A POSSIBLE GUSTATORY ORGAN ASSOCIATED WITH THE ODONTOPHORE IN LONGIDORUS LEPTOCEPHALUS AND XIPHINEMA DIVERSICAUDATUM

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In the plant parasitic nematodes Longidorus leptocephalus (Hooper) and Xiphinema diversicaudatum (Micoletzky) the long spear has two parts, the odontostyle and the odontophore. The odontophore is a modification of the anterior oesophagus and contains three sinuses which lie parallel to and around the food canal. Each sinus opens posteriorly and has nerve tissue which connects with that in the oesophagus. Anteriorly the sinuses taper to a blind end but there are structures in the cuticle which link the sinuses and the food canal. Nerve processes in each sinus are contiguous with these structures and it is thought that this arrangement is a chemoreceptor sensing the contents of the food canal. The discriminating deep feeding behaviour of these nematodes and the position of the odontophore within the feeding apparatus supports the suggested gustatory function for the sinus tissues.

Even with the light microscope the odontophore (stylet extension) in Longidorus and Xiphinema spp. can be seen to be not completely solid. Sections show that the odontophores in both genera are similar in having three sinuses lying parallel and each adjacent to the food canal. During comparative electron microscope studies on the feeding apparatus of several Longidorus and Xiphinema species these sinuses were found to contain nerve tissue and related modifications to the walls of the sinuses adjacent to the food canal. These observations prompted a more careful examination of the structures within the odontophore.

Methods

L. leptocephalus and X. diversicaudatum from local populations were fixed in 3% glutaraldehyde, postfixed in 1% osmium tetroxide and embedded in ‘Araldite’ by the method of Robertson & Taylor (1975). Specimens were sectioned in the region of the odontophore in 1 µm steps using an LKB Ultratome I. Sections were stained with alcoholic uranyl acetate followed by lead citrate using the bulk staining techniques of Robertson & Roberts (1972) and examined in an Hitachi HS-8 electron microscope operated at 50 KV.

Observations

The characteristically long spear in Longidorus and Xiphinema has two parts. The anterior part, the odontostyle is solid except for the food canal and a narrow dorsal slit which extends for almost the entire length of the odontostyle (see
Robertson & Taylor, 1975). The posterior part, the odontophore is thought to be a modification of the anterior oesophagus (Taylor, Thomas, Robertson & Roberts, 1970). It provides a sufficiently posterior point of attachment for the protractor muscles to enable maximum protraction of the odontostyle (Fig. 1). Within the odontophore are three longitudinal sinuses, comprising a large ventral

Fig. 1. Diagram of the feeding apparatus of Xiphinema and detail of the odontophore. The general arrangement is similar to the feeding apparatus of Longidorus.