

First Record of Flat-Headed Borers (Coleoptera: Buprestidae) in Al-Anbar Province-Iraq

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ABSTRACT

In this study, flat-head borers (Buprestidae) were targeted, which are important economic insects in order to stabilize the species and genera of this family. The study dealt with the distribution and spread of Buprestidae in Anbar Province. This study aims to identify the hosts that infected by them and their seasonal occurrence. The adults of these insects were searched in the orchards on both sides of the Euphrates River within the Province to investigate the presence of these beetles. Classification is based on the method used to classify the key to the order coleoptera to the species level. The results of the study showed that there are seven species belonging to this family, and they belong to three different genera distributed in the regions of the Province. This study is the first to establish flat-headed beetles in this region.

Keywords: Buprestidae, borers , Al-Anbar Province.

INTRODUCTION

The family Buprestidae is among the largest of the beetles families , about 15,500 species known in 775 genera. In addition, almost 100 fossil species have been described.^[1](Schmitz, &Bleckmann 1998). 7 species of Buprestidae family are recorded in Al-Anbar Province, these beetles are usually xylophagous species developing mainly under the bark of trees , but some species are growing in the leaf parenchyma of plants or grasses, others are develop in the soil and its insect larvae feed on roots of plants.

The Buprestid of Iraq fauna is little known, it is found on a different groups of the plants from which the insect feed on, and it was collected in the adult phase , which does not live much in this stage , its life period may take approximately one month.

few previous studies were conducted on these insects in Iraq, including Jalil Abu Al-Hub and Izzat Mustafa (Knopf, 1975). These studies are scarce in which it focus on the comparison with the economic importance of such insects, as these insects infect many plants like; the apricot, coca, peach and almond trees via attacking the stems of plants and perhaps kill the whole tree. Infection through the holes that the insect makes in the stems of the plants, in addition to the gummy secretions that plant secretes during infection.

These insects exist throughout all the year and over wintering in the form of imago, hiding under the bark of plants or the leaves of fallen trees. Most harmful insects attack fruit trees in order to feed on leaves, fruits, or twigs. Although the harmful insects that feed on the leaves and trees fruits causing great damage to them, the borrow insects attack the stems and branches of the trees, so it may sometimes lead to the death of the whole tree or to live for a shorter time than normal.(Kubán et al 2014)

Insects of this family are of different colors, have metallic luster, and their bodies are elongated. They attack the tree trunks and leave holes in the trees that attacked them resembling their appearance. Their antennae are of the serrate type and short, usually with 11 segments. Some of these insects attack the main trunks and others attack the small and large branches, others also attack the roots of trees, drilling between the bark and the wood, causing the death of such trees, indicated by an annular groove around the affected parts. (Sakenin *et al* 2008).

The family Buprestidae belongs to suborder polyphaga of order Coleoptera, which is considered one of the largest families in number of species (Bellamy, 2008).

Nationally, studies related to this family were limited in a way of some species distribution in Iraqi environment. Among the first sources to refer to this family was mentioned by (Holdhous, 1919) in the Mesopotamia region which record *Julodis audouini*, and *Julodis distinct*, also (Abdul-Rassoul 1976) record *J. onopordi* sulcata and *J. speculifera* Cast, *J. J.Holdh* . However, since the information and ‘ *Julodella mesopotamica* ‘*andreae* Oliv.

studies on this family are very few, so this research was conducted in which it includes:

- 1- A general survey of the species belong to Buprestidae in Al- Anbar Prvince - Iraq.

- 2-Determin the genus and species belonging to this family.

- 3- Recording the places from which insects were collected, with an indication of the plants parts from which they were collected.

Materials and methods:

Classification

Kingdom Animalia (Animals)

Phylum Arthropoda (Arthropods)

Subphylum Hexapoda (Hexapods)

Class Insecta (Insects)

Order Coleoptera (Beetles)

Suborder Polyphaga (Water, Rove, Scarab, Long-horned, Leaf and Snout Beetles)

Superfamily Buprestoidea (Metallic Wood Boring Beetles)

Family Buprestidae (Metallic Wood-boring Beetles)

Description of the study area: Al-Anbar Province is located in western Iraq, where it is bordered on the west by Syria and Jordan, and on the south by the Saudi border. The area is considered to be a desert nature interspersed with the Euphrates River, and it has a varied plant cover but few trees and shrubs on the riverbanks and wild jungles in the desert. And the region climate is semi-arid, where it considered as a desert nature, followed by a region with a variety of vegetation cover of trees and jungle shrubs. The region is characterized by the presence of the four seasons during the year, ranging from a cold, rainy winter climate to a period of growth within a wet spring that extends from March to April, with a hot dry in Summer and a moderate Autumn.

Samples:

Samples were collected during the study period (from August 2019 to August 2020) from fruit trees, forest trees, wild jungles, and farms scattered in the area, according to the available capabilities, insects were collected through frequent field visiting, as adult insects. Glass bottles were used during field collection, in which insects were captured, and some of

them were collected by hand from trees, jungles, and sporadic plants whereas some of them were found on the ground.

The collected insects were kept in special insect collection boxes equipped with all known collection requirements for preservation, and all the information related to collection was recorded on it. Measurements and dimensions of the insect were taken by means of Verna and photographed using a Canon camera installed on an autopsy microscope to find out some accurate details about the characteristics of these species to lead on their classification.

Seven species of flat-headed beetles were found in different regions of Al-Anbar Province belong to three different genera. They were collected during the period from 2019 to 2020 in deferent seasons of year from fields and from the General Entomology Laboratory of the College of Science, Al-Anbar University.

The samples were kept in special insect preservation boxes, with information on the place and date of collection recorded, as well as a sample of the host plant from which insects were collected and bring to the laboratory of the Department of biology at the College of Science, Al-Anbar University.

Diagnosis of insects

The insects were diagnosed in the Natural History Center and Research and Museum of the University of Baghdad, using the divisional keys of a number of specialists, comparing them with the previously diagnosed models of scientific institutions and also confirming their diagnosis with pictures and patron available in the Internet, and the attached table shows the genera and types of this insect.

In the following list all 7 species representing 3 genus known from Al-Anbar region are recorded, including all data available for each species.

1-*Chalcophorella bagdadensis* Laporte &Gory 1836

2-*Joludis speculifer* Laporte ,1835

Julodis balucha Obenberger, 1923-3

4-*Joludis syriaca* Olivier,1790

5-*Lampetis mimosa* Klug ,1929

6-*Lampetis argentata* (Mannerheim, 1837)

7-*Lampetis* sp.

Results and Discussion

Most jewel beetles(Coleoptera: Buprestidae) are xylophagous species. However, few Buprestidae mine leaves and some live on the roots of herbs or reside entirely within the bark, while

others are xylem feeders and feed both in the phloem and within the wood. Nevertheless, some species are able to invade healthy or weakened trees, eventually killing them due to girdling of the phloem system as a result of extensive larval feeding under the bark (Apel *et al*, 2000).

In this study the large insects of Buprestidae were collected using traps and nets, especially light traps and Malaise traps, preserved in alcohol. Only a small part was collected by sweeping and individual collecting by other collectors.

GEUNS *Chalcophorella*

This genus is medium-sized, with black colors, speckled with silver or white spots, and one of the most important types is *Chalcophorella bagdadensis*, which is the only type of this genus that was recorded in this region.

Adult insect length about 23-28 mm, width 9-11 mm, glossy black color with white spots. On the front of the thorax there are four small black circles, each two in one side, and in the center of the front of the thorax there is a smooth area of black wide color in one side of the sheaths tapering from the side of the head. In the front of each sheath there are almost two specific spots, these spots are smooth and black in color, while the rest of the sheath parts are a mixture of black and bronze spots, and bronze points abound in the front of the sheath, the end of the sheaths are slightly serrated. Different areas of the body like a rash.

The hosts that infest: apricots, tequi, and figs, as well as their adult insects found on other fruit trees.

The economic importance and the damage caused by digging the larvae of these insects inside the wood near the dead areas of the stem as it burrows under the bark, and the adult insects feed on the newly developed branches and these insects have one generation every two years (Kalashian, and Karagyan, 2016). It was found that the larvae and adult insects spend the winter period inside the stalk, this insect is economically important due to its abundance and the multiplicity of the hosts that attack it. The whole insects were collected from the infested branches and from the ground near the infestation area.

The adult insects appear in the beginning of March to July. Its locations in Iraq are the Provinces of Baghdad, Wasit, Nineveh and Dohuk Provinces. In a study of (Kheri,1974) found that *Chalcophorella bagdadensis* present on *Ficus* spp. the adults were collected directly by hand from the same host plant. General distribution: Known in Europe in Armenia and widely distributed in Asia: Turkey, Syria, it is recorded from localities in Iran as *bagdadensis freyi* Obenberger 1942 (Kubáň 2006), and in Iraq (Derwesh 1965; Roberts 1972; Abdul-Rassoul *et al.* 1988; Al- Ali,1977.).

GENUS *Julodis*

The genus *Julodis* is one of the largest genera, as it includes many species spread within the ancient southern polar regions and the eastern region extending to the coasts of South Africa. One of the most important genera of this family (Cobos 1986). The diagnostic characteristics are covered with short and dense fluff on the armor not visible or very small and the medial sternal plate is or not divided the posterior iliac plate slightly widens inward and its posterior edge is horizontally curved (Fadl, et al. 1991). In Iraq, two genera recorded (*Julodella* and *Julodis*) studied one of them, while the other did not (Knopf,1971). During the field visiting, the most efficient collection methods were represented by using of the regular air nets, in addition to collecting by hand from trees and bushes, also placing an umbrella under trees and shaking them until insects fall inside them.

Then comparing them with insects in which deposited in scientific institutions such as the Natural History Center and Research and Museum of the University of Baghdad, as well as the insect groups in the Department of biology in the college of science, Al-Anbar University, and insects in the Center of Desert Studies of Al-Anbar University.

The species that have been recorded and belonging to this genus are of the three following species:

Julodis balucha, *Julodis speculifer* and *Julodis syriaca*

In Iraq, especially in the northern regions of Iraq, two species are recorded (Derwesh J. 1962), this genus has a small body, often with dark brown colors and light brown spots spread out alternately and spread in the hind of the insect, the presence of dense bristles on thorax tergums of insect.

Body short, robust; coloration brown to almost black. Based on the specimens recorded and on the data from the literature all mentioned species of the genus *Julodis* are treated on the subspecific level with updated distribution and with their actual or supposed distribution in Iraq, so in some cases it was necessary to add a short taxonomic paragraph under species which had record.

The adults of *j. speculifer* were collected directly on the weeds, its recorded in north of Iraq (Kubán and Volkovitsh 2006; Ghahari *et al.* 2015). Larval development done in the soil, female depositing eggs into the soil. In Iraq the species *Julodis speculifer* has been reported under the name *Julodis distincta* Gory, 1840 by Derwesh (1965) and Khalaf and Al-Omar (1974) in which we believe it is represented as the subspecies. Yet, *Julodis Speculifera* recorded by the researcher (Abdul-Rassoul *et al.* 1988) who collected some species that he found, including the species under this study.

Genus *Lampetis*

A modern taxonomic study of the genus *Lampetis* has not been published, so all species recorded by (Howarth & Gillett, 2009) together with all accessible information on their distribution.

Three species belong genus *Lampetis* were recorded in Al-Anbar Province, in this study, they were (*Lampetis mimosa* Klug, 1929), (*Lampetis argentata* Mannerheim, 1837) and (*Lampetis* sp.). We can't diagnose the name of the third species.

The adult insect about (16-27) mm long and (5-9) mm wide. The color is brown, ranging from light to dark, with a metallic vision. there are several parallel lines on the sheath meet at the end. The sheath is dotted, as the front thorax. The head is little wider than half width of the thorax.

This genus was collected from forest trees and wild jungles within the Al-Jazirah region, north of Ramadi, and through a survey of the districts and sub-districts of Anbar Province, they were found in Heet city, near the trees on the banks of the Euphrates, as they were found in different regions of Iraq (Erbil - Sulaymaniyah) (Esmail 1994).

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