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Morphological characteristics of larvae and imago of *Myrmecaelurus trigrammus* (Pallas, 1771)(Neuroptera, Myrmeleontidae) reared in laboratory condition

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1st instar larvae of *Myrmecaeurus trigrammus* (Pallas, 1771) collected in Behesht Mustapha Marivan reared in laboratory condition , larvae fed with ants.The molting time, onset of diapause, carefully recorded .Characteristics of 3rd instar larva, and the morphological details of larva, and imago ,described and figures drawn.

Key words: *Myrmecaelurus trigrammus*, rearing, characteristics of larva and imago

INTRODUCTION

Antlions (Family Myrmeleontidae) belong to the super order Neuropterida ,order Neuroptera, sub order Myrmeleontiformia , family Myrmeleontidae and subfamily Myrmeleontinae.There are 2000 already described species in the Family of Myrmeleontidae in the world , between them ,1800 species in the subfamily Myrmeleontinae (Aspoeck et al 2001). The adult Antlions have chewing mouthparts and generally feed on pollens of flowers; the larvae live in pitfalls, dug into soil. They have sucking mouthparts , suck blood of ants or other small arthropods.The pupation of larvae occurs in a spherical cocoon ,made of small soil particles .Adults are not good fliers, and could be encountered in vegetations during early morning and or in dusk (Aspoeck et al 1980). There are more than 80 reported species for the fauna of Iranian Myrmeleontidae .There are few studies on the larval morphology and life cycle of the Antlions of Iran. The life cycle and morphology of the larvae of *Cueta lineosa* and *C.luteola* was already studied by Mirmoayedi in Iran (Mirmoayedi 2003a, b). Krivokhatsky has contributed to the study of larval morphology of *Isoleon amseli* in Russia(Krivokhatsky, 1996), and Mansell studied the behaviour of larvae of *Callistoleon illustris* in South Africa(Mansell, 1988).Hoelzel contributed much to the study of adult Myrmeleontids of Iran, but in his articles there is not any description of larval morphology (Hoelzel, 1972)

MATERIAL AND METHODS

1st instar larvae of *Myrmecaelurus trigrammus,* collected in 7th August 2005 from Behesht Mostapha in suburb of Mraivan (35° 45'N, 46°20'E), a city of 1280m altitude located on foothills of North West Zagros Mountains in western part of Iran, and bordering Iraqi frontier. Zaribar lake with an area of 1550 hectares often frozen in winter ,is located in west part of the city and contributes to the humidity in summer time and coldness of environment in winter .The larvae collected from pitfalls under canopy of annual weeds, and reared in incubators, regulated with following

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conditions ; temperature 25±1°C, photoperiod, 16L8D , and relative humidity, 60%. Time of larval molting, beginning of pupation, and appearance of imago from cocoon, were all followed, and thoroughly recorded.

RESULTS

The characters of 3rd instar larva described here are based on the morphological characteristics of the exuvia of the 3rd instar larva, found in the cocoon, after emergence of imago. 3rd instar larva: Body, pale brown, covered by tiny pieces of soil, length of body without mandible 8.5 mm (fig.1.)

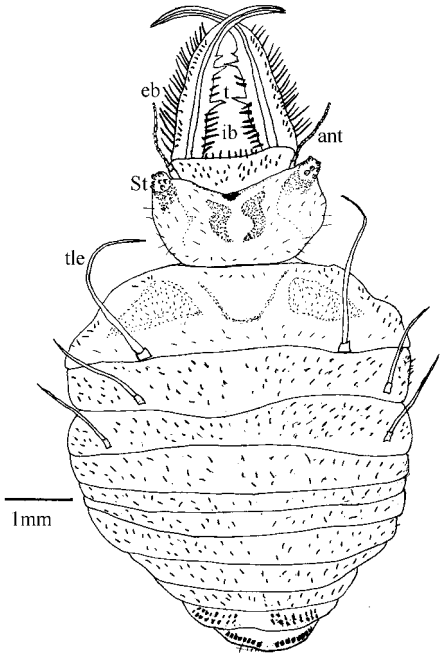

FIG.1. - 3rd instar larva of *Myrmecaeurus trigrammus*.
t; mandibular teeth, ib; mandibular internal bristles, eb; mandibular external bristles, ant; antenna, St; stemmata, tle; thoracic lateral long bristles.

Head: length 2.6mm, eyes yellow, bulging on each side of head, consists of eight stemmata. Small black spines located between stemmata. Antenna: Scape and pedicel, dark brown. Flagellum consists of 13 light brown segments .Length of each antenna 0.8 mm.

Mandible: dark brown, 2.6mm, tip sickle like and with tapering end. In it's internal border, with three conical teeth. Eight spines are located between, the base of the right mandible and the first tooth, 7 of such spines are located between the base of the left mandible and the first tooth. Two spines between the first and the second teeth of the right mandible and three between the same teeth of the right mandible. No spines between the second and the third teeth.22 long and 20 short spines are located on the external border of the right mandible, and 24 long and 20 short spines are located on the external border of the left mandible, all spines black.

Thorax : Symmetrical brown spots on the three thoracic segments .On each side of three thoracic segments ,one long thread like extension,0.35 mm long .The terga of the thoracic and abdominal segments are covered by small black spines.

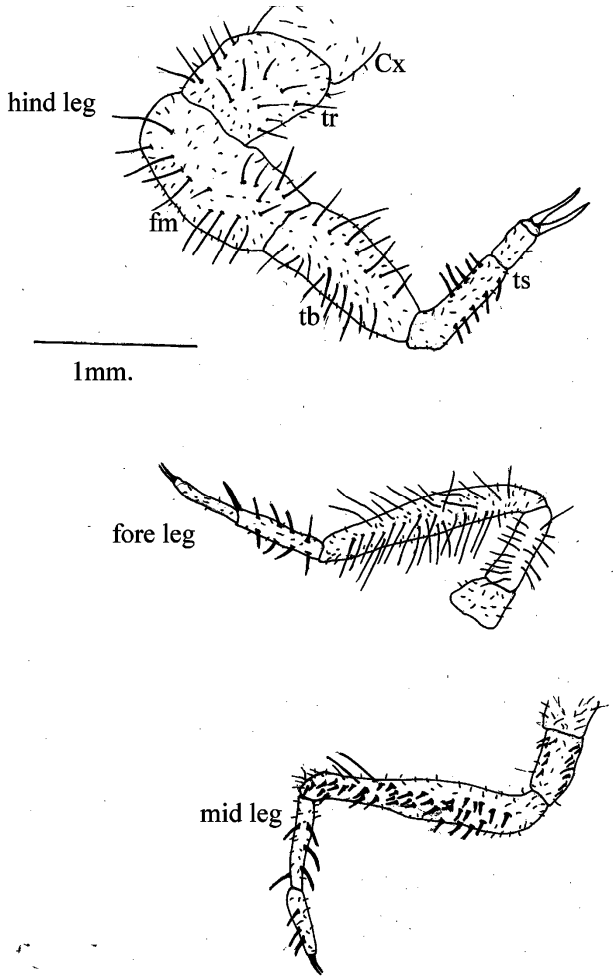

FIG.2.- Legs of the 3rd instar larva.Cx; Coxa, tr; trochanter, fm; femur, tb; tibia, ts; tarsus.

Legs: Each tarsal segment ends to two brown claws .Hind legs more strong and robust and have claws bigger than the two other pairs of legs. On the dorsal and ventral surfaces of legs are long and short spines and bristles (Fig.2.).

Abdomen: Small spines and bristles are scattered on the terga and sterna of abdominal segments. On each side of the last abdominal segment, lateral to anus, there are six long black spines, and on mid dorsal part of anus, 27 small spines situated in four rows.

Male imago: Length of body without antenna 31mm, head and thorax yellow. Compound eyes dark brown, antennae clavate brown.On epicranium of head is located a cross like dark brown spot; two other quadrate spots are equally situated lateral to it.

Pronutum: A median longitudinal dark brown band is located in median part of pronutum, dividing it to two equal sections (Fig.3.).

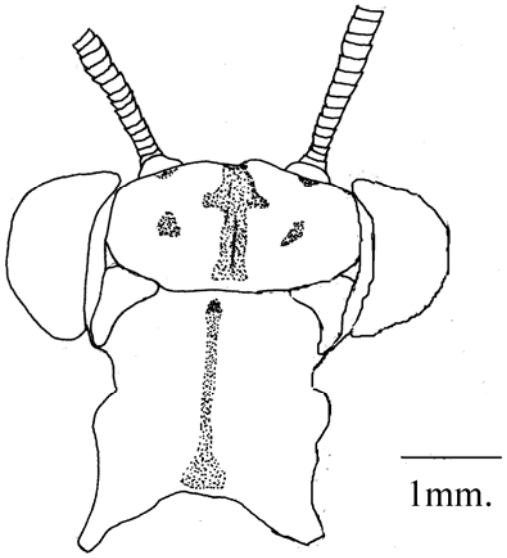

FIG.3.-head and pronutum

Wings: Fore wings: 29.6mm, hind wings 28.3 mm, both yellowish transparent without any spots.Pterostigma, distinct, whitish. Hind wing, inner radial field (irf) with four cross veins, fore wing with six cross veins (fig 4).

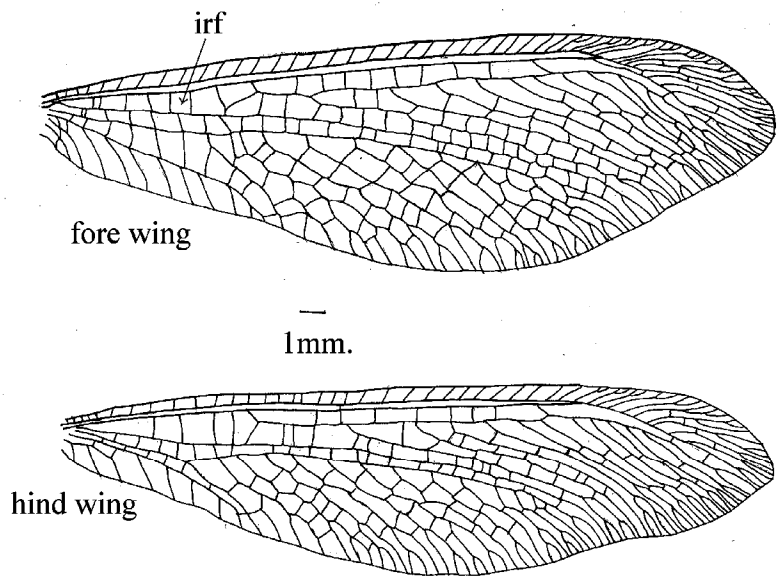

FIG.4. - Fore and hind wing. irf; inner radal field.

Abdominal segments: yellow, composed of 9 segments. A mid dorsal longitudinal brown line extends from the first to the last abdominal segment .On each side of the 6th and 7th abdominal segments is attached a pleuritosquamae (Fig .5.), with long hairs especially dense on its distal part. Genitalia of male imago, consists of gonarcus and paramer (figs.6 and 7. successively, lateral and ventral view).

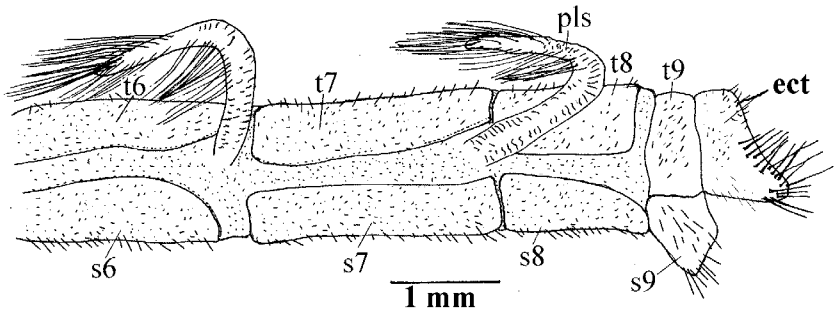

FIG.5.- Terminal abdominal segments of the imago of *Myrmecaeurus trigrammus* ,showing pleuritosquamae attached on 6th and 7th segments.pls; pleuritosquamae, t6,t7,t8,t9; tergum 6 through 9, ect; ectoproct, s6,s7,s8,s9 ; sternum 6 through 9.

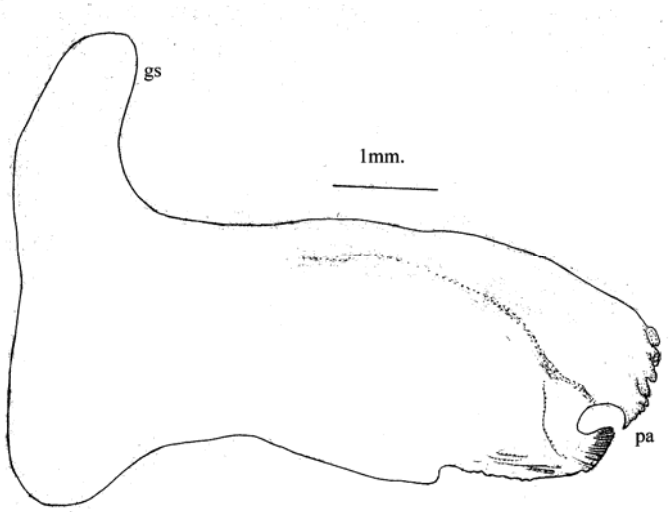

FIG.6- Male imago's genitalia, lateral view. gs; gonarcus, pa; paramer.

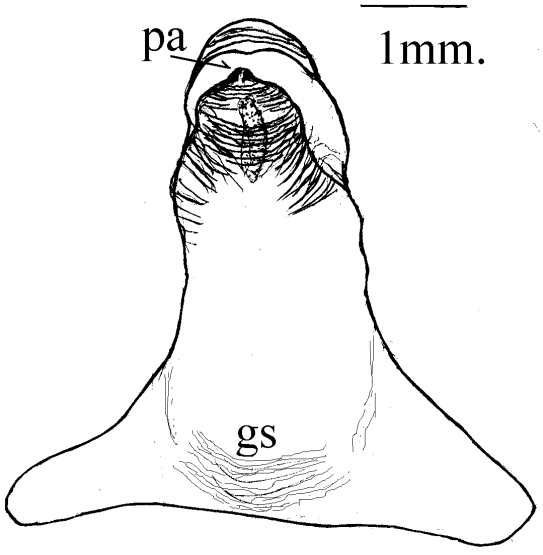

FIG.7- Male imago's genitalia, ventral view.

DISCUSSION

Of the three specimens of larvae collected in Behesht Mustapha of Marivan ,two were brought up to female imagoes and one to a male .The larvae collected in marivan in 7th August 2005, all fed with ants and no water furnished to them in all their entire life cycle. The molting of 1st to second instar larva was seen, on 31 January 2006.The second ecdysis ,that is molting of the second instar to the third was delayed untill 9.October 2006.

The pupation was seen nine months later, that is 22. June 2007. The pupa is enclosed in a cocoon made of tiny particles of soil. In 15th July, of the same year, the male imago emerged from cocoon. The two-year duration of life cycle from the 1st instar larva to the imago must be considered as a long period, because normally it might durate a few months and maximum one year and not two years. It should be due to the continual rearing of larvae in a constant temperature of 25±1°C in laboratory. While in their original microclimate the larvae live in a very cold temperature in fall and winter. In winter, generally the temperature falls below minus ten or minus fifteen degree centigrade in Marivan. This coldness should induce larval diapause, which continues through the cold climates of fall and winter and is broken by the higher temperatures in the beginning of the May. In mid May, temperature of Marivan rises to average 15°C. In other experiments (not published) personal observations proved that larvae of antlions reared in constant temperature, when transfered to the cold climate of outdoor, in the fall and winter, has triggered diapause, which continued until the first month of spring and was broken in the middle of May with faster emergence of imago.

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