view. The arrows show some modified prolateral setae and the star indicates the group of chemosensitive setae. E. *Chariobas cylindraceus*, female (RMCA_ARA_137653), distal part of palpal tarsus, lateral view. F. *Systenoplacis* cf. *vandami*, female (DNA Z003, RMCA_ARA_241962). G. *Cydrela pristina*, female (MHNG), chelicerae and palp, ventral view. H. *Acanthinozodium crateriferum*, female (RMCA_ARA_220696), anterior part of carapace and palps, lateral view. Scale bars: A, B, E, G = 0.5 mm; C, D = 50 µm; F, H = 1 mm.

101. Legs, tarsi with subdistal suture

0. absent
1. present (Fig. 9C)

In some Zodariinae, the tarsi have a subdistal suture that is visible as a faint lighter ring, especially in ventral and lateral stereomicroscope views. The feature is also present in a number of other families (Ramírez 2014, figs. 59E, F, 60F, G).

102. Legs, tarsi with row of trichobothria increasing in length towards tip

0. present (Dippenaar-Schoeman & Jocqué 1997, fig. 35e)
1. absent.

The presence of a row of trichobothria is a well known character in the Agelenidae. In Zodariidae there is apparently a tendency towards the loss of the character with a stage where only two trichobothria are left, which is still scored as ‘present’.

103. Legs, femora with dorsal swelling at basal spine

0. absent
1. present (Dankittipakul & Jocqué 2004, fig. 43)

In some taxa, the base of the femora is raised at the insertion of the basal spine. The swelling may correspond with the file of a stridulating organ in some species (Jocqué 2005, figs 15-16).

Female palp

104. Female palp, claw shape

0. pectinate (Fig. 9D)
1. untoothed or with few teeth at base only (Fig. 9E; Jocqué & Henrard 2015c fig. 1F)

Remark: In Jocqué 1991a it is mentioned that *Chariobas* and *Thaumastochilus* females have an untoothed palpal claw. After re-examination, this statement appeared incorrect; the palpal claw is stout and dark but it has teeth, albeit difficult to observe due to dense setae around the claw.

105. Female palp, claw orientation

0. not turned inward (Fig. 9E)
1. turned inward over less than 45° (Jocqué & Henrard 2015a, fig. 5E)
2. turned inward over more than 45° (Fig. 9D)

The position of the female palpal claw is turned inward in many zodariids. This character is exceptional in spiders.

106. Female palp, prolateral spination of tarsus

0. with numerous spines (Figs 1I, L)
1. without or with very few spines (Fig. 9E)
2. with thick spines or thorns (Fig. 9F; Dankittipakul & Jocqué 2006, fig. 6)

Prolateral palpal spination is variable. It is considered as numerous when more than two spines are present. Sometimes it has thick short spines named here thorns, which is an adaptation for digging.

107. Female palp, ventro-retrolateral spination of tarsus

0. with numerous spines (Figs 1I, L)
1. absent or very few (one at the most)
2. with some thick spines or thorns (Figs 9F, G)

When the spines are present, they are usually located mainly on the ventro-prolateral side of the tarsus.

108. Female palp with patch of chemosensitive hairs

0. absent
1. present (Fig. 9D; Jocqué & Henrard 2015a, fig. 5E)

109. Female palp, tarsus with dorsal trichobothrium

0. absent
1. present

110. Female palp, tarsus with retrolateral trichobothrium

0. absent
1. present

111. Female palp, tarsus shape

0. conical
1. conical, slightly compressed
2. triangular, ventrally flat (Figs 9F, G)
3. cylindrical (Fig. 9H)

In most taxa, the shape of the tarsus of the female palp is conical; in a few taxa, the last segment of the female palp is ventrally flat and triangular, another adaptation for digging.

112. Female palp, femur shape

0. normal
1. strongly swollen (Fig. 9F; Jocqué 2009, figs 114, 115)

In some genera, the palpal femora may be very stout and wider than or at least as wide as the femora of the first leg pair. This is the same in the male but not scored separately to avoid redundancy.

Abdomen

113. Abdomen, shape in lateral view

0. oval (Fig. 8I; fig. 343)
1. posteriorly widened (Fig. 10A; figs 334, 354)
2. globose or higher than long (Fig. 10B; fig. 324)
3. cylindriform or elongate oval, at least twice as long as wide (Fig. 10C)

The shape of the abdomen is most often oval and longer than high but in some taxa it may be widened posteriorly or higher than long.

114. Abdomen, ventral scutum in male

0. absent
1. present (Fig. 10A, Jocqué 2011, figs. 5, 7)

115. Abdomen, sub-epigastric scutum in female

0. absent
1. present (fig. 325)

116. Abdomen, modified setae in front of tracheal spiracle

0. absent
1. rows or field of strong blunt or sharp setae (Figs 10D, E)
2. row of setiform or flattened setae (Fig. 10F; Jocqué & Henrard 2015a, fig. 5F)
3. triangular patch of converging spiniform setae on prong (Figs 10G, H)

117. Abdomen with crown of brush hairs surrounding spinnerets

0. absent
1. present (Fig. 10I; Ramírez *et al*. 2014, figs 1D, 6C)

The spinnerets may be surrounded by protective hairs, which are densely covered by short barbs. This character is apparently an autapomorphy of *Cryptothele*.

118. Abdomen, dorsum with deep groove in male

0. absent
1. present (Fig. 10J; Henrard & Jocqué 2015, fig. 6)

Species of the genus *Suffrica* have a modified abdomen that is provided with a deep longitudinal groove in the male.

119. Abdomen, dorsum with pitted shield

0. absent
1. present (Figs 10K, L; figs. 22, 23)

120. Abdomen with frontal lateral apodemes

0. present (Jocqué 1999, figs 32, 33)
1. absent

Near the frontal curve on either side of the abdomen, there is a lateral apodeme in most zodariids.

121. Abdomen with ventral rows of apodemes

0. absent or faint
1. present, heavily sclerotized (Jocqué 2009, fig. 80)

122. Abdominal pattern

0. simple (figs 213, 302)
1. complex (fig. 44)

An intricate network of dark and white patches, difficult to describe in a few words is considered complex; simple patterns are well delimited dots, stripes or chevrons.

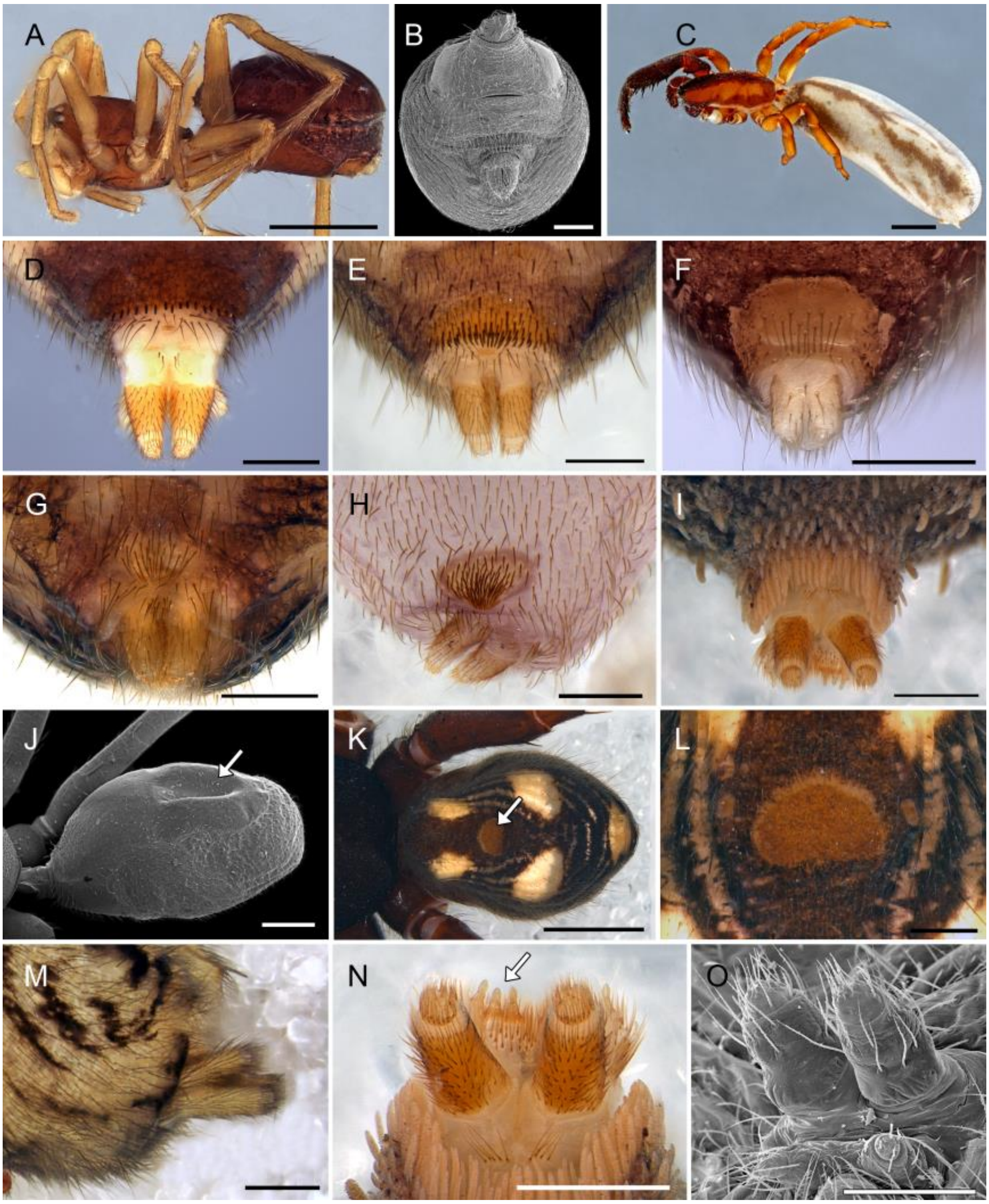

Figure 10. A. *Akyttara homunculus*, male (RMCA_ARA_242493), habitus, lateral view. B. *Mallinus nitidiventris*, male (DNA Z223, RMCA_ARA_216253), abdomen, ventral view. C. *Thaumastochilus termitomimus*, female (DNA Z295, RMCA_ARA_215886), habitus, lateral view. D. *Mallinella* spAH002, female (RMCA_ARA_238807), posterior part of abdomen, ventral view. E. *Heliconilla globularis*, male (DNA Z242, MHNG), further as previous. F. *Akyttara homunculus*, male (RMCA_ARA_242493), further as previous. G. *Forsterella faceta*, Female (DNA Z313, NZAC), further as previous. H. *Forsterella faceta*, male (DNA Z314, NZAC), further as previous. I. *Cryptothele* sp., female (QM S905504), posterior part of abdomen, ventral view. J. *Suffrica chawia*, male (RMCA_ARA_221982), abdomen, lateral, slightly dorsal view. The arrows points to the dorsal abdominal groove. K. *Storena* sp., (DNA Z194, WAM ARACH-97423) abdomen, dorsal view. The arrow points to the pitted shield. L. As previous, detail of the pitted shield. M. *Cyrioctea spinifera*, female (MACN-Ar, from Morphbank.net), posterior part of abdomen, lateral view. N. *Cryptothele* sp., female (QM S905504), spinnerets, ventral view. The arrow points to the large cylindrical gland spigots on the PMS. O. *Suffrica chawia*, male (RMCA_ARA_221982), spinnerets, ventral view. Scale bars: A, I, M, N = 0.5 mm; B, D-H = 0.2 mm; C = 2 mm; K = 1 mm; O = 0.1 mm.

123. Abdomen, ventrally with hinged hairs

0. absent
1. present

In some taxa, the abdomen is ventrally provided with long dark hairs of the same type as described in char. 30.

124. Abdomen, epiandrum

0. absent
1. present (Jocqué 2009, fig. 16)

The male genital area is covered with a sclerotized plate in many zodariids; it is usually reminiscent of the epigyne in the sense that it is a perforated and sometimes complex area.

<u>Spinnerets</u>

125. Spinnerets, ALS length

0. normal
1. long

The ALS are considered long when their length exceeds three times their diameter at the base.

126. Spinnerets, ALS shape

0. conical (Figs 10D, E)
1. cylindrical (Fig. 10M)

127. Spinnerets, posterior lateral spinnerets (PLS) in males

0. normal, at least half the length of the ALS
1. short
2. absent (Jocqué & Baert 2005, fig. 5)

The males' PLS vary a lot: in the plesiomorph state they are well developed whereas they tend to become stunted or even absent in more derived taxa.

128. Spinnerets, PLS in females

0. normal, at least half the length of the ALS (Fig. 10M)
1. short (Fig. 10N)
2. fused with PMS (Jocqué & Baert 2005, figs. 2-4)

The females' PLS go through a similar evolutionary sequence as in the males but they are never absent. In some cases they are fused with the PMS.

129. Spinnerets, posterior median spinnerets (PMS) in males

0. normal, similar to PLS
1. short
2. absent (Fig. 10O; Jocqué & Baert 2005, fig. 5)

Similar to the PLS, the males' PMS vary a lot: in the plesiomorph state they are well developed whereas they tend to become stunted or even absent in more derived taxa.

130. Spinnerets, PMS in females

0. normal, similar to PLS
1. short
2. fused with PLS (Jocqué & Baert 2005, figs. 2-4)

The females' PMS go through a similar evolutionary sequence as in the males but they are never absent. In some cases they are fused with the PLS.

131. Spinnerets, PLS and PMS of female, large cylindrical gland spigots

0. absent
1. present (Fig. 10N ; Ramírez *et al.* 2014, figs 6E, F)

132. Spinnerets, major ampullate gland spigots

0. on the edge of the ALS (Griswold *et al*. 2005, fig. 88B; Ramírez 2014, fig. 123)
1. in the centre of the ALS (Jocqué & Baert 2005, fig. 6; Ramírez 2014, figs 119C, D; Ramírez *et al*. 2014, figs 4E, F)

In most spiders the major ampullate gland spigots are situated on the edge of the ALS. In Zodariidae and Penestomidae they are in the centre of the ALS.

<u>Male palp</u>

133. Male palp, tibial apophyses

0. DTA only (figs. 48, 49)
1. RTA only
2. Both RTA and DTA (Szüts & Jocqué 2001, fig. 6; Henrard & Jocqué 2015, figs 5, 16, 29, 33)

The presence of a dorsal tibial apophysis alone is considered here apomorphic as it thus turns out in comparison with the outgroup. State 2, the presence of a dorsal tibial apophysis in combination with a RTA, is considered a secondary development.
The variations of the male palp should be handled with care as in many taxa, treated as genera on the base of somatic characters, the morphology of the male palp goes through a large range of complexity (see Jocqué *et al* 2013). The choice of a particular species within a genus as outgroup may thus determine the outcome of the polarization of the character. Characters used in an analysis should therefore be selected on the base of whether they represent a certain 'Bauplan' that can be considered as the result of a long term evolution, or a simple stage of a short-term evolution within a template sensu Jocqué & Bosselaers (2011). The apophyses on the male palpal tibia vary indeed to a large extent but it is assumed that the character states selected here are stages in a long term evolution. However, there is some evidence that the dorsal tibial apophysis is either the precursor of the lateral tibial apophysis or has been lost once the lateral tibial apophysis was well established. The plesiomorphic situation turns out to be the presence of a simple RTA. The loss of such an apophysis is clearly more derived and occurs in a few groups of the RTA-clade (e.g. Lycosidae, Ctenidae). The main problem is the presence of both a dorsal and a retrolateral apophysis as the former is probably the precursor of the RTA and occurs separately in the absence of the other. The presence of two apophyses and of a complex one with forward and backward pointing prongs is clearly derived.

134. Male palp, tibial concavity

0. absent
1. present, dorsal (fig. 196)
2. present, retrolateral (Baehr & Jocqué 2000, fig. 3a; Jocqué & Baehr 2001, fig. 11)

The evolutionary challenge to keep the intromittent organ in a particular stance during copulation did not only need a locking system (see Jocqué *et al*. 2013) but also a means to support a long embolus in the right position. Several pathways have been developed among which a cymbial fold (char. 137), an elongate median apophysis or a tibia with a lateral concavity as in many taxa of the Australian *Asteron*-group.

135. Male palp, embolus shape

0. long and rigid or whip like (Figs 11A, B)
1. short and rigid (Fig. 11C)

The length of the embolus is a very flexible character as has been shown many times (Jäger 2006; see Jocqué *et al*. 2013 for an overview). The polarity of this character will greatly depend on the choice of the outgroup, very much as in character 133.

136. Male palp, origin of the embolus

0. on the posterior or retrolateral margin of the tegulum (Fig. 11A)
1. on the prolateral part or in the centre of the tegulum (Figs 11B, C; Jocqué & Bosmans 2001, figs 18, 19)

The origin of the embolus may seem difficult to determine but in general it is clear-cut. In rare cases it originates in the centre of the tegulum (e.g. *Amphiledorus*).

137. Male palp, cymbium with retrolateral fold

0. absent
1. a deep fold up to half the length of the cymbium (Fig. 11D; Dankittipakul & Jocqué, 2004, fig. 53; Dankittipakul *et al.*, 2012 fig. 69)
2. a deep fold over the entire length of cymbium or almost (Dankittipakul & Jocqué 2004, fig. 53)

The cymbial fold appears to be one of the solutions to support a long embolus as explained for char. 134.

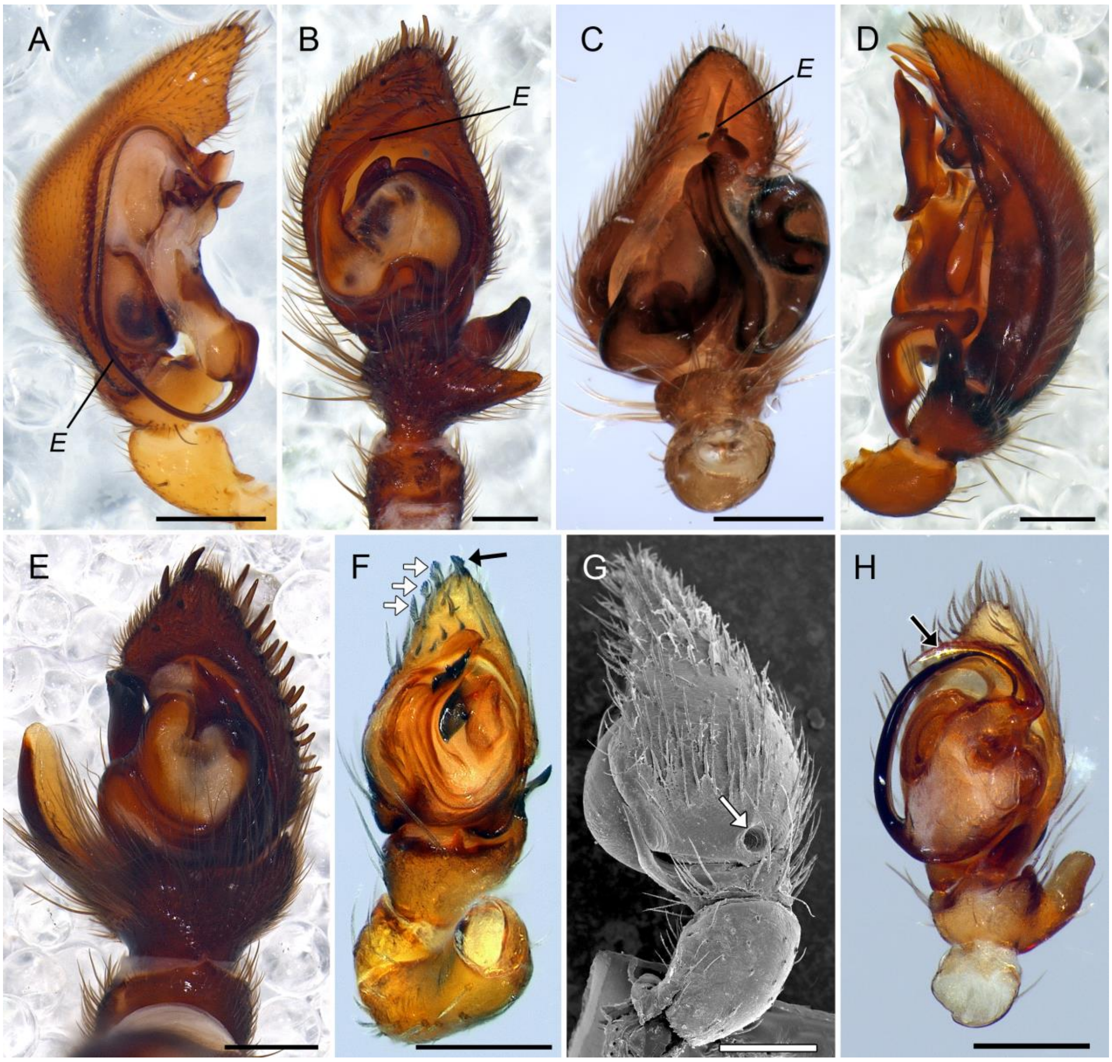

Figure 11. Male palp of different species. A. *Heradion paradiseum*, male (MHNG VN-12/03c), palp, prolateral view. B. *Storena* sp., (DNA Z194, WAM ARACH-97423), palp, ventral view. C. *Chariobas cylindraceus*, male (RMCA_ARA_137653), palp, ventral view. D. *Heliconilla globularis*, male (DNA Z242, MHNG), palp, retrolateral view. E. *Capheris abrupta*, male (DNA Z211, RMCA_ARA_225691), palp, ventral view. F. *Palaestina expolita*, male (CJL), palp, ventral view. The black arrow points to the distal spine, the white arrows point to the modified prolateral setae. G. *Acanthinozodium sericeum*, male (CRB), palp, dorsal view. The arrow points to the cymbial pit. H. *Ishania* sp., male (MCZ 79944), palp, ventral view. The arrow shows the median apophysis (MA). – *E*: embolus. Scale bars: A-D, F-H = 0.2 mm; E= 0.5 mm.

138. Male palp, cymbium with basolateral flange or process

0. absent
1. present, extending ventrally or retrolaterally (Jocqué & Baehr 1995, figs 1a, 2a; Henrard & Jocqué 2017, figs 9C, 13C, 14B)

The basolateral margin of the cymbium may be thickened and slightly protruding ventrally, forming a flange. In some cases the basolateral flange may be extended backwards and forms a spoon-shaped extension (Henrard & Jocqué, 2017).

139. Male palp, cymbium with retrolateral swelling

0. absent
1. present (Jocqué 1995a, figs 15a,b; Jocqué 1995b, figs 4b, c)

The retrolateral fold (char. 137) is accompanied with a strong lateral swelling in some genera.

140. Male palp, cymbium with patch of chemosensitive hairs

0. absent
1. present (Russell-Smith & Jocqué 2015, figs 14, 15)

The distal part of the cymbium is very often provided with a dense brush of what invariably appear to be chemosensitive or chemotactile hairs (Foelix 2011). These setae are recognized by the spiraling longitudinal grooves, the thin or truncated tip and the presence of a terminal opening.

141. Male palp, cymbium with canaliculate hairs

0. absent
1. present (figs. 39, 40)

The male palp is often provided with glands that produce a sticky matter to cover the epigyne after copulation (Uhl *et al*. 2010; Jocqué & Henrard 2015a). In some zodariids the cymbium is provided with hollow, cylindrical hairs that are obviously the outlet of an underlying gland (Jocqué 1991a).

142. Male palp, axis of cymbium (in lateral view)

0. straight or slightly curved
1. strongly curved (Jocqué 1995b, figs 2a, c)

To be eligible as state 1, both margins of the cymbium have to be curved.

143. Male palp, cymbium with prolateral spines

0. absent or very few
1. with dispersed spines
2. with numerous thick spines or thorns (Fig. 11E; Jocqué 2009, fig. 163)

144. Male palp, cymbium with retroapical spines

0. absent
1. with few spines
2. with thick short spines or thorns (Fig. 11E; Jocqué 2009, fig. 172)

145. Male palp, terminal spine

0. absent
1. present, smooth
2. present, barbed (Fig. 11F)
3. strongly enlarged (much stronger than other lateral spines) (Baehr & Jocqué 2000, figs 3a,b 4b)

In some species the palpal claw is lost. Sometimes, it can be replaced by a thick smooth spine. It appears that 'state 2. barbed' is an autapomorphy for *Palaestina*.

146. Male palp, cymbium with modified prolateral setae

0. absent
1. present, conspicuous and pectinate (Fig. 11F; Jocqué & Van Harten 2015, fig. 34)

As the character is also present and equal on the female palpal tarsus (Russell-Smith & Jocqué 2015, fig. 15), the equivalent of the male cymbium, (see Fig 9D) it is mentioned only under male palp to avoid redundancy.

147. Male palp, distal part of cymbium (when viewed ventrally or dorsally)

0. rounded apically (figs. 76, 149, 156)
1. tapered apically (figs. 133, 332, 342)

148. Male palp, cymbium with dorsal crater

0. absent
1. present (Fig. 11G; Jocqué & Henrard 2015, figs 9A, B, 12B, C, D)

In some Zodariinae species, the cymbium of the male palp is provided at its base with a dorsal, conical crater-like depression. This pit is often plugged with a sticky substance that is supposed to be used to plug the epigyne after copulation.

149. Male palp, structure of median apophysis (MA or DTA sensu Baehr, 2003a)

0. simple or absent
1. MA with long posterior extension (fig. 79; Baehr 2003, figs 3C, E)

Some genera have a MA with a very long posterior extension reaching or surpassing the basal part of the bulbus.

150. Male palp, MA (or DTA) direction

0. independent from or developed in same direction as embolus (figs. 92, 137)
1. MA developed in opposite direction of embolus (Fig. 11H; fig 79; Baehr 2003, figs 3A, C, E)

In most cases the embolus and the MA, run in the same direction. In a few cases though, the embolus is supported by a long MA that meets it from the opposite direction.

Female genitalia

151. Spermathecae

0. not touching (figs. 167, 268, 312)
1. touching (figs. 176, 199, 251).

The position of the spermathecae in the epigyne is an important identification character. However, the polarization of this feature is not clear and its value for the phylogenetic analysis can be doubted.

Cribellum and Calamistrum

152. Cribellum

0. present
1. absent

153. Calamistrum

0. present, in one row
1. present, in two rows
2. absent

The presence of a cribellum and calamistrum (chars 152 and 153) are well recognized to be plesiomorphic since the study of Lehtinen (1967).