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Observation of flight capability in *Coniocleonus nigrosuturatus* (Goeze, 1777) and a surprising feeding experiment with preference for *Sanguisorba* spp. (Coleoptera, Curculionidae: Lixinae)

by

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Abstract. One male specimen of *Coniocleonus nigrosuturatus* was caught while flying in the air in October in the Algarve (Portugal). A short feeding test allowed to hypothesize on possible further host plants.

Keywords. Cleonini, *Coniocleonus*, flight capability, host plant, ecology.

Introduction

Just recently Jilg et al. (2024) asked an exciting question about the flight capability of macropterous (big sized) Cleonine weevils. Flights are very rarely observed, and in many species – despite of well developed hind wings and muscles – only direct observations can proof successful flight capabilities. In the following we report on such an observation, and furthermore, took the opportunity and tested possible further host plants, based on a single adult specimen. Regarding host plants, there is only scarce information available for the European species of *Coniocleonus*. According to Hoffmann (1950) specimens of the more southern distributed *C. pelletii* (Fairmaire, 1859) were regularly collected from *Cistus* species (*C. monspeliensis* L., *C. laurifolius* L. and *C. albidus*) (Cistaceae). *Rumex acetosella* L. (Polygonaceae) is unanimously supposed to be the host plant of *C. hollbergii* (Fåhraeus, 1842) (Dieckmann 1983, Bayer & Winkelmann 2005, Stejskal & Trnka 2013), and *C. excoriatus* (Gyllenhal, 1834) was observed to develop on *Emex spinosa* (L.) Campd. from the same family (Stejskal & Trnka 2013). The larva of the latter species was found feeding ectophagously on the collar and roots (Julien 1980, Scott & Yeoh 1996). Even more scarce is the knowledge on *Coniocleonus nebulosus* (Linnaeus, 1758), where *Calluna vulgaris* (L). Hull as potential host plant was mentioned, doubted by most authors (e.g. Dieckmann 1983, Bayer & Winkelmann 2005, Schacht & Mertens 2021). Schacht & Mertens (2021) furthermore detected *Rumex acetosella* as only hypothetical host plant in the habitat in their survey on *C. nebulosus* in Germany. Regarding *C. cicatricosus* (Hoppe, 1795) and *C. pseudobliquus* (Müller, 1921) nothing is known at present. The most reliable investigation was undertaken regarding *C. nigrosuturatus* by Stejskal et al. (2014), whose larvae live in vertical tunnels in the earth under their host plant *Erodium cicutarium* (L.) L'Hér. (Geraniaceae) and are feeding ectophagously on the base of the stems, hence a monophagy was supposed. In general, most oligo- and monophagous weevils tend to feed upon their host plants in both, larval and adult stages. Nevertheless, as Meregalli (2014) mentioned, in Lixinae adults often feed rather polyphagously, whereas their larvae are oligo- or monophagous. Thus feeding tests with adults should be handled with care.

Results and discussion

It was quite a surprise, when an unknown beetle was flying rather quickly in front of Matthias Borer (MB) when walking down a path close to the coast. When the beetle was caught, MB recognized it as a Cleonine weevil and luckily brought it back home alive. The weather at the locality was warm (26 °C in the shade) and sunny. The weevil was walking "wasp-like" (a kind of a disrupted walking), as typical for *Coniocleonus* (Fig. 3). Back home, the first author (CG) tried to imitate the conditions using a warmth blanket (25 to 27°C) and a bright LED bulb used for plant growth, and hoping for any flight attempts, but in vain (Fig. 5).

As the weevil – now determined as a male specimen of *Coniocleonus nigrosuturatus* – did not feed for about 10 days, we immediately offered several plants, likely to occur in the habitat (and available outdoors), which were all not accepted:
Boraginaceae: *Echium vulgare* L., Plantaginaceae: *Plantago lanceolata* L., Asteraceae: *Hieracium* sp., *Leucanthemum vulgare* Lam., *Taraxacum officinale* agg., Lamiaceae: *Salvia pratensis* L., Polygonaceae: *Rumex* spp., Ericaceae: *Calluna vulgaris*, *Erica* sp.).

A member of the Fabaceae (*Medicago sativa* L.) was initially fed upon in the typical weevil manner, along the roundish leaves (Fig. 2). Also another Fabaceae added afterwards to the promising feeding plants in the box, was consumed (*Hippocrepis comosa* L.), also along the outer margin of single leaves. This observation is in accordance with the biology of the central Asian species *Coniocleonus astragali* Ter-Minasian & Korotyaev, 1977, which inhabits the Fabaceae genera *Astragalus* and *Oxytropis*, with larvae developing in chamber-like hides in plant cushions (Ter-Minasian 1988).

Just out of curiosity, we offered a species of Rosaceae, *Sanguisorba minor* L., additionally to the other plants. A plant from the original habitat of the weevil, which provides a root system suitable for the larvae to develop (Fig. 4). The feeding we observed on *Sanguisorba minor* was without doubt a very convincing finding! Altogether a whole leaf was consumed by the end of the day (Fig. 1). Moreover, the following day, another half leaf, this time of *Sangusorba officinalis* L., was fed during daytime. Two days later, the weevil was hiding under the bottom paper inside the box and did not move anymore. The box was then moved to the cellar and kept at a lower temperature of 12-14 °C. One week later (end of November) the weevil was still hiding in the exactly same position, and till January 2025, it only changed slightly its position. Obviously a phase of quiescence (diapause) started, not a surprise regarding the late season.

Figs 1-5. *Coniocleonus nigrosuturatus* **1.** Feeding on *Sanguisorba minor*. **2.** Ditto on *Medicago sativa*. **3.** The “wasp like” walking after a warm-up in a heating chamber. **4.** Excavated *Sanguisorba minor* in different ages; older plants have thicker roots, suitable for a hypothetical larval development inside. **5.** Flight experiments after the heat-up, which were not successful (Photos: C. Germann).

Hence, with the present reported observation we confirm good flight ability for *C. nigrosuturatus*, although this could not be reproduced artificially. Moreover, as the species obviously went into a winter diapause, the previous flight activity or its absence afterwards might be the postulated "phenological flightlessness" as proposed by Jilg et al. (2024). After a dispersal flight and a last meal, winter diapause followed and, as mentioned by Muda et al. (1981), the muscle tissue might even be reduced during that diapause. With probably Fabaceae and even more likely *Sanguisorba* spp. we suggest additional feeding plants (for adults), and maybe hypothetical host plants (for larvae), which should be tested in the coming season by field studies.

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