

Pastureland copses as habitats for a primeval forest relict: a unique location of the Rosalia Longicorn *Rosalia alpina* (L.) (Coleoptera: Cerambycidae) in the Polish Carpathians

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ABSTRACT. The Rosalia longicorn *Rosalia alpina* is regarded as a primeval forest relict and occurs mainly in old beech woodland in mountain areas. This paper describes a locality of the species in a copse surrounded by pastures, lying in open farmland situated at some distance from woodlands. The larval host plant was Wych Elm *Ulmus glabra*. The trees at this locality were dying from Dutch elm disease, which is caused by the fungus *Ophiostoma* sp. It is demonstrated that under favourable circumstances *R. alpina* can also colonise copses in pastureland, a hitherto unknown habitat for this species. At the same time this newly discovered locality may signify a change in the species' habitat preferences. *R. alpina* is under threat, however, from the possible felling of the dead trees by the landowner; conservation measures should therefore include a mechanism for financial compensation in return for not cutting the trees down. This work has shown that copses may be used by endangered saproxylic species. The discovery of a *R. alpina* locality in a pastureland copse gives an indication of the importance of pockets of unmanaged habitat in the farming landscape, which could be contributing to the preservation of populations of rare species.

KEY WORDS: Cerambycidae, *Rosalia alpina*, xylophage, insect, dead wood, farmland, host plant, copse, Dutch elm disease.

INTRODUCTION

The Rosalia Longicorn *Rosalia alpina* (L.) is considered a primeval forest relict (GUTOWSKI 2004). This beetle is trophically associated with Beech *Fagus* L., although the literature does name other larval food plants (see CIACH & MICHALCEWICZ 2013 and references cited there). In Central Europe the species occurs mostly in old beech woodland in mountain areas (BURAKOWSKI et al. 1990). In Poland, however, *R. alpina* was recently found in previously unknown habitats – in a forest clearing community at the succession stage containing dominant Wych Elm *Ulmus glabra* HUDS., and on roadside Ash trees *Fraxinus excelsior* L. (MICHALCEWICZ et al. 2011, MICHALCEWICZ & CIACH 2012). In addition to European Beech *Fagus sylvatica* L., the only larval food plant of *R. alpina* larvae known until recently in Poland (DOMINIK & STARZYK 1989, STARZYK 2004b), we now have Wych Elm (CIACH et al. 2007, MICHALCEWICZ et al. 2011) and Sycamore *Acer pseudoplatanus* L. (MICHALCEWICZ et al. 2013). It thus emerges from the above that in Poland *R. alpina* is capable of utilising various habitats and different food plants. The present paper describes a locality of this species in a copse among pastures lying in a farmland landscape at some distance from woodland.

METHODS

The fieldwork was carried out in the Łysa Góra range of the Beskid Niski Mountains in SE Poland. This locality of *R. alpina* was discovered during a methodical search for potential habitats of this species situated well away from woodland complexes. Imagines of *Rosalia alpina* were searched for visually, sometimes with the aid of binoculars. The characteristic features of the adults' exit holes were used to confirm the feeding of *R. alpina* larvae (see CIACH & MICHALCEWICZ 2013 and references cited there). Fragments of Wych Elm branches from this locality were taken to the laboratory for examination for the presence of Dutch elm disease, caused by fungi from the genus *Ophiostoma* SYD. et P. SYD., which could be the reason for the trees' moribund state. The laboratory tests involved the micro- and macroscopic analysis of the disease symptoms and the isolation of the fungus (from vessels) on potato dextrose agar (PDA) growth medium.

RESULTS

This new locality of *Rosalia alpina* lies near the village of Myscowa in the commune of Krempna (the exact location is not given for conservation reasons). This is a farming village and the landscape around is dominated by meadows and pastures. The locality is situated on private land, in a copse surrounded by pastures where farm animals are put out to graze. It lies well away from any woodland, 200 m from the edge of an extensive, close-canopied forest complex (Fig. 1). Located on the edge of a gully, the part of the copse described here consists of Sycamore, Wych Elm, European Beech, Norway Maple *Acer platanoides* L. and Wild Cherry *Cerasus avium* (L.) MOENCH. The understorey contains much Hazel *Corylus avellana* L.



Fig. 1. The locality of the Rosalia Longicorn *Rosalia alpina* in a pastureland copse near Myscowa and the adult exit hole in the trunk of a dead Wych Elm *Ulmus glabra* (Beskid Niski Mts, SE Poland; July 2013). Photo by J. MICHALCEWICZ.

On 14 July 2013 two adult exit holes were found in the trunk of a dead Wych Elm (Fig. 1) and two adult *Rosalia alpina* beetles were also seen at this locality. Up to five adult beetles were observed at this same locality on 26 July 2013. The actual habitat of *R. alpina* is a stand of 69 Wych Elms covering an area of ca 2500 m² at the edge of the copse. The elms form a small clump surrounded by farmland, mostly pastures and hay meadows. The mean diameter at breast height (DBH) and mean height of the Wych Elms making up this locality were 19.3 cm (SD = 15.1, range 7-86.5 cm, N = 69) and 11.5 m (SD = 4.8, range 5-25.1 m, N = 69) respectively. 28% of the trees in the copse are dead (N = 69). There are also 76 stumps of previously felled trees. The locality lies at an altitude of 445 m above sea level, and has an SSW exposure and an inclination of 10°. Isolation of the fungus and the disease symptoms of the Wych Elms indicate that these trees are dying of Dutch elm disease.

DISCUSSION

Copses, i.e. single trees and shrubs or groups of them growing away from woodland and urban areas, which fulfil ecological and aesthetic functions and are sometimes productive, constitute a food resource for various species of insects. They can be utilised by various saproxylic insects, including beetles (GUTOWSKI 2006). Rare species belonging to this group include the Great Capricorn Beetle *Cerambyx cerdo* L. (STARZYK 2004a), the Hermit Beetle *Osmoderma eremita* (SCOP.) (SZWALKO 2004) and the Red Click-beetle *Elater ferrugineus* L. (BUCHHOLZ & OSSOWSKA 2004).

This work has shown that given favourable circumstances *Rosalia alpina* can also colonise pastureland copses, where suitable conditions for its development can form. The fact that it has colonised a copse surrounded by open farmland is important in the context of what is known so far about this species' habitats (unique, hitherto unknown in Poland) and the rarity of its occurrence. This strictly protected, endangered species was classified as being of very high risk (STARZYK 2004b). Being a priority species, it is listed in Annexes II and IV of the HABITATS DIRECTIVE (1992) and requires active conservation measures (ACT 2004, REGULATION 2011). The colonisation of this locality by *R. alpina* may be a consequence of its migration from its localities in the nearby forest complex (MICHALCEWICZ et al. 2011). Moreover, this is well within the beetle's dispersal capabilities (DRAG et al. 2011): the copse is situated 770 and 800 m from these woodland localities. Dutch elm disease has contributed to the formation of this new locality of *R. alpina*. It would appear that the prevalence of this disease is of fundamental importance to the formation of suitable food resources for this species.

This newly discovered locality may be a sign of changes taking place in the habitat preferences of *Rosalia alpina*, in which processes occurring in the forest environment play an important part. Associated with forest management (maintenance of forest stand health, increasing tree density, elimination of grazing) and natural succession, they increase the canopy density and therefore the shading of potential environments where this species can flourish. In consequence, it has been showing an extinction debt since the end of the 19th century. The deterioration of light conditions in woodlands may be potentiating the drainage of the *R. alpina* population in that this is abandoning the forest for sunlit wood piles. The departure of *R. alpina* from the forest, even in combination with a change in food plant, to roadside Ash trees, open riparian woodland and open tree stands on abandoned farmland (CIZEK et al. 2009, MICHALCEWICZ et al. 2011, MICHALCEWICZ & CIACH 2012) is an indicator of the unfavourable temperatures prevailing within close-canopied forests, despite the presence in them of dead wood. The thermophilicity of *R. alpina* and its preference for open-canopied woodland (DRAG et al. 2011, RUSSO et al. 2011) testifies to the strict requirements of this species as regards the insolation of the breeding material.

It is worth mentioning that copses in open terrain may provide natural areas acting as stepping stone habitats or wildlife corridors, which, given the dispersal capabilities of the adult beetles (DRAG et al. 2011), would connect the main patches of *Rosalia alpina* habitat in this region (the Łysa Góra and Kamień ranges). It may well be that *R. alpina* is making use of copse habitats on a larger spatial scale. Confirmation of this would be of great significance for the conservation of this rare longhorn beetle.

This newly discovered habitat of *Rosalia alpina* requires conservation. It is endangered in the sense that the landowner could decide to cut down and remove the dead trees. Conservation measures should include a mechanism for compensating landowners for losses they incur by refraining from obtaining timber from localities that currently and potentially provide breeding material for this species. The inference from the above is that habitats need to be created in the future for this species by planting new copses and/or reconstructing existing ones, for example, by allowing dead wood to form and to ensure that adequate levels of insolation reach it.

The discovery of a *Rosalia alpina* locality in a pastureland copse provides sound evidence in support of the statement that patches of unfarmed habitat in an agricultural landscape are of great significance and could be contributing to the maintenance of populations of rare species.

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Received: 10 September 2013

Accepted: 21 January 2014