

Nematodes of Pyrethrum in East Africa

DALMATIAN pyrethrum (*Chrysanthemum cinerariaefolium*) (Trev.) Vis. is widely attacked in Kenya and Tanganyika by species of the nematode genus *Meloidogyne* Goeldi (root-knot nematodes), in particular *Meloidogyne hapla* Chitwood, 1949, which is a new host record.

Interveinal chlorosis and necrosis of the leaf lamina are invariably associated with heavy leaf populations of *Aphelenchoides ritzema-bosi* (Schwartz) Steiner.

While considerable economic importance must be attached to root galling of commercial pyrethrum by *Meloidogyne* spp., a recently discovered root-rot disease associated with high root populations of an apparently new species of the genus *Pratylenchus* Filipjev may prove of equal importance in pyrethrum farms at altitudes between 7,000 and 9,000 ft. This disease, although suspected in several areas of Kenya, was first found on a two-year-old planting at 8,500 ft. near Limuru, Kenya. Of 72 random samples of roots with surrounding soil, collected in groups of 24 at bi-monthly intervals from three adjacent terraces of very stunted plants, 57 were affected by a root-rot disease, with which *Pratylenchus* n.sp. was invariably associated. Heavy attacks of *M. hapla* were also present but not correlated with the symptoms of root-rot.

The first sign of this root-rot is the appearance of small patches of a brownish discoloration on the root epithelium. These lesions increase in area, darken and penetrate to the stele, girdling and eventually producing an almost completely blackened root. Eggs, larvæ and adults are found in affected tissue, specimens being recoverable even from the smallest lesions. Other nematodes and fungi are found in the later stages of the disease but not apparently in the early lesions.

Although *Pratylenchus* spp. have been reported in species of *Chrysanthemum* (Tourn.) L.¹⁻⁴ invasion and reproduction in the roots of *C. cinerariaefolium* by *Pratylenchus* n.sp. constitutes a new host record. A detailed description of the parasite will be published elsewhere.

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¹ Crossman, L., and Christie, J. R., *Plant Dis. Repr.*, **21**, (9), 144 (1937).

² Lefering, T. W., *Jversl. Proefst. Bloem. Aalsmeer*, 92 (1953).

³ Seinhorst, J. W., *Jversl. Inst. PlZiekt. Onderzoek*, 114 (1953).

⁴ Steiner, G., and Buhner, E. M., *Plant Dis. Repr.*, **19**, (3), 24 (1936).

Heavy Infestation by the Parasitic Copepod *Lernaenicus* of Sprats in the River Crouch

WHITEBAIT sprats in the estuary of the River Crouch collected in May 1957 were found to be heavily infested with copepod parasites. The fishes were collected by using a 12-ft. beam trawl with shrimp netting, several hauls being made between Burnham-on-Crouch and Holiwell Point, just inside the mouth of the River Crouch in Essex. Of the 140 sprats (*Culpea sprattus*) captured, 43 (31 per cent) were afterwards found to be parasitized by the copepod *Lernaenicus*. The two British species of

this genus, *L. sprattae* and *L. encrasicola*, were both present. It is a general rule that *L. sprattae* is fixed in the eye of the fish while *L. encrasicola* has its head buried in the tissues of the body, usually in the back, and the present sample was no exception to this rule. The sprats may be divided into the following categories:

- 97 sprats with no copepod parasites
- 32 sprats with one *L. sprattae* in one eye
- 2 sprats with two *L. sprattae* in one eye
- 7 sprats with one *L. encrasicola* in the back
- 1 sprat with two *L. encrasicola* in the back
- 1 sprat with one *L. sprattae* in an eye and one *L. encrasicola* in the back

L. sprattae is most easily distinguished from *L. encrasicola* by the moniliform appearance of the neck, as can be seen in Fig. 1. There is no doubt that the present infestation of more than 30 per cent of the fish is a severe one, but there are very few records in the literature which give a definite indication of the number of sprats parasitized in a sample. Leigh-Sharpe¹ gives 3 per cent infestation for two samples taken at Hole's Hole, near Plymouth, independently by himself and Dr. R. Gurney in 1934, and he quotes T. Scott and A. Scott's² earlier figure of 2.3 per cent at Plymouth in 1910. Among Gurney's manuscript papers now in the British Museum there is a note directing attention to the remarkable fact that his specimens of *Lernaenicus* from Hole's Hole, from more than 1,000 fishes, collected on April 10, 1934, were young, not one of them being fully grown or bearing eggs, while Leigh-Sharpe's specimens from 970 sprats, collected from the same place in the spring of the same year, presumably a little later though the actual date is not known, were mature and bearing eggs. A rapid growth of the parasite is indicated, with presumably an adverse effect on the host.



Fig. 1. A sprat about 5 cm. long with a parasite (*Lernaenicus sprattae*) embedded in the eye. Note the hole in the eye, the moniliform shape of the neck and the two long strings of eggs which stream out from the hinder end of the cylindrical body of the parasite

In the rather overcrowded conditions of fish farms in hot countries, infestations of the fishes by the similar copepod *Lernaea* sometimes occur which are more severe than any known under natural conditions; Nakai³ describes eels and loaches with the buccal cavity so crowded with parasites that food could not be swallowed. Very little, however, is known about the effect on fishes, under natural conditions, of copepod parasites of this type which live with the head buried in the tissues of the host, presumably feeding on blood and other fluid tissues. It was thought that with such a large sample of fish, both with and without parasites, it would be easy to detect signs of unhealthiness in the parasitized fishes, but this was not so, even statistically. The shape-index (*S*) was calculated for each fish using the formula $S = K \frac{\sqrt[3]{w}}{l}$ where *w* is the weight in gm., *l* the standard length in cm., and *K* is a constant. For fishes of the same length, the greater the weight the greater the shape-index. Each of 138 fishes was