A new species of the genus *Shelfordia* Cameron (Hymenoptera: Braconidae) with very long ovipositor, from NE India

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A new species of the Indo-Australian genus *Shelfordia* Cameron, 1902, viz. *S longicaudata* spec. nov. from Sikkim (India) with an exceptionally long ovipositor is described and illustrated. The *Shelfordia*-group is not recognized, and the genus *Rostraulax* Quicke, 1984, is synonymized with *Shelfordia*.

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Introduction

Owing to the kindness of Drs D.L.J. Quicke (Sheffield) and F. Koch (Berlin) I received an aberrant species of the genus *Shelfordia* Cameron, 1902 (Braconidae: Braconinae) with an exceptionally long ovipositor (about six times length of fore wing), the scapus shortened ventrally (fig. 4), the head robust (figs 2, 3) and the medio-basal area of second metasomal tergite small (fig. 8). Nevertheless, it fits well in the genus *Shelfordia*, because these characters are rather variable among the species examined, except for the length of the ovipositor. So far the only species of *Shelfordia* known with similar long ovipositor is *S. ingentiseta* (Enderlein, 1920) from Sumatra. It differs from *S. longicaudata* spec. nov. by the completely black metasoma, the sculptured medio-basal area of second tergite, the long and densely black setose ovipositor sheath, the setae about as long as the sheath is wide and its apical quarter sparsely and whitish setose, the black propodeum, and yellowish apex of middle tibia and middle tarsus.

Quicke (1987: 96) distinguished three genera in the *Shelfordia*-group: *Rostraulax* Quicke, 1984, *Cratobracon* Cameron, 1901, and *Shelfordia*. However, the characters used to define the group do not suffice very well: the well-developed notauli (a plesiomorphy), the middle lobe of mesoscutum protruding strongly in front of lateral lobes (e.g. not in the type species of *Shelfordia*: fig. 34), the first metasomal tergite either with a well-developed mid-longitudinal carina anteriorly (only *Cratobracon*) or with more or less complete dorsal carinae (variable among *Shelfordia* species), the second metasomal tergite usually with an acute, striate medio-basal area or sometimes with a smooth triangular medio-basal area (fig. 8), and the apex of fore tibia without a row of distinctly thickened bristles (a common plesiomorphic feature among genera of Braconinae). Therefore, I prefer to accept the result of the phylogentic analysis by Quicke (1988); the genus *Shelfordia* does not cluster with the genus *Cratobracon* and is an early offshoot (after the Atanycoline genera) of the *Merinotus*-group s.l. (figs 2, 3 in Quicke, 1988). *Cratobracon* can be separated from similar genera

Table 1. List of species assigned to the genus *Shelfordia*.

Name	Type locality
S. ashmeadi (Cameron, 1903)	Malaysia (Sarawak)
S. basiplagiatus (Cameron & Strand, 1912) **comb. nov.**)	Indonesia (Java)
S. bispeculum (Enderlein, 1920)	Indonesia (Sumatra)
S. celebesiensis (Szépligeti, 1901)	Indonesia (Sulawesi-Minahassa)
S. charaxa (Cameron, 1897)	Malaysia (Borneo-?Sarawak)
S. cinereicauda (Fahringer, 1942) **comb. nov.**	Indonesia (Java)
S. combusta (Smith, 1860) **comb. nov.**	Indonesia (Sulawesi)
S. criniseta (Enderlein, 1920)	Indonesia (Sumatra)
S. distincticarinata (Cameron & Strand, 1912)	Indonesia (Java)
S. flagriseta (Enderlein, 1920)	Indonesia (Sumatra)
S. foveata (Smith, 1858)	Singapore
S. ingentiseta (Enderlein, 1920)	Indonesia (Sumatra)
S. khasiana (Cameron, 1897)	India (Khasia)
S. kuchingensis (Cameron, 1903) **comb. nov.**	Malaysia (Sarawak)
S. lineativentris (Cameron, 1907)	Malaysia (Sarawak)
S. longicauda spec. nov.	India (Sikkim)
S. luzonensis (Cameron & Strand, 1912)	Philippines (Luzon)
S. malaccaensis (Strand, 1912)	Malaysia (Malacca)
S. marginifoveatus (Cameron & Strand, 1912)	New Guinea
S. martini (Cameron & Strand, 1912) **comb. nov.**	Indonesia (Sumatra)
S. melancholica (Strand, 1911)	New Guinea (Kai Isl.)
S. pallidiceps (Cameron & Strand, 1912)	Indonesia (Timor)
S. patrous (Cameron, 1903) **comb. nov.**	Malaysia (Sarawak)
S. philippensis (Roman, 1913) **comb. nov.**	Philippines
S. quadricarinata (Enderlein, 1920)	Indonesia (Sumatra)
S. rimicunea (Enderlein, 1920)	Indonesia (Sumatra)
S. rubricaudis (Cameron & Strand, 1912) **comb. nov.**	Indonesia (Sulawesi)
S. rubritincta (Cameron & Strand, 1912)	Indonesia (Java)
S. ruficeps Cameron, 1902 (figs 25-37)	Malaysia (Sarawak)
S. rugifrons (Smith, 1858) **comb. nov.**	Malaysia (?Sarawak)
S. sadyates (Cameron, 1903) **comb. nov.**	Malaysia (?Sarawak)
S. shelfordi (Cameron, 1903) **comb. nov.**	Malaysia (Sarawak)
S. sibalangitensis (Cameron & Strand, 1912)	Indonesia (Sumatra)
S. sorana (Cameron, 1904)	Malaysia (?Sarawak)
S. sylea (Cameron, 1903)	Malaysia (Sarawak)
S. trichiotheca (Cameron, 1904)	Malaysia (Sarawak)

by the (anteriorly vertical and strongly protruding) middle lobe of the mesoscutum, the very long scapus, the antennal sockets (= toruli) almost touching each other and the frons setose and with a median groove. The remaining two genera (Quicke, 1984, 1987), *Rostraulax* and *Shelfordia* were separated because of the length of the very elongate labio-maxillary complex in *Rostraulax* (not elongate in *Shelfordia*), terminal two antennal segments usually partly fused (a variable character, even not suited to separate species) and the medio-longitudinal carina of first tergite only distinct on its posterior half (also in type species of *Shelfordia*: fig. 37). Thus only the length of the labio-maxillary complex remains for the differentiation of *Rostraulax*. I was unable to find any additional differences. Examination of the holotype of the type species of

Rostraulax (*R. vechti* Quicke, 1984) proved that the labio-maxillary complex is about 0.7 times as long as the height of the eye, which is normal for *Shelfordia* (figs 6, 27). For this reason I here synonymize *Rostraulax* Quicke, 1984, with *Shelfordia* Cameron, 1902 (**syn. nov.**).

Shelfordia is a medium-sized genus, of which a enumeration of the named species is given in table 1. The biology is unknown, but related genera are parasites of larvae of Cerambycidae and Buprestidae living in dead wood; e.g. *Cratobracon* has been reared from Cerambycidae (Quicke, in litt.).

For the terminology used in this paper, see van Achterberg, 1988: 5-11.

Systematics

Shelfordia Cameron, 1902

Shelfordia Cameron, 1902: 35-36; Shenefelt, 1978: 1721; Quicke, 1982: 227, 1983: 81-82, 1985a: 349, 1987: 130, 1988a: 77, 1988b: 125, 132; Quicke & van Achterberg, 1990: 253. Type species: *Shelfordia ruficeps* Cameron, 1902 (by monotypy; examined).

Schelfordia; Szépligeti, 1904: 45 (misspelling).

Sigalphogastra Cameron, 1903: 124; Shenefelt, 1978: 1722; Quicke, 1982: 227 (synonymized with *Shelfordia*), 1987: 130, 1988a: 77. Type species: *Sigalphogastra ashmeadi* Cameron, 1903 (by monotypy; examined).

Barthasis; Baltazar, 1972: 276; Quicke, 1982: 227 (as "*Bartharsis ruficeps*"; nom. nud.).

Rostraulax Quicke, 1984: 77-78, 1985a: 349, 1985b: 216, 1988a: 78, 1988b: 125, 132; Quicke & Koch, 1990: 222. **Syn. nov.** Type-species: *Rostraulax vechti* Quicke, 1984 (by original designation; examined).

Diagnosis.— First metasomal tergite with strongly elevated and comparatively narrow (about $^1/_3$ of maximum width of tergite) parallel-sided median area in posterior 0.7 of tergite and median area with angular sides (figs 8, 22, 37); median carina at least anteriorly absent and in lateral view tergite low anteriorly (fig. 27); dorsal carinae absent or present and protruding at margin of median area; basally tergite slightly concave. Vein 1r-m of hind wing shorter than vein SC+R1 or about of equal length (figs 1, 14, 25). Frons distinctly concave medially (figs 3, 29), with or without a shallow median groove. Clypeus elevated above face and may be more or less carinate dorsally (figs 2, 15, 30). Ovipositor far protruding, its upper valve slender and its lower valve with some minute teeeth (figs 13, 35). Tarsal claws simple (figs 10, 33). Second metasomal tergite with V-shaped area and with medio-basal area (figs 8, 22, 37), but the converging carinae laterally hardly or not developed in *Shelfordia* (figs 8, 37). Scapus medium-sized to rather elongate, its apex usually somewhat protruding ventrally (fig. 23), exceptionally dorsally longer (fig. 4); its inner side without secondary edge; scapus ventrally gradually narrowed (figs 4, 26). Face punctate or punctulate only (figs 2, 30), without rugae or carinae. Third metasomal tergite without complete antero-lateral grooves (fig. 27), and no transverse groove subapically. Angle between veins 1-SR and C+SC+R of fore wing less than 60° (figs 9, 24). Mesoscutum largely glabrous; notauli complete. Median carina or crest of propodeum distinct anteriorly, and connected to elliptical medial area (figs 16, 19) or absent, at most with a weak median ridge anteriorly and medial area absent, at most with a pair of carinae (figs 12, 34); metanotum with (nearly) complete median carina (fig. 19), with short median carina anteriorly (fig. 12) or carina absent; fifth tergite truncate or slightly concave posteriorly and smooth (fig. 27; ♀), or strongly convex

posteriorly and sculptured (fig. 16; ♂); second tergite more or less robust (figs 8, 22, 37).

Distribution.— Indo-Australian (mainly Oriental: table 1).

Shelfordia longicaudata spec. nov.
(figs. 1-13)

Material.— Holotype, ♀ (ZMB), "[India], Sikkim, coll. Bingham". Paratypes: 2 ♀♀ (ZMB, RMNH), topotypic.

Holotype, ♀, length of body 15.2 mm, of fore wing 14.5 mm.

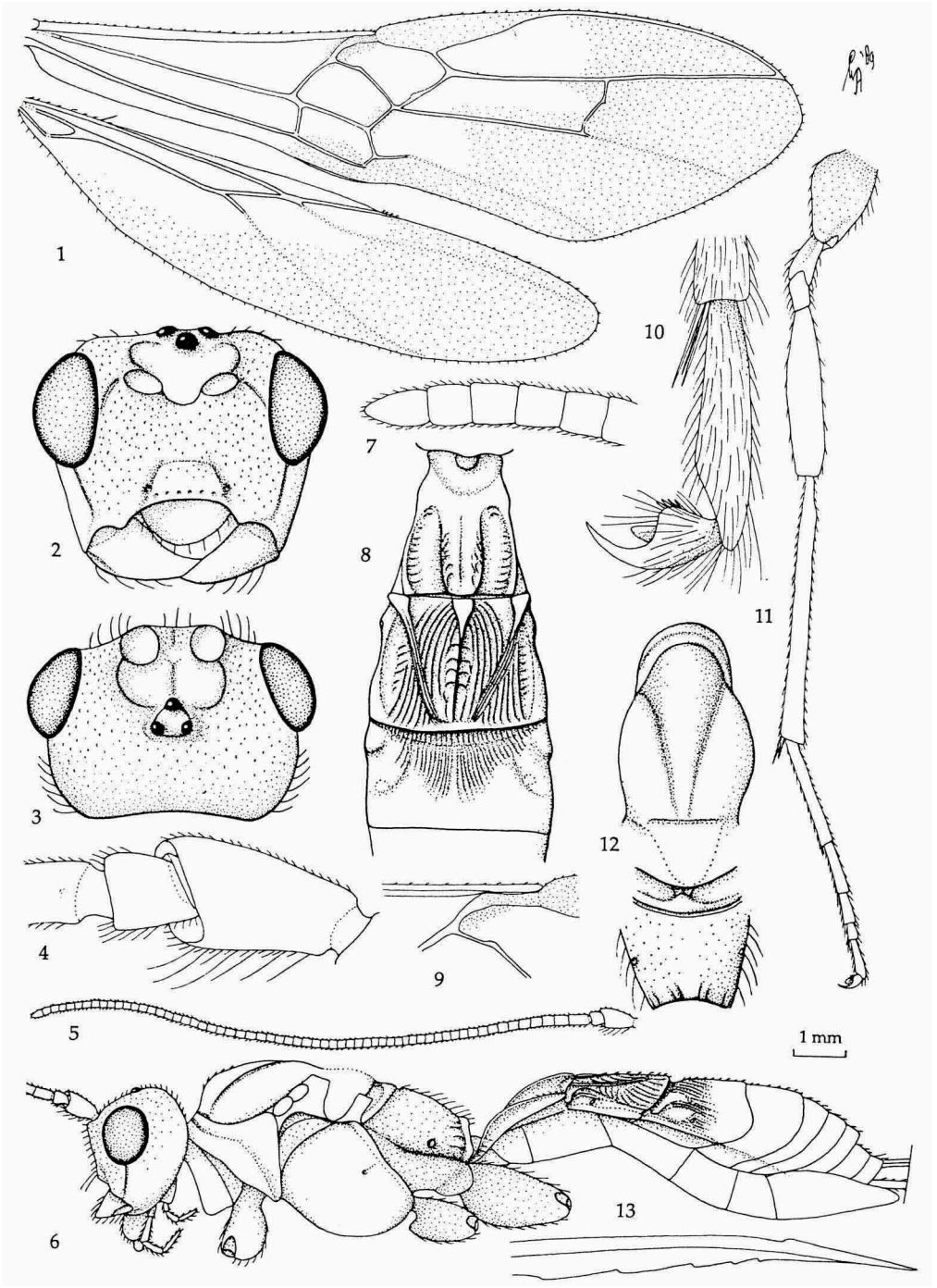
Head.— Antennal segments 61, length of third segment 1.7 times fourth segment, length of third, fourth and penultimate antennal segments 2.2, 1.3, and 1.0 times their width, respectively; scapus rather slender, its length 2.3 times its medial width (fig. 4), long setose ventrally, somewhat compressed, its outer apex subtruncate, dorsally somewhat longer than ventrally (fig. 4); length of maxillary palp 0.8 times height of head; labio-maxillary complex moderately protruding, about 0.7 height of eye (fig. 6); length of eye in dorsal view 1.1 times temple (fig. 3); temple subparallel-sided posteriorly; OOL:diameter of ocellus:POL = 31:6:7; frons with shallow median groove, distinctly concave, medially glabrous, and laterally distinctly punctate and setose (fig. 3); vertex convex and with some punctures; face flattened, coarsely punctate, its interspaces coriaceous, with curved groove to antennal sockets (fig. 2); clypeus flat, slightly elevated above plane of face, with subventral row of punctures and long setae, no dorsal carina and largely smooth (fig. 2); occipital flange rather narrow and protruding below base of mandible (fig. 6); length of malar space equal to basal width of mandible; mandible with longitudinal depression ventro-basally (fig. 6).

Mesosoma.— Length of mesosoma 1.6 times its height; episternal scrobe nearly absent, only as a small pit (fig. 6); metapleuron punctulate, its posterior part rather upcurved and large (fig. 6); middle lobe of mesoscutum rather truncate, strongly protruding in front of lateral lobes, convex as other lobes (fig. 12); scutellar sulcus narrow (fig. 12); metanotum with short median carina anteriorly (fig. 12); surface of propodeum long yellowish setose, punctulate and posteriorly with short crenulae, no median carina (fig. 12).

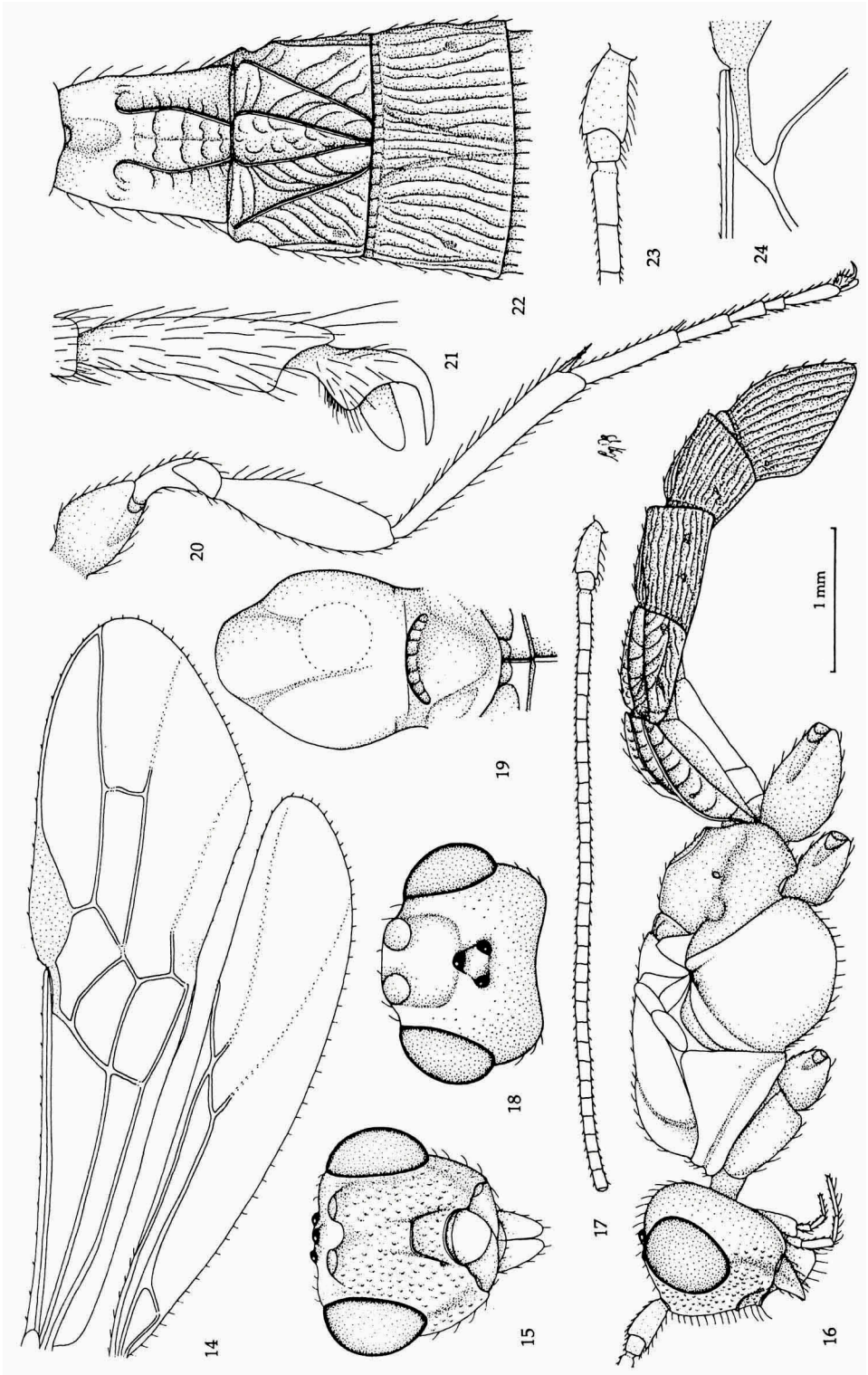
Wings.— Fore wing: r:3-SR:SR1 = 5:33:35; angle between 1-SR and C+SC+R 40° (fig. 9); 1-SR short and linear with 1-M (fig. 1); 1-M straight; cu-a long and straight, postfurcal (fig. 1); 1-CU1:2-CU1 = 1:7; 2-SR:3-SR:r-m = 22:66:23; r-m sinuate (fig. 1); 2-SR with widened part; base of 3-SR widened; second submarginal cell widened distally (fig. 1). Hind wing: 1r-m distinctly shorter than SC+R1 (fig. 1); area near cu-a sparsely setose.

Legs.— Hind coxa punctulate; all tarsal claws robust, basally pectinate and with some long setae (fig. 10); length of femur, tibia and basitarsus of hind leg 4.8, 11.6, and 7.5 times their width, respectively; length of hind tibial spurs 0.25 and 0.30 times hind basitarsus; tarsal bristles about 0.3 times as long as telotarsus (fig. 10).

Metasoma.— Length of first tergite 1.1 times its apical width, its surface largely smooth, elevated area posteriorly rugose, latero-posteriorly crenulate, slightly concave basally, dorso-lateral carinae complete and strong, dorsal carinae present in basal half of tergite, weak (fig. 8); second tergite with small triangular medio-basal



Figs 1-13, *Shelfordia longicaudata* spec. nov., ♀, holotype. 1, wings; 2, head, frontal aspect; 3, head, dorsal aspect; 4, scapus, outer lateral aspect; 5, antenna; 6, habitus, lateral aspect; 7, apex of antenna; 8, first-third metasomal tergites, dorsal aspect; 9, detail of vein 1-SR of fore wing; 10, outer hind claw; 11, hind leg; 12, mesosoma, dorsal aspect; 13, apex of ovipositor, lateral aspect. 1, 5, 6, 11: 1 × scale-line; 2, 3, 9: 2 ×; 4, 7, 10, 13: 6 ×; 8, 12: 1.6 ×.



Figs 14-24, *Sigaphogastra ashmeadi* Cameron, ♂, holotype. 14, wings; 15, head, frontal aspect; 16, habitus, lateral aspect; 17, antenna; 18, head, dorsal aspect; 19, mesosoma, dorsal aspect; 20, hind leg; 21, inner hind claw; 22, first-third metasomal tergites, dorsal aspect; 23, base of antenna, outer lateral aspect; 24, detail of vein 1-SR of fore wing. 14, 16, 17, 20: 1 × scale-line; 15, 18, 19, 22-24: 1.7 ×; 21: 5 ×.

Figs 25-37, *Shelfordia ruficeps* Cameron, ♀, lectotype. 25, wings; 26, scapus and pedicellus, outer lateral aspect; 27, habitus, lateral aspect; 28, ovipositor; 29, head, dorsal aspect; 30, head, frontal aspect; 31, detail of vein 1-SR of fore wing; 32, hind leg; 33, outer fore claw; 34, mesosoma, dorsal aspect; 35, apex of ovipositor, lateral aspect; 36, postero-basal part of hind wing; 37, first-third metasomal tergites, dorsal aspect. 25, 27, 28, 32: 1 × scale-line; 26, 33: 5 ×; 29-31, 35, 36: 2 ×; 34, 37: 1.5 ×.

area, connected to median carina, surrounded by curved carinae, which are surrounded by posteriorly converging band of striae, with lateral triangle rather depressed and rugose (fig. 8); second suture deep, wide and crenulate medially and narrow laterally (fig. 8); third tergite largely smooth, but medio-basally striate, with shallow lateral depressions (fig. 8), distinctly protruding postero-laterally (fig. 6); second and third tergites with sharp lateral crease; remainder of metasoma smooth and without antero-lateral depressions, apical tergites not depressed, with apical cleft; length of ovipositor sheath 6.62 times fore wing, normally setose (but apex missing); hypopygium large (fig. 6).

Colour.— Black; scapus, palpi, head, tegulae, mesosoma (darker than head, propodeum black apically), fore leg (except infuscate telotarsus), middle leg (except dark brown apex of tibia and tarsus), pterostigma and veins yellowish-brown; membranous ventral parts of metasoma pale yellowish; pedicellus and parastigma dark brown; apical 0.4 of wing membrane (and hind wing also posteriorly) and vein m-cu of fore wing largely dark brown (fig. 1), remaining parts yellowish; V-shaped area of second tergite and median line on third tergite reddish-brown.

Variation.— Length of fore wing 14.0-14.7 mm, of body 15.2-16.7 mm; length of ovipositor sheath 6.3-7.0 times fore wing; streak on outer side of scapus may be dark brown; third tergite may be less protruding postero-laterally than in holotype; setosity of ovipositor sheath black basally and rather greyish subapically.

Note.— This new species is directly separable from other species of *Shelfordia* by its extremely long ovipositor, the third tergite protruding postero-laterally (fig. 6), the clypeus not distinctly separated from face (fig. 2), vein cu-a of fore wing distinctly postfurcal, vein 1r-m of hind wing straight (fig. 1), vein r-m of fore wing sinuate (fig. 1), the flange over the base of the hind coxa large (fig. 6), the ovipositor sheath moderately setose and the second submarginal cell of fore wing widened distally (fig. 1). Despite the many differences, these character states are not enough for separation as a genus because of the observed variation among species of *Shelfordia*.

Acknowledgements and abbreviations

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