



Published by
www.researchtrend.net

First record of the species *Pheidole parva decanica* Forel, 1902 (Hymenoptera: Formicidae) from Kerala (India), with redescription

Presty John^{1, 3} and K.A.Karmaly²

¹Department of Zoology, Sacred Heart College, Thevara, 682013, Kerala, India

²Department of Zoology, St. Xaviers College for Women, Aluva, Kerala 683101, India.

³Current address- Forest Entomology, Kerala Forest Research Institute, Peechi, Thrissur, Kerala 680 653, India.

*Corresponding author: prestyjohn@gmail.com

| Received: 10 April 2015 | Accepted: 29 April 2015 |

ABSTRACT

Pheidole Westwood is generally known as big headed ants and the largest of all genera of plants and animals (Wilson, 2003). *Pheidole parva decanica* Forel, 1902 is recorded for the first time from Kerala. Detailed redescription of the species is provided. In addition distribution of the species is provided.

Key Words: *Pheidole parva decanica*, redescription, distribution, Kerala.

INTRODUCTION

Formicidae are the largest family under the order Hymenoptera. They act as ecological indicators, ecosystem engineers and one of the most diverse groups of insects. The genus *Pheidole* is one of the most specious diverse ant genera especially in tropical/subtropical regions (Wilson 2003). Due to its size and distribution, *Pheidole* is a very difficult genus and has been a challenge to myrmecologists taxonomically as well as biologically (Naves 1985). Kerala is one of the most species diverse states in India. It is rich in flora and fauna. But there is only a little information about the diversity, taxonomy, and distribution of *Pheidole* species. Surveys were carried out during 2010-2013. The species *Pheidole parva decanica* Forel are

redescribed here. The species was also compared with the closely resembled species.

MATERIAL AND METHODS

The specimens were collected by hand, food bait and by brush method from different localities of Kerala, which include hilly areas, marshy area, coastal regions, mid lands, wet lands, kid-arid to semi-arid regions and forests.

Species were analyzed using Leica MZ6 stereozoom microscope. Multi-focused montage images were produced using Leica DFC 295 camera attached to a Leica S8 APO Stereozoom trinocular microscope. Later, images were processed as per requirement with Adobe Photoshop CS3. Description format and morphological terminology for measurements and

indices follow Longino (2009) and Fischer (2013) and include: HL = Head length; maximum distance from the mid-point of the anterior clypeal margin to the mid-point of the posterior margin of the head, measured in full-face view; in majors from midpoint of tangent between anterior most positions of clypeus to midpoint of tangent between posterior most projections of the vertex; SL = Scape length; maximum scape length, excluding basal condyle and neck; MDL = Mandible length; maximum length of mandible measured in oblique fronto-lateral view, from apex to lateral base; EL = Eye diameter; maximum diameter of compound eye measured in oblique lateral view; PW = Pronotal width; maximum width of pronotum measured in dorsal view; WL = Webers length; Diagonal length of mesosoma in lateral view from the anterior point of the pronotal slope and excluding the neck, to the posterior- ventral margin of the propodeum; PSL = Propodeal spine length; In dorso-caudal view, with the apex of the measured spine, its base, and the centre of the propodeal concavity between the spines in focus: measurement is taken from apex to base along the one axis of a dual-axis micrometer, which is aligned along the length of the spine, crossing the second axis at the base of the measured spine, and the latter connecting the base with the centre of the propodeal concavity; PTH = Petiole length; maximum height of petiolar node measured in lateral view from the highest (median) point of the node, orthogonally, to the ventral outline of the node; PTW = Petiolar node width; maximum petiolar node width, measured in dorsal view; PPH= Post petiole height; maximum height of postpetiole in profile from uppermost to lowermost point, measured perpendicularly to tergosternal suture; PPL= Post petiole length; maximum length of post petiole in dorsal view between its visible anterior and posterior margin; PPW = Post petiole width; maximum width of post petiole from above/ in its dorsal view; CI = Cephalic index; $HW / HL \times 100$; EI = Eye index; $EL / HW \times 100$; SI = Scape index; $SL / HW \times 100$; MDI = Mandible index; $MDL / HW \times 100$; PSLI = Propodeal spine index; $PSL / HW \times 100$. All specimens are at SXC and will eventually transfer to ZSIWGRC.

Acronyms of depositories

MCZC = Museum of Comparative Zoology, Cambridge.
MHNG = Muséum d'Histoire Naturelle, Geneva, Switzerland.
NHMW= Naturhistorisches Museum, Wien, Austria.
SXC = St. Xavier's College for Women, Aluva, Kerala, India.
ZSIWGRC = Zoological Survey of India Western Ghats Regional centre, Calicut, Kerala, India.

TAXONOMIC DESCRIPTION

Pheidole parva decanica Forel

Figs. 1a-f

Pheidole parva Mayr, 1865: 98. Sri Lanka (NHMW).

Pheidole parva var. *decanica* Forel, 1902c: 175, India (MHNG)

Pheidole bugi Wheeler W. M, 1919f: 66. Borneo (MCZC) [Synonymised by Eguchi, 2008]

Pheidole rinae var. *mala* Forel, 1911a: 205 Java (MHNG) [Eguchi 2001b: 39] MHNG

Pheidole rinae r. *tipuna* Forel, 1912a: 68 Taiwan (MHNG) [Synonymised by Eguchi, 2001b]

Pheidole sauteri Wheeler W. M., 1909b: 334 Taiwan (MCZC) [Synonymised by Eguchi, 2001b]

Material examined: (1 Major) India: Kerala, Malappuram: Teak Museum 11° 18' N, 76° 15' E. 15.ii.2011, brush method; (1 Minor) India: Kerala, Malappuram: Teak Museum 11° 18' N, 76° 15' E. 15.ii.2011, food bait; (2 Majors, 2 Minors) India: Kerala, Calicut: Chevayoor 11° 16' N, 75° 49' E. 16.ii.2011, food bait; (1 Major) India: Kerala, Kollam: Munrothuruthu 8° 59' N, E 76° 36' E. 19.iii.2011, brush method; (1Minor) India: Kerala, Trivandrum: Vellayani 8° 26' N, 76° 59' E. 18.iv.2011, brush method; (1 Major) India: Kerala, Calicut: Thusharagiri 11° 27' N, 76° 2' E. 1.x.2010, hand picking; (2 Majors, 1 Minor) India: Kerala, Trivandrum: Parashala 8° 20' N, 77° 9' E. 24.x.2011, food bait; (1 Major, 1 Minor) India: Kerala, Calicut: Karaparamba 11° 17' N, 75° 46' E. 28.ii.2012, food bait; (3 Majors, 3 Minors) India: Kerala, Thrissur: Valakav 10° 30' N, 76° 17' E. 23.iv.2012, food bait; (2 Majors, 2 Minors) India: Kerala, Pathanamthitta: Achenkovil 9° 5' N, 77° 7' E. 04.iv.2012, food bait (Coll. Presty John).

Redescription

Major worker

Measurements and Indices (mm):

HW = 0.830, HL = 0.969, SL = 0.426, MDL = 0.433, EL = 0.126, WL = 0.765, PSL = 0.102, PPH = 0.217, PTH = 0.169, PTW = 0.205, PPW = 0.201, PW = 0.429, CI = 85.655, EI = 15.180, SI = 51.325, MDI = 052.168, PSLI = 12.289, PWI = 51.686, PpWI = 128.402, PeI = 39.393, PpI = 50.938.

Head: Distinctly longer (1.2x) than broad, rectangular, lateral sides parallel; occipital emargination deep (Fig 1: b), wide (0.419 mm); vertex transversely impressed (Fig 1: a); frontal carina short (0.435 mm), divergent posteriorly (0.461 mm); frontal lobe inconspicuous (Fig 1: b); antennal scrobe broad, shallow (Fig 1: b); clypeus acarinate, not emarginated anteriorly, concave, antero- medially incised; antennal groove distinct;

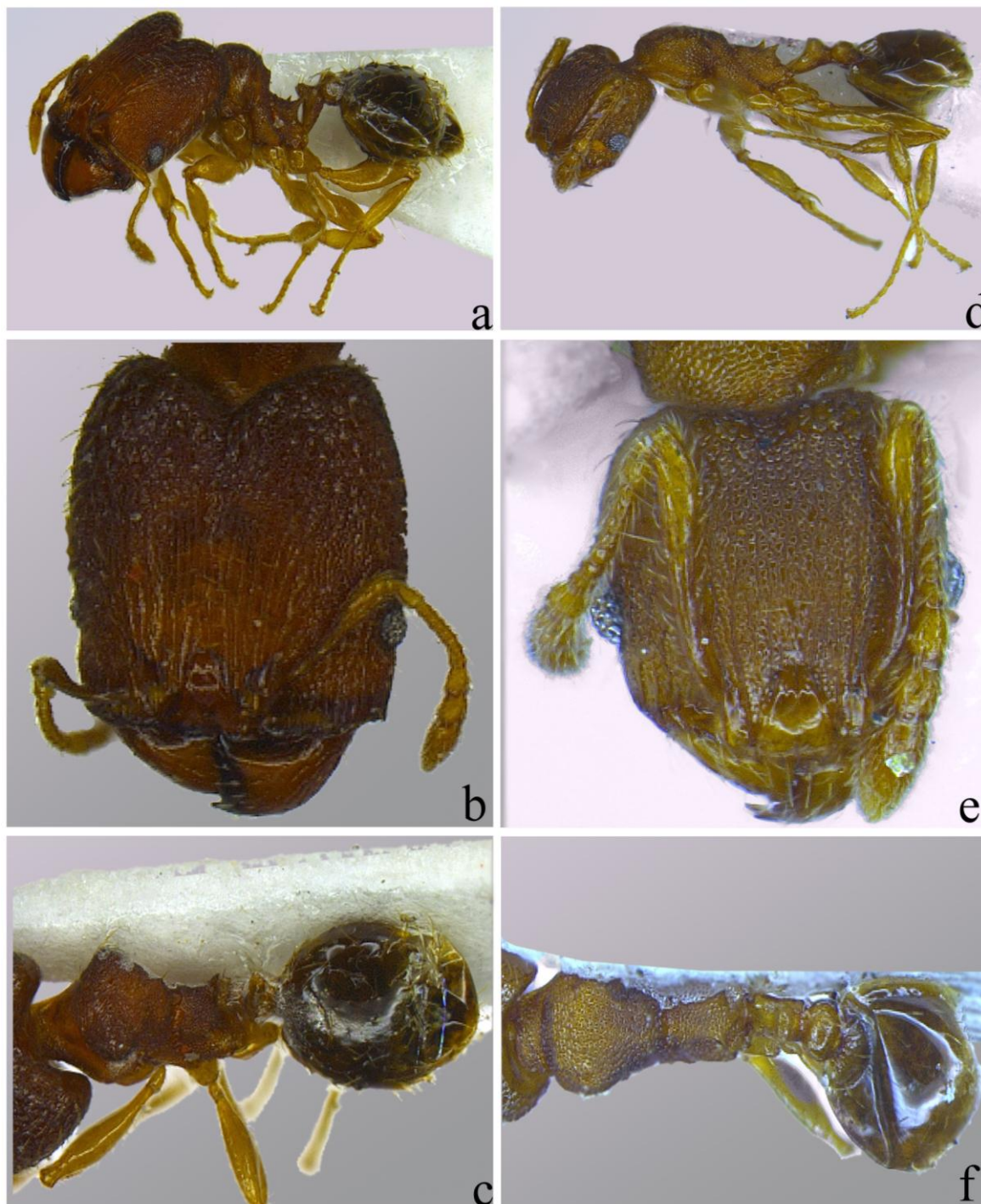


Fig.1. *Pheidole parva decanica* Forel **Major:** a) Body profile; b) Head dorsal view; c) Mesosoma dorsal view. **Minor:** d) Body profile; e) Head dorsal view, f) Mesosoma dorsal view.

scape short (0.426 mm), slender, cylindrical reaching upto half from its insertion to the top of head (Fig 1: b). F1 longer than all funicular segments (F1 = 0.090 mm, F2 = 0.037 mm, F3 = 0.036 mm, F4 = 0.031 mm, F5 = 0.029 mm, F6 = 0.053 mm, F7 = 0.027 mm, F8 = 0.028 mm). CL3 1.3x shorter than CL1 + CL2 (CL1 = 0.087 mm, CL2 = 0.089 mm, CL3 = 0.140 mm). Eyes small (0.126 mm), antero-laterally located, seven

ommatidia along longitudinal axis; malar space 1.7x longer than eye diameter; mandibles broad (0.433 mm), massive with two blunt teeth at apex.

Mesosoma and pedicel: Pronotum and mesonotum forming one convexity (Fig 1: a), pronotum attenuated anteriorly, dorsally tuberculate; promesonotal dome with weak prominence posteriorly; humeral area conspicuous, laterally

acute cones; promesonotal groove absent; mesometanotal groove shallow, equals with the height of first node of pedicel laterally (0.167 mm); basal, apical portion of metanotum sub-equal; metanotal spines acute (Fig 1: a), erect, short (0.102 mm); first node of pedicel without appendix beneath, raised medially, not emarginated anteriorly, above transverse, squamiform, 1.01x higher than second node laterally; second node of pedicel square, as long as broad (Fig 1: c), laterally rounded, 1.05x broader than first node dorsally.

Gaster: Longer than broad (0.8x), oval (Fig 1: c), opaque.

Sculpture: Head anteriorly, vertex, gena longitudinally striated (Fig 1: b); head posteriorly, laterally, occiput reticulated; mandibles smooth, polished, shining; mesosoma foveo-reticulate; katapistenum medially smooth, polished, shining; nodes of pedicel rugose; gaster anteriorly reticulo-punctate.

Vestiture: Sparse, short; head semi-erect hairs; gaster decumbent; scattered erect hairs on mesosoma; antennae, legs pubescent.

Colour: Head, mesosoma, pedicel bright chestnut red; gaster brown; legs brownish yellow; antennae darker than legs; pilosity reddish yellow.

Minor Worker

Measurements and Indices (mm):

HW = 0.458, HL = 0.478, SL = 0.392, MDL = 0.133, EL = 0.078, WL = 0.554, PSL = 0.06, PPH = 0.101, PTH = 0.126, PTW = 0.070, PPW = 0.130, PW = 0.229, CI = 95.815, EI = 17.030, SI = 85.589, MDI = 29.039, PSLI = 13.100, PWI = 50.00, PpWI = 185.714.

Head: Square (Fig 1: e), lateral sides parallel; occipital emargination distinct (Fig 1: e), wide (0.204 mm); occipital collar absent; vertex without transverse impression (Fig 1: d); frontal carina short (0.192 mm), parallel; frontal lobe inconspicuous not covering antennal groove; antennal groove distinct; scape long (0.392 mm), stout, cylindrical reaching upto the occipital emargination (Fig 1: e). F2 longer than all funicular segments (F1 = 0.036 mm, F2 = 0.039 mm, F3 = 0.038 mm, F4 = 0.019 mm, F5 = 0.021 mm, F6 = 0.023 mm, F7 = 0.017 mm, F8 = 0.026 mm). CL3 1.1x shorter than CL1 + CL2 (CL1 = 0.083 mm, CL2 = 0.081 mm, CL3 = 0.145 mm). Clypeus acarinate (Fig 1: e), medially emarginated; fronto-clypeal suture carinate; eyes small (0.078 mm), antero-medially located, 9- 10 ommatidia along longitudinal axis; malar space 1.08x longer than eye diameter; mandibles short (0.133mm), elongate; masticatory margin dentate.

Mesosoma and pedicel: Pronotum and mesonotum forming two different convexities (Fig 1: d), attenuated anteriorly; promesonotum forms a little dome (Fig 1: e) in its posterior declivity (Fig 1: f); humeral area inconspicuous; promesonotal groove absent; mesometanotal groove shallow (0.117 mm), wide; apical and basal portion of metanotum sub-equal; spines short (0.060 mm) stout, erect; first node of pedicel without appendix beneath, squamiform, transverse above, 1.04x higher than second node laterally; second node rounded (Fig 1: f), 1.9x broader than first node dorsally.

Gaster: 1.02x broader than long. Oval, opaque.

Sculpture: Head, mesosoma foveolate (Fig 1: e); nodes of pedicel punctate; gaster anteriorly reticulate; clypeus, mandibles and gaster posteriorly smooth (Fig 1: f), polished and shining.

Vestiture: Abundant, short; head laterally and gaster fully with decumbent hairs; erect hairs on mesosoma; head anteriorly with semi-erect hairs.

Colour: Head, mesosoma, pedicel reddish brown; gaster brown; legs, antennae; pilosity yellow.

Distribution: Myanmar, Sri Lanka, India [Meghalaya, West Khasi hills, Western India, Kerala (Malappuram, Calicut, Kollam, Trivandrum, Thrissur, Pathananthitta)].

Ecology: Nests behind leaf litter.

Remarks: The major worker of *P. parva decanica* Forel closely resembles *P. templaria* Forel in having 1. Head longer than broad; 2. Antennal groove distinct; 3. Mandibles smooth.

However *P. parva decanica* differs from *P. templaria* in having 1. Clypeus acarinate (in *P. templaria* clypeus carinated in middle); 2. Pronotum foveolate (in *P. templaria* pronotum smooth) 3. First node of pedicel squamiform (in *P. templaria* first node of pedicel triangular).

The minor worker of *P. parva decanica* closely resembles *P. templaria* in having 1. Scape not extending beyond the top; 2. Pronotum and mesonotum forming one convexity; 3. Gaster broadly oval, smooth.

However the minor worker of *P. parva decanica* differs from *P. templaria* in having 1. Posterior margin of head emarginate (in *P. templaria* posterior margin of head rounded); 2. Mesonotum entirely foveolate (in *P. templaria* mesonotum entirely not foveolate); Occipital collar absent (in *P. templaria* occipital collar present).

ACKNOWLEDGEMENTS

We wish to extend our gratitude to Kerala State Council for Science Technology and Environment, Trivandrum for providing financial assistance for carrying out this work. Also thankful to Dr. T.C Narendran for his moral support, encouragement and valuable suggestions throughout my research work. We also wish to thank Sr. Reethamma V A, Principal, St. Xavier's College for Women, Aluva for providing necessary facilities to carry out our work.

REFERENCES

- Eguchi, K. 2001b. A taxonomic study on Asian *Pheidole* (Hymenoptera, Formicidae): new synonymy, rank changes, lectotype designations and redescrptions. *Insecta Koreana* 18: 1-35
- Eguchi, K. 2008. A revision of North Vietnamese species of the ant genus *Pheidole*. *Zootaxa* 1902: 1-118.
- Fischer G, Fisher BL. 2013. A revision of *Pheidole* Westwood (Hymenoptera: Formicidae) in the islands of the Southwest Indian Ocean and designation of a neotype for the invasive *Pheidole megacephala*. *Zootaxa* 3683 (4): 301–356.
- Forel, A. 1902c. Myrmicinae nouveaux de l'Inde et de Ceylan. *Rev. Suisse Zool.* 10: 165-249.
- Forel, A. 1911a. Fourmis de Bornéo, Singapore, Ceylan, etc. récoltées par MM. Haviland, Green, Winkler, Will, Hose, Roepke et Waldo. *Rev. Suisse Zool.* 19: 23-62.
- Forel, A. 1912a. H. Sauter's Formosa-Ausbeute. Formicidae (Hym.). *Entomol. Mitt.* 1: 45-61.
- Longino JT. 2009. Additions to the taxonomy of New World *Pheidole*. *Zootaxa*, 2046: 1–90.
- Mayr, G. 1865. *Reise der Österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859, unter den befehlen des Commodore B. von Wüllerstorff-Urbair.* Zoologischer Theil. Formicidae: 119 pp. Wien. [14.xii.1865].
- Naves MA 1985. A monograph of the genus *Pheidole* in Florida, USA (Hymenoptera: Formicidae). *Insecta Mundi* 1: 53-90.
- Wheeler, W. M. 1909b. Ants collected by Prof. F. Silvestri in Mexico. *Boll. Lab. Zool. Gen. Agrar. R. Sc. Super. Agric.* 3: 228-238
- Wheeler, W. M. 1919f. The ants of Borneo. *Bull. Mus. Comp. Zool.* 63: 43-147.
- Wilson, E. O. 2003. *Pheidole* in the New World: A dominant, hyperdiverse ant genus. Cambridge, Mass.: Harvard University Press, [ix] + 794 pp.: 794pp.