

Research articleSubmitted: June 3rd, 2019 - Accepted: September 28th, 2019 - Published: November 15th, 2019**The jewel beetle *Lamprodila (Palmar) festiva* Linné, 1767, a new invasive urban pest of Cupressaceae in Cluj area (Romania) (Coleoptera: Buprestidae)**Horia BUNESCU¹, Teodora FLORIAN^{2,*}¹ Entomology/Zoology, Department 2, Faculty of Agriculture, University of Agricultural Sciences and Veterinary Medicine 3-5 Mănăştur Street, 400372 Cluj-Napoca, Romania - horia.bunescu@usamvcluj.ro² Entomology/Zoology, Department 2, Faculty of Agriculture, University of Agricultural Sciences and Veterinary Medicine 3-5 Mănăştur Street, 400372 Cluj-Napoca, Romania - teodora.florian@usamvcluj.ro

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Abstract

The jewel beetle *Lamprodila festiva* (Linné, 1767), in natural habitats of S Europe originally associated with *Juniperus* spp. (Juniper; Cupressaceae), has been recorded as a recent invasive pest in several European areas, affecting different genera of these coniferous trees and spreading rapidly during the last few years in many countries of Europe. The research was carried out in 2017-2018 in Cluj-Napoca area (Romania), in field and laboratory conditions. The aim of our studies was to identify and study some populations of this new invasive pest occurring in urban areas of NW Romania.

Key words: *Lamprodila festiva*, *Thuja occidentalis*, pest, invasive species, Cluj area.

Introduction

The jewel beetle *Lamprodila festiva* (Linné 1767) [= *Palmar festiva* (Linné, 1767); = *Ovalisia festiva* (Linné, 1767); = *Buprestis festiva* (Linné, 1767); = *Scintillatrix festiva* Linné, 1767] is a new invasive pest recorded in Romania. This beetle belongs to the large family of metallic wood-boring insects, the Buprestidae. Considered as the eighth largest family of the Order Coleoptera, the buprestid species are about 14.900 Worldwide (Pan et al. 2011).

The genus *Lamprodila* includes 86 species in 8 subgenera distributed mainly in Southeast Asia and Melanesia. The subgenus *Palmar* with 42 species is distinctive by large dark spots on elytra. Beside *Lamprodila festiva*, the genus includes another two infamous pests, *Lamprodila rutilans* (Fabricius, 1777) on *Tilia* and *Lamprodila mirifica* (Mulsant, 1855) on *Ulmus* (Volkovitsh & Karpun 2017).

According to Byk & Mokrzycki (2009), in the Palearctic Region the Genus *Lamprodila* (Motschulsky, 1860) includes 40 species distributed in two subgenera: Subgenus *Lamprodila* (Motschulsky, 1860), with 20 species, 7 of them in Europe, and Subgenus *Palmar* (Schaefer, 1949), with 20 species, 3 of them in Europe (Kubán 2006). Species of the genus *Lamprodila* were often alternatively placed in the genera: *Lampra*, *Ovalisia*, *Palmar* and *Scintillatrix* (Zykov 1999).

The “cypress” jewel beetle, *Lamprodila (Palmar) fes-*

tiva (Linné, 1767) is a recently introduced species in the Eastern and Northern Europe in the last years, especially following the spreading of *Thuja* spp. and other ornamental Cupressaceae. The insect has been recorded thus far from Northern Africa (Morocco, Algeria, Tunisia) and Mediterranean Europe (Greece, Italy, Spain, Portugal, France) (Verdugo 2002; Arnáiz Ruiz Lucia et al. 2005; Curletti 2006; Giovagnoli et al. 2012; Luna 2013; Salvetti 2013; Nichane & Khelil 2014; López-Pérez 2016; Pederoli 2016; Rabl et al. 2017), from Eastern Europe (Bulgaria, Hungary, Romania) (Serafim Rodica & Ruicănescu 1995; Ruicănescu & Rodica Serafim 1996; Németh 2013; Schmidt et al. 2014; Nitzu et al. 2016; Ciceoi Roxana et al. 2017) and from Central Europe (Austria, Germany, Slovakia, Slovenia, Czech Republic, Switzerland, Netherlands) (Hemmann 2007; Hellrigl 2010; Thoma & Eickermann 2014; Bílý 2017; Coljin et al. 2017; Rabl et al. 2017; Jendek et al. 2018). This pest has recently been reported also from Russia, on the NE Black Sea Coast of the Caucasus (Karpun & Volkovitsh 2016; Volkovitsh & Karpun 2017; Grebennikov & Kulinich 2017). According to data of Fauna Europaea (<https://fauna-eu.org/>), the “cypress” jewel beetle, *Lamprodila festiva* (Linné, 1767) is present at least in 21 European countries.

Volkovitsh & Karpun (2017) report *Lamprodila festiva* as a serious pest of ornamental Cupressaceae native to Mediterranean Region and Southern Europe; this species has recently expanded its range in Europe. After the first

record in the Caucasus (Sochi area) in 2013 (Karpun & Volkovitsh 2016), the species has become common in the region, where attacked and severely damaged trees of the genera *Thuja*, *Chamaecyparis*, *Juniperus* and *Cupressus*.

Volkovitsh (2017) remarks that in natural conditions, the beetle feeds on native *Juniperus*, *Cupressus* and *Tetraclinis*, while in the areas of invasion it infests different species and cultivars of ornamental, mostly introduced Cupressaceae, including urban plantations and nursery stocks, particularly *Thuja*, *Chamaecyparis*, *Platycladus*, *Callitris*, and some hybrids ("*Cupressocyparis*").

Lamprodila festiva develops in many species and cultivars of conifers, including *Callitris* (Arnáiz Ruiz Lucia et al. 2005; Volkovitsh 2017), *Chamaecyparis* (Razinger et al. 2013; Schmidt et al. 2015; Karpun & Volkovitsh 2016; Volkovitsh & Karpun 2017; Jendek et al. 2018), *Cupressus* (Salveti 2013; Volkovitsh & Karpun 2017; Jendek et al. 2018), *Juniperus* (Ugarte San Vicente et al. 2011; Razinger et al. 2013; Salvetti 2013; Schmidt et al. 2015; Karpun & Volkovitsh 2016; Pedersoli 2016; Volkovitsh & Karpun 2017; Jendek et al. 2018), *Platycladus* (Schmidt et al. 2015; Bilý 2017; Jendek et al. 2018), *Tetraclinis* (Nichane et al. 2014), *Thuja* (Razinger et al. 2013; Salvetti 2013; Schmidt et al. 2015; Vayssières et al. 2015; Karpun & Volkovitsh 2016; Nitzu et al. 2016; Bilý 2017; Volkovitsh & Karpun 2017; Jendek et al. 2018), and even *Ziziphus* (Rhamnaceae) (Curletti 1994).

This pest is included in EPPO Global Database with EPPO code POELFE (<https://gd.eppo.int/taxon/POELFE>).

The "cypress" jewel beetle, *Lamprodila festiva* (Linné, 1767) is included in the IUCN red list in Italy (Audisio et al. 2014; Carpaneto et al. 2015) and Switzerland (UFAM 2011; Monnerat et al. 2016).

According to different authors, the length of the adult "Cypress" Jewel Beetle is about 9-11 mm (Salveti 2012), 6-12 mm (Razinger et al. 2013), 7-11 mm (Nichane et al. 2015), 6,3-8,74 mm (Nitzu et al. 2016), 7-10 mm (Pedersoli 2016). The general colour is metallic green with dark patches (Harde et al. 2000; Razinger et al. 2013). Larvae are 15-20 mm long, with a pronounced head equipped with strong mandibulae (Razinger et al. 2013) or up to 25 mm (Nichane et al. 2015). Pupae are of similar size as imagoes, ca. 8-12 mm in length and up to 6 mm in width (Razinger et al. 2013), naked, white, very soft, flat and hairless (Nichane et al. 2015).

Larvae drill holes in branches and stems. They usually attack healthy plants (Razinger et al. 2013). The larvae prefer smaller branches or stems with a diameter of up to 2-10 cm (Wermelinger, 2011). The larvae develop in the basis of branches and in the trunk by digging subcortical galleries, thus affecting the conducting tissues. These galleries are sinuous, flat and wide (Razinger et al. 2013; Nichane et al. 2015). After overwintering, the larvae make bigger tunnels and galleries causing branches to die, or even causing the whole plant to die. In the second year, in spring the larvae dig out a gallery just below or in bark,

where it pupates. The adults chew their way out using their strong mouth pieces and make an oval exit hole of ca. 2-4 mm (Razinger et al. 2013; Fig. 5).

Pupae develop in late March - early April in the sapwood or in the thick bark. Adults usually appear from May to August (Nichane et al. 2015).

The whole life cycle takes from one to two years (Hellrigl 1972) or even three years (Wermelinger 2011).

Materials and methods

Our researches were carried out between 2017-2018, in an urban area (gardens and parks in Cluj-Napoca - District of Cluj - Romania) and in laboratory (Discipline of Entomology-Zoology at UASMV Cluj-Napoca). The pests were detected by periodical visual control. The detecting and collecting was very carefully because the beetles are moving fast.

The insects were collected straight from the trees by a fine sweep net, shaking down the branches over a piece of canvas, placed under the tree, with the aid of fine pincers, from the trunks and branches of trees.

Often the presence of pests was evident by their holes made in the trunk or by the visual seeking of damaged trees, characterized by dried and brown branches.

The collected biological material has been introduced in small plastic boxes or bags. The study on the material has been carried out with the aid of binocular microscopes in the Laboratory of Zoology-Entomology at UASMV Cluj-Napoca.

The captured specimens have been also studied alive in laboratory conditions. All the studied biological materials were photographed.

Results and Discussion

The first specimen was found on 15 Jul 2017, a dead one in the Central Park Simion Bărnuțiu of Cluj-Napoca. In the same area, next year was observed the first alive specimen (09 Jun 2018).

The observations concerning the "cypress" jewel beetle, *Lamprodila festiva* L. were made in 2018 (09 Jun-19 Jul), in 4 locations where the beetle was found: the Central Park Simion Bărnuțiu, in the Grigorescu, Mănăștur and Plopilor Neighborhood, on eastern arbovitae, *Thuja occidentalis* L. (Fig. 1).

There 16 adult specimens were collected from the 4 areas in Cluj-Napoca (Figs 2-4).

According to our morphological measurements on the adult specimens, the length of body varies from 9 to 11,5 mm (Fig. 2).

The body is ovoidal, metallic shine green-blue colored. The dorsal side of the body is iridescent green with golden and bluish shades (Figs 2-4). On the pronotum and

Fig. 1 – Locations of findings of the “cypress” jewel beetle, *Lamprodila festiva* L. in Cluj-Napoca areas.

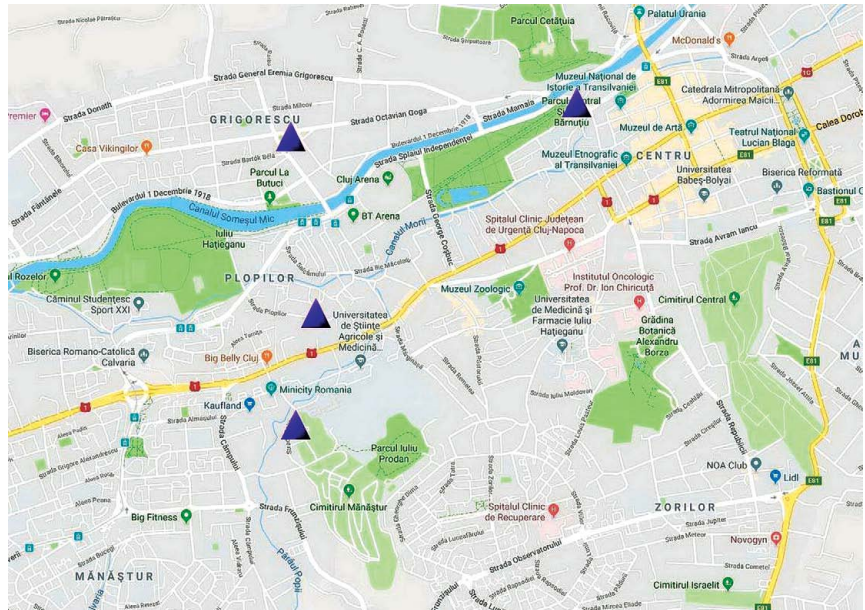


Fig. 2 – The “cypress” jewel beetle, *Lamprodila festiva* L. - measurement examples (photo by H. Bunescu H., 2018).

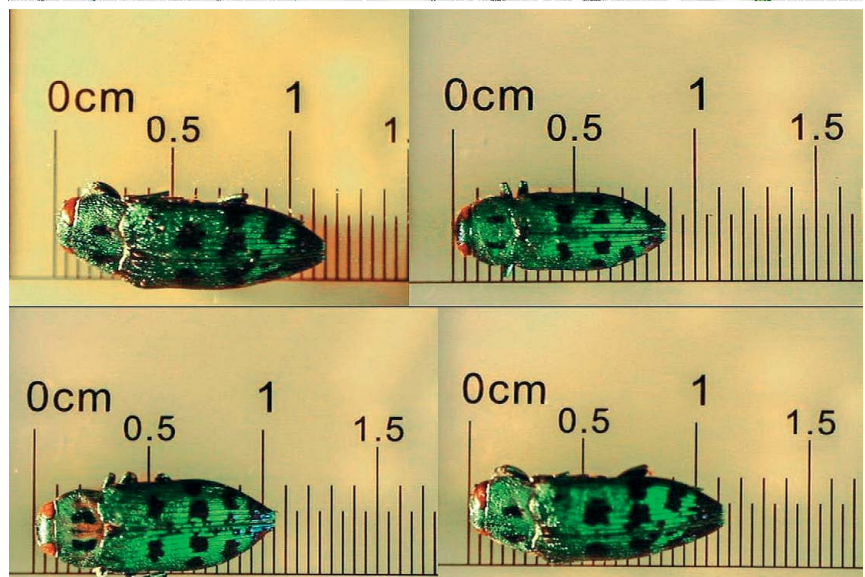


Fig. 3 – The “cypress” jewel beetle, *Lamprodila festiva* L. - adult (photo by H. Bunescu, 2018).



elytra, there are symmetrical dark purple spots (black-bluish). The beetles exhibit a denser punctuation on head and pronotum. The ventral side of the body is iridescent green uniform with golden shades. The body and wings are dark purple.

Being a Mediterranean native insect, *Lamprodila festiva* L. is thermophilous and heliophilous (Lieutier and Paine 2016) and appears to prefer warm and exposed places. The adults have been mostly observed in sunny mid-

day, especially females searching for favourable ovipositioning places, on the trunks or thick branches of living trees (Fig. 4). The beetles fly very easy from a tree to another or in the same tree crown, on the branches.

In the studied urban area, in the 4 locations, the trees and their branches were carefully examined, but only in two locations were observed emergence holes in the trunk of living trees, with imagos inside, ready to get out.

In all studied locations damaged trees were evident.



Fig. 4 – The “cypress” jewel beetle, *Lamprodila festiva* L. - female looking for a suitable place to lay eggs (photo by H. Bunescu, 2018).



Fig. 5 – Emergence holes in the trunk of eastern arborvitae, *Thuja occidentalis* L. made by the “cypress” jewel beetle, *Lamprodila festiva* L. (photo by H. Bunescu, 2018).

The symptoms of attacked plants included dry branches with chlorotic or brown-reddish leaves, cracking and lifting of bark, resin leakage. Some trees were already dried and dead (Fig. 5).

Conclusions

According to the the results of our researches during 2017-2018, we report herein the presence of the “cypress” jewel beetle, *Lamprodila festiva* in some locations of urban area in Cluj-Napoca (Romania), mostly on *Thuja occidentalis* L. The new invasive pest has an important impact damaging the living trees, in different places of the city area (gardens, parks, cemeteries, etc.), affecting their ornamental value in the urban landscape architecture.

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