

# Human Ocular Thelaziasis: First Case Report from Sikkim

Dr. Sunu Hangma Subba<sup>1</sup>, Dr. Diki Ongmu Shenga<sup>2</sup>, Dr. Tara Sharma<sup>3</sup>,  
Dr. Tenzing Choden<sup>4</sup>, Dr. Karma Doma Bhutia<sup>5</sup>

**Abstract:** This is a case report of two cases of human ocular Thelaziasis from Sikkim. The two patients came to the Ophthalmology Department, Sir Thutob Namgyal Memorial (STNM) Hospital, Sikkim with the complaint of something moving inside the eye associated with itching and foreign body sensation. The ophthalmologist examined under slit lamp and removed four motile, white worms from the left fornix and right conjunctival sac separately from two patients. The worms were received in the Microbiology Department, STNM Hospital, for identification, which were identified based on morphology as one female and three male adult worms of *Thelazia callipaeda*. They are primarily veterinary parasites, but may occasionally infect humans. This is the first time *Thelazia callipaeda* has been reported from Sikkim, a small hilly state in North-Eastern part of India. Although it has been reported from other North eastern states like Assam and Manipur earlier.

**Keywords:** Ocular Thelaziasis, Sikkim, *Thelazia callipaeda*

## 1. Introduction

Spirurid nematodes in the genus *Thelazia* may occasionally infect humans. The majority of zoonotic infections involve *T. callipaeda* (the Oriental eye worm), *T. californiensis* (the California eye worm) and *T. gulosa* (the cattle eyeworm) are less common causative agents.<sup>1</sup> Two species of *Thelazia*, namely *T. callipaeda* and *T. californiensis* (reported from California) are known to cause human Thelaziasis.

*Thelazia callipaeda* are transmitted by *Drosophila* flies to mammals including humans.<sup>3</sup> *T. callipaeda* is primarily a parasite of the dog, rabbit, cat, foxes, and occasionally human. The adult worm inhabits the orbit, conjunctival sac, or lacrimal glands. It is primarily reported from oriental countries of South Asia like India, Myanmar, China, Thailand, Japan, Korea, and Russia.<sup>3</sup> Clinical manifestation includes conjunctivitis, ocular pruritis, lacrimation, congestion and discharge, corneal oedema and corneal ulceration in severe infection. In India, the role of vector in the transmission of Thelaziasis has not been studied so far. The increase in the number of human cases in India merits for the study of transmission dynamics of Thelaziasis.<sup>2</sup>

Infective third-stage larvae of eyeworm are transmitted by insects that feed on lacrimal secretions of infected animals and humans that contain *Thelazia* spp. first-stage larvae. In the vector *T. callipaeda*, first-stage larvae undergo 3 molts ( $\approx 14-21$  days), and infective third-stage larvae may be transmitted to a new receptive host and develop into the adult stage in ocular cavities within  $\approx 35$  days. Competence of drosophilid flies of the genus *Phortica* as vectors of *T. callipaeda* has been recently demonstrated.<sup>8</sup> We report here two cases of ocular Thelaziasis in an adult male and female patient from a rural area of Sikkim.

## 2. Case Description

The first case is a 28-year-old male, farmer, cattle in the house, from a rural area of Rangpo, East district of Sikkim. He came in May 2019 to Ophthalmology Department, STNM Hospital, Sikkim with history of two creamy white worms removed from his right eye associated with foreign body sensation in the same eye. The patient did not give any

history of pain, itching, redness of eye or seeing any floating object in the field of vision during this period. The patient could not recollect any history of trauma. Vision was recorded normal. Fundus examination revealed no abnormal finding. On slit lamp examination two creamy white, motile, translucent, thread like worms were detected moving in the lateral fornix of right eye. They were extracted with sterile forceps, put in 10% formalin and received in the Microbiology Department, for identification. Second case came in June 2020. A 19-year-old female, college student, resident of Mangalbarey, West district of Sikkim. No history of any domestic pets in the house. She presented with complaints of removal of 2-3 worms from her left eye. Patient also had watering from eyes and foreign body sensation from the same eye. On slit lamp examination two similar worms were detected moving in the conjunctival sac on left eye. The worms were received in the Microbiology department for the identification.

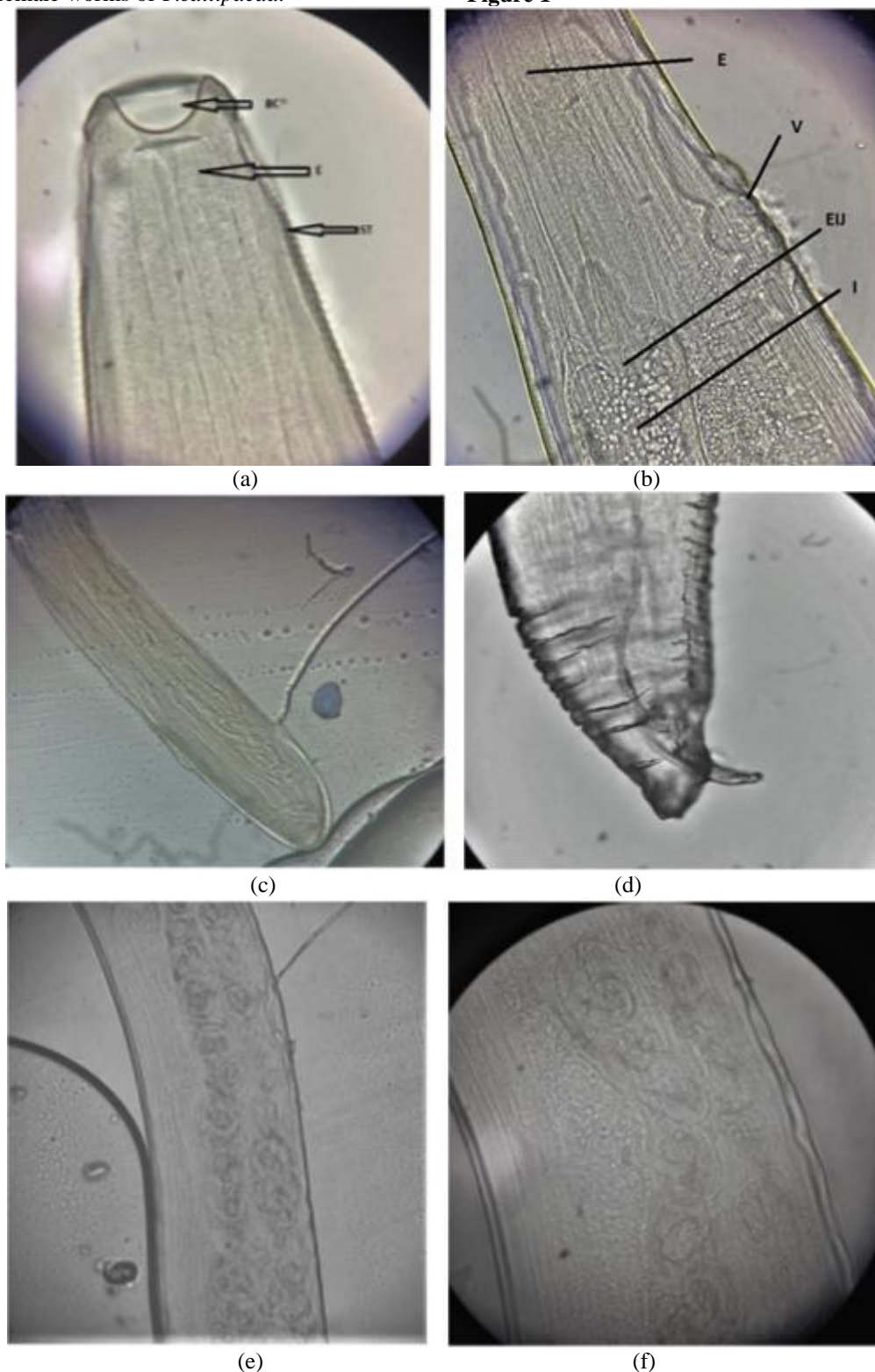
### Microbiology

Morphologically the worms were thin, thread like and white to creamy in colour. Of the four worms one was female and three were male, based on length, the female was measuring 10-14 mm and male were 8-9mm in length.

On microscopic examination, the anterior end had a distinct buccal cavity, rectangular with no tooth like structure, with prominent cephalic extension protruding anteriorly. **Figure 1(a)** A muscular oesophagus was observed and the intestine could be traced up to the posterior end. The tail was blunt with no spicule in female whereas in males the tail was pointed with spicule. **Figure 1(c), (d)** The length and the form of the spicule differ greatly. The left-hand filamentous spicule was longer than the short and stubby spicule on the right. **Figure 1(d)** The anal opening was not distinct. The vulva in female worm was anterior to esophago-intestinal junction. **Figure 1(b)** This morphology differentiates *T. callipaeda* from *T. californiensis* as the latter's vulval opening is posterior to esophago-intestinal junction.<sup>2</sup> Numerous coiled larvae were seen in the uterus of the female worm. **Figure 1(e)** Mature eggs were also seen in the posterior half and larvae were in anterior half of the worm. Transverse cuticular striations were seen on the whole body of the worm. **Figure 1(a)** On the basis of these

morphological characteristics, the worms were identified as adult male and female worms of *T.callipaeda*.

**Figure 1**



**Figure 1** (a) Anterior portion of female *Thelazia callipaeda* showing cephalic end and rectangular buccal part; (b) Anterior portion of the worm with the vulval opening located anterior to esophago–intestinal junction; (c) Blunt posterior end of female showing the intestine. (d) posterior end of male with the left-hand filamentous spicule longer than the short and stubby spicule on the right. (e) Larvae in the anterior half of the worm; (f) Numerous larvae in the anterior half (BC: Buccal cavity, E: oesophagus, ST: Striated cuticle, V: Vulval opening, EIJ: Esophago-intestinal junction, I- Intestine)



**Figure 2:** Adult worms after removal from eye.

The symptoms of the patient resolved after the removal of the worms and local anaesthesia eye drops (4% xylocaine). The patients were treated with Tab albendazole 400mg stat and repeated after 2 weeks and mild antibiotic-steroid eye drops for 10 days.

### 3. Discussion

Human Thelaziasis has been reported worldwide. Subsequently there are a few cases of human Thelazia reported from India namely Manipur, Assam, TamilNadu and Himachal Pradesh.<sup>4</sup>

In the present cases, the first case belonged to a rural region whose livelihood is farming and cattle rearing. The second case also belongs to a rural region with climate being hot and humid. Cattle rearing, contact with stray dogs, mountainous terrains, and rainy season make the humans vulnerable to ocular Thelaziasis. Conjunctival and corneal injuries and traumatic conjunctivitis facilitate the introduction of the larvae into the subconjunctival space and vitreous cavity.<sup>3</sup> In the present cases, cattle rearing and environmental surrounding was the predisposing factor. In addition, the north-eastern region of India has mountainous and foothill terrains with heavy and long monsoon with favourable temperature throughout the year, providing an ideal home for a variety of insects that play an important role in transmitting many vector-borne diseases of medical and veterinary importance.<sup>4</sup>

It is difficult to differentiate between *T. callipaeda* and *T. Californiensis* when morphological characteristics are not clearly evident. Adult worms for both species are creamy-white and measure up to 0.75 X 13.00 mm in males and 0.85 X 17.00 mm in females. The cuticle is transversely striated. In both sexes, the oral opening is hexagonal. Thelazia have a well-developed buccal cavity and a rather short oesophagus. In male worm the tails have spicules which are asymmetrical and they differ considerably in size and shape. The right spicule is very short and sturdy and the other one is about 10 times longer and filamentous. The genital opening of the female has a short flap and is located in the anterior region of the body anterior to the esophago-intestinal junction in *T. callipaeda* whereas it is positioned posterior to the esophago-intestinal junction in *T. Californiensis*. Females are ovo-viviparous. Female's posterior end is rounded and blunt. The anal opening is close to the caudal end. *T. callipaeda* can be distinguished morphologically from *T. Californiensis* based on the numbers of pre- and post-cloacal papillae in the

male. Male *T. callipaeda* have 8-10 pairs of precloacal papillae while *T. Californiensis* have 6-7 pairs. The numbers of the male's pre and postcloacal papillae and the position of the female's vulva are used as a basis in differentiation of Thelazia species.<sup>5,6</sup>

In the present cases the worms had cuticular transverse striation all along the body with a typical hexagonal/rectangular buccal cavity with no teeth like structure. The vulva was positioned anterior to esophago-intestinal junction as in *T. callipaeda*. The male was shorter than female in length and had pointed tail with spicule with short and long filament whereas female was longer in length with gravid uterus filled with coiled immature larvae and blunt tail with no spicules. male's pre and post cloacal papillae could not be appreciated in microscopy. The worms could not be processed for confirmation by molecular methods (PCR) since the worms were collected in formalin solution.

Intermediate hosts or vectors for Thelazia spp. are drosophilid flies that feed on lacrimal secretions (lacrimophagous) and associations are parasite-specific. For example, *Phortica* (*Amiota*) *variegata* and *P.okadai* are the primary intermediate hosts for *T. callipaeda*. The presence of these vectors in these areas can be ventured in future.<sup>7</sup>

### 4. Conclusion

The infection in first case might have occurred from close association with infected cows since he was a farmer. In the second case the patient used to reside in rural area where the climate is warm with humidity so could be the environmental factor favourable for drosophilae flies. Thelaziasis prevention is extremely low-priority in all countries and understandably so. Still, in some areas, like parts of India where there is a high infestation rate among dogs, there is cause to act.

Untimely or incorrect treatment of the infection may result in a delay in recovery, mainly in children and the elderly, who are most likely to be exposed to infection by the fly. Although treatment for canine infection with *T. callipaeda* with topical organophosphates, 1% moxidectin, or a formulation containing 10% imidacloprid and 2.5% moxidectin is effective, mechanical removal of parasites in humans remains the only curative option.<sup>8</sup> Thus, prevention of human thelaziasis should include control of the fly vector by use of bed nets to protect children while they are sleeping and by keeping their faces and eyes clean.

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