BIHAREAN BIOLOGIST 15 (1): 69-70
Article No.: e212201

http://biozoojournals.ro/bihbiol/index.html

New cases of introducion of *Stenochrus portoricensis* (Arachnida: Schizomida) in Switzerland

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Received: 01. December 2020 / Accepted: 10. February 2021 / Available online: 15. February 2021 / Printed: June 2021

Abstract. A schizomid, *Stenochrus portoricensis* Chamberlin, 1922 (Hubardiidae) was collected in tropical greenhouses in Botanical Gardens in Geneva, Zurich, and the Papiliorama in Kerzers, Fribourg. The findings represent the first discovery of schizomids in Switzerland, Europe.

Key Words: botanical garden, Europe, exotic species, greenhouse, Hubardiidae.

The formal definition of an introduced species is "A species that has been intentionally or inadvertently brought into a region or area. Also, called an exotic or non-native species." (US EPA 2003). In Central Europe, non-native species accidentally brought into a new area are suspected to be disseminated mainly via transport of goods. These species are sometimes able to establish new populations in places of final destination or transhipping such as greenhouses, garden centres, botanical and zoological gardens, storage buildings, or logistic centres (Kobelt & Nentwig 2008, Hänggi & Straub 2016). Greenhouses, with relatively stable conditions, including usually higher temperature and humidity than the outdoors in Central Europe, represent a suitable environment for a variety of non-native invertebrates. Exchange of plants which include potting soil between the gardens is thought to be one of the primary reasons for finding non-native species in botanical gardens (Hänggi & Straub 2016). Regarding the greenhouses in Botanical gardens and the Arachnida group, many non-native species of spiders were discovered during the last century in Switzerland (Holzapfel 1932, Knoflach 1999, Hänggi & Straub 2016). Two spiders, *Mermessus maculatus* (Banks, 1892) and *Hasarius adansoni* (Audouin, 1826), were recorded from Botanical Garden in Bern (Holzapfel 1932). In the Basel Botanical Garden *Coleosoma floridanum* Banks, 1900 was observed by Knoflach (1999). More recently, Hänggi & Straub (2016) published a baseline study from Basel, where the authors studied localities with a high potential for surviving of non-native spider species, with call to the scientific community to publish data about alien species.

The representatives of the arachnid order Schizomida are distributed exclusively in tropical and subtropical regions in nature (Harvey 2013), but *Bucinozomus hortuspalmarum* (de Armas & Rehfeldt, 2015), *Schizomus crassicaudatus* (O.P.-Cambridge, 1892), *Stenochrus portoricensis* Chamberlin, 1922 and *Zomus bagnallii* (Jackson, 1908) have been discovered surviving in greenhouses in Europe (de Armas & Rehfeldt 2015, Lauterbach et al. 2020).

In the present paper, the order Schizomida with the representative of *S. portoricensis* is documented to be found in Switzerland for the first time (Figure 1).

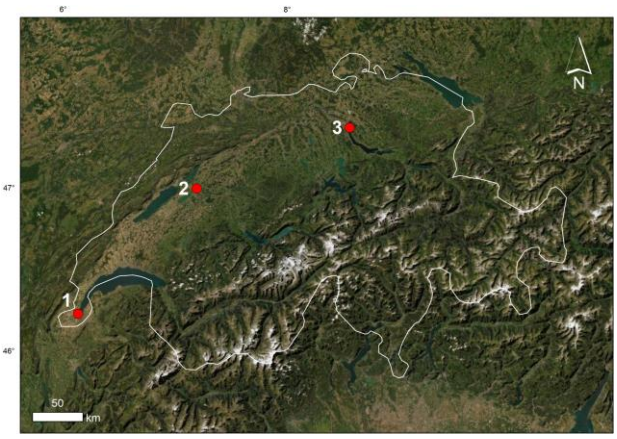

Figure 1. Distribution of *Stenochrus portoricensis* in Switzerland. Abbreviations: 1. Geneva, 2. Kerzers, Fribourg, 3. Zurich.

Figure 2. Habitat type of *Stenochrus portoricensis*, tropical greenhouse in Botanical Garden of the University in Zurich.

Females and juveniles of *S. portoricensis* were collected in tropical greenhouses in the Papiliorama in Kerzers, Fribourg (46.9899 N, 07.2011 E; 440 m a.s.l.), in the Conservatory and Botanical Garden in Geneva (46.2254 N, 06.1452 E; 395 m a.s.l.) and in the Botanical Garden of the University in Zurich (47.3579 N, 08.5618 E; 450 m a.s.l.) (Figures 1 and 2). The methodology included hand capture with forceps and pitfall trapping. The hand capture targeted specimens in the soil, leaf litter, and under stones and deadwood. Eight pitfall traps were exposed for seven days, distributed throughout the area of each greenhouse, as recommended by the gardeners to avoid damage to the plants, and so that the traps may be hidden from the

visitor's sight as much as possible. The specimens were studied as temporary slide mounts, prepared by immersing the specimens in lactic acid for clearing. After the study, they were rinsed in water and returned to 75% ethanol. The collected material is deposited in the Museum of Natural History Basel, Switzerland.

Material examined (Figure 3): SWITZERLAND (J.D. Gilgado, I. Bobbitt leg.; NMB-UROP 23b-f): Kerzers, Fribourg: 9 December 2019: 2 ♀♀, 1 juvenile; hand capture. Geneva: 15 October 2019: 13 ♀♀, 4 juveniles; hand capture; 15 October 2019: 6 ♀♀, 2 juveniles; pitfall trap. Zurich: 5 December 2019: 10 ♀♀, 1 juvenile; hand capture.

Figure 3. Female of *Stenochrus portoricensis*. Scale: 1 mm.

Diagnosis: female flagellum with three segments, the anterior process of propeltidium with only one pair of setae arranged one behind the other, metapeltidium entire, moveable cheliceral finger without accessory teeth, and mesal spur on the trochanter of the pedipalp (Rowland & Reddell 1980).

Among schizomids, *S. portoricensis* has one of the largest distributions worldwide (Teruel & Questel 2019) but only findings from Central American and the Caribbean have been regarded as autochthonous (Monjaraz-Ruedas et al. 2019). Outside America, *S. portoricensis* has been recorded as introduced from Canary Islands, Spanish mainland, England, Germany, Czech Republic, Slovakia and Poland where it was mainly discovered in heated greenhouses (Teruel & Questel 2019, Lauterbach et al. 2020). Outside of greenhouses, Barranco et al. (2014) found *S. portoricensis* in a hollow aqueduct in Seville, Spain. Oromí & Martín (1992) recorded populations from a cave and inside houses in the Canary Islands, outside of continental Europe. The present paper confirms new localities of surviving populations of non-native *S. portoricensis* in tropical greenhouses in Switzerland, continental Europe.

Acknowledgement. We are very thankful to all the managers and gardeners that allowed us to sample in their greenhouses or assisted us in the fieldwork, especially to Michael Kessler, Peter Enz, Rene Stalder and Manfred Knabe (Zurich); Chantal Derungs and Nadja Fischer (Fribourg); Didier Roguet, Nicolas Freyre and Vincent Goldschmidt (Geneva). We are thankful to Professor Bruno Baur for his advice with the sampling design, and to Edi Stöckli for providing the codes for the collection in the Museum of Natural History Basel. We would like to thank Erika Igondová, Martina Červená, and Dávid Selnekovič for technical assistance with the figures and both anonymous reviewers. We are also thankful to the University of Basel for proving the funding for this research. The study was financially supported by VEGA grant 1/0704/20.

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