

Morphological characterization of *Setaria* worms collected from cattle

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Abstract Morphological characters of *Setaria* sp. collected from cattle and buffaloes were studied. Three species *Setaria digitata*, *Setaria cervi* and *Setaria labiatopapillosa* were identified in the present study. Out of the 500 cattle screened 187 were found to harbour worms. 56.8 % (106) of animals with *S. digitata*, 24.13 % (45) had *S. cervi* and 18.96 % (36) had *S. labiatopapillosa*. Morphological characters of male and female worms of all the three species were studied in detail.

Keywords *Setaria digitata* · *Setaria cervi* · *Setaria labiatopapillosa* · Cattle · Morphology

Introduction

Filarial nematodes of *Setaria* sp. usually lives in the peritoneal cavity of cattle and the larvae called as microfilaria are found in the blood. Adult worms are generally considered to be non pathogenic although they may cause a mild fibrinous peritonitis, but the larval forms caused serious conditions. They migrate erratically into the central nervous system of unnatural hosts such as horses, sheep and goats leads to serious and often fatal neuropathologic disorder known as epizootic cerebrospinal setariosis or cerebrospinal nematodiasis or kumri or lumbar paralysis. This study was undertaken to morphologically characterize

various species of *Setaria* of cattle based on the anterior and the posterior ends of the worms.

Materials and methods

Cattle slaughtered at the Karnataka Meat and Poultry Marketing Corporation Limited (KMPMCL) Slaughter house, Bangalore and animals subjected to post mortem examination at the Department of Veterinary Pathology, Veterinary College, Hebbal, Bangalore and other institutes in and around Bangalore were screened in the present study. A total number of 500 cattle were screened during the study.

Collection and processing of worms

The peritoneal cavities of animals were thoroughly searched during evisceration and the worms were collected in normal saline. The worms were counted and male and female worms were separated based on their length. For identification of species, the cephalic and caudal ends of the worms were mounted separately in a clearing and mounting medium Rubin's mountant. Speciation was done based on the descriptions of Shoho (1958), Willard and Walker (1969), Sonin (1977) and Anderson (1992). The length and width of *Setaria* worms were also measured.

Results

Out of the 500 cattle screened, 187 (37.4 %) were found to harbour *Setaria* worms in the peritoneal cavity. Three species of *Setaria* viz., *Setaria digitata*, *Setaria cervi* and *Setaria labiatopapillosa* were observed in the present

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Fig. 1 *Setaria* sp. female worms—Gross

study. Out of the 187 cattle which were positive for *Setaria*, 106 (56.8 %) had *S. digitata*, 45 (24.13 %) had *S. cervi* and 36 (18.96 %) had *S. labiatopapillosa*. Mixed infection with all the three *Setaria* sp. was found in 30 animals (16.04 %). The worms were found freely in the peritoneal cavity or attached to the intestines, mesentery, walls of the peritoneum, lungs, liver, heart, urinary bladder, uterus and fascia. Some worms were found embedded in patches of inflammatory tissue attached to the visceral walls of the pelvic peritoneum.

The average body length and width of *S. digitata* female worms was 156 and 0.70 mm, respectively whereas that of *S. digitata* male worms was 82 and 0.50 mm, respectively. The average body length and width of *S. cervi* female worms was 142 and 0.48 mm, respectively whereas that of *S. cervi* male worms found to be 76 and 0.47 mm, respectively. The average body length and width of *S. labiatopapillosa* female worms was 150 and 0.60 mm, respectively whereas that of *S. labiatopapillosa* male worms was 80 and 0.40 mm, respectively. The gross female and male worms are depicted in Figs. 1 and 2, respectively.

Setaria digitata female worms had a peribuccal crown with a central “helmet” at the cephalic end and the lateral lips were triangular (Fig. 3) and the tail end terminated in a smooth knob with oval lateral appendages (Fig. 4). Cuticle was smooth in *S. digitata* female worms. *S. digitata* male worms also had cephalic ends similar to females but the cuticle was corrugated (Fig. 5). In *S. digitata* males, the right spicule was stout and thick with a narrow proximal end whereas the left spicule had a shaft and a blade (Fig. 6).

Setaria cervi females had crescentic lateral lips (Fig. 7) with tails studded with spines (Fig. 8). In *S. cervi* males, the cephalic end was similar to females with corrugated cuticle (Fig. 9) and in the caudal end, the right spicule was shorter and the left spicule had a tubular chitinous part with

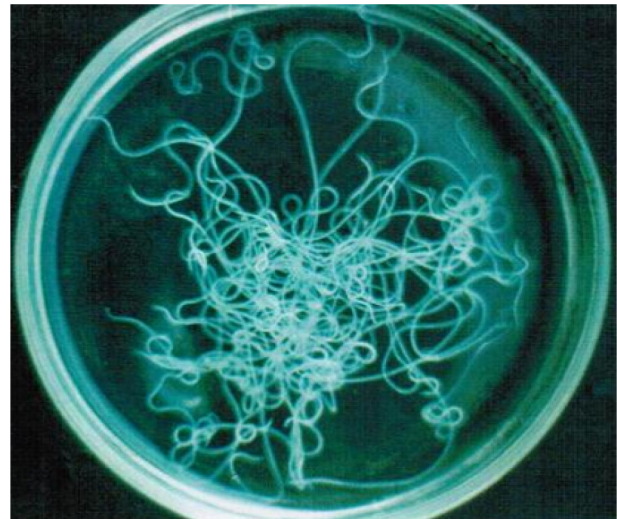


Fig. 2 *Setaria* sp. male worms—Gross



Fig. 3 *Setaria digitata* female worms—Cephalic end



Fig. 4 *Setaria digitata* female worms—Caudal end

an expanded proximal end with narrow and bifid distal end (Fig. 10).

Setaria labiatopapillosa females had a prominent peribuccal crown with rectangular lateral lips (Fig. 11) and tail end has a smooth button with pointed lateral appendages (Fig. 12). Cephalic end of male *S. labiatopapillosa* worms

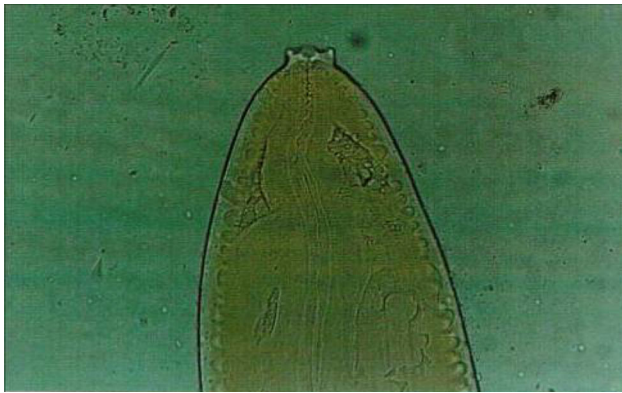


Fig. 5 *Setaria digitata* male worms—Cephalic end

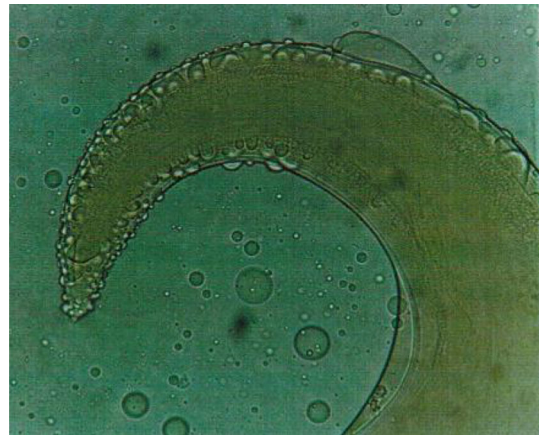


Fig. 8 *Setaria cervi* female worms—Caudal end



Fig. 6 *Setaria digitata* male worms—Caudal end

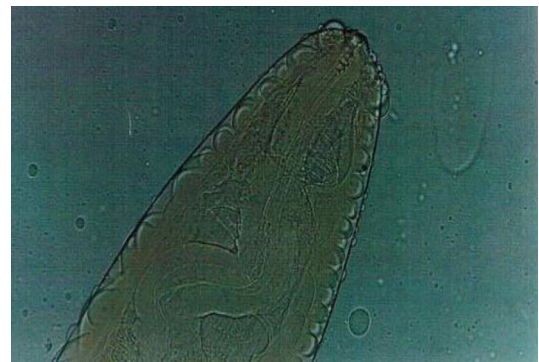


Fig. 9 *Setaria cervi* male worms—Cephalic end

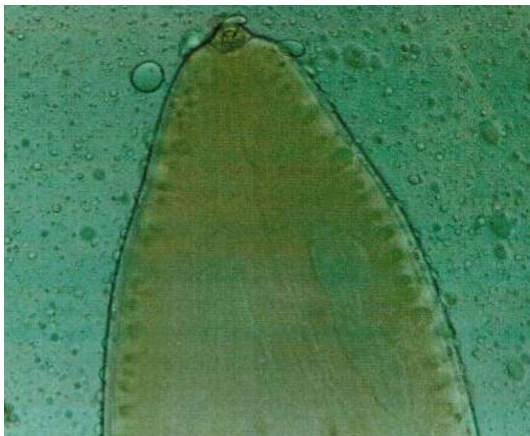


Fig. 7 *Setaria cervi* female worms—Cephalic end

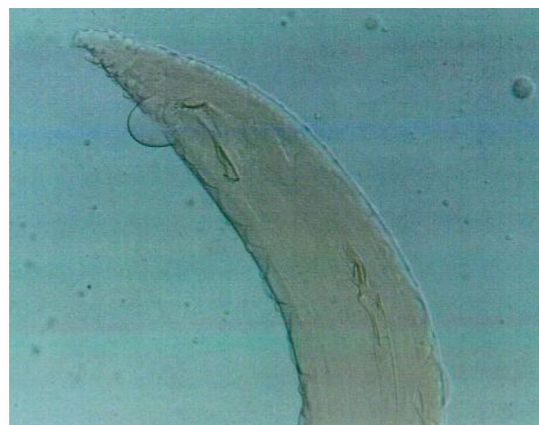


Fig. 10 *Setaria cervi* male worms—Caudal end

also had a prominent peribuccal crown and triangular lateral lips as in females (Fig. 13). Caudal end of *S. labiatopapillosa* males was highly coiled with less prominent right spicule and left spicule was wider in the middle and ending indistinctly (Fig. 14).

Discussion

Reports on prevalence and location of various species of *Setaria* worms in cattle from India and abroad were recorded. *S. digitata* adult worms found in the urinary bladder (Alwar and Lalitha 1954; Yoshikawa et al. 1976;



Fig. 11 *Setaria labiatopapillosa* female worms—Cephalic end

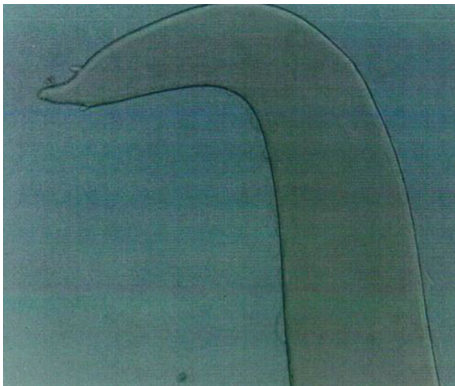


Fig. 12 *Setaria labiatopapillosa* female worms—Caudal end



Fig. 13 *Setaria labiatopapillosa* male worms—Cephalic end

Thirumurthy et al. 1995), eye (Otake 1980, Ohtake et al. 1989), epicardium of the heart (Fujita et al. 1985) and in the lungs and mesenteric lymph nodes (Ashizawa and Moritomo 1989). *S. cervi* worms observed in patches of inflammatory reaction in the visceral peritoneum (Sarwar

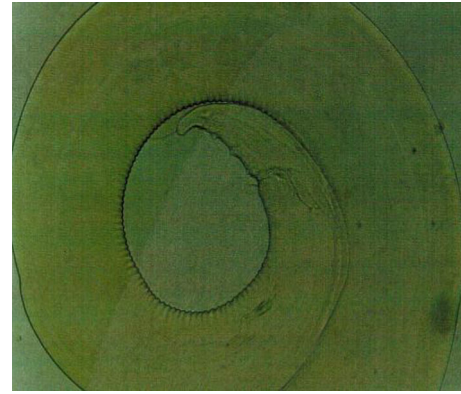


Fig. 14 *Setaria labiatopapillosa* male worms—Caudal end

1945; Chauhan and Pande 1980), liver (Vasudev 1955) and spinal cord (Pachauri 1972). *S. labiatopapillosa* has been reported from the anterior chamber of the eye (Rao 1941), peritoneal cavity (Osipov 1972) and diaphragm (Pelligrini et al. 1980) where these worms were found to be associated with inflammatory reactions. In the present study, several worms were found embedded in areas of inflammation attached to the visceral walls of the pelvic peritoneum. Haemorrhagic inflammation was also observed in the peritoneal wall and noticed in bulls. These findings are in accordance with the reports of Sarwar (1945) and Chauhan and Pande (1980) indicating that these worms can cause inflammatory reactions in their normal sites also.

In cattle particularly prevalence of *S. digitata* has been found to be more common than *S. cervi* and *S. labiatopapillosa*. Shoho (1958) from Ceylon, Mohan (1975) from Andhra Pradesh, Patnaik (1989) and Mohanty et al. (2000) from Orissa reported the prevalence of *S. digitata* in cattle ranging from 77 to 95 %. However, in the present study although the prevalence of *S. digitata* was the highest, i.e., 56.8 % compared to *S. cervi*, 24.13 % and *S. labiatopapillosa*, 18.96 %, the overall prevalence was lower compared to the above reports. This variation could be possibly due to variations in climatic conditions, geographical location, and susceptibility of the animals and other factors.

Prevalence of *S. cervi* in cattle as observed by Frickers (1948) from Surinam and McFadzean (1955) from Gambia was 42 and 32.69 %, respectively, which is less compared to the prevalence of *S. digitata* in the present study. Mohan (1975) concluded that *S. cervi* was the least common species occurring in South India among cattle. The present study is also in agreement with the observation of Mohan (1975) wherein the prevalence of *S. cervi* was 24.13 %. Apart from few prevalence reports (Rao 1941; Sarwar 1946), In India, cattle has been found to be less affected by species of *S. labiatopapillosa*. However, Patnaik (1989) from Orissa recorded 19.3 % of the cattle to be infected with this species. But several reports from abroad indicated

a higher infection rate, viz., Green and Trueman (1971) from Australia (75 %), Brengues and Gidel (1972) from France (50 %) and Ogbogu et al. (1990) from Nigeria (58.6 %). Also, this species has been reported to be the most common species among cattle in the United States and Canada (Willard and Walker 1969). In India, Rao (1941) from Andhra Pradesh and Sarwar (1946) from New Delhi reported the prevalence of this species in cattle, but in the present study, 18.96 % of the cattle found revealed *S. labiatopapillosa* which is low compared with other countries wherein *S. labiatopapillosa* species occurred in the regions with temperate weather conditions except for Nigeria which implied the adoption of the species for cooler climatic conditions.

All the morphological characters of the three species of *Setaria* encountered in the present study were in accordance with the description of Shoho (1958), Willard and Walker (1969), Sonin (1977) and Anderson (1992).

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