

## Note on the distribution of *Dixella autumnalis* (Meigen) in the south-west Netherlands (Diptera: Dixidae)

by

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**ABSTRACT.** — A survey of the distribution of larvae of *Dixella autumnalis* (Meigen) in the south-west Netherlands is reported. Some chemical, physical and biological parameters are presented. The species appears to prefer small, unpolluted or slightly polluted waters, with a dense (sub)emergent vegetation. The larvae showed a tolerance for chlorinities up to 3.4‰.

### INTRODUCTION

Data about the distribution of Dixidae in the Netherlands are scarce. One of the reasons is that the species of this family are difficult to identify. The publication of the key by Disney (1975) remedied this problem.

In the second half of the 1970s much work was done on the occurrence of macrofauna in brackish inland waters in the south-western part of the Netherlands. This area is characterized by a large number of aquatic biotopes such as creeks, so-called „inlagen” (shallow impoundments behind the seadikes caused by the historical removal of soil for the construction of the dike), ditches, ponds and pools. These biotopes differ in physical dimensions and in chlorinity, ranging from fresh to euhaline. Also the structure and the density of the higher vegetation differ.

It is interesting to note that in this part of the country only *Dixella autumnalis* was found, while elsewhere in the Netherlands other species of Dixidae occur as well.



Fig. 1. Localities where *Dixella autumnalis* (Meigen) was found in the south-western part of the Netherlands. For explanation of the numbers see Table 1.

\* Communication nr. 220

Locality	Type	Sampling date	Depth (m)	Cl <sup>-</sup> ‰	pH	Isolation	Vegetation
1. Vlietepolder	Little marsh	12.IX.78	1.50	0.21	7.65	+	Sphagnum spp. Phragmites australis
2. Valweel	Creek	23. X.78	1.25	1.60	8.3	-	Ceratophyllum submersum Phragmites australis
3. Poelbos nr. 6	Cattle drinking pool out of use	1.VIII.78	1.25	0.25	--	+	Ceratophyllum submersum Scirpus maritimus
4. Poelbos nr. 11	Cattle drinking pool out of use	12. X.79	< 1.00	0.11	--	+	Ceratophyllum submersum Scirpus maritimus
5. Poelbos nr. 24	Cattle drinking pool out of use	1.IV.80	< 1.00	0.34	--	+	Phragmites australis
6. Poelbos nr. 27	Cattle drinking pool out of use	8. X.78	1.00	2.30	--	+	Phragmites australis Scirpus maritimus
7. Poelbos nr. 29	Cattle drinking pool out of use	8.IX.79	0.75	0.32	--	+	Phragmites australis
8. Poelbos nr. 16	Pond	20.IX.80	1.00	0.33	--	+	Ceratophyllum submersum Myriophyllum spicatum Phragmites australis Scirpus maritimus
9. Brilljetjesweel	Large pool	11. X.78	2.00	0.04	8.2	+	Phragmites australis
10. Olzendepolder	Small ditch	5.VIII.77	0.30	1.06	8.7	-	Dense vegetation
11. Hedgerow-reserve Nisse	Cattle drinking pool	28.IX.76	0.80	0.07	--	+	Poor vegetation
12. Canisvliet	Creek	21.IV.78	1.00	1.00	--	-	Phragmites australis
13. Noordhofpolder	Ditch	1.VII.77	0.90	3.4	8.4	-	Polluted ditch; poor vegetation
14. Moerschans	Ditch	10.III.78	0.40	0.01	8.4	+	Phragmites australis
15. Schuddenbeurs	Ditch	24.II.77	0.25	0.18	8.0	-	Poor vegetation
16. Plompotoren	Cattle drinking pool out of use	20.IX.78	1.00	0.02	--	+	Dense vegetation, (sub- and emergent)

Table 1. Some physical, chemical and biological data from *Dixella autumnalis* localities.

RESULTS

*D. autumnalis* larvae (sampled with a shovelnets, mesh size 0.6 mm) were found at 16 localities in the Delta region (fig. 1). Abiotic and biotic factors are summarized in table 1. The species was found in various biotopes like ditches, small and larger ponds, cattle drinking pools, swamps and creeks. All localities had a clayish bottom. The locality Poelbos (nrs. 3, 4, 5, 6, 7, 8) consists of a newly planted forest in which old cattle drinking pools have been maintained. Before plantation the area was made up of grassland surrounded by brackish ditches. Drinking pools had been dug to provide the cattle with fresh rainwater.

The depth of most waters studied was less than 1.50 m. The chlorinity ranged between 0.01 and 3.4‰. At most of the localities (70%) the chlorinity was less than 0.5‰.

Generally the species was recorded in pools with a dense vegetation of (sub)emergent plants. The most abundant species were *Ceratophyllum submersum* L., *Myriophyllum spicatum* L., *Ranunculus aquatilis* L., *Phragmites australis* (Cav.) Trin. ex. Steud. and *Scirpus maritimus* L. At some localities the plants were not identified. In all cases only total vegetation density was assessed.

The following macrofauna-species commonly occurred in localities where *D. autumnalis* was found: *Plea leachi* MacGregor et Kirkaldy, *Corixa punctata* (Illiger), *Notonecta viridis* Delcourt, *Sigara striata* (Linnaeus) (Heteroptera); *Laccophilus minutus* (Linnaeus), *Hygrotus inaequalis* (Fabricius), *Agabus bipustulatus* (Linnaeus) (Coleoptera); *Pentapedilum uncinatum* Goetghebuer, *Cricotopus sylvestris* (Fabricius), *Acricotopus lucens* (Zetterstedt) (Chironomidae); *Ischnura elegans* van der Linden (Odonata); *Cloeon dipterum* (Linnaeus) (Ephemeroptera) and *Asellus aquaticus* (Linnaeus) (Crustacea). In more brackish localities the crustaceans *Palaemonetes varians* (Leach) and *Gammarus duebeni* Lilljeborg were also common.

DISCUSSION

Disney (1975) mentions swamps of rushes, reed, grass or sedges along lake shores, ponds, canals, ditches, river margins, dune slacks and fen swamps as larval habitats. Nicholson (1977) reports the occurrence of larvae of *D. autumnalis* in an old gravel pit with an emergent vegetation of reed grasses, *Carex* spp. and *Iris pseudacorus* L. and a subemergent vegetation of *Elo-dea* spp. The localities where *D. autumnalis* was found in the south-west Netherlands show similar features. All locations, with the exception of the numbers 11, 13 and 15, had a dense vegetation. The ditch in the Noordhofpolder (nr. 13) was cleared before the sampling programme.



Eleven of the sixteen localities where *D. autumnalis* was found are isolated watersystems. A very small part of the great number of sampled, not isolated waters, such as ditches, were populated with *D. autumnalis*. In general the ditches in this part of the country are eutrophic, owing to leaching of nutrients from arable land and to local sewage input. In the isolated cattle drinking pools only a few Dixellas were found.

The larvae prefer waters with a chlorinity below 0.5‰ Cl<sup>-</sup>. Eleven of the sixteen sampling stations with *Dixella autumnalis* larvae had a chlorinity below this value. The larvae are able to tolerate slightly brackish waters (oligohaliticum), as shown by the chloride concentration of 3.4‰ in the ditch at station nr. 13. However, considerable seasonal fluctuations in chemical parameters occur in brackish ditches as a result of rainfall, evaporation and seepage (Parma & Krebs, 1977). In 1977 the median chlorinity of this station was 2.1‰ (0.51-3.4; n = 18). It is therefore not surprising that accompanying macrofauna consisted of brackish species (*Palaeomonetes varians* and *Gammarus duebeni*) and typical freshwater species like *Plea leachi* and *Nepa rubra* Linnaeus.

The accompanying macrofauna described by Nicholson (1977) (*Asellus* spp., *Ischnura elegans*, *Cloeon dipterum*, *Caenis moesta* Bengtsson, *C. robusta* Eaton, Coleoptera and Hemiptera) is comparable with that of the Dutch locations. A differentiation between the sampled pools could be made on the basis of direct organic load (cattle dung). Some of the species found in the Dutch pools are characteristic for unpolluted or slightly polluted habitats (*Plea leachi*, *Cloeon dipterum* and *Pentapedilum uncinatum*); the other species are common, also in more polluted pools.

The observations show that *Dixella autumnalis* occurs in clean or slightly polluted water with a clay bottom and a dense (sub)emergent vegetation. The larvae can tolerate chlorinities up to 3.4‰. The larvae may be useful for the biological assessment of the water quality.

#### ACKNOWLEDGEMENTS

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#### PERSONALIA

Op 12 december jl. is, op de leeftijd van bijna 87 jaar, ons lid F. J. Kuiper overleden. Sinds 1943 was hij gewoon lid van onze vereniging. Zijn belangstelling gold speciaal fysiologie van insecten en toegepaste entomologie.

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