BRAUERIA (Lunz am See, Austria) 49:44-46 (2022)

A Small Study of Caddisfly Dispersal at Tampere, Finland

Juha SALOKANNEL

Abstract
Caddisflies were observed in the author's garden in Tampere, Finland in summer 2021. The distance to the nearest suitable aquatic habitat, i.e. the nearest larval habitat of each of the 38 recorded species was estimated.

Introduction

The ability for dispersal, i.e. how far an adult caddisfly can fly from the spot where its larva developed, and how dispersal can be monitored, have been studied or touched upon in many papers over the decades. For example, MALICKY'S (1987) paper discusses the aspects of catchability, flight range and artificial light attraction distance for caddisflies and reports findings from Austria and Crete. In northern Europe, there are studies e.g. by SVENSSON (1974) and SODE & WIBERG-LARSEN (1993) also considering the distance of the traps and the nearest suitable larval habitat. The recent progress in larval identification (RINNE & WIBERG-LARSEN 2017) as well as vast larval and adult materials identified during the last few decades have increased the knowledge of the aquatic habitats that the boreal caddisfly species are associated with. This also strengthens the possibility to use the adult records – even those studied a long time ago – for the dispersal studies. In this small hobby-level study, I focus only on a small amount of material from my own garden, where I know the light trap setup and the possible larval habitats of the surrounding area well.

Method and study area

The material was collected in my garden (61° 27' 58.62"N, 23° 50' 41.61"E) in Tampere, Finland using an efficient combination of lamps: Philips ML 250 W with two Sylvania 40 W tubes (Blacklight 350 and 368). These were kept on top of a funnelled collecting bucket designed for moths. Such strongly illuminating lamps are typically necessary in central Finland to catch anything during the light summer nights. However, I started not earlier than late July and kept the trap in function only on the selected sixteen nights: 26th, 30th, and 31st July, 2nd, 6th, 8th, 9th, 13th, 18th, 27th, and 28th August, 3rd, 5th, 8th, and 10th September, and 6th October 2021. The light trap was placed on a wall of a storage building and due to other buildings, trees and bushes the light was horizontally limited in practice to about 5 x 20 meter area within my garden. This setup was done on purpose, because I literally wanted to see what is flying in my garden or above it, not to attract insects horizontally from distances. I also made notes on the wind speed and direction as well as the temperature of the collecting evenings.

The garden is situated on a dry hill, which mostly is a suburban area, including also green zones. I looked for the nearest suitable aquatic habitats using detailed maps and walked to every potential spot during the autumn of 2020 (and many times before during my 15-year stay in the area). The nearest aquatic habitat categories suitable for caddisflies were the following:

1) Two vegetation-free gravel-bottom ditches that dry for the summer months at 100 and 200 m distances.
2) Temporary grassy forest pools at 500 m.
3) Human-modified main brook/canal called Vihioja at 600 m; constantly about 2-3 meters wide, lacking grassy pools, diversified with a few groundwater trickles connecting to it.
4) Three lakes and a large pond at 1,8 - 2 km. The lakes are in different directions almost at the same distance. Types range from a deep, cool lake Kaukajärvi to one of the areas shallowest and most eutrophic lake Iidesjärvi.

There are almost no garden pools in the area because people wish to avoid rearing mosquitoes and those few present are cleaned and emptied for the long winter time.

The identification of species is as defined in MALICKY (2004) and SALOKANNEL & MATTILA (2018). The species and sex of each specimen were documented.

Results

The material consists of 141 caddisfly specimens, which belong to 38 species. The species name, number of males (m.) and females (f.) as well as the distance to the nearest estimated suitable aquatic habitat are presented in the table.

Discussion

The nearest aquatic environments are temporary (category 1 and 2) and can only be inhabited by limnephilid larvae. These are species that can hatch in late spring and stay in adult or egg state over a couple of drier months. Such species in this material are *Limnephilus auricula, L. extricatus, L. flavicornis, L. griseus, L. rhombicus, L. sericeus, L. sparsus, Gyphotaelius pellucidus* and *Stenophylax permistus*.

The representatives of the rest had to fly from the more distant aquatic habitats. In my estimate, 17 species travelled at least 600 meters, 12 species almost two kilometers. *Oxyethira flavicornis* is typically a dominant hydroptilid in light trap materials collected in the vicinity of lakes in Finland. However, being the second abundant species (19 exx.) in my garden material was somewhat of a surprise as well as the presence of three other hydroptilids. These animals are tiny and one could suspect their ability for such long distance dispersal. Perhaps they use favourable weather conditions. Anyway, recording hydroptilids in such distances from the aquatic habitats is not unique, see e.g. MALICKY'S (1987) paper. The appearance of 3 females of the small and uncommon *Cyrnus fennicus* during one night is some thing that I also did not expect as I have only seen it at the lake shores, where its larvae are confined to.

There are more than 160 species of caddisflies known from the province and I assume that around 100 species have a permanent population within a few kilometer radius around my garden. I guess with long-term light trapping I would eventually catch the majority of those species, except those with obviously poor flying capability (*Chaetopteryx* and *Annitella*), many of the day-active species (GULLEFORS 2016) or those that rarely disperse from their habitat. Despite some distance e.g. to lake habitats, I suppose my garden is not the best place to observe the longest possible distances caddisflies can fly. Mentions of several km distances for the larger taxa occur in the literature, e.g. MALICKY (1987), KOVATS et al. (1996), and WIBERG-LARSEN & HANSEN (1998).

This material is too small to make conclusions on how the weather conditions affected the results, especially because I selected mainly rather similar warm, non-stormy nights. The weather effects have been studied, for example by WARINGER (1991) and NOWINSZKY et al. (2014) who show how the temperature is more significant for the flight than the wind speed. I think both the temperature and wind speed might need to exceed some trigger level before the smallest taxa like hydroptilids can effectively disperse. However, perhaps the wind shouldn't be too strong. My garden's biggest one-night catch of hydroptilids, ten specimens of *O. flavicornis*, was 27th August, when the wind speed was about 4 m/s. The minimum temperature was 12 Celsius degrees, but during the flight hours it was some degrees higher.

One last thing to bring up is the dominance of males among the trapped limnephilids when trapping further away from the larval habitat. This phenomenon discussed e.g. by SVENSSON (1974), MALICKY (1987) and LARSSON (2017) is clearly visible in my material, although in some cases the nearest suitable habitat is not that far. Limnephilids were represented by 66 males and 12 females, while the ratio in the other families was 23 males and 40 females.

Acknowledgements
Peter Wiberg-Larsen (Denmark) and Malin Larsson (Sweden) were a major help with the literature. Malin Larsson gave valuable comments on the manuscript.

References

GULLEFORS, B. 2016. Dag-, kvälls- och nattflygande nattsländor (Trichoptera) i Sverige. [Day, evening and night flying caddisflies (Trichoptera) in Sweden.] – Entomologisk Tidskrift 136(4): 137-146. Uppsala, Sweden 2016. ISSN 0013-886x.

KOVATS, Z. E., CIBOROWSKI, J. J. H., and CORKUM, L. D. 1996. Inland dispersal of adult aquatic insects. Freshwater Biology, 36,265–76.

LARSSON, M. 2017. Night, light and flight - Light attraction in Trichoptera. Master thesis. Linköping university. 39 pp.

MALICKY, H. 1987. Anflugdistanz und Fallenfangbarkeit von Köcherfliegen (Trichoptera) bei Lichtfallen. Acta Biol. Debrecina. 19: 107-129.

MALICKY, H. 2004. Atlas of European Trichoptera, Second Edition. — Springer, Dordrecht, The Netherlands.

NOWINSKY, L., KISS, O. & PUSKÁS, J. 2014. Effect of weather conditions on light-trap catches of Trichoptera in Hungary (Central Europe). Polish Journal of Entomology. Vol. 83: 269-280.

RINNE, A. & WIBERG-LARSEN, P. 2017. Trichoptera Larvae of Finland. A Key to the Caddis Larvae of Finland and Nearby Countries. 151 p.

SalokAnnel, J., and K. MATTILA. 2018. Suomen vesiperhoset. Trichoptera of Finland. Hyönteistarvike Tibiale Oy, Helsinki. 448 p.

SODE, A., & WIBERG-LARSEN, P. 1993. Dispersal of adult Trichoptera at a Danish forest brook. Freshwater Biology 30. 439-446.

SVENSSON, B. W. 1974. Population Movements of Adult Trichoptera at a South Swedish Stream. Oikos, Vol. 25, No. 2 (1974), pp. 157-175.

WARINGER, J. 1991. Phenology and the influence of meteorological parameters on the catching success of light trapping for Trichoptera. Freshwater Biology 25 (2), 307-319.

WIBERG-LARSEN, P. & HANSEN, S. B. 1998. Light trapping of Trichoptera near the coast of NW Zealand, Denmark. Natura Jutlandica. Vol. 23. 6. 69-77.

Continued next page ☛

Address of the author:
Juha Salokannel – Siikinkatu 13, FIN-33710 Tampere, Finland.
Email: juha.salokannel@gmail.com

Species	Records	Distance to nearest suitable habitat
HYDROPTILIDAE		
Agraylea multipunctata Curtis, 1834	1 m.	1,8 km
A. sexmaculata Curtis, 1834	5 m.	1,8 km
Oxyethira flavicornis (Pictet, 1834)	4 m., 15 f.	600 m or 1,8 km
Orthotrichia costalis (Curtis, 1834)	1 f.	1,8 km
PSYCHOMYIIDAE		
Tinodes waeneri (Linnaeus, 1758)	4 m.	600 m
Lype phaeopa (Stephens, 1836)	1 f.	600 m
ECNOMIDAE		
Ecnomus tenellus (Rambur, 1842)	2 m., 2 f.	1,8 km
POLYCENTROPODIDAE		
Neureclipsis bimaculata (Linnaeus, 1758)	1 m., 1 f.	600 m
Plectrocnemia conspersa (Curtis, 1834)	1 m., 1 f.	600 m
Cyrnus trimaculatus (Curtis, 1834)	3 f.	600 m
C. fennicus Klingstedt, 1937	3 f.	1,8 km
HYDROPSYCHIDAE		
Hydropsyche siltalai Döhler, 1963	1 m.	600 m
PHRYGANEIDAE		
Agrypnia varia (Fabricius, 1793)	1 f.	1,8 km
LEPIDOSTOMATIDAE		
Lepidostoma hirtum (Fabricius, 1775)	1 f.	600 m
LIMNEPHILIDAE		
Potamophylax rotundipennis (Brauer, 1857)	1 m.	600 m
Halesus digitatus (Schrank, 1781)	2 m.	600 m
Stenophylax permistus McLachlan, 1895	1 f.	100-200 m
Micropterna sequax McLachlan, 1875	1 m.	600 m
Glyphotaelius pellucidus (Retzius, 1783)	6 m., 1 f.	100-200 m
Limnephilus auricula Curtis, 1834	1 m.	500 m
L. borealis (Zetterstedt, 1840)	1 m.	1,8 km
L. centralis Curtis, 1834	2 m.	600 m
L. extricatus McLachlan, 1865	1 m.	100-200 m
L. flavicornis (Fabricius, 1787)	7 m., 1 f.	500 m
L. germanus McLachlan, 1875	2 m.	600 m
L. griseus (Linnaeus, 1758)	10 m.	100-200 m
L. ignavus McLachlan, 1865	5 m.	600 m
L. rhombicus (Linnaeus, 1758)	6 m., 2 f.	500 m
L. sparsus Curtis, 1834	18 m., 6 f.	100-200 m
L. sericeus Say, 1834	1 m., 1 f.	100-200 m
L. subcentralis Brauer, 1857	2 m.	1,8 km
LEPTOCERIDAE		
Ceraclea fulva (Rambur, 1842)	1 f.	1,8 km
C. dissimilis (Stephens, 1836)	1 m.	600 m
Athripsodes cinereus (Curtis, 1834)	1 f.	600 m
Mystacides longicornis (Linnaeus, 1758)	2 m.	600 m
Triaenodes unanimis McLachlan, 1877	1 f.	1,8 km
Oecetis lacustris (Pictet, 1834)	4 f.	1,8 km
Leptocerus tineiformis Curtis, 1834	1 m., 4 f.	1,8 km