

Therevidae (Diptera) in the East-Flemish inland dunes, pioneers on sandy soils ?

by Patrick GROOTAERT¹, Wouter DEKONINCK¹ & Dries BONTE²

¹ Department of Entomology, Royal Belgian Institute of Natural Sciences, Brussels.

² Laboratory of Ecology, Zoogeography, State University Ghent.

Summary

Relicts of East-Flemish inland dunes were investigated for the presence of dune-land fauna. Five of the 8 therevid species known from Flanders were found in the present study. In contrast to asilids, therevids showed to be pioneer species preferring areas with large bare sandy patches. Pit fall traps proved to be twice as effective to sample therevids than white or yellow pan traps. Yellow traps are ineffective. Highest activity and diversity is found in June and July.

Introduction

The scope of the present study was to investigate if there was still a characteristic dune fauna present in the relicts of the old inland dunes in the province of East-Flanders. In fact, in the past these poor agricultural lands were generally planted with woods or the sand was used for constructing or houses were built on the dryer elevated areas. So, very few original "dunes" are left. As to the origin of the sand and the dunes, we refer to DEKONINCK *et al.* (in press).

Therevid flies are often seen "sunbasking" on bare sand patches in coastal dunes. Six species are known from the Flemish coast and this was the reason to pay attention to their presence in inland dunes. Another 2 species are reported from the rest of Flanders so that our fauna counts 8 species.

Therevids are related to Asilid flies but they do not possess their strong snout. Instead they have large weak labellae and it is supposed that they hold a prey between these thick lips and suck them out the way dolichopodid flies do. Unfortunately very little is known of their biology (VAN DER GOOT, 1985; OLDROYD, 1969). Ac-

ording to VAN DER GOOT (l.c.) *Psilocephala* are "wood" species and their larvae are found in decaying wood. *Dialineura* species "fly" or forage on herbs growing on dry sandy soils. Van der Goot quotes further that *Thereva* species are observed between the "leaves", whatever this means.

There are no Red data lists nor distribution maps of therevids because there are too few observations to say something reasonable. In fact we start from nowhere.

Material and methods

Six sites with "dune" relicts in East-Flanders were sampled for their insect fauna. Table 1 gives a survey of the stations per site and the grade of perturbation or management done at each station.

From April until end September 1999, flies were collected with 5 pit fall traps and 3 white and 3 yellow pan traps per station (DEKONINCK *et al.* in press). To limit the variation in habitat and to ease comparison of the sites, the traps were placed in dry areas, floristically dry heathland.

Table 1. Sites, localities and management per station.

| Station | Locality | Site | Area |
|---------|------------------|------------------|---|
| 1 (W) | Wetteren | Den Blakken | Young heathland; recently cut pine – birch wood |
| 2 (U) | Uitbergen | Kalkense Meersen | Open duneland; recently cut pine – poplar wood |
| 3 (LV) | Lokeren | Molsbergen | Moss dunes (restored 5 year ago) |
| 4 (LN) | Lokeren | Molsbergen | Moss dunes (restored 5 year ago) |
| 5 (MB) | Moerbeke | Heidebos | Open area in wood with heath; recently large <i>Prunus serotina</i> was removed |
| 6 (MW) | Moerbeke | Heidebos | Open area in wood with heath |
| 7 (MA) | Moerbeke | Heidebos | Large open area with young heath; yearly mowed eagle fern |
| 8 (SA) | Stekene | Stropersbos | Old meadow in wood grazed by rabbits |
| 9 (SB) | Stekene | Stropersbos | Old meadow in wood, not so short grazed as SA |
| 10 (SC) | Stekene | Stropersbos | Birch wood bordering SB |
| 11 (SD) | Stekene | Stropersbos | Open bare space; old birch wood cut in previous winter |
| 12 (SM) | St-Martens-Latem | Golf course | Sand dune with heath, more than 90 years left undisturbed in golf course |

Observations

A total of 67 individuals, consisting of 60 females and 7 males, belonging to 5 species were found. Surprisingly most of the individuals were caught with the pit fall traps (Table 2). The coloured pan traps were less effective. The pit fall traps caught relatively almost twice as much as the white traps, the white traps double of the yellow traps. It is clear that yellow traps should not be used to catch therevids. The highest diversity and the largest numbers are caught in June and July (Table 3).

Table 2. Preference of therevids for trap type (P: pit fall; W: white pan trap; Y: yellow pan trap).

| Species | Trap | | | Total |
|---------------------------|-----------|-----------|----------|-----------|
| | P | W | Y | |
| <i>Dialineura anilis</i> | 2 | | | 2 |
| <i>Psilocephala ardea</i> | 2 | 6 | 2 | 10 |
| <i>Thereva bipunctata</i> | 31 | 7 | 6 | 44 |
| <i>Thereva cinifera</i> | 4 | 2 | | 6 |
| <i>Thereva nobilitata</i> | 5 | | | 5 |
| Total | 44 | 15 | 8 | 67 |

Table 3. Phenology of the species.

| Species | Month | | | | | Total |
|---------------------------|----------|-----------|-----------|----------|----------|-----------|
| | May | June | July | Aug | Sept | |
| <i>Dialineura anilis</i> | | 1 | 1 | | | 2 |
| <i>Psilocephala ardea</i> | | 2 | 7 | 1 | | 10 |
| <i>Thereva bipunctata</i> | 3 | 22 | 13 | 3 | 3 | 44 |
| <i>Thereva cinifera</i> | | | 6 | | | 6 |
| <i>Thereva nobilitata</i> | | | 4 | 1 | | 5 |
| Total number | 3 | 25 | 31 | 5 | 3 | 67 |

Table 4 gives a survey of the species found per station and per site. Except for station MB and SB, therevids were found in all stations. The numbers of species and individuals are low making the results hard to interpret statistically. Nevertheless there are some indications of the ecology of the species. Most individuals were found in the more recently perturbed areas which coincides with these sites with the largest open

sandy patches. The maximum number of 4 species were found at a station in Heidebos where eagle fern, *Pteridium aquilinum*, was mowed every year, resulting in large open sandy patches with young *Calluna*. The largest number of specimens, all mainly *Thereva bipunctata* were found at the 2 stations at Lokeren. These two stations were 5 years before the sampling a wasteland with rough vegetation and have been

cleaned up resulting in a large moss dune with a very short herb layer. Three species were also found in the freshly cut wood at Stropersbos,

indicating that there was an immediate exploration of this new site by the therevids.

Table 4. Therevid flies per site and station.

| Station | Wetteren | Uitbergen | Lokeren | | Moerbeke | | Stekene | | | St. M. Latem |
|----------------------------|----------|-----------|-----------|-----------|----------|-----------|----------|----------|----------|--------------|
| | W | U | LV | LN | MW | MA | SA | SC | SD | SM |
| Species | 1 | 2 | 3 | 4 | 6 | 7 | 8 | 10 | 11 | 12 |
| <i>Dialineura anilis</i> | | | | | | 2 | | | | |
| <i>Psilocephala ardea</i> | | | 1 | 1 | | 2 | 5 | | 1 | |
| <i>Thereva bipunctata</i> | 2 | 1 | 13 | 15 | 2 | 9 | 1 | | 1 | |
| <i>Thereva cinifera</i> | | 4 | 1 | 1 | | | | | | |
| <i>Thereva nobilitata</i> | | | | | | 1 | | 2 | 1 | 1 |
| Number of specimens | 2 | 5 | 15 | 17 | 2 | 14 | 6 | 2 | 3 | 1 |
| Species per station | 1 | 2 | 3 | 3 | 1 | 4 | 2 | 1 | 3 | 1 |
| Species per site | 1 | 2 | 3 | | 4 | | 3 | | | 1 |

Comments to the species

Dialineura anilis (L., 1761)

A common inland species (Gent, Destelbergen, Melle, Heusden, St. Amandsberg, Overmere, Diepenbeek, Hoogstraten, Lanaken, Bilsen) with only a single record from the coast (Knokke).

Only two specimens were found at Heidebos, Moerbeke.

Psilocephala ardea (F., 1794)

A very common species in inland Flanders (Gent, Destelbergen, Melle, Merelbeke, Heusden, Vinderhoute, St. Amandsberg, Munte, Heide (Antwerpen), Audergem, Diepenbeek, Hoogstraten, Lanklaar), but not reported yet from the coast nor South-Belgium.

Our records do not indicate that this species is a woodland species (VAN DER GOOT, 1985) since it should be more abundant in the wooded areas at Heidebos, De Stropers and Wetteren. It is instead found in open areas.

Thereva cinifera MEIGEN, 1830

This species is very common at the coast and until now there was only a single observation in

inland Flanders (Heusden).

Th. cinifera is dominant on the river dune at Uitbergen. Also two specimens were found in Lokeren. It probably follows the banks of the large rivers inland (Uitbergen near the Schelde and Molsbergen near the Durme). Both sites have recently been perturbed thoroughly and have large patches of bare sand.

Thereva bipunctata MEIGEN, 1820

This species is uncommon in Belgium. Only 9 specimens were present in the collection of the RBINS: Knokke, De Panne, Turnhout and Zundert. No records are available from the area around Ghent although it was thoroughly investigated by GOETGHEBUER and BEQUAERT.

In the present study, it is the dominant species. Especially in Lokeren and the station with the yearly mowed eagle fern at Heidebos. *Th. bipunctata* is probably a pioneer species in areas with large bare sandy patches.

Thereva nobilitata (F., 1775)

Th. nobilitata is a common species with a large distribution. It is found at the coast as well in the rest of the country. In the present study it is not abundant at all.

Thereva annulata (F., 1805)

A very common species at the coast with 2 records inland (Heusden, Kalmthout). This obvious species was not observed in the present study.

Thereva fulva (MEIGEN, 1804)

A not very common species known from the coast, the area around Ghent and the "Kempen". It was not observed in the present study.

Psilocephala rustica (PANZER, 1803)

A very rare species only known from Munte (23.VII.1936, det. VAN DER GOOT). It was not observed in the present study.

Conclusions

Of the 8 species that are supposed to occur in East-Flanders, we observed 5 species during the present study. Species commonly caught with hand captures were quite rare here and vice versa. So, more records are needed to understand the distribution patterns of the species: coastal, non-coastal, following the rivers inland, species from woodland etc.

To make an assessment of the presence of therevids, pit fall traps are twice as effective as white traps, yellow traps are the least effective. Sampling should be done at least during June

and July since the greatest activity and diversity occurs during that period.

In the present study we conclude that therevids can be considered as pioneer species. They appear quickly in freshly "restored" areas where i.e. the shrubs and trees have been removed (Uitbergen, Molsbergen, MA at Moerbeke) resulting in large bare sandy patches.

Much more studies are needed to understand the role that the therevids play in the ecology of sandy habitats.

Acknowledgements

The present study was done by order of the Flemish Government, AMINAL, Afdeling Natuur Oost-Vlaanderen (AMINAL/NA/98). The authors thank Mrs Viviane VANDEN BIL and her staff for their enthusiastic support to the project.

References

- DEKONINCK W., BONTE D. & GROOTAERT P., 2000. - Onderzoek naar herstelmogelijkheden t.b.v. het behoud van de specifieke entomofauna van de landduinen in Oost-Vlaanderen. Eindrapport december 2000: 211 pp. met bijlagen 44 pp.
- OLDROYD H. 1969- Diptera Brachycera section (a) Tabanoidea and Asiloidea. *Handbooks for the identification of British Insects*. IX. 4. 132 pp.
- VAN DER GOOT V.S., 1985. - De Snavelvliegen (Rhagionidae), Roofvliegen (Asilidae) en aanverwante families van Noordwest Europa. *Wetenschappelijke mededelingen K.N.N.V.* 171, 66 pp.