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An update to the taxonomy and distribution of the Arabian *Tapinoma* Foerster, 1850 (Hymenoptera: Formicidae) with an illustrated key and remarks on habitats

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Abstract

Background

Tapinoma Foerster belongs to the ant subfamily Dolichoderinae and the vast majority of its species are arboreal or generalized foragers. The genus is composed of 71 described species and 24 known subspecies worldwide, while from Arabian Peninsula, three species have been recorded so far.

New information

Ants of the genus *Tapinoma* of the Arabian Peninsula are reviewed, keyed and illustrated based on the worker caste. Three species are diagnosed, *T. melanocephalum* (Fabricius, 1793), *T. simrothi* Krausse, 1911, and *T. wilsoni* Sharaf & Aldawood, 2012. We present the first illustrated key to the Arabian *Tapinoma* enhanced by automontage images to facilitate species recognition. New distributional data for species are presented based on recently collected material from the region and literature records. Information on habitats preference and biology of species are given.

Keywords

Afrotropical region, Dolichoderinae, endemic, Middle East

Introduction

The Arabian Peninsula, in western Asia, covers a surface area of 3.2 million km² comprising Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates (UAE), and Yemen (Fig. 1). It turns out to be a very interesting biogeographic area, since it straddles the Afrotropical, the Palaearctic and, to a lesser extent, the Oriental realms (Larsen 1984, Hölzel 1998). With its location at the interchange of three biogeographic realms, the Arabian Peninsula shares faunal elements from those three regions (Zunino and Zullini 1995, Abdel-Dayem et al. 2018, Abdel-Dayem et al. 2019, Ziani et al. 2019, Abdel-Dayem et al. 2020, Letardi et al. 2020). Several faunistic contributions have shed light on zoogeography of the Arabian ants, indicating the predominance of Afrotropical species in the southwestern mountains of the Arabian Peninsula and extending southward to Yemen and eastwards to the Dhofar Province of Oman, while the species from the Palearctic prevail outside this mountainous range including the vast desert regions of the central and northern Arabia in addition to the countries of the eastern region (Kuwait, Bahrain, Oman, Qatar and UAE) (Collingwood 1985, Collingwood and Agosti 1996, Collingwood et al. 1997, Collingwood et al. 2011, Sharaf et al. 2014, Sharaf et al. 2018, Sharaf et al. 2020a, Sharaf et al. 2020b, Sharaf et al. 2021).

The genus *Tapinoma* was created with the type-species *T. collina* (junior synonym of *Tapinoma erraticum*), by monotypy (Foerster 1850). With 71 described species, 24 known subspecies and six valid fossil species, *Tapinoma* is one of the largest genera of the subfamily Dolichoderinae (Bolton 2020). The vast majority of species are arboreal (Shattuck 1992) or generalized foragers (Brown 2000), with a remarkable preference of attending honeydew producing insects (Venkataramaiah and Rehman 1989).

The genus was recorded and keyed for the first time from the Arabian Peninsula, by two species, *Tapinoma melanocephalum* (Fabricius 1793) and *T. simrothi* Krausse 1911 collected from the Kingdom of Saudi Arabia (KSA) and Oman (Collingwood 1985). The faunal study of the ant species of the Arabian Peninsula (Collingwood and Agosti 1996) reported *T. melanocephalum* from Yemen and *T. simrothi* from Kuwait and Yemen. *Tapinoma melanocephalum* and *T. simrothi* were collected from UAE by Collingwood et al. (1997), Collingwood et al. (2011). The rare species *T. wilsoni* Sharaf & Aldawood, 2012 was described from the Al Sarawat Mountains of Saudi Arabia based on the worker caste (Sharaf et al. 2012) and recently, the queen caste was discovered with the first key to the Arabian *Tapinoma* based on the queen caste (Al-keridis et al. 2021). More recently, Sharaf et al. (2020) reported *T. melanocephalum* and *T. simrothi* from the state of Qatar.

Tapinoma melanocephalum and *T. simrothi*, are widely spread either in urban sites and wild habitats of the Arabian Peninsula including agricultural fields and date palm farms. The two species are frequently collected by research projects concerned with the environment and agriculture of the region. Due to the documented relationships between numerous dolichoderine ants (e.g. *T. simrothi*) and a wide range of sap sucking insects as mealybugs (e.g. Sharaf and Aldawood 2011, Xu et al. 2019) and aphids (e.g. Addicott 1978,

Venkataramaiah and Rehman 1989), ecological and biological studies of these ant species are necessary from an agricultural perspective since it is likely they contribute in the protection and distribution of such agricultural pests.

The aims of this study are to provide an illustrated systematic key to facilitate *Tapinoma* species recognition, study the geographical distribution of species, and give notes on species habitat preference.

Materials and methods

During the present study 457 specimens were collected from countries of the Arabian Peninsula (Suppl. material 1) using different collecting techniques including hand picking (HP), Light trap (LT), Malaise trap (MT), pitfall trap (PT), sifting tray (SF), sweeping net (SW), and Yellow Pan trap (YPT). Specimens were examined using a stereomicroscope Leica M205 with an optical resolution of 0.952 μm , 20.5:1 zoom, 7.8 x to 160 x magnification, and up to 1050 lp/mm resolution (with 2.0x objective). Digital color images of each species are taken using a Leica DFC450 digital camera with a Leica Z16 APO microscope and LAS (v3.8) software. The images are available online on AntWeb (<http://www.AntWeb.org>) and are accessible through unique specimen identifiers (e.g., CASENT0906356). The species names follow the online catalogue of ants of the world (Bolton 2020). Distribution maps were made using DIVA-GIS (version 7.5.0.0). Throughout the work “w” stands for worker/workers, “q” for queen castes.

Abbreviations of Museums

BMNH, The Natural History Museum, London, United Kingdom

CASC, California Academy of Sciences, San Francisco, USA.

KSMA, King Saud University Museum of Arthropods, College of Food and Agriculture Sciences, King Saud University, Riyadh, Saudi Arabia.

JWPC, James Wetterer Private Collection, Wilkes Honors College, Florida Atlantic University, 5353 Parkside Drive, Jupiter, FL 33458, USA

WMLC, World Museum Liverpool, Liverpool, U.K.

Taxon treatments

Tapinoma melanocephalum (Fabricius, 1793)

- GBIF <https://www.gbif.org/species/1316805>

Nomenclature

Formica melanocephala Fabricius, 1793: 353 (w.) [Note: neotype w. designated by: Guerrero 2018: 499. Colombia: Magdalena. Guerrero, 2018: 499, also nominates “paraneotypes”. Under ICZN rules no such category exists.] French Guiana. Neotropic.

Materials

- a. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Qurayat;
verbatimElevation: 39 m; decimalLatitude: 23.2046; decimalLongitude: 58.9692;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2016-04-08;
individualCount: 1; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf;
identifiedBy: Mostafa R. Sharaf; dateIdentified: 2016; language: en; collectionCode:
KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
PreservedSpecimen
- b. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Ayn Hamran;
verbatimElevation: 106 m; decimalLatitude: 17.09952; decimalLongitude: 54.28403;
georeferenceProtocol: label; samplingProtocol: Sweeping; eventDate: 2017-11-20;
individualCount: 3; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf;
identifiedBy: Mostafa R. Sharaf; dateIdentified: 2017; language: en; collectionCode:
KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
PreservedSpecimen
- c. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Ayn Hamran;
verbatimElevation: 56 m; decimalLatitude: 17.08631; decimalLongitude: 54.28043;
georeferenceProtocol: label; samplingProtocol: Sifting try; eventDate: 2017-11-22;
individualCount: 10; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf;
identifiedBy: Mostafa R. Sharaf; dateIdentified: 2017; language: en; collectionCode:
KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
PreservedSpecimen
- d. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Ayn Sahlanot;
verbatimElevation: 151 m; decimalLatitude: 17.14766; decimalLongitude: 54.17878;
georeferenceProtocol: label; samplingProtocol: Malaise trap; eventDate: 2017-11-16;
individualCount: 2; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf;
identifiedBy: Mostafa R. Sharaf; dateIdentified: 2017; language: en; collectionCode:
KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
PreservedSpecimen
- e. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Dhalkout;
verbatimElevation: 34 m; decimalLatitude: 16.70703; decimalLongitude: 53.25068;
georeferenceProtocol: label; samplingProtocol: Sifting try; eventDate: 2017-11-19;
individualCount: 11; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf;
identifiedBy: Mostafa R. Sharaf; dateIdentified: 2017; language: en; collectionCode:
KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
PreservedSpecimen
- f. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Dhalkout;
verbatimElevation: 43 m; decimalLatitude: 16.70492; decimalLongitude: 53.24453;
georeferenceProtocol: label; samplingProtocol: Sifting try; eventDate: 2017-11-18;
individualCount: 7; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf;
identifiedBy: Mostafa R. Sharaf; dateIdentified: 2017; language: en; collectionCode:

- KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- g. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Dhalkout Rd., Aghbaroot Village; verbatimElevation: 1034 m; decimalLatitude: 16.79818; decimalLongitude: 53.55392; georeferenceProtocol: label; samplingProtocol: Sifting try; eventDate: 2017-11-18; individualCount: 2; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2017; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- h. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: El-Ebreien; verbatimElevation: 903 m; decimalLatitude: 23.14069; decimalLongitude: 57.31261; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2017-01-21; individualCount: 3; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2017; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- i. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Alraha Village; verbatimElevation: 74 m; decimalLatitude: 23.56665; decimalLongitude: 58.1763; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2017-01-18; individualCount: 8; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2017; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- j. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Muscat; verbatimElevation: 81 m; decimalLatitude: 23.6176; decimalLongitude: 58.49364; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2016-04-07; individualCount: 6; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2016; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- k. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Salalah; decimalLatitude: 17.02; decimalLongitude: 54.08; georeferenceProtocol: label; samplingProtocol: none specified; eventDate: 1905-06-07; individualCount: 1; sex: worker; lifeStage: adult; recordedBy: M. Gallagher; identifiedBy: Cedric A. Collingwood; dateIdentified: 1988; language: en; collectionCode: WMLC; datasetName: Ants; basisOfRecord: PreservedSpecimen
- l. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Wahiba Sands; decimalLatitude: 21.33; decimalLongitude: 59.13; georeferenceProtocol: label; samplingProtocol: none specified; eventDate: 1905-06-06; individualCount: 1; sex: worker; lifeStage: adult; recordedBy: M. Gallagher; identifiedBy: Cedric A. Collingwood; dateIdentified: 1988; language: en; collectionCode: WMLC; datasetName: Ants; basisOfRecord: PreservedSpecimen
- m. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Alkhoud Village; verbatimElevation: 63 m; decimalLatitude: 23.57154; decimalLongitude: 58.12166; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2017-01-19; individualCount: 5; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2017; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen

- n. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Fanga;
 verbatimElevation: 166 m; decimalLatitude: 23.45336; decimalLongitude: 58.11807;
 georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2017-01-20;
 individualCount: 4; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf;
 identifiedBy: Mostafa R. Sharaf; dateIdentified: 2017; language: en; collectionCode:
 KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
 PreservedSpecimen
- o. scientificName: *Tapinoma melanocephalum* ; country: Oman; locality: Nakhl;
 verbatimElevation: 322 m; decimalLatitude: 23.38803; decimalLongitude: 57.82937;
 georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2016-04-02;
 individualCount: 3; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf;
 identifiedBy: Mostafa R. Sharaf; dateIdentified: 2016; language: en; collectionCode:
 KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
 PreservedSpecimen
- p. scientificName: *Tapinoma melanocephalum* ; country: Qatar; locality: Rawdet Rashed;
 decimalLatitude: 25.233433; decimalLongitude: 51.204767; georeferenceProtocol: label;
 samplingProtocol: Hand picking; eventDate: 2005-03-12; individualCount: 1; sex: worker;
 lifeStage: adult; recordedBy: Mahmoud Abdel-Dayem; identifiedBy: Mostafa R. Sharaf;
 dateIdentified: 2005; language: en; collectionCode: KSMA; datasetName: Ants;
 ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- q. scientificName: *Tapinoma melanocephalum* ; country: Saudi Arabia; locality: Wadi
 Bagara; verbatimElevation: 436 m; decimalLatitude: 18.79287; decimalLongitude:
 42.01857; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate:
 2012-11-10; individualCount: 2; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf;
 identifiedBy: Mostafa R. Sharaf; dateIdentified: 2012; language: en; collectionCode:
 KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
 PreservedSpecimen
- r. scientificName: *Tapinoma melanocephalum* ; country: United Arab Emirates; locality:
 Palm Deira; decimalLatitude: 25.276; decimalLongitude: 55.3; georeferenceProtocol:
 label; samplingProtocol: none specified; eventDate: 2012-05-16; individualCount: 1; sex:
 worker; lifeStage: adult; recordedBy: James Wetterer; identifiedBy: James K. Wetterer;
 dateIdentified: 2012; language: en; collectionCode: JWPC; datasetName: Ants;
 basisOfRecord: PreservedSpecimen
- s. scientificName: *Tapinoma melanocephalum* ; country: United Arab Emirates; locality: Al-
 Jubail; decimalLatitude: 25.351; decimalLongitude: 55.382; georeferenceProtocol: label;
 samplingProtocol: none specified; eventDate: 2012-05-16; individualCount: 1; sex:
 worker; lifeStage: adult; recordedBy: James Wetterer; identifiedBy: James K. Wetterer;
 dateIdentified: 2012; language: en; collectionCode: JWPC; datasetName: Ants;
 basisOfRecord: PreservedSpecimen
- t. scientificName: *Tapinoma melanocephalum* ; country: Yemen; locality: Dehejamo;
 verbatimElevation: 563 m; decimalLatitude: 12.59049; decimalLongitude: 54.05205;
 georeferenceProtocol: label; samplingProtocol: none specified; eventDate: 2014-04-22;
 individualCount: 9; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf;
 identifiedBy: Mostafa R. Sharaf; dateIdentified: 2014; language: en; collectionCode:
 KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
 PreservedSpecimen
- u. scientificName: *Tapinoma melanocephalum* ; country: Yemen; locality: Dixam, Wadi
 Zereg; verbatimElevation: 279 m; decimalLatitude: 12.46868; decimalLongitude:
 54.01091; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate:
 2014-04-24; individualCount: 6; sex: worker; lifeStage: adult; recordedBy: Mostafa

- Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- v. scientificName: *Tapinoma melanocephalum*; country: Yemen; locality: Himihil Protectorate; verbatimElevation: 372 m; decimalLatitude: 12.57615; decimalLongitude: 54.30651; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-04-23; individualCount: 3; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- w. scientificName: *Tapinoma melanocephalum*; country: Yemen; locality: Lehanoh; verbatimElevation: 931 m; decimalLatitude: 12.57583; decimalLongitude: 54.04836; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-04-22; individualCount: 2; sex: worker; lifeStage: adult; recordedBy: Mostafa Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen

Diagnosis

Worker. This is an easily recognized species by the bicolored body (Fig. 2a, b), with head and mesosoma pale brown to dark brown, antennae, maxillary palps and mandibles pale brown to yellow, gaster and legs pale yellow. Head in full-face view with scapes when laid back from their insertions surpass posterior margin of head (Fig. 2c); eyes located in front of midlength of head (Fig. 2c). The size is small (1.20–1.90 mm) and mesosoma without dorsal hairs.

Previous records: **KUWAIT:** Kuwait City, 29.37°N, 47.98°E (Collingwood and Agosti 1996). **OMAN:** Hawiyah, 22.39°N, 58.85°E (Collingwood 1988); Mintirib, 22.56°N, 58.03°E (Collingwood 1988); Salalah, 17.02°N, 54.08°E (Collingwood 1988); Umm Qishrib, (Collingwood 1988); Wahiba sands, 21.33°N, 59.13°E (Collingwood 1985). **QATAR:** Rawdet Rashed, 25°14.006'N, 51°12.286'E (Sharaf et al. 2020b). **SA:** Hofuf (Collingwood 1985); Al Qatif, (Collingwood 1985). **UAE:** Abu Dhabi, Al-Ain, 24.13°N, 55.80°E (Collingwood et al. 2011); Abu Dhabi, Al-Ajban, 24.56°N, 55.34°E (Collingwood et al. 2011); Sharjah, Sharjah Desert Park, 25.28°N, 55.70°E (Collingwood et al. 2011). **YEMEN:** Aden Chalet, 12.83°N, 45.00°E (Collingwood and Agosti 1996); Socotra Is., Hoq, 12.60°N, 54.35°E (Collingwood et al. 2004); Socotra Is., Wadi Daneghan, 12.62°N, 54.07°E (Collingwood et al. 2004); Socotra Is., Goeeh, 12.53°N, 54.17°E (Collingwood et al. 2004); Socotra Is., Farmihin, 12.53°N, 53.93°E (Collingwood et al. 2004); Socotra Is., Dirhashas, 12.53°N, 53.86°E (Collingwood et al. 2004); Socotra Is., Homhil, 12.57°N, 54.32°E (Collingwood et al. 2004); Lahj, 13.06°N, 44.88°E (Collingwood and van Harten 2001); Al Kowd, 13.09°N, 45.37°E (Collingwood and van Harten 2001); Mayfa'ah, 14.33°N, 46.00°E (Collingwood and van Harten 2001).

Distribution

Tapinoma melanocephalum is a widely distributed invasive species that is spread by human commerce especially in tropics and subtropics of Old World and New World

(Wetterer 2009) with unknown native range. The species is widely spread in several countries of the Arabian Peninsula including SA and Oman (Collingwood 1985), Yemen (Collingwood and Agosti 1996), UAE (Collingwood et al. 1997), the Socotra Archipelago (Sharaf et al. 2017), and recently, it has been reported from Qatar (Sharaf et al. 2020b).

Ecology

The species inhabits a broad range of habitats worldwide (Sharaf et al. 2017) including both humid and dry soil of wild and urban localities, in homes, restaurants, hospitals, well-heated buildings, and greenhouses (Wetterer 2009), under bark and stones, in leaf litter, and sometimes nests are built in walls and potted plants indoors (Smith and Whitman 1992, Ellison et al. 2012), in moist soil of lawn and grasses, and under debris (Oster and Wilson 1978), or in opportunistic places (Hölldobler and Wilson 1990). In the Socotra Archipelago (Yemen) the species was observed foraging on a tree located on a mountainside next to a stream drainage where the soil was moist and the area was dominated by the ponerine ant, *Brachyponera sennaarensis* (Mayr, 1862) and *Adiantum capillus-veneris* L. (Pteridaceae) (Sharaf et al. 2017). It also inhabits localities rich in organic matter of animal faeces in date palm plantations (*Phoenix dactylifera* L.) (Sharaf et al. 2017). Workers attend honeydew-excreting insects for honeydew (Venkataramaiah and Rehman 1989) and also feed on both dead and live insects and when disturbed workers are running erratically and rapidly. (Smith 1965).

Tapinoma simrothi Krausse, 1911

- GBIF <https://www.gbif.org/species/1316856>

Nomenclature

Tapinoma erraticum var. *simrothi* Krausse, 1911a: 18 (w.) Italy (Sardinia). Palearctic.

Materials

- scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Khobar, Prince Sultan Palace; verbatimElevation: 8 m; decimalLatitude: 26.34625; decimalLongitude: 50.2177; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2013-12-20; individualCount: 9; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2013; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Qatif, Ar Rimal; decimalLatitude: 26.49865; decimalLongitude: 50.00488; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2013-12-17; individualCount: 5; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2013; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Buraydah; verbatimElevation: 633 m; decimalLatitude: 26.2159; decimalLongitude: 44.041383; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2011-09-17;

- individualCount: 9; sex: worker; lifeStage: adult; recordedBy: M.R. Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2011; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- d. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Afif; verbatimElevation: 1052 m; decimalLatitude: 23.90005; decimalLongitude: 42.88075; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2015-01-17; individualCount: 1; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2015; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- e. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Al Aflag, Layla; verbatimElevation: 562 m; decimalLatitude: 22.23719; decimalLongitude: 46.69951; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-01-21; individualCount: 3; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- f. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Al Ghat; verbatimElevation: 670 m; decimalLatitude: 26.02495; decimalLongitude: 44.9365; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-06-07; individualCount: 2; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- g. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Al Ghat; verbatimElevation: 679 m; decimalLatitude: 26.02219; decimalLongitude: 44.9876; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-09-13; individualCount: 3; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- h. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Al Ghat; verbatimElevation: 653 m; decimalLatitude: 26.06582; decimalLongitude: 44.91929; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2015-10-31; individualCount: 3; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2015; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- i. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Al Hayer; verbatimElevation: 587 m; decimalLatitude: 24.55755; decimalLongitude: 46.74115; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2013-10-09; individualCount: 6; sex: worker; lifeStage: adult; recordedBy: M.R. Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2013; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- j. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Al Hayer; verbatimElevation: 467 m; decimalLatitude: 24.54645; decimalLongitude: 46.74156; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-04-11; individualCount: 4; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- k. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Al Kharij; verbatimElevation: 453 m; decimalLatitude: 24.1436; decimalLongitude: 47.24252; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-01-19; individualCount: 3; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:

- Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- l. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Al Kharj;
verbatimElevation: 451 m; decimalLatitude: 24.29615; decimalLongitude: 47.15553;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-09-08;
individualCount: 9; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
 - m. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Ammariya;
verbatimElevation: 633 m; decimalLatitude: 23.8333; decimalLongitude: 45;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2008-07-07;
individualCount: 17; sex: worker; lifeStage: adult; recordedBy: M.R. Sharaf; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2008; language: en; collectionCode: KSMA;
datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
 - n. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Dirab;
verbatimElevation: 604 m; decimalLatitude: 24.41867; decimalLongitude: 46.65408;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-09-18;
individualCount: 5; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
 - o. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Hawtat Bani Tamim;
verbatimElevation: 582 m; decimalLatitude: 23.45943; decimalLongitude: 46.81895;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2015-02-19;
individualCount: 1; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2015; language: en; collectionCode: KSMA;
datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
 - p. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Hawtat Sudayr;
verbatimElevation: 732 m; decimalLatitude: 25.59162; decimalLongitude: 45.61245;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2015-01-31;
individualCount: 2; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2015; language: en; collectionCode: KSMA;
datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
 - q. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Huraymila;
verbatimElevation: 785 m; decimalLatitude: 25.127861; decimalLongitude: 46.088278;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2011-02-07;
individualCount: 9; sex: worker; lifeStage: adult; recordedBy: M.R. Sharaf; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2011; language: en; collectionCode: KSMA;
datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
 - r. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Huraymila;
verbatimElevation: 791 m; decimalLatitude: 25.12799; decimalLongitude: 46.11783;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-02-22;
individualCount: 4; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
 - s. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Huraymila;
verbatimElevation: 785 m; decimalLatitude: 25.09757; decimalLongitude: 46.10106;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-02-22;
individualCount: 9; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen

- t. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Huraymila;
 verbatimElevation: 786 m; decimalLatitude: 25.12037; decimalLongitude: 46.12265;
 georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-02-22;
 individualCount: 5; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
 Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
 datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- u. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Huraymila;
 verbatimElevation: 771 m; decimalLatitude: 25.12636; decimalLongitude: 46.15782;
 georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-02-22;
 individualCount: 4; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
 Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
 datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- v. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Huraymila;
 verbatimElevation: 801 m; decimalLatitude: 25.09358; decimalLongitude: 46.08141;
 georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-02-22;
 individualCount: 2; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
 Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
 datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- w. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: King Saud University
 Campus; verbatimElevation: 687 m; decimalLatitude: 24.716667; decimalLongitude:
 46.616667; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate:
 2009-10-19; individualCount: 3; sex: worker; lifeStage: adult; recordedBy: M.R. Sharaf;
 identifiedBy: Mostafa R. Sharaf; datelIdentified: 2009; language: en; collectionCode:
 KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
 PreservedSpecimen
- x. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: King Saud University
 Campus; verbatimElevation: 687 m; decimalLatitude: 24.716667; decimalLongitude:
 46.616667; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate:
 2013-03-15; individualCount: 18; sex: worker; lifeStage: adult; recordedBy: S. Salman;
 identifiedBy: Mostafa R. Sharaf; datelIdentified: 2013; language: en; collectionCode:
 KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
 PreservedSpecimen
- y. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: King Saud University
 Campus; verbatimElevation: 671 m; decimalLatitude: 24.721683; decimalLongitude:
 46.622083; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate:
 2013-03-11; individualCount: 28; sex: worker; lifeStage: adult; recordedBy: S. Salman;
 identifiedBy: Mostafa R. Sharaf; datelIdentified: 2013; language: en; collectionCode:
 KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
 PreservedSpecimen
- z. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: King Saud University
 Campus; verbatimElevation: 681 m; decimalLatitude: 24.72185; decimalLongitude:
 46.621183; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate:
 2013-03-07; individualCount: 8; sex: worker; lifeStage: adult; recordedBy: S. Salman;
 identifiedBy: Mostafa R. Sharaf; datelIdentified: 2013; language: en; collectionCode:
 KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord:
 PreservedSpecimen
- aa. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Majmaa;
 verbatimElevation: 722 m; decimalLatitude: 25.91771; decimalLongitude: 45.33556;
 georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-06-05;
 individualCount: 4; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:

- Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- ab. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Majmaa;
verbatimElevation: 746 m; decimalLatitude: 25.93117; decimalLongitude: 45.35802;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-09-13;
individualCount: 3; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
- ac. datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Malham;
verbatimElevation: 711 m; decimalLatitude: 25.15427; decimalLongitude: 46.28214;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-09-15;
individualCount: 3; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
- ad. datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Mozahmyia;
verbatimElevation: 677 m; decimalLatitude: 24.45125; decimalLongitude: 46.20202;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-01-25;
individualCount: 9; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
- ae. datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Mozahmyia;
verbatimElevation: 641 m; decimalLatitude: 24.46553; decimalLongitude: 46.2201;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-01-25;
individualCount: 2; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
- af. datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Mozahmyia;
verbatimElevation: 648 m; decimalLatitude: 24.48388; decimalLongitude: 46.26317;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-01-25;
individualCount: 2; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
- ag. datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Na'jan;
verbatimElevation: 513 m; decimalLatitude: 24.06858; decimalLongitude: 47.1725;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-12-13;
individualCount: 6; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA;
- ah. datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Oyaina;
verbatimElevation: 749 m; decimalLatitude: 24.90665; decimalLongitude: 46.389917;
georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2010-04-28;
individualCount: 2; sex: worker; lifeStage: adult; recordedBy: M.R. Sharaf; identifiedBy:
Mostafa R. Sharaf; datelIdentified: 2010; language: en; collectionCode: KSMA;
- ai. datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Riyadh City, Al Emam
University; verbatimElevation: 650 m; decimalLatitude: 24.81658; decimalLongitude:
46.71162; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate:
2014-09-08; individualCount: 15; sex: worker; lifeStage: adult; recordedBy: S. Salman;
identifiedBy: Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode:

- KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- aj. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Shaqra; verbatimElevation: 728 m; decimalLatitude: 25.26655; decimalLongitude: 45.26779; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-05-30; individualCount: 5; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- ak. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Shaqra; verbatimElevation: 891 m; decimalLatitude: 25.12131; decimalLongitude: 45.48365; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2015-01-23; individualCount: 1; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datelIdentified: 2015; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- al. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Tebrak; verbatimElevation: 724 m; decimalLatitude: 24.32406; decimalLongitude: 45.47128; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-11-29; individualCount: 1; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- am. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Thadiq; verbatimElevation: 735 m; decimalLatitude: 25.2936; decimalLongitude: 45.87102; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-04-26; individualCount: 1; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- an. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Wadi El Dawaser; verbatimElevation: 706 m; decimalLatitude: 20.49008; decimalLongitude: 44.76018; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-01-22; individualCount: 6; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datelIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- ao. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Wadi El Dawaser; verbatimElevation: 686 m; decimalLatitude: 22.7774; decimalLongitude: 44.78624; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2015-02-22; individualCount: 5; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datelIdentified: 2015; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- ap. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Wadi El Dawaser; verbatimElevation: 694 m; decimalLatitude: 22.47942; decimalLongitude: 44.78839; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2015-02-22; individualCount: 3; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datelIdentified: 2015; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- aq. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Wadi Hanifa; verbatimElevation: 633 m; decimalLatitude: 24.658983; decimalLongitude: 46.60345; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2010-01-15; individualCount: 6; sex: worker; lifeStage: adult; recordedBy: M.R. Sharaf; identifiedBy: Mostafa R. Sharaf; datelIdentified: 2010; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen

- ar. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Wadi Hanifa; verbatimElevation: 641 m; decimalLatitude: 24.67088; decimalLongitude: 46.59513; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2013-04-11; individualCount: 3; sex: worker; lifeStage: adult; recordedBy: M.R. Sharaf; identifiedBy: Mostafa R. Sharaf; datedIdentified: 2013; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- as. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Wadi Hanifa; verbatimElevation: 654 m; decimalLatitude: 24.67089; decimalLongitude: 46.58061; georeferenceProtocol: label; samplingProtocol: Pitfall trap; eventDate: 2014-02-14; individualCount: 1; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datedIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- at. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Wadi Hanifa; verbatimElevation: 684 m; decimalLatitude: 24.74123; decimalLongitude: 46.56113; georeferenceProtocol: label; samplingProtocol: Pitfall trap; eventDate: 2014-09-18; individualCount: 1; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datedIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- au. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Wadi Hanifa; verbatimElevation: 674 m; decimalLatitude: 24.73507; decimalLongitude: 46.57518; georeferenceProtocol: label; samplingProtocol: Pitfall trap; eventDate: 2014-09-18; individualCount: 3; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datedIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- av. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Wadi Janadriya; verbatimElevation: 603 m; decimalLatitude: 24.8773; decimalLongitude: 46.82031; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2014-11-19; individualCount: 4; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datedIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- aw. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Wadi Qarina; verbatimElevation: 633 m; decimalLatitude: 25.9365; decimalLongitude: 46.833; georeferenceProtocol: label; samplingProtocol: Pitfall trap; eventDate: 2009-11-05; individualCount: 4; sex: worker; lifeStage: adult; recordedBy: M.R. Sharaf; identifiedBy: Mostafa R. Sharaf; datedIdentified: 2009; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- ax. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Zulfi; verbatimElevation: 635 m; decimalLatitude: 26.27192; decimalLongitude: 44.77071; georeferenceProtocol: label; samplingProtocol: Pitfall trap; eventDate: 2014-01-18; individualCount: 4; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datedIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- ay. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Zulfi; verbatimElevation: 623 m; decimalLatitude: 26.27996; decimalLongitude: 44.80443; georeferenceProtocol: label; samplingProtocol: Pitfall trap; eventDate: 2014-01-18; individualCount: 12; sex: worker; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; datedIdentified: 2014; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- az. scientificName: *Tapinoma simrothi* ; country: Saudi Arabia; locality: Oyaina; verbatimElevation: 749 m; decimalLatitude: 24.90665; decimalLongitude: 46.389917;

georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2010-04-28; individualCount: 1; sex: queen; lifeStage: adult; recordedBy: M.R. Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2010; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen

ba. scientificName: *Tapinoma simrothi*; country: Saudi Arabia; locality: Wadi El Dawaser; verbatimElevation: 686 m; decimalLatitude: 22.7774; decimalLongitude: 44.78624; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2015-02-22; individualCount: 1; sex: queen; lifeStage: adult; recordedBy: S. Salman; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2015; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen

Diagnosis

Worker. Head in full-face view with strongly convex sides and nearly straight posterior margin (Fig. 3c); anterior central margin with a median well-defined notch, that is clearly deeper than broad; with head in full-face view, scape surpassing posterior margin of head by about one third of its length (Fig. 3c); metanotal groove distinct (Fig. 3a); propodeal dorsum short meeting declivity in an obtuse angle; color uniform dark brown to black, tarsi yellow-brown; whole body covered with appressed pubescence (Fig. 3a, b).

Previous records: **KUWAIT:** Failaka Island; Kuwait; Wadi Umm al-Rumam (Collingwood & Agosti 1996). **OMAN:** Wahiba sands (Collingwood 1985). **SA:** Al Qatif (Collingwood 1985). **UAE:** Al-Ain (Collingwood et al. 2011). **YEMEN:** Al-Mahwit (Collingwood and Agosti 1996).

Distribution

A Palearctic species (Borowiec 2014) originally described from Italy. It is broadly distributed species in the Arabian Peninsula (Collingwood 1985, Collingwood and Agosti 1996, Collingwood et al. 2011, Sharaf et al. 2018), Egypt (Sharaf 2006), Iran (Pashaei Rad et al. 2018), and Turkey (Kiran and Karaman 2012).

Ecology

In the SA, *T. simrothi* was found nesting among roots of lawn, attending mealybugs, and coexisting with *Solenopsis abdita* (Sharaf and Aldawood 2011). The species also attends *Aphis gossypii* Glover, 1877 for honey dew and the latter gains protection from predators in return (Karami-jamour et al. 2018). The species was nesting under stones next to *Acacia* trees of the desert habitats of the Riyadh Province.

Tapinoma wilsoni Sharaf & Aldawood, 2012

- GBIF <https://www.gbif.org/species/8745285>

Nomenclature

Tapinoma wilsoni Sharaf & Aldawood, 2012c: 38, figs. 1-3 (w.) Saudi Arabia. Afrotropic.

Materials

- a. scientificName: *Tapinoma wilsoni* ; country: Saudi Arabia; locality: Dhi Ayn Archaeological Village; verbatimElevation: 741 m; decimalLatitude: 19.9297; decimalLongitude: 41.4427; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2011-05-15; individualCount: 1; sex: worker; lifeStage: adult; recordedBy: M.R. Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2012; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- b. scientificName: *Tapinoma wilsoni* ; country: Saudi Arabia; locality: Dhi Ayn Archaeological Village; verbatimElevation: 741 m; decimalLatitude: 19.9297; decimalLongitude: 41.4427; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2011-05-15; individualCount: 29; sex: worker; lifeStage: adult; recordedBy: M.R. Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2012; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- c. scientificName: *Tapinoma wilsoni* ; country: Saudi Arabia; locality: Dhi Ayn Archaeological Village; verbatimElevation: 741 m; decimalLatitude: 19.9297; decimalLongitude: 41.4427; georeferenceProtocol: label; samplingProtocol: Yellow pan trap; eventDate: 2015-04-11; individualCount: 3; sex: worker; lifeStage: adult; recordedBy: A. Polaszek; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2015; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen
- d. scientificName: *Tapinoma wilsoni* ; country: Saudi Arabia; locality: Dhi Ayn Archaeological Village; verbatimElevation: 735 m; decimalLatitude: 19.9297; decimalLongitude: 41.4427; georeferenceProtocol: label; samplingProtocol: none specified; eventDate: 2011-09-23; individualCount: 1; sex: queen; lifeStage: adult; recordedBy: F.S. Esteves; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2012; language: en; collectionCode: CASC; basisOfRecord: PreservedSpecimen
- e. scientificName: *Tapinoma wilsoni* ; country: Saudi Arabia; locality: Dhi Ayn Archaeological Village; verbatimElevation: 728 m; decimalLatitude: 19.9297; decimalLongitude: 41.4427; georeferenceProtocol: label; samplingProtocol: Hand picking; eventDate: 2016-04-11; individualCount: 4; sex: worker; lifeStage: adult; recordedBy: M.R. Sharaf; identifiedBy: Mostafa R. Sharaf; dateIdentified: 2016; language: en; collectionCode: KSMA; datasetName: Ants; ownerInstitutionCode: KSU; basisOfRecord: PreservedSpecimen

Diagnosis

Worker. Head in full-face view clearly longer than broad with shallowly convex posterior margin and sides; anterior clypeal margin broadly and distinctly concave; scapes, in full-face view, surpass posterior margin of head by about 1/6 of its length; all funicular segments distinctly longer than broad (Fig. 4c); metanotal groove indistinct; propodeum in profile with the transition from dorsum to declivity sharply defined, the declivity concave and the angle with a raised apex (Fig. 4a); color yellow to brown-yellow, antennae and legs uniform yellow (Fig. 4a, b).

Previous records: **SA:** Al Bahah, Dhi Ayn Archaeological Village, 19.9297°N, 41.4427°E, 741 m (Sharaf et al. 2012)

Distribution

Saudi Arabia.

Ecology

Tapinoma wilsoni forages on the ground surface of a Banana farm in Dhi Ayn Archeological village, a semi-isolated area that is completely surrounded by high mountains of the Al Sarawat Mountains (KSA) and soil is clay and humid (Sharaf et al. 2012). Nothing is known about biology of the species. The species is coexisting with the ant species *Carebara arabica* (Collingwood & van Harten, 2011), *Tetramorium sericeiventre* Emery, 1877, *Pheidole minuscula* Bernard, 1953, *Trichomyrmex destructor* (Jerdon, 1851), and *Monomorium exiguum* Forel, 1894.

Identification keys

Key to the Arabian species of the genus <i>Tapinoma</i>		
1	Propodeum in profile with the transition from dorsum to declivity sharply defined, the declivity concave and the angle with a raised apex (Fig. 5a)	<i>T. wilsoni</i> Sharaf & Aldawood
–	Propodeum in profile with the transition from dorsum to declivity is a rounded angle (Fig. 5b)	2
2	Larger species, TL more than 2.0 mm; anterior clypeal margin with a deep median notch (Fig. 5c); color darker, uniformly blackish brown or black	<i>T. simrothi</i> Krausse
–	Smaller species, TL less than 2.0 mm; anterior clypeal margin with only a shallow median concavity (Fig. 5d); head and mesosoma dark yellowish-brown, gaster yellow	<i>T. melanocephalum</i> (Fabricius)

Discussion

Among the three Arabian *Tapinoma* species, *T. simrothi* is the most widespread species followed by *T. melanocephalum*, whereas *T. wilsoni* is the rarest species with a limited geographic distribution confined to the type locality (Dhi Ayn Archeological village) at the Al Sarawat Mountains KSA) (Figs 6, 7, 8). The wide geographic distribution of *T. melanocephalum* is related to the broad habitat preference of the species (Smith 1965, Oster and Wilson 1978, Venkataramaiah and Rehman 1989, Hölldobler and Wilson 1990, Smith and Whitman 1992, Wetterer 2009, Ellison et al. 2012, Sharaf et al. 2017). *Tapinoma simrothi* is broadly distributed especially in public gardens and agricultural fields of the central region of the Arabian Peninsula, and with apparent associations with the sap sucking insects for honeydew (Collingwood et al. 2011, Sharaf and Aldawood 2011). The species is also widely spread in the wild sites of the deserts in Riyadh Province especially

near to *Acacia* trees. The ability of species to inhabit both urban and wild habitats of the Arabian Peninsula interprets the wide geographic distribution.

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Author contributions

All authors contributed equally to this manuscript.

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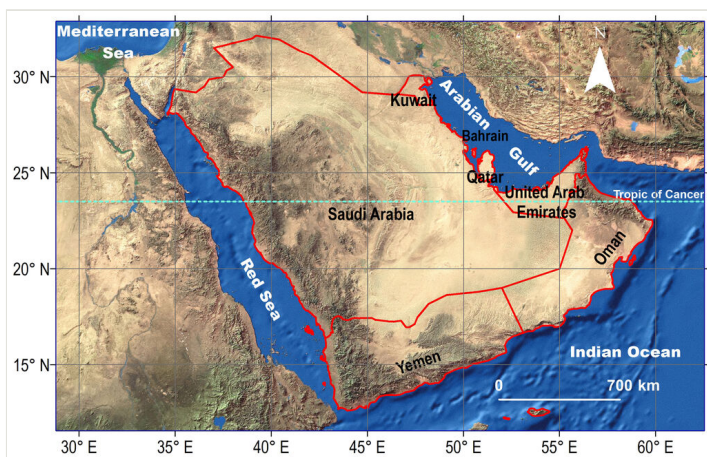


Figure 1.

Map of the Arabian Peninsula.



Figure 2.

Tapinoma melanocephalum, CASENT0922277, Michele Esposito, AntWeb.org.

a: body in profile.

b: body in dorsal view.

c: head in full-face view.

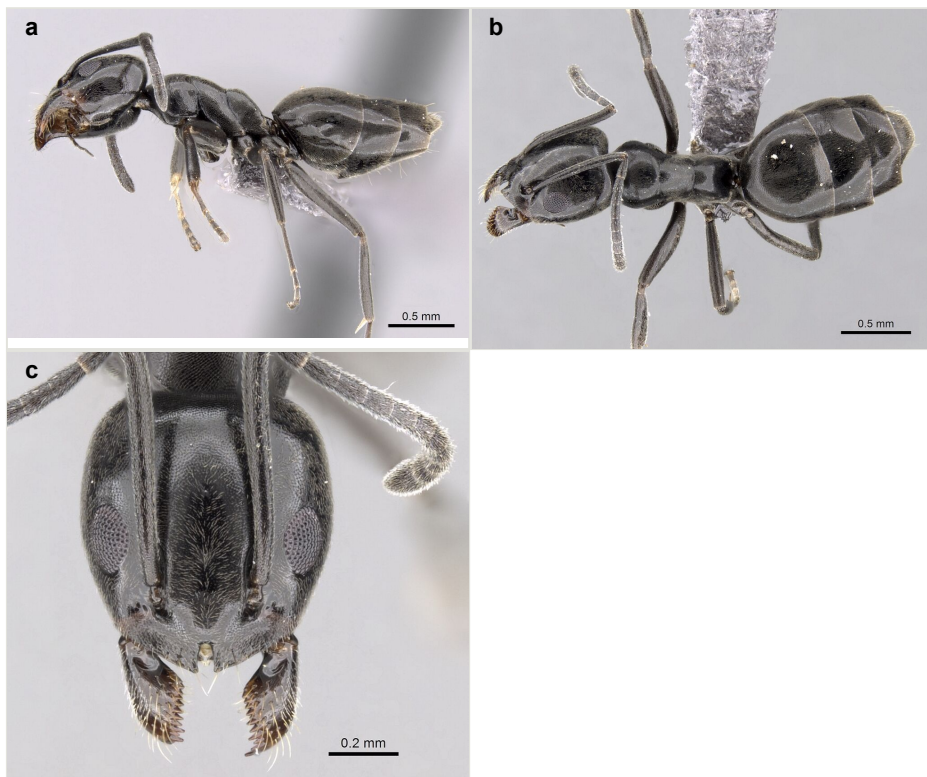


Figure 3.

Tapinoma simrothi, CASENT0263927, Estella Ortega, AntWeb.org.

a: body in profile.

b: body in dorsal view.

c: head in full-face view.

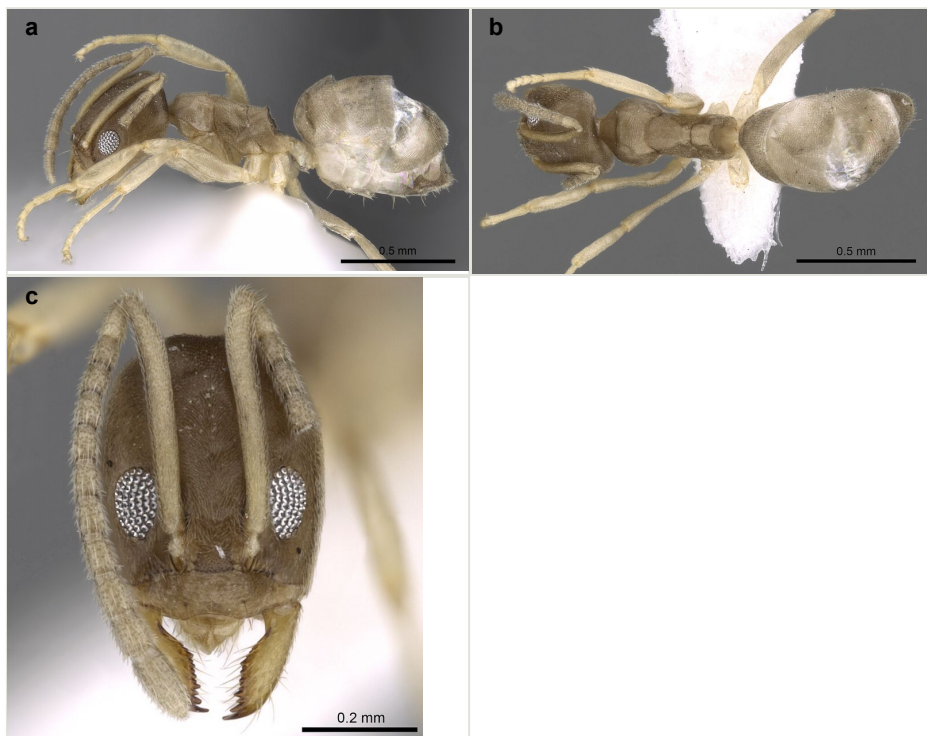


Figure 4.

Tapinoma wilsoni, CASENT0280973, Estella Ortega, AntWeb.org.

a: body in profile.

b: body in dorsal view.

c: head in full-face view.

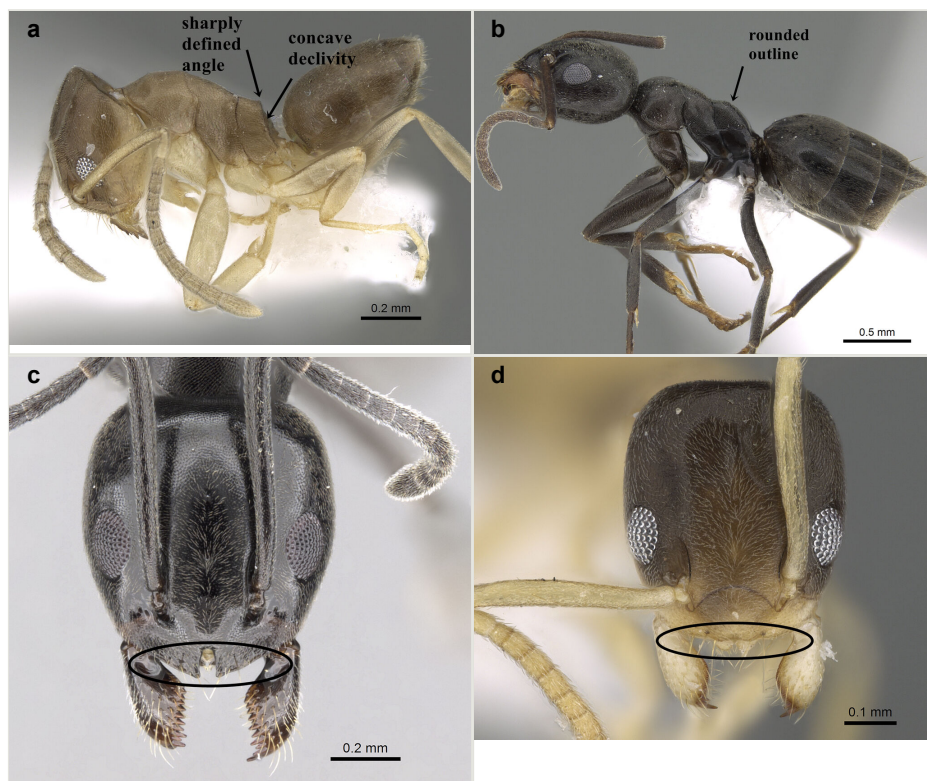


Figure 5.

Key illustrations. Michele Esposito, AntWeb.org.

a: *Tapinoma wilsoni* profile showing the concave declivity and sharply defined raised angle, CASENT0919800.

b: *Tapinoma imrothi* profile showing the rounded outline between propodeal dorsum and declivity, CASENT0919801.

c: head in full-face view of *Tapinoma simrothi* showing the median clypeal notch, CASENT0919801.

d: head in full-face view of *Tapinoma melanocephalum* showing the absence of the clypeal notch, CASENT0922277.

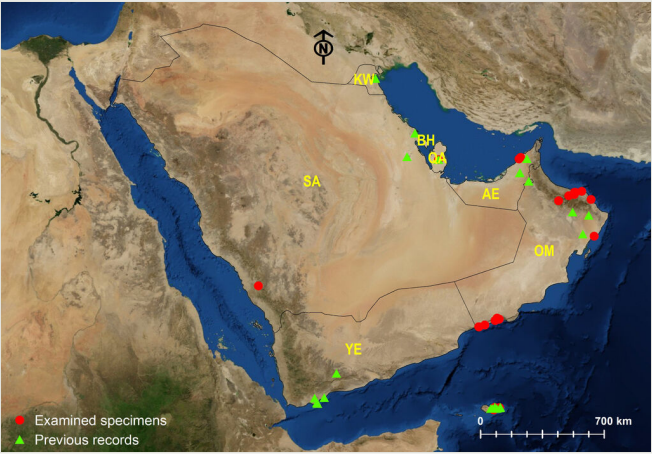


Figure 6.
Distribution map of *Tapinoma melanocephalum*.

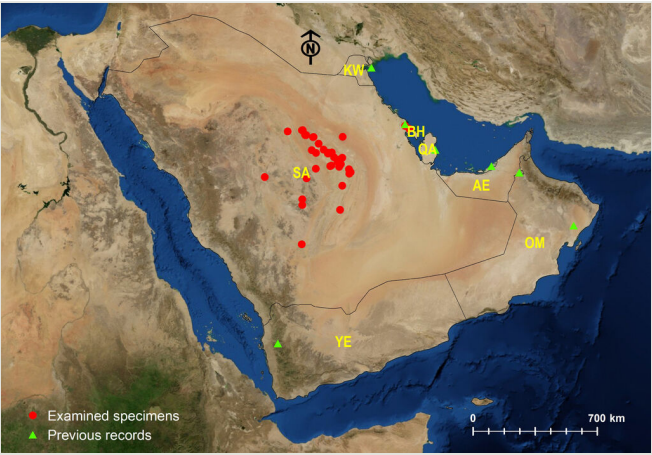


Figure 7.
Distribution map of *Tapinoma simrothi*.

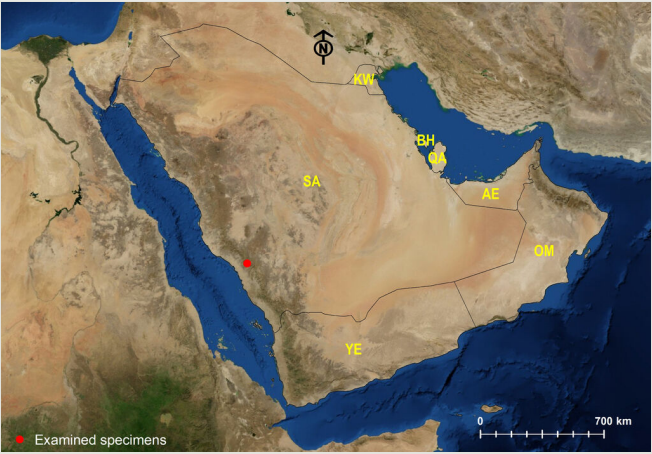


Figure 8.
Distribution map of *Tapinoma wilsoni*.

Supplementary material

Suppl. material 1: Appendix 1. Material examined data

Authors: Mahmoud S. Abdel-Dayem, Hathal M. Aldhafer, Abdulrahman S. Aldawood, Mostafa R. Sharaf

Data type: Occurences

Brief description: Distribution data of the examined material

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