

**Rosalia longicorn *Rosalia alpina* (L.) (Coleoptera: Cerambycidae)  
uses roadside European ash trees *Fraxinus excelsior* L.  
– an unexpected habitat of an endangered species**

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**ABSTRACT.** The paper reports the discovery of the rosalia longicorn *Rosalia alpina* on European ash trees *Fraxinus excelsior* in the Magura National Park (Beskid Niski Mts, SE Poland) in August 2011. Imagines were found on dead trees growing by the side of a road running between a forest and a meadow. At least eleven individuals were observed, including mating beetles. The data on this previously unknown habitat of the rosalia longicorn in Poland are discussed in the context of its trophic relationships and habitat requirements, as well as species conservation issues.

**KEY WORDS:** *Rosalia alpina*, *Fraxinus excelsior*, Carpathians, Magura National Park, host plant, roads.

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INTRODUCTION

The rosalia longicorn *Rosalia alpina* (L.) is an endangered and strictly protected icon of saproxylic biodiversity throughout its range, which mainly covers central and southern Europe. In central Europe, the rosalia longicorn occurs mostly in old mountain beech forests (BURAKOWSKI et al. 1990). Ecologically, this longhorn beetle is associated with the genus *Fagus* (SAMA 2002), but other species have also been reported as its larval host plants (e.g. ŠVÁCHA & DANILEVSKY 1988, BURAKOWSKI et al. 1990, BENSE 1995, SLÁMA 1998, SAMA 2002, BENSE et al. 2003, BINNER & BUSSLER 2006, CIACH et al. 2007, CIZEK et al. 2009).

In Poland, the rosalia longicorn is a very rare and endangered species and has been recorded in the largest numbers in the Beskid Niski Mts and the Bieszczady Mts (STARZYK 2004a). Until recently the European beech *Fagus sylvatica* L. was the only known host plant of rosalia longicorn larvae in Poland (DOMINIK & STARZYK 1989, STARZYK 2004a). Not long ago, this species was also recorded in the Beskid Niski Mts, on Wych elm *Ulmus glabra* HUDS., which is an extension of the species' niche (CIACH et al. 2007, CIACH & MICHALCEWICZ 2009, MICHALCEWICZ et al. 2011).

Located in the Beskid Niski Mts, the Magura National Park is one of the rosalia longicorn's refuges in Poland and the site of its most abundant occurrence (GIOŚ 2011). The abundance of dead European beech timber allows this species to flourish in this National Park. The occurrence of the rosalia longicorn in an anthropogenic location was therefore totally unexpected. These newly discovered localities of imagines were roadside specimens of dead European ash trees *Fraxinus excelsior* L. In this paper, we describe this unexpected habitat of the rosalia longicorn and the species' association with the European ash as a potential host plant. We discuss this information in the context of the species' host plants, habitat use and the conservation of saproxylic species inhabiting trees near roads and avenues.

## METHODS

In 2011, while we were doing research on the morphology and ecology of the rosalia longicorn in the Beskid Niski Mts, we looked for this species in sites of its potential occurrence, including localities where European beech trees in forest stands naturally decay, and timber yards. During the fieldwork, we also inspected specimens of dead, roadside European ash trees. The records of the adults reported below are the result of such accidental encounters.

The Magura National Park is situated in the south-eastern part of Poland (49°30'N; 21°29'E; 400-850 m) in the Beskid Niski Mts. It has an area of 19 439 ha and is covered mainly by a mosaic of woodlands, which make up 96% of the total area, and meadows. The fertile Carpathian beech forest *Dentario glandulosae-Fagetum* is the dominant forest plant community. The dominant tree species are the European beech and the silver fir *Abies alba* MILL. However, as a result of past human activity, some of the forest communities in the study area are forecrop forest stands growing on abandoned agricultural land. The study area is designated as the Ostoja Magurska Special Area of Conservation PLH180001 and Beskid Niski Special Protection Area PLB180002.

## RESULTS

### Description of the habitat

This locality of the rosalia longicorn lies in the Magura National Park near the village of Krempna (UTM: EV38). The site borders a public road running alongside the Krempna

stream. The mountains slopes of the narrow valley are covered by forests and there are meadows along its bottom (the exact positions are not given for conservation reasons). The four dead European ash trees on which the imagines were observed stand by the road, three of them in the verge between the road and the adjacent meadow, and the fourth at the edge of a forest, where this adjoins the road (Figs 1-2). The trees stand in a well insolated place near the edge of a forest with a south-easterly exposure. Probably, all the trees growing along the road were planted, so this is an artificial habitat. The circumferences of the ash trees at 1.3 m height were 87, 89, 116 and 137 cm respectively, and their respective heights were 11, 11, 13 and 16 m. All four trees were dead, and their bark was damaged.

#### Occurrence of adults

From 4 to 6 August 2011, at least 11 exx. (6 males, 5 females) of *rosalia longicorn* were recorded at this locality (Fig. 3). A single male, which had been previously observed, was also recorded during a subsequent inspection of the site on 10 August 2011. The imagines were at different heights on the trees. Mating beetles were also observed on one of these ash trees. In addition, an injured but still living male *rosalia longicorn* was found on the asphalt road near this locality on 6 August 2011.



**Fig. 1.** The locality of the *rosalia longicorn Rosalia alpina* on roadside European ash tree *Fraxinus excelsior* in the Magura National Park, 5 August 2011. Photo by J. Michalcewicz.



**Fig. 2.** The locality of the rosalia longicorn *Rosalia alpina* on roadside European ash trees *Fraxinus excelsior* in the Magura National Park, 6 August 2011. Photo by J. Michalcewicz.



**Fig. 3.** Adult of the rosalia longicorn *Rosalia alpina* on the dead trunk of a roadside European ash *Fraxinus excelsior* in the Magura National Park, 5 August 2011. Photo by J. Michalcewicz.

## DISCUSSION

Dead trunks of European ash trees – dry and not decomposed – are a potentially favourable place for the development of *rosalia longicorn* larvae. The genus *Fraxinus* has been quoted as a host plant for larvae of this species (i.a. BEDEL 1901, PICARD 1929, PLAVILSTSHIKOV 1955, DEMELT 1966, KASZAB 1971, MAMAEV & DANILEVSKY 1975, DANILEVSKY & MIROSHNIKOV 1985, ŠVÁCHA & DANILEVSKY 1988, HOLLIGER & BRUSTEL 1997, BENSE 2009), but well documented and detailed reports of development in ashes are scanty (SLÁMA 1998, U. BENSE pers. comm.). Moreover, adults of *rosalia longicorn* have been observed on ash trunks in Bulgaria (SIMANDL 1988, 2002). It is to be anticipated that, under favourable conditions, the *rosalia longicorn* will colonize European ashes in the future more frequently. The fact that the European ash is dying out in Europe (KOWALSKI & HOLDENRIEDER 2008, KOWALSKI et al. 2010) may play a significant part in this phenomenon by providing a significant amount of potential breeding material. At the same time, the available data on this beetle's ecological requirements in Central Europe, e.g. the discovery of elm-feeding populations in a lowland forest (CIZEK et al. 2009), as well as in a habitat consisting of a forest clearing community in a succession stage (MICHALCEWICZ et al. 2011), are indicative of the species' substantial adaptive capabilities. Moreover, the not insignificant dispersal capabilities of *rosalia longicorn* imagines (GATTER 1997, BINNER & BUSSLER 2006, DRAG et al. 2011) enable them to migrate to and colonize different habitats. This is confirmed by the spectacular switch to the atypical habitat described in this paper.

Presumably, the local extinction or dying of particular tree species may be conducive to a polyphagous species, such as the *rosalia longicorn*, changing its habitat and trophic resources (see MICHALCEWICZ et al. 2011). One should emphasize that in the case of the wych elm in Poland, that change in habitat related to a woodland environment in the process of succession (MICHALCEWICZ et al. 2011), whereas in the case of the European ash, we are dealing with single roadside trees, which are the consequence of an intentional human activity. This extension of the habitat spectrum may be due to the good condition of the *rosalia longicorn* population in the Carpathian region, as well as the cessation of other factors limiting the possibility its colonizing host plants other than the European beech. The observed changes in the ecology of this species taking place in Central Europe may be due to climatic changes. As a consequence of rising temperatures, colonization of other host plants is becoming possible, and Central European populations, previously regarded as monophages of European beech, are becoming polyphagous. The occurrence of the *rosalia longicorn* on dead European ash trees may theoretically indicate a lack of suitable conditions for reproduction in the vicinity. However, the presence of host plants (large, old decaying European beech trees) in the landscape mosaic with numerous, open, sunlit areas provides suitable conditions in which the *rosalia longicorn* can flourish.

Trees growing along roads are common and important landscape elements, and often provide a very valuable natural environment requiring some protection measures. Roadside trees can be a habitat of such rare insect species as the great capricorn beetle *Cerambyx cerdo* L. or the hermit beetle *Osmoderma eremita* (SCOP.) (DOMINIK & STARZYK 1989, STARZYK 2004b, SZWAŁKO 2004, RANIUS et al. 2005, OLEKSA et al. 2007). The rosalia longicorn has become, though opportunistically, yet another species associated with this man-made habitat. Dead roadside European ash trees, which seemingly have no special natural value, and which are the site of occurrence of the rosalia longicorn, demonstrate the importance of this type of anthropogenic habitat for endangered species. This finding indicates, moreover, that roadside trees are still an insufficiently explored habitat. The fact that the rosalia longicorn occupies anthropogenic environments simply makes the problem of protecting saproxylobionts in man-made habitats more urgent. The relevant trees may be standing close to a roadway and may be removed during road works. Future regional or local protection measures related to the rosalia longicorn should take dead and dying ash trees into account as sites of the potential occurrence of this species.

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