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VORTICELLA SP. INFESTATIONS IN NEMATODES: A REPORT

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Summary. The peritrich protozoan, *Vorticella* sp., is reported for the first time associated with nematodes in extracts from soil samples. The affected nematodes became visibly lethargic and died 18-24 h after isolation. Infection by the nematophagous fungus *Catenaria anguillulae* were also observed in some affected nematodes. *Vorticella* sp. did not show any host preference and was found attached to both plant parasitic and free-living nematodes.

Vorticella, a genus of peritrich protozoans also called "bell animalcules" on account of their shape, was first identified by Linnaeus, 1767. They are sessile fresh water forms reported from a variety of habitats, including plant roots in moist soil (Neumann and Martinoia, 2002) and sewage sludge (Nsaimana *et al.*, 1999; Laybourn-Parry *et al.*, 1999). Each individual possesses a contractile stalk with an adhesive pad, which it uses for attachment (Buhse, 1998). The sessile form transforms into a telotroch stage without the stalk and becomes free-swimming in search of a congenial environment. *Vorticella* spp. are largely bacterial feeders relying on the cilia around the margins of the oral cavity for feeding.

A *Vorticella* sp. (Fig. 1C) has been found attached to the integument of nematodes (Fig. 1A, D), tardigrades (Fig. 1E) and chironomids (Fig. 1B) in fresh extracts from soil samples from Great Field, a permanent grassland site at Rothamsted Research. The soil samples were processed using sieving and decantation and modified Baermann funnel techniques (Christie and Perry, 1951) and the organisms collected in suspension. About 60% of the nematodes were found to be infected with *Vorticella* sp. Each nematode had between two and six *Vorticella* attached on stalks to its cuticle. Presumably *Vorticella* sp. migrated through the fine pores of the mesh, at the top of the Baermann funnel, into the water along with the nematodes and later became attached to them. A slimy, sticky substance was observed on the cuticle of the affected nematodes, to which debris adhered. The nematodes with *Vorticella* attached to their cuticle were found to be moving initially but gradually became sluggish and finally died 18-24 hours after isolation. In some instances the co-existence of *Vorticella* and the nematophagous fungus *Catenaria anguillulae* was observed on the same nematode (Fig. 1D). Infection of nematodes by this fungus and consequent mortality has been extensively studied (Birchfield, 1960; Sayre and Keeley, 1969; Esser and Ridings, 1973; Deacon and Saxena, 1997) but infection of nematodes by *Vorticella* has not been previously reported. However, these organisms have been reported to cause tegumentary impairment in tadpoles of *Rana pipiens* and *Rana sylvatica* (Berrill, 2002) and infections of the eye stalk, antenna, uropod and egg masses of the fresh water prawn *Macrobrachium rosenbergii* (Tonguthai, 1997). In tadpoles, the infection results in translucent cloudy patches over the skin, interfering with gaseous exchange and making the tadpoles severely lethargic. In prawns, heavy infections resulted in mortality due to anoxia (Fisher, 1977). It is not clear whether nematodes developed similar symptoms but the cuticle is the main site of gaseous exchange in these organisms in the absence of respiratory organs.

The role of *Vorticella* sp. in regulation of nematodes is not clear as its attachment was found to be random and non-specific. The nematode species infected by the organism included plant parasitic (*Amplimerlinius* sp., *Pratylenchus* sp. and *Meloidogyne* juveniles), predatory (*Aporcelaimus* sp. and *Anatonchus* sp.) and bacteriophagous (*Mesorhabditis* sp. and *Acrobeloides* sp.) nematodes. The *Vorticella* sp., although a bacterial feeder, did not show any preference towards the bacteriophagous nematodes, thus ruling out the possibility of any trophic alliance.

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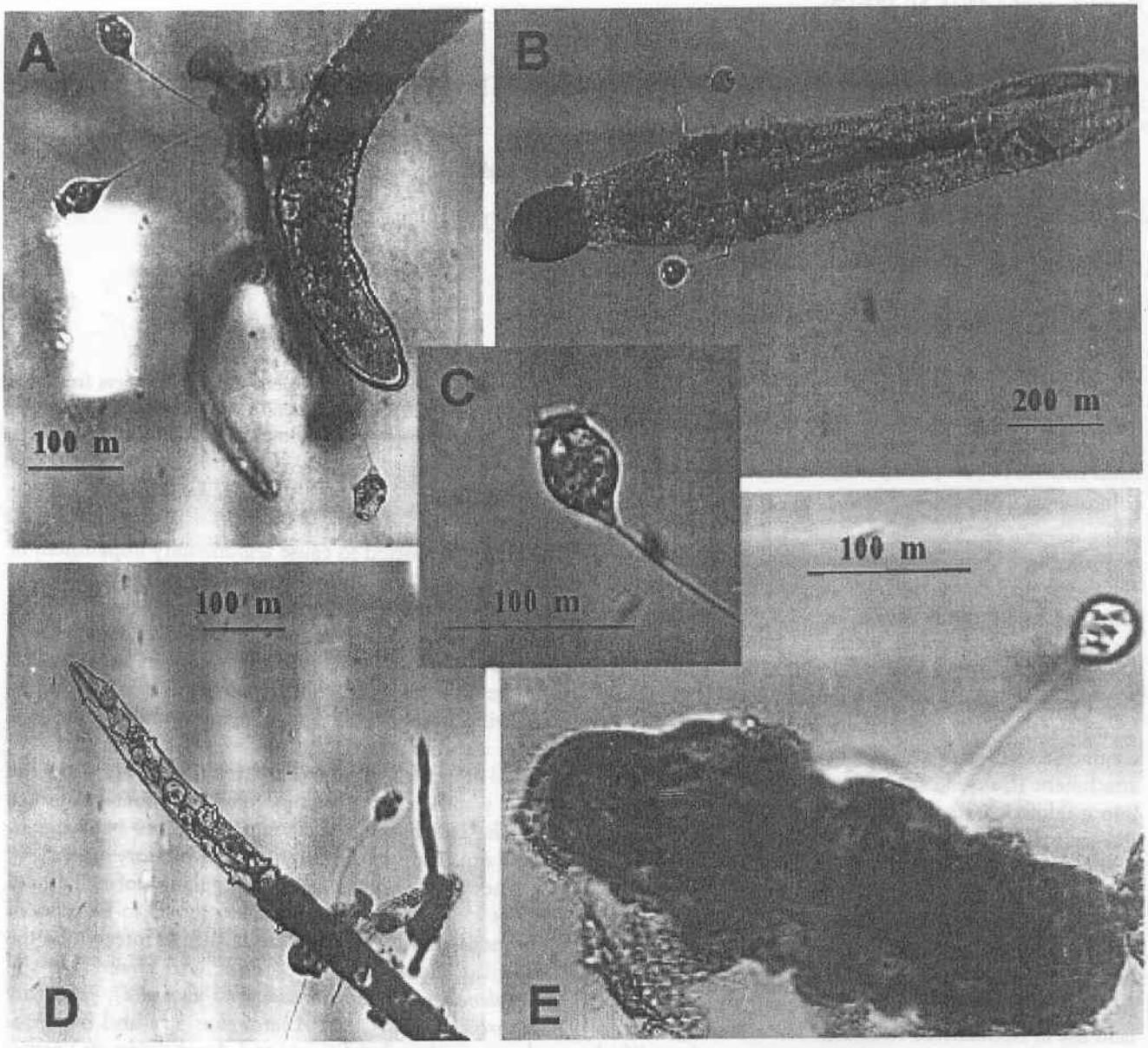

Fig. 1. *Vorticella* infestation: A *Aporcelaimus* sp. with adhered debris; B chironomid larva; C *Vorticella* sp. (magnified); D *Amplimerlinius* sp. (also infected with *C. anguillulae*); E tartigrade.

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