

## Observations on *Indothele lanka* Coyle, an ischnotheline funnelweb spider from Sri Lanka (Araneae, Mygalomorphae, Dipluridae)

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### Abstract

The first natural history observations on the endemic South Asian funnelweb spider genus *Indothele* indicate that *Indothele lanka* Coyle may be a fairly typical ischnotheline spider in terms of web design, web substrate requirements, and prey capture behaviour, but atypical in its preference for wet forest and its occurrence inside primary rain forest. Character state analysis of the new sample of females supports earlier hypotheses (Coyle, 1995) about the systematics of *I. lanka*, including its status as sister species of the other three *Indothele* species, all endemic to India. Because of restricted distributions and probable dependence on threatened habitats, *I. lanka* and its congeners deserve increased attention.

Key words: Mygalomorph spider, *Indothele*, Sri Lanka, Sinharaja World Heritage Site.

### Introduction

Unlike the other four genera in the widespread tropical funnelweb mygalomorph spider subfamily Ischnothelinae, almost nothing is known about the natural history of the recently described genus, *Indothele*, which consists of one species in Sri Lanka and its sister clade of three species in southern India (Coyle, 1995). With that in mind, the first author searched for the Sri Lankan species, *Indothele lanka* Coyle, during a recent visit (13 January - 10 February 1995) to Sri Lanka. Herein we describe observations he gathered at two sites near Kudawa in Ratnapura District of Sabaragamuwa Province in southwestern Sri Lanka; one site (site A) is at an elevation of 500 m near M. Wijesinghe's

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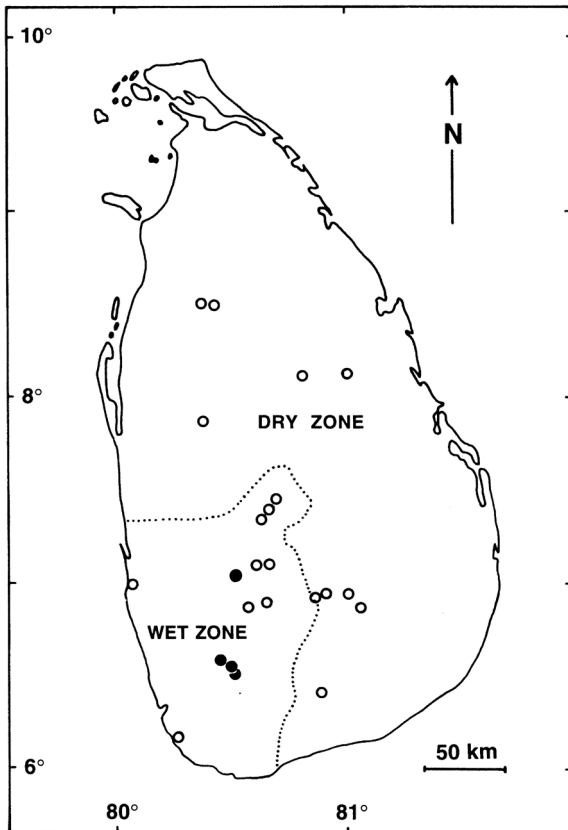
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guesthouse just outside the Sinharaja World Heritage Site (hereafter Sinharaja WHS) and the other (side B) is at an elevation of 500-750 m inside the Sinharaja WHS along the Waturawa and Moulawella nature trails about 2-3 km from the first site. We also update the description of *I. lanka* (which had previously been known from two males and seven females) with an analysis of six additional females. We urge others to follow our lead and learn more about this species and the three even more poorly known Indian members of the genus, which, like *I. lanka*, appear to be restricted in distribution (Coyle, 1995) and threatened by habitat destruction. The specimens collected in this study are deposited in the National Museum at Colombo, Sri Lanka, and the Slovene Museum of Natural History at Ljubljana, Slovenia.

### Natural history

**Ecology.** Although *I. lanka* was sought in all 21 localities visited in Sri Lanka, it was found only at the two above-mentioned sites, which are very close to the other two recently recorded localities for this species (in the Morapitiya Forest Reserve and Sinharaja World Heritage Site) (Coyle, 1995). This cluster of four *I. lanka* sites is centered in Sri Lanka's wet zone, which occupies the southwestern quarter of the country and receives 3000 to over 5000 mm of



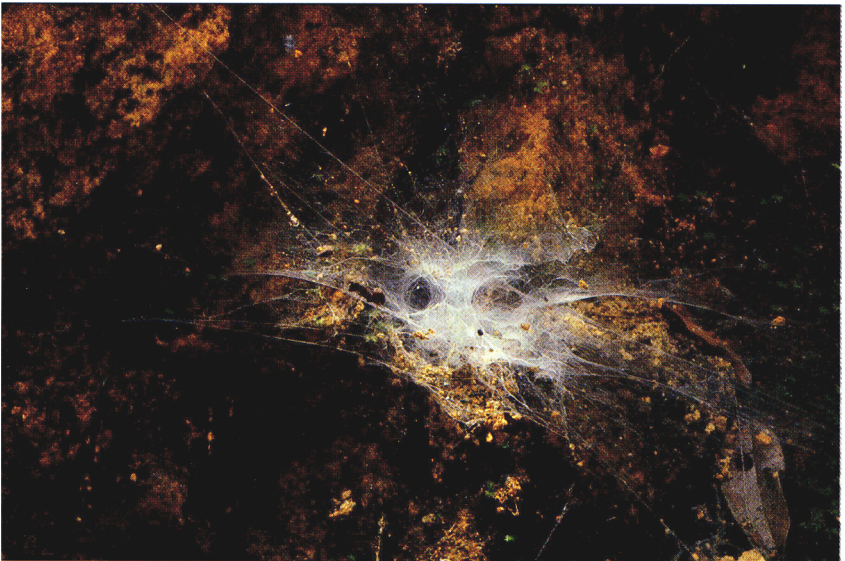
**Figure 1.** Solid black circles on map of Sri Lanka mark known localities of *Indothele lanka* Coyle; the three clustered solid black circles mark four sites in and near the Sinharaja WHS where this species was found between 1983 and 1995, and the fourth solid black circle designates a locality (Nawalapitiya) 70 km north of these sites where Sherriffs (1919) observed this species in about 1915. Unfilled circles mark the 19 other localities where first author in 1995 searched for this species but was unable to find it. Dotted line represents approximate boundary between the wet and dry zones of Sri Lanka (Erdelen, 1988).

rainfall in a typical year (Erdelen, 1988) (Fig. 1). The spiders were found only in primary and secondary rain forest and were particularly common at site B, where several hundred webs were observed. Both sites A and B average over 5000 mm of rain per year (M. Wijesinghe, pers. comm.). Although the webs of *I. lanka* were found inside both secondary and primary rain forest on the ground (among rocks, tree roots, and leaf litter) and on tree trunks, they appeared to be most common on the banks of roads and trails in these forests, where they seemed to replace the lycosid (*Hippasa*) and psechrid [*Psechrus torvus* (O.P.-Cambridge)] sheet/funnelweb spiders that are often common on road banks elsewhere in Sri Lanka. Ten of the visited localities which do not harbor *I. lanka* populations lie in the dry zone of Sri Lanka in disturbed habitats in areas that had once been covered with dry and mesic semi-evergreen forest and intermediate forest (Erdelen, 1988). The other nine localities lacking *I. lanka* are in the wet zone, but the lowland and submontane rain forests native to this zone no longer remain at any of these localities. The only other record for *I. lanka* known to us is Sherriffs' (1919) observation of ischnotheline spiders, undoubtedly *I. lanka*, together with *P. torvus* "on the road-banks of the upcountry tea estates" near Nawalapitya about 70 km north of the Sinharaja Reserve at about 920 m elevation in an area he reported to average over 6300 mm of rain per year. In total, these observations indicate that *I. lanka* is probably restricted to rain forest and adjacent disturbed habitats in the wet zone of southwestern Sri Lanka.

Rain forest (particularly primary rain forest) is unusual habitat for ischnothelines; all other species whose habitats are known appear to prefer more open and dryer habitats (Coyle, 1995). It may be that the South Indian species of *Indothele* live in dryer habitats than does *I. lanka* [*Acacia*-dominated arid scrub habitat is common near the type locality of *Indothele mala* Coyle (Coyle, 1995)]. However, it should be emphasized that reliable habitat data for the South Indian *Indothele* species are lacking and that there are remnant patches of humid to wet forest at or very near the sites where *I. mala* and *Indothele rothi* Coyle have been collected (N. Meegama & P. Rasmussen, pers. comm.).

The apparent inability of *I. lanka* to survive in habitats other than rainforest probably makes it more extinction-prone than most other ischnotheline species. The majority of Sri Lankan angiosperm and vertebrate endemics, like *I. lanka*, are restricted to the wet zone, and most of these are further restricted to the remaining patches of natural forest which have so far managed to survive the spread of timber harvesting, tree farming, and agriculture (Erdelen, 1988). Hopefully, the nearly 90 km<sup>2</sup> Sinharaja WHS, which is the only large area of more or less undisturbed rain forest in Sri Lanka, the chief refuge of Sri Lankan endemics, and an International Biosphere Reserve (Erdelen, 1988; Green, 1990), will be protected from the kinds of changes that have probably already reduced and obliterated *I. lanka* populations in other parts of the wet zone.

**Behaviour.** As is common in other ischnotheline species, *I. lanka* webs are typically clustered; for example, on one roadbank eight adult and nine juvenile webs occurred a 7 X 1.5 m area which was 7 m from the next web. The



**Figure 2.** Photos of two *Indothele lanka* webs on roadbank in Morapitiya Forest Reserve.

webs are similar to those of other ischnothelins (Coyle, 1995). The tubular silk retreat, typically extending 5-10 cm into natural cavities and crevices, opens out onto a capture web consisting of one to several sheets inclined at different angles and extending outward in different directions to attachment points on nearby ground, rock, root, leaf or other surfaces (Fig. 2). Each sheet



consists of areas of very fine close-spaced threads (which may give the web a faint blue cast) which are supported by "cables" of cohering treads. Some threads may extend up from the capture sheets to substrates as far as 40 cm above the sheet. The approximate area covered by the dominant plane of the capture web of seven adults and near-adults ranged from 80 to 600 cm<sup>2</sup> and averaged 244 cm<sup>2</sup>. Smaller webs are simpler (less three-dimensional) than larger webs and may consist of little more than a single fan-shaped sheet. Adult *I. lanka* capture webs, like those of *Lathrothele* and *Andethele* species, are generally smaller and less three-dimensional than those of the larger-bodied species of *Ischnothele* and *Thelechoris* (Coyle, 1995). *Indothele lanka* webs often contain dead leaves, soil particles, and other debris. Despite careful searching, no symbionts were observed living in the webs.

Spiders were commonly positioned facing out from the mouth of the retreat during both day and night. They were very shy and quickly retreated deep into the retreat if the observer approached carelessly or touched the web. Ants dropped in the web were approached with a series of short rapid dashes separated by relatively long pauses, the typical ischnotheline approach pattern (Coyle & Ketner, 1990; Coyle, 1995). Ant remains were common in retreats. One female had an egg sac (15 X 20 mm) in her retreat, and spiderlings were seen in the retreats of some other females.

**Morphology.** Figure 3 shows the unusually long and flexible pair of posterior lateral spinnerets characteristic of ischnotheline spiders and the dark background colour and pale paired dorsal abdominal marks characteristic of *I. lanka*. Individuals appear significantly darker when alive than after preservation in ethanol. Analysis of all character states of the six adult females collected by



**Figure 3.** Photograph of live adult female *Indothele lanka* from Sinharaja World Heritage Site: spider had been removed from its web and placed on the ground.

the first author (two at site A and four at site B) clearly support the hypothesis that they are conspecific with the seven females described by Coyle (1995). Quantitative character values for the current total sample of 11 measured *I. lanka* females (including the six newly measured ones) are as follows (Methods and character abbreviations given in Coyle [1995]. Measurements in mm. Range, mean, and standard deviation given.): CTP = 7-11 (8.5±1.2), CDP = 0-1 (0.4±0.5), CTR = 8-12 (10.5±1.0), CDR = 6-12 (9.8±1.9), PTarS = 6-9 (8.0±1.0), ITarS = 0-2 (0.5±0.7), MC = 50-127 (94±25), CL = 3.47-5.24 (4.49±0.70), CW = 3.04-4.62 (3.94±0.59), CS = 0.52-0.85 (0.73±0.09), AMD = 0.20-0.28 (0.24±0.03), AMS = 0.09-0.19 (0.14±0.03), OQW = 1.00-1.48 (1.27±0.18), OL = 0.00-0.06 (0.03±0.02), SL = 1.92-2.78 (2.44±0.34), SW = 1.74-2.48 (2.16±0.30), IFL = 2.54-3.81 (3.27±0.50), ITL = 1.73-2.62 (2.25±0.34), IML = 1.81-2.62 (2.27±0.32), ITarL = 1.08-1.50 (1.30±0.16), LSL1 = 1.46-2.31 (1.89±0.30), LSL2 = 1.31-2.08 (1.70±0.28), LSL3 = 3.16-5.31 (4.32±0.76), CDR(100)/CL = 181-289 (224±53), CS(100)/CW = 16.2-23.1 (18.6±2.2), AMD(100)/CL = 4.4-6.1 (5.3±0.5), OQW(100)/CL = 27.3-29.9 (28.4±0.7), SW(100)/SL = 84-92 (88.6±2.3), ITL(100)/CL = 48-53 (50.2±1.3), LSL3(100)/CL = 89-102 (95±5).

Coyle (1995) cited several character states that were diagnostically useful in separating *I. lanka* from the other *Indothele* species. The only one of these that is now diagnostically less useful is OQW(100)/CL. The new (often slightly increased) ranges of character state variation for *I. lanka* females require no modification in the character state assignments used in Coyle's (1995) cladistic analysis and, therefore, do not contradict the hypothesis that *I. lanka* is the sister species of the three Indian species of *Indothele*.

### Acknowledgements

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