The food-web of the *Cladophora*-belt fauna

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KURZFASSUNG: **Die Nahrungskette der Fauna der *Cladophora*-Zone.** In der Ostsee bildet die Grünalge *Cladophora glomerata* große, gürtelförmige Bestände in Ufernähe. Diese Bestände und ihre Fauna sind für die ökologischen Verhältnisse in der Ostsee von großer Bedeutung. Es wurde daher das Artengefüge dieser Fauna analysiert und Trockengewichtsbestimmungen an *C. glomerata* durchgeführt. Die Produktivität dieser Alge beträgt 3105 m Algenfilamente pro Quadratdezimeter pro Monat (mittleres Trockengewicht eines 1000 mm langen Algenfilamentes: 0,25 mg). Pro Quadratdezimeter Felsenoberfläche ergeben sich folgende Werte für die Hauptorganismengruppen: Trockengewicht für *Cladophora:* 0,78 g, für Diatomeen: 1,25 g; Anzahl Tiere: 12 544 Individuen. In Laboratoriumsexperimenten konnte nachgewiesen werden, daß epiphytische Diatomeen der *Cladophora* für die ersten postmarsupialen Stadien des Isopoden *Idotea baltica* lebensnotwendig und für den Gastropoden *Hydrobia ulvae* sowie für Chironomidenlarven zur Erzielung maximaler Wachstumsraten erforderlich sind. Der tägliche Konsum an *Cladophora*-Filamenten wurde für junge *Idotea baltica* und *Gammarus oceanicus* an Hand der ausgeschiedenen Faeces ermittelt. Die Nahrungskette innerhalb der Fauna der *Cladophora*-Zone wird an Hand von Beispielen illustriert.

INTRODUCTION

The ecology of animals inhabiting seaweed communities is a rather virgin field. In the Baltic Sea, pertinent studies have thus far been concentrating on the fauna of areas occupied by *Fucus vesiculosus*. Such areas have proven to be unusually rich in regard to the number of animals species, if one takes the overall reduction in species numbers into consideration which is typical for brackish waters. Quantitative studies on the *Fucus* fauna have been carried out by SEGERSTRÅLE (1928, 1944), OHM (1964) and, in Öresund, by DAHL (1948) and HAGERMAN (1966).

The littoral belts of green algae developing chiefly during summer is botanically well known from the thorough investigations made by LEVRING (1940) and WAERN (1952). There are, however, only very few papers published on the associated microfauna. An example is the work by OTTO (1936) on the *Enteromorpha*-zone. This zone and especially the belt of *Cladophora glomerata* are important parts of the phytal and exert great influence upon the fauna of the Baltic Sea as a whole. In the first place, the dense vegetation of the filamentous algae *Cladophora glomerata* provides suitable niches and nourishment for the young stages of some of the most important invertebrate animals of the Baltic. Secondly, the fauna in the deeper layer of the sea is occasionally directly influenced by the photosynthetic littoral zone. During storms, tufts of *Cladophora,* heavily covered with epiphytes, are easily torn away and transported over great distances. When this green plant material finally sinks to the sea bottom, it constitutes highly valuable food material.

QUANTITATIVE METHODS

During the investigations of the *Cladophora*-belt on the rocky coast around the Askö Laboratory, I have taken quantitative samples regularly to study the animal colonization of the growing algae and the changes in the composition of animal species during the season. The animals collected in each sample were carefully washed out and the dry weight of the algae was determined. The dry weight of most samples was between 10 and 20 mg. During each collection the distribution of epiphytic diatom genera was registered and the number of specimens per running mm *Cladophora*-fila-

Table 1

The epiphytes on a 24 mm long filament of *Cladophora.* The number of specimens has been counted for each mm from the base (section 1) to the apex (section 24) of the filament. (a) *Synedra,* (b) *Epithemia* (larger species), (c) *Epithemia* (smaller species), (d) *Licmophora,* (e) *Cocconeis,* (f) *Rhoicosphenia,* (g) *Navicula*

Section (mm)	Bacteria	Cyanophycea	Diatoms size in μ							Total
			a ca. 100	b 80–70	c 25	d 30	e 30	f 20	g 15	
1	+	+			144			1		145
2	+	+	2	1	89	2	3	126	26	249
3	+	+		4	37	1	6	190	32	270
4	+	+	1	1	8		2	223	16	251
5	+				3	2	2	201	21	229
6	+				4	3	1	260	8	276
7	+						1	121	3	125
8	+					1	2	50	1	54
9			2				1	15	3	21
10						1	1	8	1	11
11			3			3	1	7	1	15
12							1	1		2
13			1			3	2	5	3	14
14									2	2
15							1	2		3
16			1				2			3
17						1	2			3
18			1						1	2
19										
20						1		1		2
21										
22										
23						2				2
24									2	2
Total			11	6	285	20	28	1211	120	1681

ment was counted under a microscope. Table 1 gives an example of the number of epiphytes occurring on a 24 mm long filament. In this way seasonal variations in the diatom flora have been established. In principle, the results obtained can be regarded representative for the *Cladophora*-belt of great parts of the Baltic Sea.

ANALYSIS OF ALGAL DRY WEIGHT

Epiphytes often occur in great masses, and consequently greatly affect the dry weight of the *Cladophora* samples. The dry weight of diatoms has been calculated. Filaments of *Cladophora glomerata* practically free of epiphytes were measured under the microscope; their average dry weight was 0.25 mg per 1000 mm of filament. This value is only valid if the filaments have a diameter of 30 to 85 μ, which is characteristic for this species in the investigated locality.

By measuring comparable material with a rich diatom growth the total dry weight of the epiphytes was obtained (Table 1). In order to obtain a general value for the weight of different kinds and sizes of diatoms a key for transformation into "diatom-units" (Table 2) was devised. The approximate weight of each diatom-unit has been

Table 2

Key for transforming the different types of diatoms which occur on the green alga *Cladophora glomerata* into "diatom-units"

Genus	Size in μ	"Diatom-unit"
Roicosphenia	15–20	1
Licmophora	25–35	2
Navicula	15	1
Tabellaria	15–20	1
Synedra	ca. 100	5
Cocconeis	30–35	2
Epithemia	20–30	1,5
Epithemia	70–80	4

calculated to be 48×10^{-7} mg. If the density of diatoms is more than 52 diatom-units per mm of filament, which is often the case, the weight of the epiphytes exceeds that of the *Cladophora* itself.

THE TOTAL SURFACE OF ALGAE

A more interesting value than the length of algal filaments is, of course, the total surface available for the animals. Estimations of the species specific total surface have been considered rather impossible to make, especially for tuft-like algae (DAHL 1948, pp. 44–45). WIESER (1951), however, described a method by which samples of different algae can be compared. An "adsorption-coefficient" of each species was determined and considered to be equivalent to the total surface. It is interesting to note that the greatest relative surface was established for a species of *Cladophora*.

In comparing small samples of a single filamentous species I find it more sufficient to determine the dry weight (from which the total length of the filaments can be calculated) and to use an approximate value for the filamental diameter in order to obtain the total surface. The principle part of *Cladophora* cells has a diameter of 50 μ; this value is in agreement with diagrams of cell-sizes (presented by Söderström 1963, pp. 44–45), characteristic for *Cladophora glomerata*. For my practical purposes, I calculated the dry weight of a tuft of *Cladophora glomerata*, having a total surface of 1 dm^2, as 15.9 mg.

THE PRODUCTION IN THE *CLADOPHORA*-BELT

The production in the sea is an extensive subject of which we will not get a complete picture until the mosaic of works on single parts of it are put together. In regard to the production in brackish waters, summer-annual filiform algae are of great importance. During the vegetation period they grow rapidly, imparting considerable quantities of organic nutrients. In the northern part of the Baltic Sea proper the perennial belt of *Cladophora glomerata*, growing in about 0.5 m depth, reproduces during the middle of July and thus gives rise to a new belt, often situated close to the midwaterline. In 1966, zoospores were seen on the 12th of July; on the 20th of July the first new plants were observed on the rock. On the 27th of July, the filaments were about 2 to 3 cm long, and on the 16th of August, when the growth had continued for a month, the algae were about one dm long, and a very dense summer-belt had developed in depths of 1 to 8 cm. This rapid growth rate conforms with that observed by Mason (1965) for *C. glomerata* in farm ponds.

Table 3

Components making up the biomass per dm^2 rock surface area in the *Cladophora* belt. (Askö, August 16, 1966)

Biomass-components/dm^2 rock surface	
Cladophora (length)	3105 m
Cladophora (surface area)	50 dm^2
Cladophora (dry weight)	0,78 g
"Diatom-units"	242×10^6
Diatoms (dry weight)	1,15 g
Macro-animals (number of individuals)	44
Micro-animals (number of individuals)	12500

In a one month old *Cladophora*-belt, the total dry weight of algae and animals per square unit of rock surface was estimated. All components of the biomass are shown in Table 3. The sampling method was essentially the same as the one used by Chapman (1955) in the coralline alga zone. A frame enclosing 1 dm^2 was placed on the rock and all algae vegetation inside it was carefully scraped off and bottled in filtered seawater. Two parallel samples were taken; they proved to be quite similar in every detail. The animals were sorted out and the algae washed in distilled water, then dried at 100° C to weight constancy, which was obtained at about 2 g. The diatom flora of the samples was analysed; it had the composition shown in Table 1. The density of diatom-units was calculated to be 78 per mm of the *Cladophora*-filament. From the known correlation between algal dry weight and length we get a total sum of 3105 m *Cladophora*-filaments. Summer alga production in the upper belt of *Cladophora glomerata* in the Baltic Sea is consequently about 3 km alga filaments per dm² per month. Other brackish waters of the world where seaweed production has been measured are, for example, the southern seas of the U.S.S.R. According to MOROSOVA-VODYANITZKAYA (1941) the annual productivity in a *Cladophora* spp.-vegetation is 275.1 g per m² in the Black Sea, which is about the same as in the Baltic Sea.

The mean value of the number of macroscopic animals found was 44. The microfauna of the belt was unusually poor; it was calculated to 12 500 specimens per dm² of the rock and consisted to 95 % of rotifers. This figure does not include all protozoans; only ciliates larger than 100 μ have been counted.

Recalculated for m² rock surfaces, our results become comparable with earlier studies on animal density in seaweed communities. COLMAN (1940) found in Wembury Bay, England, values of 274 320 individuals per m² in a community of *Lichina pygmaea*, and 202 735 per m² in *Ascophyllum nodosum* with epiphytic *Polysiphonia lanosa*. From the Mediterranean WIESER (1959) reports that the highest density with about 4 million per m² is reached in a *Halopteris scoparia* community; in the *Cladophora-Enteromorpha* zone of the same area the density is 900 000 m². CHAPMAN (1955) in the Azores littoral has found 376 800 per m² in the *Corallina granifera* zone. The result obtained in the *Cladophora*-belt in the Baltic, 1 254 400 per m², must be considered surprisingly high, considering the fact that this is a brackish area, but the number of species is small; the rotifer *Proales reinhardti* EHRENBERG provides the majority of individuals.

Comparable values from other seaweed communities in the Baltic Sea are not easy to find. The microfauna in the vegetation of *Fucus vesiculosus* has been dealt with by OHM (1964). A sample taken in July contained about 15 000 individuals per 500 g algae (wet weight). Nematodes represented the dominating group. According to SEGERSTRÅLE (1944) the mean value of *Fucus* per m² in 0.5 to 1 m depth is 9.5 kg in the Tvärminne area. If this value is used together with OHM's material for calculating animal numbers in the *Fucus* vegetation of the Bay of Kiel, a density of some 310 000 individuals per m² is obtained. This rather low value can, to some extent, be explained by OHM's semi-quantitative sampling method. Considerably higher density values are reported by HAGERMAN (1966) from northern Öresund in a *Fucus serratus* community. This investigation is also one of the very few concerned with animal density per algal surface. *Fucus serratus* may harbour up to 46 000 non-sessile animals per m² algal surface. The value cannot, however, be directly compared with mine (25 000 animals per m² *Cladophora* surface) since the surface of the *Fucus* epiphytes in which most of the animals live has not been taken into consideration.

TYPES OF FEEDERS IN THE FAUNA OF THE *CLADOPHORA*-BELT

Herbivores

The fauna of the *Cladophora*-belt is to a large extent herbivorous. In Figure 1 some herbivores are shown in their habitats. Some animals eat the filaments of green alga, others feed on the diatoms. On the basis of this information, I considered it interesting to know how much food was required by different species. The following

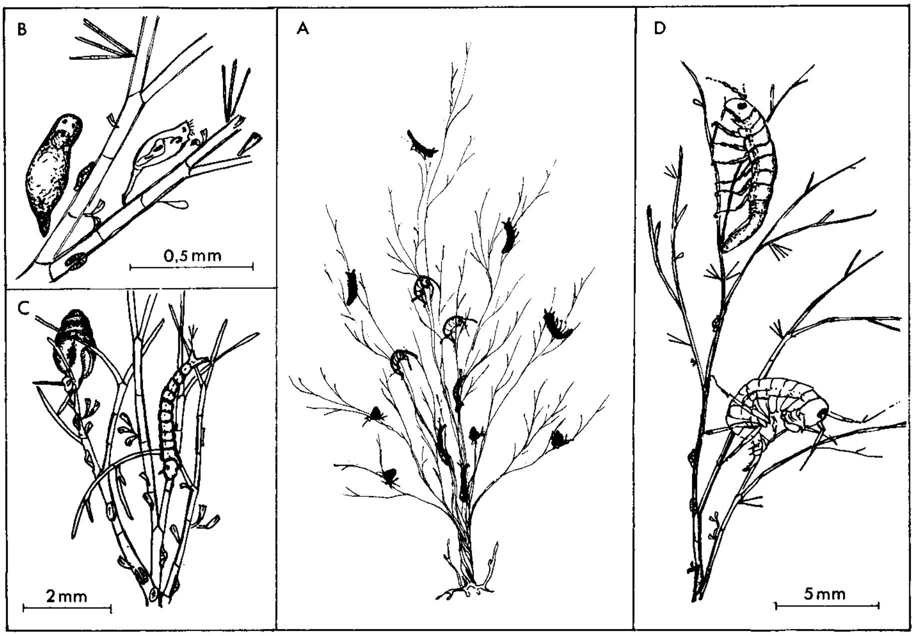

Fig. 1: Some herbivores of the *Cladophora*-belt. (A) Their characteristic positions on the alga, (B) Turbellarian *Provortex balticus* and rotifer *Proales reinhardti,* (C) Gastropod *Hydrobia ulvae* and a chironomid larva, (D) Isopod *Idotea baltica* and amphipod *Gammarus oceanicus*

experiments were carried out to calculate the consumption-rate of some important herbivores. All experiments were performed under natural conditions of light at a constant temperature of 15^0 C. Food sources were *Cladophora,* (regarded as being free from diatoms), and cultures of diatoms, chiefly *Navicula* sp. and *Synedra* sp.

Browsers, feeding on *Cladophora*-filaments

Idotea baltica Pallas

At the beginning of July 1966, a number of female *Idotea baltica* with juveniles in their brood-pouches were collected from the upper *Fucus*-region. The specimens were kept individually in glass-jars containing seawater and a tuft of *Cladophora.* The time was noted when the ca. 2 mm long juveniles left the brood-pouch.

From one newly released brood 40 specimens were individually placed in small glass-bowls filled to a height of 4 ml with filtered seawater. 20 of the test individuals were given a small piece of *Cladophora,* and the other 20 a few drops of a diatom culture. The faecal pellets emitted in each bowl were counted and removed every 24 hours when new water and food was added. Survival rates were much higher in the group fed with diatoms. 50 % of the animals fed with *Cladophora* were dead after 43 hours, they were apparently able though to eat the green alga threads. In the diatom group 50 % of the specimens lived for 15 days.

After the third and fourth postmarsupial moulting there was a sudden reduction in the number of survivors among the diatom fed individuals. This caused me to start an identical experiment using one month old (4 mm long) individuals from another brood. Here the results were reversed: in the diatom fed group 50 % had died within 40 hours, but in the *Cladophora* fed group all specimens were still alive after more than one month; by this time they had reached a body length of 8 mm.

The results of these two experiments can be summed up as follows: 2 mm long juveniles eat *Cladophora*-filaments; epiphytic diatoms are necessesary for survival. Later stages of 4 to 8 mm body length have no need of diatoms. On the contrary pure diatom food seems to be detrimental in some way. One month old individuals are able to eat a great amount of *Cladophora.*

The faecal pellets emitted by animals fed on *Cladophora* were examined under the microscope, and it was thus possible to estimate the length of the *Cladophora*-filaments eaten. A photograph of such a pellet with a total filament length of some 8 mm is shown in Figure 2A. From every moulting stage 10 faecal pellets were collected

Table 4

Length of *Cladophora* filaments consumed within 24 hours by juveniles of *Idotea* and *Gammarus,* and chironomid larvae respectively

Animals	Length	Consumption/24 hrs.
Idotea	3 mm	315 mm
Idotea	4 mm	641 mm
Gammarus	3 mm	86 mm
Gammarus	4 mm	126 mm
Chironomidae	3.5 mm	4 mm

and measured, and the average length of the *Cladophora*-filament per pellet was calculated as well as the daily consumption (Table 4). The total amount of *Cladophora* required by one specimen passing each successive postmarsupial stage from 2 to 8 mm body length is about 40 m (Fig. 3).

Observations by DE LA CRUZ (1960) on the feeding activity of *Idotea baltica* in the *Fucus* vegetation have demonstrated that the filiform paraphyses on the *Fucus* thallus are preferred as food. The average consumption rate of *Fucus* amounts to one-fifth of the body weight per half an hour. A weed preference has also been observed for *Idotea granulosa* RATHKE (NAYLOR 1955a). Less than 5 mm long individuals of

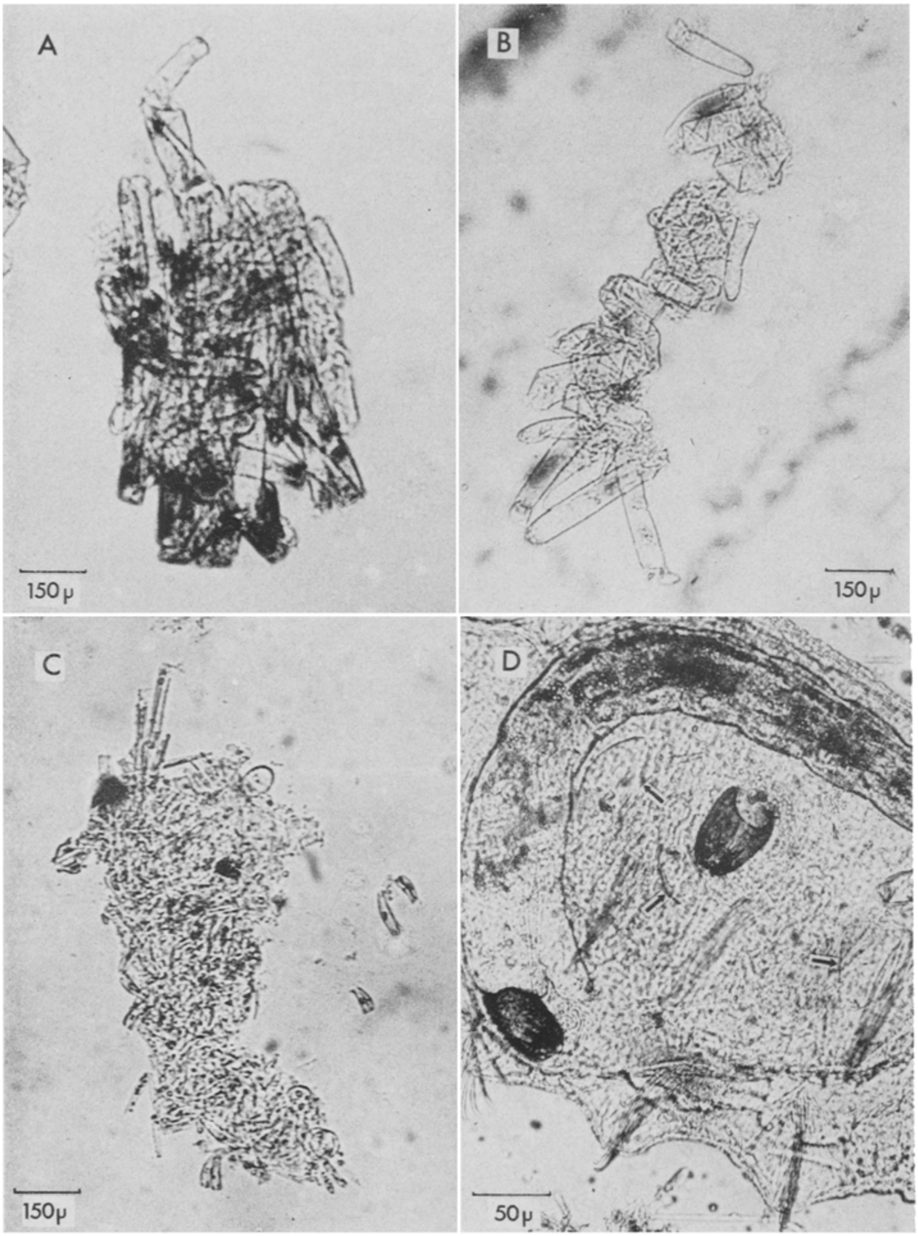

Fig. 2: Faecal pellets of (A) *Idotea baltica,* (B) *Gammarus oceanicus,* (C) Chironomid larva (mainly composed of diatom *Rhoicosphenia*). (D) Part of the gut of *Chaetogaster limnaei,* containing chironomid larvae and three specimens of *Colurella colurus* (arrows)

this species are most abundant on small tufted algae such as *Cladophora*. There are very few studies on the growth of different species of *Idotea*. NAYLOR's (1955b) investigation on *I. emarginata* is the most exhaustive one. Sizes and lengths of the first postmarsupial stages, characteristic for this species, are about the same as in *I. baltica*.

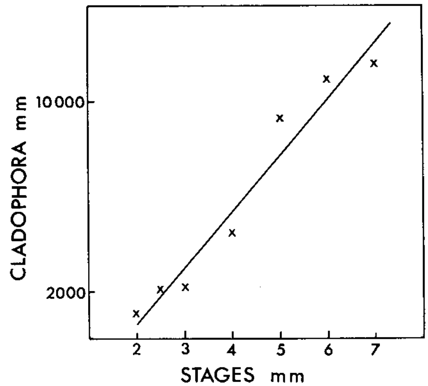

Fig. 3: Average food consumption (length of *Cladophora* filaments in mm) of *Idotea baltica* (post marsupial stages of different body lengths). The regression-line is eye-fitted

Gammarus oceanicus SEGERSTRÅLE

In the *Cladophora*-belt the population density of young gammarids is often very high. Since gammarids represent an important prey for many fishes of the Baltic Sea it is of interest to assess their rates of food consumption.

24 about 3 mm long juveniles of *Gammarus oceanicus* were collected and placed in glass-bowls (similar technique as in the *Idotea*-experiments). Half of the individuals were offered *Cladophora;* the other half diatoms. Seven weeks later all but 3 individuals were still alive and had moulted about 5 times. No difference in size or activity was noted between the two groups. The mean value of the total length of *Cladophora*-filaments consumed per day was calculated. A photograph of a faecal pellet emitted by a specimen fed on *Cladophora* is seen in Figure 2B. Table 4 shows that 3 mm long individuals eat 86 mm filaments and 4 mm long ones 126 mm per day. Compared with *Idotea baltica* of the same size, *Gammarus oceanicus* eats considerably less and grows significantly slower.

Diatom feeders

Chironomidae

Larvae of chironomids are usually very numerous in the *Cladophora*-belt. The bigger larvae undoubtedly eat green alga threads. It was proved by an experiment that at a body length of 3.5 mm they are able to eat small pieces of *Cladophora*, but their natural food are diatoms. A photograph of a faecal pellet emitted from a 3.5 mm long specimen just removed from its natural habitat is shown in Figure 2C. A large amount of diatoms, especially *Rhoicosphenia*, can be seen. The animal was taken from an area where the diatom growth was about the same as under the conditions on which Table 1 is based. Chironomid larvae prefer to sit close to the base of the algae in a dense growth of filaments (Fig. 1).

Hydrobia ulvae Pennant

Gastropods are also typical epiphyte feeders. A poor epiflora of bacteria and blue-green algae may suffice as food source but ample availability of diatoms increases their growth-rate. This was demonstrated in a feeding experiment of the same type as the ones described previously. Small specimens of *Hydrobia ulvae* fed on diatoms grew more rapidly than those fed on *Cladophora*, although production rate of faecal pellets was about the same in the two groups. Growth-rates are given in Table 5.

Table 5

Growth rates (length of snail house in mm), of gastropods, *Hydrobia ulvae*, fed on *Cladophora* – filaments without epiphytic diatoms, or cultures of diatom *Navicula*. Water temperature 15° C; salinity 6.4 ‰ S

Duration of Experiment (days)	Food source	
	Cladophora	Diatoms
0	1 mm	1 mm
22	1.41 mm	1.52 mm
43	1.46 mm	1.85 mm

Proales reinhardti Ehrenberg

The first animals immigrating a newly established *Cladophora*-belt are usually rotifers. They are primarily represented by *Proales reinhardti*. Once settled down in the habitat, the population rapidly increases. For example, 2 weeks after a *Cladophora*-belt had started to grow, more than 200 specimens of *P. reinhardti* per 10 mg algae were collected.

P. reinhardti feeds on small diatoms. Table 6 gives a list of diatoms found in the guts of 20 specimens. The test material was collected in an area where the epiphytic growth corresponds to the situation referred to in Table 1. The diatom genus *Licmophora* dominates in the guts, although its representatives are rather few in number on the filaments. The microhabitat of *P. reinhardti* is the peripheri of the *Cladophora* tuft where also *Licmophora* attains its greatest relative abundance. Possibly representatives of this genus are comparatively easy to pick off from the threads, and therefore more commonly eaten than other diatoms of the same cell size.

Detritus feeders

Colurella colurus Ehrenberg

For the very numerous rotifer *Colurella colurus* (50 to 60 μ in size) there are hardly any epiphytic diatoms small enough to be suitable as food. The species feeds on

Table 6

Gut contents of 20 adult specimens of the rotatorian *Proales reinhardti*. The cell sizes of the 5 different diatoms are given in brackets

Specimen No.	Gut contents				
	Licmophora (30 μ)	*Rhoicosphenia* (20 μ)	*Navicula* (15 μ)	*Tabellaria* (15 μ)	*Epithemia* (25 μ)
1	4	2	1		
2	2	1			
3	2		4		
4	1		1		
5	3		2		
6	5		2		
7	8		2		
8	4		6		
9	1	1			
10	1				
11	1				
12	15	2			
13		8	19		
14	7				
15	14				
16	1		1		
17	2		2		
18	1				
19	5	1	1	1	1
20	5		2		

bacteria and detritus, and for example, on the incompletely digested material in the feacal pellets of *Idotea* and *Gammarus*.

Tachidius discipes GIESBRECHT

A harpacticoid of regular abundance in the *Cladophora*-belt is *Tachidius discipes*. DAHL (1958, p. 87) found this species only in detritus free samples. In my experiments *T. discipes* reproduced and survived for one year or longer in stagnant water cultures containing samples of *Cladophora*; the only food source available was slowly decaying parts of this green alga.

Carnivores

Aspelta clydona HARRING & MYERS

The Rotatoria are a dominating group in the upper *Cladophora*-belts of the Baltic Sea. Most species are diatom feeders but a few are predators. *A. clydona* periodically found in the samples, for example, preys on other Rotatoria especially on *Proales reinhardti*.

Provortex balticus SCHULZE

A permanent predator is the turbellarian *Provortex balticus*. It catches living ciliates and rotifers, for example, *Proales reinhardti*. Its main food sources, however, are diatoms of the genus *Epithemia;* this was shown by JANSSON (1966).

Chaetogaster limnaei VON BAER

The greatest predator among the animals in the *Cladophora*-belt is probably *Chaetogaster limnaei*. Typical prey organisms are *Tachidius discipes*, larvae of Chironomidae, and *Colurella colurus* (Figs. 2 D; 4). As *C. limnaei* is periodically rather common in the belt, this predator might affect the species composition of the fauna.

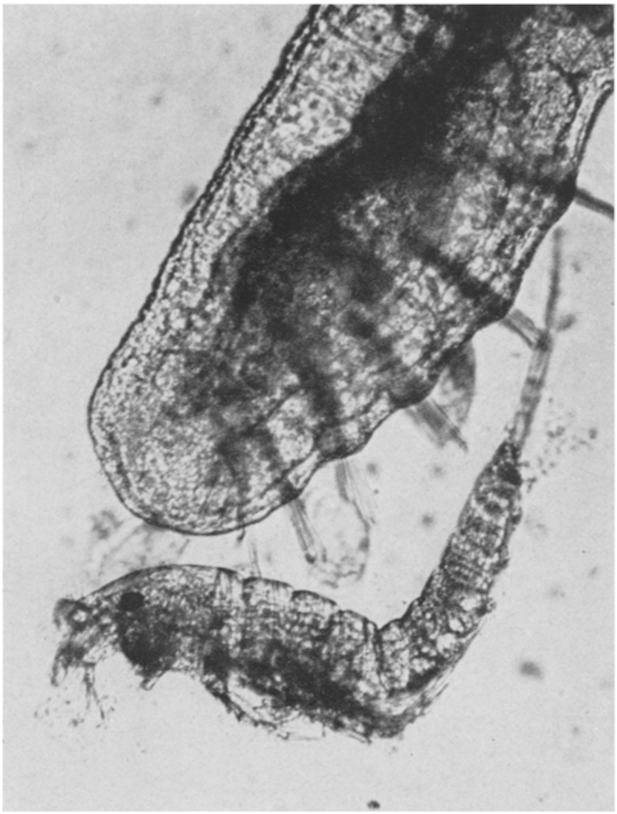

Fig. 4: Anus region of *Chaetogaster limnaei;* beneath a freshly emitted *Tachidius discipes*

Scavengers

Feeding on dead animals has by many authors been considered characteristic for the adults of both *Idotea* and *Gammarus*. In the *Cladophora-belt* I do not think that this type of nourishment is of any importance for the young *Idotea*. Growing-up *Gammarus*, on the other hand, may be scavengers when the opportunity arises. In an exposed *Cladophora*-belt, however, where *Gammarus oceanicus* is found, most dead animals are quickly washed away.

Suspension-feeders

Cardium lamarcki REEVE

This bivalve metamorphoses in great numbers in the *Cladophora*-belt. The young animals sit in the *Cladophora* tufts feeding on suspended material which is concentrated in the filamentous vegetation.

CONCLUSIONS

As already pointed out by several authors, the great total surface of the filamentous green alga *Cladophora* makes it a suitable micro-habitat for dense animal colonisation. The attractiveness of its surface area is highly increased by epiphytic diatoms. The importance of these epiphytes as a food source for the fauna associated with *Cladophora* is outstanding. For the young stages of some species the diatoms are even necessary for survival. Later stages of these species do no longer depend on diatoms as a food source and may indeed live in quite different habitats.

A characteristic food web exists in the *Cladophora*-belts; a part of this food web is schematically illustrated in Figure 5.

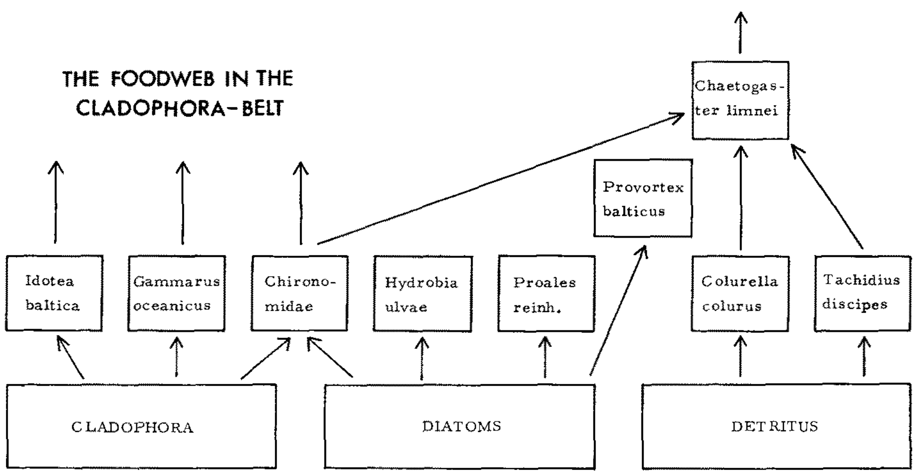

Fig. 5: Some important components of the food-web in the *Cladophora*-belt

Typical food chains are, for example, diatoms → *Proales reinhardti* → *Provotex balticus* and *Cladophora* + *diatoms* → chironomid larvae → *Chaetogaster limnaei.*

In the production of organic matter in the sea, *Idotea* and *Gammarus* are of great importance as fish food; their juveniles, therefore, must be considered the most important components of the food web in the *Cladophora*-belts.

SUMMARY

1. The species composition of the fauna in the *Cladophora glomerata* belts of the Baltic sea has been studied quantitatively.
2. Examples are presented to illustrate composition and density of the epiphytic diatom flora.
3. The dry weight of *Cladophora glomerata* was determined with the aid of length measurements under a microscope. It amounts to 0.25 mg per 1000 mm length of alga filaments, and to 15.9 mg for a tuft with a total surface area of 1 dm^2.
4. The productivity of *Cladophora glomerata* was calculated. It amounts to 3105 m alga filaments per dm^2 per month.
5. The following biomasses per dm^2 rock surface have been estimated: *Cladophora* (dry weight): 0.78 g, diatoms (dry weight): 1.15 g, animals (number of individuals): 12 544.
6. The fauna of the *Cladophora*-belt has been subdivided according to feeding types.
7. Some herbivores have been studied in laboratory experiments. The epiphytic diatoms are important for survival of the first postmarsupial stages of the isopod *Idotea baltica* as well as for maximum growth rates of the gastropod *Hydrobia ulvae* and chironomid larvae.
8. The daily consumption of *Cladophora*-filaments has been determined for juveniles of the isopod *Idotea baltica* and the amphipod *Gammarus oceanicus* by microscope examinations of faecal pellets.
9. The diatom diet of the rotifer *Proales reinhardti* has been listed according to genera or species. Among the animals living in the *Cladophora*-belt, *P. reinhardti* attains the highest numbers of individuals.
10. Examples of food-chains within the *Cladophora* community are presented.

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