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First record of the neozoic species *Naupactus cervinus* Boheman, 1840 (Coleoptera, Curculionidae, Entiminae) for Switzerland with a short review of its spreading and food plants

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The polyphagous Neotropical weevil *Naupactus cervinus* Boheman, 1840 was caught as prey of the wasp *Cerceris arenaria* (Linné, 1758) in a garden above Porto Ronco in southern Ticino, Switzerland. An overview on the weevil's origin, spreading and its food plants at family-level is given.

Keywords: Curculionidae, *Naupactus cervinus*, *Cerceris arenaria*, neozoon, new record, pest species, faunistics, Ticino, Switzerland.

INTRODUCTION

The comparatively rich fauna of Curculionoidea in Switzerland comprises nearly 1080 species and subspecies (Germann 2010, 2011, 2013, Germann *et al.* 2015, Giusto & Germann 2015). A small set of 44 species, the present one included, were introduced. Solely 33 of these neozoons are able to develop outdoors, whereas 11 live eusynanthropically in heated buildings. In the following the record of *Naupactus cervinus* Boheman, 1840 in southern Ticino is presented and discussed.

MATERIAL & METHODS

The specimen is conserved in the collection of Jacqueline Grosjean (Oberwangen). J. Grosjean already discovered a good dozen of insects new to the Swiss fauna, or at least only very rarely found (see Obrecht 2014), part of them from around the same locality Porto Ronco (Swiss coordinates: 699/110) in the southern canton of Ticino. Abbreviation: NMBE – Natural History Museum Bern.

RESULTS

Record in Ticino

The single female specimen (Figs 1, 2) was caught on 27th July 2015 by Jacqueline Grosjean as prey of the wasp *Cerceris arenaria* (Linné, 1758) (Hymenoptera: Crabronidae). *C. arenaria* is specialized in hunting for Curculionoidea. Entiminae genera belong to its favourite prey (Bitsch *et al.* 1997), as *Otiorhynchus difficilis* Stierlin, 1858, *O. sulcatus* (Fabricius, 1775), *O. rugosostriatus* (Goeze, 1777) and *O. armatus* Boheman, 1843. All four occur at the same locality where *N. cervinus* was caught; *O. armatus* is another neozoon in Switzerland and had also been discovered by J. Grosjean at the same locality above Porto Ronco (Germann 2006).

Besides, the wasp has been observed hunting for the following additional entimine weevils in Switzerland (unpublished records based on label-data by Monika Meyer-Holzapfel (1907–1995) in the collection of the NMBE): *Otiorhynchus chrysocomus* Germar, 1824, *O. lepidopterus* (Fabricius, 1794), *O. anthracinus* (Scopoli, 1763), *O. pupillatus* Gyllenhal, 1834, *O. singularis* (Linné, 1767), *Phyllobius arborator* (Herbst, 1797) and *P. glaucus* (Scopoli, 1763). The habitat where *Naupactus cervinus* was discovered is a terraced garden above Porto Ronco in the canton of Ticino, with various ornamental trees and shrubs: *Citrus sinensis*, *C. japonica*, *Ficus carica*, *Olea europaea*, *Hedera helix*, *Trachycarpus fortunei*, and *Hydrangea* sp.

Origin and spreading

N. cervinus originates from the Neotropical region and is native to the highly endangered Paranaense Forest covering southern Brazil, eastern Paraguay and north-eastern Argentina (Lanteri 1993, Rodriguero *et al.* 2013). From there both amphigonic and parthenogenetic populations are known. Lanteri (1993) indicated that the amphigonic populations belonged to *N. cervinus* (based on the type specimen from Brazil), whereas the asexually reproducing ones were attributable to the name *N. godmani* (Crotch, 1867) based on specimens spread to the Azores Islands. But she further emphasized that in principle they represent different forms of reproduction of the same species, *N. cervinus* therefore having priority. The investigations by Rodriguero *et al.* (2013) of different parthenogenetic populations of *N. cervinus* revealed a high genetic, and a smaller morphological variability, where density of scales and length of bristles on the elytra differed. Rodriguero *et al.* (2013) examined parthenogenetic Neotropical populations and found support for a beginning differentiation and probable specialization of a «forest» clade and a «grassland» clade. The parthenogenetic populations of the apparently more adaptable «grassland» clade of *N. cervinus* (Rodriguero *et al.*, in press and written communication) may have spread already in the 18th century to the USA (Chittenden 1901) with first records in 1874 from New York (Chadwick 1965), Hawaii (Perkins 1900), Mexico (Champion 1922) and Canada since 1885 and 1890 (Chadwick 1965). It was recorded by Crotch (1867) from the Azores, records followed from North Africa since 1924 (Morocco), Portugal and Spain (Clerc 1928), and since 1906 (Champion 1922; without locality), or 1908 from Italy (Liguria; Vitale 1927). Since the late 1920ies records from southern France (Clerc 1928) are known, but the occurrences have remained localised up to now, and a massive dispersal did not (yet?) occur (Pantacchini 1993). Simultaneously *N. cervinus* spread around the globe to South Africa, Johannesburg since 1920ies, the Australian region since 1934, and New Zealand since 1937 (Chadwick 1965). Interestingly rather early records are known from isolated islands as Juan Fernandez in 1916, Easter Island in 1917, unnamed Polynesian islands in the 1940ies, St. Helena in 1955 and La Réunion surely before the 1990ies (Chadwick 1965, Perrin *et al.* 2007). The present distribution is restricted primarily to warm (tropical to subtropical) or warm-temperate climates, free from frost. Thus records from much more northern countries like Denmark and Sweden (Palm 1996, Borisch 1997) in Europe refer to unique appearances or eusynanthropical occurrences such as in greenhouses. In Europe and adjacent regions up to now additional records from the Canary Islands, Madeira, Malta, Israel (Alonso-Zarazaga 2013), Georgia and Turkey (Lodos 1990) were published.

Fig. 1 (left). Habitus of *Naupactus cervinus* Boheman, 1840; Porto Ronco.
Fig. 2 (right). Original square label by J. Grosjean from the first specimen of *Naupactus cervinus* Boheman, 1840 from Switzerland.

Food plants

Naupactus cervinus is a polyphagous weevil and accepts a broad range of host plants, reaching from often cited Rutaceae (*Citrus* spp.), to Rosaceae, but feeding was also observed on Amaranthaceae, Anacardiaceae, Apocynaceae, Arecaceae, Asparagaceae, Asteraceae, Cannaceae, Celastraceae, Convolvulaceae, Corylaceae, Cunoniaceae, Ericaceae, Fabaceae, Fagaceae, Geraniaceae, Hydrangeaceae, Lauraceae, Malvaceae, Myrtaceae, Oleaceae, Pinaceae, Salicaceae, Sapotaceae, Solanaceae, Theaceae, Thymelaeaceae, Urticaceae, Verbenaceae and Ericaceae (Hoffmann 1950, Razzauti 1913, Chadwick 1965, Perrin *et al.* 2007). On Ericaceae, I once had numerous finds of *N. cervinus* together with the indigenous entimine weevil *Caulomorphus subsulcatus* (Boheman, 1833) in autumn 1998 on Corsica near Porto Vecchio on *Arbutus unedo*, where feeding traces at the leaf margins could be detected. *N. cervinus* was primarily active at night (also stated by e.g. Clerc 1928, Chadwick 1965). Regarding damages on cultivated plants in Europe, *N. cervinus* has a good potential as pest organism and attacks mostly fruit trees as oranges, limes, mandarins, almonds, peaches, and ornamental shrubs as *Pelargonium* and roses

(Razzauti 1913), and all the representatives of the plant families listed above. The larva feeds on the roots of various plants and was illustrated along with the egg and the pupa (e.g. Razzauti 1913). Larvae of. *N. cervinus* were also successfully bred under laboratory conditions, where especially roots of potato (*Solanum tuberosum*) are well accepted and lead to highest breeding success (Masaki & Takahashi 1999).

DISCUSSION

Due to the mild insubric climate in the canton of Ticino and the high potential of rapid growth of populations due to asexual reproduction, the new faunal element *N. cervinus* is very likely to become established soon at least in southern Ticino in Switzerland. The variety of food plants shown is impressive and proofs that *N. cervinus* definitely belongs to the series of polyphagous entimine weevils that show a considerable potential as pests on fruit trees in agriculture and on ornamental plants in gardens. A more northern immigration is unlikely due to the harsh climate in the alpine mountain chain which act as a natural barrier to a potential spread. Although, considering the present global climate warming, this cannot be excluded per se in the future.

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