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Pycnogonids as prey of blenniid fishes
Pantopoden als Nahrung von Schleimfischen

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Abstract : Gut analyses yielded five pycnogonid species *(Tanystylum orbiculare, T. conirostre, Anoplodactylusus virescens, Ammothella* sp., *Achelia* sp., cf. Tab. I) as prey of the blenniid fish *Lipophrys pholis.* The majority of Pycnogonida was eaten during wintertime (cf. Tab. II). Three out of 19 specimens caught at night had eaten pycnogonids.

Résumé : L'analyse des viscères du poisson de la famille des Blennidae *Lipophrys pholis* a permis le recensement de cinq espèces de pycnogonides (*Tanystylum orbiculare, R. conirostre, Anoplodactylusus virescens, Ammothella* sp., *Achelia* sp., cf (Tab. I). La majorité des pycnogonides a été ingérée pendant l'hiver (cf. Tab. II). Trois sur dix-neuf espèces capturées la nuit avait mangé des Pycnogonides.

INTRODUCTION

Pycnogonida are regarded as having very few enemies. Helfer & Schlottke (1935) and Arnaud & Bamber (1987) gave the current state of knowledge at that time. Fry (1980) was of the opinion that commercially important fish rarely and only accidentally ingest pycnogonids. He mentioned only (unspecified) gobies as more regular consumers of pycnogonids. The results obtained below are rather indicative of a lack of studies in this respect.

MATERIAL AND METHODS

In the course of an investigation on resource sharing of Blenniidae in the rocky littoral at Torre de la Mora (Tarragona, Spain) and other sites of the northern Mediterranean coast (Nieder 1992) a total of 69 *Lipophrys trigloide*s, 73 *Parablennius pilicornis*, and 70 *Scartella cristata* were caught. The specimens were caught in plastic bags, sacrificed, and immediately fixed in 4 % formalin. The gut was removed, its contents identified and the volume of each food item determined.

Nineteen *Lipophrys trigloides* were caught at night, between 1 to 2 hours after sunset.

For identification of pycnogonids we relied mainly on Stock (1968), the specimens of *Tanystylum* were identified according to Krapp (1973).

RESULTS

Whereas no pycnogonids could be found in the guts of *S. cristata*, and only one *P. pilicornis* had eaten pycnogonids, the intestinal tracts of twelve out of 69 *L. trigloides* contained pycnogonids, 1 to 4 in number.

TABLE I

Pycnogonids in specimens of *L. trigloides* from La Mora (Tarragona, Spain) and Moneglia (Liguria, Italy).
N° = identification number ;
day/night = caught by day (d)/ at night (n).

specimen n°	site	month	day/ night	species
1	La Mora	1/90	d	*Tanystylum orbiculare* 1 ♀
2	La Mora	1/90	d	*Tanystylum orbiculare* 1 ♀
3	La Mora	1/90	d	*Ammothella* cf. *longipes* 1 chel. iuv.
4	Moneglia	2/90	n	*Anoplodactylus virescens* (n = 4, 1 ♂)
5	Moneglia	2/90	n	*Tanystylum conirostre* 1 ♂ ovig.
6	Moneglia	2/90	n	*Tanystylum conirostre* 1 ♂
7	La Mora	9/90	d	*Tanystylum conirostre* 1 ♀
8	La Mora	12/90	d	*Tanystylum conirostre* 1 ♂
9	La Mora	12/90	d	*Tanystylum conirostre* 1 ♀
10	La Mora	12190	d	*Tanystylum conirostre* 1♀
11	La Mora	12/90	d	*Tanystylum conirostre* 1 ♂
12	La Mora	12/90	n	Ammotheidae lacking cephalon, cf. genus *Achelia*

The autecology of pycnogonids in the Mediterranean as well as in other seas is poorly known : in the Adriatic Krapp-Schickel & Krapp (1975) and Schüller (1989) studied some littoral habitats, the Mediterranean coast of Spain was studied by Munilla León (1980a, b) and Munilla (1982, 1986). Arnaud (1988) presented a comprehensive synthesis of pycnogonid material sampled in various regions of the Mediterranean. For the Ligurian Sea no ecological study of pycnogonids was undertaken, there are only two faunistic works (Faraggiana 1940, Soyer 1966).

The pycnogonids obtained by our gut analyses fit into the existing scheme of ecological distribution of genera and species : both *Tanystylum* species may inhabit the decimeters just below the water surface where *Lipophrys* is normally hunting (Nieder 1992). Here *Tanystylum* can constitute the main element in pycnogonid cenoses if the water is agitated and rather clean (cf. Krapp-Schickel & Krapp 1975). *Anoplodactylus virescens* may be pre-

sent in shallow water, but it is a rare species (Arnaud 1988). Notwithstanding this, both preceding faunistic studies (Faraggiana 1940, Soyer 1966) on pycnogonids from the Ligurian Sea reported this species.

In February 1990, 3 specimens of *L. trigloides* were caught at night. All three contained pycnogonids, one specimen (number 13) as much as 4 *Anoplodactylus virescens*. In two specimens (numbers 7 and 11) pycnogonids contributed notably to the diet of the blenniid species, with 15 and 10 % of the total food volume respectively. In all other cases, the relative volume of pycnogonids was less than 5 % of the total gut contents.

DISCUSSION

So far, blenniid fishes were not known to feed on pycnogonids (Arnaud & Bamber 1987). This is certainly due to the fact that pycnogonids are rather rare elements in the diets of blennies and, if present, normally don't turn up in larger quantities. Zander (personal communication) sometimes listed pycnogonids among "other" food items when they were found. Zander & Bartsch (1972) detected pycnogonids in epiphytal samples near Banyuls (France), but not in the gut of five species of blennies, among them *L. trigloides*. Gibson (1968) found pycnogonids in less than 1 % of *Lipophrys pholis* collected at Banyuls. Zander & Heymer (1992) found pycnogonids in 18 % and 30 % respectively of *Tripterygion delaisi xanthostoma* (Tripterygiidae) specimens from two different Mediterranean sites.

On the Atlantic coast of France Gibson (1972) detected an occurrence of pycnogonids in 1 % of *Lipophrys pholis* and 8 % of *Gobius paganellus*. Carvalho (1982) examined the food of *Coryphoblennius galerita*, *Lipophrys pholis* and *Lipophrys trigloides*. He found pycnogonids only in *Lipophrys trigloides*, with a 2 % frequency. Outside of European waters, pycnogonids have been reported in the food of Blennioidea in the Gulf of California by Kotrschal and Thomson (1986).

The data presented in this work indicate that *Lipophrys trigloides* is the most important pycnogonid predator among European blennies whereas other species seem to play a marginal role.

TABLE II

Frequency distribution of pycnogonids in intestines of *L. trigloides* at La Mora in 1990. N = total number of specimens examined ; % = percentage of *L. trigloides* containing pycnogonids.

	1/90	4/90	7/90	9/90	12/90
N	12	12	13	12	12
%	25	0	0	8	42

Most of the pycnogonids have been consumed in wintertime, as shown in Tab. II. Whether this may be attributed to a greater activity of pycnogonids on the surface of the substrate used by blennies, or it reflects a specific hivernal food habit of *L. trigloides*, has still to be investigated.

Lipophrys trigloides is known to be exceptional among Mediterranean blennies for its sturdy dentition and preference for rather big sized prey (e. g. Gastropoda) (Goldschmidt *et al.* 1980 and personal observations by J. N.). Furthermore, this bleniid is nocturnally active (Nieder in prep.), which may contribute to its success as a pycnogonid hunter.

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