PRELIMINARY OBSERVATIONS ON THE FOOD OF THE SPIDER THERIDION PICTUM (Walck.) AND ITS PREDATORS

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In addition to experimental investigations into the regularity of spider predation on mosquitoes, observations have been made of the natural process in the field (Dabrowska-Prot, Luczak, 1968; Luczak, Dabrowska-Prot, 1968).

These researches were made on the species Tetragnatha montana Simon and food collected from the spiders' webs in an alder wood of the Kampinos Forest National Park, Poland, where mosquitoes were abundant, was analysed. The investigation showed that mosquitoes constituted a considerable per cent of the food of Tetragnatha montana.

Within this research, during the second fortnight of July 1969, 103 webs of the spider Theridion pictum (Walck.) were examined in the same habitat of alder wood, where T.pictum occurred in aggregations of about 5-6 webs over an area of 4 m^2. The average density of these spiders on the investigated area covering about 0.5 hectare of this forest, was 2 webs per 4 m^2. Webs were found low down on different plant species of the herb layer, usually 20-50 cm above the surface of the forest floor and most frequently on the tufts of Carex paniculata. The webs of this spider are adapted to catch winged prey, and this type of prey should be its basic food (Wiehle, 1937; Locket and Millidge, 1953).

In addition to T.montana and T.pictum, other species of web-spiders were frequently found, among them Achaearanea tepidariorum simulans Thor. (also frequent on Carex paniculata) and Theridion ovatum Clerck. Observations were carried out in the period following cocoon making by T.pictum females. Usually the females had one cocoon in the nest, but four females were found which had two cocoons. Young spiderlings developed from about 40% of cocoons. The males were not found.

Altogether, 202 prey were collected from the webs of T.pictum. The main food of this spider in the investigated habitat consisted of insects from the Diptera group (52% of the whole food) and Coleoptera (14% of the whole food) as shown in Table I. Within these two major prey groups, fine forms not exceeding 0.5 cm (73%) prevailed. Mosquitoes (Culicidae) formed 16% of the whole food, and 30% of all Dipterous prey. Also, the share of ants among the prey caught in webs was considerable and reached 6%. Other prey, besides the groups already mentioned, constituted altogether 8% of the whole food of T.pictum. Our results confirm the observations of other arachnologists about the frequent occurrence of various species of Coleoptera in the food of spider species of the genus Theridion. T.pictum is to a large extent a predator of this group of insects.

Mosquitoes, apart from Coleoptera and other Diptera, were the basic food of this spider species. Thus, the obtained material allows us to assume that T.pictum is an effective predator of mosquitoes. Also it should be taken into consideration that 1969 was an especially poor year for the mosquito fauna in the Kampinos Forest. Observations carried out

in July 1968 prove that during the mass occurrence of mosquitoes, their share in the food of T.pictum may be accordingly greater. Twenty-seven nests of this species were checked and it was noted that the share of mosquitoes was 50% of the whole amount of prey found.

It is interesting that the mosquito species Aëdes cinereus Meig., which was scarce in the habitat in 1969, was found in the webs of T.pictum. This is most probably connected with the habitat penetration of this mosquito species. During the daytime it penetrates only the herb layer, i.e. the vegetation zone occupied by T.pictum, and does not fly to the undergrowth layer. Food selection by T.pictum is supported also by observations of Diptera of the genus Tricholauxania (most probably T.preusta) which are rarely caught in the webs of this spider, in spite of their occurrence in great quantities in the investigated habitat. In all the webs of T.pictum examined, only one specimen of this Diptera was found, but it was observed that Tricholauxania preusta was caught in the webs and eaten by the spider Linyphia triangularis Clerck.

Kind of food	Number of individuals		Percentage share in the food	
Big Coleoptera*	6	69	3.0	34
Small Coleoptera	63		31.0	
Big Diptera*	20	105	10.0	52
Small Diptera	47		23.0	
Culicidae	32		16.0	
Tipulidae	6		3.0	
Homoptera	5	28	2.5	14
Heteroptera	2		1.0	
Lepidoptera	3		1.5	
Hymenoptera				
Formicidae	12		6.0	
Aphidiidae	1		0.5	
Araneida	3		1.5	
Opiliones	1		0.5	
Mollusca	1		0.5	
	202		100.0 %	

Table I. Composition of food collected from the webs of Theridion pictum.
* The group of big Coleoptera and big Diptera contains individuals above 0.5 cm in size.

In 103 T.pictum nests examined, we found four dead females, which were probably killed by spiders of the same genus (species T.ovatum and Theridion sp.), found in the nests beside the dead females of T.pictum.

The observations on the predation of other spiders on the investigated species (caught "red-handed" in the nests of T.pictum) are very interesting. In two instances these were the females of T.ovatum just before laying eggs, as could be assumed by their size. They were probably wandering into the webs of other neighbouring species in search of food, and on this occasion penetrated the nests of less active females of T.pictum which were already looking after their cocoons. T.ovatum is also known to visit the webs of other spider species. The authors found it on the web of Meta segmentata Clerck. Bristowe (1941; 1958) describes an interesting behaviour of a T.ovatum female which, during the fight of two T.pictum females for the insect caught in one of their webs, took the prey while the other two were fighting. Also, he observed T.ovatum devouring T.sisyphium (Clerck) on its own web, and the species was also seen hunting for insects on the webs of Linyphia triangularis (Bristowe, 1941; 1958). It would be very interesting to find out the per cent of T.ovatum females leaving their own webs to look for food in the webs of other spiders during the period of their increased food demand.

Finding the remains of Theridion spiders in the nests of T.pictum allows us to assume that the result of a fight between two predators may be favourable either for the attacking species or the attacked one. Observations of Bristowe (1941) are similar. However, it is difficult to discuss the significance of the observed phenomenon as of a factor limiting the population numbers on the basis of such limited material.

References.

BRISTOWE,W.S. 1941: The Comity of Spiders,Vol.II, Ray Society, London, XIV + 229-560 pp.

---------- 1958: The World of Spiders. New Naturalist, Collins, St.James's Place, London, XIII + 304 pp.

DĄBROWSKA-PROT,E.,ŁUCZAK,J. 1968: Studies on the incidence of mosquitoes in the food of Tetragnatha montana Simon and its food activity in the natural habitat. Ekol.Pol.A. 16, no. 43 : 843-85.

ŁUCZAK,J.,DĄBROWSKA-PROT,E. 1968: Studies on Tetragnatha montana Simon. Bull.Brit.Spider Study Group, 38 : 7-9.

LOCKET,G.H.,MILLIDGE,A.F. 1953: British Spiders, Vol.II, Ray Society London, VII + 449 pp.

WIEHLE,H. 1937: 26 Familie: Theridiidae oder Haubennetz-Spinnen (Kugelspinnen) - Die Tierwelt Deutschlands, ed. F.Dahl, 33 Teil, Spinnentiere oder Arachnoidea VIII - 222 pp.

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