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A Taxonomic Study and The Annual Preseence of The Species *Siagona Angustipennis* Bates 1892 of Ground Beetles: Order: Coleoptera: Family: Carabidae in Maysan Governoratel/ Iraq

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***Abstract*— This study was conducted on the Carabidae family for the period from 1/12/2018 to 11/30/2019 in Maysan Governorate, the research included a diagnostic study of Siagona angustipennis Bates 1892, which it relies upon the classification of species, genera and families of ground beetles on the study of adult insects.**

The results showed that the aforementioned species was recorded in Iraq in Maysan province (Qalaat Saleh area) in the months of April, May and June, and the highest population density of adult insects in May was 4 insects / traps, while the insect was not recorded for the remaining months of the year.

The most significant diagnostic character of adult insects: Head elongated, wide, antennae thick, filiform, scape twice the length of the second piece, the mandibles are uneven, left mandible is larger than right mandible, pronotum is wide at the front and narrow at the back, midline is clearly low, two side grooves on the disk Uninterrupted on pronotum, the average length of the insect is 11-17 mm.

Keywords— Coleoptera, Carabidae, *siagona angustipennis* Maysan

I. Introduction

Coleoptera is one of the largest order it contains approximately 360, 000 described species. (Bouchard *et al*., 2017). The morphological diversity of beetles led to the spread of their species, outperforming the various orders, most families of this order are universal (Arnett and Thomas, 2000). It represents 40% of every known insects in the world (Hangay and Zborowski, 2010). Ground beetles of the Carabidae family of the predatory insect groups that have studied in most countries of the world, It consist of more than 40,000 species spread over 1927 genera around the world, it lives in various lands and on almost all continents, most are nocturnal, but some are diurnal, most of them cannot fly (Larochelle and Lariviere, 2007).

S. angustpenn Bates 1829 belongs to subfamily: Siagninae which known by Erwin (1985) has two genera; the genus *Siagona* which is distributed in the south Palaeartic region, and the genus *Luperca* which occurs in India and Africa (Erwin, 1978). Erwin (1979) clarified that it lives in wetlands with decomposing plants or under lark. the modifications of mandibles , head curvature and pronotum curvature make it a good predator (Talarico *et al*., 2009). The most significant characteristics of this subfamily: Head elongated, wide. Antennae thick and filamentous. The mandibles are large and arched, left mandible is bigger than the right mandible. Pronotum wide, front wide between anterolateral angles, narrow between posterolateral angles, the main edge is straight, anterolateral angles are prominent and sharp, posterolateral angles not visible, the edges are upright from the anterolateral angles to the middle of the pronotum length after which they arch firmly toward the base, the midline is low along the pronotum. Femur and tibia thick (Andrewes, 1929).

II. Materials and Methods:

A. *Description of the study area:*

The region studied for th is characterized by the density of palm and earth groves is abundant with grass and weeds, for being since it has not been cultivated for nearly two years, it is located near lands planted with different vegetables on the banks of the Tigris River, which gives reasonable conditions to for the insect from high humidity and availability prey from arthropods and other insects. Picture (1,2).

B. Sample collection:

Pitfull traps with dimensions of 15 cm diameter , 15 cm hieht, were used to collect the adult specimens, filled 40% of volume with a solution of 70% ethyl alcohol with a few drops of odorless cleaning liquid to break the surface tension and some drops of glycerol (Skvarl *et al*., 2014; Lovei and sunderland, 1996). The traps were distributed on the lines of each line containing three traps , the distance between one line and another was 10 meters, the traps were distributed in three locations, and the distance between one site and another was 100 meters, samples were collected every two weeks (Karem and Fadl, 2010).

Sample collection site

Picture (1) the location of sample collection on the map.

Picture (2) Sample collection location.

C. Internal dissection and making microscopic slides:

After transferring samples to the laboratory and preserved with 70% alcohol wash with distilled water, at that transferred to a 100 ml beaker Contains 10% sodium hydroxide they were left for 15 days or or put in sodium hydroxide 15% Leave it for 10 days at room temperature or as indicated by the kind of sample then samples were washed with distilled water several times (Gabara, 1986); (Khudair, 2014). Passed up the ethyl alcohol ascending (60%, 70%, 80% and 90%) for 15 minutes per dilution. Then it was placed in a Petri dish containing 90% alcohol until it was dissected, the insect can be dissected before placing it with sodium hydroxide by placing it in a Petri dish after placing a filter paper in the dish it helps to insure the insect in the dish and not to slip, after slicing the parts with a fine needle, put them in sodium hydroxide.

Glass slides were made for the insect parts, after dissecting the insect samples preserved with 70% ethyl alcohol by cutting the parts with a fine needle (insulin syringe), making sure that the form is placed in the form it is intended for the purpose of the study next, put the glass slides in a heat oven under 60 ° C for 24 hours.

The large parts that cannot be covered with the slide cover are installed on the glass slides as required for the purpose of assessment and drawing by a speedy dry, straightforward nail polish (Shaaban, 2018). Used the Lucida camera (Dissection microscope), which is installed on the optical microscope to draw transparent and small, Lucida's camera was mounted on a dissecting microscope to draw large portions. Full insect lengths were measured and lengths of the parts of Image program, the unit mm of measurement of the body and its parts is adopted. The insect and its parts were photographed by the Canon 40-pixel camera,

III. Results

A. Description of genera siagona Latreille, 1804:

The body is elongated and flat, pedunculate; head pubescent; antennae are visible on each side under a raised side edge, pieces 1-4 pubescent, first piece long, clavate-shaped, mentum and submentum integrated, pronotum is broad from the front and narrow from the back, base elongated, on the surface are uninterrupted side grooves, procoxae cavity closed behind.

B. Description of species S. angustipennis Bates 1892:

Body: Subconvex black; antennae, palpi, and mandibles more or less reddish; head and pronotum pedunculate isolated from the body; its average length is 11.170 mm. picture (3-A-B).

Head Picture (4): elongated and broader, length 2.28 mm, width 1.71 mm, the side edges are raised, slightly bend, upper surface punctate, less in the middle and dense at the sides, setae on the top edge of the eye; antennae filiform, not reach the middle of the elytra, scape twice the length of the second piece, the second piece is smaller than the third piece, pieces 3-10 similar; compound eyes not prominent; clypeo-labral suture clear; clypeus black, rectangular, 6 setiferous punctures present anteriorly; fronto-clypeal suture clear curved; frons punctate; posterior part of the head raised to form a prominent ridge.

Mouth parts: Labrum rectangular**,** length 0.27 mm, width 0.58 mm, teeth medial rarely present anteriorly (trilobites), 5 setiferous punctures present anteriorly Fig. (1-A); mandibles Picture (1-B) largeand curved, left mandible length 1.87 mm longer than right mandible length 1.74 mm, two tooth for each mandible, Pointed finish, foreground is

black and it gradually turns copper toward the base; maxillary palp length 0.92 mm, 0f four coppery pieces, front pieces darker, base piece small, second long, third, and fourth equal in size, all pieces carry setae except for basal, top square; galea and lacinia yellow; distigalea black; labial palp length 1,044 mm of three pieces, last piece is a distinctive horseshoe like, hairy, from the ventral side, the hair brush looks like white.

Thorax:

Pronotum is firmly attached to the front from the front and back pedunculate, it is wider than its length, black, front wide between anterolateral angles and tight from the back, width from the front is 2.43 mm, the middle is 2.90 mm, the base is 1.06 mm, length 2.04 mm, anterolateral angles prominent and sharp, anteriority edge is straight, the edges are upright from the anterolateral angles to the middle of the pronotum length after which they arch firmly toward the base, the midline is low along the pronotum, the presence of two deep lateral grooves, disc punctate, high density in the middle and less at the sides, withstand the outer edge five setae close to the anterolateral angles on each side, four other setae are spread over the outer edge two on top and two in the back on each side Picture (4); scutellum unclear. From the ventral side pronotum black- copper, punctate, pubescent; epipleura is wider near the anterolateral angles and narrows toward the back; procoxal cavities closed posteriorly; mesothorax and metathorax black- copper, pubescent.

Legs:

Legs strong black, hairy; femur stout; fifth tarsus is longer than the other; hind tibia is long; the first piece of the posterior tarsus is longer than the second, third and fourth pieces, front leg length 5.61 mm Fig. (2-A) middle leg length 5.66 mm Fig. (2-B) posterior leg length 7.01 mm Fig. (2-C).

Elytra:

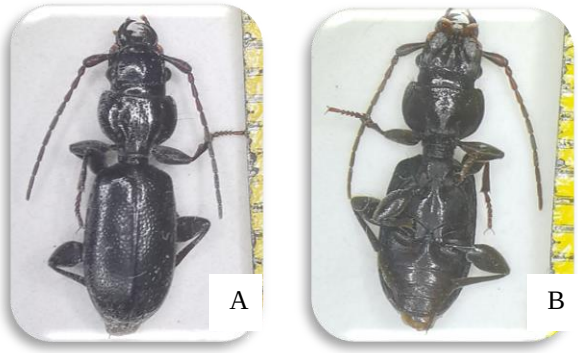
Elytra black, rounded obtuse humeral angle, sides that curve gently for 2 /3 of the elytral length, then curve strongly towards the apices; striae and intervals are not clear; dorsal surface is punctate and pubescent; there are two seta on the shoulder of the elytra and on each side; it is narrow from the top and widening of the base Picture (6-B).

Abdomen:

Abdomen black- copper; the fifth, sixth and seventh sterna are pale; there are setae on the middle and sides of the estranges; ambulatory pairs of setiferous punctures on sterna 4-6; last sternum often with a single pair of ambulatory setae in the male and two pairs in the female.

Male genitalia:

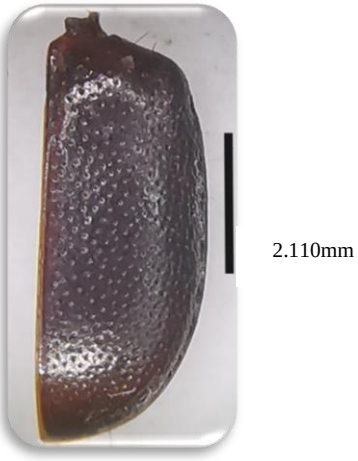
Male copulatory organ consisting of the aedeagus Picture (7), straight front quarter curved toward the bottom, the front end is a wide, distinct beak-like, the length of the aedeagus is 1.736 mm.



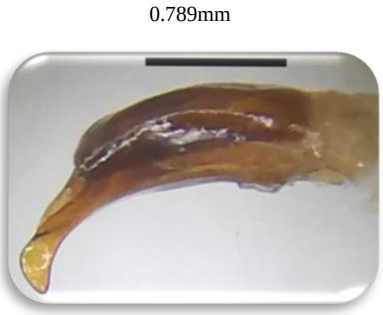
Picture (3) A- the dorsal surface of a complete insect B- the ventral surface of a complete insect.

Picture (4) head

Picture (5) Pronotum



Picture (6) elytra



Picture (7) aedeagus.

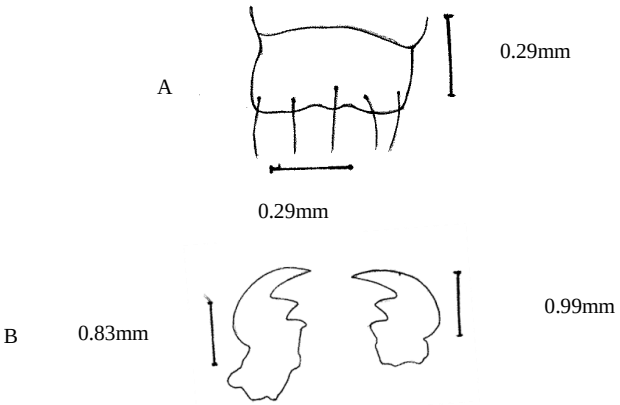


Fig. (1) A- labrum B- Mandilbles

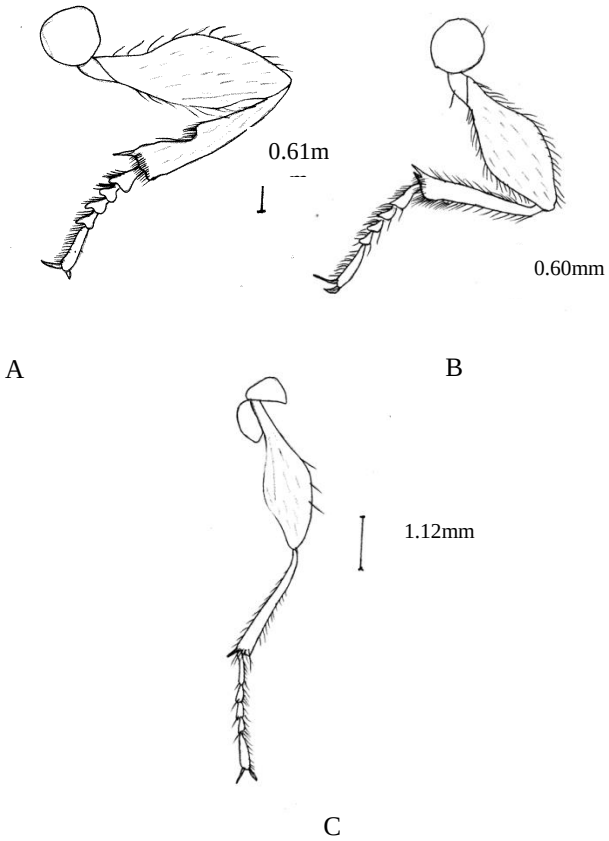
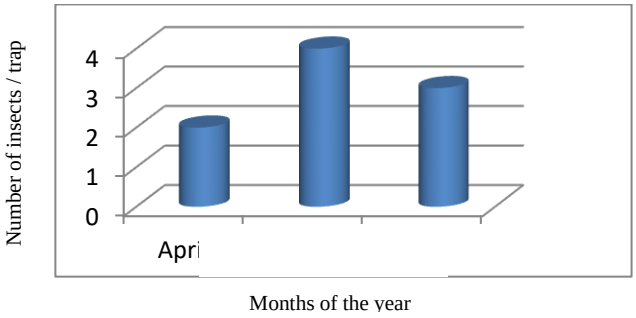


Fig. (2) A- front leg B- middle leg C-hind leg.

Environmental study:

Numerical density of the species *S. angustipennis*: The resilts of the examination indicated the presence of the ***s. angustipennis*** species, during three months of the year(2019) are the long periods of April, May and Jun in the Qal'at Salih area/ Maysan Governorate.

The results indicate that the highest average number of adult insects was during the months of May where reached 4 adult insect / trap, insect activity decreased or disappeared during the hot summer months and cold winter months.



L.s.d. 0.26 (P>0.05)

Fig. (3) the numerical density of ***S. angustipennis*** adults during a year in the Qal'at Salih area.

IV. Discussion

Taxonomic study: Andrewes, (1929) ; Baert *et al*., 1949 clarified that the most significant diagnostic traits of this species antennae thick, filiform, scape twice the length of the second piece; left mandible is larger than right mandible; pronotum is wide at the front and narrow at the back; midline is clearly low, two side grooves on the disk Uninterrupted on pronotum; the average length of the insect is 11.170 mm.

Environmental study:

Fig (6) shows that the insect is active during the spring months and that the highest density rates are in May**,** Bauer *et al*., (2005) revealed that it shows up in early spring, When the soil moisture is high, they are located under the stones from mid-April and onwards, and when the soil dries up and becomes cracked, it enters deep cracks, particularly during the hot and dry hours of the day, it is nocturnal activity.

The studied area provides suitable conditions for the insect from high humidity and provides prey from arthropods and other insects for being near the Tigris River and the growth of weeds in it.

Ground beetles are a natural enemy group in the agricultural environment, more specifically in humid locations such as wet grassland, lowland vegetation and wetlands higher than adjacent lands (Kromp1999), The fact that the studied land is not cultivated for a long time, and this gives appropriate states of stability and consequently the presence of different types of insects, As semi-natural fields such as forests, field borders and contain numerous kinds of arthropods that are valuable since they give a more steady condition than cultivated fields (Mediene *et al*., 2011), This stability is due to the fact that these habitats include greater biological diversity than annual crops (Altieri and Nicholls, 2004) these resources available in the uncultivated areas allow the development of beneficial arthropods that then move to the cultivated plots (Duelli *et al*., 1990; Tscharntke

2007). Persons of the genus Sigonia prefer cracked sandy clay lands because they have a level body appropriate for moving inside the soil cracks and they have altered jaws to hunt ants because they are specialized in feeding on it (Talarico, 2002).

V. Conclusions

The Iraqi enviroment is bountiful with Carabidae species, this type is one of the few species in the world, which has a great role in the natural balance, this kind of predator is critical important to ants.

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