COMPARATIVE MORPHOMETRY OF INFECTIVE LARVAE OF COMMON NEMATODE PARASITES OF CATTLE IN KERALA

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A detailed morphometry of infective larvae of common gastrointestinal nematode parasites *Haemonchus contortus*, *Oesophagostomum radiatum*, *Trichostrongylus colubriformis*, *T. axei*, *Cooperia punctata*, *Bunostomum phlebotomum* and *Strongyloides papillosus* recovered from coproculture and egg culture of the worms collected from calves, heifers and adults of cattle was undertaken for identification and their differentiation.

Key Words: Morphometry, infective larvae, nematode, cattle.

Morphometric identification and differentiation of infective larvae is essential for evaluation of infections and pathogenicity of different parasites, epidemiological surveys and apply appropriate control measures against different gastrointestinal nematode parasites of cattle because, the eggs of gastrointestinal nematodes are difficult to differentiate. Morphology of infective larve of single or few species was studied time to time by different workers (Anantaraman, 1942; Sprent, 1946; Hansen and Shivanani, 1956; Berrie et al., 1988, Raman et al., 1996, Van Wyk et al., 2004) using few characters like size and tail sheath length. But for an accurate diagnosis particularly in mixed infection, other characters must also be taken into consideration. With this aim in mind the present study to identify the infective larvae of seven species of nematodes of cattle with complete morphological characters was undertaken.

Copro culture

Faecal samples and worms were collected from cattle brought to Veterinary hospital and slaughterhouses, respectively at Trichur and Mannuthy in Kerala. The faecal samples were examined for the presence of eggs by the routine centrifugal sedimentation technique. Positive faecal samples were cultured by following modified Veglia’s method (Sathianesan and Peter, 1970). Egg cultures were also set up with eggs recovered from worms, in a petri-dish with water.

Recovery and identification of infective larvae

After four days when large number of infective larvae had been developed, the culture bottle was kept horizontally over a table and small quantity of water was then introduced inside the bottle. The bottle was then rolled over the table gently, so that the water added, washed all the sides...
of the bottle and all the larvae were then pipetted out into a cavity dish for identification. A drop of suspected larval suspension was pipetted out from the cavity dish and transferred into a slide. It was then gently heated to immobilize and gradually kill the larvae to facilitate examination and cover slip was placed over it. The sides of the coverslip were then sealed with molten paraffin to avoid evaporation. Larvae from egg culture were also prepared in the same way. The larvae were then examined under a light microscope and identified based on studying the morphological peculiarities and measurements of various parts of the body. About 10-20 larvae were studied and finally their average had been taken (Table 1).

The morphometrical details of infective larvae of Haemonchus contortus, Oesophagostomum radiatum, Cooperia punctata, Trichostrongylus colubriformis, T. axei and Strongyloides papillosus are given in the Table 1 with previous authors measurements.

Besides these, the larvae were differentiated by the following Keys:

**Haemonchus contortus**: globular buccal capsule; kink in tail sheath just posterior to tail; tail sheath endings into a fine whip-like filament.

**Oesophagostomum radiatum**: Buccal capsule tubular; esophageal armature present; tail sheath very long, fine, filamentous; 16-20 intestinal cells.

**Trichostrongylus colubriformis**: Buccal cavity absent; 2 tubercles at the tail tip; tail sheath stumpy.

**T. axei**: Absence of tubercles at the tail tip.

**Bunostomum phlebotomum**: larvae with smallest body; long tail sheath; Oesophagus club shaped.

**Cooperia punctata**: Pear shaped buccal cavity; tail sheath short whip like; 2 oval bodies at the anterior end.

**Strongyloides papillosus**: Slender, naked, oesophagus is very long and filariform, tail tip bifid.

The various measurements and characters of the infective larvae of the nematodes of cattle on total length, breadth, sheath length, tail, intestinal cell and oesophagus were nearly similar as furnished by various authors. They were for Haemonchus contortus (Keith, 1953; Hansen and Shivanani, 1956), Oesophagostomum radiatum (Anantaraman, 1942; Keith, 1953), Trichostrongylus colubriformis (Keith, 1953; Hansen and Shivanani, 1956), Bunostomum phlebotomum (Krug and Mayhew, 1946; Sprent, 1946; Keith, 1953), Cooperia punctata (Hansen and Shivanani, 1956), and Strongyloides papillosus (Keith, 1953) The above authors did not mention all details of morphology. But present study gave all morphological details viz., nerve ring, excretory pore, genital primordium, rectum, anus and tail for correct identification.

**ACKNOWLEDGMENT**

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**REFERENCES**


Table 1: Comparative morphometry of infective larvae of common nematodes of cattle.

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Nematode</th>
<th>Body Length</th>
<th>Intestinal Intensity</th>
<th>Distance from anterior end</th>
<th>Genital Length</th>
<th>Tail Length</th>
<th>Tail Sheath Length</th>
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<tbody>
<tr>
<td>1</td>
<td>Haemonchus cardinalis</td>
<td>67.5-70.5</td>
<td>12.5-15.7</td>
<td>10.5-12.5</td>
<td>5.5-6</td>
<td>35-45</td>
<td>63.5-77</td>
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<tr>
<td></td>
<td>H. contortus</td>
<td>65-75</td>
<td>12-15</td>
<td>10-15</td>
<td>5-6</td>
<td>35-45</td>
<td>66.5-77</td>
</tr>
<tr>
<td></td>
<td>H. diversus</td>
<td>60-70</td>
<td>12-15</td>
<td>10-15</td>
<td>5-6</td>
<td>35-45</td>
<td>65.5-78</td>
</tr>
<tr>
<td>2</td>
<td>Oesophagostomum radiatum</td>
<td>75-80</td>
<td>15-18</td>
<td>12-15</td>
<td>6-8</td>
<td>50-60</td>
<td>80.5-90</td>
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<tr>
<td></td>
<td>Eustrongylus trachea</td>
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<td>15-18</td>
<td>12-15</td>
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<tr>
<td></td>
<td>Cooperia punctata</td>
<td>78-83</td>
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<td>6-8</td>
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