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First record of *Aceria granati* (Canestrini et Massalongo, 1894) in Slovakia

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Abstract: Plant galls of *Aceria granati* (Canestrini et Massalongo 1894) were observed on the leaves of *Punica granatum* (Lythraceae) in a private garden in Nitra in July, 2017. *Aceria granati* is a monophagous gall mite damaging the leaves of *Punica granatum*. This gall mite was present in one locality in Nitra only and was probably imported from Hungary via the plant trade. This is the first observation of an *Aceria granati* occurrence in Slovakia.

Keywords: alien insect pest; plant gall; Lythraceae

Over the last 50 years, the global trade and climate change have also brought new insect species which could establish new populations and even become invasive in their new environment (Csóka et al. 2012), for example, *Dryocosmus kuriphilus* (Yasumatsu, 1951), *Drosophila suzukii* (Matsumura, 1931), *Metcalfa pruinosa* (Say, 1830), and *Aceria kuko* (Kishida, 1927). The pomegranate tree (*Punica granatum* L.) is a favourite fruit in tropical and subtropical climates (Pourghayoumi et al. 2017). *P. granatum* is native to the area between Iran and the Himalayas in northern India (Ergun, Ergun 2009; Viuda-Martos et al. 2010). Commercial orchards of pomegranate trees are widely cultivated in Iran, India, the Mediterranean countries, the drier regions of Southeast Asia, Malaysia, the East

Indies, tropical Africa, the United States, China, Japan, and Russia (Fadavi et al. 2005). *Punica granatum* is grown in Slovakia as an exotic ornamental plant in pot and bonsai cultures or in open soil in the warmest regions of Slovakia. Climatic conditions, where winter temperatures are lower than $-15\text{ }^{\circ}\text{C}$, are a limiting factor for the growing of *P. granatum* although central Asian cultivars can survive even at temperatures of $-25\text{ }^{\circ}\text{C}$ or $-30\text{ }^{\circ}\text{C}$ (Melgarejo et al. 1997). *Aceria granati* (Canestrini et Massalongo) (Acari: Prostigmata: Eriophyidae) is a monophagous gall mite damaging the leaves of *Punica granatum* described for the first time in Italy (Davis et al. 1982; Amrine, Stastny 1994, 1996). The leaf margins are narrowly rolled in a downwards direction, sometimes so deeply that a branch may appear

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defoliated. *Aceria granati* occurs worldwide where *Punica granatum* is grown. Its presence has been confirmed in Cyprus, France, Greece, Hungary, Macedonia, Montenegro, Italy, Portugal, Romania, Spain, Serbia, Slovenia, Germany, and Turkey (Albert 2012; De Lillo 2013; Ripka, Salamon 2013). In India and South Africa, *Aceria granati* is considered as a major pest of *Punica granatum* (Meyer, Craemer 1999; Agrawal 2000). The mites are mainly spread by contact with infested plants or plant parts and even on plants grown as bonsai (Ripka, Salamon 2013).

MATERIAL AND METHODS

Galls of *Aceria granati* on *Punica granatum* were observed for the first time in a private garden in Nitra (48°19'57.350"N, 18°6'25.586"E) in 2017. The city of Nitra is situated on the west side of the Slovak Republic, on 48°N 14°E. The climate is characterised as semiarid and humid. The average annual total precipitation is 600 mm. The average annual temperature is 9.5 °C. Three *P. granatum* specimens are growing in the garden. The oldest specimen is 40 years old of unknown origin. The second specimen is a spontaneous seedling from the first mentioned plant and is 12 years old. The last plant is an ornamental cultivar *Punica granatum* 'Flora Plena' imported from Balatonszárszó (Hungary) in 2015. In 2019, we found infected plants in the nursery of the Faculty of Horticulture and Landscape Engineering in Nitra (48°18'49.914"N, 18°4'42.732"E). The origin of the propagation material was from the first

mentioned site with the presence of *A. granati*. We collected leaves with galls. Slices of the galls were macerated in a 10% solution of potassium hydroxide for 24 hours. The solution was centrifuged and preparates were made. With the help of an Olympus BX51 microscope, we found six adult specimens and we used them for the identification, which was based on a description provided by Ripka and Salamon (2013).

RESULTS AND DISCUSSION

The samples from all the infested plants of *Punica granatum* in Nitra (three adult specimens from the private garden, twelve seedlings from the plant nursery) show typical damage caused by *Aceria granati*. Typical edge-roll galls were found on all of the infested plants. The edge-roll galls were present in the parts of the plants with intensive growth (Figure 1). Beside the *A. granati* individuals (Figure 2), we also found nymphs and imagoes of thrips. The average length of the imagoes was 178 µm. The minimal length of the measured imagoes was 142 µm and the maximum length was 215 µm. Ripka and Salomon (2013) also mention the occurrence of thrips in the galls created by *A. granati* collected in Hungary. The strongly infested leaves were twisted and the assimilation area was significantly reduced. We did not find mite damage on the flowers or fruits at all and the yield of pomegranate fruits was unaffected. *A. granati* damages the flowers and decreases the total yield of the pomegranate fruits in the area of the *P. granatum*'s natural distri-



Figure 1. Edge-roll galls caused by *Aceria granati* on *Punica granatum* in Nitra

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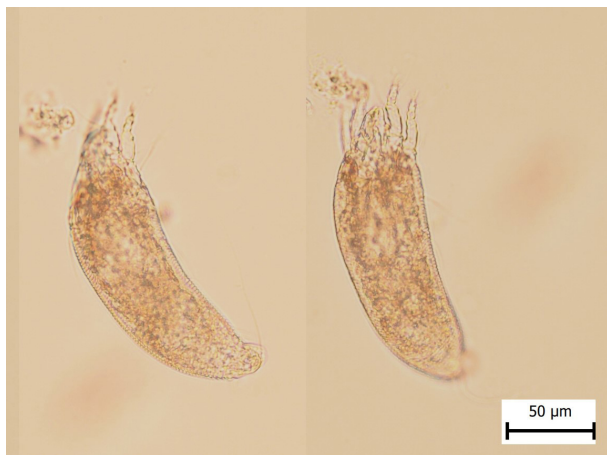


Figure 2. Adult of the gall mite *Aceria granati*

bution (Agrawal 2000; Ripka, Salomon 2013). Our findings are similar to the symptom description of the *A. granati* damage on *P. granatum* by Ripka and Salomon (2013). This isolated occurrence of *A. granati* in Slovakia suggests that the distribution of *Aceria granati* over long distances is usually encountered through the international plant trade, where mites from the genus *Aceria* are transferred with their host plants (Hrudová, Šafránková 2018). After identifying *A. granati*, none of the plants were destroyed. Neither the chemical nor biological protection against this insect pest is sufficiently resolved in Slovakia. Acaricides affect only the mites outside of the edge-roll galls, but the others staying inside the galls are protected. Removing the fallen leaves helps to reduce an overwintering mite population only minimally, since the majority of the mites are overwintering on the buds of the host plant. Eradication of this invasive species is not feasible. In Slovakia, *Punica granatum* plants are only grown in private gardens as exotic plants and *Aceria granati* is not currently considered a pest of commercial crops, but monitoring its occurrence is necessary.

REFERENCES

Agrawal V.K. (2000): Management of eriophyid mite, *Aceria granati*, on pomegranate and morpho-physio histopathological effects of the pest on the host. [Doctoral dissertation.] Rajasthan Agricultural University; Bikaner.
 Albert R. (2012): Neuer Schädling in Baden-Württemberg Goji-Gallmilbe. *Obst & Garten*, 4: 136–138.

- Amrine J.W., Stasny T.A. (1994): Catalog of the Eriophyoidea (Acarina: Prostigmata) of the World. West Bloomfield, Indira Publishing.
 Amrine J.W., Jr., Stasny T.A. (1996): Corrections to the Catalog of the Eriophyoidea (Acarina: Prostigmata) of the World. *International Journal of Acarology*, 22: 295–304.
 Csóka Gy., Hirka A., Szócs L. (2012): Rovarglobalizáció a magyar erdőkben. *Erdészeti Közlemények [Insect globalisation in Hungarian forests]*, 2: 187–198.
 de Lillo E. (2013): Fauna Europaea: Eriophyoidea. In: Magowski W.Ł. (ed.): *Fauna Europaea: Acari: Acariformes. Fauna Europaea version. 2.4.* Available at <http://www.faunaeur.org> (accessed Jul 23, 2020).
 Ergun M., Ergun N. (2009): Maintaining quality of minimally processed pomegranate arils by honey treatments, *British Food Journal*, 111: 396–406.
 Fadavi A., Barzegar M., Azizi M.H., Bayat M. (2005): Note. Physicochemical composition of ten pomegranate cultivars (*Punica granatum* L.) grown in Iran. *Food Science and Technology International*, 11: 113–119.
 Hrudová E., Šafránková I. (2018): Goji Berry Gall Mite *Aceria kuko* occurrence in the Czech Republic – Short Communication. *Plant Protection Science*, 54: 39–42.
 Melgarejo P., Martínez Valero R., Guillamón J.M., Amorós M.M.A.A. (1997): Phenological stages of the pomegranate tree (*Punica granatum* L.). *Annals of Applied Biology*, 130: 135–140.
 Meyer, M.K.P. (Smith), Craemer C. (1999): Mites (Arachnida: Acari) as crop pests in southern Africa: An overview. *African Plant Protection*, 5: 37–51.
 Pourghayoumi M., Bakhshi D., Rahemi M., Kamgar-Haghighi A.A., Aalami A. (2017): The physiological responses of various pomegranate cultivars to drought stress and recovery in order to screen for drought tolerance. *Scientia Horticulturae*, 217: 164–172.
 Ripka G., Salomon P. (2013): First occurrence of an alien eriophyoid mite species, *Aceria granati* (Canestrini et Massalongo) in Hungary. *Növényvédelem*, 49: 576–581.
 Viuda Martos M., Fernández López J., Pérez Álvarez J.A. (2010): Pomegranate and its many functional components as related to human health: a review. *Comprehensive Reviews in Food science and Food Safety*, 9: 635–654.

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