
SHORT NOTES

Larval habitat characteristics along the Scheldt estuarium of *Bradysia ocellaris* (COMSTOCK), a Black Fungus Gnat (Diptera: Sciaridae) of economic importance

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Species of the family Sciaridae (Diptera: Sciaroidea) are found worldwide and more than 1,700 species have been described so far (7). From Europe 649 species have been identified to date (5) of which 35 are recorded in Belgium (6). These flies have largely been neglected because of their small size (1–7 mm), their hidden lifestyle and the difficulties involved with their identification. Sciarid larvae live in decaying organic matter in the soil, under bark of decaying trees and on fungal fruiting bodies (1). The larvae of some species, however, can also be found in leaves and stems of plants (3). Some species of Sciaridae are common pests in greenhouses (2).

In spring 2009 large numbers of larvae of *Bradysia ocellaris* (COMSTOCK, 1882) were found in mud samples (first 5 cm) from the tidal zone along the river Scheldt near Gentbrugge. This species had not been previously recorded in Belgium (4). Probably the larvae feed on fungi and rotting plant material that are present in the tidal mud.

In Europe, *B. ocellaris* can be a common and serious economic pest of glasshouse crops,

and is sometimes found in association with the cultivation of the mushroom *Agaricus bisporus* LANGE (IMBACH) (Agaricaceae) (8). Mass occurrences of larvae are not uncommon and can cause extensive damage in forestry and agriculture (8), leading to significant losses in crop production (7). In the neighbourhood of Gentbrugge near the river Scheldt no large greenhouses can be found, but several companies have storage rooms for food articles, and also private gardens with small greenhouses are present in this area. In order to understand how and when *B. ocellaris* specimens could become a pest in areas surrounding the river Scheldt, experiments were carried out to determine some ecological characteristics and larval survival of this species under changing water levels in the tidal zone of the river.

On 15 March 2009 15 mud samples (1000 ml) were taken into the laboratory. Each sample was divided into five subsamples (200 ml). Four of these subsamples were given different treatments for 46 days (subsample A: 6 days submerged under 10 cm water from the Scheldt and afterwards kept humid; subsample B: let dry out; subsample C: kept humid with water from the Scheldt and subsample D: 15 days submerged under 10 cm water from the Scheldt and afterwards kept humid. All the subsamples

with different treatments were kept in emergence traps (14 cm high and diameter of 9 cm). All traps were exposed to the same temperature (26 °C), light regime (8 h dark and 16 h light) and humidity. The fifth subsample was used to determine relative moisture and relative organic matter content.

Subsamples for analysis of organic matter were dried at 105 °C for 24 h. Afterwards they were weighed, placed in the oven at 430 °C for 24 h and reweighed. The difference between the weights corresponded to the total organic matter, which was expressed as a percentage. Subsamples for analysis of relative moisture were weighed to determine their moist weight, dried and then reweighed to determine the soil moisture content. The weight difference was expressed as a percentage of the original weight.

The preparation and identification of all emerged male sciarid specimens was conducted by Frank Menzel. Sciarid specimens were prepared as permanent mounts for microscopic examination using Canada balsam as mountant. They were deposited in the collections of Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany (76 ♂♂) and Royal Belgian Institute of Natural Sciences, Brussels, Belgium (37 ♂♂). Identification of female sciarid specimens to species level is not possible based on morphological characteristics alone. However as all males belonged to one species we assumed all females to be *B. ocellaris* too. The first *B. ocellaris* were observed after 11 days (26-03-2009) and 625 individuals of *B. ocellaris* emerged from the treatments in total (Table 1).

The organic matter content of the samples from which *B. ocellaris* emerged varied between 9 and 22 %. The range for the percentage of relative moisture was 45 to 62.5 %.

There was a significant difference between the different treatments ($F_{3,56} = 22.51$, $p = < 0.001$). No correlation was found between the relative moisture content of the original sample and the number of *B. ocellaris* emerging for any of the treatments, suggesting no preference for a certain humidity of the mud samples. We did find a significant positive correlation between the organic matter content of the samples and the number of adult *B. ocellaris* in treatment C (kept humid) ($p = 0,0423$) (Fig. 1).

A lot of moist decaying organic matter suitable as food for the larvae is present at the Sea Scheldt arm in Gentbrugge favouring the presence of high abundances of *B. ocellaris*.

Bradysia ocellaris is regarded as an introduced species (2) and is mainly found in greenhouses (8) where they are mostly introduced with contaminated soil (2). Here it seems, that the species has developed a temporary mass occurrence under favourable conditions in the estuary ecosystem at the Sea Scheldt arm in Gentbrugge. The migration of these flies from small greenhouses of public gardens in the vicinity of Gentbrugge to the tidal zone of the river Scheldt near Gentbrugge is a possibility. However it still remains the question if such a mass occurrence might serve as a source for nearby *B. ocellaris*-free greenhouses in the neighbourhood. We therefore suggest a detailed monitoring of potential new habitats in the neighbourhood.

TABLE 1

Number of emerged *B. ocellaris* for each treatment.

Treatment	Mean <i>B. ocellaris</i> /subsample	Total <i>B. ocellaris</i> /treatment
A (submerged for 6 days)	16,2	243
B (let dry out)	1,1	17
C (kept humid)	24,3	365
D (submerged for 15 days)	0	0
Total		625

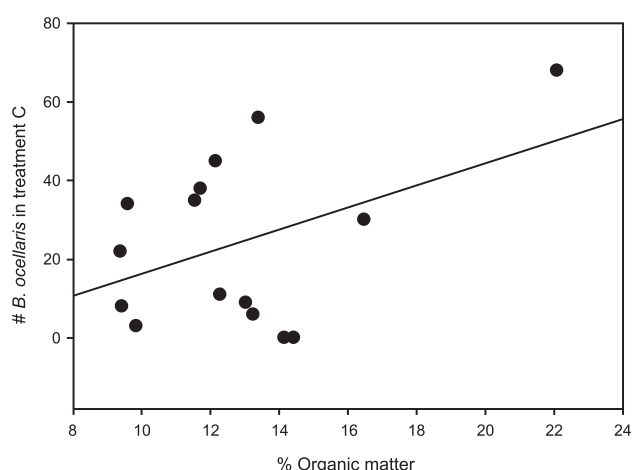


Fig. 1. – Organic matter (%) in relation to the number of *B. ocellaris* (ordinate) in treatment C (samples that were kept humid)

Sciaridae are terrestrial organisms, which prefer semi humid conditions, so the presence of *B. ocellaris* in a tidal habitat is remarkable. In our experiments, we found that when the larval habitat was submerged for 15 days, no larvae survived. Submerging the larval habitat for 15 days could, therefore, be an efficient way to prevent the emergence of adult *B. ocellaris* and their slater colonisation of urban regions near the Scheldt. Submerging the area for even a shorter period could reduce the number of adult *B. ocellaris*. We therefore suggest such a management action if problems with Black Fungus gnats appear in the urban surrounds of the Scheldt.

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