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FIRST RECORD OF THE MEDITERRANEAN SCALE INSECT *KERMES VERMILIO* (PLANCHON, 1864) IN SLOVAKIA

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Abstract: The Mediterranean scale insect *Kermes vermilio* (Planchon, 1864) (Hemiptera: Coccoidea: Kermesidae) is a phytophagous species associated primarily with evergreen oaks (*Quercus* spp.). It is native to the Mediterranean Basin, where it commonly occurs on *Quercus ilex*, *Quercus coccifera*, and *Quercus suber*. In southern Europe, the species may occasionally reach pest status, particularly in urban environments, where heavily infested trees exhibit chlorotic foliage, branch dieback, and reduced growth. Here, *K. vermilio* is recorded for the first time from Slovakia. The infestation was detected on an ornamental *Quercus ilex* tree imported from Italy and planted in a private garden in Bratislava. This finding extends the known distribution range of *K. vermilio* to Central Europe and highlights the potential for further northward spread through the trade of Mediterranean ornamental oaks.

Key words: Kermesidae, Hemiptera, Distribution, Oak trees, *Quercus*, Central Europe

INTRODUCTION

Species of the family Kermesidae (Hemiptera: Coccoidea) are restricted to the Northern Hemisphere, where they occur throughout the Nearctic, Oriental, and Palaearctic regions (BEN-DOV et al. 2015). The family currently comprises approximately 100 valid species assigned to ten genera, most of which develop exclusively on oaks (*Quercus* spp.) (BEN-DOV et al. 2015). Both sexes generally occur on twigs, branches, and within bark crevices, although several species have been reported from leaves (BULLINGTON & KOSZTARAB 1985, PODSIADŁO 2005). Most Kermesidae species are not considered harmful to their host trees; however, infestations of certain species have been associated with branch dieback, flagging, reduced growth rates, and, on rare occasions, tree mortality. Such detrimental effects have been observed mainly in urban environments (KOZÁR 1974, VIGGIANI 1991, PELLIZZARI et al. 2012, PODSIADŁO 2012).

Kermes vermilio (Planchon, 1864) is a relatively small and inconspicuous scale insect, and its presence is typically first detected through visible feeding damage. Infestations may cause characteristic patchy leaf yellowing, desiccation of apical shoots, and premature leaf drop. Adult females are sessile and nearly spherical, exhibiting a reddish-brown coloration with a greyish-white, waxy covering, and are attached to a circular, white wax pad. Mature females reach a maximum diameter of approximately 4 mm. The first- and second-instar nymphs are bright red, whereas adult males, as is typical for scale insects, possesses a single pair of wings and resembles tiny dipteran. *Kermes vermilio* is univoltine, oviparous, and overwinters as first-instar nymphs (MAROTTA et al. 1999). Each female lays more than 1,000 eggs (LEONARDI 1920, WERMELINGER & FORSTER 2015). In Italy, nymphs typically appear in late May to early June, whereas in the United Kingdom first instars have been observed as late as August (MALUMPHY 2008). Newly emerged nymphs remain active for two to three days before settling to feed, showing a marked preference for young shoots. The species feeds primarily on evergreen oaks, including *Quercus coccifera*, *Q. ilex*, and *Q. suber* (HOY 1963). *Kermes vermilio* is native to the Mediterranean region (e.g. HOY 1963, SILVA & CARMONA 1988, FOLDI 2001, MASTEN MILEK et al. 2016); however, in recent decades, its range has expanded northwards, with confirmed records in the United Kingdom (MALUMPHY 2008) and Switzerland (WERMELINGER & FORSTER 2015). In this paper, we report the first record of *Kermes vermilio* from Slovakia, thereby extending the species' known distribution into Central Europe.

MATERIAL AND METHODS

During routine horticultural maintenance conducted on 30 July 2025 in a private garden, browning of leaves and a decline in vitality were observed on a holm oak (*Quercus ilex* L.). A subsequent examination of the branches and foliage revealed the presence of numerous scale insects. Specimens were collected and transferred to the laboratory for identification based on available taxonomic keys – KOSZTARAB & KOZÁR (1988), PELLIZZARI et al. (2012). Live individuals were photographed using a Canon EOS 80D camera equipped with a Canon 100 mm f/2.8L Macro IS USM lens, and later preserved in 98 % ethanol for further study.

RESULTS AND DISCUSSION

SW Slovakia: Bratislava, Dlhé diely (48° 9'32"S, 17° 2'41"V, 237 m a. s. l., 30.7.2025, *Kermes vermilio*, 15 sessile females and numerous first-instar nymphs (Fig. 1), leg. det. et coll. J. Čapka & A. Purkart; observation of hundreds of specimens in different stages nested on *Quercus ilex*

Fig. 1. Sessile females and numerous red colored first-instar nymphs on *Quercus ilex* twig.

Kermes vermilio is regarded as a pest of *Quercus ilex*, particularly in urban environments in Italy (BELCARI & MINNOCCI 1989) and Spain (MARTIN BERNAL et al. 2002). The scale insects weaken their host plants by feeding on the phloem sap. In the present case, the infestation was detected on a single tree planted in a private garden. The host individual had been imported from Italy three years before detection and, at the time of sampling, measured approximately four meters in height. Immediately following specimen collection, the infestation was eradicated using chemical control measures. It is possible that *K. vermilio* is more widespread in Central Europe than is currently documented, since large numbers of *Q. ilex* are regularly imported from Mediterranean countries. This species of oak is occasionally cultivated as an ornamental tree in Slovak parks and private gardens.

The nymphs hatch in July at protected sites on young shoots, where they resume feeding the following spring at the time of bud burst. The first moult occurs in early April, followed by a second moult in mid-May. By late May, the population consists predominantly of adults. Oviposition extends over a period of approximately three weeks, and the first nymphs appear in mid-June (MAROTTA et al. 1999). In Central Europe, phenological development may be delayed by approximately two weeks, according to data available for certain instars (BALACHOWSKY 1950). In the Slovak record, both first-instar nymphs were

observed at the end of July, which is consistent with this assumption. Similarly, in the United Kingdom, these stages appeared at the end of August (MALUMPHY 2008).

In Europe, the known natural enemies of *K. vermilio* are primarily parasitic wasps belonging to the family Encyrtidae (Hymenoptera), including *Cheiloneurus claviger* Thomson, 1876 (DEL BENE & LANDI 1992), *Encyrtus infidus* (Rossi, 1790) (TRJAPITSIN 1957), and *Metaphycus hirtipennis* (Mercet, 1921) (MAROTTA et al. 1999).

Historically, *Kermes vermilio* was one of the two species that served as an essential source of red dye for textiles in Asia and Europe (Wouters 1990). The use of oak-kermes dye reached its peak between the 12th and 16th centuries. The scarlet pigment, referred to as *shani* or *tola'at shani* in Hebrew (meaning "crimson worm"), was derived from the *Kermes* species and is mentioned in the Old Testament, either alone or together with other precious dyes, such as the blue and purple pigments obtained from marine snails. The oldest known use of this species as a source of red colour dates back to the Middle Bronze Age (1954–1767 BCE) (SUKENIK et al. 2024).

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SÚHRN

Obchod so živými rastlinami je jedným z hlavných vektorov šírenia nepôvodných druhov organizmov. Často sa jedná o rôzny fytofágny hmyz, ktorý nachádza v novom prostredí ďalšie útočisko a miesto na rozmnožovanie. Typickým príkladom sú červce (Coccoidea) schopné rýchlej a početnej reprodukcie. Jedným z nich je druh *Kermes vermilio* (Planchon, 1864) rozšírený v mediteránnej oblasti, kde sú jeho hostiteľskou drevinou vždyzelené duby, najmä *Quercus ilex*, *Quercus coccifera* a *Quercus suber*. Tie sú vďaka miernejším zimám čoraz častejšie obľúbenou drevinou v záhradách a parkoch strednej Európy. V tomto článku opisujeme výskyt červcov *K. vermilio* z Bratislavy objavených na vyše štvormetrovom *Q. ilex.* Drevina importovaná z Talianska bola v mieste nálezu vysadená tri roky pred objavom, čo môže naznačovať schopnosť týchto cudzokrajných červcov tolerovať miestne klimatické pomery.