

## The subgenus *Tipula* (*Tipula*) in Finland and Estonia

Fenja Brodo

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Only two species in the subgenus *Tipula* occur in Finland and in Estonia: *paludosa* Meigen, 1830 and *subcunctans* Alexander, 1921. Their distributions in Finland are mapped and their flight periods are compared. The erroneous inclusion of *T. oleracea* Linnaeus, 1758, to the Finnish and Estonian faunas is based on conflicting species concepts employed by different authors.

Fenja Brodo, Canadian Museum of Nature, P.O. Box 3443, Station "D", Ottawa, Ontario, Canada K1P 6P4

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### 1. Introduction

There are about 100 species of Tipulidae listed as occurring in Finland (Hackman 1980) and 79 in Estonia (Remm 1986). Very few of these are of any economic importance. The species in the subgenus *Tipula* (*Tipula*), however, especially those belonging to the *oleracea* group, have long been recognized as being injurious to plants. In fact, the name *oleracea* refers to cruciferous plants and was given by Linnaeus to a species which he knew to infest the roots of several cruciferous cultivated plants (Tjeder 1953).

Similar damage, but not restricted to cruciferous plants, occurs in Finland (Vappula 1965). Larvae belonging to the subgenus *Tipula*, called "leather jackets," have been documented destroying seedlings of various vegetables and grains by eating the roots and other underground plant parts as well as the leaves and stems. They also cause extensive damage to both natural meadows and cultivated hay fields. There are three potential pest species in this group and it was not established which species are responsible for the recorded damage in Finland (Vappula 1965). The larvae can be distinguished but with difficulty (Brindle 1959, Hollander 1975a) and

differences of opinion regarding the nomenclature of these species have confused the issue.

The species involved are *Tipula oleracea* Linnaeus, *T. paludosa* Meigen, and *T. subcunctans* Alexander (= *czizeki* de Jong). The nomenclature problem centered around the identities of *T. oleracea* and *T. paludosa*. Tjeder (1953) understood the name *oleracea* to refer to the common pest of cabbages and other garden vegetables. In most of continental Europe, however, this species was known as *T. paludosa*, and *T. oleracea* referred to a species having a more southern distribution, occurring only at the extreme southern tip of Sweden (Tjeder 1953), and usually found along river banks (Mannheims 1950).

The identities of *Tipula oleracea* and *T. paludosa* were formally established in 1980 by ICZN (Bull. Zool. Nomencl. 37, opinion 1160; Oosterbroek & Theowald 1992). A neotype for *T. oleracea* Linnaeus was designated for the species with the more southern distribution in Europe, conforming with the opinion of Mannheims (1952, 1954) and most other Europeans (except the Scandinavians). The name *paludosa* Meigen was retained for the cabbage pest, and an earlier name, *fimbriata* Meigen was suppressed.

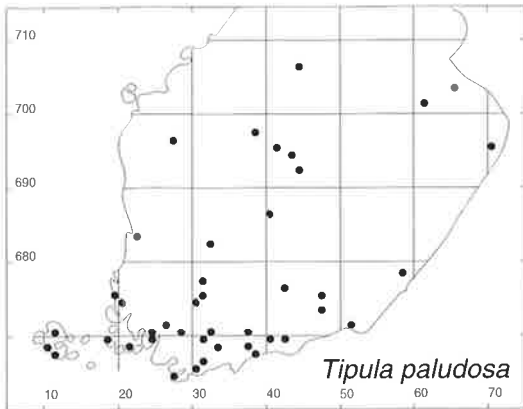


Fig. 1. Distribution of *Tipula paludosa* Meigen in Finland.

The third species in this complex, now known as *Tipula subcunctans* Alexander (Oosterbroek & Theowald 1992), is referred to as *czizeki* de Jong in much of the relevant literature (Hackman 1980, Hofsvang 1981, Hollander 1975a, b, Mannheims 1954a, b, Remm 1986, Tjeder 1953).

While studying the collection in Helsinki, I became aware of the confusion in this group. Frey and Tjeder had identified some of the material using identical concepts. Lackshewitz and Mannheims had identified other specimens, but with different species concepts (Mannheims 1954a, 1965a, b, 1967). Other specimens had been incorporated into the collection, mostly following the concept of Tjeder and probably based on his paper of 1953. Consequently, both Mannheims (1963, 1964) and Hackman (1980) recorded three species in the subgenus *Tipula* occurring in Finland. The same confusion of taxonomic identity existed in the collections at the University of Tartu, Estonia, and in the private collection of Dr. Kaupo Elberg.

## 2. Methods and results

All specimens of the subgenus *Tipula* found in the insect collections at the Universities of Helsinki (including the Department of Applied Zoology, Viikki), Oulu, Turku, Tartu and in the Elberg collection (Tartu) have been studied and annotated. I was not able to see the private collection at

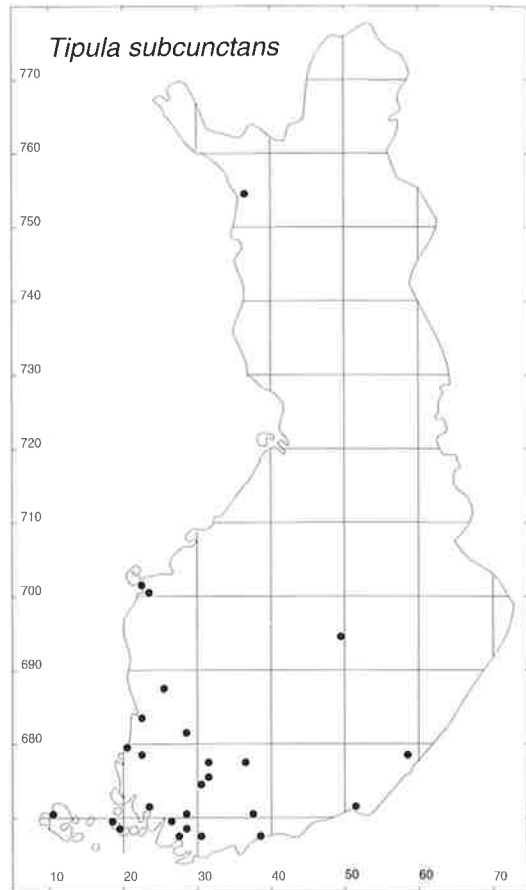


Fig. 2. Distribution of *Tipula subcunctans* Alexander (= *czizeki* de Jong) in Finland.

Forssa, southwest Finland, mentioned by Mannheims (1964). Figures 1 and 2 show the distributions, in Finland, of *Tipula paludosa* (based on 122 ♂♂ and 58 ♀♀) and *T. subcunctans* (based on 114 ♂♂ and 42 ♀♀), respectively. In addition to these, there were eight males and one female of *T. paludosa* from Karelia (Hogland, Hiitola, Petrosawodsk, Rajala Saima-Kanal, Terijoki, Tytärsaari and Viipuri Kotaniemi), and of *T. subcunctans* there were a male and a female from Karelia (Metsäpirtti), three males and seven females from Russia (Taganrog & Tobolsk) and a male and a female from Curonia, Latvia. (Specimens of *T. oleracea* were also found in these collections but proved to be from Berlin, Corfu, Denmark, Holland and Iran.) In Estonia,

there were no records of *T. oleracea*; *T. paludosa* was found to be common, with scattered records from all parts of the country, and *T. subcunctans* was recorded from only three localities: Puka, Kingissepp (=Kuressaare, Saaremaa) and Keila-Joa (northern coastal area west of Tallinn).

### 3. Discussion and conclusions

Of the three species in this group, only *Tipula paludosa* and *T. subcunctans* are known to occur in Finland and Estonia. Almost all the distribution records of *T. oleracea* in both countries refer to *T. paludosa*. This is not surprising considering that *T. oleracea* is essentially a species with a more southern distribution and only gets as far north as Lithuania (Podenas 1992) and the southern tip of Sweden (Tjeder 1953) and is not known to occur in Norway (Hofsvang 1981). Selke (1936), in Germany, recorded univoltine cycles for both *T. paludosa* and *T. subcunctans* and a bivoltine cycle for *T. oleracea*. This suggested to Dufour (personal communication) that the bivoltine cycle may restrict *T. oleracea*'s migration to the north. Yet, in Lithuania, despite extensive collecting, Podenas (1992) has only recorded one generation of *T. oleracea* from 8–21 August.

Museum collections often give a false impression of relative abundance of species. In Finland, *Tipula subcunctans* seems to have been almost as commonly collected as *T. paludosa*, whereas in Estonia, Lithuania, Sweden and Norway *T. subcunctans* is represented by far fewer specimens in the collections. This imbalance had been attributed in part to *T. subcunctans*, later appearance in the season coupled with reduced collecting activity at that time (Hofsvang 1981, Tjeder 1953). These authors also document that in Norway and Sweden *T. subcunctans* extends a little further north than *T. paludosa*. The same may be true in Finland, however, the lone northern record represents only a single female, without date and collected many years ago by J. Sahlberg in Muonio. On the other hand, Theowald (1982) recorded swarms of *T. subcunctans* and the absence of *T. paludosa* in coastal areas of the Gulf of Bothnia, in both Sweden and Finland.

Unfortunately, the dates of these collections were not noted.

*Tipula paludosa* was mainly collected in August (8 July to 30 August, with an additional record of a male, 8 September, from Tallinn). (Four laboratory-reared specimens of *T. paludosa* from Viikki are dated 25 June 1945.) In contrast to this, most specimens of *T. subcunctans* were caught in September (3 September to 1 October). Similar striking differences in flight period have been noted in the Netherlands (Hollander 1975b), Norway (Hofsvang 1981) and Sweden (Tjeder 1953) but the differences were not as clear cut in Lithuania (Podenas 1992). Hollander (1975a, b) suggested that this serves as a pre-mating barrier for these species which are not distinguished by different courtship behaviors. Occasional cross-matings had been observed in the field and cross-matings readily occur in the laboratory, quite often resulting in viable offspring (Hemmingsen & Theissen 1956).

There is considerable habitat overlap between these two species. Brindle (1959), suggested that *Tipula paludosa* has wider tolerances as its larvae survive in a variety of soils, from dry pasture to marsh, and in semiaquatic and aquatic moss, whereas *T. subcunctans* is found only in pasture and marsh soil. Yet, as Theowald (1982) has shown, *T. subcunctans* must be able to tolerate "swampy estuarine biotopes with intermittent overflows of brackish water of up to 2–3%." Tjeder (1953) documented an outbreak of *T. subcunctans* on golf greens in southern Sweden.

Often damage is noted but the species is not identified (Vappula 1965). Hofsvang (1981) surmized that much of the damage in Norway (and probably also in Finland and Estonia) is done by *Tipula paludosa*. Crop injuries are usually noted in May and June, just when most *T. paludosa* larvae are in their last, and most voracious instar. The larvae of *T. subcunctans* matures later. This species overwinters in the egg stage, somewhat unusual for Tipulidae.

The adults of these species have been very well described and illustrated by Mannheims (1952). In the field, quick and reliable identification is possible using an 8 × hand lens. Table 1 indicates the characters to look for in order to distinguish all three species in the *Tipula oleracea* group.

Table 1. Characteristics for distinguishing the species of the *Tipula oleracea* group in the field.

|  | <i>paludosa</i>   | <i>subcunctans</i>                                      | <i>oleracea</i>  |
|--|---|---|--|
| Number of antennal segments                            | 14  | 13  | 13   |
| Eye width ventrally                                    | wider than 1st flagellomere (usually 2–3 times as wide) | wider than 1st flagellomere (usually 2–3 times as wide) | usually narrower than 1st flagellomere (at most 1.5 times as wide) |
| Female: wing length                                    | shorter than abdomen                                    | as long as abdomen                                      | as long as abdomen   |
| Female: egg filament (visible in eggs still in female) | absent  | present   | present  |

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