Comparative Stereoscan Electron Micrographs of Nematode Heads

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At a time when the application of stereoscan techniques to nematology is increasing, we felt it suitable to present a selection of pictures of a wide biological and systematic spectrum of nematodes.

The smaller species, *Tetradonema plicans* (Cobb) and *Prionchulus* sp. (Wu and Hoeppli) were fixed in TAF and dehydrated in glycerol. *Enoplus* sp. was fixed in Gordon's fixative and dehydrated in glycerol. *Mermis nigrescens* (Dujardin), *Ascaris lumbricoides* (Linne) and *Ascaris suum* (Goeze), *Dictyocaulus viviparus* (Block) and the hookworms *Ancylostoma caninum* (Ercolani), *A. ceylanicum* (Looss) and *A. tubaeforme* (Zeder) were fixed in formalin and slowly dehydrated in alcohol; all worms were mounted on aluminum studs using double-sided adhesive tape or silver DAG, and coated with gold/palladium (3). The specimens were viewed on a Cambridge Stereoscan microscope at 10-20 kV.

Figs. 1-3 show the arrangement of the teeth of three species of hookworms. *A. caninum* (dog, Fig. 1) and *A. tubaeforme* (cat, Fig. 2), although often treated as one species, are separate (2). *A. ceylanicum* (dog and man, Fig. 3) has cutting plates instead of teeth.

A thickened ring occurs just inside the oral opening of *Dictyocaulus viviparus* (Fig. 4).

It has been suggested that *Ascaris lumbricoides* (man, Fig. 5) and *A. suum* (pig, Fig. 6) may best be separated on the characters of the head (1, 11). Figs. 5 and 6 show some differences. The four papillae and small amphidial apertures (6) are shown in Fig. 6.

In *Enoplus* sp. (seaweed) the six setae are

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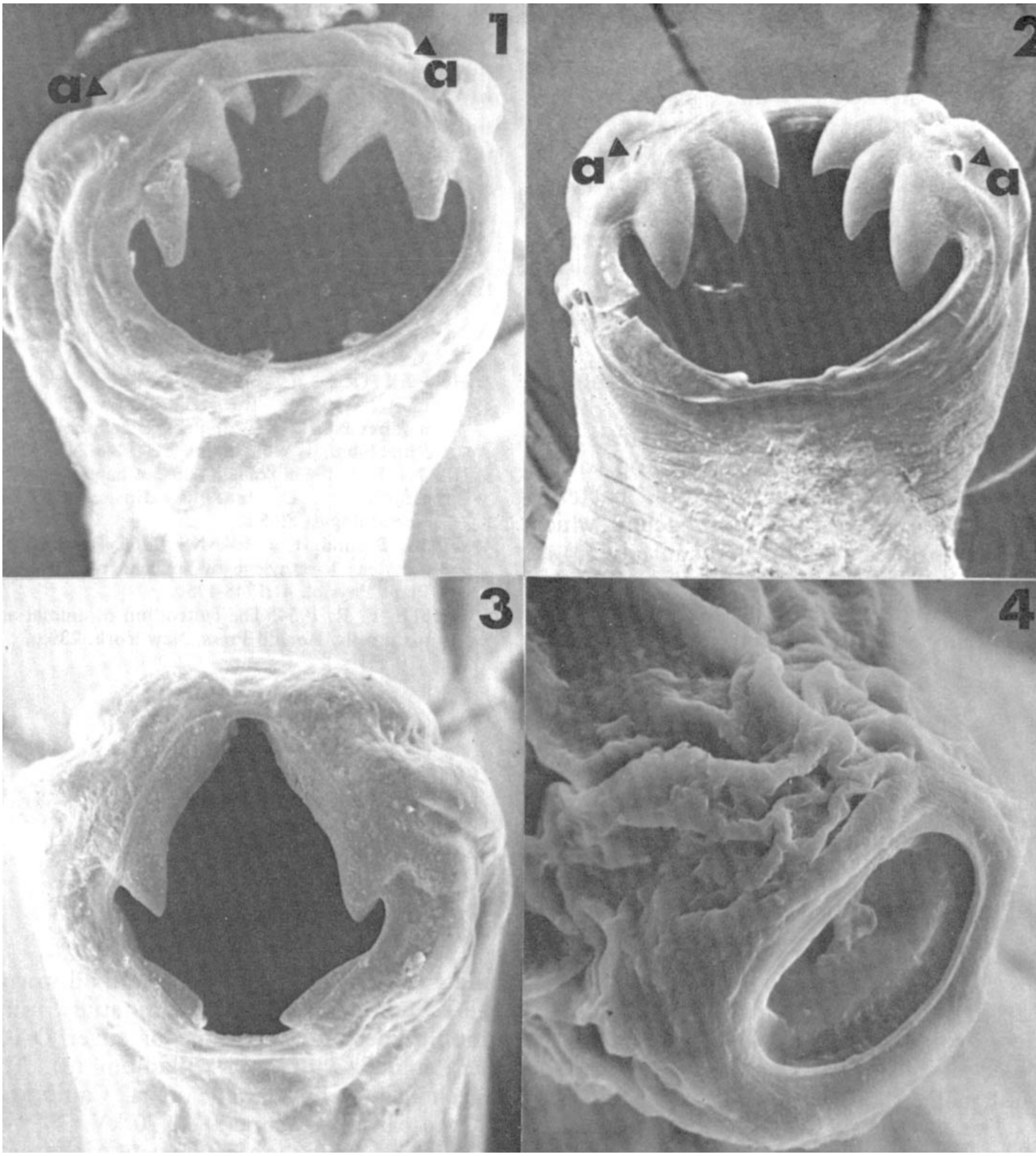

FIG. 1-4. Stereoscan electron micrographs **1**. Adult, *Ancylostoma caninum* (× 385); **2**. Adult, *Ancylostoma tubaeforme* (× 323); **3**. Adult, *Ancylostoma ceylanicum* (× 562); **4**. Adult, *Dictyocaulus viviparus* (× 1,192); a = amphidial apertuve.

composed of two fused elements (Fig. 7). Weiser (12) concluded on general anatomical grounds that *Enoplus* would be predatory, but we suggest the stoma is likely to be that of a browser.

Prionchulus sp. (soil) has a rounded, six-sided stomatal aperture (Fig. 8), apparently associated with the development of a shearing force during the powerful sucking action of the muscular pharynx.

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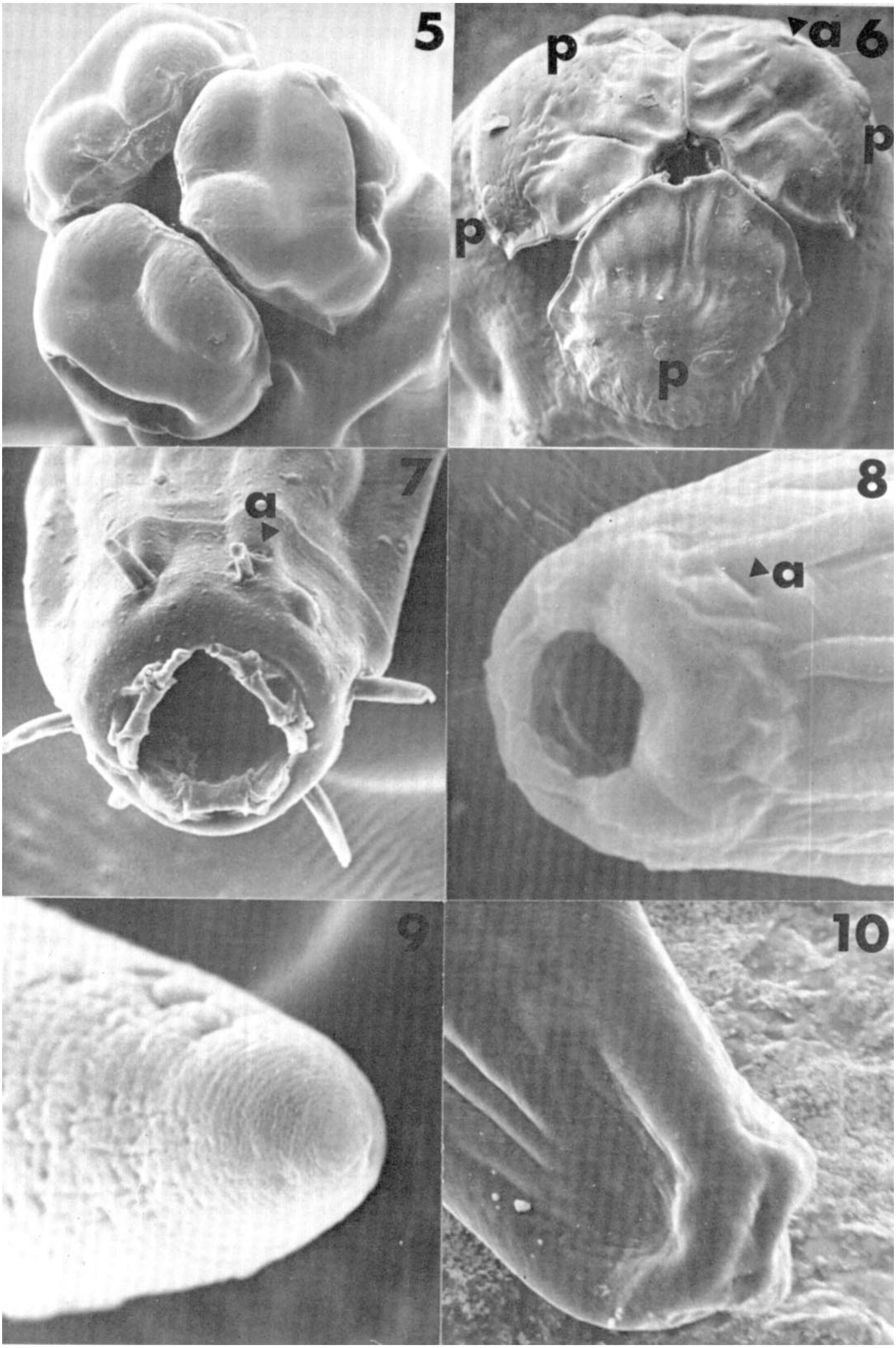
FIG. 5-10. **5**. Adult, *Ascaris lumbricoides* (× 120); **6**. Adult, *Ascaris suum* (× 100); **7**. Adult, *Enoplus* sp. (× 729); **8**. Adult, *Prionchulus* sp. (× 1,828); **9**. Adult female, *Tetradonema plicans* (× 1,825); **10**. Gravid adult female, *Mermis nigrescens* (× 281). Legend: a = amphidial aperture, p = papilla.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Two adult female parasites, *Tetradonema plicans (Bradysia)* and *Mermis nigrescens* (grasshopper), show no indication of a distinct stoma (Figs. 9, 10). Our photograph of *T. plicans* supports the latest observations of Hudson (4, 5). The absence or extensive modification of functional stomata in entomophilic species from the haemocoel may be a widespread phenomenon (7, 9, 10).

The position of the amphids varies in these species. In *Ascaris* and *Ancylostoma* the amphidial apertures are directed forwards, and it is conceivable that these organs are intimately associated with sensitivity in feeding or digestion (8). By contrast, the amphidial apertures of *Enoplus* sp. and *Prionchulus* sp. open behind the stoma and are less likely to be associated with feeding.

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