

Occurrence of the maidenhair fern aphid *Idiopterus nephrolepidis* (Hemiptera: Aphididae) on commercial ferns in the Czech Republic

Výskyt mšice *Idiopterus nephrolepidis* (Hemiptera: Aphididae) na komerčně pěstovaných kapradinách v České republice

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Abstract. The maidenhair fern aphid (*Idiopterus nephrolepidis* Davis, 1909) was detected on fronds of *Asplenium nidus* cultivar ‘Crissie’ grown in a glasshouse in Brno in July 2012. This insect most likely originated in the Neotropical Region, but now has a cosmopolitan distribution due to anthropic dispersion, particularly with imported ornamental plants. In Central and Northern Europe it can only survive in glasshouses, while in warm regions it can survive outdoors. Currently, no environmental or economic impacts are foreseen.

INTRODUCTION

The genus *Asplenium* contains about 700 species of ferns distributed all over the world. Most of them are distributed in the tropics or south-temperate regions (Kramer & Green 2013). *Asplenium nidus* (bird’s-nest fern) is an epiphytic plant belonging to the family Aspleniaceae. The species is native to tropical regions of southeastern Asia, Australia and Africa. It has lanceolate leaves 500–1500 mm long and 100–200 mm wide, with a dark brown midrib, and which grow from a central area (Palmer 2003). It can survive as a terrestrial plant as well as in epiphytic situations. In many countries, including the Czech Republic, this species of fern is imported and grown as an ornamental house plant.

Idiopterus nephrolepidis Davis, 1909 is the only species in the genus *Idiopterus* Davis, 1909 (Blackman & Eastop 2008). It has a body with a wrinkled dorsal cuticle, with indistinctly visible reticulation formed by rows of small spinules. The head is rough with spinules. Lateral frontal tubercles large, with parallel inner sides, median frontal tubercle not developed. Antennae are longer than body, with secondary rhinaria in both apterae and alatae. First tarsal segments are equipped with three hairs. Legs are whitish. *Idiopterus nephrolepidis* is apparently entirely anholocyclic, breeding parthenogenetically through the year and producing the winged forms in spring and summer (Tasheva-Terzieva et al. 2011, Alford 2012). These aphids live in colonies of nymphs and winged and wingless females. They were usually detected on the adaxial side of the young rolling or developing fronds of the ferns, where they suck sap. As a result, heavily infested fronds die (Pirone 1978).

This insect probably originated in Neotropical regions, but nowadays is cosmopolitan due to anthropic dispersion, especially with imported ornamental plants (Mejías et al. 2010). It is

widely distributed in Europe on cultivated ferns, especially ladder fern (*Nephrolepis exaltata*), maidenhair fern (*Adiantum capillus-veneris*), *Polypodium* and *Pteris* (Alford 2012). In Central and Northern Europe it is present in glasshouses, or indoors only (Heie 1993) and it is not able to survive outside, although Blackman & Eastop (2008) also list caves in northern temperate regions; it can only survive outdoors in subtropical regions (Tasheva-Terzieva et al. 2011).

MATERIAL AND METHODS

The aphids were found on fronds of *Asplenium nidus* cultivar ‘Crissie’ grown in a commercial glasshouse of a garden centre in Brno in July 2012. Colonies of apterous and alate viviparous females and nymphs were detected on the adaxial side of young rolling or developing fronds of *Asplenium*. Fifty individuals collected from the colonies were used for determination. Wingless and winged females, 50 individuals, were used for laboratory studies on *A. nidus* plants at 22°C, 60% relative humidity and 12-hour light-dark cycle. The generation time of these aphids under the conditions above was observed.

RESULTS

Aphids were detected on fronds of *Asplenium nidus* cultivar ‘Crissie’ grown in a glasshouse in July 2012. The apterous viviparous females and nymphs found were oval-shaped, black bodied and 1.16–1.55 mm long. They were dark coloured with black-green cauda, and siphunculi with black basal part and white distal part. Antennae longer than the body, white with 1st and 2nd antennomeres black. Legs whitish, with three hairs on the first tarsomere. Winged viviparous females are very similar to apterous ones. They have a conspicuous wide black border around the venation of the first pair of wings. The second pair of wings is very small. These morphological characters match those given by Pirone (1978). The life span of adults was 16–17 days, larval development took 5–7 days (at 22°C, 60% relative humidity and 12-hour light-dark cycle). One generation under these conditions took 21 to 24 days. It will be shorter or longer under different conditions, in particular different temperature. The morphological characteristics of these aphids correspond to the description of *I. nephrolepidis* according to Heie (1993).

Aphid specimens are housed in the Diagnostic Laboratory of the Central Institute for Supervising and Testing in Agriculture in Opava, as wet preparations.

DISCUSSION

Idiopterus nephrolepidis forms colonies on the surfaces of fronds and petioles only (Mejías et al. 2010). According to Severin & Tompkins (1950) the main symptoms for *Asplenium nidus* from the aphids sucking sap, are irregular dark green spots and dark green vein-banding on the youngest leaves. Later, these spots cover the lateral veins and interveinal spaces. The oldest leaves which have been attacked by these pests become distorted. Infested plant fronds may turn black and die (Alford 2012).

In the Czech Republic *I. nephrolepidis* has only been recorded indoors on imported plants in Brno on 12.vi.2012 on *Asplenium nidus* cultivar ‘Crissie’. According to Su et al. (2014) this aphid’s host plants primarily belong to families of the orders Polypodiales – Aspleniaceae, Aspidiaceae, Blechnaceae, Cystopteridaceae, Davalliaceae, Dennstaedtiaceae, Oleandraceae,

Schizaeaceae, Polypodiaceae, and Pteridales – Adiantaceae, Pteridaceae, Sinopteridaceae. However, there are many recorded angiosperm host plant species belonging to other families: Acanthaceae, Araceae, Crassulaceae, Iridaceae, Liliaceae, Orchidaceae, Ranunculaceae, Saxifragaceae, Gesneriaceae, and Eric (2014) also indicated the family Primulaceae.

While *I. nephrolepidis* was found in a glasshouse with other potential host plants present, *Saintpaulia*, *Streptocarpus* and *Primula*, close to the infested *Asplenium*, the pest was not present on these other plants.

In Europe this aphid has been recorded in Hungary (Ripka 2008), Portugal (Borges et al. 2008), Denmark (Heie 1993), Switzerland, Spain, and Greece (Tasheva-Terzieva et al. 2011). Eric (2014) lists *I. nephrolepidis* for Belgium, Canary Island (Spain), Madeira (Portugal), Italy (including Sicily), France, Germany, Netherlands, Slovenia, Poland, Slovakia, Sweden and the United Kingdom. Holman (1991) mentioned only one occurrence of this aphid in the list of aphids and their host plants in the Botanical Garden of Charles University in Prague in Czechoslovakia, and Šefrová & Laštůvka (2005) and Mlíkovský & Stýblo (2006) referred to this finding. Šefrová & Laštůvka (2005) considered this aphid to be a potential invasive species in the Czech Republic. There is no information about occurrence of *I. nephrolepidis* between 1990 and 2015. The European and Mediterranean Plant Protection Organisation (EPPO) database does not give this species as being present in either the former Czechoslovakia (EPPO 2016a) or in the Czech Republic (EPPO 2016b).

CONCLUSION

We do not think this aphid is likely to be an important pest on either naturally occurring ferns or on ornamental species in glasshouses. However, it is necessary to warn growers of the potential risk of imported ferns, or *Saintpaulia*, *Streptocarpus* and *Primula* being infested by these aphids. In the Czech Republic nine species of *Asplenium* which may be potential host plants of *I. nephrolepidis* occur naturally, but it is assumed that these aphids cannot survive outdoors during winter.

Use of registered aphicides is an option in the case of harmful occurrences of this aphid.

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SOUHRN

12.VII.2012 bylo v Brně na listech rostlin sleziníku *Asplenium nidus* kultivar ‘Crissie’, pěstovaných ve skleníku, zjištěno napadení mšicemi druhu *Idiopterus nephrolepidis* Davis, 1909. Rostliny byly do České republiky importovány. *Idiopterus nephrolepidis* pochází z neotropické oblasti a v současné době jej lze označit za kosmopolitní. Důvodem jeho rozšíření je lidská činnost, zejména obchodování s okrasnými rostlinami.

Idiopterus nephrolepidis tvoří kolonie na listech a řapících kapradin (Mejias et al. 2010). Jak uvádějí Severin & Tompkins (1950) hlavními symptomy napadení na *Asplenium nidus* L. jsou nejdříve nepravidelné, tmavě zelené skvrny a tmavé lemování žilek na nejmladších listech. Později se skvrny rozšiřují i na postranní žilky a mezižilkové prostory. Sání na starších listech se projevuje deformacemi. Napadené rostliny později černají a hynou (Alford 2012).

Podle Su et al. (2014) hostitelské rostliny *I. nephrolepidis* náležejí zejména mezi kapradiny do čeledi řádu Polypodiales – Aspleniaceae, Aspidiaceae, Blechnaceae, Cystopteridaceae, Davalliaceae, Dennstaedtiaceae, Oleandraceae, Schizaeaceae, Polypodiaceae; a řádu Pteridales – Adiantaceae, Pteridaceae, Sinopteridaceae. Avšak hostiteli mohou být i krytosemenné rostliny z jiných čeledí: Acanthaceae, Araceae, Crassulaceae, Iridaceae, Liliaceae, Orchidaceae, Ranunculaceae, Saxifragaceae, Gesneriaceae a Eric (2014) uvádí jako hostitelské také rostliny z čeledi Primulaceae. Přestože byla mšice nalezena ve skleníku na rostlinách umístěných v těsné blízkosti dalších možných hostitelů, v tomto případě z rodů *Saintpaulia*, *Streptocarpus* a *Primula*, nebyly tyto rostliny napadeny.

V Evropě byla *I. nephrolepidis* zjištěna v Maďarsku (Ripka 2008), Portugalsku (Borges et al. 2008), Dánsku (Heie 1993), Švýcarsku, Španělsku a Řecku (Tasheva-Terzieva et al. 2011). Dle Erica (2014) také v Belgii, na Kanárských ostrovech, Madeiře, v Itálii (včetně Sicílie), Francii, Německu, Nizozemí, Slovinsku, Polsku, na Slovensku, ve Švédsku a Velké

Británii. V České republice zmiňuje její ojedinělý výskyt Holman (1991) v seznamu mšic a jejich hostitelských rostlin v Botanické zahradě Karlovy univerzity v Praze, na jehož práci odkazují i Šefrová & Laštůvka (2005) a Mlíkovský & Stýblo (2006). Informace o výskytu *I. nephrolepidis* v ČR mezi roky 1990 a 2015 chybí. Podle databázových údajů European and Mediterranean Plant Protect Organisation (EPPO) nebyl výskyt této mšice zaznamenán ani v bývalém Československu (EPPO 2016a) ani v současné České republice (EPPO 2016b). Ve střední a severní Evropě může tato mšice žít jen ve sklenicích, v teplých oblastech může přežívat venku. Momentálně v našich podmínkách nepředpokládáme její environmentální ani ekonomický význam.