

A New Record for the Kastamonu Poplar Pest Fauna: *Melanophila (Trachypteris) picta decastigma* (Fabricius) (Coleoptera, Buprestidae)*

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ABSTRACT

Poplar (*Populus nigra*) is one of the most important fast growing tree species which is widely grown throughout the world and used in various industrial branches. Poplar wood cultivation is a forestry activity carried out in forests and outside of the forest areas and is seen as one of the most effective ways to increase wood production. However, the leaves, shoots, branches, stems and roots of the poplar tree are attacked by various pests, which greatly affect the health of the tree. One of these pests is *Melanophila (Trachypteris) picta decastigma* (Fabricius). The pest was first discovered in *Populus nigra* at Gököy, Kastamonu in 2016. Although this subspecies has been reported in the literature, there has been no scientific record reported in Kastamonu. The adults of this subspecies were examined and information about their taxonomic characteristics were identified. Results revealed that *M. p. decastigma* has caused intense larval damage on poplar fields in the Kastamonu region.

I. INTRODUCTION

The development of industrial plantations with poplar and fast growing species is designed to meet the rapidly growing need for wood raw material in Turkey [1]. However, one of the most important threats that affect the survival and growth of poplar plantations are the insects. Poplar stem borer beetle, *Melanophila picta*, is one of the most significant pests that have been attacking poplar trees throughout Iran and Greece, particularly in West Azarbaijan [2, 3]. This pest has also been causing significant damages in poplar plantations and nurseries in Turkey [4], particularly young poplar plantations (2-5 years old), specifically *Populus alba*, *P. nigra* and *P. pyramidalis*. The larvae of this insect damage the trees, both young and old, by opening galleries into the trunks. Unhealthy trees and seedlings are the most vulnerable subjects of attack of this insect

[5, 6, 4]. The insect is activated by warm temperature, usually at around 20°C and higher, in which they mate and lay eggs at the height of about 2-2.5 m of the trunk level above the soil surface. The incubation period of the egg is about 9-14 days, and then after hatching, the larva penetrates into the bark resulting in the slow death of the attacked trees, as manifested in the change in color of the tree and inward collapse of the bark [7]. In this study, *Melanophila (Trachypteris) picta decastigma* (Fabricius, 1787), which was first discovered in poplar populations of the Kastamonu region, have been characterized, including its morphology, spread, damage and control methods.

II. METHODS AND MATERIALS

The main subject of the study is *Melanophila (Trachypteris) picta decastigma* (Fabricius, 1787), which has been found in poplar trees in Kastamonu-Gököy. The study site is characterized by an arid climate classification, based on the Thornwaite's climate classification [8].

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Average annual temperature is 9.8°C, with hottest month in July (20.2°C) and the coldest month in January (-1.1°C). Average annual precipitation is about 449.6 mm, which is widely distributed across the Kastamonu region. Rainfall distribution across the different seasons are 19.4% in winter (87.2 mm), 34.4% (154.6 mm) in spring, 27.1% (121.8 mm) in summer, and 19.1% (86 mm) in autumn. Average relative humidity is about 70%. The soil texture is dominantly clay type, which becomes muddy during the rainy season. Clay is considered as fertile type of soil. The soil is rich in calcium carbonate with pH ranging from 7.5 to 8.1 [9]. To describe the subjects of this study, samples from the trunks with signs of insect attack were collected, and then brought to the laboratory for analysis. The adults were grown at room temperature in organtine cages. The insects in the samples were identified based on the identification key prepared by Tozlu and Özbek [10].

III. RESULTS AND DISCUSSION

Morphological Characteristics of *Melanophila*

***Melanophila picta decastigma*.** This species has light yellow, irregularly shaped spots on the elytra (**Figure 1a**). The tip of the elytra has more or less round ends

(**Figure 1b**). The end part of the anal sternite in the female is very distinctive in the middle with a bright outgrowth (**Figure 1c**). Across the globe, this species has been widely distributed in Germany, Albania, Austria, Bulgaria, Algeria, Czechoslovakia, Armenia (Yerevan), Morocco, France, Wales, Iran, Spain, Switzerland, Italy, Portugal, Romania, Russia (Caucasus, Crimea), Syria, Tunisia, Turkey, Ukraine, Yugoslavia and Greece [11, 12, 13]. In Turkey, this species has been reported to be found in Balikesir (Manyas Lake), Erzurum and Malatya (Darende-Balaban) [11, 12, 13, 14, 15, 16]. Besides, Sekendiz reports that this subspecies spreads throughout the country [17].

The average length of the adults is 12.2 mm and the average width is 4.48 mm. There are irregularly shaped yellow spots on the elytra. The tip of the elytra ends roundishly and there is a distinctive edge in the anal sternite in the female (**Figure 2**).

***Melanophila cuspidata*.** This species is distinct from *M. picta decastigma* by the features of its body, which lacks speckles on elytra (**Figure 2a**). Also, the tip of the elytra ends sharply (**Figure 2b**). The tip of the anal sternitis in the female is in bright black with a very slight indentation in the middle (**Figure 2c**).

M. cuspidata is widely distributed in Albania, Azerbaijan, Algeria, Armenia, Morocco, France, Georgia,, Iran, France, Spain, Italy, Kazakhstan, Egypt, Uzbekistan, Russia, Syria, Tajikistan, Tunisia, Turkey,

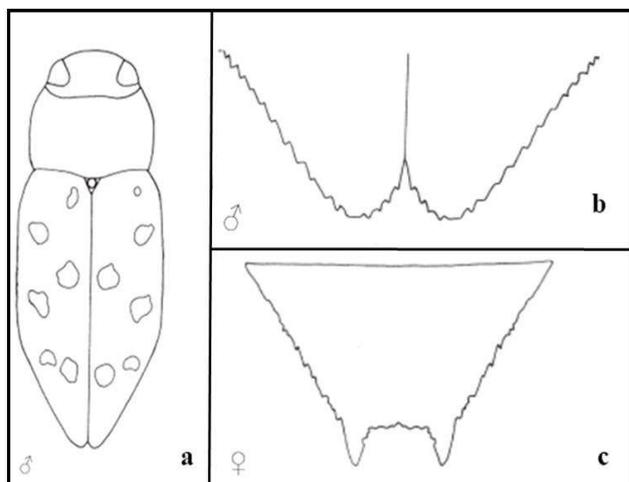


Figure 1. General view of the body, a. *Melanophila picta decastigma*, b. The end of Elytra, c. Anal sternite

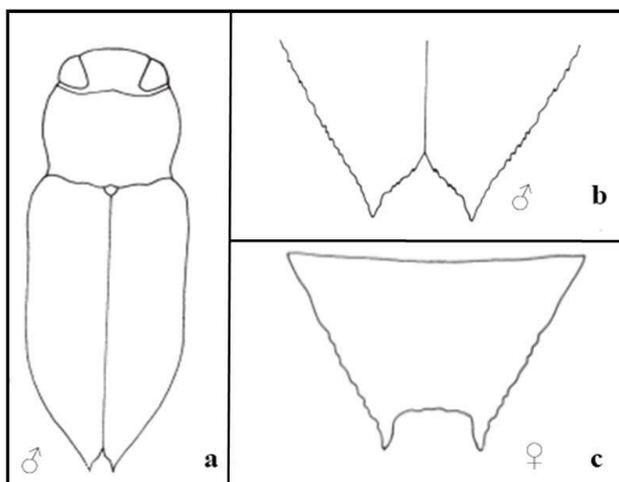


Figure 2. General view of the body, a. *Melanophila cuspidata*, b. The end of Elytra, c. Anal sternite

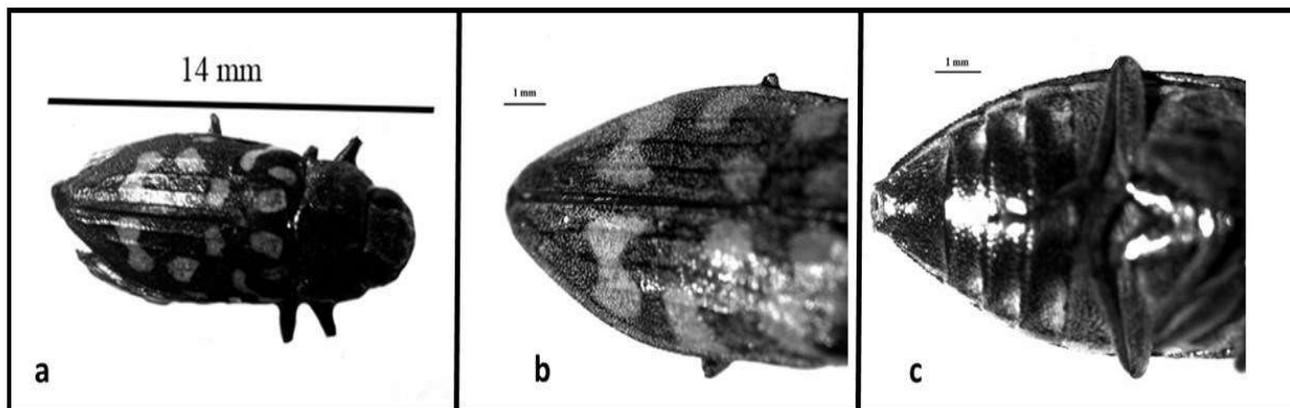


Figure 3. Morphological characteristics of *M. picta decastigma* samples obtained in Gökkyö. **a.** General view of the body, **b.** The end of Elytra, **c.** Anal sternite

Yugoslavia and Greece [12, 16]. In Turkey, sighting of this species has been reported in Içel (Anamur, Erdemli) and Izmir [11]. This species lays eggs sometime between June and July, during which the eggs can be found in cracks of barks. The eggs have white color, and would hatch in about 9 to 10 days. The larvae have well developed mouths and chests, with bristles along their sides to aid in the movement. A pupa has a length of about 2 to 3 cm, which would develop from the mature larvae. In Kastamonu, the first adults were obtained in laboratory conditions sometime in July.

IV. CONCLUSION

Although most of the Buprestidae families are secondary pests, they multiply exponentially resulting in increased food requirement. When this happens, the insects seek food from any sources, including poplar, which results in serious damage to host plants. Unhealthy Poplar trees are highly vulnerable to attack by the pests which bore a hole into the trees, and then lay their eggs within the cracks of the bark [6, 18, 19, 20]. This species has been reported in many countries, and has now found its way to the Kastamonu region. Both species, *M. picta decastigma* and *M. Cuspidata*, have been causing significant damages to poplar plantations, not only in Turkey, but also in other countries in temperate regions.

Among the biological methods to regulate the spread of this insect is keeping the plantation healthy. Proper site selection and appropriate cultural and silvicultural practices are factors that affect the growth performance of trees [4], and are means to ensure the healthy growth of trees. Poplars should not be planted in an unsuitable soil type. Plantation maintenance to prevent weed competition should be properly observed [21, 22]. Chemical control is also possible through application of insecticides. Some of cultural measures include observance of best planting practices, proper timing in planting the seedlings (90-100 cm in height and planting in spring season), and application of control measures of insects during larval stage. Spraying the bark with chemicals would kill the larvae before they enter the bark. The main problem of chemical control is the potential for river contamination, particularly those areas close to water bodies.

Biological control is also possible. Natural predators of larvae i.e. *Dolichomitus* sp. (Hymenoptera: Ichneumonidae), *Iphiaulax impostor* (Hymenoptera: Braconidae), *Spathius curvicaudis* (Hymenoptera: Braconidae), *Atractogaster semiculptus* (Hymenoptera: Ichneumonidae), *Atanycolus ivanow* (Hymenoptera: Braconidae), and *Cratocentrus fastuosus* (Hymenoptera: Chalcididae) are the parasites used against *M. picta decastigma*. *Picus viridis* is the only mentioned predator that feeds on larvae of *M. picta* [23].

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