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To cite this article: Ratnayake Kaluarachchige Sriyani Dias, Seiki Yamane, Shahid Ali Akbar, Hetti Arachchige Wajira Swarnamali Peiris & Aijaz Ahmad Wachkoo (2019) Discovery of the worker caste of *Protanilla schoedli* Baroni Urbani & De Andrade (Formicidae: Leptanillinae) in Sri Lanka, *Oriental Insects*, 53:2, 160-166, DOI: [10.1080/00305316.2018.1476273](https://doi.org/10.1080/00305316.2018.1476273)

To link to this article: <https://doi.org/10.1080/00305316.2018.1476273>



Published online: 24 May 2018.



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# Discovery of the worker caste of *Protanilla schoedli* Baroni Urbani & De Andrade (Formicidae: Leptanillinae) in Sri Lanka

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## ABSTRACT

The worker caste of the ant species *Protanilla schoedli* is discovered and described for the first time based on specimens collected across Sri Lanka. The specimens examined demonstrate within-species morphological variations in body size, petiolar shape and colour. A distributional map and worker images to facilitate its identification are provided.

## ARTICLE HISTORY

Received 17 May 2017  
Accepted 9 May 2018

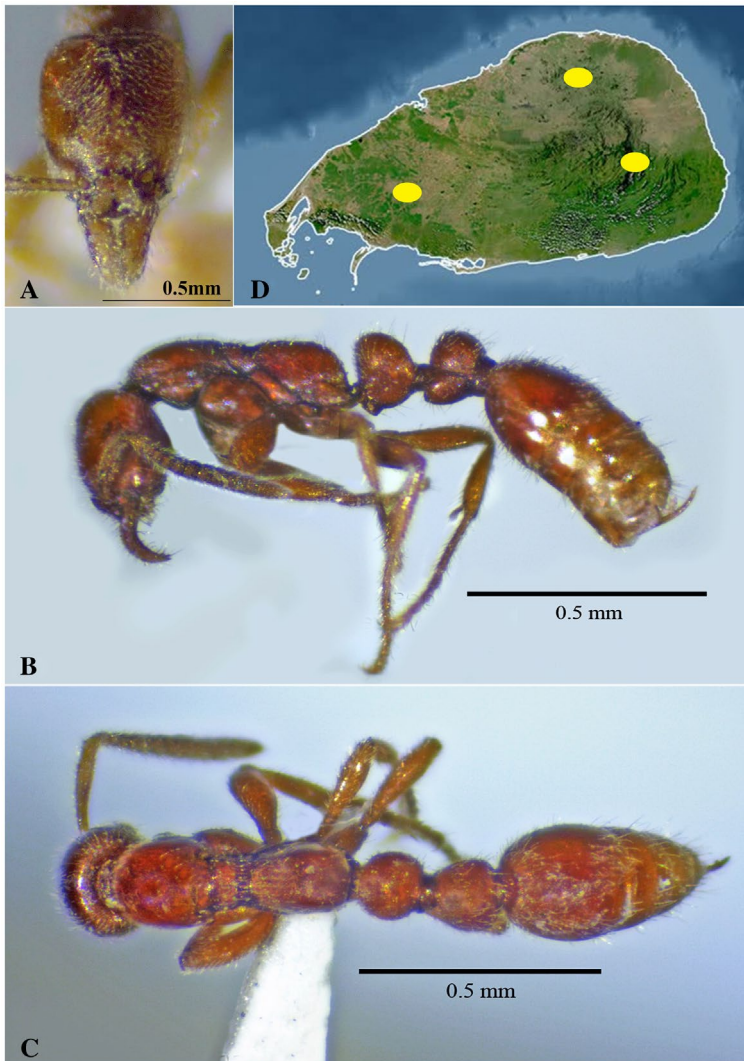
## KEYWORDS

Ants; worker; morphology;  
taxonomy; Sri Lanka

## Introduction

The ant subfamily Leptanillinae represents one of the early branches of the ant phylogeny (Moreau et al. 2006; Rabeling et al. 2008; Kück et al. 2011) with small subterranean workers difficult to collect (Masuko 1990). The subfamily is currently represented by 2 tribes, 9 genera, 65 species with members widely distributed in tropical and warm temperate regions of the Old World and Australian regions (Bolton 1990, 2017). The genus *Protanilla* Taylor is currently represented by 12 species distributed in South Palearctic, Oriental and Indo-Australian regions (Xu 2002, 2012; Bharti and Akbar 2015; Bolton 2017; Man et al. 2017; Hsu et al. 2017). These species are characterised by the antennal sockets that lie far back from the anterior margin of the head, labrum with a pair of minute peg-like dentiform setae and narrow triangular elongate mandibles bearing numerous peg-like teeth on its inner surface (Bolton 1990).

Little taxonomic or biogeographical information is available for the Sri Lankan *Protanilla*, with only one species known to date: *P. schoedli* Baroni Urbani & De Andrade, 2006. The erroneous mention of *P. rafflesi* Taylor, 1990 (Man et al. 2017)



**Figure 1A–D.** *Protanilla schoedli* worker. A, head, full-face view; B, body, lateral view; C, body, dorsal view; D, distribution map of *P. schoedli* in Sri Lanka.

from Sri Lanka is rectified here. This species is actually known only from Singapore and Malaysia. Baroni Urbani and De Andrade (2006) described *Protanilla schoedli* based on a single queen from Inginiyagala, Uva, Sri Lanka. In this paper, we describe the worker caste of *P. schoedli* for the first time.

### Material and methods

The ant specimens were collected by hand collection and soil sifting methods. The morphology was examined under an Optika SZM-LED2 stereo-microscope. For images, Sony Cybershot DSC WX80 digital camera was used on the same



**Figure 2A–D.** *Protanilla schoedli* holotype queen (AntWeb: CASENT0911228). A, head, full-face view; B, body, lateral view; C, body, dorsal view; D, labels of holotype (Photograph courtesy of Alexandra Westrich).

microscope. All specimens examined for this study are deposited at ZEMK and SKYC. Standard measurements and indices mentioned in the description are as defined in Bolton (1990) and Xu (2002). Measurements are provided in mm for the following body parts to second decimal using an ocular micrometer: TL—total body length in a straight line from mandibular apex to tip of gaster with body in profile; HL—maximum head length measured from midpoint of anterior clypeal margin to midpoint of posterior margin of head in full-face view; HW—maximum head width behind eyes in full-face view; SL—length of antennal scape, excluding basal condyle; MSL—mesosomal length, the diagonal length of the mesosoma in

profile view from the point at which the pronotum meets the cervical shield to the posterior base of the metapleuron; PW–maximum pronotal width in dorsal view; PNH–petiolar node height in profile; PNL–maximum length of the petiolar node in dorsal view; PNW–maximum width of the petiolar node in dorsal view; PPNH–post-petiolar node height in profile; PPNL–maximum length of the post-petiolar node in dorsal view; PPNW–maximum width of the post-petiolar node in dorsal view; CI–cephalic index =  $100 \times HW/HL$ ; SI–scape index =  $100 \times SL/HW$ .

### Abbreviation of depositories

ZEMK –The Department of Zoology and Environmental Management, University of Kelaniya, Sri Lanka.

SKYC – Seiki Yamane Collection, Japan.

### Results

#### *Protanilla schoedli* Baroni Urbani & De Andrade, 2006 (Figs. 1A–D, 2A–D)

*Protanilla schoedli* Baroni Urbani & De Andrade, 2006: 45; figs. 1–3 (queen)  
SRI LANKA.

*Material examined:* Sri Lanka: Sabaragamuwa Province, Ratnapura District, Pompekelle, 80 m, 6°41.152'N, 80°24.221'E, 2 workers, 18.ii.2004, 1 worker, 24.iii.2004, soil sifting, leg. RKS Dias; Gilimale Forest Reserve, 120 m, 6°45.523'N, 80°26.991'E, 2 workers, 03.ii.2008, hand collected, leg. RKS Dias; Sinharaja Forest Reserve, 120 m, 6°21'N and 80°21'E, 6°27'N, and 80°37'E, 4 workers, 28–31. xii.2005, soil sifting, leg. RKS Dias; North Central Province, Anuradhapura, Anuradhapura Sanctuary, 80 m, 8°20' N, 80°23' E, 3 workers, 03.ii.2008, hand collection, 3 workers, 07.ii.2008, soil sifting, leg. HAWS Peiris & RKS Dias.

Worker measurements: TL 2.6–2.8, HL 0.46–0.56, HW 0.38–0.45, SL 0.40–0.57, MSL 0.74–0.93, PW 0.30–0.32, PNH 0.20–0.31, PNL 0.22–0.25, PNW 0.20–0.26, PPNH 0.14–0.24, PPNL 0.17–0.23, PPNW 0.23–0.26, CI 77–94, SI 100–127 ( $n = 10$ ).

In full face view head longer than broad, narrowed anteriorly; posterior margin nearly straight with posterolateral corners rounded; lateral margins weakly convex. Clypeus trapezoidal, sharply demarcated posteriorly and laterally, with a longitudinal central depression; anterior margin shallowly concave. Mandible elongate triangular with a downwardly curved apex; masticatory margin with 14 peg-like teeth. Antenna 12-segmented with distal end of scape reaching posterolateral corner of head, flagellum weakly incrassate toward apex.

In profile view pronotum weakly convex and higher than propodeum. Mesothorax significantly constricted, promesonotal suture and metanotal groove distinct. Propodeum with almost straight dorsum and rounded posterodorsal corner, declivity nearly straight. Petiolar node narrowed apically and roughly



triangular, anterior margin straight, dorsal and posterior margins convex forming a single arch, anterodorsal corner narrowly rounded; subpetiolar process wedge-like, with an elliptical sub-transparent fovea; ventral margin of sternite weakly convex. Postpetiolar node erect, dorsal and anterior margins roundly convex with anterodorsal corner rounded; sternite anteriorly inclined and anteroventrally pointed, ventral margin convex. First gastral segment long, almost occupying 2/5 of the gaster. A well-developed sting present.

In dorsal view pronotum wide with convex lateral margins. Mesothorax constricted, short and narrow. Propodeum relatively wider than mesothorax with slightly convex lateral margins. Petiolar node weakly widening posteriorly, almost as broad as long. Postpetiolar node distinctly widening posteriorly, weakly longer and wider than petiolar node.

Body surface smooth and shiny, covered with abundant erect to suberect hairs and decumbent pubescence, head dorsum with dense pubescence. Antennae and legs with abundant suberect to subdecumbent hairs and dense decumbent pubescence. Mandibles and antennal sockets with long hairs. Body colour yellowish brown to reddish brown; mandibles, antennae, legs and gastral apex light yellow to yellowish brown.

*Worker variation:* Most of the within-species morphological variation in *P. schoedli* workers is manifested in the body size, petiolar shape and colour. This variation includes: lighter colouration in smaller workers with postpetiolar sternite much less produced, whereas in larger workers it is distinctly inclined anteriorly, with anterior margin of petiolar node more vertical and straight.

*Comments:* Type locality and overall similarity in the general appearance of the workers and the holotype queen, examined on AntWeb ([www.antweb.org](http://www.antweb.org)): CASENT0911228, render us reasonable to describe its worker caste. However, we need colony samples with queen to conclusively confirm this combination.

## Discussion

Ant fauna of Sri Lanka is highly diverse with high Indo-Malayan affinity and a high degree of endemism. However, like other insect groups the patterns of ant diversity and their distribution in the region is poorly explored. With regard to the subfamily Leptanillinae very little is known about the intra-specific variations among the specimens. The new additions to the subfamily are building up more knowledge about the limits of intra- and inter-specific variation within the subfamily and eventually will diagnose the subfamily in much better way than what is currently known (Hsu et al. 2017). In light of the recent success acquired by means of subterranean pitfall trap sampling (Man et al. 2017), it is highly possible that many more specimens and probably some new species will be discovered. From Sri Lanka perhaps more *Protanilla* ants await discovery as majority of the region is still unexplored.

## Acknowledgements

Financial support from National Science Foundation of Sri Lanka (RG 2003/ZOO/06 and RG 2007/EB/03) is acknowledged. Ms. Nadeeka Madushani, Ms. Dinushi Fernando and Mr. Krishan Rajapaksa (University of Kelaniya, Sri Lanka) are thanked for photographing and processing the images of *P. schoedli*. We are appreciative to our reviewers, especially Prof. Zhenghui Xu (College of Forestry, Southwest Forestry University, Yunnan Province, China) for very helpful comments and suggestions about the manuscript. We are grateful to AntWeb team ([www.antweb.org](http://www.antweb.org)) for their immensely useful work.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Funding

This work was supported by the National Science Foundation of Sri Lanka [grant number RG 2003/ZOO/06 and RG 2007/EB/03].

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