Persian J. Acarol., 2020, Vol. 9, No. 3, pp. 299–301.
http://dx.doi.org/10.22073/pja.v9i3.60667
Journal homepage: http://www.biotaxa.org/pja

Correspondence

First finding of *Pentamerismus oregonensis* and its abundance (Acari: Tenuipalpidae) on juniper trees in Kyiv, Ukraine

Lesia Bondareva[1*] and Piotr Chumak[2]

1. *Faculty of Plant protection, Biotechnology and Ecology, National University of Life and Environmental Sciences, Kyiv, Ukraine; E-mail: lnubip69@gmail.com*
2. *Polissia National University, Zhytomyr, Ukraine; E-mail: Chumakp@i.ua*

[*] Corresponding author

PAPER INFO.: Received: 24 March 2020, Accepted: 4 May 2020, Published: 15 July 2020

The genus *Pentamerismus* McGregor, 1949 currently contains 22 species with wide distributions (Mesa *et al*. 2009; Alatawi and Kamran 2015). Only four species of this genus are known in Ukraine: *P. foliisetis* (Livshits & Mitrofanov, 1967), *P. juniperi* (Reck, 1951), *P. oregonensis* (McGregor, 1949) and *P. taxi* (Haller, 1877). Three of these species have been recorded only in Crimea (Livschitz and Mitrofanov 1967; Mitrofanov and Strunkova 1979). However, *P. taxi* has been found on yew in Kyiv (Bondareva and Chumak 2018).

Pentamerismus oregonensis is a species with a wide distribution, found in Armenia (Bagdasarian 1962), Georgia (Arabuli 2015), Turkey (Çobanoğlu *et al*. 2011; Yesilayer and Çobanoğlu 2012), Iran (Khanjani and Gotoh 2008), Pakistan (Chaudhri *et al*. 1974), Saudi Arabia (Alatawi and Kamran 2015), USA (Pritchard and Baker 1958), Korea (Lee and Lee 1992), Japan (Ehara 1962), England (Bowman and Bartlett 1978), Greece (Hatzinikolis 1987), Hungary (Kontschan and Ripka 2017) and Bulgaria (Trencheva and Trenchev 2018). The species was previously found in Crimea, Ukraine (Livschitz and Mitrofanov 1967; Mitrofanov and Strunkova 1979) and recently by Mishustin (2020) on *Juniperus scopulorum* in Kherson Region of Ukraine. Here, we note the first finding of *P. oregonensis* mites in botanical gardens, parks and street green areas of Kyiv. These are the northernmost findings of the species in Ukraine. We have also made observations on the development of the pest within urban conditions.

Pentamerismus oregonensis mites were found for the first time in Kyiv on juniper plants at the following areas: Fomin Botanical Garden (50° 26′ 35″ N, 30° 30′ 14″ E), Gryshko National Botanical Garden of the NAS of Ukraine (50° 24′ 45″ N, 30° 33′ 44″ E), Zankovetska's park (50° 25′ 06″ N, 30° 31′ 23″ E), Tarasa Shevchenko park (50° 26′ 30″ N, 30° 30′ 46″ E) and in street green areas [Lva Tolstoho square (50° 26′ 21″ N, 30° 30′ 58″ E) and Obolon quay (50° 30′ 51″ N, 30° 30′ 56″ E)]. In total, 52 females and 3 males of *P. oregonensis* mites were collected on the examined juniper plants. The collected material is stored at the Department of integrated protection and plant quarantine of National University of Life and Environmental Sciences of Ukraine.

Female mites of *P. oregonensis* overwinter in bark creases and hidden crevices of the plants. Their winter dormancy lasts until the middle of April. The females start laying eggs at 15 °C and warmer air temperatures. During the study period, we recorded the first larvae of *P. oregonensis* in

How to cite: Bondareva, L. & Chumak, P. (2020) First finding of *Pentamerismus oregonensis* and its abundance (Acari: Tenuipalpidae) on juniper trees in Kyiv, Ukraine. *Persian Journal of Acarology*, 9(3): 299–301.

Kyiv in the second half of May. The pest's abundance significantly increased in July and was maximum in August, with subsequent significant decline before entering diapause. In the moderate climate of Kyiv city, *P. oregonensis* had one generation per year.

Juniper is one of the most attractive feeding resources for *P. oregonensis* mites (Mitrofanov and Strunkova 1979). Thus, we analyzed the attractiveness of introduced plants of the genus *Juniperus* to the pest in Fomin Botanical Garden during the study seasons in 2018–2019. Examination of 15 sorts and varieties of junipers revealed the differences in the mite abundance. The highest abundance of *P. oregonensis* was noted on *Juniperus sabina* L., 3.6 mites/100 needle plants. Other sorts and varieties were less infested: 1.3 mites/100 needle trees of *J. communis* L. and *J. sibirica* Burgsd., 1.2 mites/100 needle trees of *J. oblonga* Bieb.; 0.9 mites/100 needle plants of *J. chinensis* L. and *J. x media* Melle; 0.7 mites/100 needle plants of *J. rigida* Siebold & Zucc. and *J. virginiana* L. The pest abundance was 0.5 and 0.5 mites/100 needle plants of *J. oxycedrus* L. and *J. davurica* Pall., respectively. At other varieties (*J. horizontalis* Moench, *J. prostrata* Pers., *J. excelsa* Bieb., *J. foetidissima* Willd.) the abundance was 0.1–0.2 mites/100 needle plants. During the study period, the pest was not observed on *J. tuekestanica* Kom. At 1.2 mites/100 needle plants abundance, the pest caused yellowing of leaves and the loss of plant's decorative value.

The climate fluctuations of the latest decades are, first and foremost, associated with the global warming and changing precipitation. According to IPCC (Intergovernmental Panel of Climate Change), the average surface temperature increased by 0.74 °C in 1906–2005. The warming rate increased almost twice in the second half of the century. According to predictions of the leading international climate research centers, the mean surface temperature in Ukraine can increase by 1.5–2 °C before 2050 (Anonymous 2018). On the example of *P. oregonensis* we can study how a species with tropical origin, initially introduced with planting material to the moderate climate, spreads outside of its native range and provided with suitable conditions, gains a foothold in against the backdrop of climate warming.

ACKNOWLEDGEMENTS

We would like to thank Olga Zhovnerchuk, Ph. D., I.I. Schmalhausen Institute of Zoology NAS of Ukraine for her assistance with this study.

REFERENCES

Alatawi, F.J. & Kamran, M. (2015) Two new flat mite species of *Aegyptobia* and *Pentamerismus* (Acari: Tenuipalpidae) from Saudi Arabia. *Turkish Journal of Zoology*, 39: 244–250.

Shevchenko, O. (2018) What to do for Ukraine with climate change: summary of the forum "Energy for Change 2018". Available from: https://mistosite.org.ua/articles/shcho-robyty-ukraini-zi-zminamy-klimatu-konspekt-forumu-enerhiia-zmin-2018 (Accessed on 29.01.2020).

Arabuli, T. (2015) Two new records and list of tenuipalpid mites (Acari: Tenuipalpidae) for Georgian fauna. *Proceedinds of the Institute of Zoology*, 24: 33–45.

Bagdasarian, A.T. (1962) Contribution to the fauna of false spider mites of Armenia. *Izvestiia Akademii Nauk SSR*, 15: 49–58 (In Russian).

Bondareva, L.M. & Chumak, P.Y. (2018) *Pentamerismus taxi* (Haller, 1877) (Acari: Tenuipalpidae): A new pest in the conditions of Kyiv. *Russian Journal of Biological Invasions*, 9(1): 9–12. DOI: 10.1134/S2075111718010034.

Bowman, C.E. & Bartlett, P.W. (1978) *Pentamerismus oregonensis* McGregor (Acari: Tenuipalpidae) infesting imported *Juniperus chinensis* L. in England. *Plant Pathology*, 27(12): 200–201.

Chaudhri, W.M., Akbar, S. & Rasool, A. (1974) *Taxonomic studies of the mites belonging to the*

families Tenuipalpidae, Tetranychidae, Tuckerellidae. Caligonellidae, Stigmaeidae and Phytoseiidae. University Agriculture Lyallpur, Pakistan, 250 pp.

Çobanoglu, S., Tiedt, L., Saglam, D. & Ueckermann, E. (2011) Scanning Electron Microscopic (SEM) study of selected Tenuipalpidae (Acari: Prostigmata; *Pentamerismus*, *Aegyptobia*) from Türkiye. *Entomoloji Dergisi*, 35(1): 19–29.

Ehara, S. (1962) Mites of greenhouse plants in Hokkaido, with a new species of Cheyletidae. *Annotationes zoologicae japonenses*, 35: 106–111.

Hatzinikolis, N.E. (1987) A revision of tenuipalpid mites of Greece (Acari: Tenuipalpidae). *Entomologia Hellenica*, 5: 47–60.

Khanjani, M. & Gotoh, T. (2008) False spider mites of the genus *Pentamerismus* McGregor (Acari: Tenuipalpidae) from Iran. *Zootaxa*, 1768: 52–60.

Kontschan, E. & Ripka, G. (2017) Checklist of the Hungarian spider mites and flat mites (Acari: Tetranychidae and Tenuipalpidae). *Systematic & Applied Acarology*, 22(8): 1199–1225.

Livshits, I.Z. & Mitrofanov, V.I. (1967) Materials to the cognition of the Acariformes: Tenuipalpidae fauna. *Proceedings Nikitsky Botanic Garden*, 39: 3–37.

Mesa, N.C., Ochoa, R., Welbourn, W.C., Evans, G.A. & Moraes, G.J. (2009) A catalog of Tenuipalpidae Berlese of the world (Acari: Prostigmata). *Zootaxa*, 2098: 1–185.

Mitrofanov, V.I. & Strunkova, Z.I. (1979) *Opredelitel kleschey-ploskotelok*. Dushanbe: Donish, 148 pp. (In Russian).

Mishustin, R. (2020) Ukrainian Biodiversity Information Network. Available from: http://ukrbin.com/show_image.php?imageid=70611&big=1 (Accessed on 29.01.2020)

Pritchard, E.A. & Baker, E.W. (1958) The false spider mites (Acarina: Tenuipalpidae). *University of California Publications in Entomology*, 14: 175–274.

Trencheva, K.G. & Trenchev, G.S. (2018) Three new species of Tenuipalpidae (Acari: Prostigmata) for the fauna of Bulgaria. *Journal of Entomology and Zoology Studies*, 6(4): 1794–1798.

Lee, W.-K. & Lee, J.-S. (1992) A checklist and key to the Tetranychidae mites (Acari: Chelicerata) of Korea. *The Korean Journal of Systematic Zoology*, 3: 45–58.

Yesilayer, A. & Çobanoğlu, S. (2012) Population development and natural enemies of *Pentamerismus oregonensis* McGregor 1949 (Acari: Tenuipalpidae) and its distribution on parks and ornamental plants in İstanbul province. *Türkiye Entomoloji Dergisi*, 36 (1): 135–146.