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**Sudhakar Kommu**  
Department of Veterinary  
Parasitology, PVNRTVU  
Hyderabad, Telangana, India

**GS Sreenivasa Murthy**  
Department of Veterinary  
Parasitology, PVNRTVU  
Hyderabad, Telangana, India

**G Rajeshwari**  
Department of Veterinary  
Parasitology, PVNRTVU  
Hyderabad, Telangana, India

## ***Oesophagostomum radiatum*: The nodular worm infection in calves and larval recovery from nodules**

**Sudhakar Kommu, GS Sreenivasa Murthy and G Rajeshwari**

### **Abstract**

The pathogenic effect of *Oesophagostomum radiatum* in cattle is attributed to the nodules in the intestine and it is the most damaging worm to cattle when present in large number. Repeated exposure to the infective larvae may result in the accumulation of large numbers of fourth stage worms in nodules. The calf intestines having nodules were collected and processed both by acid pepsin method and by pressing the nodules in between two slides. Both of the procedures revealed the presence of larvae which later on was confirmed to be fourth stage (L4) male larvae based on the its morphological characters such as presence of buccal capsule; the size of the tail which is generally short, dorsally directed and ended abruptly with a ventral truncation.

**Keywords:** *Oesophagostomum radiatum*, Calves, Nodular worm, L4 Larvae, Acid pepsin

### **1. Introduction**

*Oesophagostomum radiatum* (nodular worm) being the significant parasite and the most frequently encountered large bowel parasite of cattle. The life cycle of the parasite in calves never exposed previously to the infection have been described by Andrews and Maldonado (1941) [3] and Anatarman (1942) [2]. *O. radiatum* adults (14-22 mm long) are whitish and found in thick mucus in the caecum and proximal colon. Numerous nodular lesions, 3-6 mm diameter and resulting from the histotrophic phase, appear scattered on the serosa of the small intestine and to a lesser extent the caecum and colon. In heavy infections, the caecal and proximal colonic mucosa is congested, oedematous and thickened with excessive amounts of turbid mucus (Hutchinson, 2009) [7]. Formation of nodules has little pathogenic significance in cattle (Taylor *et al.*, 2007) [9]. Emergence of histotropic fourth-stage larvae from the submucosal cysts was associated with intestinal hemorrhage in all experimentally infected calves (Bremner, 1974) [4]. The chronic disease may occur in young stock (in which it may be fatal) and in old ones (which usually recover); sometimes there is death of young animals. Bremner (1976) [5] indicated that the resistance of cattle to initial infection with *O. radiatum* increases with age.

### **2. Materials and Methods**

Calf intestines containing nodules (Fig. 1) were collected during post mortems conducted by Dept. of Pathology at College of veterinary science, Rajendra Nagar, Hyderabad. Intestines were washed properly in tap water and opened up to check for the presence of adult nematodes. The nodules were carefully dissected out. Few nodules were pressed between two slides and few were subjected for acid pepsin digestion for larval recovery. The nodules were kept in required amount of acid pepsin and incubated at 40°C for 1-2 hour. The digested tissue were removed and the liquid was strained by using 38µm sieve to get the larvae (Hutchinson, 2009) [7].

### **3. Results**

The pressing of the nodule revealed the presence of larvae. Larvae were also recovered through acid pepsin digestion technique (Fig 2). The morphology of the larvae was studied. The larva was in L4 stage and it was going to develop into a male.(Fig. 3) The fourth stage larva has an oval, thin walled provisional buccal capsule. Cervical papillae appear and the oesophagus takes on the form of that in adults. Sexes can be differentiated by the shape of the tail, which in the male is directed dorsally and is shorter than that in the female (Anderson, 2000) [2]

**Correspondence**  
**Sudhakar Kommu**  
Department of Veterinary  
Parasitology, PVNRTVU  
Hyderabad, Telangana, India

#### 4. Discussion

Marotel (1908) [6] recognized that the three morphological stages found in nodules in cattle in France belonged to *O. radiatum*. The larval form found inside the nodule was confirmed to be L4 stage of male and the morphological features such as presence of buccal capsule and the short size of tail which ended abruptly with a truncated appearance on the ventral side which is in accordance to the information provided by Anderson (2000) [2]. According to Bremner (1974, 1976) [4, 5], *O. radiatum* is more pathogenic



**Fig 1:** Photomicrograph showing nodules on the calf intestine



**Fig 2:** Photomicrograph showing recovered larvae of *O. radiatum* through acid pepsin digestion method



**Fig 3:** Photomicrograph showing L4 stage male larvae of *O. radiatum* recovered by pressing the nodule in between two slides. b- Buccal capsule, t- tail to calves as compared to cattle and the resistance increases with age.

#### 5. Conclusion

In this study the larval stage was identified based on its morphology.

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