

# Review of the Arabian rare ant genus *Parasyscia* Emery, 1882 (Hymenoptera: Formicidae) with description of a new species from the Asir Mountains, Saudi Arabia

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The Arabian species of the rare ant genus *Parasyscia* Emery, 1882 are reviewed. Two species are treated, *P. rifati* sp. n. and *P. wittmeri* (Collingwood, 1985). *Parasyscia rifati* sp. n. is described from the Asir Mountains, Saudi Arabia based on the worker and ergatoid gyne castes. A key to both species is presented. New locality records with a distribution map and biological notes are presented.

**Key words:** Dorylineae, Asir Province, Middle East, key, Afrotropical Region.

## INTRODUCTION

The ant genus *Parasyscia* was established by Emery (1882) for the newly described species *P. piochardi* Emery from Syria. The ant catalogue of the Neotropical Region (Kempf 1972) treated *Parasyscia* as a junior synonym of *Cerapachys* Smith, 1857, but was recently revived from synonymy by Borowiec (2016). The genus includes 50 described species (Bolton 2017) distributed throughout the warm temperate and tropical Old World (Borowiec 2016) and a few species in the subtropics (Fisher & Bolton 2016). Species of the genus are small in size, cryptic in nature, nesting in decaying logs (Collingwood 1985; Borowiec 2016) and under rocks (Brown 1975), and with a single arboreal species, *P. zimmermani* (Wilson 1959; Sarnat & Economo 2012).

Among the doryline genera, the worker caste of *Parasyscia* can be diagnosed by the combination of the following characters (Fisher & Bolton 2016; Borowiec 2016): eyes of variable sizes; terminal funicular segment swollen forming a distinct club; promesonotal suture absent; propodeal spiracle situated low on sides; propodeal lobes present; petiole with rounded sides in dorsal view; constriction between abdominal segments III and IV present; constriction between abdominal segments IV, V and VI absent; middle tibiae with a single pectinate spur; pretarsal claws unarmed,

and abdominal segment III anterodorsally often marginate.

The first species of *Parasyscia* recorded from the Arabian Peninsula was *P. wittmeri* Collingwood from the Asir Mountains in southwestern Kingdom of Saudi Arabia (K.S.A.) (Collingwood 1985). Two species were previously included in the genus *Cerapachys*, recorded from the region and recently transferred to different genera: *Lioponera longitarsus* Mayr, 1879 (= *Cerapachys longitarsus* (Mayr, 1879)) from K.S.A., United Arab Emirates (U.A.E.) and Yemen (Collingwood 1985; Collingwood & Agosti 1996; Collingwood *et al.* 2011; Collingwood & van Harten 2001), and *Eburopone wroughtoni* (Forel, 1910) (= *Cerapachys wroughtoni* (Forel, 1910); *Eburopone* as defined by Borowiec (2016) from U.A.E. (Collingwood *et al.* 2011).

In the present work the two Arabian species of *Parasyscia* are treated, *P. rifati* sp. n. and *P. wittmeri* (Collingwood, 1985).

## MATERIAL AND METHODS

### Measurements and indices

#### Measurements (Figs 1–3)

BL = body length; sum of lengths of head, mesosoma, petiole and gaster; EL = eye length;



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maximum length of compound eye in profile; HL = head length: in full-face view, maximum length of head from the mid-point of anterior clypeal margin to posterior margin of the head; HW = head width: width of head in full-face view, behind eyes; PH = petiole height: maximum height of petiole, measured from apex of node to ventral edge of petiole, parallel to anterior margin of petiole; PL = petiole length: maximum length of petiole measured in dorsal view; PRW = pronotal width: maximum width of pronotum in dorsal view; PW = petiole width: maximum width of petiole measured in dorsal view; SL = scape length: maximum straight-line length of scape shaft excluding condyle; TL = tempora length: measured from posterior margin of eye to posteromedian margin of head; WL = Weber's length: diagonal length of mesosoma in profile, from posteroventral margin of propodeal lobe to anterior-most point of pronotal slope, excluding the neck.

#### Indices

CI = cephalic index ( $HW/HL \times 100$ ); EI = eye index ( $EL/HW \times 100$ ); SI = scape index ( $SL/HW \times 100$ ).

Throughout the text, 'w' stands for worker or workers, 'q' for queen, and 'm' for male.

#### Institutional abbreviations

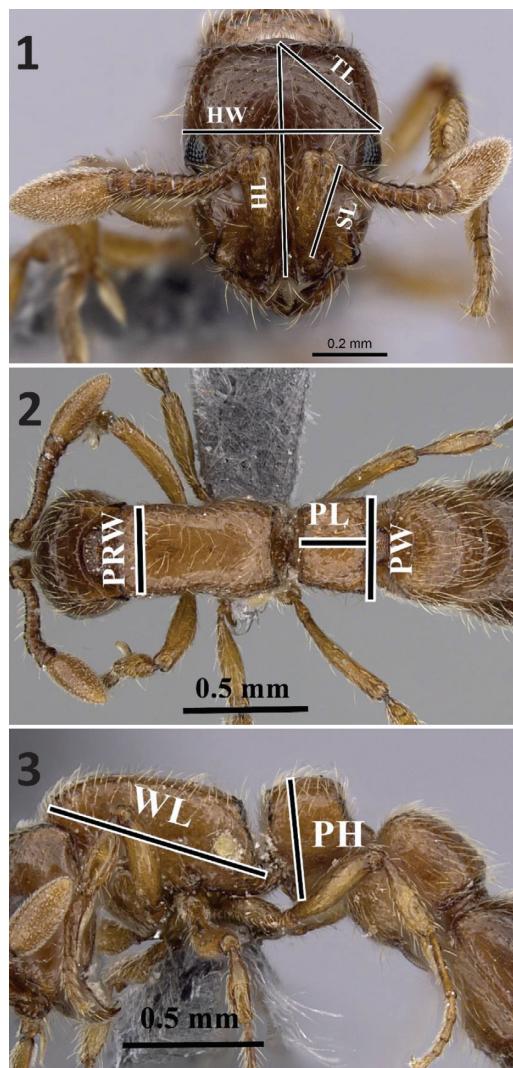
The collection abbreviations follow Lattke (2000).

CASC = California Academy of Sciences Collection, San Francisco, CA, U.S.A.; KSMA = King Saud University Museum of Arthropods, Plant Protection Department, College of Food and Agriculture Sciences, King Saud University, Riyadh, K.S.A.; WMLC = World Museum Liverpool, Liverpool, U.K.

## RESULTS

### Key to the Arabian *Parasyscia* Emery

1. Eyes small with five ommatidia in the longest row (EI 11–18) (Fig. 4); petiole nearly oval in dorsal view with rounded anterior and posterolateral angles (Fig. 5)
  - ..... *P. wittmeri* (Collingwood)
- Eyes larger with 11–12 ommatidia in the longest row (EI 15–30) (Fig. 6); petiole clearly trapezoidal in dorsal view with acute anterior and posterolateral angles (Fig. 7)
  - ..... *P. rifati* sp. n.



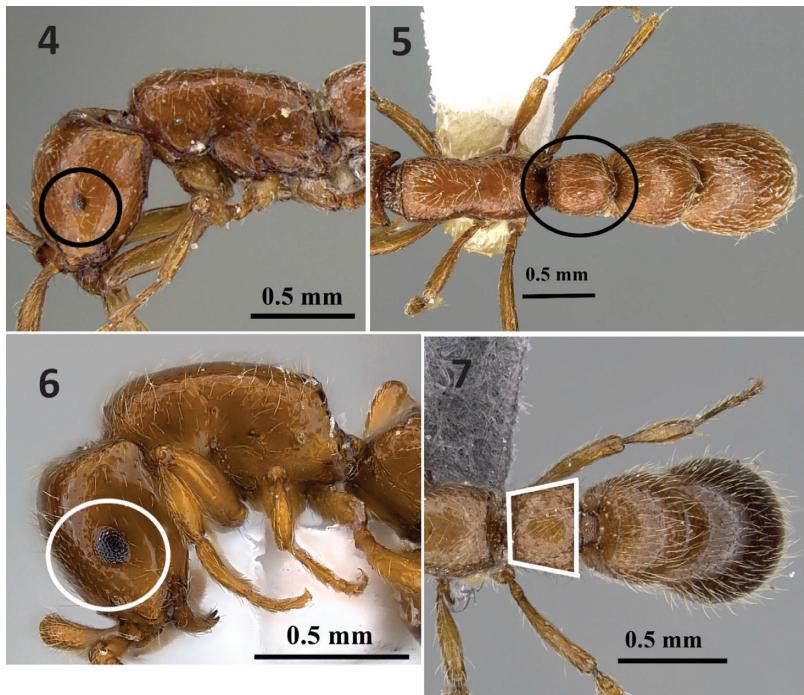
**Figs 1–3.** Images illustrating the used measurements of *Parasyrcia* species. **1**, Head in full-face view; **2**, body in dorsal view; **3**, body profile (all *P. rifati* sp. n., CASENT0263910, Antweb; photographs: W. Ericson).

### *Parasyrcia rifati* Sharaf & Akbar sp. n.

Figs 8–13

*Holotype*, pinned worker. K.S.A.: Al Bahah Province, Al Mukhwah, Dhi Ayn Archeological village, 19.929417°N 41.441722°E, 741 m, 15.v.2011, (M.R. Sharaf leg.) (CASENT0823938, KSMA).

*Paratypes*, pinned workers. K.S.A.: Al Bahah Province, Al Mukhwah, Dhi Ayn Archeological village, 19.9296°N 41.4433°E, 741 m, 18.iv.2010, (M.R. Sharaf leg.) (1 w, CASENT0217369); Al Bahah Prov-



**Figs 4–7.** *Parasyscia* key illustrations. 4, Head profile of *P. wittmeri* (Collingwood) showing eyes; 5, body in dorsal view of *P. wittmeri* showing petiole (both CASENT0922314, Antweb – Photographs: M. Esposito). 6, Head profile of *P. rifati* sp. n. showing eyes; 7, body in dorsal view of *P. rifati* showing petiole (both CASENT0263910, Antweb; photographs: W. Ericson).

ince, Al Mukhwah, Dhi Ayn Archeological village, 19.934583°N 41.442861°E, 744 m, 20.ix.2011, MRS0022, (M.R. Sharaf leg.) (5 w); same data as the holotype (2 w); Asir Province, Abha, Raydah, 18.193633°N 42.390333°E, 1772 m, 08.vi.2014, (Al Dhafer et al. leg.) (1 w); Asir Province, Mahayel Asir, Wadi Al Hilah, 18.502017°N 42.036983°E, 11.ii.2016, (A. Al Ansi leg.) (1 w) all in KSMA; Al Bahah Province, Al Mukhwah, Dhi Ayn Archeological village, 19.9296°N 41.44285°E, 750 m, 20.ix.2011, (B.L. Fisher leg.) (1 w, CASENT0263910, CASC). Paratype pinned queen: Al Bahah Province, Al Mukhwah, Dhi Ayn Archeological village, 19.934583°N 41.442861°E, 744 m, 20.ix.2011, MRS0022, (M.R. Sharaf leg.) (1 w, CASENT0823939, KSMA).

#### Measurements

*Holotype.* BL 2.85; EL 0.12; HL 0.57; HW 0.45; PH 0.35; PL 0.25; PRW 0.37; PW 0.37; SL 0.32; TL 0.30; WL 0.72. Indices. CI 79; EI 27; SI 71.

*Paratype workers.* BL 2.50–3.47; EL 0.07–0.17; HL 0.60–0.72; HW 0.47–0.57; PH 0.32–0.47; PL 0.27–0.37; PRW 0.32–0.45; PW 0.35–0.45;

SL 0.25–0.45; TL 0.25–0.37; WL 0.70–0.92. Indices: CI 78–89; EI 15–30; SI 49–79 ( $n = 9$ ).

#### Worker (Figs 8–10)

*Diagnosis.* *Parasyscia rifati* can be diagnosed by the combination of the following characters: eyes moderately large with 11–12 ommatidia in the longest row; petiole appears trapezoidal in dorsal view with acute anterior and posterolateral angles; mesosoma, petiole, appendages and first gastral segment yellow or yellow-brown, head and rest of gastral tergites brown.

*Head.* Distinctly longer than broad in full-face view, with nearly straight posterior margin and feebly convex sides; antennae 11 segments; mandibles with two minute reduced basal denticles; torulo-posttorular complex well developed; scapes when laid back from their insertions fail to reach posterior margin of eyes; funicular segments 2–8 distinctly broader than long; preapical segment nearly as long as broad; apical funicular segment swollen forming a distinct club nearly as long as rest of funicular segments except first segment; eyes of moderate size (EI 15–30) with 11–12

ommatidia in longest row. *Mesosoma*. Promesonotal and metanotal sutures absent; posterior margin of propodeum feebly concave in dorsal view; propodeum little broader than mesosoma in dorsal view. *Petiole*. Appears trapezoidal in dorsal view, with nearly straight anterior and posterior margins. *Sculpture*. Body surface punctate. *Pilosity*. Torulo-posttorular complex with a single hair; pale suberect hairs abundant over entire body surfaces. *Colour*. Mesosoma, petiole, legs, antennae and first gastral segment yellow or yellow-brown, head and rest of gastral segments brown.

#### *Ergatoid gyne* (Figs 11–13)

BL 2.92; EL 0.12; HL 0.65; HW 0.52; PH 0.32; PL 0.35; PRW 0.37; PW 0.42; SL 0.40; TL 0.35; WL 0.87. Indices: CI 80; EI 23; SI 77 ( $n = 1$ ).

*Head*. Distinctly longer than broad in full-face view, with nearly straight posterior margin and feebly convex sides; antennae 12 segments; mandibles with two minute reduced basal denticles; torulo-posttorular complex well developed; scapes when laid back from their insertions fail to reach posterior margin of eyes; funicular segments 2–8 distinctly broader than long; preapical



8



9



10



11



12



13

**Figs 8–10.** *Parasyscia rifati* sp. n. **8**, Body profile; **9**, body in dorsal view; **10**, head in full-face view (all CAS-ENT0263910, Antweb; photographs: W. Ericson).

**Figs 11–13.** Gyne of *Parasyscia rifati* sp. n. **11**, Body profile; **12**, body in dorsal view; **13**, head in full-face view (photographs: A.S. Alola).

two segments nearly as long as broad; apical funicular segment swollen forming a distinct club; eyes moderately large (EI 23) with more than 20 ommatidia in longest row; ocelli well developed. *Mesosoma*, *Petiole*, *Sculpture*, *Pilosity* and *Colour* matching all characters of worker caste.

**Etymology.** The patronymic name (*P. rifati*) has been selected in honour of the late famous Egyptian Qura'an reader Sheikh Muhammad Rifat (1882–1950).

**Habitat.** In the Asir Mountains several workers were foraging in moist leaf litter under a large fig tree while material from Asir Province, Abha, Raydah, were collected by pitfall traps. Otherwise, nothing is known of the ecology or biology of the species.

**Comments.** This new species is the second species known from the Arabian Peninsula. *Parasyscia rifati* is morphologically closest to *P. kenyensis* (Consani, 1951) from Kenya in terms of colour and body measurements. However, *P. rifati* can be easily separated from *P. kenyensis* by the larger eyes, with 11–12 ommatidia in the longest row, the shorter scapes that fail to reach posterior margin of eyes, the superficial punctures over body surface, and the shining cephalic surface, whereas *P. kenyensis* has smaller eyes, with 1–5 ommatidia in the longest row, longer scapes that surpass posterior margin of eyes, deep punctures over body surface, and dull cephalic surface. *Parasyscia rifati* is readily distinguished from the Arabian species *P. wittmeri* Collingwood by the characters given in the key.

#### ***Parasyscia wittmeri* (Collingwood, 1985),**

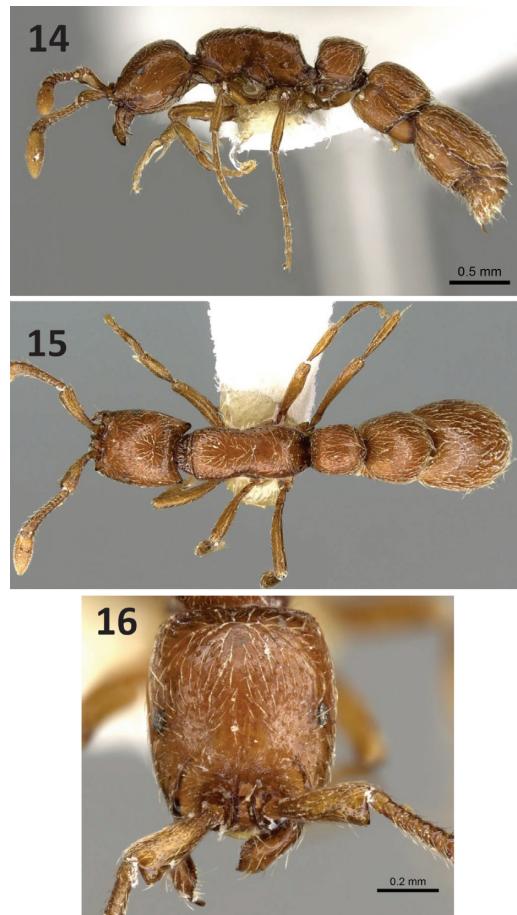
Figs 14–16

*Cerapachys wittmeri* Collingwood, 1985: 237, fig. 8 w. Saudi Arabia. Afrotropic. Combination in *Parasyscia*: Borowiec, 2016: 205. (WMLC), [http://www.antweb.org/specimen/CAS\\_ENT0922314](http://www.antweb.org/specimen/CAS_ENT0922314). Holotype worker [examined].

#### **Worker (Figs 14–16)**

**Measurements.** BL 1.75–3.40; EL 0.05–0.10; HL 0.45–0.87; HW 0.45–0.57; PH 0.27–0.45; PL 0.25–0.35; PRW 0.30–0.42; PW 0.25–0.42; SL 0.27–0.40; TL 0.35–0.40; WL 0.62–0.90. Indices: CI 63–100; EI 11–18; SI 53–74 ( $n = 8$ ).

**Diagnosis.** *Parasyscia wittmeri* Collingwood can be diagnosed by the combination of the following characters: eyes distinctly small with five ommatidia in longest row; petiole appears oval in dorsal



**Figs 14–16.** *Parasyscia wittmeri* (Collingwood). 14, Body profile; 15, body in dorsal view; 16, head in full-face view (CASENT0902708, Antweb; photographs: Z. Lieberman).

view with curved anterior and posterolateral angles; uniform yellow or red-yellow.

**Head.** Distinctly longer than broad in full-face view, with straight posterior margin and feebly convex sides; antennae with 11 segments; scapes when laid back from their insertions surpass posterior margin of eyes in full-face view; funicular segments 2–8 distinctly broader than long; preapical segment little longer broad; apical funicular segment swollen forming a distinct club nearly as long as rest of funicular segments except first segment; eyes small with five ommatidia in longest row. *Mesosoma*. Promesonotal and metanotal sutures absent; posterior margin of propodeum feebly concave in dorsal view. *Petiole*. In dorsal view broader posteriorly than anteriorly.

*Sculpture.* Body surface punctate. *Pilosity.* Pale suberect hairs abundant over entire body surfaces. *Colour.* Uniformly yellow or red-yellow.

*Material examined.* K.S.A.: Asir Province, Abha, Raydah, 18.201583°N 42.408933°E, 2578 m, 26.viii.2014, P.T. (Al Dhafer *et al.* leg.) (4 w, KSMA); Asir Province, Al Kola, Al Harajah, Dhahran, 17.919764°N 43.371031°E, 10.iv.1983, (C.A. Collingwood leg) (1 paratype w, CASENT0906333, 1 paratype w, CASENT0902708, WMLC).

*Habitat.* This species was found in soil under a stone in grazed scrubby pasture (Collingwood 1985).

#### Material of unknown *Parasyscia*

##### *Parasyscia sa01*, Figs 17–20

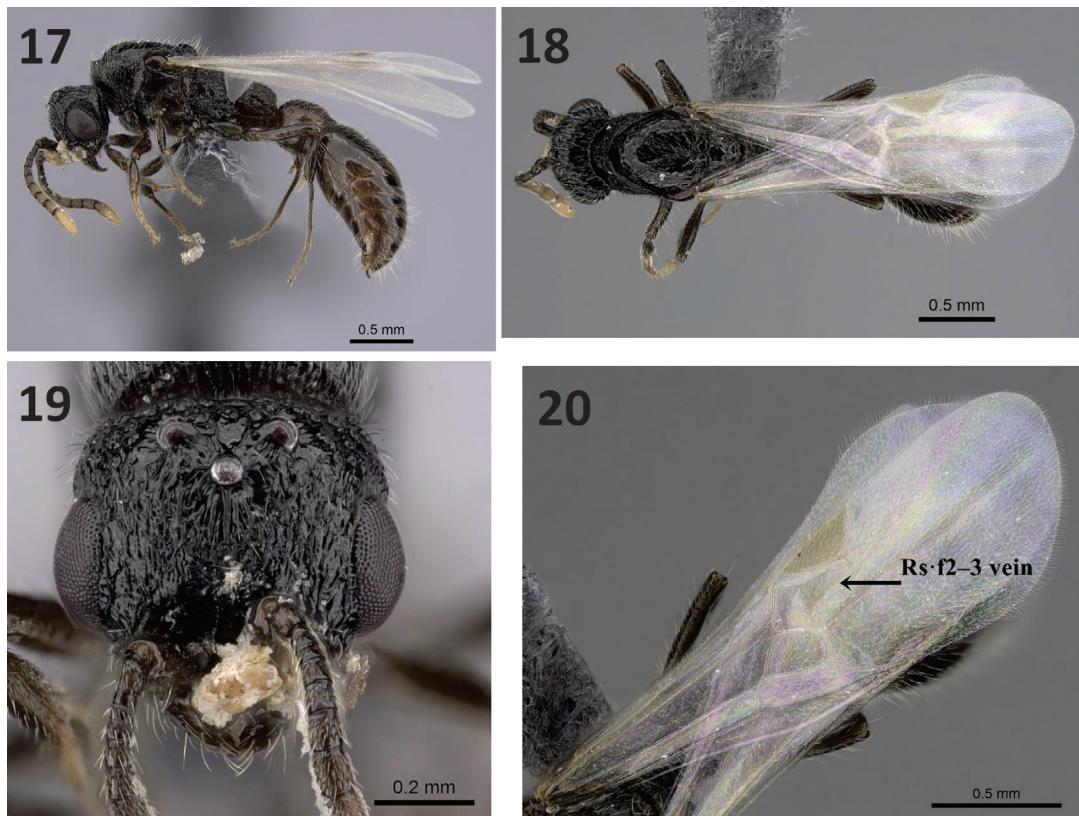
###### Male

*Head.* Little broader than long with nearly straight posterior margin in full-face view; anten-

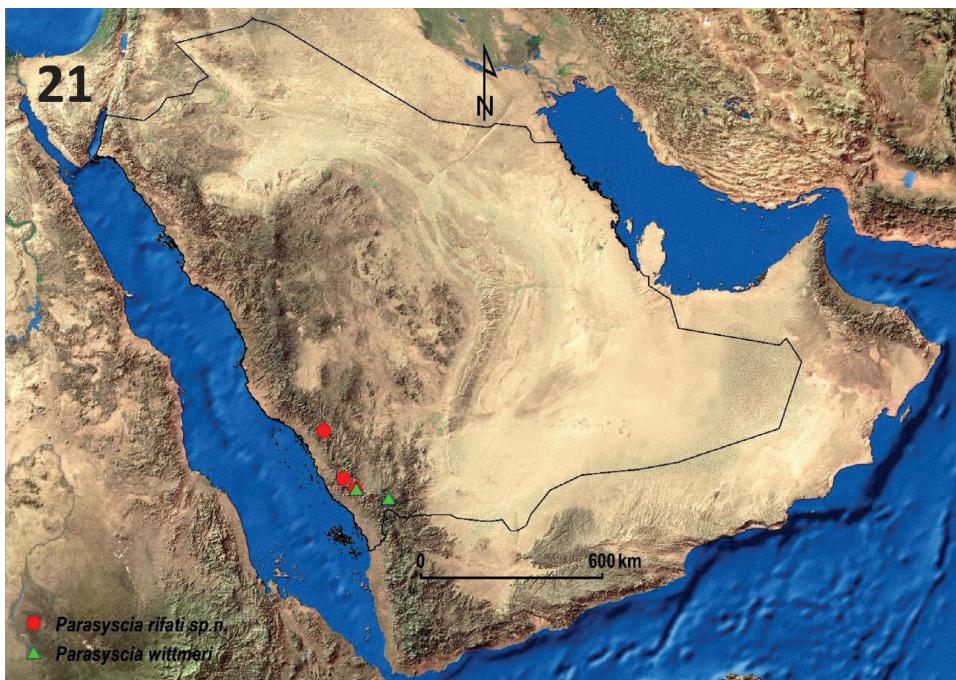
nae with 13 segments; mandibles triangular with six small dents. *Mesosoma.* Transverse mesopleural and metapleural grooves distinct; propodeal dorsum making an obtuse angle with declivity in profile; propodeal lobes present;  $Rs \cdot f2-3$  vein present in forewing. *Petiole.* A massive node with inclined anterior surface and rounded dorsum. *Sculpture.* Cephalic surface, mesosoma, and petiole irregularly rugulose and glossy; mandibles smooth and shining; anepisternum, katepisternum and gaster smooth and shining. *Pilosity.* All body surface covered with short suberect hairs. *Colour.* Uniformly black.

*Material examined.* K.S.A.: Al Bahah Province, Al Mukhwah, Dhi Ayn Archeological village, 19.9296°N 41.44285°E, 750 m, 20.ix.2011, (B.L. Fisher leg.) (1 m, CASENT0263903, CASC).

*Note.* The single male specimen was found foraging in leaf litter in a shaded place under a *Ficus* tree at Dhi Ayn archeological village (Al Bahah Province). Since this male has not been found in associ-



**Figs 17–20.** *Parasympsa sa01*, male. **17**, Body profile; **18**, body in dorsal view; **19**, head in full-face view; **20**, wing venation (all CASENT0263903, Antweb; photographs: W. Ericson).



**Fig. 21.** Distribution map of *Parasyscia* species on the Arabian Peninsula (M.S. Adel-Dayem).

ation with worker castes, it is difficult to predict to which species it belongs and perhaps it represents a third species. We prefer to treat it as a male of unknown species of *Parasyscia*.

## DISCUSSION

Due to the cryptic nature of *Parasyscia* species, and colonies apparently with relatively few individuals (Borowiec 2016), the genus is one of the rarest ants known from the Arabian Peninsula. Little material is available for examination in regional museums and collections. In more than 30 years of collecting efforts in the region (Collingwood 1985; Collingwood & Agosti 1996), in addition to extensive surveys by the senior author, only 28 workers, a single gyne and a male have been collected. The direct methods are not useful for collecting this group of ants but pitfall traps are successful. Most specimens from the Asir Mountains of southwestern K.S.A. were collected by pitfalls. The majority of species are known from workers whereas sexual castes are rarely collected.

The zoogeography of the southwestern mountains of the Arabian Peninsula have Afrotropical affinities (Eig 1938; Zohary 1973; Collingwood 1985; Lehrer & Abou-Zied 2008; Doha 2009;

Aldawood et al. 2011; Sharaf & Aldawood 2011, 2013; Sharaf et al. 2012a, b, c, 2014, 2015, 2017; El-Hawagry et al. 2013, 2015). The available geographical data on the species revealed a restricted regional distribution confined to the southwestern mountains of the Arabian Peninsula (Fig. 21). The genus *Parasyscia* is represented in the Afrotropical Region by 14 species (Fisher & Bolton 2016). This study along with records in Collingwood (1985) and Collingwood & Agosti (1996) provide further evidence of the Afrotropical faunal affinities of the southwestern mountains of the Arabian Peninsula.

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