

A study about the Arthropoda caught by *Drosera* species

by

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Abstract

During the month of June, 1972 I had the opportunity to make a short study of the interrelations of *Drosera intermedia*, *D. rotundifolia* and *D. anglica*, possible differences in the composition of the insects caught by these species, etc., in Drenthe: a province in the east of the Netherlands.

In the following part I shall summarize the results of the most interesting part of the study, viz., what Arthropods are caught by the *Drosera* spp. and whether there is any correlation between them and the habitats of the *Drosera* species.

Results

The habitats of the three species of *Drosera* which occur in the Netherlands, were investigated. *Drosera anglica* is rare and was only found in two places. A correlation between *D. anglica* and one of the other species is therefore of but little value. There appeared to be a strong negative correlation between the two other species, *D. intermedia* and *D. rotundifolia* ($r = -0.9$).

These two sundew-species are found in two quite different habitats, viz., around fens and in wet heaths. Around fens *D. intermedia* was found in the initial stages of the succession, especially with *Sphagnum crassifolium* and *S. cuspidatum*. Sometimes it grows under water, resulting in a narrow-leaved, erect, green plant or "moon-dew". This initial stage of the succession has the aspect of a more open vegetation than the drier (later) stages in which *D. rotundifolia* occurs in combination with *Sphagnum magellanicum* and *S. apiculatum*, frequently together with *Gymnocolea inflata* and *Erica tetralix*. These latter stages with *D. rotundifolia* (and where it occurs also *D. anglica*) are characterized by a more closed vegetation of Phanerogames or by a fast growing *Sphagnum* (e.g. *S. apiculatum*). Probably *D. rotundifolia* can compete better for light than *D. intermedia* because the broader leaves are placed, if possible, horizontally like a rosette, when they are full-grown. The leaves of a full-grown *D. intermedia* are narrower and more or less erect, especially the apical half of the leaves.

In wet heaths we find the same situation, except that there is not such a clear succession as in fens. But there are also more open vegetations, especially in the Lycopodio Rhynchosporietum albae, and more closed vegetations, especially in the Ericion tetralicis. There is also an artificial initial stage, viz., after de-foresting which is indeed followed by a vegetation with *D. intermedia*!

When the fore-going hypothesis is right, *D. rotundifolia* may occur in the more open habitat together with *D. intermedia*, but the reverse should not occur. This was indeed observed: never a flourishing *D. intermedia* was found in the habitat of *D. rotundifolia*, but the reverse was not uncommon.

An interesting question remains: would there be any difference in the kind of Arthropods caught by these two species? And if so, would there be a clear correlation with the habitat of the *Drosera* species?

In order to study this aspect of *Drosera*, the catches of Arthropods by *D. intermedia*, *D. rotundifolia* and *D. anglica* were collected. The latter species, growing together with *D. rotundifolia*, forms hybrids (*D. × obovata*), as could be found in both localities where *D. anglica* occurred. *D. anglica* is a stout species with long erect leaves which are moderately broad and have a quite different position.

The results of the identifications of the catches are given in Table 1. This table gives the following information:

Table 1. Composition of the catches of the *Drosera* spp.

Groups of Arthropods	<i>intermedia</i>				<i>rotundifolia</i>				<i>anglica</i>			
	Total		Partly digested		Total		Partly digested		Total		Partly digested	
	no	%	no	%	no	%	no	%	no	%	no	%
DIPTERA	412	93.5	332	83	137	57.0	89	65	49	66.2	41	83
a) Nematocera	403		330		116		83		39		37	
b) Brachycera	9		2		21		6		10		4	
COLEOPTERA	4	0.9	2	50	38	15.8	16	42	16	21.6	5	32
HYMENOPTERA	9	2.0	3	33	23	9.6	8	32	2	2.7	—	—
a) Formicoidea	1		—		6		3		—		—	
b) Chalcidoidea	5		2		8		3		—		—	
c) Proctotrupoidea	2		1		4		—		—		—	
d) Braconidae	1 ⁶⁾		—		2 ⁷⁾		1		2 ⁸⁾		—	
e) Ichneumonidae	—		—		2		—		—		—	
f) Cynipidae	—		—		1		1		—		—	
HOMOPTERA	3	0.7	—	—	18	7.5	2	11	4	5.4	—	—
a) Cicadomorpha	1		—		4		—		—		—	
b) Aphididae	2 ¹⁾		—		8		2		1		—	
HETEROPTERA	1 ²⁾	0.2	—	—	4 ³⁾	1.7	—	—	1	1.4	—	—
TRICHOPTERA	1 ⁴⁾	0.2	—	—	—	—	—	—	—	—	—	—
ODONATA	—	—	—	—	3 ⁵⁾	1.3	—	—	—	—	—	—
ORTHOPTERA	1	0.2	—	—	1	0.4	—	—	—	—	—	—
THYSANOPTERA	—	—	—	—	4	1.7	1	25	—	—	—	—
COLLEMBOLA	7	1.6	—	—	1	0.4	—	—	—	—	—	—
ARACHNIDA	2	0.5	1	50	7	2.9	2	29	2	2.7	—	—
ACARINA (Oribatei)	1	0.2	—	—	4	1.7	—	—	—	—	—	—
TOTAL	441	100.0	338	77	240	100.0	118	50	74	100.0	46	62

1) Wingless

2) Macropterous form of *Hebrus ruficeps*

3) Two brachypterous forms of *Hebrus ruficeps*

4) Hydropsychidae

5) ♂♂ of *Enallagma cyathigerum*

6) ♀ of *Blacus* sp.

7) ♂ of *Dacnusa* sp. and ♂ of *Opius* sp.

8) ♂ of *Apanteles* sp. and ♂ of *Dacnusa* sp.

1) *Drosera intermedia* caught significantly more Diptera-Nematocera than the two other species. This can be correlated with the wetter habitat of *D. intermedia*, which is closer to the place where midges emerge and stay for a while. Beetles, aphids and arachnids were caught in lesser quantities.

2) The catches of *D. rotundifolia* and *D. anglica* are similar, especially the catches of Diptera, Coleoptera, Homoptera and Arachnida. This leads to the following conclusions. The catches of a *Drosera* species depend primarily on two factors:

a) the species of Arthropods (whithin a certain size) that occur in its habitat and, of course, b) the abundances and activities of these species. The position of the leaves must be of secondary importance, it is highly variable too, depending on their surroundings and age.

3) As far as the small numbers of other Arthropods permit any conclusion the Diptera seem to be faster digested than the specimens of the other groups. But this is not surprising as most of them are Nematocera, and the exoskeleton of these insects is relatively thin.

Table 2. Catches in a more open habitat of *D. intermedia*, in which *D. rotundifolia* penetrates.

Drosera species	<i>intermedia</i>				<i>rotundifolia</i>			
	Total		Partly digested		Total		Partly digested	
	no	%	no	%	no	%	no	%
DIPTERA	222	94.1	189	86	73	71.5	66	90
a) Nematocera	219		188		68		64	
b) Brachycera	3		1		5		2	
HYMENOPTERA	7	3.0	2	29	17	16.6	3	18
a) Formicoidea	-		-		1 ¹⁾			
b) Chalcidoidea	7		2		16		3	
HOMOPTERA	2	0.9	-	-	5	4.9	-	-
a) Cicadomorpha	1		-		3		-	
b) Aphididae	-		-		1		-	
c) Aleurodidae	1		-		1		-	
COLEOPTERA	-	-	-	-	1 ²⁾	1.0	-	-
THYSANOPTERA	1	0.4	-	-	1	1.0	-	-
ORTHOPTERA	1	0.4	-	-	-	-	-	-
COLLEMBOLA	-	-	-	-	2	2.0	1	50
ARACHNIDA	1	0.4	-	-	1	1.0	-	-
ACARINA (Oribatei)	1	0.4	-	-	2	2.0	-	-
larva of LEPIDOPTERA	1	0.4	-	-	-	-	-	-
TOTAL	236	100.0	191	81	102	100.0	70	69

1) *Myrmeca sabuleti* Meinert

2) Curculionidae

In Table 2 the results are given of the identifications of the catches of the two *Drosera* species. They grow in a more open vegetation, in which *D. rotundifolia* partly penetrated and partly remained in the surrounding higher vegetation. The

catches were collected during half an hour in this place. The penetration of an important part of the *rotundifolia*-plants in the habitat of *intermedia* alters the composition of the catches of the former slightly in the direction of the latter. More Diptera (in which the midges exceed the flies), at the same time scarcer catches of Coleoptera, Homoptera, and Heteroptera. The large number of parasitic Hymenoptera caught by *D. rotundifolia* may be caused by the intensive search-behaviour of these animals in combination with the larger, more horizontal leaves of *D. rotundifolia*.

Table 3. Number of the Arthropods above 5mm length

Size of the Arthropods <i>Drosera</i> species	5-20 mm		> 20mm	
	number	% of total	number	% of total
<i>intermedia</i>	5	1.1	-	-
<i>rotundifolia</i>	6	2.5	3	1.3
<i>anglica</i>	2	2.7	-	-

The catches above the length of 5 mm are shown in Table 3. These catches are of *D. intermedia* only midges, of *D. rotundifolia* two arachnids, one fly, one midge, one grasshopper (!) and one staphylinid. Of *D. anglica* one midge and one bug. Above 20 mm are three damselflies. This gives a little support to the hypothesis that the habitat is the primary factor in the catching of certain kinds of Arthropods by these most interesting plants.

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