

# FICHES D'IDENTIFICATION DU ZOOPLANCTON

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## FAECAL PELLETS

by

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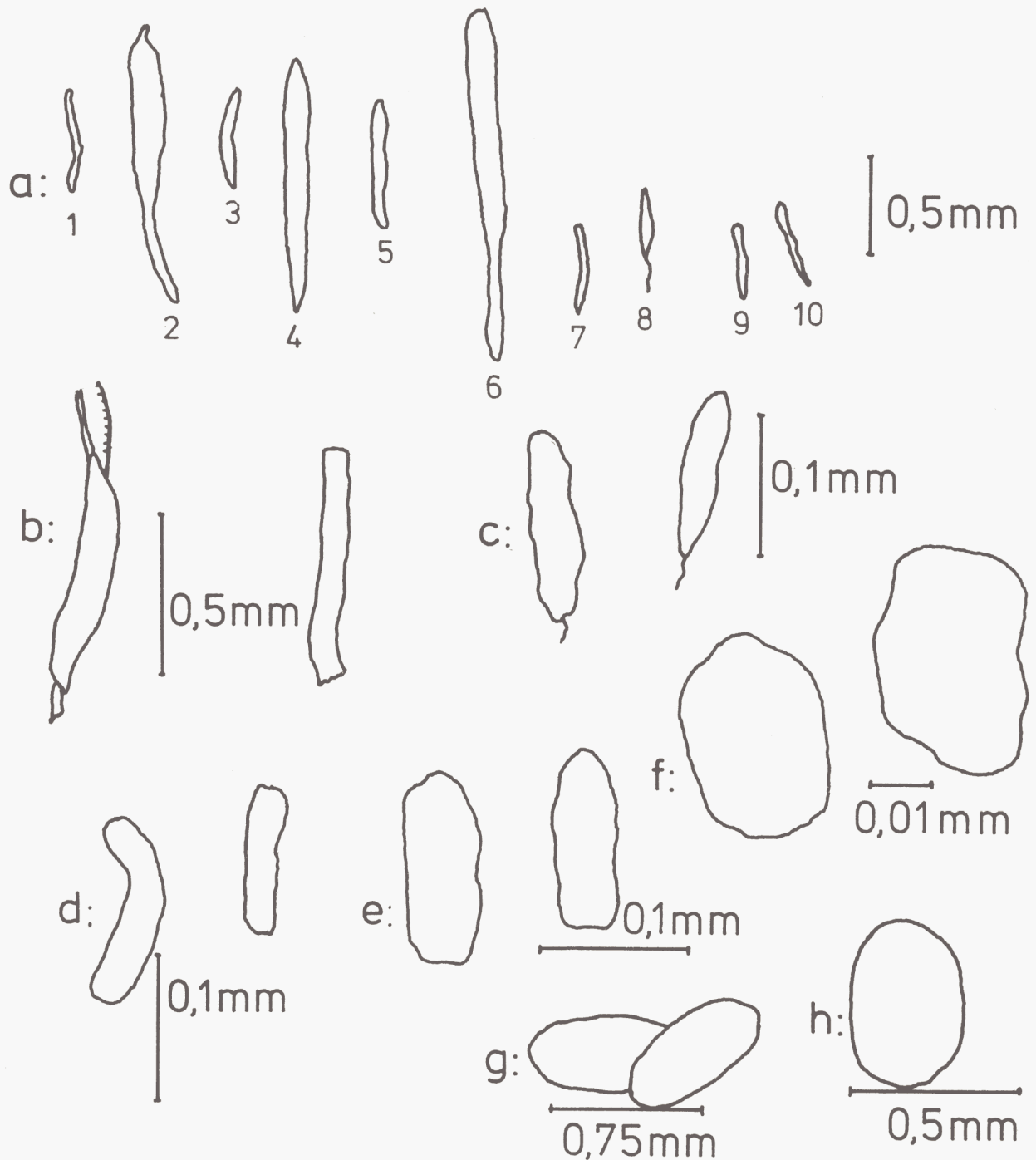
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Faecal pellets of some planktonic crustaceans and benthic invertebrates.

- a: Faecal pellets of *Calanus finmarchicus*. 1 and 2: Male and female fed on *Skeletonema* and *Nitzschia*. 3 and 4: Male and female fed on *Skeletonema*. 5 and 6: Male and female fed on *Ditylum*. 7 and 8: Unknown food source. 9 and 10: Animals fed on *Biddulphia*.  
 b: Faecal pellets of *Meganyctiphanes norvegica*. Note the crustacean spines in the left faecal pellet.  
 c: Faecal pellets of *Centropages hamatus* (with tail piece).  
 d: Faecal pellets of *Pseudocalanus elongatus*.  
 e: Faecal pellets of *Acartia bifilosa*.  
 f: Faecal pellets of *Oithona similis*.  
 g: Benthic pellets: Faecal pellets of Maldanid-Rhodine sp.  
 h: Benthic pellet: Faecal pellet of *Syndosmia alba*.

## Faecal pellets

There are many plankton research programmes in which a knowledge of faecal pellets would be valuable, e.g., egg productivity, food chains, etc., but present knowledge is far from satisfactory. Copepod pellets are probably the most important group. This sheet attempts to show the little information that is available, and it is also hoped that, in revealing this scarcity, it will stimulate further research into a most useful subject.

**Table 1. Characteristics of the faecal pellets of different planktonic crustaceans**

a = number of faecal pellets examined, b = mean length of faecal pellets, c = mean length of the tail piece, d = mean breadth, e = length/breadth, f = characteristic form, g = food used in the investigation.

Species	a	b	c	d	e	f	g	Author
<i>Calanus finmarchicus</i> ♂	?	550 $\mu\text{m}$	—	45 $\mu\text{m}$	12.2	Cylindrical	<i>Skeletonema</i> + <i>Nitzschia</i>	RAYMONT and GROSS, 1972
<i>Calanus finmarchicus</i> ♀	?	950 $\mu\text{m}$	510 $\mu\text{m}$	180 $\mu\text{m}$	5.3	Cylindrical	<i>Skeletonema</i> + <i>Nitzschia</i>	
<i>Calanus finmarchicus</i> ♂	?	520 $\mu\text{m}$	—	60 $\mu\text{m}$	8.4	Cylindrical	<i>Skeletonema</i>	
<i>Calanus finmarchicus</i> ♀	?	1350 $\mu\text{m}$	—	130 $\mu\text{m}$	10.4	Cylindrical	<i>Skeletonema</i>	
<i>Calanus finmarchicus</i> ♂	?	685 $\mu\text{m}$	—	80 $\mu\text{m}$	8.4	Cylindrical	<i>Ditylum</i>	
<i>Calanus finmarchicus</i> ♀	?	1200 $\mu\text{m}$	670 $\mu\text{m}$	155 $\mu\text{m}$	7.7	Cylindrical	<i>Ditylum</i>	
<i>Calanus finmarchicus</i>	?	200–400 $\mu\text{m}$	Present	50–100 $\mu\text{m}$	—	Cylindrical	?	MOORE, 1931
<i>Calanus helgolandicus</i>	2	650 $\mu\text{m}$	—	100 $\mu\text{m}$	6.5	Cylindrical	<i>Biddulphia</i>	CORNER et al., 1972
<i>Acartia bifilosa</i> ♂	132	123 $\mu\text{m}$	12 $\mu\text{m}$	34 $\mu\text{m}$	3.7	Cylindrical	<i>Chaetoceros decipiens</i> + <i>Chaetoceros socialis</i> + <i>Detonula cystifera</i> + <i>Skeletonema costatum</i> + flagellates 4 $\mu\text{m}$ $\emptyset$	MARTENS, 1976
<i>Acartia bifilosa</i> ♀	192	142 $\mu\text{m}$	23 $\mu\text{m}$	53 $\mu\text{m}$	2.8	Cylindrical		
<i>Centropages hamatus</i> ♂	79	110 $\mu\text{m}$	39 $\mu\text{m}$	33 $\mu\text{m}$	3.3	Cylindrical		
<i>Centropages hamatus</i> ♀	156	139 $\mu\text{m}$	43 $\mu\text{m}$	43 $\mu\text{m}$	3.3	Cylindrical		
<i>Pseudocalanus elongatus</i> ♂	133	157 $\mu\text{m}$	21 $\mu\text{m}$	31 $\mu\text{m}$	5.2	Cylindrical		
<i>Pseudocalanus elongatus</i> ♀	106	157 $\mu\text{m}$	22 $\mu\text{m}$	31 $\mu\text{m}$	5.2	Cylindrical		
<i>Oithona similis</i> ♂	62	36 $\mu\text{m}$	—	26 $\mu\text{m}$	1.5	Ellipsoid	Phyto- and zooplankton powder	ABDUL KADER, 1975
<i>Oithona similis</i> ♀	181	36 $\mu\text{m}$	—	26 $\mu\text{m}$	1.5	Ellipsoid		
<i>Spicodiantomus chelospinus</i>	?	250 $\mu\text{m}$	—	77 $\mu\text{m}$	3.3	?	Ground filamentous green algae	
<i>Spicodiantomus chelospinus</i>	?	288 $\mu\text{m}$	—	68 $\mu\text{m}$	4.2	?	Groundnut cake powder	
<i>Spicodiantomus chelospinus</i>	?	385 $\mu\text{m}$	—	74 $\mu\text{m}$	5.2	?	Coloured filter-paper powder	
<i>Spicodiantomus chelospinus</i>	?	115 $\mu\text{m}$	—	58 $\mu\text{m}$	2.0	?	<i>Nitzschia closterium</i>	
<i>Spicodiantomus chelospinus</i>	?	269 $\mu\text{m}$	—	64 $\mu\text{m}$	4.2	?	Mainly crustaceans	JOHANNES and SATOMI, 1966
<i>Palaemonetes pugio</i>	?	1–20 mm	—	50–200 $\mu\text{m}$	—	Cylindrical	“Natural food”	MOORE, 1931
<i>Meganyctiphanes norvegica</i>	?	Up to 4 mm	—	100–150 $\mu\text{m}$	—	Cylindrical		FOWLER and SMALL, 1972
<i>Euphausiaceae</i> spp.	?	1040–7300 $\mu\text{m}$	—	48–176 $\mu\text{m}$	9–65	Cylindrical		
<i>Artemia salina</i>	10	1250 $\mu\text{m}$	—	390 $\mu\text{m}$	3.2	Cylindrical	<i>Phaeodactylum</i>	REEVE, 1963
<i>Artemia salina</i>	10	1530 $\mu\text{m}$	—	425 $\mu\text{m}$	3.6	Cylindrical	<i>Dunaliella</i>	
<i>Artemia salina</i>	10	1370 $\mu\text{m}$	—	365 $\mu\text{m}$	3.8	Cylindrical	Sand	

## Description

## Shape:

The characteristic shape of most of the faecal pellets of planktonic copepods and euphausiids is a cylinder with rounded ends (*Calanus finmarchicus*, *Calanus helgolandicus*, *Acartia biflosa*, *Centropages hamatus*, *Pseudocalanus elongatus*) or often frayed ends (*Meganyctiphanes norvegica*) (MOORE, 1931). The surrounding membrane can form a tail piece, and the frequency of occurrence is different in the different species (*Acartia*, 11 %; *Pseudocalanus*, 30 %; *Centropages*, 50 %) (MARTENS, 1976). No tail piece could be found on the faecal pellets of male *Calanus finmarchicus*. The mean length of the faecal pellets is relatively great compared with the breadth, with the ratio of length to breadth of the faecal pellets of *Calanus* spp. varying between 6:1 and 10:1 (CORNER et al., 1972). In euphausiids it even varies between 9:1 and 65:1 (FOWLER and SMALL, 1972).

The faecal pellets of the cyclopoid *Oithona similis* are characteristically ellipsoid in shape and without tail pieces. The mean ratio of length to breadth is 1.4:1. This resembles the type of some faeces of benthic origin described by MOORE (1931), as for *Syndosmia alba* or for a young maldanid worm, with a length to breadth ratio of 1.6:1 and a characteristically oval to ellipsoid shape. The faecal pellets of the benthic animals are much larger, so confusion with planktonic faeces (length 500–750  $\mu\text{m}$ ) is unlikely. They have a brownish, massive non-transparent structure, whereas the faecal pellets of the planktonic species are of a greenish brown, more transparent structure.

## Size:

The length and breadth of the faecal pellets of a single species may vary even if a constant source of food is maintained. The length of faeces of *Acartia biflosa* varied between 50 and 240  $\mu\text{m}$ ; *Oithona similis*, 20–80  $\mu\text{m}$ ; *Centropages hamatus*, 50–200  $\mu\text{m}$ ; and *Pseudocalanus elongatus*, 50–270  $\mu\text{m}$  (MARTENS, 1976). With different sources of food the size also varies, and for *Palaemonetes pugio* by as much as 2000 % (JOHANNES and SATOMI, 1966)!

The mean values of length and breadth of the faecal pellets of the species mentioned above show significant differences (MARTENS, 1976), so that an analysis of the distributive function of length or breadth of a natural "faecal pellet population" should lead to a specific identification on the species level. The size and shape of faeces of mainly carnivorous species (e.g. euphausiids) may be affected by indigestible remains of food, e.g., large crustacean spines (MOORE, 1931). The faecal pellets of the males of some species were normally smaller than those of the females (*Acartia biflosa*, *Centropages hamatus*, *Calanus finmarchicus*) (RAYMONT and GROSS, 1942; MARTENS, 1976).

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