



A revision of the endemic South African spider genus *Austrachelas*, with its transfer to the Gallieniellidae (Arachnida: Araneae)

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Abstract

The endemic South African spider genus *Austrachelas* Lawrence, 1938 is revised. The type species, *A. incertus* Lawrence, 1938, and *A. natalensis* Lawrence, 1942, are redescribed, and their males described for the first time. Seven new species are described: *A. bergi* n. sp. (female only), *A. kalaharinus* n. sp. (male only), *A. merwei* n. sp. (both sexes), *A. pondoensis* n. sp. (both sexes), *A. reavelli* n. sp. (both sexes), *A. sexoculata* n. sp. (male only), and *A. wassenaari* n. sp. (both sexes). A cladistic analysis performed including *Austrachelas* and various species of the corinnid subfamilies Trachelinae, Castianeirinae, Corinninae and Phrurolithinae, and species from the Liocranidae, Gallieniellidae, Gnaphosidae and Lamponidae, suggests that *Austrachelas* is currently misplaced. Its transfer to the Gallieniellidae is proposed.

Key words: affiliations, cladistics, Corinnidae, new species, Trachelinae

Introduction

The sac spider subfamily Trachelinae (Araneae: Corinnidae) is currently being subjected to a series of generic revisions in the Afrotropical region. In the first of these papers, on the monotypic genus *Thysanina* Simon, 1910, five new species were described (Lyle & Haddad 2006a). Further revisions of the genera *Cetonana* Strand, 1926 and *Trachelas* L. Koch, 1876 are currently underway (Lyle 2008). Our studies have led to the discovery of several new genera in the region, of which four have recently been described (Haddad 2006; Haddad & Lyle 2008).

The genus under study in the present paper, namely *Austrachelas* Lawrence, 1938, was previously only known from two species described from KwaZulu-Natal, South Africa by Lawrence (1938, 1942). *Austrachelas* was initially described in the Clubionidae, which at that time represented a large polyphyletic group that was subsequently separated into a number of smaller families (Lehtinen 1967). Although the genus has since been included in the Corinnidae: Trachelinae (Dippenaar-Schoeman & Jocqué 1997), its affiliations have never been properly investigated or confirmed. Members of the genus can be easily recognised by their medium to large size, PME smaller than PLE, bright orange to deep-red carapace, grey abdomen with cream chevron markings (Figs 1–15), scopulate anterior legs, paired dorsal metatarsal spines on the posterior legs, and details of the genitalic morphology.

In our preliminary investigations, it became clearly evident that *Austrachelas* was not a tracheline, and probably not even a corinnid (Lyle & Haddad 2006b). Members of this genus have a total absence of leg cusps in both sexes, structures that are often regarded as typical at least for males of the subfamily (Platnick & Shadab 1974), although some genera (*Fuchiba* Haddad & Lyle, 2008 and *Fuchibotulus* Haddad & Lyle, 2008) or species within genera (e.g. *Trachelas* L. Koch, 1874) may lack cusps (Haddad & Lyle 2008; Lyle 2008; Bosselaers *et al.* 2009). Rather, the leg spination, mouthpart and eye morphology, and spinneret structure suggested that *Austrachelas* may be a gallieniellid, allied to the South African genus *Drassodella* Hewitt, 1916 (Lyle & Haddad 2006b). Genitalic morphology shares some broad similarities to *Drassodella*, but most closely resembles that of the genus *Rhabdoctesis* Simon, 1897 of the Liocranidae (see Tucker 1920), although *Austrachelas* differs morphologically in some respects to the latter genus. Consequently, the precise placement of *Austrachelas* is still not clear.

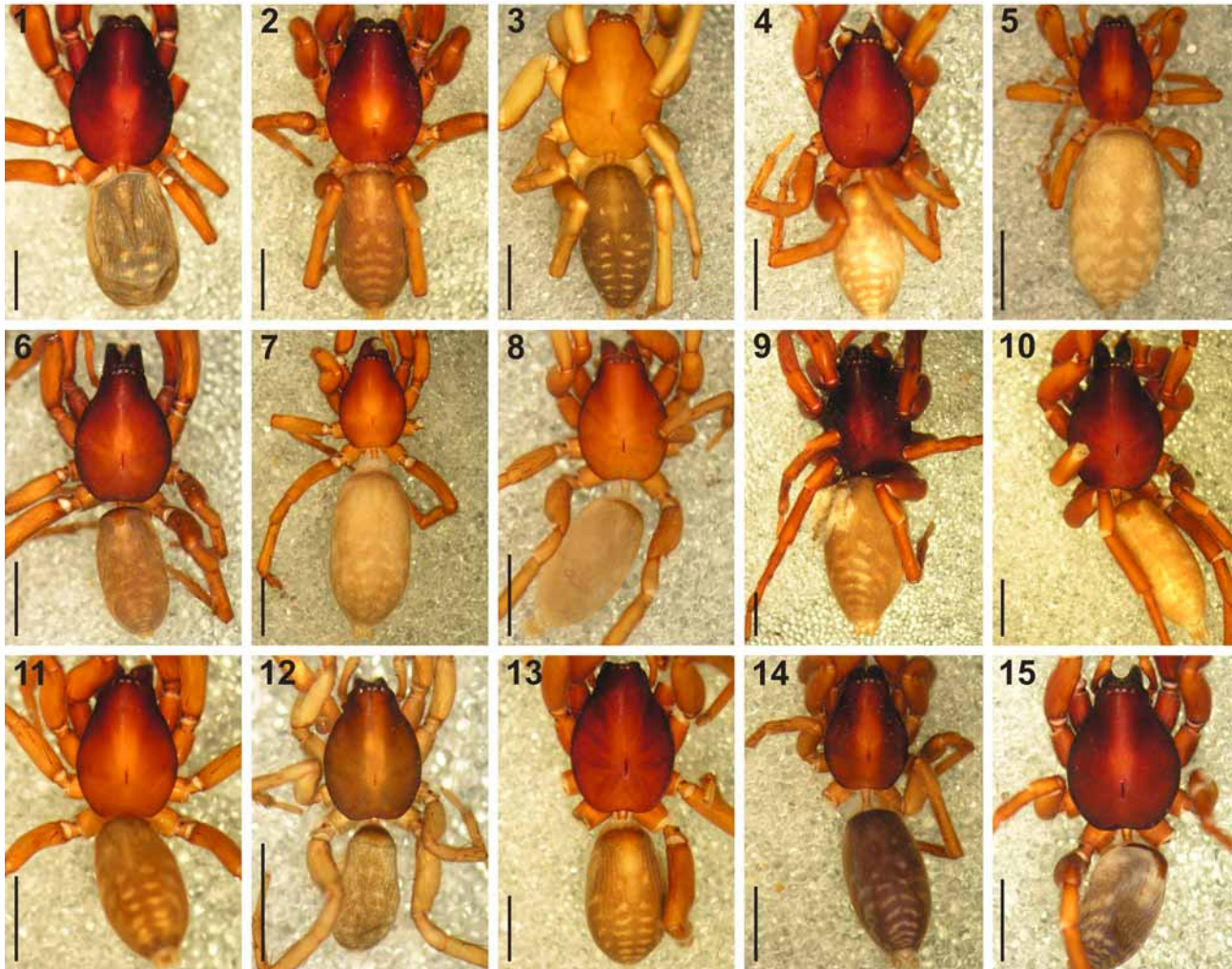
In the current paper *Austrachelas* is revised, *A. incertus* Lawrence, 1938 and *A. natalensis* Lawrence, 1942 are redescribed, and their males are described for the first time. An additional seven new species from South Africa are described. A morphologically-based phylogenetic study with members of the families Corinnidae, Gallieniellidae, Lamponidae, Gnaphosidae and Liocranidae is carried out to determine the placement of *Austrachelas*.

Material and methods

Morphology. Material was observed in 70% ethanol using a stereomicroscope for all descriptions, digital photographs and measurements by C.H.. The epigynes and male palps of representative specimens were dissected, cleaned in a Branson 3200 ultrasonic bath for 10 minutes in 70% ethanol, and drawn by R.L..

M.R. produced scanning electron microscopy (SEM) of *Austrachelas pondoensis* n. sp., and interpreted the morphology of spinnerets. Material for SEM was cleaned using a soft brush in alcohol 70% and excess setae were removed using thin forceps. The samples were dehydrated through a graded ethanol series (from 70–100%) and then critical-point dried. Specimens were then cleaned again with a brush, and placed on aluminium stubs. For three dimensional structures the samples were placed at the end of a thin, flexible copper ribbon, which allowed reorientation and imaging from all sides. In all cases the samples were first

glued with adhesive and then the connection with the metal secured with a patch of colloidal graphite. The samples were sputter-coated with Au/Pd for ca. 2 minutes and subsequently studied in a SEM FEI XL30 TMP under high vacuum and 15kV.



FIGURES 1–15. Digital microscope photographs of the habitus of *Austrachelas* species: (1) *A. bergi* **n. sp.**, female; (2) *A. incertus* Lawrence, 1938, female; (3) same, male; (4) *A. kalaharinus* **n. sp.**, male; (5) *A. merwei* **n. sp.**, female; (6) same, male; (7) *A. natalensis* Lawrence, 1942, female; (8) same, male; (9) *A. pondoensis* **n. sp.**, female; (10) same, male; (11) *A. reavelli* **n. sp.**, female; (12) same, male; (13) *A. sexoculata* **n. sp.**, male; (14) *A. wassenari* **n. sp.**, female; (15) same, male. Scale bars = 2.0mm.

R.L. and C.H. produced SEM images of *Austrachelas merwei* **n. sp.**. Material was prepared through a graded ethanol series from 70–100%, critical point dried in an argon chamber, glued onto stubs with adhesive, and then sputter-coated with Au/Pd for 3 minutes. Digital SEM photographs were taken using a JEOL WinSEM 6400 under high vacuum at 10kV.

Digital photographs of the dorsal habitus of all *Austrachelas* species were taken by C.H. using a Nikon Coolpix 8400 mounted on a Nikon SMZ800 stereomicroscope. Incident light images and digital photographs of the somatic and genitalic morphology of *Austrachelas pondoensis* **n. sp.** were taken by M.R. with a digital camera Nikon DXM1200 mounted on a Nikon SMZ1500 stereomicroscope. The extended focal range images were produced with Helicon Focus (<http://www.heliconsoft.com/>) and the scale bars placed with custom scripts with IMatch (<http://www.photools.com/>).

Leg spination follows the format of Bosselaers & Jocqué (2000) and includes the following abbreviations: do—dorsal; pl—prolateral; plv—prolateral ventral; rl—retrolateral; rlv—retrolateral ventral; tr—trichobothria; ve—ventral; vt—ventral terminal. All measurements are given in millimetres (mm). A range of body measurements is given for the smallest and largest specimens of each sex, when available, and eye and leg measurements are given for the largest specimen of each sex. Abbreviations used in the descriptions are as follows: AER—anterior eye row; AL—abdomen length; ALE—anterior lateral eye; ALS—anterior lateral spinneret(s); AME—anterior median eye; AW—abdomen width; CL—carapace length; CW—carapace width; FL—fovea length; MA—median apophysis; PER—posterior eye row; PLE—posterior lateral eye; PLS—posterior lateral spinneret(s); PME—posterior median eye; PMS—posterior median spinneret(s); RTA—retrolateral tibial apophysis; SL—sternum length; SW—sternum width; TL—total length. Abbreviations used in the phylogenetic analysis: ci—consistency index; es—extra steps; hi—homoplasy index; rc—rescaled consistency index; ri—retention index.

Material is deposited in the following institutions (curators are given in parenthesis): AMG—Albany Museum, Grahamstown (Ashley Kirk-Spriggs); CAS—California Academy of Sciences, San Francisco (Charles Griswold); MRAC—Muséum Royal de l'Afrique Centrale, Tervuren, Belgium (Rudy Jocqué); NCA—National Collection of Arachnida, Pretoria (Ansie Dippenaar-Schoeman); NMSA—Natal Museum, Pietermaritzburg (Juthika Baijoo & Audrey Ndaba); NMBA—National Museum, Bloemfontein (Leon Lotz); PCCH—Personal collection of Charles Haddad; PCHD—Personal collection of Herman De Koninck; PCJB—Personal collection of Jan Bosselaers; QMB—Queensland Museum, Brisbane, Australia (Robert Raven).

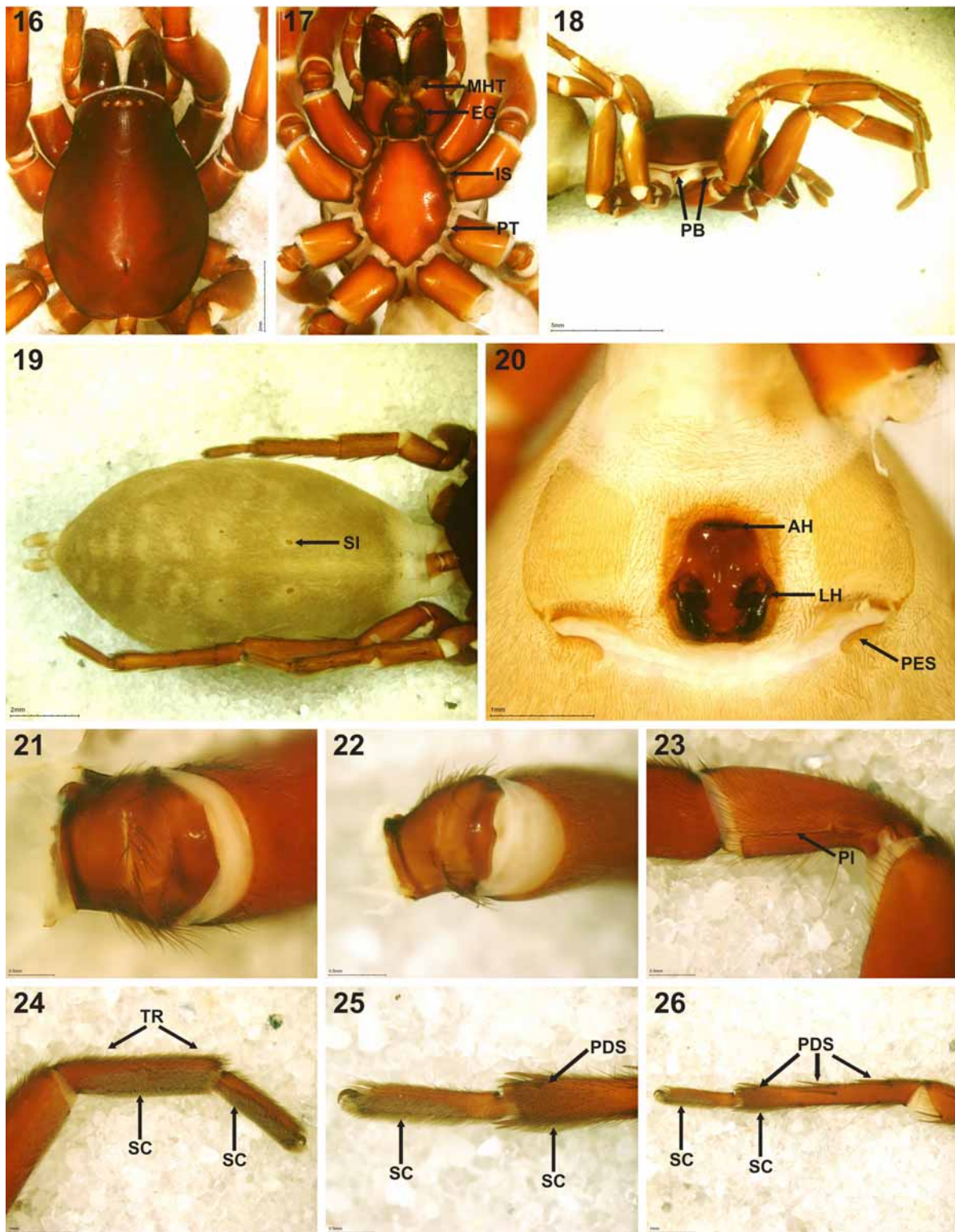
When locality co-ordinates were not provided on labels or were not available from institutional databases, they were traced using the Global Gazetteer Version 2.1 (www.fallingrain.com) and are indicated in square brackets.

Cladistics. Phylogenetic analyses were performed by J.B. using the computer programmes PAUP 4.0 beta 10 (Swofford 2002), Winclada 1.00.08 (Nixon 2002), and TNT 1.1 (Goloboff *et al.* 2003). Optimisation of character states and printing of the preferred tree was performed using Winclada.

Phylogenetic analysis

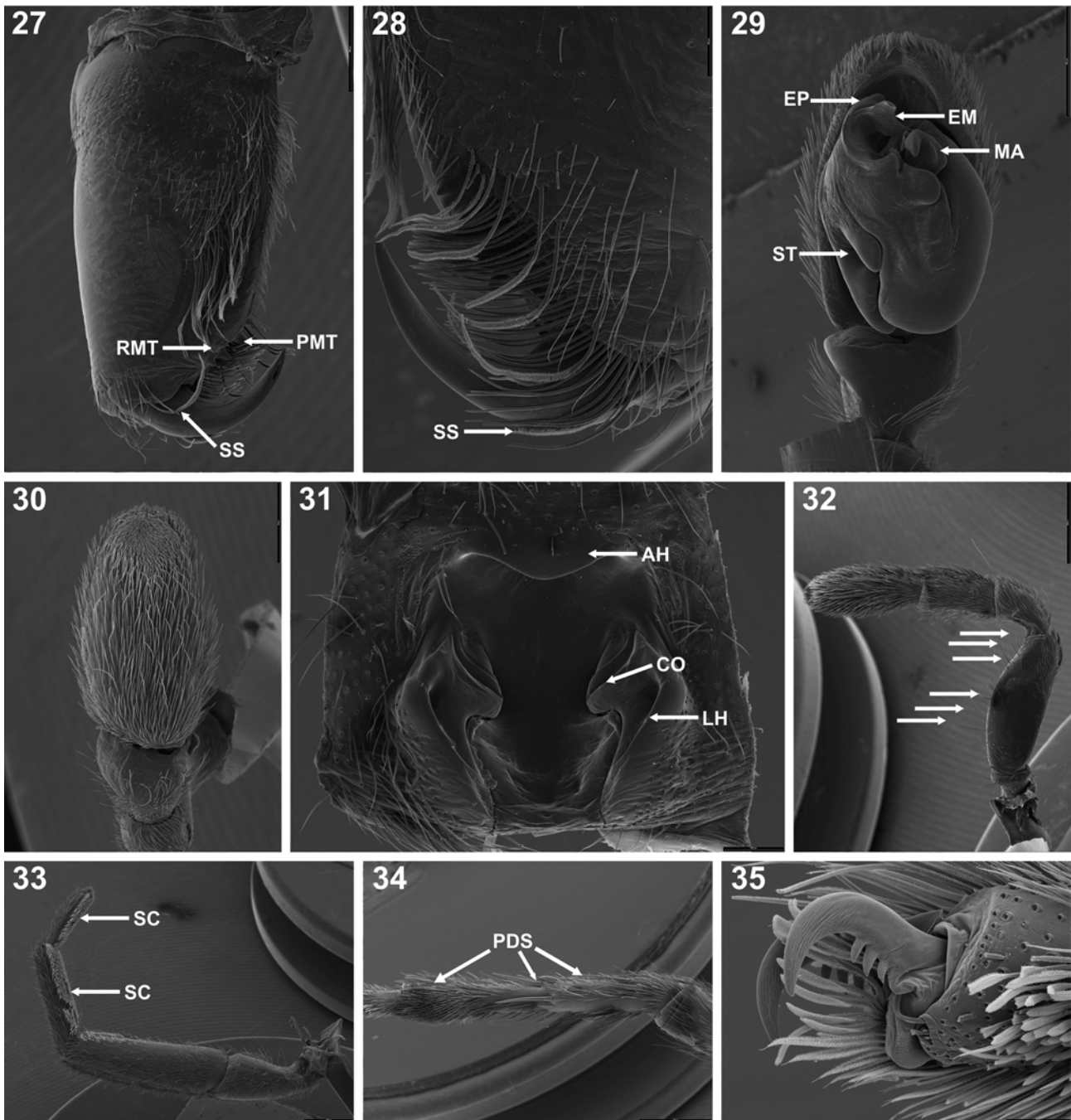
Taxon choice. To assess the placement of *Austrachelas* it was decided to make a comparison with several families or subfamilies to which it may belong: Corinnidae: Trachelinae (current placement), Corinnidae: Corinninae, Castianeirinae and Phrurolithinae (related subfamilies), Gallieniellidae (somatic morphology similarities), Liocranidae (genitalic morphology similarities), Gnaphosidae and Lamponidae (genitalic and somatic morphological similarities). A list of material examined by C.H. and J.B. for assessment of morphological characters is provided in Appendix 1. To assess its familial placement we included more than one genus of each family (for those considered to be possibly related to *Austrachelas*) to increase the robustness of the phylogenetic analyses and confirm generic associations of the included species. *Zora spinimana* (Sundevall, 1833) was used as outgroup (Watrous & Wheeler 1981; Maddison *et al.* 1984).

Characters. A series of 96 characters (57 binary and 39 multistate) was coded for the 51 taxa chosen. All characters are phylogenetically informative. Where possible, characters were scored with character states hierarchically related, as advocated by Hawkins *et al.* (1997), even though this necessitated coding missing entries due to character inapplicability in some instances (Maddison 1993). The 13 leg characters used in the present analysis were carefully chosen and scored to avoid problems of spine homology (Bosselaers 2002). As details of cephalothorax shape and its small sclerites are important in diagnosing the dionychan families under study (Bosselaers & Jocqué 2002), 25 of the characters used relate to this, while 13 characters describe eye size and morphology. Not surprisingly, another 12 characters were needed to adequately describe abdominal sclerotisation, which plays a key role in discriminating between dionychan ground spider families (Jocqué & Dippenaar-Schoeman 2006). The highly variable and diagnostic male and female copulatory organs encompass 23 characters. All 96 characters used in the analysis are listed below. The 27 characters with state changes illustrated on the tree in Fig. 50 are indicated by an asterisk.



FIGURES 16–26. Digital microscope photographs of the somatic morphology of female *Austrachelas pondoensis* n. sp.. (16) cephalothorax, dorsal view; (17) same, ventral view; (18) same, lateral view; (19) abdomen, dorsal view; (20) abdominal venter, epigastric area; (21) trochanter I, ventral view; (22) trochanter IV, ventral view; (23) patella I, retrolateral view; (24) leg I, prolateral view, arrow indicating metatarsal and tarsal scopulae; (25–26) distal end of leg IV, indicating paired retrolateral dorsal spines and metatarsal and tarsal scopulae. Abbreviations: AH—anterior epigynal hood; EG—endite groove; IS—intercoxal sclerite; LH—lateral epigynal hood; MHT—maxillar hair tuft; PB—pleural bars; PDS—paired dorsal metatarsal spines; PES—post-epigastric sclerite; PI—patellar indentation; PT—precoxal triangle; SC—scopulae; SI—sigillum; TR—trichobothria.

1. Both sexes carapace texture: 0) smooth or finely wrinkled (Fig. 16), 1) distinctly tuberculate.
2. Both sexes AER viewed from the front: 0) procurved, 1) straight.
3. Male AME: 0) smaller than ALE, 1) about equal to ALE, 2) larger than ALE.
4. Male AME: 0) separated by less than half their diameter, 1) separated by more than half their diameter, 2) separated by distance equal to or larger than their diameter.
5. Male clypeus: 0) less than AME diameter, 1) about equal to AME diameter, 2) larger than AME diameter.
6. * Male PER viewed dorsally: 0) procurved, 1) straight (Fig. 39), 2) recurved.
7. * Male PME: 0) smaller than PLE (Fig. 39), 1) about equal to PLE, 2) larger than PLE.
8. Male PME: 0) separated by less than half their diameter, 1) separated by more than half their diameter, 2) separated by distance equal to or larger than their diameter.
9. * Female AME: 0) smaller than ALE, 1) about equal to ALE, 2) larger than ALE.
10. Female AME: 0) separated by less than half their diameter, 1) separated by more than half their diameter, 2) separated by distance equal to or larger than their diameter.
11. Female clypeus: 0) less than AME diameter, 1) equal to AME diameter, 2) larger than AME diameter.
12. * Female PER viewed dorsally: 0) procurved, 1) straight (Fig. 36), 2) recurved.
13. * Female PME: 0) smaller than PLE (Fig. 36), 1) about equal to PLE, 2) larger than PLE.
14. Female PME: 0) separated by less than half their diameter, 1) separated by more than half their diameter, 2) separated by distance equal to or larger than their diameter.
15. * Both sexes PME shape: 0) round, 1) oval or asymmetrical (Figs 16, 36, 39).
16. * Both sexes PME shape: 0) dome-shaped, extending above cuticle, 1) flattened (Figs 36, 39).
17. * Fovea: 0) long and narrow, 1) short and narrow, 2) short and broad, 3) indistinct or absent.
18. Chilum: 0) present, 1) absent.
19. Chilum: 0) split, 1) single.
20. Male cheliceral promargin: 0) with more than 3 teeth, 1) with three teeth, 2) with two or fewer teeth.
21. * Male cheliceral retromargin: 0) with more than 3 teeth, 1) with three teeth, 2) with two or fewer teeth.
22. * Chelicerae with at least one long bent seta (scrappy seta) anterior to fang base: 0) present (Fig. 28), 1) absent.
23. Chelicerae with at least one long bent seta posterior to fang base: 0) present (Fig. 27), 1) absent.
24. Female cheliceral promargin: 0) with more than 3 teeth, 1) with three teeth (Fig. 27), 2) with two or fewer teeth.
25. Female cheliceral retromargin: 0) with more than 3 teeth, 1) with three teeth, 2) with two or fewer teeth (Fig. 27).
26. * Both sexes fang angle: 0) between transverse to body axis and 45° to body axis, 1) between 45° to body axis and parallel to body axis (Fig. 40).
27. * Male labium: 0) wider than long, 1) as long as wide, 2) longer than wide.
28. Female labium: 0) wider than long, 1) as long as wide, 2) longer than wide (Fig. 17).
29. * Endites: 0) laterally notched, 1) straight laterally.
30. * Endites: 0) with deep and sharply demarcated longitudinal median groove/ridge close to border with labium (Fig. 17), 1) constricted medially but without distinctive groove/ridge, 2) groove/ridge absent.
31. Endites with oblique depression: 0) present, 1) absent.
32. Serrula: 0) distinctive, 1) inconspicuous or reduced.
33. Apical maxillar hair tuft: 0) present (Fig. 17), 1) absent.
34. Sternum: 0) oval (Figs 17, 37), 1) shield-shaped.
35. Male sternum with precoxal triangles: 0) present, 1) absent.
36. Male sternum with intercoxal sclerites: 0) between coxae I and II, II and III, and III and IV, 1) between coxae I and II, and II and III, 2) absent.
37. Pleural bars: 0) fused with each other and/or with intercoxal sclerites, 1) isolated or only partly fused with each other, no single continuous strip (Fig. 18).
38. Female sternum with precoxal triangles: 0) present (Fig. 17), 1) absent.

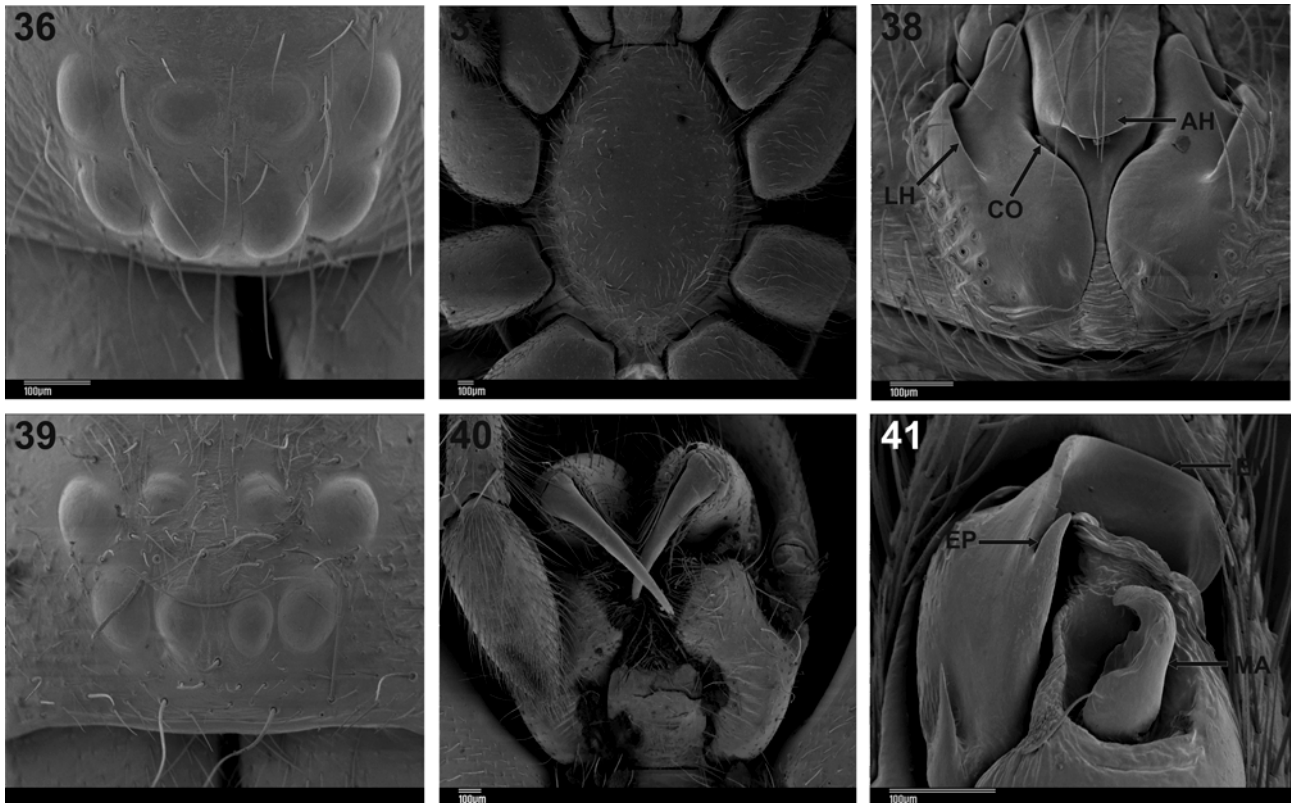


FIGURES 27–35. Scanning electron micrographs of *Austrachelas pondoensis* n. sp. somatic and genitalic morphology. (27) female chelicera, posterior view; (28) same, anterior view (29) male palp, ventral view; (30) same, dorsal view; (31) female epigyne, ventral view; (32) female left palp, retrolateral view, arrows indicating erect ventral setae; (33) female left leg 1, arrows indicating metatarsal and tarsal scopulae; (34) female left metatarsus 4, arrows indicating paired dorsal prolateral spines; (35) female, tarsal claw of left leg 4. Abbreviations: AH–anterior epigynal hood; CO–copulatory openings; EM–embolus; EP–embolar protuberance; LH–lateral epigynal hood; MA–median apophysis; PDS–paired dorsal metatarsal spines; PMT–promarginal teeth; RMT–retromarginal teeth; SC–scopulae; SS–scrappy seta; ST–subtegulum. Scale bars: 27, 29, 30 = 0.5mm; 28, 31 = 0.2mm; 32–34 = 1.0mm; 35 = 0.1mm.

39. Female with intercoxal sclerites: 0) between coxae I and II, II and III, and III and IV (Fig. 17), 1) between coxae I and II, and II and III, 2) absent.

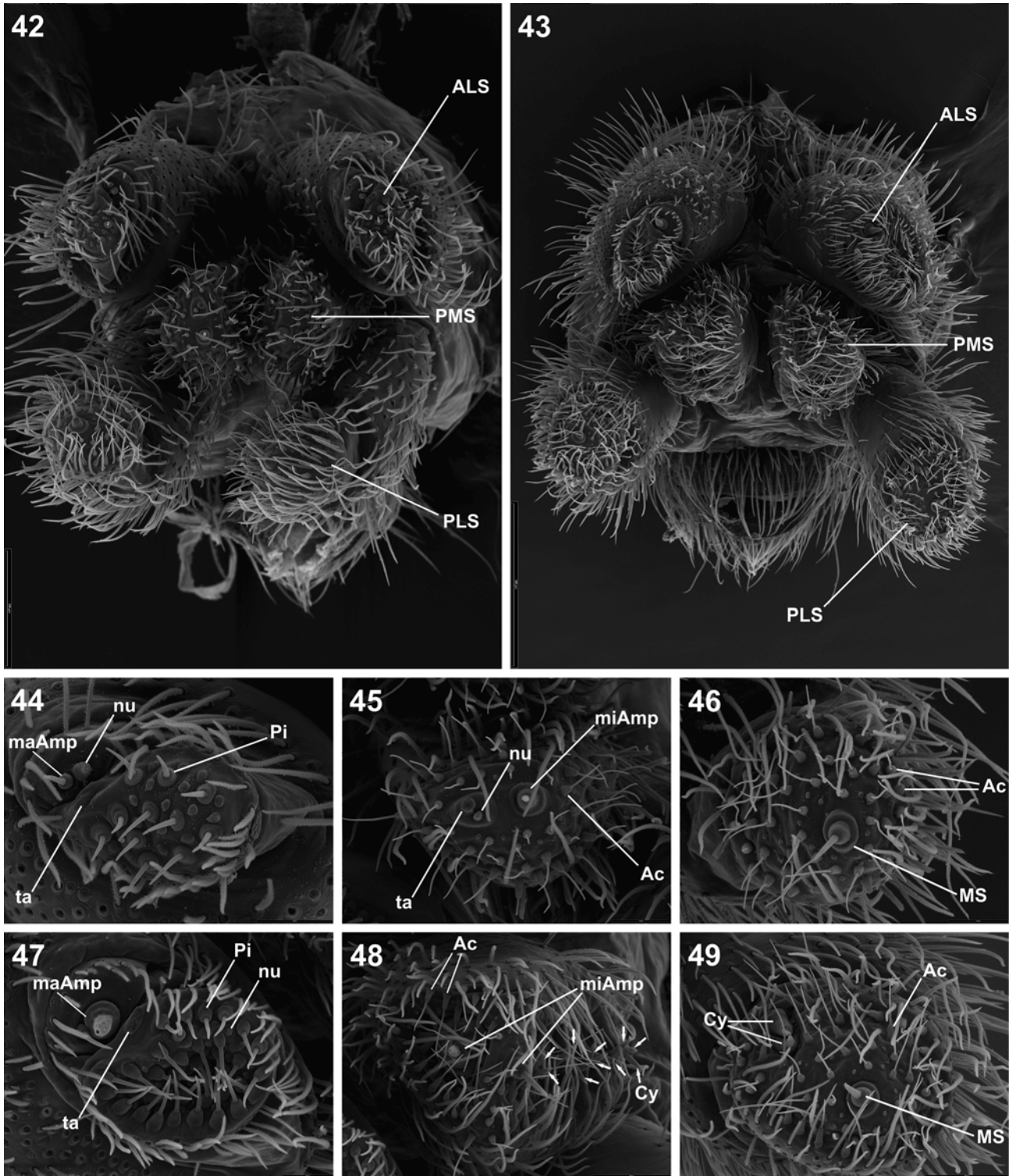
40. Both sexes with plumose (feathery) setae on body: 0) present, 1) absent.

41. * Curved hairs anteriorly on male abdomen: 0) present, 1) absent.
42. Dorsal scutum on male abdomen: 0) present, 1) absent.
43. Dorsal scutum on male abdomen: 0) covering at least $\frac{3}{4}$ of dorsal surface, 1) covering half or less of dorsum (Fig. 6).
44. Male dorsal abdominal sigilla: 0) two or more distinct sclerotised pairs, 1) two weakly sclerotised indistinct pairs, 2) sigilla absent.
45. Male abdomen with epigastric sclerite: 0) present, 1) absent.
46. Male epigastric sclerite surrounding base of petiole: 0) present, 1) absent.
47. Male abdominal ventral sclerite: 0) present, 1) absent.
48. * Male abdomen with inframaxillary sclerite anterior to spinnerets: 0) present, 1) absent.
49. * Curved hairs anteriorly on female abdomen: 0) present (Fig. 19), 1) absent.
50. Dorsal scutum on female abdomen: 0) present, 1) absent (Fig. 19).
51. Female dorsal abdominal sigilla: 0) two or more distinct sclerotised pairs (Fig. 19), 1) two weakly sclerotised indistinct pairs, 2) sigilla absent.
52. Female abdomen with epigastric sclerite: 0) present, 1) absent (Fig. 20).
53. Female epigastric sclerite surrounding base of petiole: 0) present, 1) absent.
54. Female abdomen with inframaxillary sclerite anterior to spinnerets: 0) present, 1) absent.
55. * ALS: 0) cylindrical, basal and apical diameter the same, 1) conical, apical diameter distinctly less than basal diameter (Figs 42, 43).
56. Male PMS: 0) slender (Fig. 43), 1) short and stout.
57. Male PLS separation: 0) less than half their length, 1) by more than $\frac{3}{4}$ their length (Fig. 43).
58. Female PMS: 0) slender (Fig. 45), 1) short and stout, 2) flattened or subtriangular, 3) gnaphosid-type, with distinct anterior and posterior sections.
59. Female PLS separation: 0) by less than half their length, 1) by more than $\frac{3}{4}$ their length (Fig. 42).
60. * Piriform male palpal tegulum: 0) present, 1) absent.
61. * Piriform male palpal tegulum shape 0) narrowed retrolaterally, with protruding subtegulum (Castianeirinae-type), 1) smoothly rounded and teardrop-shaped.
62. * Inflated male tegulum: 0) present, 1) absent.
63. Male embolus: 0) originating proximally, 1) prolaterally, 2) distally, 3) retrolaterally.
64. Male embolus shape: 0) short, stout and pointed, 1) long, thin and sickle-shaped, 2) long and thin, encircling tegulum, 3) long and thin, passing beneath tegulum, 4) broad and flattened (Figs 29, 41), 5) corkscrew-shaped.
65. Male embolus: 0) with basal embolar apophysis, 1) with laminate or teeth-like structures on prolateral or distal margin (Figs 29, 41), 2) neither modification.
66. * Male palpal median apophysis: 0) present (Figs 29, 41), 1) absent.
67. Male palpal median apophysis: 0) broad base with narrowed tip, often hook-shaped (Figs 29, 41), 1) long and broad, 2) fine and wire-like.
68. * Male palpal conductor: 0) present, 1) absent.
69. Male palpal conductor: 0) sclerotised, 1) membranous.
70. * Male palpal subtegulum in ventral view of palp: 0) hidden, 1) visible prolaterally (Fig. 29), 2) visible pro- and retrolaterally, 3) visible retrolaterally, 4) visible proximally.
71. Male palpal cymbium tip: 0) broad and short (Fig. 29), 1) distinctly narrowed and pointed.
72. Male palpal cymbium with distal dorsal setal mat (= *cymbial scopula* of Platnick 2002): 0) present (Fig. 30), 1) absent.
73. Modified setae at distal tip of cymbium: 0) present, 1) absent (Fig. 29).
74. Modified setae at distal tip of male cymbium: 0) cluster of setae in distinctive rows, 1) cluster of more than four setae not in rows, 2) one to four distal setae.
75. Male palpal tibia with: 0) two or more distinctly separate apophyses, 1) single simple or complex apophysis, 2) no apophyses.
76. * Male palpal patellar apophysis: 0) present, 1) absent.
77. Male palpal femoral apophysis: 0) present, 1) absent.
78. Long erect ve setae on male palpal femur: 0) in single row, 1) scattered, 2) absent.
79. Female epigyne with anterior hood (= *epigynal atrium* of Platnick 2002): 0) present (Figs 20, 31, 38), 1) absent.



FIGURES 36–41. Scanning electronic micrographs of *Austrachelas merwei* **n. sp.** female (36–38) and male (39–41). (36, 39) eye structure and arrangement, dorsal view; (37) sternum; (38) epigyne, ventral view; (40) mouthparts; (41) distal half of male palpal tegulum. Abbreviations: AH–anterior epigynal hood; CO–copulatory openings; EM–embolus; EP–embolar protuberance; LH–lateral epigynal hood; MA–median apophysis.

80. Female epigyne with median septum: 0) present, 1) absent (Figs 20, 31, 38).
81. Female epigyne with lateral hoods (= *lateral ledges* of Platnick 1984; not the same as lateral epigynal hooks of Ctenidae and Zoropsidae): 0) present (Figs 31, 38), 1) absent.
82. Female copulatory openings: 0) anterior to ST 1, 1) posterior to ST 1, 2) in same transverse plane as ST 1.
83. Long erect ve setae on female palpal femur: 0) in two distinct rows, 1) in one row (Fig. 32), 2) scattered, indistinct or absent.
84. Trochanter notch: 0) present, 1) absent (Figs 21, 22).
85. Patellar indentation of legs I and II: 0) narrow (Fig. 23), 1) wide.
86. Leg I and II regular leg spines: 0) numerous and widespread, 1) few and irregularly placed, 2) absent.
87. * Leg I and II paired ve leg spines: 0) present 1) absent (Fig. 33).
88. Tibiae I and II ve leg spine pairs: 0) Four or more 1) one to three.
89. Leg III and IV regular leg spines: 0) numerous and widespread (Fig. 34), 1) few and irregularly placed, 2) absent.
90. Metatarsi III and IV dorsal spines: 0) in two rows pro- and retrolaterally (Figs 25, 26, 34), 1) in single rows pro- and retrolaterally, 2) scattered spines pro- and retrolaterally in no distinctive arrangement, 3) absent.
91. * Male leg I and II ve leg cusps: 0) present, 1) absent.
92. Male leg I and II scopulae: 0) present and dense, 1) weak or absent.
93. Female leg I and II ve leg cusps: 0) present, 1) absent.
94. Female leg I and II ve structures: 0) dense scopulae (Figs 24, 33), 1) long erect upright setae, 2) weak scopulae or scopulae absent.
95. Male tarsus IV: 0) straight, 1) distinctly bent/curved.
96. Claw tufts in both sexes: 0) present (Fig. 35), 1) very weak or absent.



FIGURES 42–49. Scanning electron micrographs of spinnerets of *Austrachelas pondoensis* n. sp. male (42, 44–46) and female (43, 47–49). (42, 43) spinneret arrangement; (44, 47) anterior lateral spinneret; (45, 48) posterior median spinneret; (46, 49) posterior lateral spinneret. Abbreviations: Ac–aciniform gland spigot(s); ALS–anterior lateral spinneret; Cy–cylindrical gland spigot(s); maAmp–major ampullate gland spigot(s); miAmp–minor ampullate gland spigot(s); MS–PLS modified spigot(s); nu–nubbin(s); Pi–piriform gland spigot; PLS–posterior lateral spinneret; PMS–posterior median spinneret; ta–tarpore(s). Scale bars: 42 = 0.2mm; 43 = 0.5mm; 44–47 = 0.05mm; 48, 49 = 0.1mm.

TABLE 1. Character state changes at the nodes of the preferred tree (Fig. 50). Characters have been optimized favouring reversals over parallel gain (“ACCTRAN” optimization, “fast” in Winclada). Non-homoplasious character state changes are indicated by *, entirely non-homoplasious characters by **, ambiguous optimisations by °.

Node	Character state changes
1	11:2°, 14:2°, 62:4°, 73:1°, 80:1*°
2	3:0, 4:0, 9:0, 10:0°, 63:2°, 69:1°, 70:1°, 78:1°, 95:1, 96:1°
3	8:1, 14:1°, 18:1°, 33:1, 68:1
4	35:0°, 36:0, 38:0, 41:1*, 49:1*, 84:1°
5	5:0, 17:1, 22:1, 27:1, 28:1°, 39:1, 64:0°, 67:2**, 90:3
6	6:2, 11:0, 12:2, 23:1°, 30:1, 43:0°, 63:2°, 66:1, 68:1, 70:1°, 72:1, 86:2, 89:2
7	64:3*°, 71:1, 91:0*
8	3:0°, 5:2, 9:0°, 11:2, 42:0, 44:0°, 74:2**
9	63:1°, 76:0**
10	1:1, 7:2°, 13:2°, 23:0°, 27:0, 28:0
11	3:1°, 18:1, 20:2, 24:2, 39:0, 44:1°, 63:2°, 64:0°, 75:2, 85:1, 91:1
12	9:1°, 83:1, 86:1°, 87:1, 90:2
13	3:1°, 45:0, 50:0, 73:0, 75:0°
14	45:0, 48:0**, 51:0°, 64:0°, 82:0°
15	3:1°, 6:0, 9:1°, 12:0, 23:0°, 28:0, 30:2°, 75:0°, 83:1°, 86:0, 89:0°, 91:1
16	3:2°, 9:2°, 17:0, 27:0, 35:1, 38:1°, 43:1°, 44:1°, 51:1°, 53:0°, 58:1, 60:0, 74:0°, 78:0, 90:1
17	14:1°, 40:0, 44:2°, 50:0, 54:0, 61:0**, 64:5, 70:2°, 75:2°, 84:0, 88:1
18	20:2, 24:2, 36:1°, 38:0°
19	4:0, 5:1, 10:0, 11:1, 14:2°, 35:0, 44:1°, 45:1, 57:0, 58:0, 59:0
20	19:0, 52:0°, 72:0°, 73:0°, 82:1, 89:1°
21	20:0, 24:0, 32:1, 36:1, 42:1, 63:0, 64:2, 83:2°
22	1:1°, 6:1, 8:1°, 12:1°, 14:1°, 23:1°, 39:0, 54:0, 70:0, 75:1°
23	3:0°, 9:0°, 15:1, 17:3, 18:1, 22:0, 62:0**, 72:1°, 77:0, 89:2°
24	28:1, 37:1, 63:1, 64:1, 66:0, 68:0, 80:0
25	15:1, 16:1, 29:0, 31:0
26	4:0, 18:1°, 20:0, 21:0*, 24:0, 25:0, 33:1, 36:2°, 40:0, 51:2, 63:3°, 64:2°, 68:1, 85:1, 89:1, 90:2
27	7:0°, 9:0°, 10:2°, 13:0°, 27:2, 28:2, 30:0*, 39:0, 55:0*°, 71:1°, 78:0, 79:0°, 83:1°, 84:0°, 86:1°, 88:1°
28	3:1, 6:1, 7:2°, 8:0, 12:1, 13:2°, 14:0, 41:0, 73:0, 80:0°
29	11:0°, 19:0, 27:1, 28:1, 30:1, 49:0, 63:2°, 65:1, 72:1, 81:1, 86:0°, 95:1, 96:1
30	37:0°, 42:0, 45:0°, 58:0, 69:1, 70:1°, 87:1
31	9:2, 10:1°, 11:1, 17:1, 43:0°, 44:0, 50:0°, 52:0, 63:0°, 64:1, 90:2
32	1:1, 7:1°, 13:1°, 46:0°, 70:0°, 79:1°
33	4:0°, 21:1, 58:1, 67:1**
34	7:2°, 8:0, 14:0, 24:0°, 34:0, 43:1°, 56:1°, 64:0, 84:1, 86:2, 89:1°, 90:3°
35	13:2, 50:1°, 51:0, 57:0, 78:2, 83:2, 92:0, 94:0
36	3:0, 6:2°, 12:2°, 26:1, 55:1°, 71:0°
37	20:0, 24:0, 30:1, 80:0°
38	4:2°, 31:1, 34:0, 37:1°, 45:1°, 84:1
39	5:1°, 11:0°, 17:2°, 23:1, 27:0°, 28:0°, 42:1, 64:2°, 66:1, 78:2, 79:1°, 86:2, 89:1, 90:3, 96:1

continued next page

TABLE 1. (continued)

Node	Character state changes
40	3:2°, 4:0°, 6:0°, 10:0, 12:0°, 20:2, 24:2, 32:1, 35:1, 36:1°, 38:1, 39:1°, 51:0°, 58:3, 69:0, 72:1, 83:2
41	13:1, 17:0°, 27:2°, 28:2°, 30:1, 95:1
42	5:0, 9:2, 34:1, 36:2°, 39:2°, 64:1, 71:1, 89:2, 92:0, 94:0
43	6:1, 8:1, 12:1, 63:2°, 65:1, 68:1, 81:0, 92:0, 94:0
44	4:1°, 8:0, 10:0°, 14:0
45	36:1, 39:1
46	4:0, 14:1°, 20:2, 24:0
47	8:1

Analysis and results

The matrix of character states can be found in Appendix 2. All characters were run unordered in the analyses performed.

An equally weighted analysis of the data matrix was performed in PAUP with **hsearch addseq=random nreps=1000** (heuristic search with tree bisection and reconnection swapping and 1000 random addition sequences). In order to avoid spurious resolution due to unsupported (Coddington & Scharff 1994; Wilkinson 1995) or ambiguously supported (Nixon & Carpenter 1996) branches, those with a minimum length of zero were collapsed with **condense collapse=minbrlen**. Eighteen shortest trees (length = 676) were found in 517 out of 1000 random addition sequences, involving 222380000 rearrangements. The same set of 18 shortest trees was also found when analysing the data set in TNT (Goloboff *et al.* 2003, 2008a), a programme applying new tree searching technologies (Goloboff 1999). When using **Init. addseqs = 10, Find min. length 10 times, Sectorial Searches (RSS+CSS, default options), Tree Drift (20 substitutions, max. fit difference = 5, max. rel. fit difference = 30, 10 cycles), Tree fusing (20 rounds)**, the 18 trees were found after 121206319 rearrangements. The strict consensus of this set of shortest trees shows poor resolution.

Because cladograms obtained by attributing *a posteriori* weights to characters based on their relative degrees of homoplasy on a set of heuristic trees explain the data better (Bosselaers & Jocqué 2002, Goloboff *et al.* 2008b) a weighted analysis was also performed.

Implied weighting was preferred: the solution obtained by this method is not influenced by some initial weights attributed to the characters because trees are found in one stage (Kaila 1999), and self-consistency of the final cladograms is not defined with respect to a pooled set of topologies (Harbach & Kitching 1998). Also, the fit function used does not have a lower bound of zero, minimising the chance of dismissing evidence by entirely excluding characters, and the method does not downweight multistate characters (Goloboff 1993). When applying implied weighting in PAUP with **pset goloboff = yes, hsearch addseq = random nreps = 1000**, collapsing branches with a minimum length of zero with **condense collapse=minbrlen**, a single fittest tree with fit = -42.57266 (PAUP attributes a negative sign to fit values) was found 80 times, involving 314952256 rearrangements. An additional implied weighting search run in TNT using **Settings / implied weighting** and **Analyze / Traditional search** as well as **New Technology search (same settings as above)** produced the same single fittest tree. In both searches, the default value for the concavity constant was used. Since PAUP uses a concavity constant k as defined in the fit formula $f_i = (k + 1)/(s_i + k + 1 - m_i) = (k + 1)/(es + k + 1)$ in Goloboff (1993), and TNT uses a concavity constant k' equal to $k + 1$ ($f_i = k'/(es + k')$, Goloboff *et al.* 2003), the default concavity constant values used are 2 for PAUP and 3 for TNT. Because TNT calculates weighted homoplasy (a complement of fit, $1 - f = es/(es + k')$) for implied weighting trees, another fit value = 53.42734 was reported for the same fittest tree. The single fittest tree has length = 702, $ci = 0.2051$, $ri = 0.5921$, $hi = 0.7979$ and $rc = 0.1215$. This tree is our preferred solution.

Bremer support (a statistic based on the number of extra steps needed on a tree in order to collapse a branch, Bremer 1988, 1994), expressed as fit values, was calculated in TNT, using the command lines **mult; hold ; sub ; bb = fill; bsupport;**, gradually increasing the **hold** and **sub** values until the solution stabilised, eventually reaching **hold 50000; sub 7;**

Discussion

The single fittest tree, with node numbers, state changes for 27 out of 96 characters and Goloboff fit Bremer support values in italics below branches is illustrated (Fig. 50). Table 1 lists character state changes at the nodes of the preferred tree, under ACCTRAN optimization.

Homoplasy is high in this data matrix: only 6 out of 96 characters (48, 61, 62, 67, 74 and 76) are completely free of homoplasy on the preferred tree and only 19 character state changes, 21:0, 30:0, 41:1, 48:0, 49:1, 55:0, 61:0, 62:0, 64:3, 67:1, 67:2, 70:3, 70:4, 74:0, 74:2, 76:0, 80:1, 83:0, 91:0, are non-homoplastic. Sanderson and Donoghue (1989: 1785, fig. 1) performed a polynomial regression analysis on data from 60 cladistic analyses, and derived the following equation based on them: $ci = 0.90 - 0.022 * (\text{number of taxa}) + 0.000213 * (\text{number of taxa})^2$. Applying this equation, 51 taxa would yield a ci value of 0.33, while the fittest tree found for the present data matrix has a ci value of 0.21.

When observing the position on the preferred tree of species presently classified in Corinnidae and Liocranidae (Platnick 2009), it becomes obvious that much additional work will be necessary to sort out the exact affinities of all of them. It must be stressed that solving this problem falls outside the scope of the present contribution, but some brief comments will be given here.

The "*Agroeca* complex" (Bosselaers & Jocqué 2002; Ubick *et al.* 2005: 163) branches off as a monophyletic group at the base of the tree, closest to the outgroup *Zora*, a position which is not in contradiction with Wunderlich's (2008: 486) debatable proposal to include Liocranidae in Zoridae. The other genera under study are grouped in the large clade 4. The most important character state changes that support this clade are the presence of precoxal triangles in males and females (35:0, lost five times, and 38:0, lost three times), presence of intercoxal sclerites between all coxae in males (36:0, lost or reduced several times), and the absence of curved hairs anteriorly on abdomen of males and females (41:1 reversed in clade 28 and *Neato*, and 49:1, reversed in clade 29, *Rhaeboctesis*, and *Neato*). Clade 4 is composed of two large subclades, 5 and 25.

Clade 5 groups all Corinnidae studied, with the exception of *Hortipes*. The clade is supported mainly by a short and narrow fovea (17:1, changed six times), the absence of a long bent seta anterior to fang base (22:1, reversed in clade 23), male and female labium as long as wide (27:1 and 28:1, both reversed to wider than long several times), presence of four intercoxal sclerites in females (39:1, six in a few genera) and absence of dorsal spines on metatarsi III and IV (90:3, reversed in clades 12 and 16).

Significantly, both *Trachelas* and *Cetonana* are polyphyletic in the present result, as has been supposed before by several authors (Simon 1897:180; Platnick & Ewing 1995; Grismado 2004; Haddad & Lyle 2008; Lyle 2008; Bosselaers *et al.* 2009). Moreover, "*Medmassa*" *proxima* Lessert, 1923, is not in clade 16, which groups all Castianeirinae included in the analysis. "*Medmassa*" *proxima* is not congeneric with the type species *Medmassa frenata* (Simon, 1887) or *Medmassa semiaurantiaca* Simon, 1910. "*Medmassa*" *proxima* does not belong to Castianeirinae and will be transferred to another genus in a subsequent paper (Haddad & Bosselaers, in prep.).

Clade 25 is supported mainly by asymmetrical PME (15:1, paralleled in clade 23), flattened PME (16:1, paralleled in *Phrurolithus*), and notched endites (29:0, lost three times) with an oblique depression (31:0, lost in *Centroina*, *Asadipus* and clade 38).

The position of *Hortipes*, branching off at the base of clade 25, differs from its placement in the cladogram of Bosselaers and Jocqué (2002), illustrating the difficulty of clarifying the relationships of this enigmatic genus.

Subsequent to *Hortipes*, clade 28, encompassing the gnaphosid *Drassodes sesquidentatus* as well as *Rhaeboctesis*, a genus of uncertain affinities, branches off at the base of clade 30. Clade 30 itself is composed of two sister clades, 31 and 36.

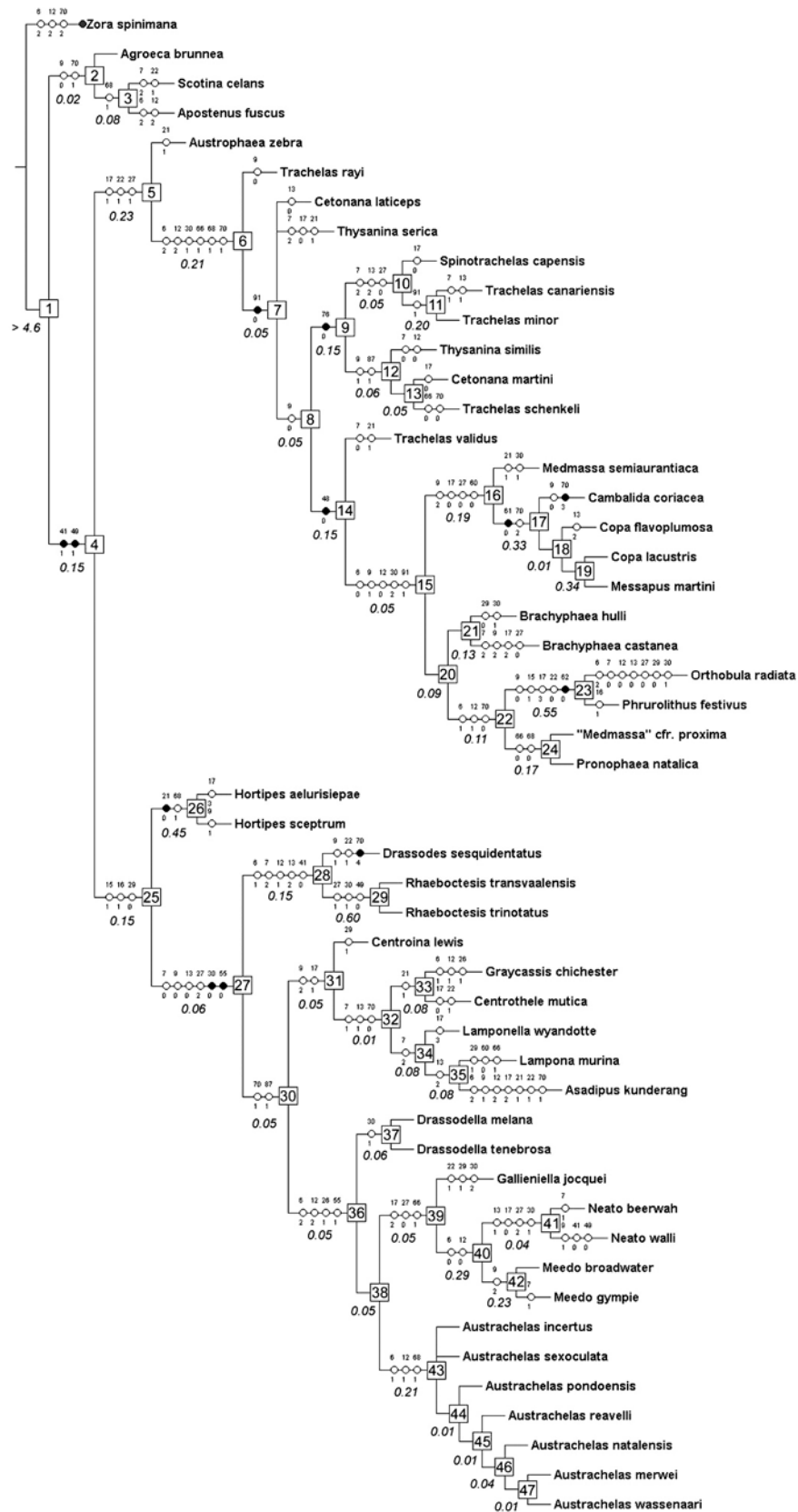


FIGURE 50. Single fittest tree obtained under implied weighting for 51 species from the families Corinnidae, Gallieniellidae, Lamponidae, Gnaphosidae and Liocranidae, with *Zora spinimana* (Zoridae) as outgroup. State changes under ACCTRAN are indicated on the tree for 27 out of 96 characters (see text); non-homoplasious state changes are in black, homoplasious state changes in white. Nodes are numbered on the tree and Goloboff fit Bremer support values are indicated in italics below branches.

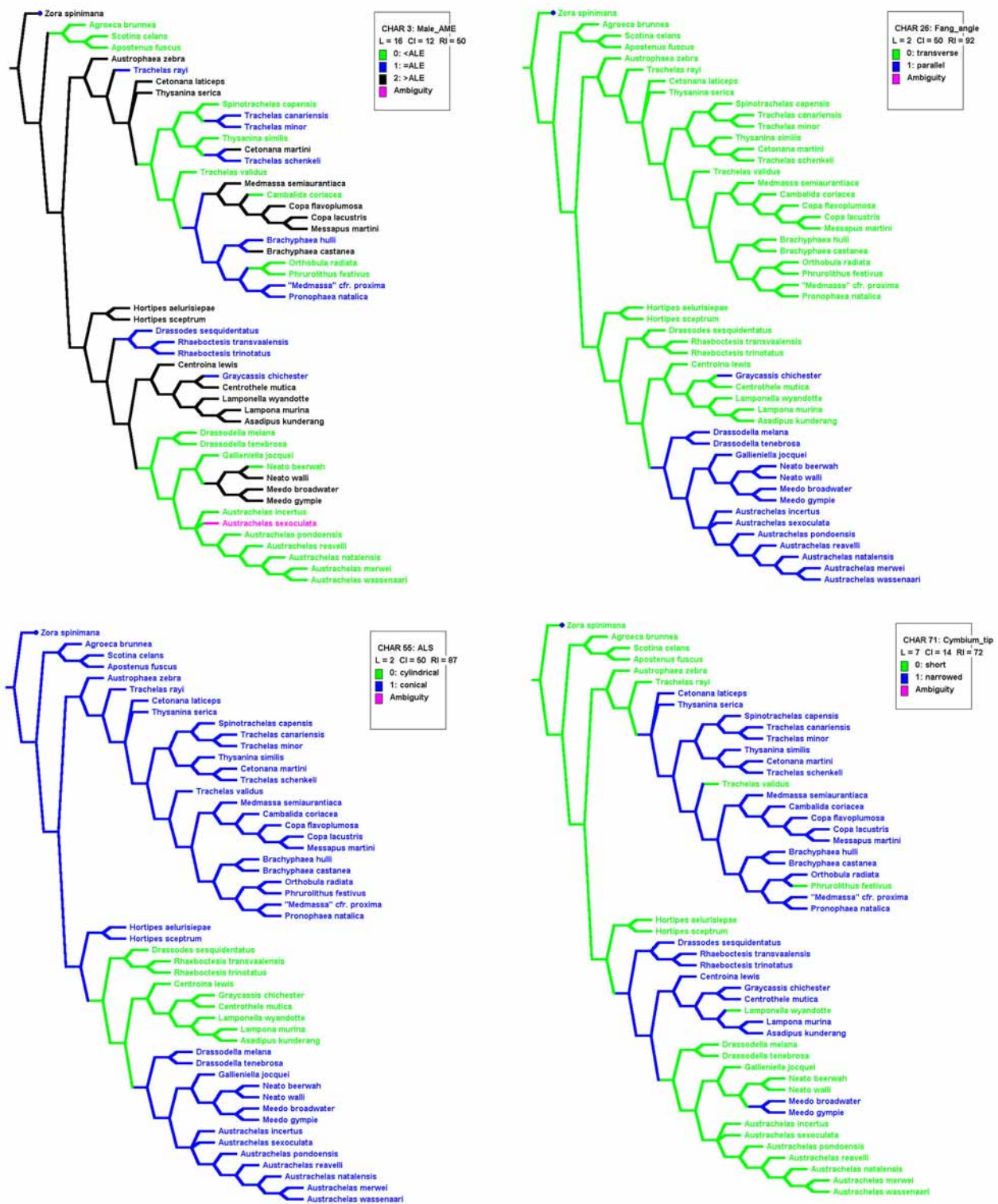


FIGURE 51. Character state distribution obtained under ACCTRAN on the fittest tree of four characters supporting the inclusion of *Austrachelas* in the Gallieniellidae clade. Graphics obtained with Winclada 1.00.08.

Clade 31 corresponds to Lamponidae and is supported mainly by large, closely spaced female AME (9:2 and 10:1) with a diameter equal to clypeus width (11:1), a short and narrow fovea (17:1), a large male dorsal abdominal scutum (43:0, smaller in clade 34), sclerotised male sigilla (44:0), presence of a female dorsal abdominal scutum (50:0, lost twice) and epigastric sclerite (52:0), a proximally inserted embolus (63:0) and scattered dorsal spines on metatarsi III and IV (90:2, absent in clade 34).

The sister clade to Lamponidae in the preferred tree is clade 36, which can be considered to correspond to Gallieniellidae. The clade is supported mainly by small male AME (3:0, reversed in clade 40), a recurved PER (6:2 and 12:2, but procurved in clade 40 and straight in clade 43, *Austrachelas*), fangs parallel to body axis (26:1, paralleled in *Graycassis*), conical ALS (55:1) and a short cymbium tip (71:0, reversed in clade 42). Based on several important characters, such as male AME size, fang angle, ALS shape and cymbium shape (Fig. 51), the genus *Austrachelas* proves to be firmly embedded in the Gallieniellidae clade.

Taxonomy

Austrachelas Lawrence, 1938

Austrachelas Lawrence, 1938: 504.

Austrachelas: Dippenaar-Schoeman & Jocqué, 1997: 128.

Type species: *Austrachelas incertus* Lawrence, 1938

Diagnosis. *Austrachelas* spiders can be recognised by a combination of the following characters: densely scopulate anterior metatarsi and tarsi; strongly spined posterior legs, with prolateral and retrolateral dorsal metatarsal spines in two rows; eyes in closely situated group, PME smaller and more closely situated to each other than to PLE; carapace raised evenly along midline, and sternum oval (Figs 16–18). Female epigyna well sclerotised, with anterior hood [epigynal atrium] and lateral hoods [lateral ridges], laterally situated copulatory openings in narrow fold (Figs 20, 31, 38), and complex internal structures; post-epigastric sclerites present in females (Fig. 20). Male palps with dense setal mat in distal half of cymbium [cymbial scopula], short hook-like median apophysis present, and embolus distally curved in broad arc, with small lobed or denticulate structures on its distal margin (Figs 29, 30, 41).

Description. Medium to large sized spiders, 4.7–15.3mm in length. Carapace orange-brown to bright wine-red in colour, paler along midline (Figs 1–15); carapace raised evenly along midline, sloping sharply posteriorly (Fig. 18). Eyes closely grouped together; AER procurved, PER straight or very slightly recurved (Fig. 16); AME closer to ALE than to each other, ALE larger than AME; PME transversely oval, flattened, closer to each other than to PLE, PME smaller than PLE (Figs 36, 39). Chelicerae not protruding far beyond anterior margin of carapace; fangs long, directed obliquely (Figs 16, 17, 40), with scrappy setae close to fang base (Fig. 28); lateral margins of endites nearly parallel, inner margin with distinctive groove (Fig. 17); labium longer than wide. Sternum oval, narrowed anteriorly (Figs 17, 37); precoxal triangles and intercoxal sclerites present (Fig. 17); pleural bars isolated (Fig. 18). Leg formula 4123; trochanters not notched (Figs 21, 22), patellar indentation narrow (Fig. 23); anterior legs with one or two prolateral spines on femora only, metatarsi and tarsi densely scopulate ventrally (Figs 24, 33); posterior legs strongly spined, with dorsal metatarsal spines in paired prolateral and retrolateral rows (Figs 25, 26, 34); metatarsi III and IV longer than tibiae. Abdomen elongate, grey dorsally with cream chevron markings (Figs 1–15), pale laterally and ventrally; males with short dorsal scutum, absent in females; dorsum with two pairs of sigilla; venter unsclerotised except for post-epigastric sclerites (Fig. 20). Spinnerets (only observed with SEM in *Austrachelas pondoensis* n. sp., Figs 42–49): anterior lateral spinnerets conical, nearly cylindrical, not widely spaced, with two articles, terminal article continuous on ectal margin, interrupted mesally at major ampullate area; female with two major ampullate gland spigots, posterior one much larger (reduced to nubbin in male); piriform gland spigots relatively small, not sexually dimorphic, shafts about same size as anterior major ampullate. Posterior median spinnerets with two minor ampullate gland spigots (one reduced to nubbin in male), many aciniform gland spigots, and posterior field of 10 cylindrical gland spigots, loosely arranged in rows (absent in male). Posterior lateral spigots with many aciniform gland spigots, two basal cylindrical gland spigots (absent in male), and one distal modified spigot (minor ampullate, sensu Platnick 2002). Colulus a pilose patch. Female epigyne with anterior and lateral hoods, lateral copulatory openings (Figs 31, 38), anterior ST 2 and posteriorly situated ST 1. Male palp with broad cymbium with dense dorsal distal setal mat,

broadly curved embolus and median apophysis on tegulum (Figs 29, 30); embolus sometimes with lobed or denticulate protuberance on distal margin (Figs 29, 41); male palpal tibia with complex single apophysis with variable shape, often with lobes or denticles.

***Austrachelas bergi* n. sp.**

(Figs 1, 52, 53)

Diagnosis. Females of this species are recognised by the unique epigyne structure, which in contrast to females of most other species in the genus (except *A. pondoensis* n. sp.), is considerably narrower anteriorly than posteriorly (Fig. 52). *A. bergi* n. sp. can be separated from the latter species by the medially placed spermathecae (Fig. 53), which are well separated in *A. pondoensis* n. sp. (Fig. 69).

Etymology. Named for Michiel van den Berg, who collected the type specimens.

Female. Measurements: CL 2.85–4.90, CW 2.03–3.70, FL 0.22–0.39, AL 2.85–4.65, AW 1.78–3.30, SL 1.60–2.63, SW 1.15–1.85, TL 5.60–9.80, AME–AME 0.08, AME–ALE 0.05, ALE–ALE 0.42, PME–PME 0.12, PME–PLE 0.14, PLE–PLE 0.70.

Length of leg segments (sequence from femur to tarsus, and total): I $3.55 + 1.88 + 2.45 + 1.83 + 1.10 = 10.81$; II $3.18 + 1.83 + 2.42 + 1.75 + 1.07 = 10.25$; III $2.23 + 1.12 + 1.45 + 2.00 + 1.00 = 7.80$; IV $3.62 + 1.90 + 2.75 + 3.25 + 1.17 = 12.69$.

Carapace deep red, paler along midline (Fig. 1); AER strongly procurved, laterals larger than medians; AME separated by distance equal to $\frac{1}{2}$ their diameter, AME nearly touching ALE; clypeus height equal to $1\frac{1}{4}$ times AME diameter at AME, equal to ALE diameter at ALE; PER straight, laterals larger than medians; PME separated by distance equal to $\frac{3}{4}$ their diameter, PME separated from PLE by distance equal to PME diameter. Chelicerae deep orange-red; promargin with three teeth, median tooth largest, distal and proximal teeth subequal in size; proximal tooth closest to median tooth; retromargin with single small tooth, closest to fang base of all teeth. Legs all uniform yellow-orange to red in colour. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 2 do 2 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 2 rl 2 plv 2 rlv 2 vt 2, IV pl 5 rl 5–6 plv 2 rlv 1 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 5 rl 4 plv 1 rlv 1 vt 2, IV pl 5 rl 5 plv 2 rlv 1 vt 3; palp: femora do 2, patellae pl 1 rl 1 distal dorsal seta present, tibiae pl 3 rl 2, tarsus pl 3 do 1 rl 2 plv 1 rlv 1. Abdomen dark grey dorsally, with mottled cream spots (Fig. 1), paler laterally and ventrally; dorsum and venter lacking scutum or other sclerites. Epigyne distinctly narrower anteriorly than posteriorly; anterior hood elongate, with unique folds (Fig. 52); copulatory openings anteromedially situated, entering ST 2 medially; ST 1 oval, posteriorly situated, slightly separated (Fig. 52).

Male: unknown.

Type material: Holotype ♀: SOUTH AFRICA: *Mpumulanga Province*, Hall & Sons, 10km NE Nelspruit [25°30'S, 30°58'E], 29.IX.1997, M. van den Berg (on Hass avocado trees) (NCA 98/218).

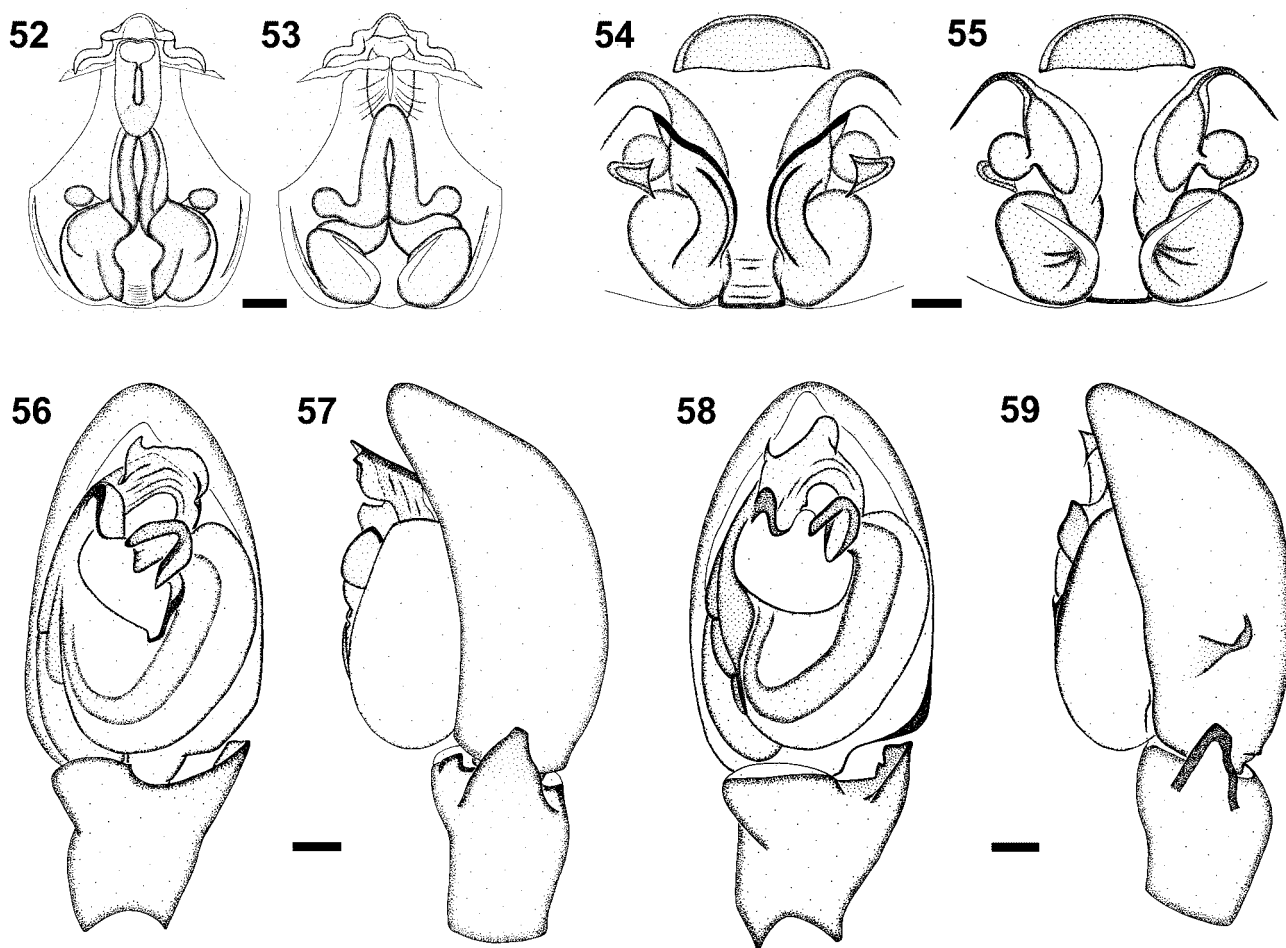
Paratype: 1 ♀: SOUTH AFRICA: *Mpumulanga Province*, Hall & Sons, 10km NE Nelspruit [25°30'S, 30°58'E], 8.I.1998, M. van den Berg (on Fuerte avocado trees) (NCA 98/768).

Distribution. Known only from the type locality (Fig. 82).

***Austrachelas incertus* Lawrence, 1938**

(Figs 2, 3, 54–57)

Austrachelas incertus Lawrence, 1938: 504, fig. 28. (♀)



FIGURES 52–59. Genital morphology of *Austrachelas* species. (52–53) *A. bergi* **n. sp.**: female epigyne, ventral view (52), dorsal view (53); (54–57) *A. incertus* Lawrence, 1938: female epigyne, ventral view (54), dorsal view (55), male palp, ventral view (56), retrolateral view (57); (58–59) *A. kalaharinus* **n. sp.**, male palp, ventral view (58), retrolateral view (59). Scale bars = 0.1mm.

Diagnosis. The female of *A. incertus* can be recognised by the very broad distinctive semi-circular anterior hood (Fig. 54); males closely resemble *A. kalaharinus* **n. sp.**, but can be distinguished by the size and position of the denticles on the distal margin of the embolus (Fig. 56), and by the simple retrolateral tibial apophysis (with two denticles in *A. kalaharinus* **n. sp.**).

Female. Measurements: CL 4.20–4.62, CW 2.98–3.22, FL 0.40–0.42, AL 4.65–7.50, AW 2.30–4.20, SL 2.33–2.55, SW 1.60–1.70, TL 8.85–12.25, AME–AME 0.08, AME–ALE 0.03, ALE–ALE 0.40, PME–PME 0.09, PME–PLE 0.16, PLE–PLE 0.68.

Length of leg segments (sequence from femur to tarsus, and total): I 2.65 + 1.73 + 2.20 + 1.65 + 1.08 = 9.31; II 2.48 + 1.62 + 2.03 + 1.63 + 1.00 = 8.76; III 2.30 + 1.30 + 1.38 + 1.87 + 1.00 = 7.85; IV 2.98 + 1.63 + 2.30 + 2.70 + 1.20 = 10.81.

Carapace deep red-brown, dark orange-red along midline (Fig. 2); AER strongly procurved, laterals larger than medians; AME separated by distance equal to their diameter, AME separated from ALE by distance equal to $\frac{1}{2}$ AME diameter; clypeus height equal to $1\frac{1}{2}$ times AME diameter at AME, equal to $\frac{3}{4}$ ALE diameter at ALE; PER straight, laterals larger than medians; PME separated by distance equal to their diameter, PME separated from PLE by distance equal to $1\frac{1}{2}$ times PME diameter. Chelicerae deep red-brown; promargin with three teeth, proximal tooth smallest, median tooth largest; median and distal teeth closest together; retromargin with two small subequal teeth, situated close to fang base. Legs all yellow-orange, slightly darker distally. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 1 do 2–3 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 2–3 do 0–1 rl 2 plv 2 rlv 1 vt 2, IV pl 1 rl 2 plv 2 rlv 2 vt 2; metatarsi:

I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 6 do 2 rl 5 plv 1 rlv 1 vt 2, IV pl 6 rl 5 plv 2 rlv 1 vt 2; palp: femora pl 1 do 2, patellae spineless, tibiae pl 3 rl 2, tarsus pl 3 do 1 rl 1 plv 1 rlv 1. Abdomen dark grey dorsally, with cream chevron markings (Fig. 2), cream laterally and ventrally; dorsum and venter lacking scutum or other sclerites. Female epigyne with broad semi-circular anterior hood (Fig. 54); copulatory openings anterolaterally situated, entering median ST 2; ST 1 oval, posteriorly situated, distinctly separated (Fig. 55).

Male. Measurements: CL 4.23, CW 2.98, FL 0.42, AL 4.35, AW 2.25, SL 2.33, SW 1.57, TL 8.98, AME–AME 0.12, AME–ALE 0.05, ALE–ALE 0.35, PME–PME 0.09, PME–PLE 0.16, PLE–PLE 0.65.

Length of leg segments (sequence from femur to tarsus, and total): I 3.18 + 1.78 + 2.45 + 1.95 + 1.18 = 10.54; II 3.00 + 1.68 + 2.25 + 1.90 + 1.20 = 10.03; III 2.58 + 1.30 + 1.53 + 2.01 + 1.08 = 8.50; IV 3.45 + 1.68 + 2.53 + 3.08 + 1.20 = 11.94.

Carapace deep orange-brown, paler along midline (Fig. 3); AER strongly procurved, laterals larger than medians; AME separated by distance equal to 1½ times their diameter, AME separated from ALE by distance equal to ¾ AME diameter; clypeus height equal to 2¼ AME diameter at AME, equal to ALE diameter at ALE; PER straight, laterals larger than medians; PME separated by distance equal to ¾ their diameter, PME separated from PLE by distance equal to 1½ times PME diameter. Chelicerae pale yellow-orange; promargin and retromargin with single small tooth; promarginal tooth larger, retromarginal tooth closer to fang base. Legs all yellow-orange, slightly paler distally. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 1 do 2 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 2 rl 2 plv 2 rlv 1 vt 2, IV pl 1 rl 2 plv 2 rlv 1 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 6 rl 4 plv 1 rlv 1 vt 2, IV pl 6 rl 5 plv 2 rlv 1 vt 2. Abdomen grey with cream chevron dorsally (Fig. 3), cream laterally and ventrally; small anterior dorsal scutum present, venter without any sclerites. Male palp with broad rounded prolateral tibial apophysis and simple triangular retrolateral tibial apophysis; median tegular apophysis hook-shaped; embolus curved in broad arc, with curved tooth-like prolateral and hook-like retrolateral projection on distal margin of embolus (Figs 56, 57); palpal spination: femora do 2, tarsi pl 1.

Type material: Holotype ♀, deposited in NMSA (examined): SOUTH AFRICA: *KwaZulu-Natal Province*, Bulwer [29°48'S, 29°45'E], V.1936, R.F. Lawrence (NMSA 120).

Additional material examined: SOUTH AFRICA: *KwaZulu-Natal Province*, Cathkin Peak [29°04'S, 29°21'E], 5800ft a.s.l., no further information, 1 sa ♂, 1 sa ♀ (NMSA 2161) [leg spination corresponds with other specimens]; Hilton, near Pietermaritzburg [29°33'S, 30°18'E], Grounds of St Anne's Diocesan School, 6.V.1991, P. Croeser & Members of Wildlife Club, 1 ♀ (NMSA 21892); Karkloof, 50km NNW of Pietermaritzburg, 29°26'S, 30°19'E, 4600ft a.s.l., 20.X.1985, C. Griswold, T. Griswold & J. Doyen (forest), 2 ♀ (NMSA 21893); Ndumeni forest, Cathedral Peak, 4800 ft a.s.l., 28°57'S, 29°12'E, 21-24.II.1984, C. Griswold & T. Meikle-Griswold, 1 ♂ (NMSA 21894); Pietermaritzburg [29°37'S, 30°22'E], Chase Valley, III. 1937, R.F. Lawrence, 1 sa ♀ (NMSA 1712) [leg spination corresponds with holotype].

Distribution. Known from the KwaZulu-Natal midlands and uKhahlamba-Drakensberg Mountains (Fig. 82).

Austrachelas kalaharinus n. sp.

(Figs 4, 58, 59)

Etymology. This species is named for the Kalahari Desert, which has its southernmost reaches near the type locality.

Diagnosis. This species is closely related to *A. sexoculata* n. sp., but the two species can be distinguished by the eight eyes of *A. kalaharinus* n. sp. (six in *A. sexoculata* n. sp.) and the presence of denticles on the retrolateral tibial apophysis of *A. kalaharinus* n. sp. (Fig. 58), which are absent in *A. sexoculata* n. sp..

Male. Measurements: CL 3.58, CW 2.58, FL 0.35, AL 3.60, AW 1.90, SL 2.00, SW 1.40, TL 7.20, AME–AME 0.07, AME–ALE 0.02, ALE–ALE 0.37, PME–PME 0.09, PME–PLE 0.12, PLE–PLE 0.54.

Length of leg segments (sequence from femur to tarsus, and total): I 2.45 + 1.37 + 1.83 + 1.40 + 0.90 = 7.95; II 2.35 + 1.35 + 1.70 + 1.33 + 0.85 = 7.58; III 2.00 + 1.03 + 1.13 + 1.48 + 0.73 = 6.37; IV 2.70 + 1.33 + 2.00 + 2.38 + 0.90 = 9.31.

Carapace uniform deep red-brown, black along margins (Fig. 4); AER strongly procurved, laterals slightly larger than medians; AME separated by distance equal to $\frac{1}{2}$ their diameter, AME nearly touching ALE, separated from ALE by distance equal to $\frac{1}{8}$ AME diameter; clypeus height equal to $1\frac{1}{2}$ times AME diameter at AME, equal to ALE diameter at ALE; PER straight, laterals slightly larger than medians; PME separated by distance equal to $\frac{1}{2}$ their diameter, PME separated from PLE by distance equal to PME diameter. Chelicerae deep red-brown, anterior surface with coarse ridges; promargin with four teeth, proximal tooth smallest, second tooth largest; large space before third and fourth teeth, close to fang base and intermediate in size; retromargin with single small denticle, situated close to third promarginal tooth. Legs all deep orange, slightly paler distally. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 1 do 2 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 2 rl 2 plv 2 rlv 1 vt 2, IV pl 1 rl 2 plv 2 rlv 2 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 6 rl 4 plv 1 rlv 1 vt 2, IV pl 6 rl 5 plv 2 rlv 1 vt 2. Abdomen grey with cream chevron dorsally (Fig. 4), cream laterally and ventrally; small anterior dorsal scutum present, venter without any sclerites. Male palp with broad spoon-shaped prolateral tibial apophysis and triangular retrolateral tibial apophysis with two denticles on inner margin; median tegular apophysis hook-shaped; embolus curved in broad arc, with tooth-like prolateral and hook-like retrolateral projections on outer margin of embolus (Figs 58, 59); palpal spination: femora do 2.

Type material: Holotype ♂: SOUTH AFRICA: *Free State Province*, near Kimberley, Farm “Benfontein” [28°53'S, 24°50'E], III.1981, S. Erasmus (pitfall traps) (NCA 2008/2763).

Distribution. Known only from the type locality (Fig. 82).

Austrachelas merwei n. sp.

(Figs 5, 6, 36–41, 60–63)

Diagnosis. Females of this species are recognised by the broad tongue-like anterior hood of the epigyne (Fig. 60), and males by the narrow RTA of the palp with a curved tip, and the distal margin of the embolus, with a single prolateral process (Figs 41, 62).

Etymology. Named for Marius van der Merwe, who collected all the known material of this species.

Female. Measurements: CL 2.15–3.17, CW 1.63–2.33, FL 0.18–0.33, AL 2.95–5.48, AW 1.60–2.75, SL 1.30–1.83, SW 1.05–1.30, TL 5.35–9.10, AME–AME 0.05, AME–ALE 0.04, ALE–ALE 0.29, PME–PME 0.07, PME–PLE 0.10, PLE–PLE 0.45.

Length of leg segments (sequence from femur to tarsus, and total): I 2.20 + 1.23 + 1.60 + 1.23 + 0.78 = 7.04; II 2.03 + 1.18 + 1.47 + 1.18 + 0.78 = 6.64; III 1.80 + 0.95 + 1.05 + 1.40 + 0.65 = 5.85; IV 2.40 + 1.25 + 1.87 + 2.03 + 0.93 = 8.48.

Carapace deep orange-brown, slightly paler along midline (Fig. 5); AER procurved, laterals slightly larger than medians; AME separated by distance equal to $\frac{1}{2}$ their diameter, AME separated from ALE by distance equal to $\frac{1}{2}$ AME diameter; clypeus height equal to $1\frac{1}{4}$ AME diameter at AME, equal to $\frac{2}{3}$ ALE diameter at ALE; PER very slightly recurved, nearly straight, laterals larger than medians (Fig. 36); PME separated by distance equal to $\frac{3}{4}$ their diameter, PME separated from PLE by distance equal to PME diameter. Chelicerae deep orange-brown; promargin with four teeth, second tooth largest, remaining teeth subequal in size; proximal and second teeth close together, separate from closely situated third and fourth teeth by small gap; retromargin with single small denticle, situated near third promarginal tooth. Legs all orange in colour, slightly darker distally. Leg spination: femora: I pl 1 do 1, II pl 1–2 do 1, III pl 2 do 2 rl 1, IV do 2 rl 1; patellae: spineless; tibiae: I & II spineless, III pl 2 rl 2 plv 2 rlv 1 vt 2, IV pl 2 rl 2 plv 2 rlv 2 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 5 rl 4 plv 1 rlv 1 vt 2, IV pl 6 rl 5 plv 2 rlv 2 vt 2; palp: femora do 2, patellae pl 1, tibiae pl 2 rl 2, tarsus pl 3 do 1 rl 2 plv 1 rlv 1. Abdomen pale grey

dorsally, with mottled pale grey chevron (Fig. 5), cream laterally and ventrally; dorsum and venter lacking scutum or other sclerites. Female epigyne with distinctive lateral hoods and tongue-like anterior hood (Figs 38, 60); copulatory openings anterolaterally situated, entering ST 2 via narrow entrance ducts; ST 2 anteriorly situated, oval with lateral oval expansions, with looping tube leading to large posteriorly situated ST 1 (Fig. 61).

Male. Measurements: CL 2.48–3.05, CW 1.83–2.23, FL 0.23–0.28, AL 3.20–3.65, AW 1.68–1.95, SL 1.43–1.57, SW 1.05–1.15, TL 5.80–6.83, AME–AME 0.06, AME–ALE 0.03, ALE–ALE 0.30, PME–PME 0.07, PME–PLE 0.09, PLE–PLE 0.47.

Length of leg segments (sequence from femur to tarsus, and total): I $2.30 + 1.23 + 1.78 + 1.18 + 0.87 = 7.36$; II $2.13 + 1.15 + 1.60 + 1.28 + 0.90 = 7.06$; III $1.78 + 0.90 + 1.10 + 1.43 + 0.73 = 5.94$; IV $2.43 + 1.15 + 1.78 + 2.13 + 0.93 = 8.42$.

Carapace uniform orange-brown, slightly paler along midline (Fig. 6); AER strongly procurved, laterals slightly larger than medians; AME separated by distance equal to $\frac{1}{2}$ their diameter, separated from ALE by distance equal to $\frac{1}{4}$ AME diameter; clypeus height equal to AME diameter at AME, equal to $\frac{3}{4}$ ALE diameter at ALE; PER very slightly recurved, nearly straight, laterals larger than medians (Fig. 39); PME separated by distance equal to $\frac{2}{3}$ their diameter, PME separated from PLE by distance equal to PME diameter. Chelicerae deep orange-brown; promargin with four teeth, proximal tooth smallest, second tooth largest, third and fourth teeth progressively smaller; retromargin with one small denticle, situated near third promarginal tooth. Legs all deep orange, paler yellow-orange distally. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 3 do 2 rl 2, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 2 rl 2 plv 2 rlv 1 vt 2, IV pl 2 rl 2 plv 2–3 rlv 2 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 5 rl 4 plv 1 rlv 1 vt 2, IV pl 6 rl 5 plv 2 rlv 1 vt 2. Abdomen grey with indistinct pale grey chevron dorsally (Fig. 6), cream laterally and ventrally; dorsum with small anterior scutum, venter without sclerites. Male palpal tibia with single triangular retrolateral apophysis with curved tip; median tegular apophysis broad, hook-like; embolus arc-shaped, with distinct distal angle, and single tooth-like prolateral embolar process (Figs 41, 62, 63); palpal spination: femora do 2.

Type material: Holotype ♀: SOUTH AFRICA: *KwaZulu-Natal Province*, Ngome State Forest, 27°49'S, 31°26'E, VIII.1992, M. van der Merwe (pitfall traps, dense forest) (NCA 94/448). Allotype ♂: same locality as Holotype, XII.1992, M. van der Merwe (pitfall traps, open forest) (NCA 94/398).

Paratypes: All from type locality, collected by M. van der Merwe using pitfall traps: Dense forest: III.1992, 1♂ (NCA 94/418); V.1992, 1♂ (NCA 94/411); V.1992, 1♂ (NCA 94/434); V.1992, 3♂ (NCA 94/446); VI.1992, 1♂ (NCA 94/397); VI.1992, 1♂ (NCA 94/419); XII.1992, 1♀ (NCA 94/405); Open forest: III.1992, 2♂ (NCA 94/423); IV.1992, 3♂ (NCA 94/427); IV.1992, 4♂ (NCA 94/429); IV.1992, 1♀ (NCA 2005/2033); V.1992, 1♂ (NCA 94/409); V.1992, 3♂ (NCA 94/428); VI.1992, 1♂ (NCA 94/44); VI.1992, 1♂ (NCA 94/400); VII.1992, 1♀ (NCA 94/435); IX.1992, 1♀ (NCA 94/447); X.1992, 1♀ (NCA 94/403); X.1992, 1♀ (NCA 94/444); X.1992, 1♂ (NCA 94/432); XI.1992, 1♀ (NCA 94/399); XI.1992, 1♀ (NCA 94/417); XII.1992, 1♀ (NCA 94/424).

Distribution. Known only from the type locality (Fig. 82).

Austrachelas natalensis Lawrence, 1942

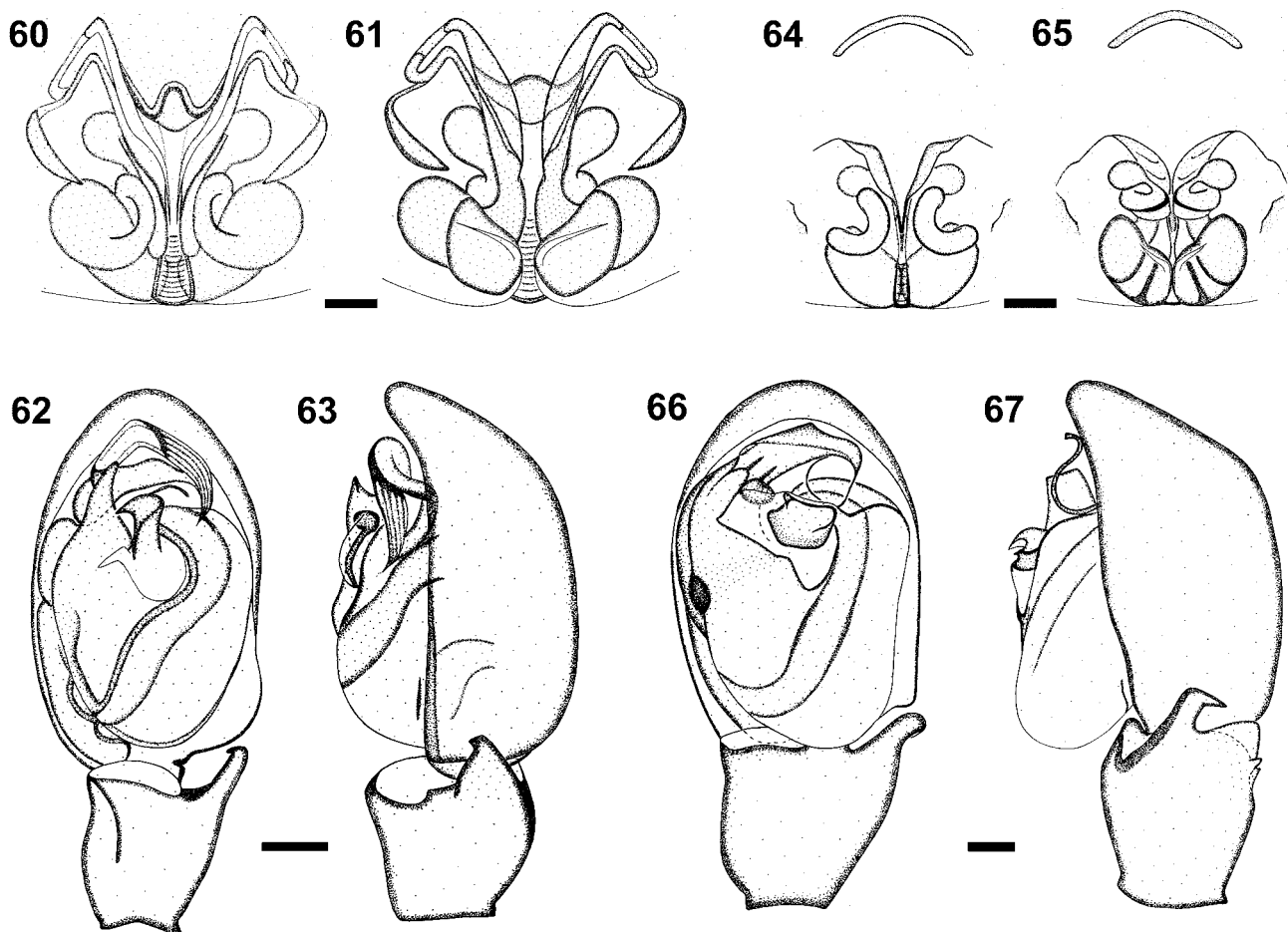
(Figs 7, 8, 64–67)

Austrachelas natalensis Lawrence, 1942: 175, fig. 24. (♀)

Diagnosis. Females of this species can be easily recognised by the broad fine anterior hood of the epigyne and the distinctive C-shaped spermathecal ducts, visible through the integument (Fig. 64); males can be recognised by the simple structure of the distal margin of the embolus, and the distinctly shaped lobes of the retrolateral tibial apophysis of the palp (Fig. 67).

Female. Measurements: CL 2.90–2.95, CW 2.00–2.07, FL 0.23–0.25, AL 3.45–3.95, AW 2.00–2.50, SL 1.65–1.70, SW 1.15–1.20, TL 6.15–6.95, AME–AME 0.05, AME–ALE 0.02, ALE–ALE 0.24, PME–PME 0.06, PME–PLE 0.08, PLE–PLE 0.38.

Length of leg segments (sequence from femur to tarsus, and total): I 1.83 + 1.13 + 1.40 + 0.93 + 0.60 = 5.89; II 1.77 + 1.07 + 1.28 + 1.00 + 0.63 = 5.75; III 1.45 + 0.80 + 0.90 + 1.15 + 0.63 = 4.93; IV 2.10 + 1.10 + 1.60 + 1.93 + 0.80 = 7.53.



FIGURES 60–67. Genitalic morphology of *Austrachelas* species. (60–63) *A. merwei* n. sp.: female epigyne, ventral view (60), dorsal view (61), male palp, ventral view (62), retrolateral view (63); (64–67) *A. natalensis* Lawrence, 1942: female epigyne, ventral view (64), dorsal view (65), male palp, ventral view (66), retrolateral view (67). Scale bars = 0.1mm.

Carapace yellow-brown, paler along midline (Fig. 7); AER strongly procurved, laterals larger than medians; AME separated by distance equal to $\frac{2}{3}$ their diameter, AME separated from ALE by distance equal to $\frac{1}{4}$ AME diameter; clypeus height equal to $1\frac{1}{4}$ times AME diameter at AME, equal to $\frac{2}{3}$ ALE diameter at ALE; PER very slightly recurved, nearly straight, laterals larger than medians; PME separated by distance equal to $\frac{2}{3}$ their diameter, PME separated from PLE by distance equal to PME diameter. Chelicerae deep red-brown; promargin with four equally spaced teeth; proximal tooth smallest, second tooth largest, third and distal teeth subequal in size; retromargin with single small tooth, situated at third promarginal tooth. Legs all uniform yellow-orange in colour. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 2 do 2 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 3 rl 2 plv 2 rlv 1 vt 2, IV pl 3 rl 2 plv 2 rlv 1 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 6 rl 4 plv 1 rlv 1 vt 2, IV pl 6 rl 5 plv 2 rlv 1 vt 2; palp: femora do 2, patellae spineless, tibiae pl 3 rl 2, tarsus pl 3 rl 2 plv 1 rlv 1. Abdomen grey dorsally, with cream chevron (Fig. 7), cream laterally and ventrally; dorsum and venter lacking scutum or other sclerites. Epigyne with broad anterior hood; copulatory openings anteriorly situated, entering

spermathecae through elongate entrance ducts (Fig. 64); ST 2 small, sharply bent, situated anteriorly; ST 2 connected by broad C-shaped duct to oval posterior ST 1 (Figs 64, 65).

Male. Measurements: CL 3.60–3.95, CW 2.70–2.88, FL 0.30–0.40, AL 3.35–3.65, AW 1.95–2.00, SL 2.00–2.10, SW 1.48–1.53, TL 6.90–7.65, AME–AME 0.04, AME–ALE 0.02, ALE–ALE 0.30, PME–PME 0.07, PME–PLE 0.10, PLE–PLE 0.48.

Length of leg segments (sequence from femur to tarsus, and total): I $2.48 + 1.48 + 1.80 + 1.43 + 1.00 = 8.19$; II $2.33 + 1.43 + 1.70 + 1.35 + 0.93 = 7.74$; III $1.97 + 1.08 + 1.15 + 1.53 + 0.83 = 6.56$; IV $2.80 + 1.43 + 2.03 + 2.27 + 1.05 = 9.58$.

Carapace deep orange-brown, paler along midline (Fig. 8); AER strongly procurved, laterals slightly larger than medians; AME separated by distance equal to $\frac{1}{3}$ their diameter, AME separated from ALE by distance equal to $\frac{1}{4}$ AME diameter; clypeus height equal to $1\frac{1}{4}$ AME diameter at AME, slightly less than ALE diameter at ALE; PER very slightly recurved, nearly straight, laterals larger than medians; PME separated by distance equal to $\frac{1}{2}$ their diameter, PME separated from PLE by distance equal to PME diameter. Chelicerae pale yellow-orange; promargin with three teeth, proximal tooth smallest, median tooth largest, closer to each other than to distal tooth; retromargin with single small tooth, similar in size to promarginal proximal tooth, closest to fang base of all teeth. Legs all yellow-brown, slightly darker distally. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 2 do 2 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 3 rl 2 plv 2 rlv 1 vt 2, IV pl 3 rl 2 plv 2 rlv 2 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 6 rl 4–5 plv 1 rlv 1 vt 2, IV pl 6 rl 5 plv 2 rlv 2 vt 2. Abdomen grey with paler grey chevron (Fig. 8), cream laterally and ventrally; dorsum with small anterior scutum, venter without any sclerites. Palp with broad median apophysis; embolus triangular along distal margin (Fig. 66); palpal tibia with hook-like ventral retrolateral apophysis, and lobed dorsal retrolateral apophysis with two small denticles (Fig. 67); palpal spination: femora do 2.

Type material: Holotype ♀, deposited in NMSA (examined): SOUTH AFRICA, *KwaZulu-Natal Province*, Estcourt [29°00'S, 29°52'E], X.1937, R.F. Lawrence (NMSA 1725).

Additional material examined: SOUTH AFRICA: *KwaZulu-Natal Province*, Durban, dunes north of Durban, 29°51'S, 31°01'E, 22.VII.2002, R. Jocqué (sieved litter), 1 ♀ (MRAC 212309); La Mercy [29°38'S, 31°08'E], 17.VI.1996, S. Beje (intercropping), 1 ♂ (NCA 97/632); Pietermaritzburg, Denison, Golf Road, 29°37'S, 30°23'E, 16–25.VII.1990, M. Alderweireldt & R. Jocqué (pitfall in grassy vegetation), 1 ♀ (MRAC 171737); Shongweni [29°51'S, 30°42'E], VII.1940, W.O. Rump, 1 ♀ (NMSA 2988); Umgeni Valley Nature Reserve, 29°29'S, 30°15'E, 22.IX.2003, C. Haddad (leaf litter at tree base), 1 ♂ (NCA 2006/1543).

Distribution. Known from the KwaZulu-Natal midlands and coastal regions (Fig. 82).

Austrachelas pondoensis n. sp.

(Figs 9, 10, 16–35, 42–49, 68–71)

Diagnosis. This is the largest species in the genus, and females can be easily distinguished by the shape of the anterior epigynal hood and the widely separated spermathecae (Figs 31, 68, 69); males can be recognised by the large partially hidden triangular lobe distally on the embolus and the denticulate retrolateral tibial apophysis (Figs 29, 70, 71).

Etymology. This species is named after the Pondoland region in the Eastern Cape Province, South Africa.

Female. Measurements: CL 5.18–6.05, CW 3.70–4.28, FL 0.40–0.48, AL 6.50–9.20, AW 3.10–5.13, SL 2.88–3.05, SW 2.00–2.27, TL 11.80–15.30, AME–AME 0.08, AME–ALE 0.04, ALE–ALE 0.60, PME–PME 0.10, PME–PLE 0.22, PLE–PLE 0.89.

Length of leg segments (sequence from femur to tarsus, and total): I $3.95 + 2.38 + 2.95 + 2.12 + 1.38 = 12.78$; II $3.50 + 2.10 + 2.58 + 2.05 + 1.28 = 11.51$; III $2.78 + 1.65 + 1.70 + 2.32 + 1.05 = 9.50$; IV $4.07 + 2.10 + 3.08 + 3.72 + 1.20 = 14.17$.

Carapace deep red-brown, slightly paler medially (Fig. 9); AER strongly procurved, laterals larger than medians; AME separated by distance equal to $\frac{1}{2}$ their diameter, AME separated from ALE by distance equal to $\frac{1}{4}$ AME diameter; clypeus height equal to $1\frac{1}{2}$ AME diameter at AME, equal to $\frac{1}{4}$ ALE diameter at ALE; PER straight, laterals larger than medians; PME separated by distance equal to $\frac{1}{2}$ their diameter, PME

separated from PLE by distance equal to $1\frac{1}{4}$ PME diameter. Chelicerae deep orange; promargin with three teeth, proximal tooth smallest, median tooth largest; proximal and median teeth closer to each other than to distal tooth; retromargin with two small denticles, situated either side of distal promarginal tooth. Legs all deep orange in colour, slightly paler distally. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 1 do 2 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 2 rl 2 plv 2 rlv 1 vt 2, IV pl 2 rl 2 plv 3 rlv 2 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 6 rl 5 plv 1 rlv 1 vt 2, IV pl 6 rl 6 plv 2 rlv 1 vt 2; palp: femora do 2, patellae spineless, with prominent pl 1 seta, tibiae pl 3 do 2, tarsus pl 3 do 2 rl 3 plv 1 rlv 1. Abdomen dark grey dorsally, with mottled pale grey chevron (Fig. 9), paler grey laterally and ventrally; dorsum and venter lacking scutum or other sclerites. Female epigyne with short narrow anterior hood and small lateral hoods (Figs 31, 68); copulatory openings laterally situated, entering ST 2 via narrow entrance ducts; ST 2 small, globose, connected broadly to widely separated elongate oval posterior ST 1 (Fig. 69).

Male. Measurements: CL 4.78, CW 3.58, FL 0.32, AL 5.30, AW 2.55, SL 2.60, SW 1.92, TL 10.32, AME–AME 0.10, AME–ALE 0.03, ALE–ALE 0.43, PME–PME 0.07, PME–PLE 0.14, PLE–PLE 0.63.

Length of leg segments (sequence from femur to tarsus, and total): I $3.30 + 1.88 + 2.65 + 2.15 + 1.25 = 11.23$; II $2.95 + 1.88 + 2.28 + 1.90 + 1.28 = 10.29$; III $2.48 + 1.38 + 1.50 + 2.05 + 1.08 = 8.49$; IV $3.40 + 1.70 + 2.55 + 3.30 + 1.25 = 12.20$.

Carapace deep wine-red (Fig. 10); AER strongly procurved, laterals slightly larger than medians; AME separated by distance equal to $\frac{1}{2}$ their diameter, separated from ALE by distance slightly smaller than $\frac{1}{4}$ AME diameter; clypeus height equal to $1\frac{1}{2}$ AME diameter at AME, equal to ALE diameter at ALE; PER straight, laterals larger than medians; PME separated by distance equal to $\frac{1}{2}$ their diameter, PME separated from PLE by distance equal to PME diameter. Chelicerae deep red-brown, anterior margin with coarse ridges; promargin with three teeth, median tooth largest and proximal tooth smallest; median and proximal teeth closest together; retromargin with two small teeth, situated either side of distal promarginal tooth. Legs all deep red, slightly paler orange-red distally. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 1 do 2 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 2 rl 2 plv 2 rlv 1 vt 2, IV pl 1 rl 2 plv 2 rlv 2 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 6 rl 6 plv 1 rlv 1 vt 2, IV pl 6 rl 6 plv 2 rlv 1 vt 2. Abdomen dark grey with pale grey chevron dorsally (Fig. 10), cream laterally and ventrally; dorsum with small anterior scutum, venter without sclerites. Male palpal tibia with curved retrolateral apophysis with three distinctive tooth-like apophyses along inner margin; median tegular apophysis broad, hook-like with blunt tip; embolus arc-shaped, with large triangular lobe partially hidden behind distal margin of embolus (Figs 70, 71); palpal spination: femora do 2.

Type material: Holotype ♀, deposited together with 1♂ and 7♀ paratypes: SOUTH AFRICA: *Eastern Cape Province*, Lusikisiki district, Mzimhlava River mouth, $31^{\circ}20'S$, $29^{\circ}40'E$, II.1980, M.E. Baddeley (coastal evergreen forest) (MRAC 163974).

Additional material examined: Same data as types, I.1980, 12♀ 1♂ (MRAC 159047, SEM preparations MJR-1031-1038, 1063-1065, temporary mount CJG-00154); I.1980, 1♂ (MRAC 166821, SEM preparations MJR-01039, MJR-01040, temporary mounts CJG-00155, CJG-00156).

Distribution. Known only from the type locality in Pondoland, Eastern Cape Province, South Africa (Fig. 82).

***Austrachelas reavelli* n. sp.**

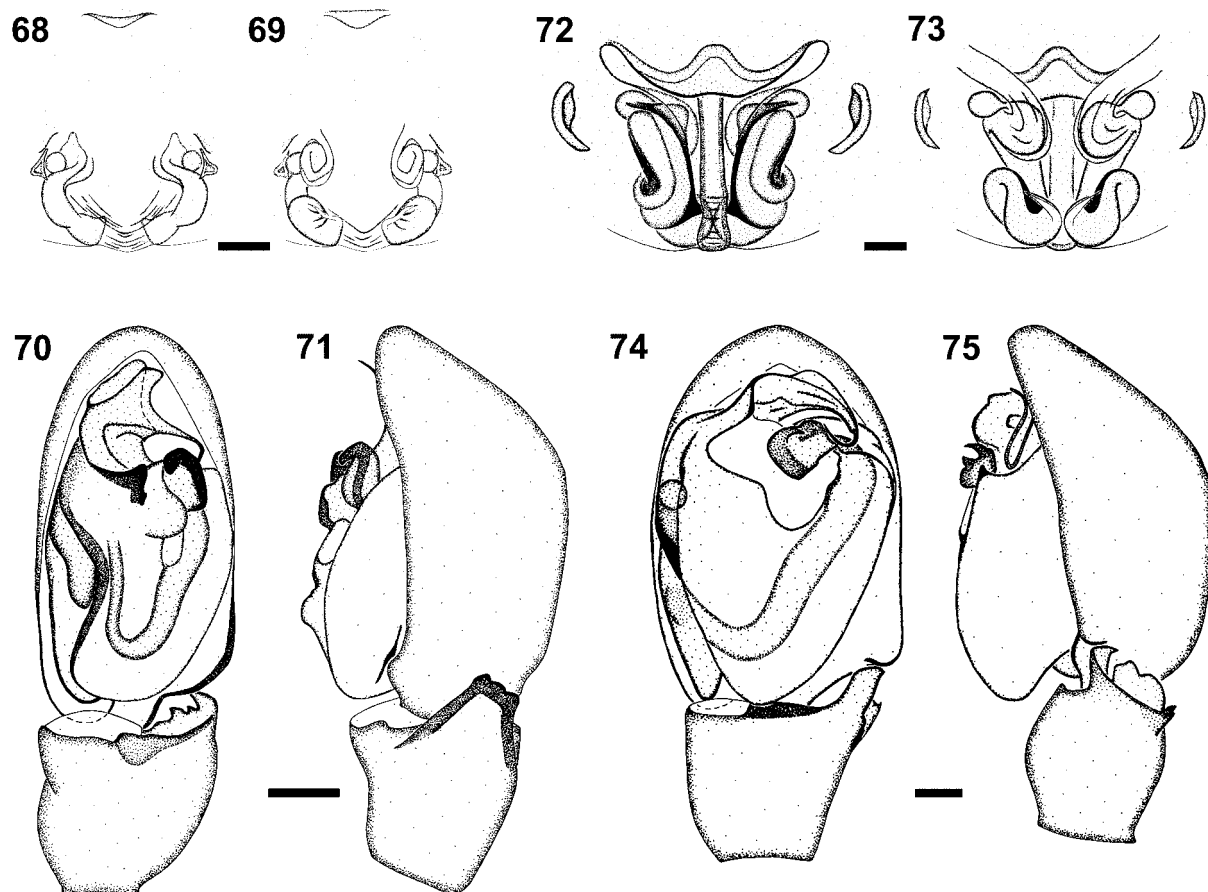
(Figs 11, 12, 72–75)

Diagnosis. Females of this species is can be distinguished by the very broad anterior hood and widely separated lateral hoods of the epigyne (far from the spermathecae), and the whirled ST 1 (Figs 72, 73); males can be recognised by the lobed projection along the distal margin of the male palp (Fig. 74) and the bifid lobe of the retrolateral tibial apophysis (Fig. 75).

Etymology. The species epithet is a patronym in honour of Peter Reavell, who collected the holotype, in recognition of the large quantity of valuable spider material that he has collected in South Africa, particularly from KwaZulu-Natal.

Female. Measurements: CL 3.30, CW 2.38, FL 0.32, AL 3.55, AW 2.10, SL 1.88, SW 1.40, TL 7.05, AME–AME 0.05, AME–ALE 0.02, ALE–ALE 0.29, PME–PME 0.05, PME–PLE 0.11, PLE–PLE 0.49.

Length of leg segments (sequence from femur to tarsus, and total): I 2.33 + 1.40 + 1.80 + 1.30 + 0.78 = 7.61; II 2.20 + 1.30 + 1.65 + 1.21 + 0.75 = 7.11; III 1.90 + 0.93 + 1.10 + 1.48 + 0.71 = 6.12; IV 2.55 + 1.20 + 1.90 + 2.38 + 0.90 = 8.93.



FIGURES 68–75. Genitalic morphology of *Austrachelas* species. (68–71) *A. pondoensis* n. sp.: female epigyne, ventral view (68), dorsal view (69), male palp, ventral view (70), retrolateral view (71); (72–75) *A. reavelli* n. sp.: female epigyne, ventral view (72), dorsal view (73), male palp, ventral view (74), retrolateral view (75). Scale bars = 0.1mm.

Carapace orange-brown, paler along midline (Fig. 11); AER strongly procurved, laterals larger than medians; AME separated by distance equal to $\frac{1}{2}$ their diameter, AME separated from ALE by distance equal to $\frac{1}{4}$ AME diameter; clypeus height equal to AME diameter at AME, equal to $\frac{1}{2}$ ALE diameter at ALE; PER straight, laterals larger than medians; PME separated by distance equal to $\frac{1}{2}$ their diameter, PME separated from PLE by distance equal to PME diameter. Chelicerae deep orange; promargin with three teeth, median tooth largest, proximal tooth smallest; teeth evenly spaced; retromargin with single small tooth, closest to fang base of all teeth. Legs all uniform yellow-orange in colour. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 2 do 3 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 2 rl 2 plv 2 rlv 1 vt 2, IV pl 3 rl 2 plv 2 rlv 2 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 6 rl 6 plv 1 rlv 1 vt 2, IV pl 6 rl 6 plv 2 rlv 1 vt 2; palp: femora do 2, patellae spineless, with prominent pl 1 rl 1 setae, tibiae pl 3 rl 2, tarsus pl 3 do 1 rl 2 plv 1 rlv 1. Abdomen grey dorsally with mottled pale grey chevron (Fig. 11), paler laterally and ventrally; dorsum and venter lacking scutum or other sclerites. Female epigyne with very broad anterior hood, lateral hoods widely separated from spermathecae (Fig. 72); copulatory openings anterolaterally situated, entering ST 2 broadly; ST 2 anteriorly situated, curved with small globular lateral extensions, connected broadly to whirled posterior ST 1 (Fig. 73).

Male. Measurements: CL 2.33, CW 1.72, FL 0.22, AL 2.23, AW 1.25, SL 1.38, SW 0.95, TL 4.70, AME–AME 0.05, AME–ALE 0.03, ALE–ALE 0.23, PME–PME 0.04, PME–PLE 0.07, PLE–PLE 0.34.

Length of leg segments (sequence from femur to tarsus, and total): I $1.70 + 0.95 + 1.20 + 0.90 + 0.70 = 5.45$; II $1.43 + 0.90 + 1.12 + 0.93 + 0.65 = 5.03$; III $1.30 + 0.70 + 0.75 + 1.03 + 0.55 = 4.33$; IV $1.85 + 0.93 + 1.40 + 1.65 + 0.73 = 6.56$.

Carapace orange-brown, yellow-orange along midline (Fig. 12); AER strongly procurved, laterals much larger than medians; AME separated by distance equal to $\frac{3}{4}$ their diameter, separated from ALE by distance equal to $\frac{1}{4}$ AME diameter; clypeus height equal to $\frac{1}{4}$ AME diameter at AME, equal to $\frac{1}{2}$ ALE diameter at ALE; PER very slightly recurved, nearly straight, laterals larger than medians; PME separated by distance equal to $\frac{1}{2}$ their diameter, PME separated from PLE by distance equal to PME diameter. Chelicerae deep orange-brown, anterior margin with coarse ridges; promargin with three evenly spaced teeth, proximal tooth largest and distal tooth smallest; retromargin with single small denticle, situated close to median promarginal tooth. Legs all yellow-orange, paler yellow distally. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 2 do 2 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 3 rl 2 plv 2 rlv 1 vt 2, IV pl 2 rl 2 plv 2 rlv 2 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 5 rl 4 plv 1 rlv 1 vt 2, IV pl 6 rl 5 plv 2 rlv 1 vt 2. Abdomen grey with paler mottling dorsally (Fig. 12), cream laterally and ventrally; dorsum with small anterior scutum, venter without sclerites. Male palp with broad, hook-like median apophysis; embolus arc-shaped, with slight lobe on distal margin of embolus (Fig. 74); palpal tibia with folded hook-like retrolateral apophysis with two small retrolateral dorsal tooth-like projections and bifid intermediate lobe (Fig. 75); palpal spination: femora do 2.

Type material: Holotype ♀: SOUTH AFRICA: *KwaZulu-Natal Province*, Zululand, Ngoye Forest, 2831DC, VIII.1981, P. Reavell (NMSA 14055). Allotype ♂: SOUTH AFRICA: *KwaZulu-Natal Province*, Hluhluwe-Imfolozi Park, 28°00'S, 31°43'E, 20.VI.2006, M. Mgobozi (pitfall traps) (NCA 2006/1352).

Distribution. Known from northern parts of KwaZulu-Natal, South Africa (Fig. 82).

Austrachelas sexoculata n. sp.

(Figs 13, 76, 77)

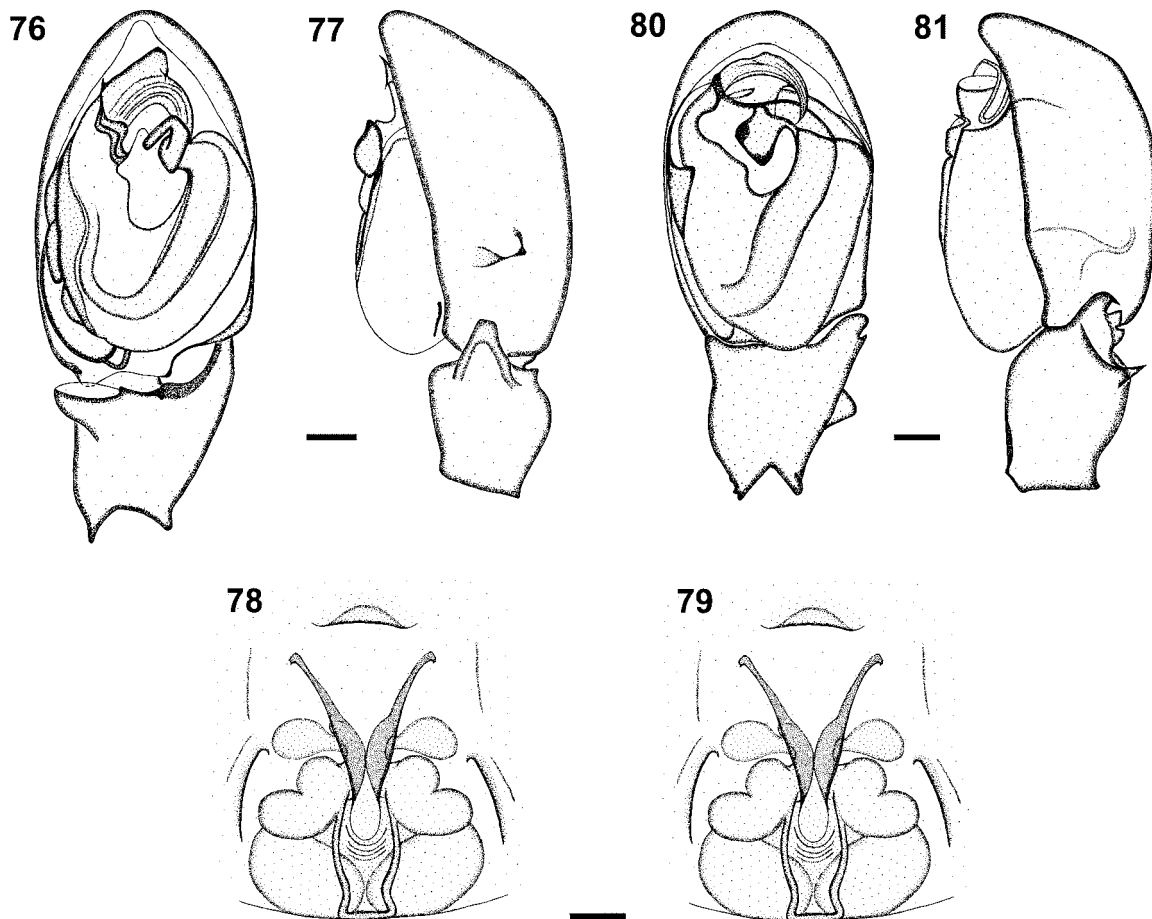
Diagnosis. This species is unique in the genus by the reduction and absence of the anterior median eyes.

Etymology. This species is named for the Latin “sex” (six) and “ocularis” (eyes), and reflects the presence of only six eyes and the absence of the anterior median eyes.

Male. Measurements: CL 4.43, CW 3.05, FL 0.45, AL 4.35, AW 2.50, SL 2.40, SW 1.60, TL 9.15, ALE–ALE 0.32, PME–PME 0.07, PME–PLE 0.12, PLE–PLE 0.58.

Length of leg segments (sequence from femur to tarsus, and total): I $3.20 + 1.75 + 2.30 + 1.80 + 1.05 = 10.10$; II $3.00 + 1.70 + 2.18 + 1.70 + 0.95 = 9.53$; III $2.55 + 1.28 + 1.48 + 1.82 + 0.92 = 8.05$; IV $3.43 + 1.70 + 2.43 + 3.00 + 1.12 = 11.68$.

Carapace deep red, paler along midline (Fig. 13); AME absent, ALE large, separated by distance equal to $1\frac{1}{2}$ times their diameter; clypeus height equal to $1\frac{1}{4}$ times ALE diameter; PER straight, laterals larger than medians; PME separated by distance equal to $\frac{3}{4}$ their diameter, PME separated from PLE by distance equal to $1\frac{1}{2}$ times PME diameter. Chelicerae deep red-brown, anterior margin with coarse ridges; promargin with three teeth, proximal and median teeth larger, subequal in size, closer to each other than to distal tooth; retromargin with single small denticle close to fang base. Legs all orange-brown, paler distally. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 1 do 2 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 2 rl 2 plv 2 rlv 1 vt 2, IV pl 2 rl 2 plv 2 rlv 2 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 6 rl 4 plv 1 rlv 1 vt 2, IV pl 5 rl 5 plv 2 rlv 1 vt 1. Abdomen dark grey dorsally (Fig. 13), cream laterally and ventrally; dorsum and venter lacking scutum or other sclerites. Palpal tibia with spoon-shaped prolateral ventral apophysis and simple triangular retrolateral apophysis; median tegular apophysis broad, hook-like; embolus arc-shaped, with small tooth-like projections prolaterally and retrolaterally on distal margin of embolus (Figs 76, 77); palpal spination: femora do 2.



FIGURES 76–81. Genitalic morphology of *Austrachelas* species. (76–77) *A. sexoculata* n. sp.: male palp, ventral view (76), retrolateral view (77); (78–81) *A. wassenaari* n. sp.: female epigyne, ventral view (78), dorsal view (79), male palp, ventral view (80), retrolateral view (81). Scale bars = 0.1mm.

Female: unknown.

Type material: Holotype ♂: SOUTH AFRICA: *Eastern Cape Province*, East London [33°02'S, 27°55'E], V.1916, Dr Rattray (AMG).

Distribution. Known only from the type locality (Fig. 82).

***Austrachelas wassenaari* n. sp.**

(Figs 14, 15, 78–81)

Diagnosis. This species is related to *A. natalensis* and females can be distinguished by the larger spermathecal structures and narrower anterior hood of the epigyne (Fig. 78), and males by the structure of the retrolateral tibial apophysis of the palp, with a sharp dorsal tooth (Fig. 81).

Etymology. This species is named after Theo Wassenaar, who collected many of the type specimens.

Female. Measurements: CL 2.87–3.10, CW 2.03–2.25, FL 0.28–0.38, AL 3.35–4.20, AW 1.63–2.18, SL 1.60–1.70, SW 1.18–1.28, TL 6.25–7.40, AME–AME 0.05, AME–ALE 0.03, ALE–ALE 0.28, PME–PME 0.05, PME–PLE 0.10, PLE–PLE 0.45.

Length of leg segments (sequence from femur to tarsus, and total): I 2.08 + 1.35 + 1.55 + 1.05 + 0.78 = 6.81; II 1.95 + 1.20 + 1.43 + 1.05 + 0.68 = 6.31; III 1.95 + 0.80 + 0.93 + 1.28 + 0.75 = 5.71; IV 2.35 + 1.20 + 1.78 + 2.15 + 0.88 = 8.36.

Carapace deep orange-brown, orange along midline (Fig. 14); AER strongly procurved, laterals larger than medians; AME separated by distance equal to $\frac{1}{2}$ their diameter, AME separated from ALE by distance equal to $\frac{1}{3}$ AME diameter; clypeus height equal to $\frac{1}{4}$ AME diameter at AME, equal to $\frac{2}{3}$ ALE diameter at ALE; PER very slightly recurved, nearly straight, laterals larger than medians; PME separated by distance equal to $\frac{1}{2}$ their diameter, PME separated from PLE by distance equal to PME diameter. Chelicerae deep orange; promargin with four evenly spaced teeth, proximal tooth smallest, second tooth largest, third and distal teeth intermediate in size, subequal in size; retromargin with single small denticle, situated near third promarginal tooth. Legs all yellow-orange in colour, paler distally. Leg spination: femora: I pl 1 do 1, II pl 1 do 1, III pl 2 do 2 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 3 rl 2 plv 2 rlv 1 vt 2, IV pl 3 rl 2 plv 2 rlv 2 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 6 rl 4 plv 1 rlv 1 vt 2, IV pl 6 rl 5 plv 2–3 rlv 1 vt 2; palp: femora do 2, patellae spineless, with prominent pl 1 do 2 setae, tibiae pl 4 rl 2, tarsus pl 3 rl 3 plv 1 rlv 1. Abdomen dark grey dorsally, with mottled pale grey chevron (Fig. 14), paler grey laterally and ventrally; dorsum and venter lacking scutum or other sclerites. Female epigyne with distinctive lateral hoods and narrow anterior hood (Fig. 78); copulatory openings anterolaterally situated, entrance ducts narrow, entering broad C-shaped ST 2 with anterolateral lobe, connected closely to large posteriorly situated oval ST 1 (Fig. 79).

Male. Measurements: CL 3.35–3.63, CW 2.48–2.83, FL 0.37–0.48, AL 2.95–3.40, AW 1.83–2.30, SL 1.80–2.00, SW 1.35–1.58, TL 6.15–7.30, AME–AME 0.05, AME–ALE 0.04, ALE–ALE 0.30, PME–PME 0.07, PME–PLE 0.11, PLE–PLE 0.51.

Length of leg segments (sequence from femur to tarsus, and total): I $2.60 + 1.45 + 2.00 + 1.45 + 0.98 = 8.48$; II $2.48 + 1.43 + 1.70 + 1.45 + 0.95 = 7.66$; III $2.10 + 1.13 + 1.25 + 1.65 + 0.85 = 6.98$; IV $2.83 + 1.40 + 2.15 + 2.68 + 1.10 = 10.16$.

Carapace deep wine-red, black around margins, paler along midline (Fig. 15); AER strongly procurved, laterals slightly larger than medians; AME separated by distance equal to $\frac{1}{2}$ their diameter, separated from ALE by distance equal to $\frac{1}{4}$ AME diameter; clypeus height equal to $\frac{1}{4}$ AME diameter at AME, equal to $\frac{3}{4}$ ALE diameter at ALE; PER very slightly recurved, nearly straight, laterals larger than medians; PME separated by distance equal to $\frac{2}{3}$ their diameter, PME separated from PLE by distance equal to PME diameter. Chelicerae deep red-brown, anterior margin with coarse ridges; promargin with two teeth, distal tooth largest and proximal tooth smallest; retromargin with two teeth, smaller than promarginal teeth, situated closer to fang base. Legs all deep orange-brown, paler orange distally. Leg spination: femora: I pl 1 do 1, II pl 1–2 do 2, III pl 2–7 do 3 rl 1, IV do 2; patellae: spineless; tibiae: I & II spineless, III pl 3 rl 2 plv 2 rlv 1 vt 2, IV pl 2 rl 2–3 plv 2 rlv 2 vt 2; metatarsi: I & II spineless, strongly scopulate, III & IV scopulate in distal half, III pl 6 rl 4–6 plv 1 rlv 1 vt 2, IV pl 6 rl 4–5 plv 2 rlv 1 vt 2. Abdomen dark grey with pale grey chevron dorsally (Fig. 15), cream laterally and ventrally; dorsum with small anterior scutum, venter without sclerites. Palpal median tegular apophysis broad, hook-like; embolus arc-shaped, distal margin of embolus without lobes or teeth (Fig. 80); palpal tibia with hook-like retrolateral apophysis with two closely associated pointed lobes and sharp dorsal tooth-like apophysis (Fig. 81); palpal spination: femora do 2.

Type material: Holotype ♀: SOUTH AFRICA: *KwaZulu-Natal Province*, Richards Bay, [28°43'S, 32°12'E], 26.VIII.1996, T. Wassenaar (pit traps) (NCA 97/110).

Paratypes: SOUTH AFRICA: *KwaZulu-Natal Province*, Richard's Bay, [28°43'S, 32°12'E], 18.VI.1996, T. Wassenaar (pitfall traps), 1♂ 2♀ (NCA 97/72); Same data, 29.VII.1996, 2♂ 1♀ (NCA 97/73); Greater St. Lucia Wetlands Park, Fanies Island, 28°32'S, 32°24'E, 21–25.VII.1990, M. Alderweireldt & R. Jocqué (pitfall, woodland edge with grass), 1♂ 2♀ (MRAC 171752).

Distribution. Known from northern coastal parts of KwaZulu-Natal, South Africa (Fig. 82).



FIGURE 82. Distribution of the genus *Austrachelas*, endemic to South Africa.

TABLE 2. Generic composition, distribution and most recent taxonomic treatments of the spider family Gallieniellidae.

Genus	Valid species	Distribution	Publications
<i>Austrachelas</i> Lawrence	9	South Africa	Current study
<i>Drassodella</i> Hewitt	7	South Africa	Tucker (1923)
<i>Gallieniella</i> Millot	4	Madagascar, Comores	Platnick (1984, 1995)
<i>Galianoella</i> Goloboff	1	Argentina	Goloboff (2000)
<i>Legendrena</i> Platnick	7	Madagascar	Platnick (1984, 1990, 1995)
<i>Meedo</i> Platnick	13	Australia	Platnick (2002)
<i>Neato</i> Platnick	7	Australia	Platnick (2002)
<i>Oreo</i> Platnick	5	Australia	Platnick (2002)
<i>Peeto</i> Platnick	1	Australia	Platnick (2002)
<i>Questo</i> Platnick	1	Australia	Platnick (2002)
<i>Toxoniella</i> Warui & Jocqué	2	Kenya	Warui & Jocqué (2002)

Discussion

The genus *Austrachelas* now comprises nine species endemic to South Africa. The species generally occur in moist savanna and forest habitats in the east and south-east of the country, with the exception of *A. kalaharinus* **n. sp.**, which occurs in dry *Acacia* savanna in central South Africa. Consistent with other Gallieniellidae, *Austrachelas* are ground-dwelling spiders that were captured mainly by pitfall trapping.

The somatic morphology of the genus is very stable, reflected in the results of the phylogenetic analysis (Fig. 50, Appendix 2). Male palpal morphology is also very conservative, and species can be separated primarily on small differences in the shape and position of the palpal median apophysis, embolic protuberances and shape of the retrolateral tibial apophysis. Females show more variation than males, particularly in the shape and position of the anterior and lateral epigynal hoods and spermathecal structures.

The phylogenetic analysis confirmed earlier suspicions (Lyle & Haddad 2006b) that *Austrachelas* is misplaced and should be transferred to Gallieniellidae. Several synapomorphic characters supporting its placement within the Gnaphosoidea include the depressed endites, oval flattened PME and the sclerotised ALS (Platnick 1984). Further, the “lower gnaphosoid” families have a small distal segment on the ALS, which is at least partly sclerotised (Platnick 2002), also found in *Austrachelas* (Figs 44, 47). The presence of two parallel rows of cylindrical gland spigots on the female PMS of *Austrachelas* (Fig. 48) is a characteristic shared by Gallieniellidae and Trochanteriidae within the “lower gnaphosoids” (Platnick 2002). In addition to the above, its placement within the Gallieniellidae is supported by the following synapomorphies: PME flattened, oval and smaller than PLE (Figs 36, 39), leg IV longer than leg I, and chelicerae with long, oblique fangs (Platnick 1984, 2002).

The relationships of *Austrachelas* within the Gallieniellidae are not yet fully resolved as not all of the known genera were included in our phylogenetic analysis. The genus may be the sister group of *Drassodella* + *Toxoniella*, which were suggested by Warui & Jocqué (2002) as possible sister taxa. *Austrachelas* shares with *Drassodella* the anterior and lateral epigynal hoods, the hook-like median apophysis on the male palp, the slightly angled chelicerae, and the short dorsal abdominal scutum in males. It differs from *Drassodella* in the eye arrangement (PER straight rather than slightly recurved), the densely scopulate anterior legs, the chevron-patterned abdomen (as opposed to stripes or spots), oval rather than shield-shaped sternum, and the modified RTA of the male palp (simple and triangular in *Drassodella*). Despite these morphological similarities, *Drassodella* branched as sister to a gallieniellid clade including the type genus *Gallieniella*, the Australian genera *Meedo* and *Neato*, and *Austrachelas* (Fig. 50). Clearly further studies are necessary to evaluate the phylogeny of the family as a whole.

The present study increases the generic complement of Gallieniellidae in the Afrotropical region to five, and the total family species richness worldwide beyond 50 species (Table 2). Recent taxonomic studies have reported the family for the first time from South America (Goloboff 2000) and Australia (Platnick 2002). Thus, the family has a distribution known mainly from the southern hemisphere across all continents.

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Appendix 1. List of material examined for the phylogenetic analysis, listed alphabetically according to their classification at the start of the current study. Abbreviations: (ex. C.H.)—examined by Charles Haddad; (ex. J.B.)—examined by Jan Bosselaers.

Corinnidae: Castianeirinae

- Cambalida coriacea* Simon, 1909 (ex. C.H.): SWAZILAND: Mbabane, XI.1964, R.F. Lawrence, 2♂ 5♀ (NMSA 9441).
Copa flavoplumosa Simon, 1885 (ex. C.H.): SOUTH AFRICA: *Western Cape Province*, De Hoop Nature Reserve, Potberg, 34°22.549'S, 20°32.004'E, 4.IV.2004, C. Haddad (sieving leaf litter), 16♂ 1♀ (NCA 2008/576).
C. lacustris Strand, 1916 (ex. C.H.): SOUTH AFRICA: *Gauteng Province*, Johannesburg, Sandton, 3.VIII.1997, N. Buckley, 1♀ (NCA 97/1030); *Free State Province*, Bloemfontein district, Deelhoek farm, 1.IX.2001, C. Haddad (under rocks in grassland), 1♂ (NCA 2002/492).
Medmassa semiaurantiaca Simon, 1910 (ex. C.H.): BOTSWANA: Okavango Delta, near Shakawe, Lesideng Research Camp, 18°25.822'S, 21°53.771'E, 26-29.XI.2006, C. Haddad (night collecting), 4imm. 3♂ (NCA 2007/995); Okavango Delta, Samochima Lagoon, Shakawe Fishing Camp, 18°25.749'S, 21°54.035'E, 10.XII.2006, C. Haddad (under tree bark), 1♀ (NCA 2007/1023).
Messapus martini Simon, 1897 (ex. C.H.): MOZAMBIQUE: Chidenguele, Paraiso de Chidenguele, 38m a.s.l., 24°57.276'S, 34°11.860'E, 16.XII.2007, C. Haddad, R. Lyle & R. Fourie (night collecting, dune forest), 1♀ (NCA 2008/200); SOUTH AFRICA: *KwaZulu-Natal*, Ndumo Game Reserve, Crocodile Farm, 26°54.426'S, 32°19.185'E, 17.I.2006, C. Haddad (on wall of house at night), 1♂ (NCA 2008/271).

Corinnidae: Corinninae

- Austrophaea zebra* Lawrence, 1952 (ex. C.H.): SOUTH AFRICA: *KwaZulu-Natal Province*, Port Edward, Blencantra Farm, 5 km NE of Port Edward, 31°02'S, 30°10'E, 335 m a.s.l., 6.IV.1983, J. Stannard (outside on paving bricks), 1♀ (NMSA); Pietermaritzburg, Lynnfield Park, III.1989, A.E. Whittington, 1♂ (NMSA 6865).
Brachyphaea castanea Simon, 1896 (ex. J.B.): KENYA: Amboseli National Park, 02°41'26"S, 37°13'13"E, 1140 m a.s.l., 15.VII.2007, J. Bosselaers (hand captured under stone), 1♂ 1♀ (PCJB2033).
B. hulli Lessert, 1921 (ex. C.H.): KENYA: Homa Bay Agricultural Research Centre, C. Midega (pitfall traps, maize fields), 1♂ 1♀ (NCA 2004/1337).
“*Medmassa*” *proxima* Lessert, 1923 (ex. J.B.): SOUTH AFRICA: *Eastern Cape Province*, East London, Pineapple Research Station, 33°01'S, 27°58'E, 1.XII.1981, G. Petty (pitfall traps in bush), 1♂ 1♀ (NCA 92/111).
Pronophaea natalica Simon, 1897 (ex. C.H.): SOUTH AFRICA: *Eastern Cape Province*, Kei Mouth, 12.XII.2002, C. Haddad (leaf litter at tree base), 4♂ 2♀ (NCA 2008/575).

Corinnidae: Phrurolithinae

- Hortipes aelurisiepae* Bosselaers & Jocqué, 2000 (ex. C.H.): SOUTH AFRICA: *KwaZulu-Natal Province*, Ndumo Game Reserve, Crocodile Farm, 26°54.426'S, 32°19.185'E, 30.VI.2003, C. Haddad (leaf litter, riverine bush), 1imm. 2♂ 1♀ (NCA 2008/578).
H. sceptrum Bosselaers & Jocqué, 2000 (ex. J.B.): CAMEROON: Mt Oku, 2350 m a.s.l., 8-15.III.1983, R. Bosmans (pitfall trap), 1♂ (MRAC); 2650 m a.s.l., 8.III.1983, R. Bosmans, 1♀ (MRAC).
Orthobula radiata Simon, 1897 (ex. C.H.): SOUTH AFRICA: *KwaZulu-Natal Province*, Umgeni Valley Nature Reserve, near Howick, 11.V.2003, C. Haddad (leaf litter, tree base), 2♂ 3♀ (NCA 2008/577).
Phrurolithus festivus (C.L. Koch, 1835) (ex. J.B.): BELGIUM: Antwerp Province, Beerse, Heide St. Jozef, 2-3.V.1997, J. Bosselaers (sifting litter in Calluna heath), 2♂ 4♀ (PCJB2009).

Corinnidae: Trachelinae

- Austrachelas* spp.: see material examined for each species (ex. C.H.).
Cetonana laticeps (Canestrini, 1868) (ex. J.B.): SPAIN: *Girona Province*, Baix Empordà, Els Angels, 485 m a.s.l., 6.IX.2008, J. Bosselaers (sifting litter in corkoak wood), 1♂ 1♀ (PCJB2053).
C. martini (Simon, 1897) (ex. C.H.): SOUTH AFRICA: *KwaZulu-Natal Province*, Greater St. Lucia Wetlands Park, Hell's Gate, 22.XI.2004, J. Esterhuizen (tsetse fly traps), 1♂ 2♀ (NCA 2005/224).
Spinotrachelas capensis Haddad, 2006 (ex. C.H.): SOUTH AFRICA: *Western Cape Province*, De Hoop Nature Reserve, Potberg, 34°22.549'S, 20°32.004'E, 24.III.2005, C. Haddad (under *Eucalyptus* bark), 1♂ (NCA 2005/2011); De Hoop Nature Reserve, Bitou No. 2, 34°27.194'S, 20°24.250'E, 25.IX.2006, C. Haddad (under rocks), 2♀ (NCA 2007/3884).
Thysanina serica Simon, 1910 (ex. C.H.): NAMIBIA, Omaruru River Mouth, 22°40'S, 14°31'E, 10.II.1969, B. Lamoral & R. Day, 1♂ 1♀ (NMSA).
T. similis Lyle & Haddad, 2006 (ex. C.H.): TANZANIA: Tanga, W Usambara Mountains, Mazumbai Station, 04°48.5'S, 38°30.0'E, 1500m a.s.l., 10-20.XI.1995, C.E. Griswold, N. Scharff & D. Ubick (around buildings), 1♂ (CAS);

Tanga, W Usambara Mountains, Amani Forest, 05°5.7'S, 38°38.0'E, 950m a.s.l., 27.X-9.XI.1995, C.E. Griswold, N. Scharff & D. Ubick, 3imm. 2♀ (CAS).

Trachelas schenkeli Lessert, 1923 (ex. C.H.): SOUTH AFRICA: *Mpumulanga Province*, Kruger National Park, Skukuza, Onder Sabie, 13.VIII.1991, S. Naser (on plant), 1♀ (NCA 2002/480); *KwaZulu-Natal Province*, Ithala Game Reserve, Doornkraal Camp, 27°30.735'S, 31°12.231'E, 29.VI.2007, R. Fourie & C. Haddad (beats, short shrubs), 2imm. 1♂ (NCA 2007/286).

T. canariensis Wunderlich, 1987 (ex. C.H.): SOUTH AFRICA: *Northern Cape Province*, Prieska District, Green Valley Nuts, 29°35'11"S, 22°56'41"E, 20.IX.2001, C. Haddad (under cut grass, ground covers, pistachio orchards), 1♂ 1♀ (NCA 2002/480).

T. minor O.P. Cambridge, 1872 (ex. J.B.): FRANCE: *Bouches-du-Rhône*, 13♂ 18♀ (MNHN 325).

T. rayi Simon, 1878 (ex. J.B.): SPAIN, FRANCE: (no data) 6♂ 43♀ (MNHN 1523).

T. validus Simon, 1884 (ex. J.B.): SPAIN: *Burgos*, Miranda de Ebro, 3♂ 1♀ (MNHN 5659).

Gallieniellidae

Drassodella melana Tucker, 1923 (ex. C.H.): SOUTH AFRICA: *KwaZulu-Natal Province*, Ngome State Forest, 27°49'S, 31°26'E, X.1992, M. van der Merwe (pitfall traps, open forest), 1♂ 1♀ (NCA 94/431).

D. tenebrosa Lawrence, 1938 (ex. C.H.): SOUTH AFRICA: *KwaZulu-Natal Province*, Pietermaritzburg, Town Bush, XII.1939, R.F. Lawrence, 2imm. 2♂ 2♀ (NMSA 2905).

Meedo broadwater Platnick, 2002 (ex. C.H.): AUSTRALIA: *Queensland*, Mount Gayndah, summit, 25°36'S, 151°32'E, 340m a.s.l., 27.I-2.VI.1999, Monteith & Thompson (pitfall, open forest), 1♂ (QMB S51126); Deepwater Creek, via Rosedale, 10m a.s.l., 6.V-24.VII.1975, G.B. & S.R. Monteith (pitfall, rainforest), 1♀ (QMB S73765).

M. gympie Plantick, 2002 (ex. C.H.): AUSTRALIA: *Queensland*, Yarraman, 518m a.s.l., 7.VII-10.XI.1974, G.B. & S.R. Monteith (pitfall, rainforest), 1♀ (QMB S73791); Mount Cottin, Scott's Dam, 27°36'S, 153°13'E, 120m a.s.l., 12.XII.1997-7.V.1998, G.B. Monteith (pitfall, rainforest), 1♂ (QMB S42480).

Neato beerwah Platnick, 2002 (ex. C.H.): AUSTRALIA: *Queensland*, Upper Brookfield, 27°30'S, 152°55'E, 23.IV.1981, V. Davies & R. Raven (litter, vine forest with *Auracaria*), 3♂ 1♀ (QMB S73906).

N. walli Platnick, 2002 (ex. C.H.): AUSTRALIA: *Queensland*, Lake Broadwater, via Dalby, 17.V-24.XI.1985, Queensland Museum & M. Bennie (pitfall traps), 1♀ (QMB S73910); *Victoria*, Warby Range State Park, 10km W of Wangaratta, 36°18'S, 146°11'E, 28.VII.2000, M. Scholes (pitfall traps, dry sclerophyll, old growth), 1♂ (QMB S54131).

Gallieniella jocquei Platnick, 1984 (ex. J.B.): COMOROS: Mohéli, Miringoni, Llang Llang plantations, Mango orchards and trees bordering plantation, 12°15'S, 43°45'E, 5-13.XI.1983, R. Jocqué (pitfall traps), 1♂ 1♀ (MRAC 160925).

Lamponidae

Asadipus kunderang Platnick, 2000 (ex. C.H.): AUSTRALIA: *Queensland*, Lords Table, base, east, open forest, 22°40'27"S, 148°01'30"E, 9.I-4.III.2006, R. Raven (pitfall traps), 2♂ 1♀ (QMB S80087).

Centroida lewis Platnick, 2000 (ex. C.H.): AUSTRALIA: *Queensland*, Head of Roots Ck, 12km WNW Mossman, 1200m a.s.l., 12-29.XII.1990, ANZSES Expedition, 1♀ (QMB S32414); Devils Thumb Area, 10km NW Mossman, 1000-1180m a.s.l., 10.X.1982, Monteith, Yeates & Thompson (pyrethrum knockdown, RF), 1♂ (QMB S26496).

Centrothele mutica (Simon, 1897) (ex. C.H.): AUSTRALIA: *Queensland*, Mount Glorious, 13.IV-26.V.1983, A. Hiller (Malaise trap), 1♂ (QMB S26511); Mount Tamborine, 10.VII.1974, V. Davies & R. Raven (beating), 2♀ (QMB S26503).

Graycassis chichester Platnick, 2000 (ex. C.H.): AUSTRALIA: *Queensland*, Palm Grove, Mount Tamborine, 670m a.s.l., 1974-1975, G.B. & S.R. Monteith (pitfalls, rainforest), 1♂ (QMB 28350); *New South Wales*, Victoria Park, via Alstonville, 16-26.XII.1974, C.B. & S.R. Monteith (pitfalls), 1♀ (QMB S31319).

Lampona murina L. Koch, 1873 (ex. C.H.): AUSTRALIA: *Queensland*, Rochedale, 1.III.1979, 1imm. 1♂ (QMB S28034); Brisbane, Stafford, 9.II.1968, A.N. Innes, 1♀ (QMB S25973).

Lamponella wyandotte Platnick, 2000 (ex. C.H.): AUSTRALIA: *Queensland*, Davies Creek National Park, 17°00'S, 145°34'E, 29.X.1991-23.VII.1992, P. Lawless, R. Raven & M. Shaw (pitfall traps), 1♂ (QMB S22741); Wyandotte Creek, 18°29'S, 144°55'E, 6.XI.1991-26.VII.1992, P. Lawless, R. Raven & M. Shaw (pitfall traps, dry *Eucalyptus* woodland), 3♀ (QMB S21784).

Gnaphosidae

Drassodes sesquidentatus Purcell, 1908: SOUTH AFRICA: *Northern Cape Province*, Prieska District, Green Valley Nuts, 29°35'11"S, 22°56'41"E, 2001-2002, C. Haddad (pitfalls, pistachio orchards), 6imm 2♂ 5♀ (PCCH).

Liocranidae

Agroeca brunnea (Blackwall, 1833) (ex. J.B.): BELGIUM: *Antwerp Province*, Beerse, De Schrieken, 11.XII.1994, J. Bosselaers (sifting litter in mixed wood), 1♂ (PCJB895); same locality, 22.IX.2005, J. Bosselaers (sifting litter in

mixed wood), 1♀ (PCJB2001).

Apostenus fuscus Westring, 1851 (ex. J.B.): BELGIUM: *West Flanders Province*, Kluisbergen, Kluisbos, 15.V.2007, H. De Koninck (pitfall traps in deciduous wood), 2♂ 2♀ (PCHD).

Rhaeboctesis transvaalensis Tucker, 1920 (ex. C.H.): SOUTH AFRICA: *Limpopo Province*, Springbokvlakte, Tuinplaas, Settlers (Wildskamp), 19.XII.2002, M. van Jaarsveld (pitfall traps, grass), 1♂ (NCA 2003/1333); Springbokvlakte, Settlers (Bekendevelei), 29.I.2003, M. van Jaarsveld (pitfall traps, grass), 1♀ (NCA 2003/1308).

R. secundus Tucker, 1920: SOUTH AFRICA (ex. C.H.): *Free State Province*, Florisbad Research Station, 2826Cc, XI.1985, Museum staff (pres. traps), 1imm. 8♂ 2♀ (NMBA 1114).

Scotina celans (Blackwall, 1841) (ex. J.B.): BELGIUM: *Namur Province*, Treignes, 19.X.2002, H. De Koninck (pitfall traps in chalk grassland), 3♂ 3♀ (PCHD).

Zoridae

Zora spinimana (Sundevall, 1833) (ex. J.B.): BELGIUM: *Limburg Province*, Zolder, Bolderberg, Gust Claesheide, 29.IX.1983, J. Bosselaers (hand capture in heathland), 2♂ 2♀ (PCJB0045).

Appendix 2. Character-taxon matrix.

	ci	ri	gfit
Steps	5	0.636	0.429
Neato walli	0	0	0
Neato beerwah	0	0	0
Meedo gympie	0	0	0
Meedo broadwater	2	0.125	0.176
Gallieniella jocquei	18	0.111	0.158
Brachyphaea castanea	12	0.167	0.231
Agroeca brunnea	12	0.167	0.231
Apostenus fuscus	12	0.167	0.231
Scotina celans	14	0.143	0.200
Phrurolithus festivus	11	0.182	0.250
Brachyphaea hulli	16	0.125	0.176
Hortipes sceptrum	20	0.100	0.143
Hortipes aelurisepae	16	0.125	0.176
Orthobula radiata	13	0.154	0.214
Austrachelas wassenaari	10	0.200	0.273
Austrachelas sexoculata	14	0.143	0.200
Austrachelas reavelli	2	0.500	0.750
Austrachelas pondoensis	2	0.500	0.750
Austrachelas natalensis	2	0.500	0.750
Austrachelas merwei	2	0.500	0.750
Austrachelas incertus	2	0.500	0.750
Asadipus kuderang	2	0.500	0.750
Centroina lewis	2	0.500	0.750
Lampona murina	2	0.500	0.750
Centrothele mutica	2	0.500	0.750
Lamponella wyandotte	2	0.500	0.750
Graycassis chichester	2	0.500	0.750
Drassodella tenebrosa	2	0.500	0.750
Drassodella melana	2	0.500	0.750
Rhaeboctesis trinotatus	2	0.500	0.750
Rhaeboctesis transvaalensis	2	0.500	0.750
Thysanina similis	2	0.500	0.750
Thysanina serica	2	0.500	0.750
Trachelas rayi	2	0.500	0.750
Trachelas validus	2	0.500	0.750
Trachelas minor	2	0.500	0.750
Trachelas canariensis	2	0.500	0.750
Trachelas schenkeli	2	0.500	0.750
Spinotrachelas capensis	2	0.500	0.750
Pronophaea natalica	2	0.500	0.750
Messapus martini	2	0.500	0.750
"Medmassa" proxima	2	0.500	0.750
Medmassa semiaurantiaca	2	0.500	0.750
Copa lacustris	2	0.500	0.750
Copa flavoplumosa	2	0.500	0.750
Cambalida coriacea	2	0.500	0.750
Cetonana laticeps	2	0.500	0.750
Cetonana martini	2	0.500	0.750
Austrophaea zebra	2	0.500	0.750
Drassodes sesquidentatus	2	0.500	0.750
Zora spinimana	2	0.500	0.750
Characters:	1	0	0
	2	0	0
	3	2	1
	4	1	2
	5	2	0
	6	2	1
	7	1	2
	8	2	0
	9	2	1
	10	1	2
	11	1	2
	12	2	1
	13	1	2
	14	1	2
	15	0	1
	16	0	1
	17	0	1
	18	1	0
	19	2	1
	20	1	2
	21	2	1
	22	0	1
	23	1	0
	24	1	0
	25	2	0
	26	0	0
	27	0	2
	28	0	2

