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First record of *Lachnaia italica* Weise, 1882 (Coleoptera: Chrysomelidae) in Croatia

Prvi nalaz vrste *Lachnaia italica* Weise, 1882 (Coleoptera: Chrysomelidae) u Hrvatskoj

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Abstract

Adult beetles of *Lachnaia italica* Weise, 1882 were found for the first time in Croatia in a nursery near Rovinj in June 2023. The beetles were found on plum (*Prunus domestica* L.) seedlings, with visible feeding damage on the leaves. The beetles were based on adult's morphological characteristics and the identification key for the family Chrysomelidae. Species *L. italica* is widespread in Italy and occurs in several surrounding countries. Adults feed primarily on the terminal branches of hawthorn and young oaks. However, they can also cause damage to a variety of other plants including roses, plums, and cherries. These beetles are known to consume leaves, shoots, and tender flowers, posing a significant threat to the flowering development of these young plants. Due to the lack of literature sources on this species, in this article, we have attempted to summarize the available literature to describe the morphology, life cycle, damage, and possible control of this pest.

Keywords: Chrysomelidae, Croatia, first record, *Lachnaia italica*, plum seedlings

Sažetak

Odrasle jedinke vrste *Lachnaia italica* Weise, 1882 pronađene su po prvi put u Hrvatskoj. Jedinke su uočene na sadnicama šljive (*Prunus domestica* L.) u rasadniku blizu Rovinja u lipnju 2023. Na biljkama su uočene štete na lišću u vidu grizotina. Jedinke su identificirane na osnovi morfoloških karakteristika odraslog stadija pomoću relevantnih ključeva za porodicu Chrysomelidae. Vrsta *L. italica* široko je rasprostranjena na području Italije, a pronađena je i u zemljama u okruženju. Odrasle jedinke najviše se hrane na mladim izbojcima gloga i hrasta. Međutim, mogu se hraniti i na drugim biljkama, uključujući ruže, šljive i trešnje. Odrasle jedinke hrane se na lišću, mladicama i cvjetnim pupovima, što predstavlja značajnu prijetnju cvjetanju mladih biljaka. Zbog nedostatka literaturnih izvora o ovoj vrsti u ovom članku pokušali smo sažeti dostupnu literaturu kako bismo opisali morfologiju, životni ciklus, štete i mogućnosti suzbijanja ovog štetnika.

Ključne riječi: Chrysomelidae, Hrvatska, *Lachnaia italica*, prvi nalaz, sadnice šljive

Introduction - *Uvod*

The family Chrysomelidae encompasses a diverse group of insects known for their striking characteristics (Lopatin 2008). Members of this family are typically small to medium-sized beetles with oval-shaped bodies. They exhibit a wide range of colours, including vibrant metallic hues, patterns, and markings, which serve as both camouflage and warning signals (Maceljski 2002). Chrysomelidae species often possess robust antennae and chewing mouthparts adapted for feeding on plant material. Some notable features include elytra (hardened forewings) that cover the membranous hindwings and protect the delicate flying mechanisms underneath (Hangay and Zborowski 2010). Additionally, many Chrysomelidae species are phytophagous, feeding on various plant parts such as leaves, stems, and flowers (Sánchez-Reyes et al. 2019).

Lachnaia italica Weise, 1882 is an insect characterized by a peculiar morphological constitution of larvae and adults belonging to the order Coleoptera, family Chrysomelidae, subfamily Clytrinae, genus *Lachnaia* Chevrolat, 1837 (Warchalowski 2003). This species is native to Italy where it is widely distributed. It also occurs in Corsica and subsp. *occidentalis* Grasso, 1963 only in Sardinia (Regalin et al. 2006). According to GBIF (2023), this species can also be found in France, Switzerland, Hungary, Serbia, and Slovenia.

Adults of this species are both phytophagous and polyphagous. During May and June, they can be frequently found on the terminal branches of hawthorn and young oaks. The blackberry represents one of the main host plants. But also, they can attack roses, plums and cherries, eating away leaves, shoots, and flowers, ruining the young plants´ growth. They feed on the tender leaves, sometimes causing significant damage by completely consuming the buds (Coltivazione biologica 2023).

In natural conditions, this insect is present in field hedges. Increasingly, *L. italica* is showing a tendency to invade parks and gardens in Italy. When the population of these insects is particularly high, they can cause significant damage to plants. This beetle often goes unnoticed or is mistaken for a ladybug, which has an elongated shape and a slightly faded color (Comune di Nonantola 2018).

The aim of this paper is to present the first record of *L. italica* in Croatia and provide information about the species morphology, life cycle and damages.

Materials and Methods – *Materijali i metode*

During a regular visit to the nursery garden in Istria County as part of the survey, several specimens of beetles from the genus *Lachnaia* were detected on young plum (*Prunus domestica* L.) seedlings. The beetles were found near Rovinj (45°04’57.4’’N 13°40’34.9’’E) on June 5th, 2023. Two specimens were caught by hand, placed in 70 % alcohol with label, and transported to the laboratory for morphological identification.

Species determination based on morphological characteristics of adult stage was made using Warchalowski (2003, 2010) identification key for Chrysomelidae of Europe and the Mediterranean area and Lompe’s (2023) Beetles of Europe. For morphological identification, Carl Zeiss SteREO Discovery.V12™ binocular microscope was used with an Olympus camera bound to a screen of computer. Version 4.6 of the software AxioVision FREIGHT of Carl Zeiss was used to make the photos for the identification.

Results and Discussion – *Rezultati i rasprava*

Using Warchalowski's (2003, 2010) identification key for the Chrysomelidae of Europe and the Mediterranean, and Lompe's (2023) Beetles of Europe, we determined that the species collected was male *L. italica*. To be sure, we compared our specimen aedegus with a male *L. italica* obtained from Italy and confirmed a match. It was also compared with several male specimens of *Lachnaia sexpuntacta* Scopoli, 1763, collected from several different locations in Croatia (entomological collection Zadravec, Zagreb) and there was no match with that species. Boscain (2019) mentions the species *L. italica* in his travelogue of butterflies in Croatia, giving only one picture of an insect. His finding cannot be considered accurate or a first record, as there is no mention of how the species is determined and there is no official record in the scientific or professional literature. Moreover, it is not possible to determine the species without a species identification in the laboratory based on morphological characteristics of aedegus. Hence, this is the first record of this species in Croatia based on a scientifically relevant identification method with all important faunistic data.

Species description – *Opis vrste*

The adult *L. italica* have external conspicuous features by which they are easily recognized. The adult beetle is about one centimetre in length. The elytra are yellowish ochre with three black spots. One spot is located anteriorly on the lateral side, while the other two spots appear after the center of the elytra, forming a transverse line (Coltivazione biologica 2023) (Figure 1). Their entire body is black with iridescent reflections, characterized by a hypognathous head and hairy pronotum. The antennae are serrated and shorter than half of the body length (Figure 2). Males have conspicuously elongated forelegs, especially on the tarsal segments, with segment one of the tarsi on the outside as long as the second and third segments combined (Warchalowski 2003). However, *L. italica* can be easily confused with the morphologically very similar species *L. sexpunctata* which occurs in Croatia and is more widespread. These two species are difficult to distinguish basis of external morphological characters, which are usually variable. They can be reliably distinguished based on examining the male genitalia (aedeagus) (Warchalowski 2003). Species *L. italica* aedeagus is as in Figures 3 and 4: central process long, thickened at apex, strongly crooked backwards, length 9.0 to 11.5 mm (Warchalowski 2010).

Figure 1 Adult of the species *Lachnaia italica*, Kadoić Balaško, 2023
Slika 1. Odrasli oblik vrste *Lachnaia italica*, Kadoić Balaško, 2023.

Figure 2 Antennae and pronotum with hairs of *Lachnaia italica*, Šimala, 2023
Slika 2. Ticala i dlakavi pronotum vrste *Lachnaia italica*, Šimala, 2023.

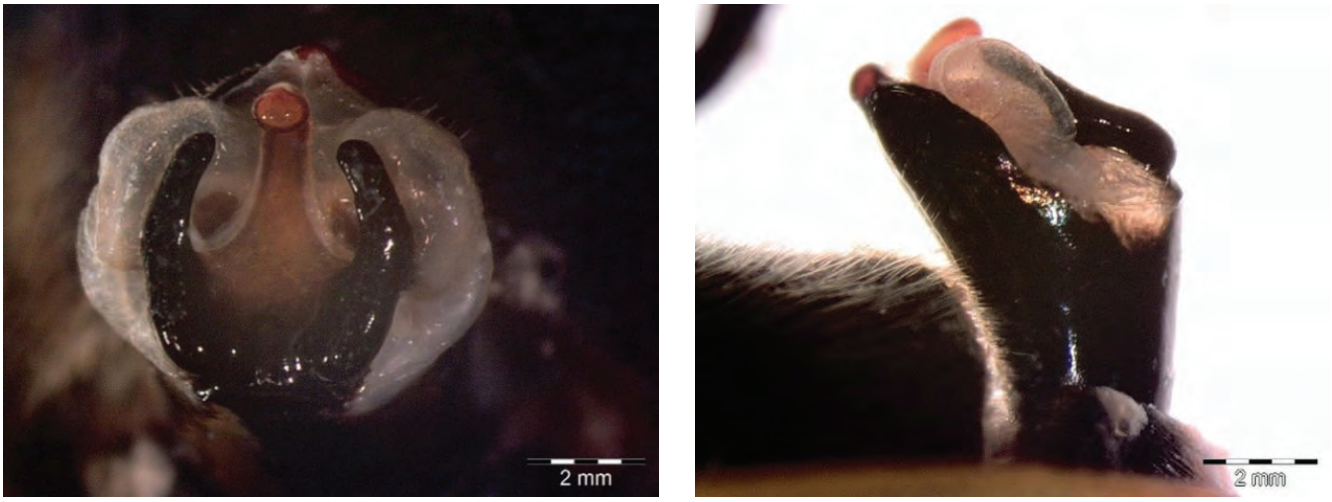

Figure 3 and 4 Apical part of aedegus of *Lachnaia italica*, frontal (left) and lateral (right) view, Šimala, 2023
Slika 3 i 4. Vršni dio aedegusa vrste *Lachnaia italica*, pogled sprijeda (lijevo) i bočno (desno), Šimala, 2023.

According to the literature (Fiori 1948), the larvae are very similar to those of *Clytra quadripunctata* Linnaeus, 1758, but they can be recognized immediately by their slightly curved dorsal cranial region instead of being flat. The neonate larva of *L. italica* is oligopodous and submelolontoid, but very different from the typical larva of Chrysomelidae. The cranial region is strongly sclerotized, slightly convex on the dorsal side, and equipped with large spatulate setae. The antennae are short, the prothorax has two sclerotized notal plates, the legs appear long, and abdominal segments 5 to 8 are short and bent forward. The neonate larva is 1.2 mm long, pale yellowish with a head, notal plates, and reddish-brown legs. The pupal cocoons measured 12 mm in length (Fiori 1948).

Life cycle – *Životni ciklus*

For mating activities, adults prefer the terminal branches of young sun-exposed oaks or small bushes located above the nests of ant *Formica rufa* Linnaeus, 1761. The females lay their eggs towards the end of May and in the early days of June, following the typical reproductive behaviour of most Clytrinae species. The eggs are covered with the female's excrement and then dropped onto the ground, ensuring the protection of the developing embryos. The eggs are laid individually or more commonly in clusters. The insect undergoes its larval development by feeding on plant debris (Fiori 1948). According to Agrain et al. (2015), *L. italica* larvae are Myrmecophilous, which means they have a positive interspecies association with ants. Coleopterans are common commensals in ant nests (Hölldobler and Wilson 1990), but this association regarding the genus *Lachnia* is not sufficiently researched.

Steinhausen (1986) investigated the duration of *L. italica* life cycle. The total development time for *L. italica* in his research under laboratory conditions was found to be two years and 24 days from the time the first eggs are laid until the beetle hatches. These results confirmed his earlier assumption of a two-year development period for this species, and it can be assumed that the laboratory conditions, particularly a consistently warm room temperature, did not cause any developmental delay.

Damages and possible control – *Štete i mogućnosti zaštite*

Adults primarily consume leaves, leading to plant damage. Unfortunately, there is a lack of information regarding the extent of damage in agricultural areas and the use and effectiveness of chemical control against this pest. However, if the number of adults is particularly high, the damage to plants may be continuous, and damage to young seedlings in nurseries can be significant (Comune di Nonantola 2018).

These beetles fly slowly and sometimes drop to the ground without moving when disturbed. This behaviour is more common in the early morning hours when temperatures are lower. Therefore, it may prove useful to provoke the fall of these insects during the coolest hours of the day by shaking infested shrubs and plants. With this mechanical control method, it is possible to collect and eliminate most of the specimens present on the plants without harming the environment. The larvae feed on plant debris and do not cause damage to plants (Comune di Nonantola 2018).

Conclusion - *Zaključak*

This is the first record of *L. italica* in Croatia. This species is native to Italy. Considering that the species was found in a nursery garden on seedlings, we can assume that it was introduced with imported plant material from Italy. So far, no significant damage has been found in Croatia. However, since a large amount of planting material is imported from Italy, there is a possibility that the pest will spread and cause damage over time. Therefore, future work should involve continuous monitoring to keep track of possible spread through Croatia.

Acknowledgment - *Zahvala*

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