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## A new genus of insect parasitic nematode recovered from a mole cricket in Manipur, India

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**Abstract-** The present paper describes about a unique parasitic insect nematode recovered from the insect *Gryllotalpa africana* collected from Thangmeiband area (24° 49' 24" N and 93° 56' 10" E), of Imphal, Manipur. The described specimen is very different from all the already known thelastomatid nematodes in many important characters. The cephalic end is much protruded, rod like with blunt end enclosing a long mouth cavity in the form of a vestibule. Body is covered by thick transparent cuticle. Oesophagus long consisting of three parts- corpus, isthmus and a rounded valvular bulb. A slightly circular ridge present around at the beginning of the valvular bulb. Cephalic end is not annulated and body annulations are faintly visible. Tail is roughly conoidal with long filiform caudal appendage. Considering all these taxonomic characters, the present specimen was found to be different from any other known species, hence the present specimen is reported as new genus.

**Key words:** Nematoda, *Gambhiria* n.gen., Insect, *Gryllotalpa* sp., Manipur.

### INTRODUCTION

Nematodes are the highly diversified colourless, pseudocoelomate and triploblastic lower invertebrate. The body is covered by thick cuticle. The morphological structures are greatly related with their mode of adaptation to the environment. Nematode exhibit either free living or parasitic mode of life. They can parasitise wide range of host diversity including all invertebrate and vertebrate host. Insect parasitic nematodes are referred as entomophagous nematodes. Many species of entomophagous nematodes are economically very important to control the unwanted increase of population of insect pest damaging the agricultural crops, by using as a bio-control agent. Family Thelastomatidae Travassos, (1929)<sup>1</sup> is the largest family

of superfamily Thelastomatoidea which includes the entomophagous nematodes. The present specimen is elevated up to the level of new genus of the family thelastomatidae which is characterised with many distinct characters of having vestibule like mouth part, slightly constricted cuticle, tail conoidal having long filiform caudal appendages, etc. Basing on the characteristic features of the present specimen, it is proposed as a new genus and new species.

### MATERIALS & METHODS

Insects were collected from different localities of Manipur and brought to the laboratory in a ventilated plastic vessel in live condition and then dissected in a petri dish with a normal saline solution. The nematode specimen recovered from intestine of the host insect (*Gryllotalpa*

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*africana*) were fixed in A.F.A. (Alcohol Formalin Acetate) for few minutes. The fixed nematodes were transferred to G.A. (Glycerine alcohol) in cavity blocks which are ultimately transferred to the desiccator for complete dehydration. After few days the dehydrated specimen were mounted in pure glycerine on a slide, covered with nail polish and then the nematode was studied under the microscope. The diagram was drawn with the help of camera lucida and measurements were taken with the help of ocular. The present work follows the Seinhorst's (1959)<sup>2</sup> rapid glycerine method. All the measurement values are given in mm, if otherwise not mention.

### OBSERVATION

#### Generic Characters:

Body elongated and cylindrical. The cephalic end is much protruded, rod like blunt end enclosing a long mouth cavity in the form of a vestibule. Body covered by thick transparent cuticle. Mouth opening is rounded like a hole. Oesophagus long consists of three parts corpus, isthmus and rounded valvular bulb. A slightly circular ridge present around at the beginning of the valvular bulb. Vulva opens just below the mid-body. Eggs are oval in shape. Cephalic end is not annulated and body annulations are faintly visible. Tail is roughly conoidal with long filiform caudal appendage.

### DESCRIPTION

#### Female:

Body is elongated and cylindrical, measures 1.46-1.67 long and 0.11-0.12 wide. Cephalic end is protruded as a rod like structure with blunt end which surrounds the mouth part. The mouth cavity is much elongated in the form of vestibule measures 0.06-0.08 long and 0.01-0.025 wide. Body is covered with a thick transparent cuticle. Annulation is faintly visible and shows a little constriction at the middle of annules. Oesophagus 0.25-0.27 long, consisting of three parts corpus, isthmus and valvular bulb. Corpus is tubular, measures 0.12-0.14 long and 0.01-0.02 wide. Isthmus is very short, connect both the corpus and valvular bulb measures 0.01-0.02 long and 0.01-0.02 wide. Valvular bulb is rounded muscular, measures 0.03-0.04 long and 0.03-0.04 wide having a slightly circular ridge at the beginning of valvular bulb. Nerve ring surrounds the corpus at 0.14-0.17 from the anterior end. Cardia well developed. Excretory pore opens at 0.22-0.26 from the anterior end. Vulval opening at 0.82-0.90 from the anterior end. Eggs

are oval shaped enclosed by a thin shell containing one or two divided cells inside, measures 0.02-0.03 long and 0.01-0.02 wide. Anus opens at 1.38-1.48 from the anterior end. Tail is long conoid shape with long filiform caudal appendage, measures 0.11-0.21 long.

**Male:** Not found.

### RESULTS & DISCUSSION

The presence of certain distinctive morphological characters in the present specimen differentiates itself from other close relatives. The present specimen belongs to the order Oxyurida and family Thelastomatidae Travassos, (1929)<sup>1</sup> base on the cuticular modification of buccal cavity and cephalic extrimity. Thelastomatidae is one of the largest family of phylum Nematoda contains the following common genera viz.,

*Binema* Travassos (1925)<sup>3</sup>, *Blatticola* Schwenk (1926)<sup>4</sup>, *Cameronia* Basir (1948)<sup>5</sup>, *Cephalobellus* Cobb (1920)<sup>6</sup>, *Gryllophila* Basir (1942)<sup>7</sup>, *Hammerschmidtella* Chitwood (1932)<sup>8</sup>, *Isobinema* Rao (1958)<sup>9</sup>, *Leidynema* Schwenck (in Travassos, 1929)<sup>1</sup>, *Linstowiella* Basir (1956)<sup>10</sup>, *Pseudonymus* Diesing (1857)<sup>11</sup>, *Schwenkiella* Basir (1956)<sup>10</sup>, *Thelastoma* Leidy (1849)<sup>12</sup>, *Zonothrix* Todd (1942)<sup>13</sup>.

The present specimen differs from the above genera in having beautifully chiselled conoidal tail with much elongated filiform caudal appendage terminating into a hair like manner. The style of annulation is very much different from the above genera on the wide and also constriction at the middle portion of annules. Even though it shows some resemblance with genus *Isobinema* Rao 1958 in having the cuticle structure and the shape of the posterior part of the body, it differs from *Isobinema* in following characters:

Mouth part is large, elongated, rod shaped structure having large long hole of mouth cavity in the present specimen (mouth has a simple hole surrounded by eight labio papillae in *Isobinema*).

Valvular bulb has a circular ridge at the beginning (such circular ridge is not found in *Isobinema*).

Corpus is slightly tapers at the junction of the mouth cavity (but corpus is tubular and blunt at both the ends in *Isobinema*).

Each annule has an indistinct middle inward constriction in the present specimen which are uncommon to others species and annules are absent in *Isobinema*.

Polar filaments are absent (eggs are held together by a polar filament in string like fashion in *Isobinema*).

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The laid eggs and also egg present in the ovaries possess two cell stages inside the ooplasm

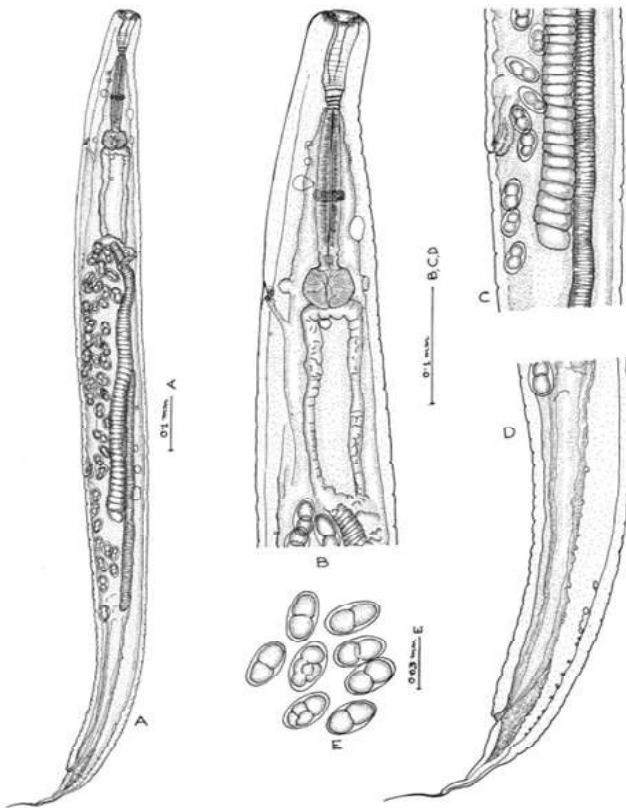
(Such distinct demarcation of cell division is not seen in the ooplasm of *Isobinema*).

After detail morphological analysis of the present specimen with respect to the other nematodes reveals many differencing characters and compel to propose a new genus and new species, for its accommodation.

**Table 1- Comparison of the present specimen *Gambhiria filicaudatum* n.gen. & n.sp. with its closest genus *Isobinema* Rao 1958**

(Measurements are given in millimetre unless stated)

| Characters     | <i>Isobinema</i> Rao 1958   | Present specimen   |
|----------------|---|--|
| Body           | 2.82-4.09 long and 0.34-0.36 wide.                                  | 1.46-1.67 long and 0.11-0.12 wide.   |
| Mouth part     | The mouth opening is simple hole surrounded by eight labio-papillae | Mouth part is large, elongated, tube like structure having large long hole of mouth cavity |
| Oesophagus     | 0.35-0.45 long  | 0.25-0.27 long (shorter)   |
| Valvular bulb  | Circular ridges are not seen at valvular bulb                       | Valvular bulb has a circular ridge at the beginning  |
| Corpus         | 0.273-0.315 X 0.03-0.037  | 0.12-0.14 long and 0.01-0.02 wide having slightly tapering at the anterior end.            |
| Cuticular wall | Smooth without of annules   | Each annule has an indistinct middle inward constriction which are not seen.               |
| Egg            | 0.054-0.06 X 0.03-0.036   | 0.02-0.03 X 0.01-0.02 and having divided two cells inside the ooplasm                      |
| Polar filament | Present   | Absent   |



**Fig. 1- Camera lucida drawing of *Gambhiria filicaudatum* n.gen. & n.sp. A. Entire female; B. Anterior end; C. Vulval region; D. Female posterior end; E. Eggs.**



**Fig. 2- Photomicrograph of *Gambhiria filicaudatum* n.gen. and n.sp. A. Major portion of anterior end; B. Major portion of posterior end.**

TAXONOMIC SUMMARY

|                         |   |
|-------------------------|---|
| <b>Genus</b>            | : <i>Gambhiria</i> n.gen.   |
| <b>Species</b>          | : <i>filicaudatum</i> n.sp.   |
| <b>Type Host</b>        | : <i>Gryllotalpa africana</i>   |
| <b>Type Habitat</b>     | : Posterior part of intestine.  |
| <b>Locality of Host</b> | : Thangmeiband (24° 49' 24" N and 93° 56' 10" E), Imphal West, Manipur. |

**Deposition of Specimens:**

Holotype and Paratype specimens were deposited to the Museum of Parasitology Section of, Centre of Advanced Studies in Life Sciences, Manipur University, Canchipur, Imphal, Manipur (India).

**Etymology:**

The generic name *Gambhiria* n.gen. is given after the name of Prof. R. K. Gambhir Singh, a parasitologist of this region for his contributions in the field of parasitology and species name *filicaudatum* n.sp. from the hair like filiform ending of tail.

**Ethical Approval:**

All the procedure of the research work using animal species insect host follows all the ethical standards of the Institutional Animal Ethics Committee of Manipur University (M.U/D.LSc.IAEC/1/19).

**CONCLUSION**

Considering the various morphological characteristics of the present specimen it cannot be accommodated under any genus of the family thelastomatidae as it has many characters which are quite dissimilar to others. Hence it is compelled to erect a new position to place the present specimen by giving new name *Gambhiria filicaudatum* n.gen. & n.sp. The new genus name is given in honor of Prof. R.K. Gambhir Singh, a renowned parasitologist of the state.

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