Cionus nigritarsis, a weevil new to The Netherlands, with notes on the occurrence and distribution of *C. thapsus* and *C. hortulanus* (Coleoptera: Curculionidae)

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Abstract: *Cionus nigritarsis* is reported for the first time from The Netherlands. A large population was discovered at Weert, province of Limburg. *Cionus nigritarsis* closely resembles *C. hortulanus* and especially *C. thapsus*. We therefore studied material of these species from a number of private and institutional collections. All specimens determined as *C. thapsus* except one were misidentified and appeared to be *C. hortulanus*. In this contribution we present aspects of the taxonomy, distribution and ecology of these species, and we provide illustrations of the male and female genitalia. Our study of the male genitalia disclosed that the internal sac of *C. nigritarsis*, *C. thapsus* and *C. hortulanus* all have a tubular sclerite provided with a flagellum, which is considered a primitive feature within weevils.

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Introduction

Members of the genus *Cionus* (Figwort Weevils) are characteristic weevils, that can be readily recognised by the black velvety patches on the elytra. Adults and larvae feed exposed on *Scrophularia* (Figworts) and *Verbascum* (Mulleins), both belonging to the Scrophulariaceae. The larvae are slug-like and covered with a glutinous layer of slime. They feed exophagous on the under-surface of the host-leaves and pupate in paper-like globular cocoons, which are attached to the foodplant and can easily be taken for fruits. When *Cionus*-species are present, they generally are abundant. Also very often two or even more species of *Cionus* co-occur on the same plant. Thus far six species of *Cionus* are known from The Netherlands: *Cionus alauda* (Herbst), *C. scrophulariae* (Linnaeus), *C. tuberculosus* (Scopoli), *C. olens* (Fabricius), *C. hortulanus* Geoffroy, and *C. thapsus* (Fabricius) (Brakman, 1966; Heijerman, 1993).

On 8 August 1998 we were fortunate to discover a large population of *Cionus nigritarsis* Reitter near Weert, province of Limburg, from which we collected a large number of specimens. There are no published records of this species from The Netherlands. *Cionus nigritarsis* closely resembles *C. thapsus* and the two species key out in the same couplet in several published keys such as the key presented by Lohse & Tischler (1983). Therefore we decided to study the material of *C. thapsus* in the main Dutch museum collections to find out whether the two species may have been confused in the past. It appeared that the few specimens present under *C. thapsus* were almost all misidentified and were in fact the common *C. hortulanus*. We then made an appeal to the Dutch coleopterists to examine their collections for specimens of *C. thapsus*. As a response we received some material, but all specimens identified as *C. thapsus* were in fact *C. hortulanus*. Among them we did not find any *C. nigritarsis*. We also checked material of *C. hortulanus* in some private and museum collections, but did not find any

specimens of *C. nigritarsis*. Therefore we conclude that our findings of *C. nigritarsis* constitute the first record of this species for The Netherlands.

Cionus alauda, *C. scrophulariae*, *C. tuberculosus* and *C. olens* are rather distinctive species which can be readily recognised and identified with the naked eye, even in the field. The remaining species, *C. hortulanus*, *C. thapsus* and *C. nigritarsis,* closely resemble each other and must be examined under a binocular microscope. Especially *C. nigritarsis* and *C. thapsus* are very similar in appearance. It seems that in the past *C. nigritarsis* has often been overlooked and several authors point out that older records of *C. thapsus* may relate to *C. nigritarsis*. Males however, can be reliably separated on the bases of their genitalia. Although *Cionus hortulanus* can be recognised relatively easily by its narrowed rostrum, it was often misidentified as *C. thapsus*.

In this contribution we will discuss aspects of the taxonomy, distribution and ecology of these species, and will present figures of the male genitalia. As far as we know there is no literature presenting drawings of the female genitalia. Because females of all three species can be easily separated on the basis of the spermatecae, we will present figures of the female genitalia as well.

History

Cionus thapsus is included already in the earliest Dutch checklists of beetles of The Netherlands (Snellen van Vollenhoven, 1848, 1858, 1870; Everts, 1875, 1887). However, Everts (1903) stated that *C. thapsus* is not indigenous in The Netherlands and that some older records (from 1870-1887) were incorrect and referred to *C. hortulanus*. Everts (1906) listed *C. thapsus* not as an indigenous species, but as occurring in neighbouring countries. Finally, Everts (1922) listed the species as occurring in The Netherlands, based on records from Winterswijk ('June') and Kerkrade ('Limburg'). From that time the species is present on the Dutch lists (Everts, 1925; Brakman 1966; Heijerman, 1993).

Everts (1922) mentioned a variety of *C. thapsus*, var. *nigritarsis*, described in 1904 by Reitter and differing from *C. thapsus* by the black instead of yellowish red tarsi and base of antennae and by a less dense pubescence on the elytra. In a note Everts (1922) added that Wingelmüller (1914) considers var. *nigritarsis* a good species. In later literature Wingelmüller (1914) was followed including *C. nigritarsis* as a separate species (e.g. Horion, 1935; Hoffmann, 1958). Also Brakman (1966) mentioned *C. nigritarsis* as a species occurring in countries surrounding The Netherlands. We were not able to check Wingelmüller (1914) ourselves, since only a few copies of the Münchener Koleopterologische Zeitschrift, in which Wingelmüllers monograph appeared, were saved from a fire and were never published again (Alonso-Zarazaga, 2001, personal communication).

Cionus hortulanus is on the Dutch beetle list since the publication of Snellen van Vollenhoven in 1848.

Material

All specimens of *Cionus nigritarsis* collected at Weert were taken from *Verbascum nigrum* L. (Dark Mullein). They were collected on a stretch of ruderal land along a railway embankment. No specimens of other *Cionus*-species were taken on the same locality.

We have studied material from the collections of the National Museum of Natural History, Naturalis, Leiden (RMNH); the Zoological Museum, Amsterdam (ZMAN) and the Department of Entomology of Wageningen University, Wageningen, and the private collections of R. Beenen (Nieuwegein), T. Kwakman (Deventer), D. Vestergaard (Soest) and P. Poot (Maastricht).

In the collections of ZMAN nine Dutch specimens were found under *C. thapsus* and all actually are *C. hortulanus*. In the collections of RMNH two specimens were present under *C. thapsus*, one from Kerkrade (no date, leg. Latiers, ex coll. Everts), the other one

from Winterswijk (19.vi.21, leg. Kempers, ex coll. Everts). These must be the records mentioned in Everts (1922). The specimen from Winterswijk carried a label "is m.i. *hortulanus*, 1966, A. C. M. van Dijk" and does indeed belong to *C. hortulanus*. So the presence of *C. thapsus* on the Dutch list is only based on a single, undated specimen.

Cionus hortulanus is rather common and widespread in The Netherlands. Brakman (1966) reports it from five out of 11 provinces: Overijssel, Gelderland, Noord-Holland, Zeeland, and Limburg. Utrecht, Noord-Brabant and Friesland can be added based on collection material not seen by Brakman and records of the first author.

Identification and recognition

Cionus hortulanus can be easily separated from all other species of *Cionus* by the shape of its rostrum, which is tapering towards the end. In females the rostrum is smooth, shiny and without punctures between the insertion

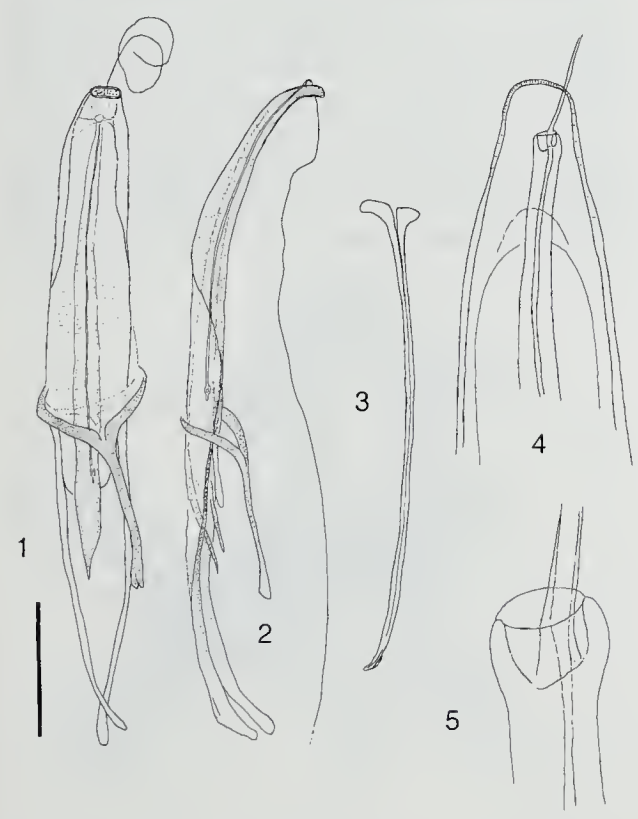

Fig. 1-5. Male genitalia of *Cionus nigritarsis* (The Netherlands, Weert, 8.viii.1998). 1, aedeagus with tegmen in ventral view; 2, idem in lateral view; 3, spiculum gastrale; 4 and 5, details of flagellum (scale fig. 1-3: 0.5 mm; fig 4: 0.2 mm; fig 5: 0.05 mm).

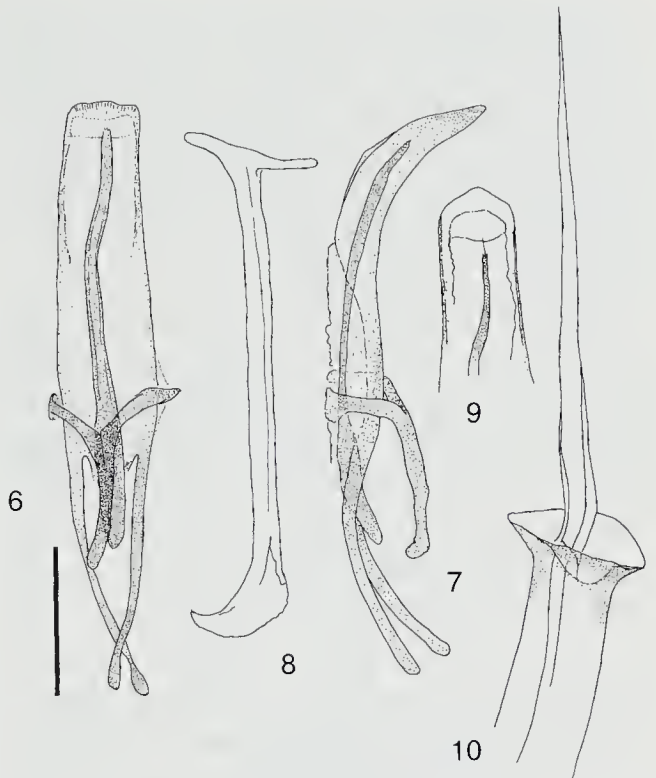

Fig. 6-10. Male genitalia of *Cionus thapsus* (France, Pyrénées Orientales, Estagel, 21.vi.1982). 6, aedeagus with tegmen in ventral view; 7, idem in lateral view; 8, spiculum gastrale; 9, apex of median lobe; 10, flagellum (scale fig. 6-9: 0.5 mm; fig. 10: 0.05 mm).

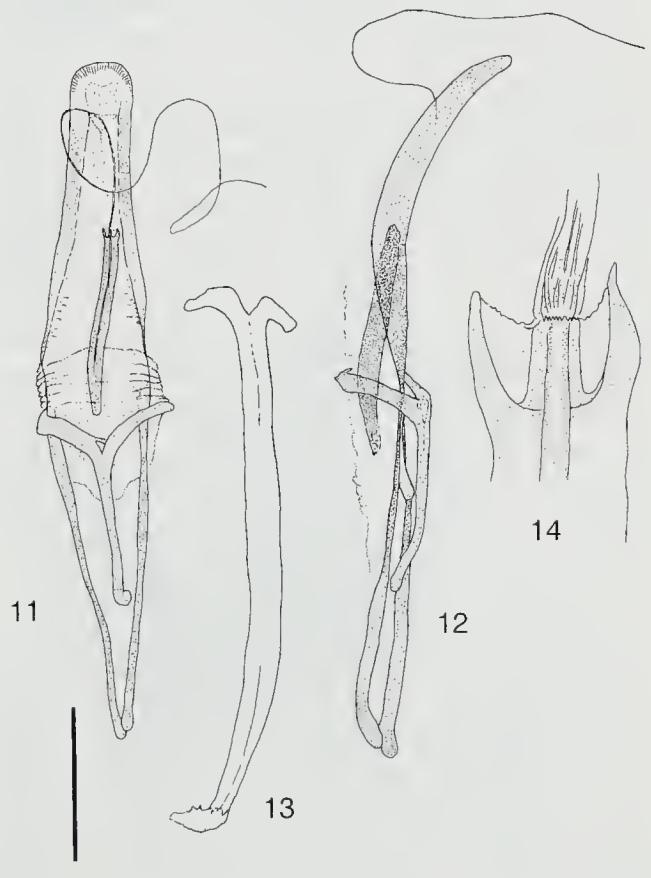

Fig. 11-14. Male genitalia of *Cionus hortulanus* (France, Pyrénées Orientales, Estagel, 21.vi.1982). 11, aedeagus with tegmen in ventral view; 12, idem in lateral view; 13, spiculum gastrale; 14, detail of basal part flagellum (scale fig. 11-13: 0.5 mm; fig. 14: 0.05 mm).

of the antennae and the top. In *C. thapsus* and *C. nigritarsis* the rostrum is not narrowed towards the top and shagreened and pubescent. Males of *C. hortulanus* can also be distinguished by the shape of the aedeagus (see figures in Lohse & Tischler, 1983 and Tempère & Péricart, 1989).

Horion (1935) presents a key for the German species of *Cionus* belonging to the *thapsus*-group, including among others *C. nigritarsis* and *C. thapsus*, based on Wingelmüller (1914, 1921), and states that for a reliable identification one should have males as well as females at one's disposal. *Cionus nigritarsis* and *C. thapsus* are extremely close to each other and when using only external characters they can only be distinguished on comparison. For a reliable separation of *C. nigritarsis* from *C. thapsus* one should use the male genitalia. *Cionus nigritarsis* is described (Horion, 1935; Lohse & Tischler, 1983) as somewhat smaller than *C. thapsus* and with the scale-like pubescence less completely covering the ventral surface. The black marks of the alternate interstices are more conspicuous and reach closer to the base of the elytra. The club of the antennae is 2.5 times as long as wide, instead of 2.25 as in *C. thapsus*. Its rostrum is somewhat weaker developed and with sides completely parallel. Antennae and legs are mostly black, but sometimes reddish to rust-coloured. Moreover, the aedeagus in *C. thapsus* is completely sclerotised, like in *C. alauda*, *C. scrophulariae* and *C. tuberculosus*, whereas in *C. nigritarsis* the external covering of the penis is membraneous, as in the remaining species of the genus (Horion, 1935; Lohse & Tischler, 1983).

The drawings of the aedeagus by Lohse & Tischler (1983) do not show much detail; they only present the general outline of the apex in ventral view. Tempère & Péricart (1989) present somewhat more detailed drawings of a larger part of the penis in ventral and lateral view. Because of the importance of the male genitalia for the recognition of species, we present detailed drawings of the male genitalia of *C. nigritarsis*, *C. thapsus*, and *C. hortulanus* (fig. 1-14). They also differ in the shape of the spiculum gastrale: in *C. nigritarsis* the spiculum is much longer and more slender. Moreover, our study of the male genitalia of these three species revealed that they all have a tubular sclerite provided with a non-sclerotised flagellum inside the internal sac of the aedeagus (the median lobe). In *C. nigritarsis* the tube seems only weakly sclerotised. In *C. thapsus* the flagellum is very short and hardly visible, whereas in *C. hortulanus* and especially in *C. nigritarsis* it is very long and extruding the ostium. The presence of flagella is considered a primitive feature of the inner sac in weevils. A flagellum can be found in Anthribidae, Brentidae, some Rhynchitidae and Attelabidae, Nanophyidae, primitive Apionidae and others (Alonso-Zarazaga, 2001, personal communication).

As far as we could verify, female genitalia were never figured. We therefore dissected females of the three species to study the spermathecae. In all three species the spermathecal capsule is clearly sclerotized; they differ in form and hence they are useful to distinguish between our three species (fig. 15-17). In *C. nigritarsis* and *C. hortulanus* the spermathecae are rather similar, but still different in general shape and in the form of the atria where the spermathecal gland and spermathecal duct are inserted. In *C. thapsus* the spermathecal gland and duct are inserted in a common atrium.

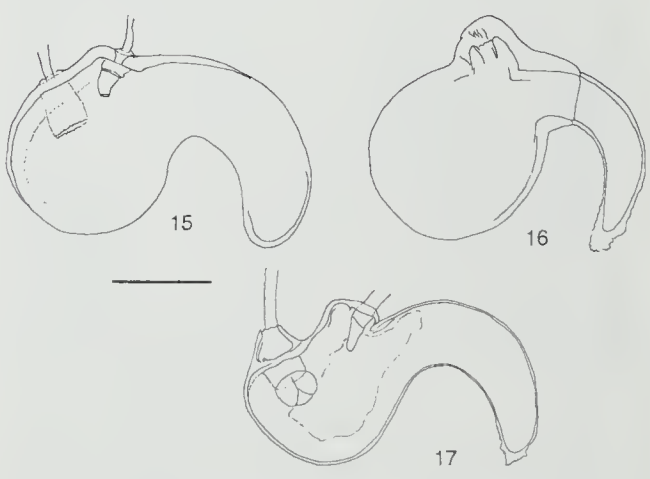

Fig. 15-17. Spermathecae of *Cionus*-species. 15, *Cionus nigritarsis* (The Netherlands, Weert, 8.viii.1998); 16, *C. thapsus* (France, Pyrénées Orientales, Estagel, 21.vi.1982); 12, *C. hortulanus* (The Netherlands, Olst, 05.viii.1997) (scale: 0.1 mm).

Ecology and distribution

Cionus nigritarsis feeds on *Verbascum nigrum* L. and *V. thapsus* L. (Common Mullein) (Scherf, 1964; Koch, 1992). Hoffmann (1958) mentions *V. lychnitis* L. (White Mullein) as a foodplant. Scherf (1964) notes that the larval stages are unknown.

Cionus thapsus can be found on *Verbascum nigrum*, *V. thapsus* and *V. lychnitis*, where the larvae feed on the flowers and unripe fruits (Scherf, 1964). Hoffmann (1958) writes that the species lives on a number of *Verbascum*-species and adds *V. sinuatum* L. and *V. pulverulentum* Vill. (Hoary Mullein).

Cionus hortulanus feeds on *Verbascum nigrum* and *V. phlomoides* L., but also on *Scrophularia nodosa* L. (Figwort) and *S. aquatica* L. (Mudwort); the larvae live externally on the flowers and leaves (Scherf, 1964). Hoffmann (1958) also mentions *S. alpestris*, *S. erhardti* and *V. pulveratuella* Vill. – *floccosum* W. et Kit. It has also been found on *Buddleja* spp. (Butterfly Bush; Philp, 1991). *Buddleja* is not a Scrophulariaceae, but it belongs to the Buddlejaceae. These two families are even classified in separate orders, Gentiales and Scrophulariales respectively. Also *C. scrophulariae* is known to feed on a *Buddleja* species, viz. *B. globosa* Hope (Bullock, 1987; Smith, 1992). Koch (1992) writes that the species is oligophagous on *Verbascum* and *Scrophularia* species, but it is especially found on *V. nigrum*. Also Lohse & Tischler (1983) mention *V. nigrum*, where it would often occur together with *C. thapsus*.

Cionus hortulanus is very widespread from central Asia westwards all over Europe, being one of the more common *Cionus*-species; the area of *C. nigritarsis* ranges from the Caucasus towards the Pyrenees and up to southern Scandinavia; *C. thapsus* occurs throughout Europe and a large part of Asia, but is less

Fig. 19. European distribution of *Cionus thapsus*. Pale grey: based on national borders; dark grey: based on regional borders (or the species is reported to occur all over the country).

Fig. 18. European distribution of *Cionus nigritarsis*. Pale grey: based on national borders; dark grey: based on regional borders (or the species is reported to occur all over the country).

Fig. 20. European distribution of *Cionus hortulanus*. Pale grey: based on national borders; dark grey: based on regional borders.

common compared with the other two species (Lohse & Tischler, 1983). The European distribution of *Cionus hortulanus*, *C. thapsus* and *C. nigritarsis* is presented in figures 18-20, based on data from the main European checklists and some additional sources.

Acknowledgements

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