

New records of *Coleosoma blandum* O. Pickard-Cambridge, 1882 and *C. floridanum* Banks, 1900 from Sri Lanka (Araneae: Theridiidae)

Mathura Tharmarajan

Suresh P. Benjamin

National Institute of Fundamental Studies,
Hantana Road,
Kandy, Sri Lanka
email: suresh.benjamin@gmail.com

Abstract

The comb-footed spiders *Coleosoma blandum* O. Pickard-Cambridge, 1882 (male only) and *C. floridanum* Banks, 1900 (male only) are redescribed, based on newly collected material from Sri Lanka. The latter species is reported for the first time from the island.

Keywords: biodiversity • cobweb spiders • new record

Introduction

The spiders of Sri Lanka are not well studied (Benjamin & Bambaradeniya 2006). Recent studies mostly focused on the families Salticidae, Onopidae, and Thomisidae (Benjamin 2004, 2011; Benjamin & Jaleel 2010; Kanesharatnam & Benjamin 2016; Ranasinghe & Benjamin, 2018; Ileperuma Arachchi & Benjamin 2019). Currently, 31 theridiid species are recorded from Sri Lanka, most of them described more than a century ago and known only from their original descriptions (World Spider Catalog 2020).

The genus *Coleosoma* consists of small, ant-mimicking spiders (Saaristo 2006). *Coleosoma* was erected by O. Pickard-Cambridge in 1882 based on the description of the Sri Lankan species *C. blandum*. Presently, *Coleosoma* comprises 10 described species which are globally distributed, being found in every continent except for Australia and Antarctica (World Spider Catalog 2020). Unlike other comb-footed spiders, the comb on the tarsus of the fourth pair of legs in *Coleosoma* is difficult to distinguish (Srinivasulu *et al.* 2013). Species of *Coleosoma* are divided into two groups, the *floridanum* group and the *blandum* group, based on embolus spiral length, epigynum sclerotization, length of copulatory duct, and size of spermathecae (Sirvid & Fitzgerald 2016).

The two species recorded here have been reported from the Seychelles, India, Bangladesh, Myanmar, Thailand, the Philippines, China, Japan, and the Americas. They have also been introduced to Europe (World Spider Catalog 2020). This pattern of distribution is probably due to accidental anthropogenic dispersal associated with travel and trades among countries (Levi 1967). In this paper we redescribe *C. blandum* and *C. floridanum* and provide an update on their distribution within Sri Lanka, including the first records of the latter species.

Materials and methods

Sampling was primarily done by beating. The collected specimens were preserved in 70% ethanol and examined using an Olympus SZX7 stereomicroscope. Female genitalia were dissected and digested using Sigma Pancreatin LP 1750 enzyme complex. Male palps and epigynes were cleared, mounted, and examined using methyl salicylate and viewed with an Olympus BX51 compound microscope. Photographs of intact spiders, palps and epigynes were taken using a Leica MC170 HD camera mounted on a Leica M205C stereomicroscope using the Leica Application Suite (Leica Microsystems Ltd) and merged with Helicon focus image stacking software (version 6, Helicon Software Ltd). Images were edited using Photoshop CC and assembled using Adobe Illustrator CS6. Specimens were identified based on illustrations given in Saaristo (2010). The occurrence of both species in Sri Lanka was mapped in QGIS v. 3.14.16 (QGIS Development Team 2013) using the coordinates of sampled localities obtained during field work. In a few cases coordinates were approximated using Google Earth. Morphological terminology follows Agnarsson (2004). All measurements of images are in millimetres. All specimens are deposited in NMSL.

Institutional abbreviations: DFC = Department of Forest Conservation, DWLC = Department of Wild Life Conservation, NIFS = National Institute of Fundamental Studies, NMSL = National Museum of Sri Lanka, FR = Forest Reserve.

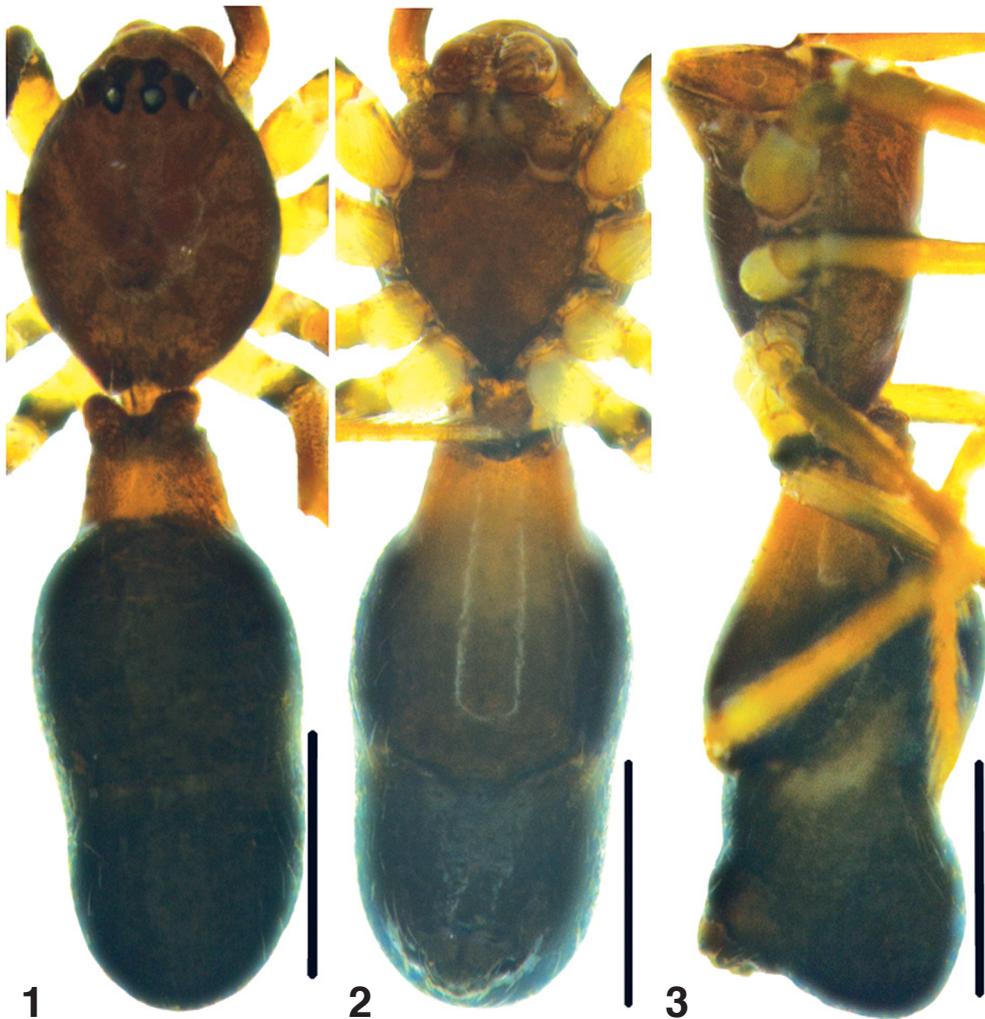
Anatomical abbreviations: ALE = anterior lateral eyes, AME = anterior median eyes, C = conductor, Cy = cymbium, Chd = cymbial hood, Chk = cymbial hook, E = embolus, EA = embolic apophysis, ETA = extra tegular apophysis, FD = fertilization duct, MA = median apophysis, PLE = posterior lateral eyes, PME = posterior median eyes, S = spermathecae, SC = subconductor, ST = subtegulum, T = tegulum, Tb = trichobothria, THE = Theridiidae, Tp = tegular pit, Ta = tarsus, Ti = tibia, TTA = theridiid tegular apophysis.

Theridiidae Sundevall, 1833

Coleosoma O. Pickard-Cambridge, 1882

Coleosoma O. Pickard-Cambridge, 1882: 427 (type species: *Coleosoma blandum* O. Pickard-Cambridge, 1882 from Sri Lanka).

Diagnosis: Relatively small species with depressed carapace (Pickard-Cambridge 1882). In males of most species, the opisthosoma is elongated and medially constricted. The anterior opisthosoma of males and females bears a neck-like sheath between the pedicel and the opisthosoma. Males can easily be recognized by the broad cymbium and bulbus with a long, spiral embolus. Opisthosomae of males have rows of stridulatory picks which are used in a prosoma-opisthosoma stridulatory mechanism with the posterior end of the carapace (Sirvid & Fitzgerald 2016). Opisthosomae of females



Figs. 1–3: *Coleosoma blandum*, male habitus. **1** dorsal view; **2** lateral view; **3** ventral view. Scale bars = 0.5 mm.

are highly variable, but are mostly higher and globular in shape.

Description: Small yellow-brown theridiids displaying strong sexual dimorphism (Saaristo 2006), size less than 3 mm in length (Sirvid & Fitzgerald 2016). Carapace, sternum, and pedipalp similar in colouration, mostly yellow brownish. Legs long, whitish, formula I, IV, II, III. Opisthosoma of male elongated, yellow or brown in colour with black shaded area. Eyes small, in two rows, laterals fused. Opisthosoma of female globular, higher than long, colour yellow to brown. Anterior opisthosoma of male and female connected to pedicel with neck-like sheath area. Palps with long, spiral embolus, in most species encircled around tegulum. Epigynum simple, dark brown, necklace-like or Y-shaped (Saaristo 2006).

Included species: *Coleosoma acutiventer* Keyserling, 1884, *C. africanum* Schmidt & Krause, 1995, *C. blandum* O. Pickard-Cambridge, 1882, *C. caliothripsum* Barrion & Litsinger, 1995, *C. floridanum* Banks, 1900, *C. matinikum* Barrion & Litsinger, 1995, *C. normale* Bryant, 1944, *C. octomaculatum* Bösenberg & Strand, 1906, *C. pabilogum* Barrion & Litsinger, 1995, *C. pseudoblandum* Barrion & Litsinger, 1995.

Distribution: See World Spider Catalog (2020).

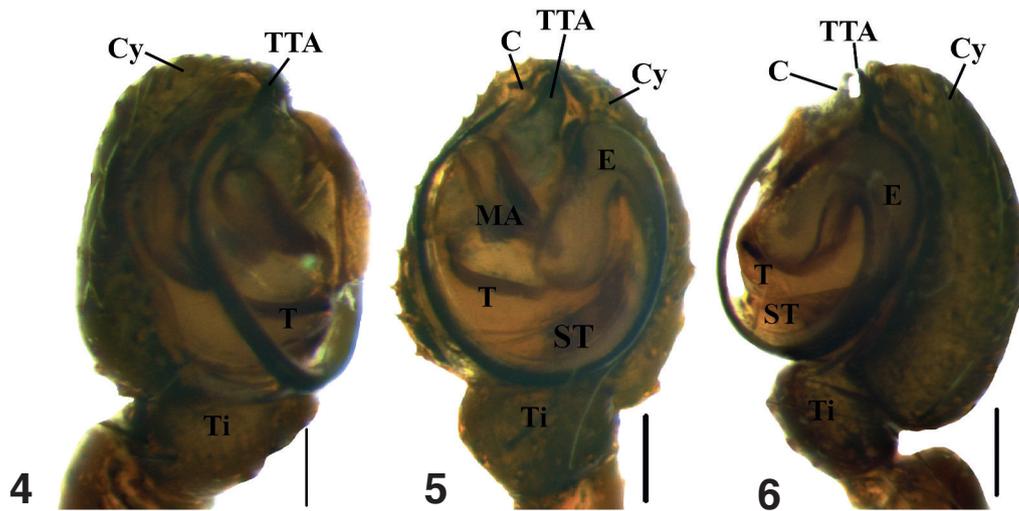
***Coleosoma blandum* O. Pickard-Cambridge, 1882** (Figs. 1–6)

Coleosoma blandum O. Pickard-Cambridge, 1882: 427, pl. 29, fig. 3

For complete list of citations see World Spider Catalog (2020).

Material examined: SRI LANKA: Central Province: Matale District, Cardamom plantation, 7°30'48"N 80°39'42"E, beating, 1♂ (IFS_THE_581), 03–04 September 2003, S. P. Benjamin *et al.*; North Western Province: Puttlam District, Eluwankulama, 8°16'23.6"N 79°52'48.359"E, 1♂ (IFS_THE_586), 20 April 2015; Kurunegala District, Ethagala mountains, 7°29'11.23"N 80°22'21.64"E, 300 m, hand collection, 1♂ (IFS_THE_582), 01–28 February 2007, leg. Ziyard Jaleel.

Diagnosis: Males can be easily identified by the wider cymbium and palpal bulb with a long circular sickle shaped embolus, with spiral completing almost a complete circle. *Coleosoma blandum* and *C. floridanum* are quite similar in somatic morphology; however, they strongly differ in palpal structure: the palp and cymbium of *C. blandum* is broader than that of *C. floridanum*, the embolus of *C. blandum* winds in a complete circle (Figs. 4–6). Females of *C. blan-*



Figs. 4–6: *Coleosoma blandum*, male palp (left). **4** prolateral view; **5** ventral view; **6** retrolateral view. C = conductor, Chd = cymbial hood, E = embolus, ST = subtegulum, T = tegulum, Ti = tibia, TTA = theridiid tegular apophysis. Scale bars = 0.1 mm.

dum can be distinguished from *C. floridanum* based on the following characters: weakly sclerotized epigynum, indistinct opening, long copulatory duct, and small spermathecae (Saaristo 2006; Sirvid & Fitzgerald 2016).

Description of male: Small spiders, total length 1.92–2.3, carapace length 0.75–0.85, width 0.54–0.55, opisthosoma length 1.2–1.4, opisthosoma width 0.54–0.65. Carapace, palp, and sternum yellow-brown with black hue. Carapace oval shape, elongated, not high, longer than wide. Clypeus region higher than other parts of carapace and slightly slanted (Figs. 1–3). Ocular area little higher and bearing two rows of small eyes. Laterals juxtaposed and arrangement of medians form a square. Eye diameters and inter distances: AME 0.04–0.05, ALE 0.04–0.06, PME 0.04–0.06, PLE 0.04, PME-PME 0.04–0.05, PLE-PLE 0.28–0.30, ALE-PME 0.03–0.04. Opisthosoma longer than wide with characteristic long, neck-like anterior extremity jointed between pedicel and opisthosoma, which is yellow-brown in colour, fore part furrowed and loosely placed on pedicel. Opisthosoma cylindrical, large dirty white area present on both lateral sides and ventral side of opisthosoma with the remainder with black ash shading. Posterior end of opisthosoma slightly rounded and projects above spinnerets. Legs long and whitish with a few black streaks. Leg I: Fm 1.2–1.35, Pt 0.25–0.27, Tb 0.93–1.0, Mt 1.0–1.2, Ta 0.45–0.55, leg II: Fm 0.78–0.9, Pt 0.2–0.24, Tb 0.60–0.66, Mt 0.66–0.78, Ta 0.27–0.40, leg III: Fm 0.6–0.75, Pt 0.2–0.42, Tb 0.42–0.77, Mt 0.50–0.82, Ta 0.3–0.37, leg IV: Fm 0.9–1.12, Pt 0.2–0.27, Tb 0.60–0.77, Mt 0.6–0.82, Ta 0.30–0.48. Sternum triangular, width 0.34–0.4; length 0.4–0.58 widest at 1st coxae and tapered towards the tip at 4th coxae. Labium not rebordered, fused with sternum and almost rounded. Palp of moderate length (cymbium height + tibia height) 0.42–0.5, yellow-brown in colour. Tibia very short, Tibial distal end broad, distal rim slightly asymmetric and faint visible tibial rim setae confirmation in examined palp. Cymbium broad, cymbial distal retromargin with a small distal apophysis containing narrow cymbial hood interacts with distal MA in bulb-cymbium mechanism where as cymbial

hood locks bulb and protects from free rotation of the bulb. No paracymbium. Conductor membranous, folded upon embolus spiral tip, closely positioned to TTA. MA, TTA and E as in Figs 4–6.

Female unknown.

Habitat: The spiders were collected by beating foliage up to a height of 2 m.

Coleosoma floridanum Banks, 1900 (Figs. 7–11)

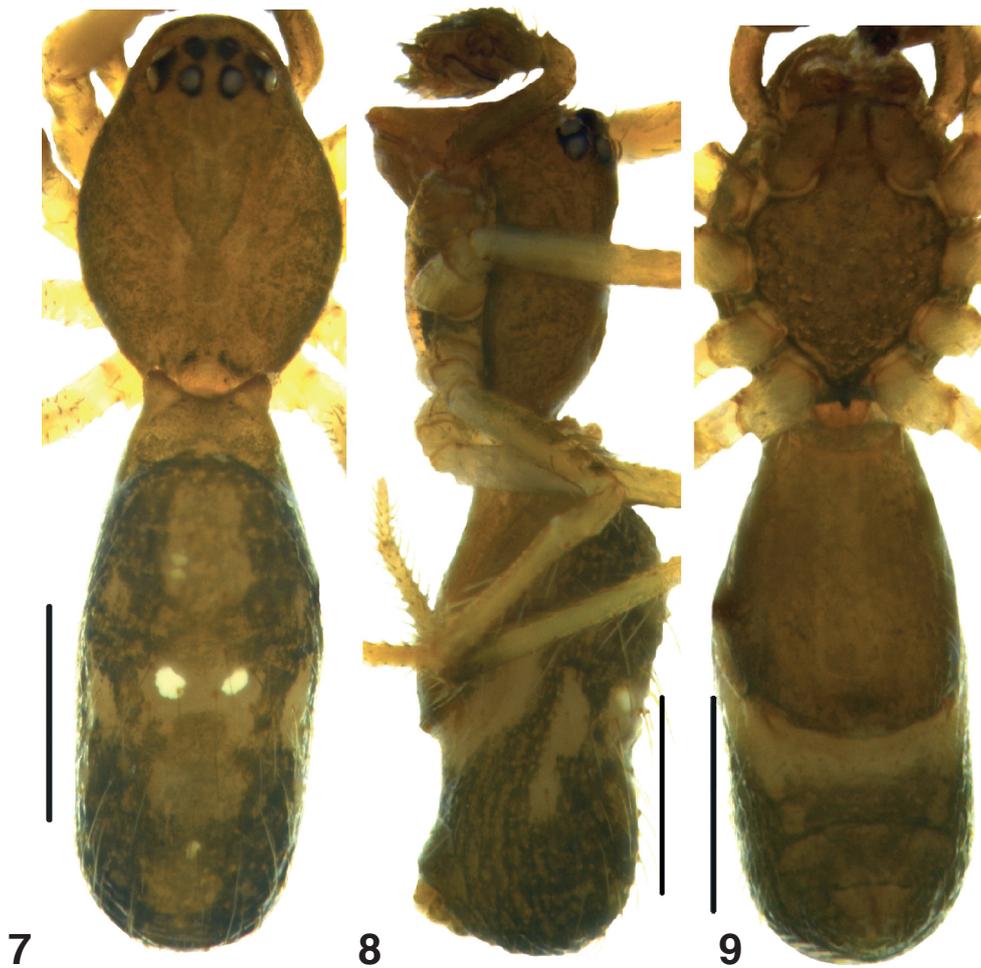
Coleosoma floridana Banks, 1900: 98

For complete list of citations see World Spider Catalog (2020).

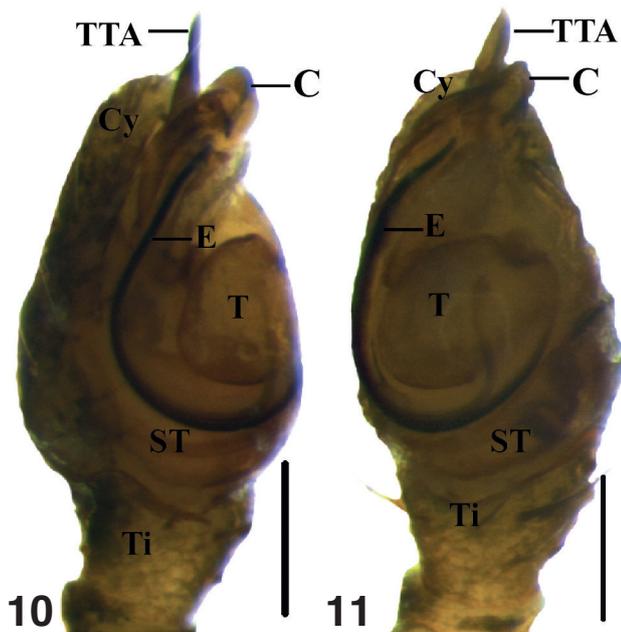
Material examined: SRI LANKA: Central Province: Kandy District, Peradeniya botanical gardens, 7°17'57"N 80°38'29"E, 460 m, ♂ (IFS_THE_585), 27 July 2011, leg S. P. Benjamin and S. Batuwitta; North Central Province: Anuradhapura District, Mihintale sanctuary, 300 m, 8°21'02.14"N 80°31'01.00"E, hand collection, 1♂ (IFS_THE_583), 06 July 2013, S. P. Benjamin *et al.*

Diagnosis: Males can easily be identified from *C. blandum* by the palp with a narrow cymbium, shorter embolus spiral completing about a half circle, and elongated conductor and TTA; females by the epigynum being more sclerotized and the spermathecae larger. In both species, opisthosoma and pedicel are connected with a neck-like sheath which is shorter and wider in *C. floridanum* cf. *C. blandum*.

Description of male: Total length 1.28–2.25, carapace length 0.56–0.9, width 0.44–0.62, opisthosoma length 0.76–1.4, opisthosoma width 0.42–0.6. Carapace ash-brown in colour, oval shape, longer than wide, anterior and posterior carapace narrowed, anterior bearing two rows of eyes. Eye measurements: AME 0.06, ALE 0.06, PLE 0.04–0.06, PME-PME 0.04, PLE-PLE 0.18–0.2, ALE-PME 0.03–0.04. Opisthosoma elongated, cylindrical, opisthosoma and pedicel connected via neck-like sheath (Figs. 7–9). Midline stripe of dorsal opisthosoma, lateral sides of opisthosoma



Figs. 7–9: *Coleosoma floridanum*, male habitus. **7** dorsal view; **8** lateral view; **9** ventral view. Scale bars = 0.5 mm.



Figs. 10–11: *Coleosoma floridanum*, left palp. **10** prolateral view; **11** ventral view. C = conductor, Chd = cymbial hood, E = embolus, ST = subtegulum, T = tegulum, Ti = tibia, TTA = theridiid tegular apophysis. Scale bars = 0.1 mm.

and most of ventral opisthosoma brownish, remainder grey, pair of dorsal white small circular dots. Posterior end of opisthosoma rounded. Sternum triangular, width 0.30–0.34; length 0.38–0.40. Labium rounded, fused with sternum, re-bordered. Legs long and yellow-whitish. Palp whitish-yellow in colour. Leg I: Fm 1.0, Pt 0.3, Tb 0.92, Mt 1.04, Ta 0.52, leg II: Fm 0.88, Pt 0.26, Tb 0.6, Mt 0.72, Ta 0.44, leg III: Fm 0.6, Pt 0.22, Tb 0.42, Mt 0.46, Ta 0.34, leg IV: Fm 0.875, Pt 0.3, Tb 0.84, Mt 0.82, Ta 0.5. Palpal tibia very short, distal end wider than proximal, tibial rim asymmetric, retrolateral trichobothria. Cymbium with small distal narrow cymbial hood as in *C. blandum*. Conductor, embolus and TTA closely associated. Conductor slightly membranous; long, narrow, tube-like, placed between embolus spiral tip and TTA, subequal distal portion of conductor, conductor with groove. Embolic base broadly lobed and obscuring MA. TTA unbranched, spine-like with sharp apex; straight, elongated outside of distal cymbium; embolus and TTA not closely associated. Embolus comparatively short compare to *C. blandum*, originates retroventrally, embolus base lobed with apophysis connected to tegular pit. Embolus spiral, very thin, well sclerotized, completes half circle (Figs. 10–11).

Female unknown.

Habitat: The spiders were collected by beating foliage up to a height of 2 m.

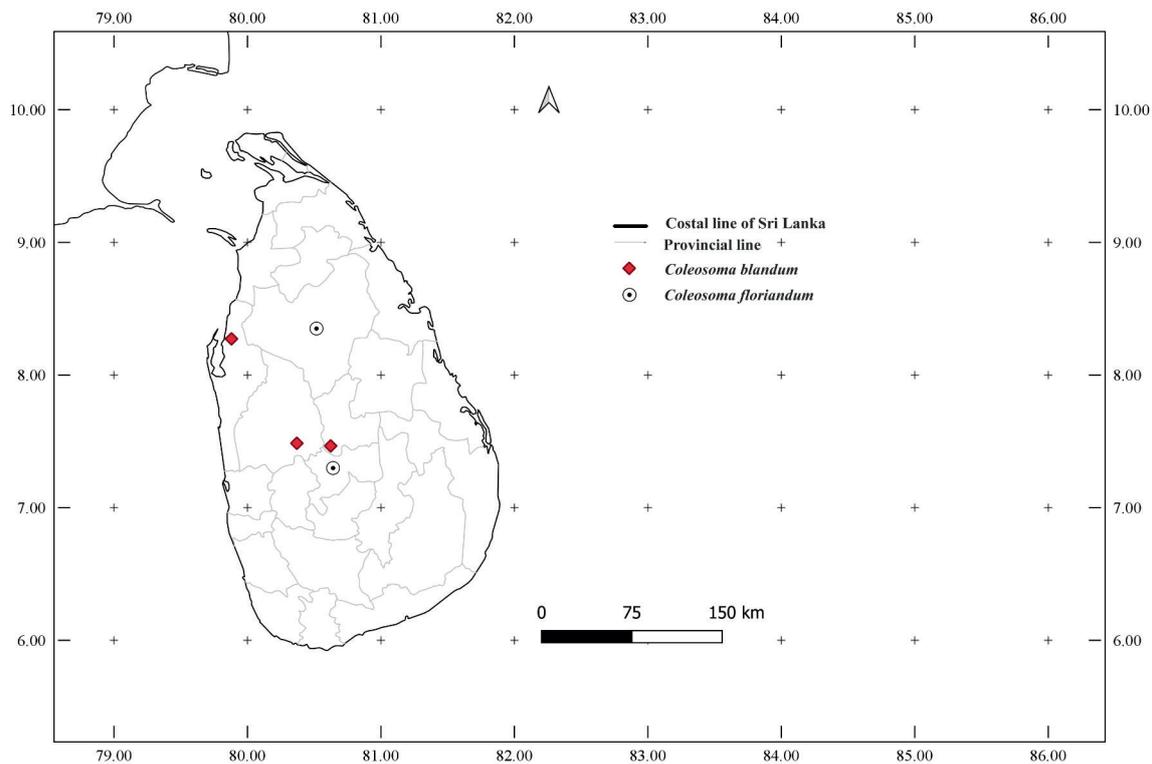


Fig. 12: Localities of *Coleosoma* species described from Sri Lanka.

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