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The pholcid spiders from Sri Lanka: redescription of *Pholcus ceylonicus* and description of a new genus (Araneae: Pholcidae)

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Abstract

The pholcid spiders of Sri Lanka have never been revised in any detail. Most species previously known from the island are widespread synanthropics. However, recent collecting has revealed a rich native fauna, with new taxa at species and genus levels. In this paper we redescribe *Pholcus ceylonicus* O. Pickard-Cambridge, 1869, present the first record of *Modisimus culicinus* (Simon, 1893) for Sri Lanka, and describe two new species of a new genus, *Wanniyala agrabopath* n. sp. and *Wanniyala hakgala* n. sp. Both new species appear to be restricted to relatively undisturbed forests, where they inhabit the leaf-litter. Several new Sri Lankan species tentatively assigned to *Belisana* Thorell will be described in a forthcoming revision of that genus. These studies suggest that a rich pholcid fauna may await discovery in Sri Lanka.

Keywords: Araneae, biodiversity, new genus, new species, Pholcidae, *Pholcus ceylonicus*, Sri Lanka, taxonomy, Wanniyala

Introduction

Sri Lanka, together with the Western Ghats of southern India, is considered one of the global biodiversity hotspots (Myers et al. 2000). However, the diversity of the invertebrate fauna has never been assessed. In this study we consider the pholcid spiders of Sri Lanka. Of the seven species previously recorded for the island, only two are native (Table I; *Pholcus ceylonicus*; *P. fragillimus*), the other five are widespread synanthropics (*Artema atlanta*, *Crossopriza lyoni*, *Holocneminus multiguttatus*, *Micropholcus fauroti*, *Smeringopus pallidus*). However, as in other groups of spiders and vertebrates (Pethiyagoda 1994; Meegaskumbura et al. 2002; Benjamin 2004), recent collecting has revealed a diverse native fauna, at the level of both genera and species. This paper is the first in a projected series to treat this material. It provides a detailed redescription of *Pholcus ceylonicus*, including the first SEM photos of this species, and descriptions of two species of a new genus. This new genus is presently known from Sri Lanka only. However, as the fauna of

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Table I. Pholcid species recorded in Sri Lanka, with references.

Species	References
Synanthropic	
<i>Artema atlanta</i> Walckenaer, 1837	Karsch 1891; Saaristo 2001
<i>Crossopriza lyoni</i> (Blackwall, 1867)	Huber et al. 1999
<i>Smeringopus pallidus</i> (Blackwall, 1858)	O. Pickard-Cambridge 1869; Karsch 1891; Sherriffs 1919
<i>Holocnemius multiguttatus</i> (Simon, 1905)	Deeleman-Reinhold 1995
<i>Micropholcus fauroti</i> (Simon, 1887)	Saaristo 2001
<i>Modisimus culicinus</i> (Simon, 1893)	New record: Sri Lanka: Sabaragamuwa Prov., Ratnapura Distr., rainforest near Ratnapura, 1♀, no date (G. Schmidt), in Senckenberg Museum, Frankfurt
Probably native	
<i>Pholcus ceylonicus</i> O. Pickard Cambridge, 1869	O. Pickard-Cambridge 1869; Brignoli 1972; herein
<i>Pholcus fragillimus</i> Strand, 1907	Strand 1907
<i>Pholcus</i> sp. (cf. <i>opilionoides</i> ; = <i>fragillimus</i> ?)	Unpublished data
<i>Pholcus</i> (<i>Leptopholcus</i> ?) sp.	Unpublished data
<i>Pehrforsskalia</i> ? sp.	Unpublished data
<i>Wanniyala agrabopath</i> n. sp.	Herein
<i>Wanniyala hakgala</i> n. sp.	Herein
<i>Wanniyala</i> sp.	Unpublished data
<i>Belisana</i> sp. 1	Unpublished data
<i>Belisana</i> sp. 2	Unpublished data
<i>Belisana</i> sp. 3	Unpublished data
<i>Belisana</i> sp. 4	Unpublished data

the island is closely related to that of the Western Ghats (Lehtinen 1980; Meegaskumbura et al. 2002; Benjamin 2004) we assume that further *Wanniyala* species may occur there.

Several new Sri Lankan species tentatively assigned to *Belisana* Thorell will be described in a forthcoming revision of that genus. Further species with uncertain generic affinities (similar to *Leptopholcus* Simon and *Pehrforsskalia* Deeleman-Reinhold and van Harten) are currently represented by females only and will be described as soon as males are available. The type material of *Pholcus fragillimus* has probably been destroyed in Stuttgart during the Second World War (see Benjamin 2001), and only one female is available to us that might belong to that species. This study suggests that a rich pholcid fauna may await discovery in Sri Lanka. Intensified collecting and study, coupled with measures to protect the remaining forest fragments, are obviously the most important next steps.

Taxonomy

Style of descriptions is as in Huber (2000). Measurements are in mm unless indicated otherwise. The material studied is deposited in the collections of the Muséum d'Histoire Naturelle, Genève (MHNG), Muséum National d'Histoire Naturelle, Paris (MNHN), Collection C. L. Deeleman-Reinhold, deposited in the National Museum of Natural History, Naturalis, Leiden (RMNH), and Museum of Zoology, Turku (MZT).

Pholcus ceylonicus O. Pickard-Cambridge, 1869 (Figures 1–4)

P. ceylonicus O. Pickard-Cambridge 1869, p 378–379; Plate 11, Figures 13, 21–27; Brignoli 1972, p 909–911; Figures 1–2, 4–7; Brignoli 1975, p 36; Figure 2f (copied from Brignoli 1972).

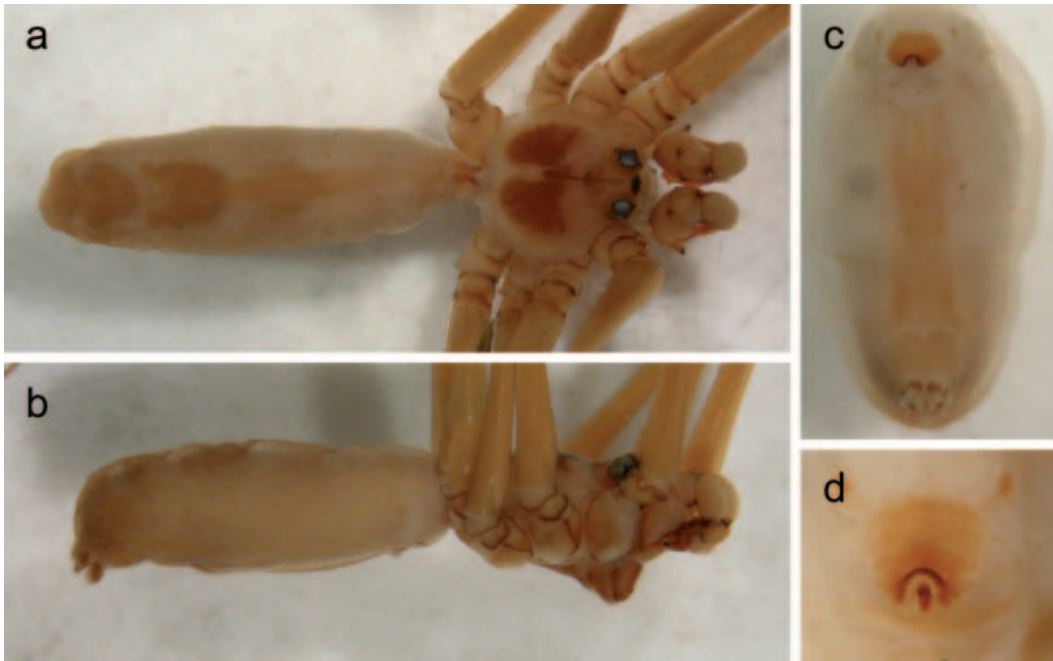


Figure 1. *Pholcus ceylonicus*. (a, b) Male habitus, dorsal and lateral views; (c) female abdomen, ventral view; (d) epigynum, ventral view.

Types

Male lectotype and two female paralectotypes (designated by Brignoli 1972), without locality information except Sri Lanka, in Hope Department of Entomology, Oxford, not examined (see Brignoli 1972 for detailed information on the type material).

Diagnosis

Large eight-eyed pholcid, easily distinguished from all known congeners by the shapes of procurus, bulb, male palpal trochanter apophysis, and epigynum (Figure 2b, e).

Male (Istripura). Total length 7.3, carapace width 2.0. Leg 1: 50.4 (12.2+0.9+12.3+21.9+3.1), tibia 2: 8.7, tibia 3 missing, tibia 4: 7.9; tibia 1 L/d: 63. Habitus as in Figure 1a, b. Carapace pale ochre with distinctive brown marks, ocular area also light brown, clypeus pale ochre, sternum pale ochre with light brown median mark, labium light brown; legs light brown, tips of femora and tibiae lighter; abdomen mostly grey, dorsally with distinctive brown pattern (barely visible in Figure 1a), genital area small brown mark, ventrally posteriorly light brown. Ocular area distinctly elevated, lateral triads not on stalks, black median line on carapace but no thoracic furrow; distance PME–PME 290 μ m; diameter PME 190 μ m; distance PME–ALE 50 μ m; distance AME–AME 60 μ m, diameter AME 80 μ m. Clypeus unmodified. Sternum wider than long (1.3/1.1). Chelicerae as in Figure 2d, with two small modified hairs on each distal apophysis (Figure 4b), proximal apophyses in unusual frontal position (Figure 2d). Palps as in Figures 2a, b, 3a, b; coxa

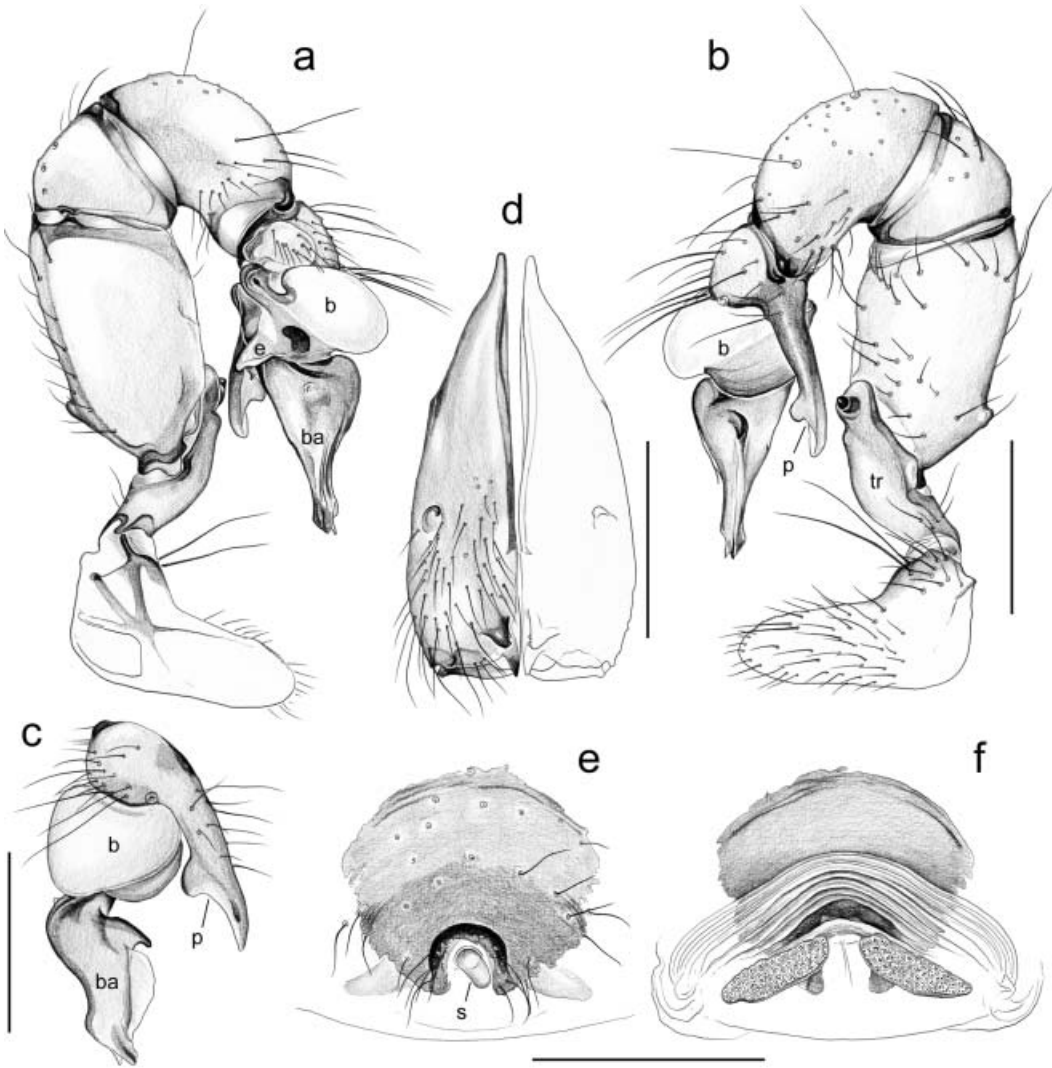


Figure 2. *Pholcus ceylonicus*. (a, b) Left male palp, prolateral and retrolateral views; (c) procurus and genital bulb, dorsal view; (d) male chelicerae, frontal view; (e, f) cleared epigynum, ventral and dorsal views. b, genital bulb; ba, bulbal apophysis; e, embolus; p, procurus; s, scape; tr, trochanter. Scale bars: 0.5 mm.

unmodified, trochanter with large retrolateral apophysis provided distally with strong modified hair (Figure 3e, f), femur large, with dorsal projection, procurus rather small and simple (Figures 2b, 3a, b), bulb with whitish globular part and large apophysis (Figures 2a–c, 3a–d), transparent conical projection prolaterally (embolus?) (Figure 2a). Palpal tarsal organ capsulate (Figure 4c). Retrolateral trichobothrium of tibia 1 at 5%; most hairs on legs missing, but apparently without spines, curved hairs, and vertical hairs; tarsus 1 with >20 pseudosegments, only distally about 10 fairly distinct. Male gonopore apparently with four epiandrous spigots (Figure 4a; note that the gonopore of this specimen is malformed or damaged).

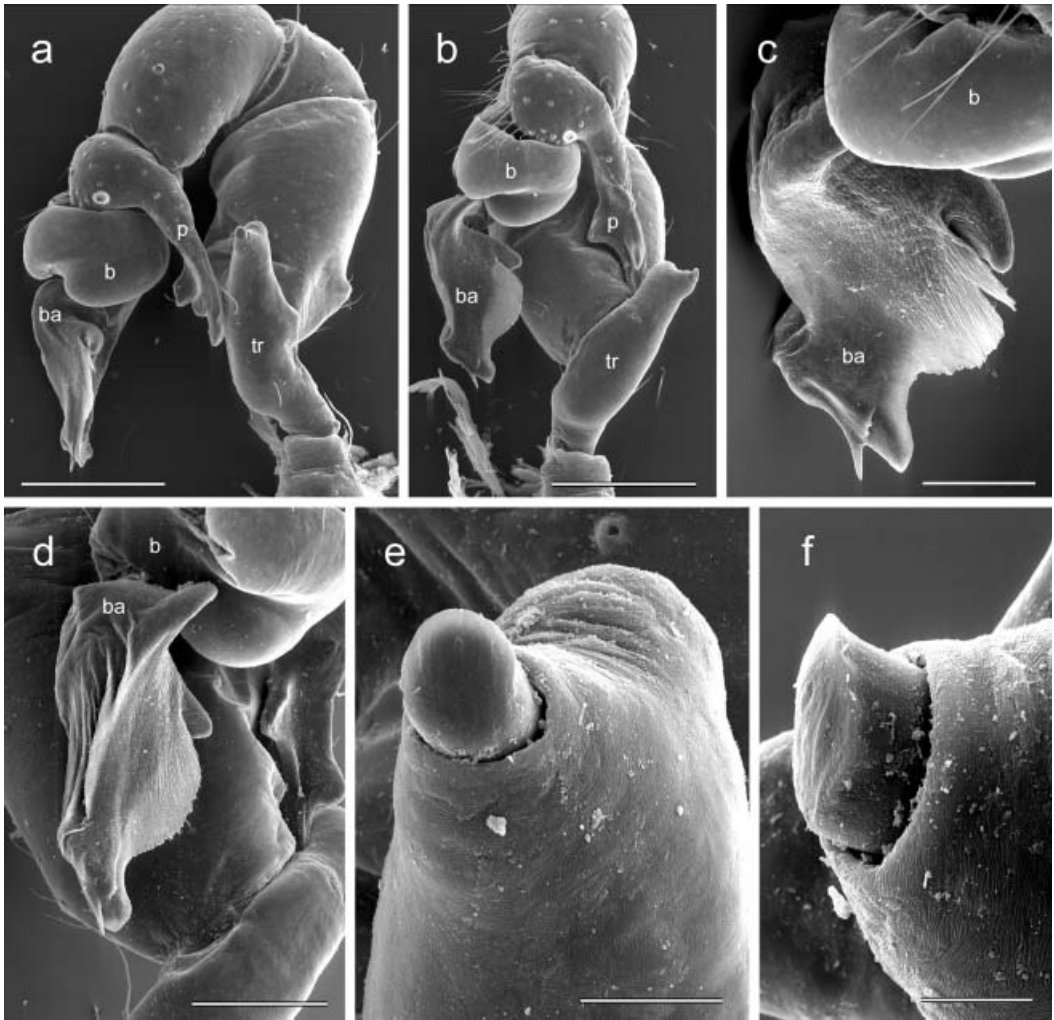


Figure 3. *Pholcus ceylonicus*. (a) Left male palp, retrolateral view; (b) left male palp, dorsal view; (c) bulbal apophysis, dorsal view; (d) bulbal apophysis, ventro-prolateral view; (e, f) modified hair on male palpal trochanter apophysis. b, genital bulb; ba, bulbal apophysis; p, procurus; tr, trochanter. Scale bars: 400 μm (a, b); 100 μm (c); 200 μm (d); 40 μm (e); 20 μm (f).

Variation. Tibia 1 in seven other males: 11.4–12.5 (mean: 12.0).

Female. In general similar to male. Tibia 1 in three females: 9.0, 9.9, 10.3. Epigynum small in relation to abdomen (Figure 1c), with black sclerotized rim and variably sclerotized scape (Figures 1d, 2e, 4d). Dorsal view as in Figure 2f. Anterior lateral spinnerets with one widened, one pointed, and several (about six) cylindrically shaped spigots each (the latter spigots appear all damaged in Figure 4e). Posterior median spinnerets with two spigots each (one broken in Figure 4f).

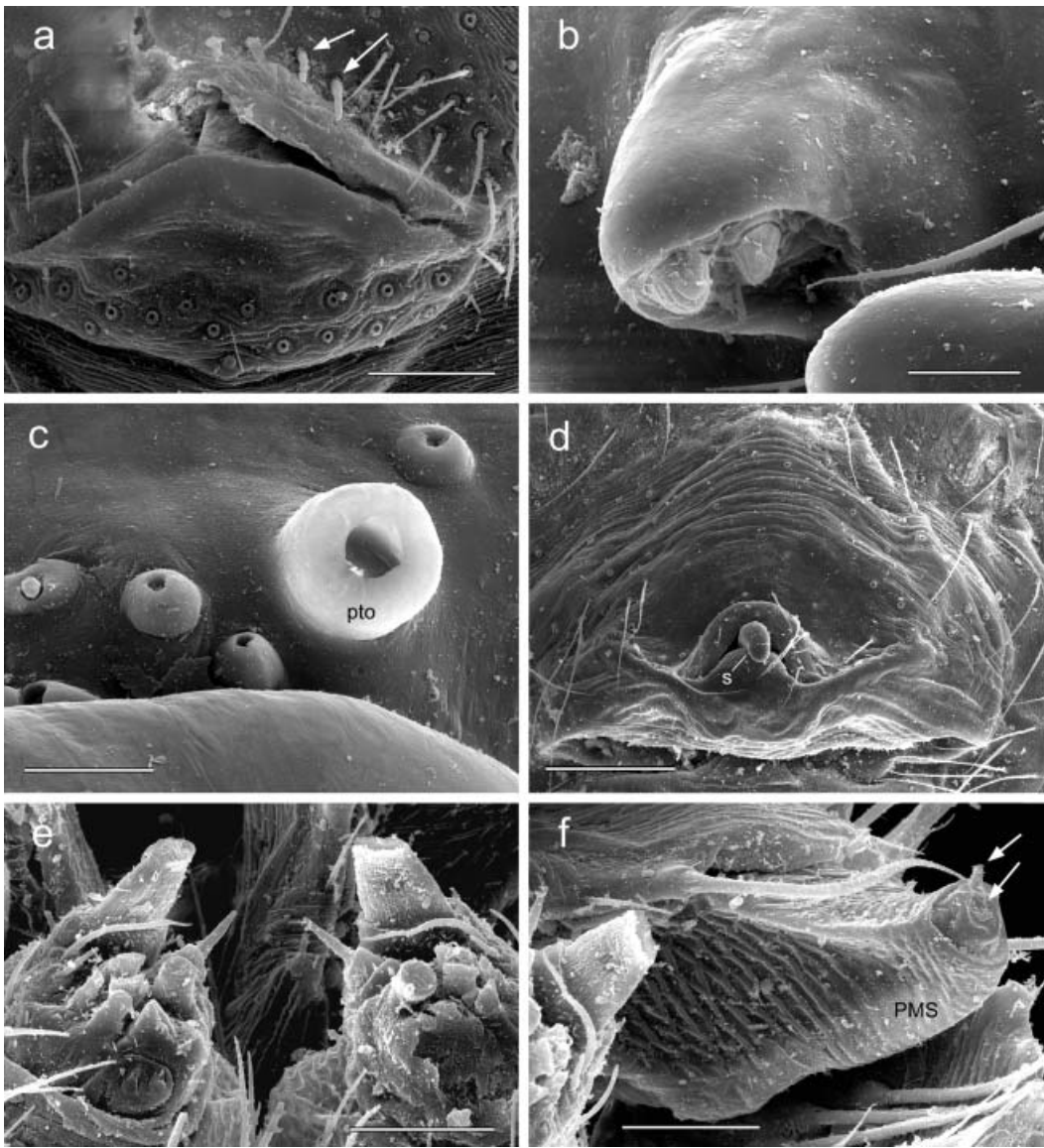


Figure 4. *Pholcus ceylonicus*. (a) Male gonopore; arrows point to epiandrous spigots; (b) male cheliceral apophysis with two modified hairs; (c) palpal tarsal organ; (d) epigynum with scape; (e) female anterior lateral spinnerets; (f) female posterior median spinneret; arrows point to spigots (one of them damaged). PMS, posterior median spinneret; pto, palpal tarsal organ; s, scape. Scale bars: 70 μm (a); 20 μm (b); 30 μm (c); 200 μm (d); 40 μm (e, f).

Distribution

Known from several localities in Sri Lanka (Figure 9).

Material examined

Sri Lanka: "Istripura" [no further data on label; Brignoli 1972: Hanguranketa, ($7^{\circ}10'N$, $80^{\circ}46'E$), 19 January 1970, V. Aellen, P. Strinati], 2♂, 2♀, several juveniles (three vials), in

MHNG. Rawanaella (6°51'N, 81°04'E) [no further data on label; Brignoli 1972: Ella, 16 January 1970, V. Aellen, P. Strinati], 1♀ in MHNG. “Nuwalupitiya” (Nawalapitiya: 7°03'N, 80°32'E), no date (E. Simon), “956 *Pholcus polei* E. S.” (unpublished name), 5♂, 2♀ in MNHN (AR 10229).

Notes

Brignoli (1972) considered it probable that the present species will have to be removed from *Pholcus*. In fact, the bulb does not show the characteristic sclerites (uncus and appendix) of many other *Pholcus* species including the type species, and the procurus is unusually small and simple. However, male chelicerae and female epigynum agree with the usual pattern, as do general body shape and size. Most importantly, however, no evidence is known to suggest an alternative placement. The species should be left in *Pholcus* until a revision of the genus provides evidence to the contrary.

Wanniyala new genus

Type species. *Wanniyala agrabopath*, new species.

Etymology

Named for the Wanniyala-Aetto or “forest people”, an indigenous people of Sri Lanka, commonly known as Veddahs. They are the earliest inhabitants with any living descendants in Sri Lanka. They have lived in their forest environment as hunter-gatherers for the past 18,000 years, but are now endangered due to rapid development and destruction of the forest habitat.

Diagnosis

Small pholcids (body length about 2 mm) with six eyes, long legs, and globular abdomen, distinguished from other pholcines by the male genitalia [procurus with distinctive distal hinged sclerite (Figure 7a, b, e, f), ventral transparent projection (t1 in Figure 7), prolateral proximal projection, and brush-like structure (t3 in Figure 7), bulb with tubular embolus and single sclerotized projection (Figure 6a)], and by the combination of modified clypeus (Figure 6c), reduction of ALS spigots (Figure 8b, c), and large number of short vertical hairs on male metatarsi.

Description

See descriptions of the two species below.

Distribution

Known only from Sri Lanka (Figure 9). The genus might also occur in India, but the pholcid fauna of India has barely been studied.

Composition and relationships

The genus includes two named species (newly described below) as well as one unnamed species from Inginiyagala (7°13'N, 81°32'E), Badulla District (one male), and from Rattota (7°31'N, 80°41'E), Matale District (one male) (3634–35 in MZT). The latter

species is not described because the female remains unknown. *Wanniyala* is clearly a representative of pholcines *sensu* Huber (2000). Within this subfamily, relationships remain largely obscure. This is mainly due to the fact that the large genus *Pholcus* and some potential relatives have never been revised.

***Wanniyala agrabopath* new species**
(Figures 5a–e, 6, 7a–d)

Type

Male holotype from Agrabopath Forest, Agrapatana (6°52'N, 80°43'E), Sri Lanka, 7 March 2000 (S. P. Benjamin), in MHNG.

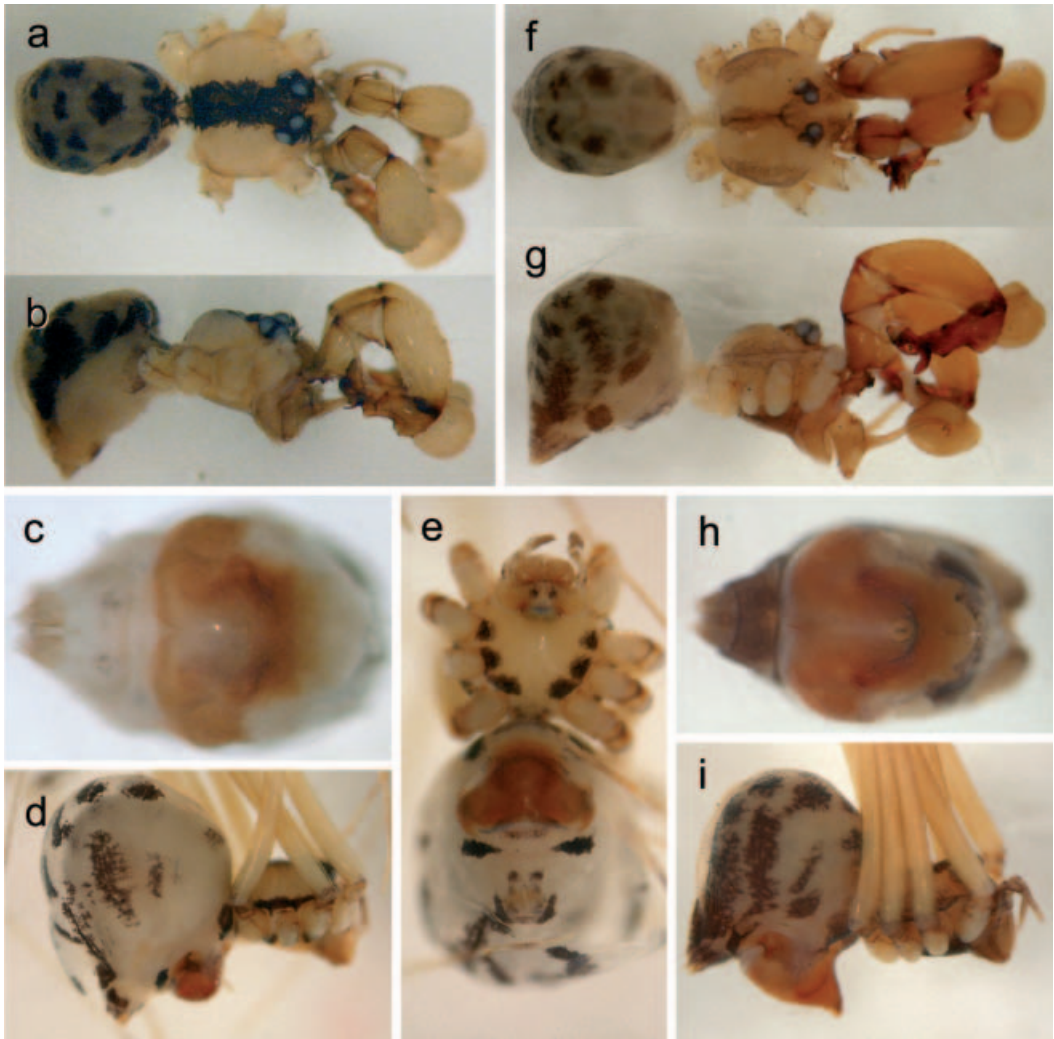


Figure 5. (a–e) *Wanniyala agrabopath*; (f–i) *W. hakgala*. (a, b, f, g) Male habitus, dorsal and lateral views; (c, h) female abdomen, ventral views; (e) female, ventral view; (d, i) female habitus, lateral views.

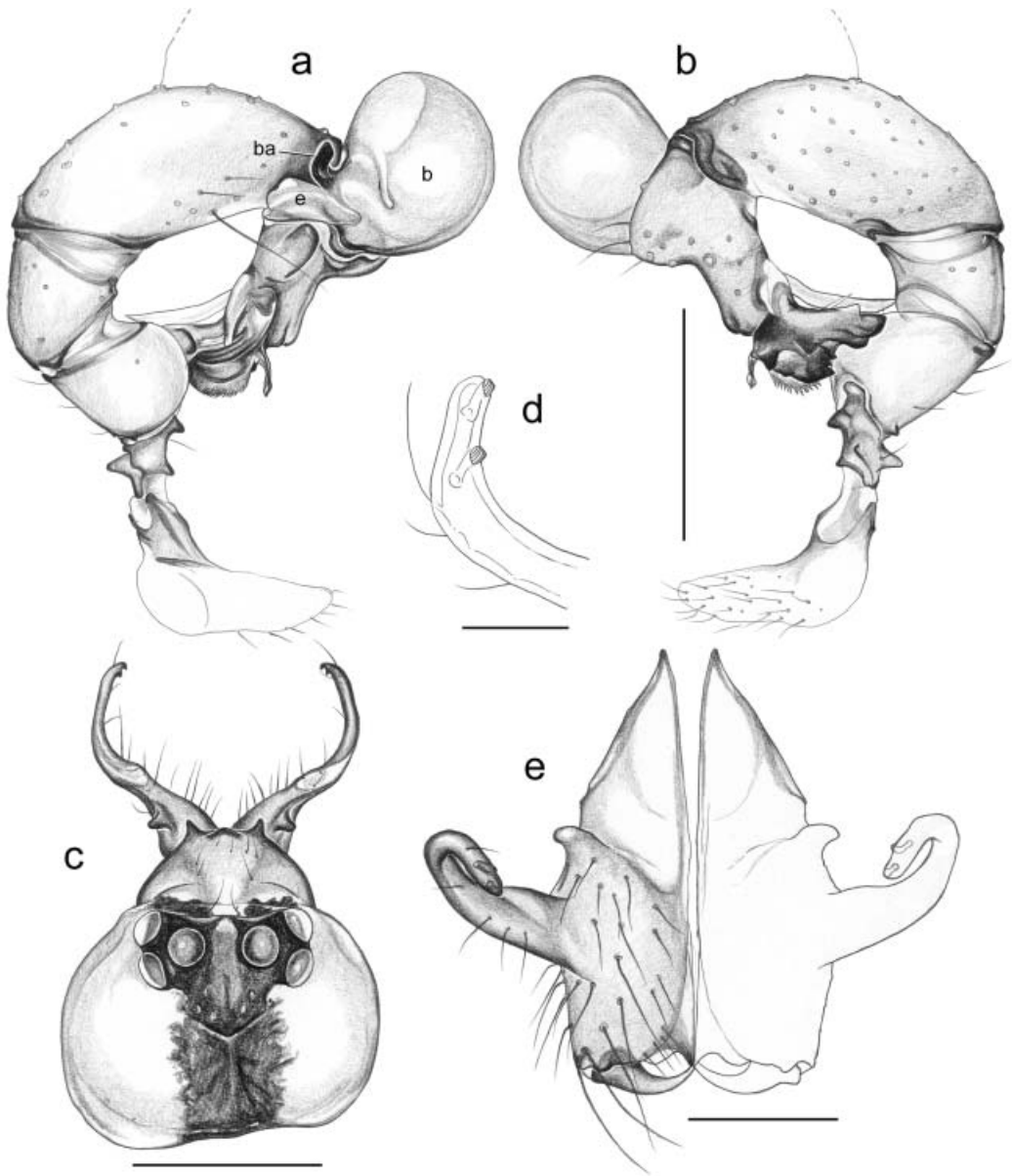


Figure 6. *Wanniyala agrabopath*. (a, b) Left male palp, prolateral and retrolateral views; (c) male prosoma and chelicerae, dorsal view; (d) tip of male cheliceral apophysis; (e) male chelicerae, frontal view. b, genital bulb; ba, bulbal apophysis; e, embolus. Scale bars: 0.5 mm (a–c); 50 μ m (d); 0.2 mm (e).

Etymology

The specific name is a noun in apposition, taken from the type locality.

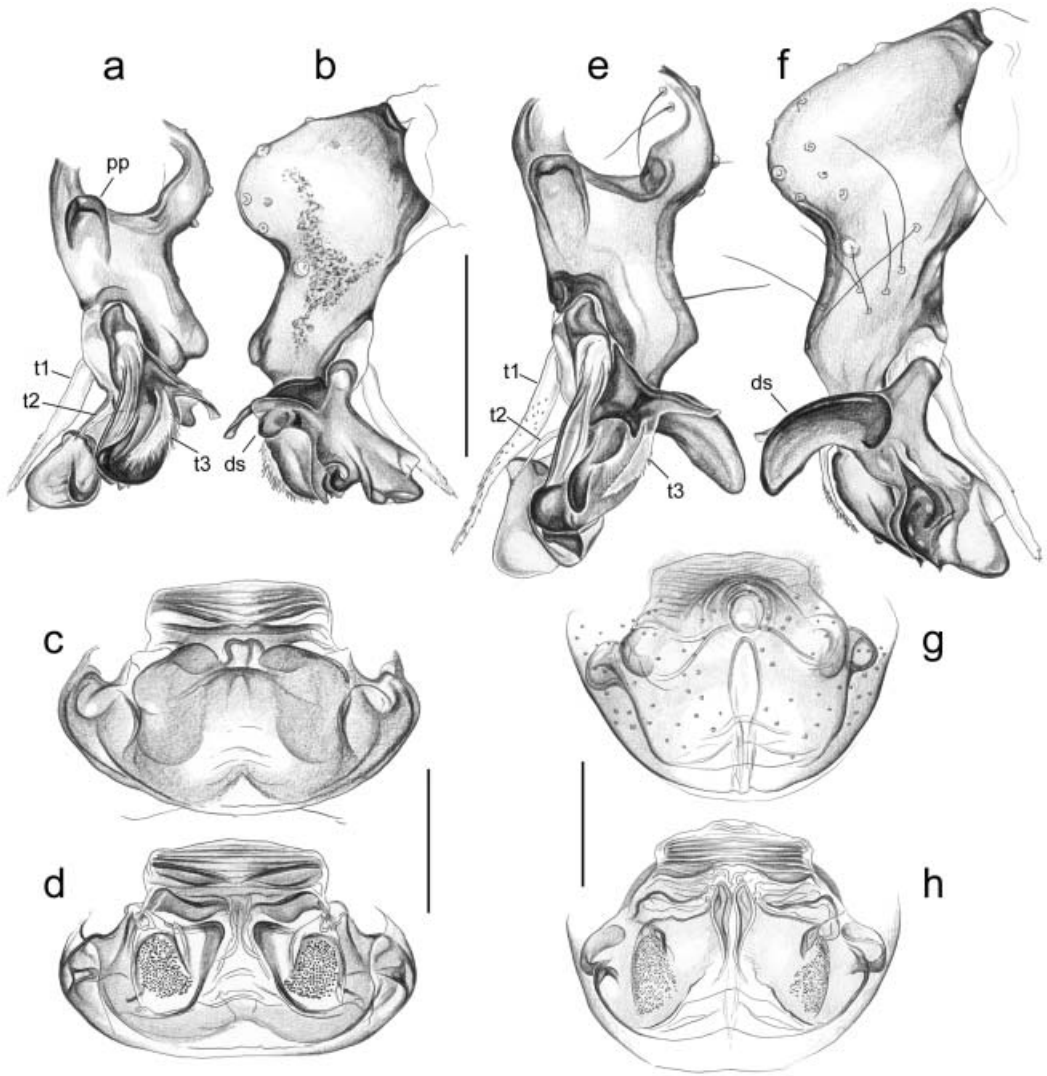


Figure 7. (a–d) *Wanniyala agrabopath*; (e–h) *W. hakgala*. (a, b, e, f) Left procurus, prolateral and retrolateral views; (c, g) cleared epigyna, ventral views; (d, h) cleared epigyna, dorsal views. ds, dorsal sclerite; pp, proximal projection; t1–3, transparent projections. Scale bars: 0.3 mm (a, b, e, f: all to same scale).

Diagnosis

Closely related to *W. hakgala*; easily distinguished by shape of dorsal sclerite on procurus (ds in Figure 7b), by epigynum without pointed projection (cf. Figure 5d and 5i); also by shorter clypeus projections, shorter cheliceral apophyses, and apparently by colour pattern (Figure 5a, b).

Male (holotype). Total length 1.9, carapace width 0.86. Leg 1: 15.7 (3.75+0.4+3.95+5.8+1.8), tibia 2: 2.25, tibia 3: 1.7, tibia 4: 2.3; tibia 1 L/d: 47. Habitus as in Figure 5a, b. Carapace ochre-yellow with wide blackish median band, without lateral dark

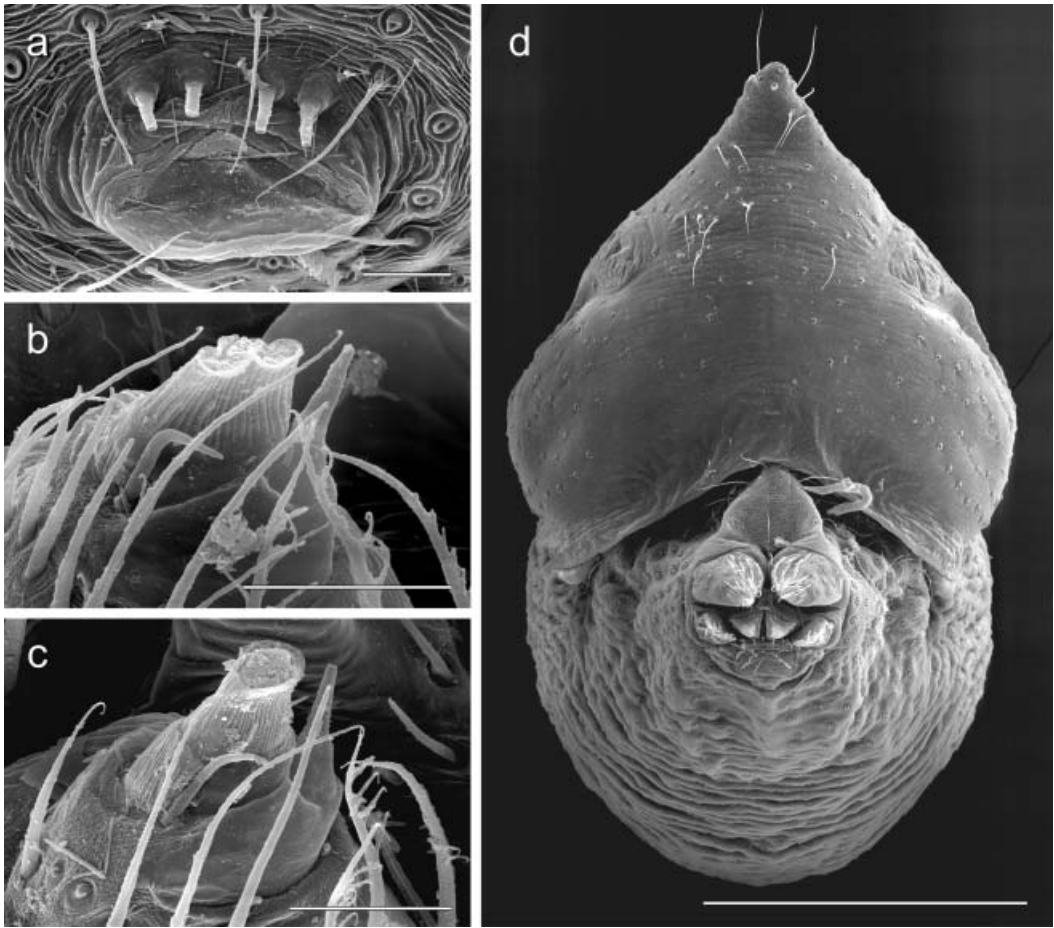


Figure 8. *Wanniyala hakgala*. (a) Male gonopore with four epiandrous spigots; (b, c) female and male anterior lateral spinnerets with widened and pointed spigots; (d) female abdomen, ventral view. Scale bars: 20 μm (a–c); 0.5 mm (d).

margins, clypeus only slightly darkened; sternum pale ochre yellow. Legs pale ochre-yellow, dark rings on tibiae (subdistally). Opisthosoma grey with black pattern, ventrally without pattern. Ocular area slightly elevated, thoracic furrow very distinct frontally; distance PME–PME 70 μm; diameter PME 100 μm; distance PME–ALE 30 μm; AME absent. Clypeus with pair of short projections 35 μm long and indistinct median hump. Sternum wider than long (0.65/0.50). Chelicerae as in Figure 6c, e, with pair of long apophyses provided with two modified hairs on each tip (Figure 6d), tips 0.52 apart. Palps as in Figure 6a, b; trochanter with several short projections, femur with small proximo-dorsal apophysis, procurus very complex distally, apparently with two hinged processes, with three transparent processes (t1–3 in Figure 7a); bulb with distinctive hooked sclerite and membranous embolus (Figure 6a). Retrolateral trichobothrium of tibia 1 at 12%; most hairs on legs missing, but apparently without spines, without curved hairs, with several rows

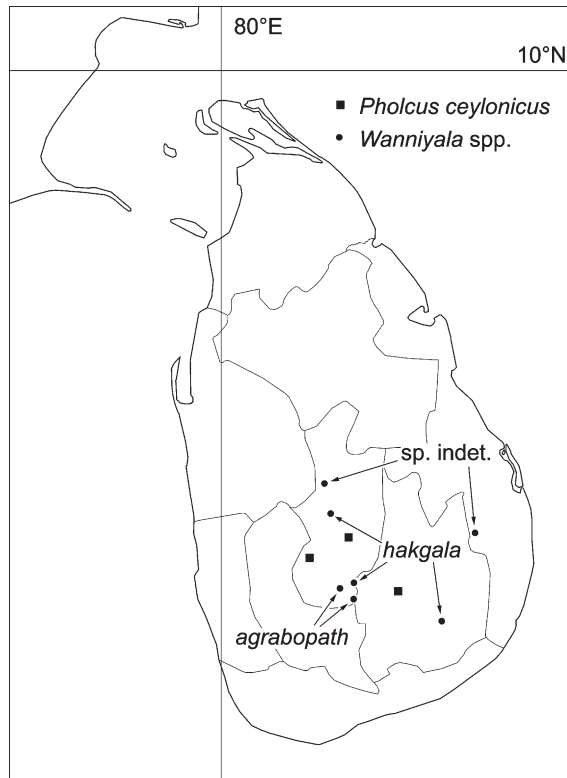


Figure 9. Known geographic distributions of *Pholcus ceylonicus*, *Wanniyala agrabopath*, *W. hakgala*, and an undescribed species of *Wanniyala*.

of vertical hairs on all metatarsi (clearly present in other male seen); tarsus 1 with >20 pseudosegments, only distally quite distinct.

Variation. Tibia 1 in male from Horton Plains: 3.2. This male differs also in colour pattern and is therefore assigned tentatively: lateral margins on carapace darkened, three pairs of black spots on sternum (cf. Figure 5e), with dark pattern on abdomen also ventrally, black rings also on femora (subdistally).

Female. In general similar to male, but clypeus unmodified and metatarsi without rows of vertical hairs; the female from Horton Plains has the same colour pattern as the male from this locality (see above). Tibia 1 in female from type locality: 2.85; female from Horton Plains: 2.55. Epigynum large but rather simple externally, without conical elevation (Figure 5c–e), apparently with pair of pockets 0.65 apart. Dorsal view as in Figure 7d.

Distribution

Known from two localities in Sri Lanka (Figure 9).

Material examined

Sri Lanka: Agrapatana: Agrabopath Forest: type above, together with 1♂, 1♀; Horton Plains (6°48'N, 80°48'E), 2200 m above sea level (a.s.l.), forest litter, 13–15 August 1981 (P. R. and C. L. Deeleman), 1♂, 1♀ (and one epigynum!) (RMNH).

Wanniyala hakgala new species
(Figures 5f–i, 7e–h, 8)

Type

Male holotype from Hakgala (6°54'N, 80°48'E), Nuwara Eliya district, Sri Lanka; in grass and litter along a mountain brook, 18 November 1972 (P. Lehtinen), in MZT (3631).

Etymology

The specific name is a noun in apposition, taken from the type locality.

Diagnosis

Closely related to *W. agrabopath*; easily distinguished by shape of dorsal sclerite on procurus (ds in Figure 7f), by epigynum with pointed projection (Figures 5i, 8d); also by longer clypeus projections, longer cheliceral apophyses, and apparently by colour pattern (Figure 5f, g).

Male (holotype). Total length 2.2, carapace width 0.97. Leg 1: 17.1 (4.25+0.4+4.5+6.15+1.85), tibia 2: 3.0, tibia 3: 2.1, tibia 4: 2.85; tibia 1 L/d: 51. Habitus as in Figure 5f, g. Carapace ochre-yellow with darker median and lateral bands, clypeus also darkened; sternum light brown. Legs pale ochre-yellow, slightly darker rings on femora (subdistally), patellae, and tibiae (subdistally). Opisthosoma grey with black pattern, ventrally also with dark pattern. Ocular area slightly elevated but distinct, thoracic furrow very shallow; distance PME–PME 140 µm; diameter PME 105 µm; distance PME–ALE 25 µm; AME absent. Clypeus with pair of short projections 90 µm long and distinct median hump. Sternum wider than long (0.75/0.60). Chelicerae very similar to *W. agrabopath* (cf. Figure 6c, e) with pair of long apophyses provided with two modified hairs on each tip (cf. Figure 6d), tips 0.88 apart. Palps in general very similar to *W. agrabopath* but significantly larger; trochanter and femur projections identical to *W. agrabopath*, procurus very similar to *W. agrabopath*, but with very different dorsal sclerite (Figure 7f); bulb apparently identical to *W. agrabopath* (cf. Figure 6a). Retrolateral trichobothrium of tibia 1 at 13%; legs without spines, without curved hairs, with several rows of vertical hairs on all metatarsi; tarsus 1 with >20 pseudosegments, only distally quite distinct. Anterior lateral spinnerets with only two spigots each (Figure 8c). Male gonopore with four epiandrous spigots (Figure 8a).

Variation. Tibia 1 in other male: 4.15.

Female. In general similar to male, but clypeus unmodified and metatarsi without rows of vertical hairs. Tibia 1 in female from Hakgala: 3.1–3.45; female from Gumbukena: 3.05;

females from Kandy district: 2.7–3.0 ($n=4$). Epigynum very large, with distinctive median conical elevation (Figure 8d), pockets not seen. Dorsal view as in Figure 7h. Spinnerets as in male (Figure 8b).

Distribution

Known from three localities in Sri Lanka (Figure 9).

Material examined

Sri Lanka: Nuwara Eliya district: Hakgala: type above, together with 1♂, 5♀; Kandy district: Kandy (7°18'N, 80°38'E), 1600 m a.s.l., forest and waterworks, in umbrella web under large tangle, 7–11 August 1981 (collector not given), 4♀ (RMNH); “Nonawatte”, wet slope at waterfall, 16 November 1972 (P. Lehtinen), 1♀ (MZT 3630); Moneragala district (6°40'N, ~81°20'E): “Gumbukena” (=Kumbukana?), in teak litter, 19 November 1972 (P. Lehtinen), 1♀ (MZT 3632).

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