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Biological Study of *Crptolaemus montrouzieri* Mulsant (Coleoptera: Coccinellidae) as Aphid Insects Predator, in Sabha Farms Sought West of Libya.

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Abstract \

Most Coccinellidae species are carnivorous predators, preying on aphids, scale insects and plant mites. Since they prey on agriculture pests are considered beneficial insects and introduced as biological control agents. The biological characteristics of *Cryptolaemus montrouzieri* Mulsant (Coleoptera: Coccinellidae) (Super family: Cucujoidea, Sub order Polyphaga) was observed and associated with several plants pest in some agriculture frame in Sabha region feeding on Aphid pest and scale insect. This is the first observation as predator of Aphid species in Sabha region because was recorded as predator in mealy bug species in Sabha (south of Libya). The present work was explored as potential bio control agent against aphid pest, and general description of immature and mature stages. The observation recorded the female lays a cluster 5 to 20 eggs, larva with elongated bodies and bumpy black with brightly coloured spots, pupa black with brightly colour, adult stage has soft exoskeleton until their cuticles harden at finely adult stage range in length from 4mm to 8mm, the female larger than male. The development times from the egg to pupa stage ranged from 12 to 17 days at 28C, adult live approximately four months. Reproduction was the greatest for green aphid pest. The predatory capacity of *C. montrouzier* showed that it is a useful bio control agent against the aphid pest

Key words: *Cryptolaemus montrouzieri*, Biological control, Eggs, Larvae, Pupa,

**Introduction **

Aphids are common pest in Libyan farms and they cause damage to many plants including vegetables, fruits, shrubs and ornamental trees [5]. The most damage is caused by sucking the juices from the stems and leaves causing a reduction in yield [20, 31, 33]. Some species of Aphids inject saliva into the plant tissue as they feed which may transmit viral diseases among plants [3,8,35,37,].

Biological control is one of way to reduce this pest, natural enemies are very important in the control of aphids [6,7,15,36], among the most important natural enemies are parasitic wasps which contain various spices that lay their eggs inside aphids [18,22,23,32,38,40], also, predators feed on aphids, they include Ladybird beetle adults, their Larvae, Lacewing larvae, and Syrphid fly larvae are the most important in biological control of aphids [11,12,13,16,17,30]. Ladybirds belong to (Coleoptera: Coccinellidae) which consist of (around 5000 species), Ladybirds feed on several species of insects, and they have different colours, red, orange or bright yellow with black spots, these colours useful to keep other predators far and very important in classification. The common ladybirds which feed on aphids are *Coccinella undecimpunctata*, *Coccinella septempunctata*, *Adonia variegata*. The family of Coccinillidae also contains some species feeds on Scale insects and Mealybugs [1,2,9,10,14,25].

Cryptolaemus montrouzieri feeds on mealybus species, the main prey of this predator is the Vine mealy bug, *Planococcus ficus* (Signoret) (Hemiptera: Pseudococcidae) [26, 28, 39].

This research aims to study the biology of *Cryptolaemus montrouzieri* as predator of aphids as alternative prey.

**Material and Methods **

The research work was conducted in Sabha city (Hajara and Alshareet Al- Akhdar areas, each area has been chosen randomly two farms cultivated by the same forage field crops Alfalfa crop) by direct observations and noted gradually, also, adults, pupa, larvae, and eggs of *Cryptolaemus montrouzieri* was collected directly by hand. The samples were brought for Laboratory investigations. The life cycle was followed through the direct observation regarding the weather (temperature, wind, light) these steps of observations were aimed to give the highest activity and lowest activity of life stars to rich the biological study of it. Recorded sequences of predation were then played through video program in computer with video monitoring software, frames were captured on disc and video scan lines were removed by adobe Photoshop software.

Results and Discussion \

Immature stage description:

Eggs: lay clusters of anywhere on plant for five to twenty eggs near prey aphid colony, the eggs yellow oval shaped. Plate (2).

Larva: larva black with orange spots or stripes, they have six black legs two to three weeks after they hatched, they well be ready to pupate. Plate (3).

Pupa: larva prepares to pupate it hunkers down on leaf and holds on it. It moults its black spiky skin as it begins to take the shape of an adult takes one to two weeks. Plate (6) eggs of *C. montrouzieri*

Adult stage description:

When an adult emerges, it takes a few minutes to get its new form the adult can live several

months. Adults they are all oval in shape and the outer pair of wings is hardened, newly emerged adult have soft body until their cuticles harden, they appear pale black with orange heads and tails 4mm in long Plate (6 and 7). Larvae are alligator shaped, up to 1/3cm in long, it covered with white waxy hairs which make them resemble mealybugs Plate (3 and 4). The adult beetles and the larvae prey on aphids. Most active in sunny day in temperature 28°C, on the other hand, they survive at temperature 16–33°C, but will not survive sub-freezing temperatures, they will stop searching for prey. They prefer the sunlight, but they are not effective during dull winter months, these observations were matched with [4, 24,27].



Plate (1) Adult of Aphids



Plate (2) eggs of *C. montrouzieri*



Plate (3) Larvae of *C. Montrouzieri*



Plate (4) Larvae feeds on aphid adult



Plate (5) Larvae to next stage Pupa



Plate (6) Pupa of *C. montrouzieri*



Plate (7) Adult of *C. montrouzieri*



Plate (8) adult of *C. montrouzieri* feeds on aphids

Life history:

The life cycle begins with egg, once adult females mated lays a cluster of 5-20 eggs among eggs usually deposit her eggs on a plant with suitable prey aphids are a favourite food. Eggs hatch into larvae in about 5 days at 28°C (spring season) Larvae has three stages which spend from 12-17 days to go pupa stage, during these days, larvae feed on aphid eggs, nymphs, the honeydew produced by aphids and adult aphids. Pupa of *C. montrouzieri* places on stems, Twigs and leaves and becomes more effective when population very high. After 7-10 days, adult emerges and live around four months, during these time, adult females and males' mate and then females lay eggs, Kaufmann T [21] showed that information which been matched with this study.

Feeding habits:

Field observations of predation events are the most direct approach to assess a predator species, larvae and adult stage of *C. montrouzieri* can feed on a variety of aphids, larvae feed on any other soft bodied plant pest such as mite and scale insects. The larva has large mandibles with to suck juices from the prey Plate (8). According to some references were recorded *C. montrouzieri* predate on some orders such as order of Hemiptera which including families Pseudococcidae (Planococcus spp, *Phenacoccus* spp, *Pseudococcus* spp).[19] was mentioned that the predation rate was higher for adult females than for males, also, [28] was reported each Larva can consume 900-1500 *M. hirsutus* eggs or 300 nymphs or 30 adults during its development, in the same context, [28] reported an average

consumption of 881.30 eggs, 259 nymphs or 27.55 adult female *M. hirsutus* or 3330.60 eggs of *P. citri* [29], otherwise,[34] the female ladybird must consume at least eight adult *P. citri* for normal egg production to occur. Larvae and adult *C. Montrouzieri* were frequently observed running between deferent stages of aphid prey and eating all the eggs, larva, and adult. I did not notice actual feeding on pupal stage. The predator was observed in aphid colony touching the surface of live eggs, larvae and in particular on adult, with their mouthparts. Because these observations are observed during the predation event, they additionally provide information, next to this work to investigated the feeding requirements and behaviour habits of predator *C. Montrouzieri*.

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دراسة بيولوجية عن المفترس *Crptolaemus montrouzieri* Mulsant (Coleoptera: Coccinellidae) علي حشرات المن في بعض مزارع مدينة سبها الجنوب الغربي من ليبيا.

عبدالباسط ابوصلاح ابوقيلة

قسم علم الحيوان، كلية العلوم، جامعة سبها، ليبيا سبها

المخلص /

أجريت دراسة حيتائية حقلية ومعملية عن المفترس *Crptolaemus montrouzieri* في بعض مزارع في منطقة سبها حيث تعتبر معظم الافراد التابعة لهذا الجنس Coccinellidae من اهم المفترسات الحشرية حيث تفترس حشرات المن بجميع انواعه والحشرات القشرية وكذلك الحلم النباتي.

في هذه الدراسة تمت دراسة بعض الجوانب الحياتية علي محاصيل زراعية مختلفة مصابة ببعض الافات مثل المن و الحشرات القشرية. نتائج الدراسة تعتبر اولية واول مرة تسجل لهذا المفترس في منطقة الدراسة حيث تم تسجيل معدلات مختلفة من الافتراس علي حشرة المن، سجلت الدراسة ان معدل افتراس للانثى اكثر من الذكر علي حشرة المن. من خلال نتائج الدراسة تبين ان الانثى تضع البيض علي شكل مجموعات او انفرادي من 5-20 بيضة البيض ابيض شفاف، اليرقة سوداء اللون مع وجود بقع علي الناحية الظهرية وجدار الجسم سميك مع وجود ثلاث ازواج من الارجل البارزة وطولها من 7-8 ملم، لمقدرة الافتراسية لليرقات عالية لها دور كبير في عملية الافتراس، العدراء ذات لون اسود لاماع، التطور من البيضة الي الطور البالغ تتراوح من 12-17 يوم تحت درجة حرارة 28م. من نتائج الدراسة يتبين ان للمفترس *Crptolaemus montrouzieri* امكانية عالية في برنامج المكافحة الحيوية علي الافات من حشرات المن و الحشرات القشرية في منطقة الدراسة

الكلمات الدالة : *Crptolaemus montrouzier* ، المكافحة الحيوية، البيض، اليرقة، أعداء.