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NEW ADDITIONAL RECORDS FOR ANT FAUNA FROM IRAQ

Israa Khalaf Aneed[1], Razzaq Shalan Augul[2] and Layla Jabbar Mohammed Al-Bahadyli[1]

[1]Department of Biology, College of Science, Al-Mustansiriya University, Baghdad, Iraq
[2]Iraq Natural History Research Center & Museum, University of Baghdad, Baghdad, Iraq

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***Corresponding Author**:
Razzaq Shalan Augul

E-mail: razzaqshalan@gmail.com

ABSTRACT

We recorded two new records of ants, Cataglyphis fortis (Forel, 1902) and Lepisiota syriaca (André) from Iraq. The diagnostic characters of the species are given. These species of ants were redescribed and reported the diagnostic characters; these characters and other morphological features were figured using camera Lucida and digital image.

Keywords: Ants, Formicinae, Hymenoptera, Iraq, New Record.

INTRODUCTION

Ants are eusocial insects of the family Formicidae and, along with the related wasps and bees, belong to the order of Hymenoptera. The number of species still remaining to be discovered and described is extraordinarily high. Ant members function at many levels: predators and prey, as re, mutualists, and herbivores (Hölldobler and Wilson, 1990). On the other hand, the known living ants involve 17 subfamilies, 334 genera, 13.226 species and 1.966 subspecies of which are described; in Iraq, there were about 108 species was recorded (Bolton, 2017).

The desert ant or *Cataglyphis* Förster is diagnosed from other genera by many features that include: ocelli present and distinct, anterio-ventral surface of head with long and curved hairs, antennal insertion closed to clypeal suture (Collingwood and Agosti, 1996; Mohamed *et al*. 2001).

This genus distributes in the Sahara desert (Bernard, 1968), southern Russia, southern Spain
(Mangan and Webb, 2012); Turkey, the Aral-Caspian area near Tijanchan, Yogoslavia and Hungary (Petrov, 1986).

In previous studies, many species were registered in Iraq; and from these: Pisarski (1965) described two new species: *Cataglyphis kurdistanicus*, *C. alibabae* and one subspecies *C. livida lutea* ; while Abdul Rassoul *et al*. (1978) listed four new record species belong to this genus: *C. albicans* Roger, *C lividus* Andre, *C. lutea* Emery, *C. semitonsa* Santchi; then Borowiec (2014) added the species of *C. albicans* (Roger), *C. diehlii* (Forel), *C. isis* (Forel) and *C. nodus* (Brullé).

The morphological features that important to diagnose the genus of *Lepisiota* Santschi, 1926 from other genera in the Formicinae are including: the antennae with eleven segments, propodeum bidentate or bituberculate and petiole emarginated or bidentate (Collingwood and Agosti, 1996); this genus distributed in the old world and with 83 described species (Bolton, 2014). According to previous publications, Donisthorpe (1918) and
Crawley (1920) listed the species of *Lepisiota frauenfeldi* (Mayr) only in Iraq.

Despite the wide diversity of ants and there are a lot of the taxonomic and survey studies in the world, this group has remained little attention in Iraq; for this reason, the current study has proposed to add a new information to ant fauna.

MATERIALS AND METHODS

Specimens' collection and identification:

The worker ants were collected by using an aspirator and fine brush during March 2016.

The specimens were diagnosed to genus by using different taxonomic keys such as: Agosti (1990), Bolton (1994), Collingwood (1985), Collingwood and Agosti (1996), Mohamed *et al.* (2001) and Cagniant (2009); whereas the species were identified according to Taylor (2015).

The Samsung galaxy S4, GT-19500 was used for taking the figures of specimens with a scale of measurements using a

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binocular dissecting microscope (MB. MARIOBROMA.SRL, Roma) to magnificent the morphological features. To figure some parts, the Camera Lucida with binocular dissecting microscope (ZEISS, Germany) was used. The specimens of this species are deposited in the insect collection of Iraq Natural History Research Center and Museum, University of Baghdad.

Measurements:
According to Collingwood and Agosti (1996), the following are abbreviations of measurements (in millimeters) were taken with a binocular dissecting microscope fitted with an ocular micrometer:
CI (Cephalic index): HW×100/HL
TL (Total Length): total extended length of a specimen, from mandibular apex to gasteral apex.
HL (Head Length): length of head, with the exception of mandibles, measured in a straight midline.
HW (Head Width): maximum width of head, excluding eyes.
EL (Eye Length): maximum diameter of the eye.
SL (Scape Length): straight-line length of antennal scape excluding basal neck.
SI: (Scape Index): SL×100 / HW.

RESULTS

The results registered two new record species belonging to subfamily of Formicinae (Hymenoptera; Formicidae) to fauna of Iraq; these species are *Cataglyphis fortis* and *Lepisiota syriaca*. The redescription and figured for most characters as in below:

Cataglyphis fortis (Forel, 1902)
Myrmecocystus albicans var. *fortis* Forel, 1902. Annales de la Société Entomologique de Belgique : 156.
Materials examined: Baghdad, Jaddria: 3 workers, 1.March.2016.
Distribution: Algeria (Borowiec, 2014), newly recorded to Iraq.
Redescription of this species:

Measurements: TL: 6.2 mm, CI: 96.2, EL: 0.484, HL: 1.575, HW: 1.515, SL: 1.818, SI: 120.012.
Color: Body generally shinny black (Figure 1); mandibles dark brown; body covered by silvery pubescences and moderate density, this pubescences become more dense on propodeum compared with other parts; spinules and setulae on tarsi are shiny dark brown; hairs on trochanters, femurs and tibiae are pale; hairs on posterior side of the head are pale.

Head (Figure 2, 3A, 4): slightly longer than wide; shiny without obviously sculptures, but in high magnification, it featured finely granulated; median frontal line weakly; ocelli small and distinct; compound eyes are oval shaped and prominent; frons with three pairs and short setulae arranged along of the median part and beside of the median frontal line, these setulae separated by varying distances, the first one placed at nearly of vertex, second pair placed at lower level of anterior ocellus and last pair placed at below of the lower level of compound eyes. Antennal insertions continuous with fronto- clypeal suture or clypeal margin, below of the clypeal margin there are two short and sub-erect setulae; clypeus obviously wide, apical margin clearly convex and with a long and different length and decumbent setae. Posterior surface of head with moderately length and semi curved two pairs of hairs; also there was a tuft of long and curved hairs at base of hypostoma.
The outer margins of mandibles are curved; inner margins with six teeth and varying in sizes, the fourth tooth from apical margin is very small compared to the others; mandibles clothed with different length and scattered hairs.
Labrum glabrous and the anterior margin with deeply concave; the third segment of maxillary palp slightly longer than fourth, this character is important to distinguish this species from closely other species; fourth segment slightly longer than combined of fifth and sixth segments; the segments covered with fine and short hairs compared with the diameter of segments with exception on second and third segments, these segments with hairs slightly longer than the diameter of segments, and become more fine on sixth segment.

Antennae (Figure 3B): scape slightly longer than length of head; antennomeres (= segment of antenna) covered by moderately dense of dark brown pubescences, apex of scape with many short and decumbent setulae; pedicle longer than first flagellomere (flagellomere: segment of flagellum) (1.85 time); also it evidently longer than second flagellomere (1.62 time); the other segments are equal in length and diameters approximately; with the exception the apical segment it clearly longer and thinner.

Thorax (Figure 5, 6): Alitrunk (prothorax, mesothorax and metathorax) and propodeum are shiny without obviously sculptures, but in high magnification, it featured finely granulated; prothorax without hairs, pronotum it appears swollen, wider and higher than other surface of thorax in dorsal view; dorsal surface rounded; propleuron is narrowed in lateral view, and appeared in ventral side consist of closely two triangles, the bases at near of coxae but the head of triangles direction to neck. Mesothorax: mesonotum narrowed and obviously depression than pronotum especially the last half, with clearly a flat dorsal surface; metanotum reduced and appeared by weakly constriction in lateral view; mesopleuron elongated and striped shaped like; metapleuron narrowed and shorter than mesopleuron.
The propodeum simple or without armed, dorsal surface with two pairs of hairs, the first one are short and erect hairs at nearly to level of propodeal spiracles, the second pair is slightly shorter and located at the middle of declivity; generally the propodeum with sculpture composed from finely and densely granulate, this sculpture more clearly than other parts of the thorax; the pubescences more densely than other parts; dorsum of propodeum higher than mesonotum and convex; declivity; declivity with a flat dorsal surface and oblique in lateral view.

Legs (Figure 7): The legs are relatively elongated than body length; fore legs obviously thicker than mid and hind tibiae; the length of legs increased gradually from fore to hind legs; coxae, femurs and tibiae with short, erect and scattered hairs. The hind tibia is characterized by has a row consist from short and four setulae (or spiny hairs according to Collingwood and

Agosti, 1996) on the internal side and the apical tibia with inner spur, those setulae varying in length and separated by wide and diverse spaces (Figure 8).

Petiole (Figure 9, 10): This part is very useful to distinguish this species from the nearby species of it; anterior face and dorsal surface of node meeting at an angle and appeared slightly rounded in side view; petiole slightly longer than high, in dorsal view convex and narrow, apex of node rounded in profile view; dorsal surface covered by many short and erect hairs.

Gaster (Figure 11): Oval shaped; gasteral tergites and sternites with short, semi-erect and slightly tend to backward of setulae on the posterior margins from third to fifth segments; acidopore surrounded by brush or fringed that composed from medium length of setulae.

The measurements of some parts that belong to the workers of Cataglyphis fortis were agreement with Taylor (2015), and furthermore, the features of the following were used for diagnosis of this species: the body is black shinny, the third segment of maxillary palp longer than fourth, apex of petiole in profile more rounded and legs much longer compared with body length; these characters are more important to separate this species from closely species; whereas the species of Cataglyphis albicans (Forel) that closely to first species characterize by different features, including : TL 3.75-8.0 mm; third segment of maxillary palp equal to fourth; pro- and mesonotum darker red-brown,; antennae, tibiae and tarsi red-brown to lighter (Wehner, 1983).

***Lepisiota syriaca* (Andre, 1881)**

Acantholepis frauenfeldi var. *syriaca* Andre, 1881. Catalogue raisonné dès Formicides provenan du voyage en Orient de M. Abeille de Perrin et description des espèces nouvelles. Annales de la Société Entomologique de France, 6(1)**:** 53-78.
Materials: Baghdad, Hayy Ur: 7 workers, 9.March.2016.
Distribution: Greece, Crete, Egypt, Iran, Israel, Saudi Arabia, and Turkey (Borowiec, 2014), newly recorded in Iraq.

Redescription of this species:
Measurements: TL: 2.5-3.3, CI: 86.95, EL: 0.27, HL: 0.92, HW: 0.7, SL: 1.1 mm, SI: 157.14.
Color: Body generally dull and slightly bicolor (Figure 12); head dark brown, thorax and legs are reddish brown to dark brown with the exception: coxae, trochanters and femurs are dark brown; petiole dark brown except the apical of node is black; gaster black. Pubescences silver pale; setae, setulae and hairs brown with the exception the setulae on gaster are pale brown.

Head (Figure 13): Very slightly longer than wide; with obviously sculptures in magnification at 40X, that consist from densely and finely granulated; pubescences on head are scattered or poorer density; vertex slightly convex; frontal line somewhat distinctly and extend from lower level of compound eyes to level of antennary pits; ocelli small and distinct; compound eyes are oval shaped and slightly prominent in frontal view. Frons with three pairs of medial length and erect and setulae arranged along of the median part and beside of the frontal line, these setulae separated by varying distances, the first one placed at nearly of vertex or behind the posterior ocelli, the second pair placed at clearly above the lower level of compound eyes, the last pair found at nearly above the level of antennal insertion. Antennal insertions continuous with clypeal margin, below of the clypeal margin with suberect setulae; clypeus clearly wider than long and with weaker median-longitudinal carina, apical margin convex, clypeus with scattered, median length and suberect setae that leaving wide space in some areas and.
Mandibles slightly curved (Figure 14), covered by dense, recumbent and varying hairs; inner margin of mandible consist from four and varying teeth, the apical is larger than others, whereas the second is smaller.
Labrum without hairs, anterior margin with very deeply concave; the third segment of maxillary palp longer than fourth, fourth segment shorter than fifth and sixth segments together. (Figure 15A), segments of palps covered by finely pubescences.

Antennae (Figure 15 B): antennae appeared elongated compared with body size; scape obviously longer than length and width of head; scape glabrous, pedicel and flagellomeres covered by moderately dense of dark brown pubescences; pedicle longer than first and fifth flagellomeres (1.33 time); the flagellomeres from first to fifth are equal in length and diameters; the other segments from sixth to eight are equal in length and diameters but slightly shorter than first to fifth; apical segment it clearly longer than others (1.5 time compared with first to fifth flagellomeres) but it's thinner, especially at the apex.

Thorax (Figure 16 and 17): Alitrunk and propodeum are somewhat shiny but finely and conspicuously reticulate; pronotum it appears enlarged, wider and higher than other surface of thorax in dorsal view, dorsal surface convex at middle if it's seen in lateral view, rounded at the lateral sides in dorsal view, anterior of dorsal surface with one pair of erect and moderately long setulae at laterally and well spaced; propleuron is wider than the previous species and obviously elongated Mesothorax: mesonotum very narrowed and obviously depression than pronotum, with a rounded dorsal surface; it's become thinner gradually and to be consist constricted at the middle part, posterior part of mesonotum slightly expand; mesonotum separated from metanotum by obviously thoracic spiracles; metanotum shorter than mesonotum, with slightly a flat dorsum surface; mesopleuron wide and elongated; metapleuron also elongated but very narrow.

Propodeum (Figure 18): glabrous, separated by obviously furrow, wider than the previous parts, whereas narrowed than pronotum. Anterior of dorsal surface with prominent laterally that leaving depression surface medially; apices of these elevated are armed, composed from short process or short teeth and direction to backward. Posterior of dorsal surface is depression and somewhat flat, ending small process posteriorly; declivity narrowed and slightly concave dorsally and sloping surface if it's seen laterally.
Legs : The legs are relatively elongated compared to the body length; fore legs obviously thicker and shorter than mid and

hind tibiae; fore coxae glabrous and bigger than the others; while the mid and hind coxae with short, fine and erect hairs. Femurs and tibiae without hairs short; fore tibia with pair of setulae those are different in length behind the base of tibial spur, mid tibia with an apical spur only, hind tibia with an apical spur on inner side and a pair of different setulae on outer side. Generally; the tarsi spinous, especially the basitarsi; aroli in all legs are small and weak.

Petiole (Figure 17, 18 and 19): This part is very useful to distinguish this species from the nearby species of it; higher of petiole than the length (1.25 time) with node as wide as it is high; node squamiform if seen from profile view; dentate in frontal view or angular sides, the apical corners with acutely dentate; posterior part of petiole with short erect hairs on ventral surface.

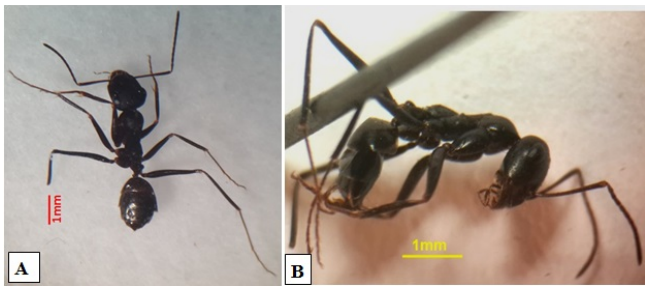

Fig. 1
Worker of *Cataglyphis fortis* A- dorsal view B-lateral view.

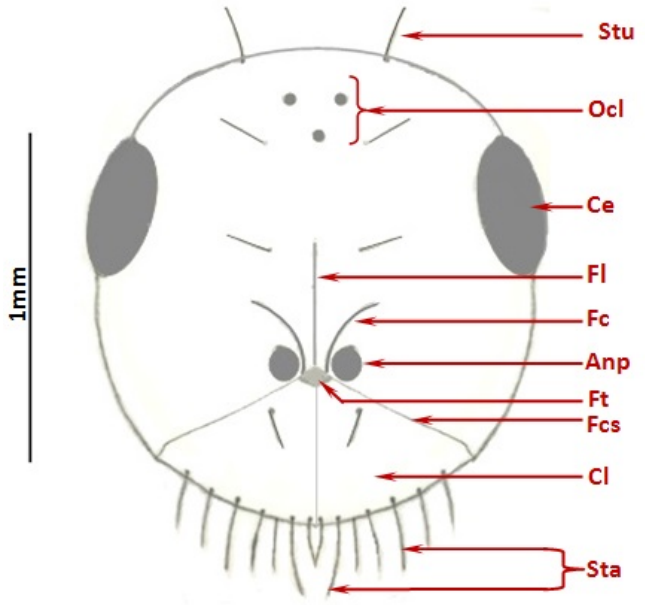

Fig.2
Anterior view of head in *C. fortis* (Stu: setula; Ocl: ocelli; Ce: compound eye: Fl: frontal line; Fc: frontal carina; Anp: antennary pit; Ft: frontal triangle; Fcs: fronto-clypeal suture; Cl: clypeus; Sta: setae).

Gaster: Semi-spherical shaped in dorsal view, oval shaped if it seen laterally; posterior edges of gasteral tergites and sternites with distant and tending to backward setulae that medium in length, but increase in length gradually toward apical gaster; acidopore without clearly fringed setae.

This species can be determined from the closely species, especially the *L. frauenfeldi* which by some morphological features, these features are: the petiole characterized by having distinctly angle sided but in *L. frauenfeldi* with rounded sided if it's seen in frontal view; the color of head, alitrunk and legs in this species reddish brown and darker in some small area compared with darker color in above species.

DISCUSSION

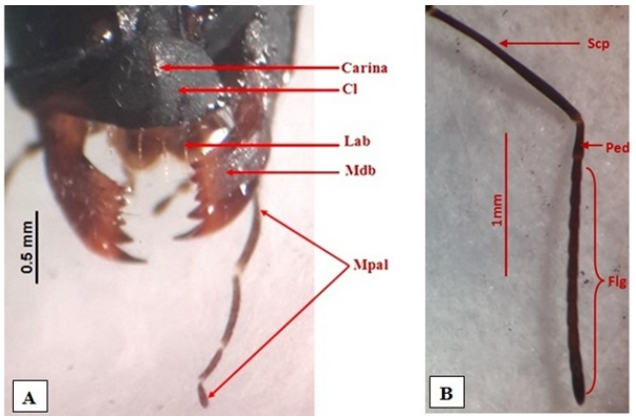

Fig. 3
Some parts of head in *C. fortis*; A- Lower parts of head (anterior view) B-Antenna (Cl: clypeus; Lab: labrum; Mdb: Mandible; Mpal: maxillary palp).

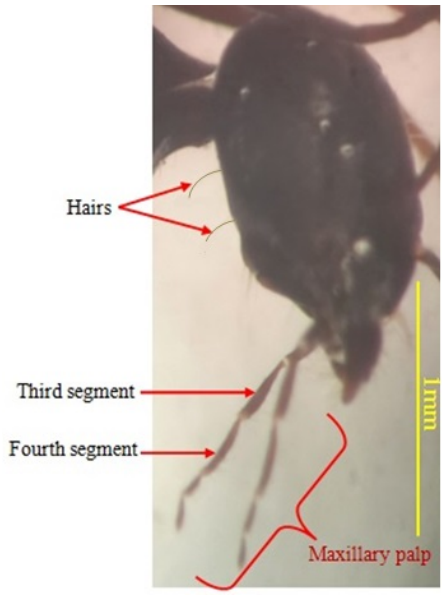

Fig. 4

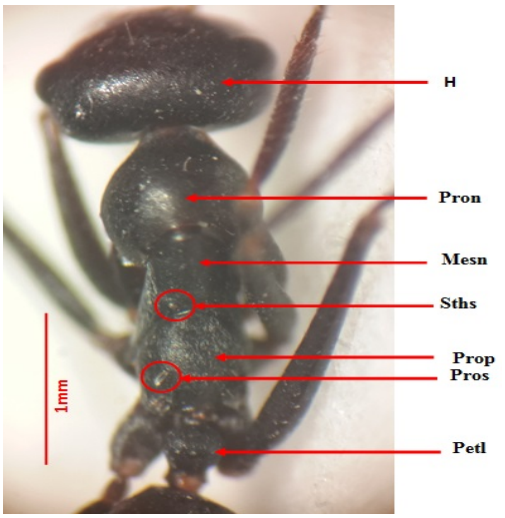

Fig. 5
Dorsal surface of head and thorax in worker of *C. fortis.*

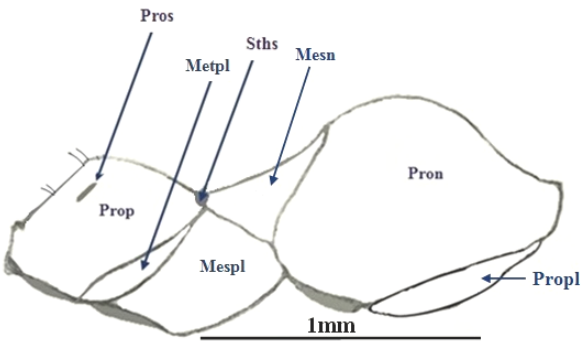

Fig. 6
Lateral view of thorax in *C. fortis*.

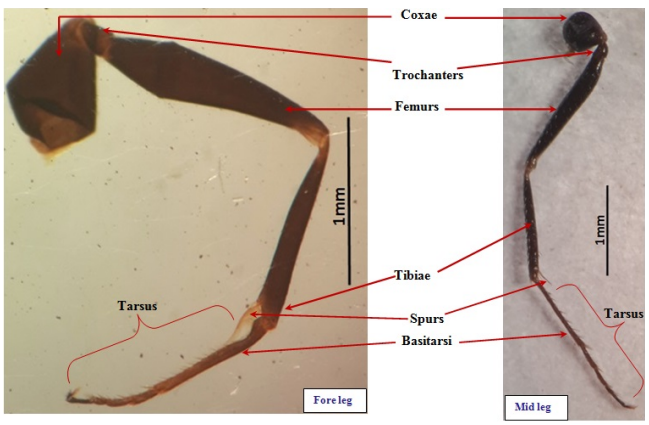

Fig. 7
Fore and mid legs in worker of *C. fortis.*

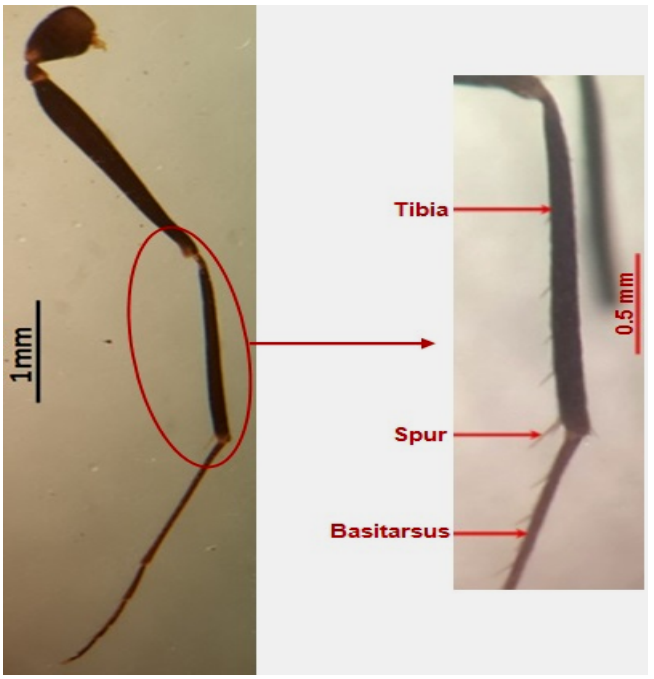

Fig. 8
Hind leg of *C. fortis.*

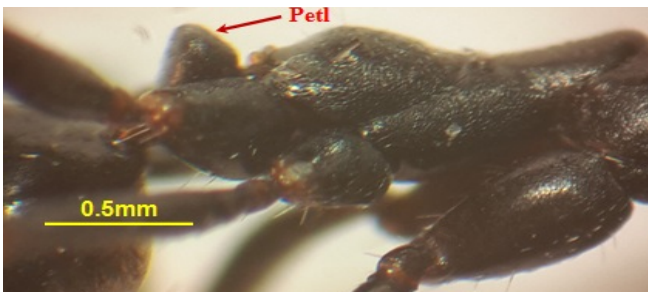

Fig. 9
Lateral side of some part of body worker in *C. fortis* that shown petiole (Petl).

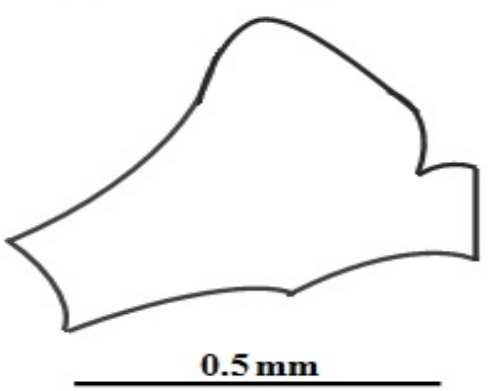

Fig. 10
Petiole of *C. fortis* (lateral view).

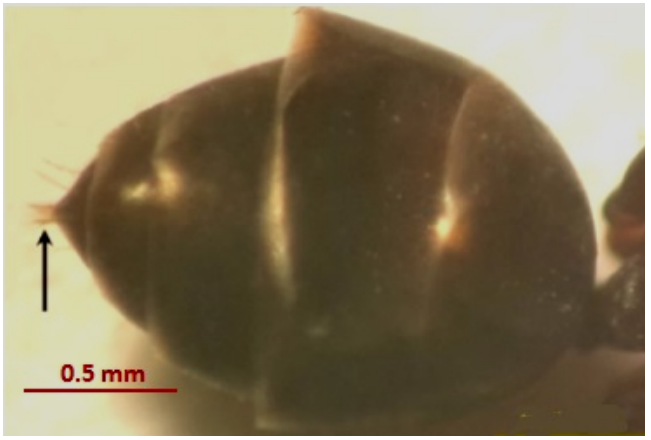

Fig. 11
Lateral side of gaster in worker of *C. fortis* that shown acidopore surrounding by fringed.

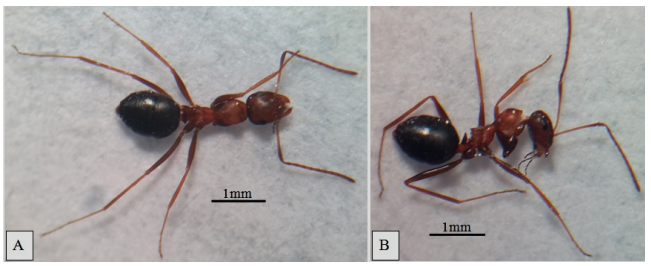

Fig. 12: Worker of *Lepisiota syriaca* A- Dorsal view B- Lateral view

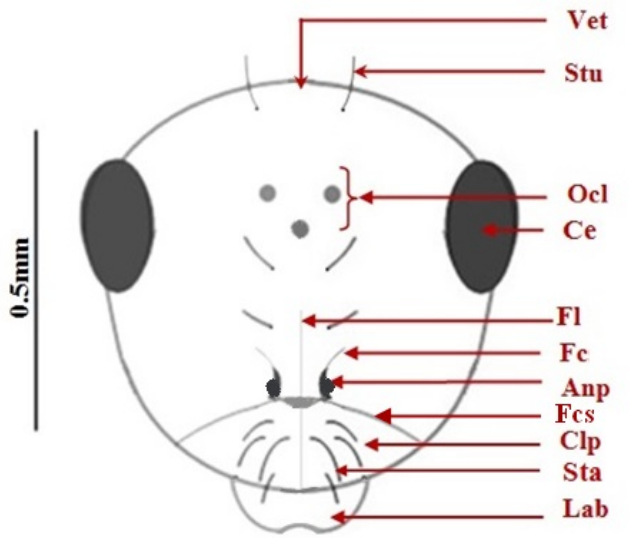

Fig. 13
Anterior view of head in *C. syriaca* (Stu: setula; Ocl: ocellus; Ce: compound eye: Fl: frontal line; Fc: frontal carina; Anp: antennary pit; Ft: frontal triangle; Fcs: fronto-clypeal suture; Cl: clypeus; Sta: setae)

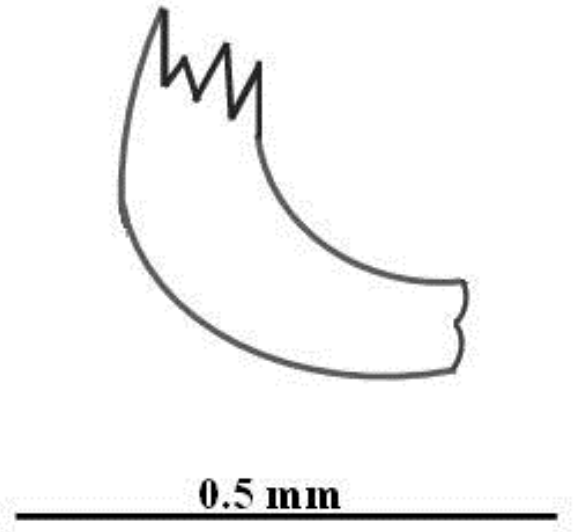

Fig. 14
Mandible in worker of *L. syriaca*

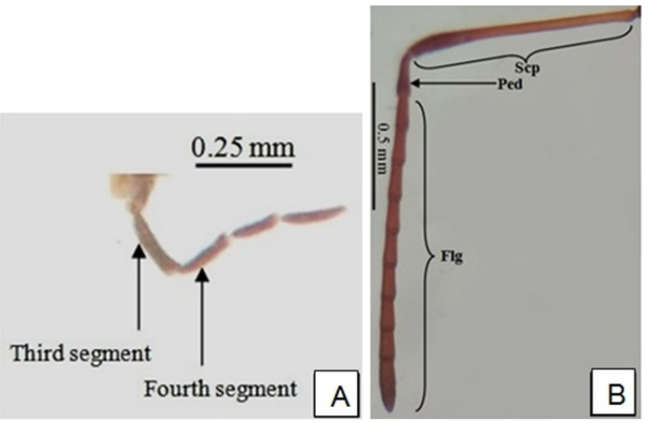

Fig. 15
Maxillary palp and antenna of *L. syriaca* A- Maxillary palp B- Antenna.

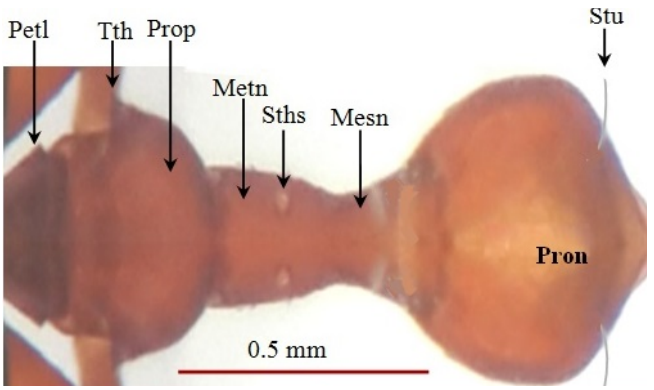

Fig. 16
Dorsal surface of thorax in worker of *L. syriaca.*

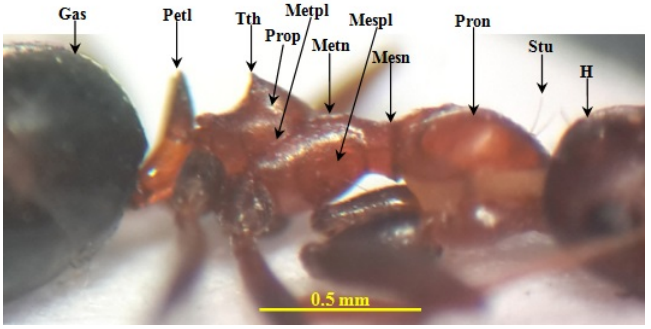

Fig. 17
Lateral view of thorax in worker of *L. syriaca*.

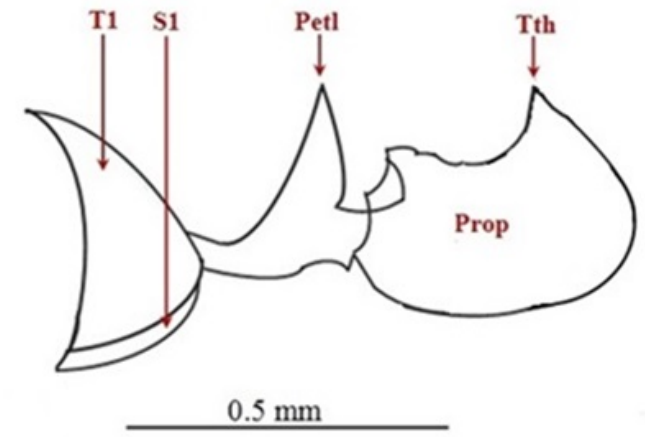

Fig. 18
Lateral view of propodeum with petiole and first segment of gaster in worker of *L. syriaca*.

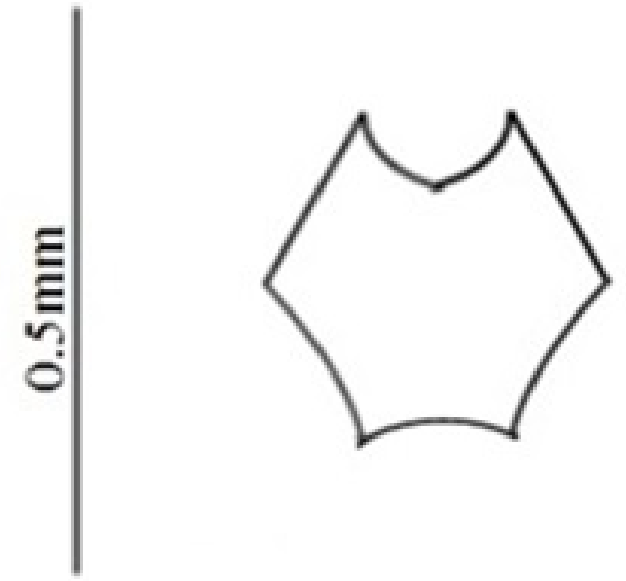

Fig. 19
Petiole of *L. syriaca* (Anterior view).

According to Collingwood and Agosti (1996) and Taylor (2015), the morphology of petiole is one of the most important character in species determination of *Cataglyphis*, and in less important the measurements and color; on the contrary, in the species of *Lepisiota*, Taylor (2015) was depended on the scape and legs length; morphology of clypeus, propodeum and petiole and somewhat on colors, but we find that Collingwood and Agosti (1996) relied greatly on the measurements, presence of hairs on alitrunk, sculptures and colors. Due to the geographic variation of Iraq and the widely environmental changes in recent years, we believe that there are many species that can be unknown or unregistered Iraqi fauna because of the lack of a comprehensive study of all regions. We also hope to conduct an extensive study of ants with attention to diagnosis that depending on molecular studies.

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AUTHORS' CONTRIBUTION

Israa Khalaf Aneed prepared the project design and figured the specimens; Razzaq Shalan Augul, identified the species and wrote the manuscript, while Layla Jabbar Mohammed Al-Bahadyli collected the specimens.

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