

Information about the biology, ecology and distribution of *Pilemia tigrina* (MULSANT, 1851), in Romania (Coleoptera: Cerambycidae)

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Summary: Although *Pilemia tigrina* is a species of conservation concern, its biology, ecology and distribution in Romania are still poorly known. The data we are adding here contribute to complete the knowledge in the above-mentioned aspects. This is also the first time in 105 years (last known in 1912) that the authors recorded many new occurrences of this species, inside and nearby of three Natura 2000 sites near Cluj-Napoca. They are: “Dealurile Clujului de Est”, “Suatu - Cojocna - Crairât” and “Cheile Turzii”. Also, *P. tigrina* was recently reported at “Piatra Secuiului” (Rimetea/Alba), as well as at “Stânca” (Comarna/Iași).

Key words: *Pilemia tigrina*, Coleoptera, Cerambycidae, Romanian fauna

Pilemia tigrina (MULSANT, 1851), belongs to the family Cerambycidae (longhorn beetles), order Coleoptera. It occurs in Armenia, Bulgaria, Moldova, Southern European Russia, European Turkey, Romania, Serbia, Montenegro, Ukraine and Hungary (FUSU *et al.* 2015, ÖZDIKMEN and TURGUT 2010, TÓTH *et al.* 2016).

In Romania, it is known from Transylvania, Banat, Moldova and Dobrogea regions. Last year's new records in Romania are from: Natural Reserve “Fânațele Clujului”, Halta Tunel, Boju Cătun, Crairât, Cheile Turzii, Piatra Secuiului (observation and/or coll. of Andrei CRIȘAN, Adrian RUCĂNESCU, Alexandru CRIȘAN and Lucian TEODOR) (Transylvania); Șandra, Peciu Nou (CSATHÓ 2010, TÓTH *et al.* 2016) (Banat); Dealul lui Dumnezeu, Valea lui David, Pajiștile de la Mârzești, Comarna, Stânca (DASCĂLU 2002 cited by POPESCU 2013, FUSU *et al.* 2015, Cosmin-Ovidiu MANCI unpublished data) (Moldova) and Hagieni forest (coll. DASCĂLU, cited by FUSU *et al.* 2015 and Cosmin-Ovidiu MANCI unpublished data) (Dobrogea).

The distribution map of *P. tigrina* (Fig. 1) was created based on information from: PANIN & SĂVULESCU 1961, IENIȘTEA 1975, CSATHÓ 2010, SERAFIM 2010, POPESCU 2013, FUSU *et al.* 2015, MIHĂILESCU *et al.* 2015, TÓTH *et al.* 2016 and recent observation and/or coll. of: Andrei CRIȘAN, Adrian RUCĂNESCU, Cosmin-Ovidiu MANCI, Alexandru CRIȘAN and Lucian-Alexandru TEODOR, IBIS Database (<http://ibis.anpm.ro/>).

P. tigrina is a protected species both at European level (annex II and IV of the Habitats Directive, code Natura 2000 - 4020, EUNIS code 196432) and national level (annex 3 and 4A of the GEO 57/2007

(Government Emergency Ordinance) on the regime of natural protected areas, conservation of natural habitats, wild flora and fauna, with subsequent amendments and completions, approved with amendments and completions by Law 49/2011, as subsequently amended and supplemented.

In Europe, *P. tigrina* is mentioned on the Standard Forms of eleven Natura 2000 sites (Table 1) (<http://natura2000.eea.europa.eu/>, TATOLE *et al.* 2009).

Between years 2008 and 2017, in Romania, *P. tigrina* was recorded in the following Sites of Community Importance: Dealurile Clujului de Est, Cheile Turzii, Suatu - Cojocna - Crairât, Trascău, Dealul lui Dumnezeu, Valea lui David, Pădurea și pajiștile de la Mârzești and Pădurea Hagieni - Cotul Văii.

On the site ROSCI0087 Grădiștea Muncelului - Cioclovina (according to the site management plan available on the website of the central public authority for environmental protection), *P. tigrina* was not (at least yet) identified. On the ROSCI0218 Dealul Mocrei - Rovina - Ineu and ROSCI0206 Iron Gates there are no records since 1963 (SERAFIM 2010) and 1975, respectively (IENIȘTEA 1975).

Even if the summed area of Sites of Community Importance in Romania where *P. tigrina* was recorded in the last 35 years seems impressive: 80117.15ha (<http://natura2000.eea.europa.eu/>), it should be noted that the appropriate habitats with the host plant, *Anchusa barrelieri* (ALL.) VITMAN, are very restricted within these sites. For example, on the site ROSCI0295 Dealurile Clujului de Est, *P. tigrina* was recorded on a total surface of about 2.5 ha (which

means 0.01% of the site area). On the site ROSCI0238 Suatu - Cojocna - Crairât, the species was recorded on an area of about 3 ha (i.e. 0.07% of the site area), and 2 larger populations were found in the vicinity of the site on two areas each of them about 1 ha. On the site ROSCI0035 Cheile Turzii, the species was also identified on an area not exceeding 0.5 ha (i.e. 0.15% of the site area). On the site ROSCI0253 Trascău, the species was identified near the path that ascends to Piatra Secuiului, approx. 0.5 ha (i.e. 0.001% of the site area). On the site ROSCI0265 Valea lui David the plant is scattered here and there, only rarely grouped. More extensive observations were made by one of the authors (Cosmin-Ovidiu MANCI) in 2017 on a population in the vicinity of Stâncă (Comarna, Iași County) where about 5 ha were travelled (not included in any natural protected area). Thousands of specimens of the host plant, *A. barrelieri*, were found, and over 100 specimens of *P. tigrina* were recorded.

Counting of the specimens was done in the

evening, when the adults were found on the top of the plants, between the flowers.

A synthetic table with new records of *P. tigrina* in Romania is presented below (Table 2).

Description

Length of specimens varies from 9 to 15 mm. Body colour is dark with or without a weak metallic shine. Head, pronotum and elytra are covered with numerous spots of greyish or yellowish-white spots of hairs. On pronotum 3 more or less distinct longitudinal rows of lighter pubescence can be seen. The antennae are of medium length and only slightly longer than half of the of the body length, being longer in the males, but not touching the apices of the elytra. Antennal segments 3 to 11 with a ring of whitish pubescence. On the sides of the abdomen, on the head and on the thorax, there are erect hairs, which are missing on the elytra. A longitudinal median, greyish-white

Table 1. Natura 2000 sites that include *Pilemia tigrina* on their Standard Forms (<http://natura2000.eea.europa.eu/>)

Natura 2000 code	Name	Area (Ha)	Country
BG0001042	Iskarski prolom - Rzhana	22665.90	Bulgaria
HUDD20030	Mecsek	26177.30	Hungary
HUKM20009	Mezőhegyes-battonyai gyepek	94.73	Hungary
ROSCI0035	Cheile Turzii	326.50	Romania
ROSCI0058	Dealul lui Dumnezeu	707.54	Romania
ROSCI0087	Grădiștea Muncelului - Cioclovina	39864.80	Romania
ROSCI0171	Pădurea și pajiștile de la Mârzești	202.07	Romania
ROSCI0206	Porțile de Fier	125446.00	Romania
ROSCI0218	Dealul Mocrei - Rovina - Ineu	4189.88	Romania
ROSCI0265	Valea lui David	1439.89	Romania
ROSCI0295	Dealurile Clujului de Est	19627.50	Romania

Table 2. New records of *P. tigrina* in Romania

Toponym	Data when observations were performed	Number of searching hours	Number of specimens observed
Natural Reserve "Fânățele Clujului" (Cluj-Napoca/Cluj) (ROSCI0295 Dealurile Clujului de Est)	May 5 th , 6 th , 28 th , 2016	10	>40
Halta Tunel (Cojocna/Cluj) (ROSCI0238 Suatu - Cojocna - Crairât)	May 4 th , 2016	2	11
Halta Boju Cătun (Cojocna/Cluj) (near ROSCI0238 Suatu - Cojocna - Crairât)	May 23 rd , 29 th , 2015	4	16
Crairât (Ploscoș/Cluj) (ROSCI0238 Suatu - Cojocna - Crairât)	May 4 th , 6 th , 2017	4	7
Cheile Turzii (Mihai Viteazu/Cluj) (ROSCI0035 Cheile Turzii)	June 4 th , 8 th , 2016	5	2
Piatra Secuiului (Rimetea/Alba) (ROSCI0253 Trascău)	May 14 th , 2017	1	3
Stâncă (Comarna/Iași) (no protected area)	May 21 st , 2017	2	>100

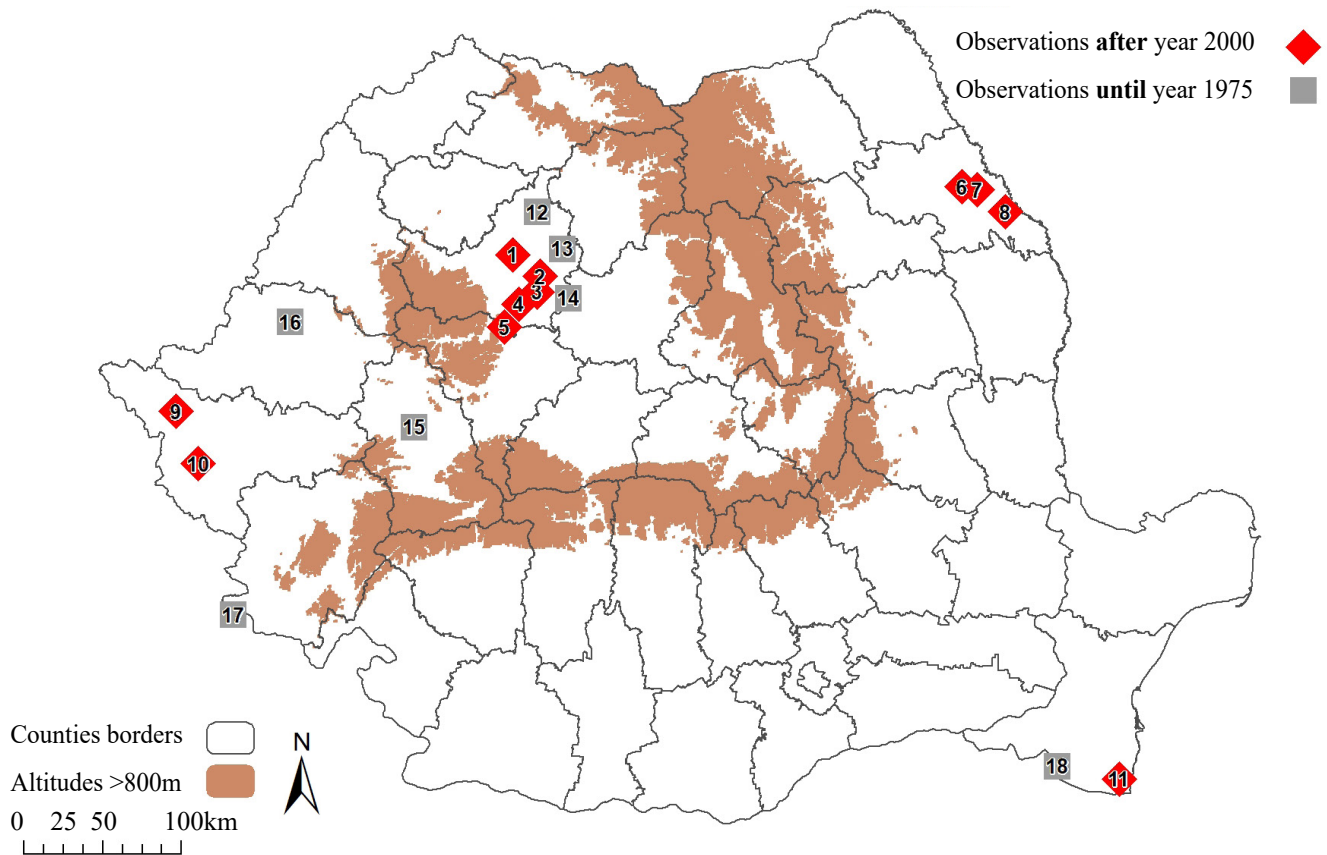


Fig. 1. Distribution map of *Pilemia tigrina* in Romania:

1 - Natural Reserve "Fănațele Clujului" (ROSCI0295 Dealurile Clujului Est) (obs. Andrei CRIȘAN 2016),
 2 - Halta Tunel (Cojocna/Cluj) (ROSCI0238 Suatu - Cojocna - Crairât) (obs. Andrei CRIȘAN 2015-2016),
 3 - Halta Boju (Cojocna/Cluj) (obs. Andrei CRIȘAN and Adrian RUCĂNESCU 2015), respectiv Crairât (Ploscoș/Cluj) (ROSCI0238 Suatu - Cojocna - Crairât) (obs. Andrei CRIȘAN 2017),
 4 - Natural Reserve Turda Gorges (ROSCI0035 Cheile Turzii) (obs. Andrei CRIȘAN 2016),
 5 - Piatra Secuiului (Rimetea/Alba) (obs. Alexandru CRIȘAN and Lucian TEODOR 2017),
 6 - Dealul lui Dumnezeu (ROSCI0058 Dealul lui Dumnezeu) and Valea lui David (ROSCI0265 Valea lui David) (Dascălu 2002, Popescu 2013, obs. Cosmin-Ovidiu MANCI 2015),
 7 - ROSCI0171 Pădurea și pajiștile de la Mârzești (DASCĂLU 2002, POPESCU 2013),

8 - Comarna/Stâncă (Comarna/Iași) (obs. Cosmin MANCI 2016, 2017),
 9 - Șandra (Șandra/Timiș) (TÓTH et al 2016),
 10 - Peciu Nou (Peciu Nou/Timiș) (CSATHÓ 2010, TÓTH et al. 2016),
 11 - Pădurea Hagieni (ROSCI0157 Pădurea Hagieni - Cotul Văii) (obs. DASCĂLU 2008 in FUSU et al. 2015, obs. Cosmin-Ovidiu MANCI 2013),
 12 - Dej (Cluj) (PETRI 1912 in PANIN & SĂVULESCU 1961),
 13 - Geaca (Geaca/Cluj) (PETRI 1912 in PANIN & SĂVULESCU 1961),
 14 - Zau de Câmpie (Zau de Câmpie/Mureș) (PETRI 1912 in PANIN & SĂVULESCU 1961),
 15 - Deva (Hunedoara) (PANIN & SĂVULESCU 1961),
 16 - Ineu (Arad) (SĂVULESCU 1963 in SERAFIM 2010),
 17 - Baziaș (Socol/Caras-Severin) (IENIȘTEA 1975),
 18 - Pădurea Dumbrava (Constanța) (SĂVULESCU 1965 in SERAFIM 2010).

stripe passes through the dorsal part of the pronotum, less obviously on the cephalic capsule. Ventrally the abdominal sternites 1 and 2 in males have a distinct elevation. The older specimens, in the second half of May lose the black scales and become more greyish (HEGYESSY and MERKL 2014, PANIN and SĂVULESCU 1961 and BENSE 1995) (Figs. 2-3). In Romania can be confused with *Pilemia hirsutula* (Frölich, 1793) (Fig. 4), which lives on Lamiaceae species, but its body is covered with a brownish or brown-yellowish pubescence, the marbled appearance being less obvious (HEGYESSY and MERKL 2014).

P. tigrina can sometimes be found together with *Opsilia caerulescens* (SCOPOLI, 1763) on *A. barrelieri*

(Fig. 5). The elytra of *O. caerulescens* are coloured greenish-blue or gray, uniform. *O. caerulescens* develops on several other Boraginaceae, especially on *Echium* sp., since *P. tigrina* develops exclusively on *A. barrelieri*.

Biology and ecology

The female places the eggs on the stems of *A. barrelieri*, at the leaf axilla, at about 10-65 cm above the ground. The larvae develop in the stem (June), eating its way to the root of the host plant. Of interest is the larval cannibalism – in one plant only one larva can survive (HEGYESSY and MERKL 2014). The adult



Fig. 2. *Pilemia tigrina*, details (Photos: C.O. Mancì)



Fig. 3. *Pilemia tigrina* mating (A) (Photo: A. Crişan) and feeding (B) (Photo: C.O. Mancì)



Fig. 4. *Pilemia hirsutula* (Photo: C.O. Mancì)



Fig. 5. *Opsilia caerulea* (Photo: A. Crişan)

emerges in September–October, but will hibernate in a loose cocoon in the root of the plant from where it will emerge near end of April (HEGYESSY and MERKL 2014). The adult can be found until the beginning of June, with peak activity from the end of April to mid-May (DANYIK 2015). Due to the larval cannibalism, for the long-term maintenance of a *P. tigrina* population, a big population of *A. barrelieri* is needed (Fig. 6).

The adults feed on parts of young stems, leaves and flowers of *A. barrelieri*, being well camouflaged. They fly only in sunny weather and seem to have a well-developed sight, hiding behind the stem, or falling down to the ground, staying motionless in case of danger. If the weather is warm enough, they fly fast. During the bad weather as well as at night, more individuals group on the flowers, leaf bases or stem branching (DANYIK 2015). Due to this behaviour, the species identification and monitoring can also be done in rainy days, misty weather or early mornings. If the vegetation is very abundant, sometimes the visual detection of the species is inconclusive. Then, the method of sweeping vegetation with the entomological net is necessary to detect the specimens.

Protection and conservation

The species distribution is insular, because of the insular distribution of its host plant *A. barrelieri*. Destruction of the host plant habitat is the main cause of the global and regional scale of the population decline of *P. tigrina*. In the case of existing populations,

grazing or mowing of vegetation before July can result in destruction of eggs or young larvae from the stems of the plants. Lack of any traditional land use activities can result in an overgrowing of bushes and slow disappearance of these meso-xerophile meadows together with hostplant *A. barrelieri* and, of course as consequence the *P. tigrina* populations. The use of pesticides on land near the sites of *A. barrelieri* also can have adverse effects on *P. tigrina* populations.

The main protection measure should consist in maintaining and preserving the areas with *A. barrelieri* and avoiding any fertilization or using of pesticides. Between the middle of April and the end of May, in areas with *A. barrelieri*, on which the presence of *P. tigrina* was identified or supposed to exist, any disruptive activity must be avoided.

On the sites where presence has been confirmed, the needed measures are to remove invasive plant species, as well as other bushes, in favour of the maintenance of meso-xerophile meadows. It is also desirable to extend the research to check the presence of the *P. tigrina* on all potential areas (where the presence of the *A. barrelieri* plant is known).

Due to the fragmentation of habitats as a result of human activities over the past one hundred years (intensification of agriculture, infrastructure works, extension of human settlements), most of the populations of this species are virtually isolated from each other. Under these circumstances, even if it is more difficult to put it into practice, it would be important to make ecological corridors to connect



Fig. 6. *Pilemia tigrina* habitat, in Boju Cătun (Photo: A. Ruicănescu)

(some) populations of this species.

We consider that the species is not as rare as it is less studied in Romania, and a systematic search for it correlated with the data available for the host plant, *A. barrelieri*, would generate a significantly larger data volume. We would like to mention that some of the new reports from Transylvania presented in this material were possible following the implementation of some European financing projects for the elaboration of management plans for three Natura 2000 sites: ROSCI0035 Cheile Turzii, ROSCI0295 Dealurile Clujului de Est and ROSCI0238 Suatu - Cojocna - Crairât.

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