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A taxonomic note on the female reproductive system of parasitic nematodes

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Abstract : Parasitic nematodes have been taxonomically classified by many authors on the basis of their morphology & body size. In the present communication, however, special emphasis has been given on the female reproductive system as the key of nematode taxonomy.

Keywords: Taxonomic note, female reproductive system, parasitic nematode.

INTRODUCTION

Nematodes are generally - elongated, cylindrical, unsegmented, pseudocoelomate invertebrates with a body tapering at both ends. Their morphology and body size varies widely ranging from microscopic to very long, usually up to 18-20cm. However rarely few are exceptionally long. For example, *Placentonema gigantissima*, a parasitic nematode found in the placenta of sperm whale (reported by Gubanov, 1951) , is 8.0-8.4 meter long (perhaps it may be the longest nematode so far known).

For the convenience of study, parasitic nematodes can be broadly divided into - **plant-parasitic** /soil dwelling -nematodes found parasitic or infesting various plants and **animal parasitic** nematodes found in various animals , from insects to vertebrates , even causing serious infections or diseases . Parasitic nematodes being sexually dimorphic organism have a well developed separate reproductive system of male and female. A complete female reproductive system consist of one or two ovary , an oviduct, a seminal receptacle, tubular uterus , a vagina and an opening called as gonopore or vulva.

Usually or in majority of the nematodes the vulval opening is present in the mid ventral part of the body , with a variable locations, may be shifted to anterior (upward) or posterior (downward) depending on the species but specific for the species . On the basis of the number of arms (branch) and its position of extension, they are referred as - amphidelphic- when the two arms are extended on either side (side by side) , didelphic - when both the arms are extending in the same side , whether anterior or posterior to the vulval opening , monodelphic- when there is only one / single arm or branch and if it is extend towards the oral side /anteriorly it is termed as mono-prodelphic and if it extend towards the anal side /posteriorly it is termed as mono-opisthodelphic (Fig. -1). These are normal or usual terms used in the female reproductive system of Nematodes.

The location or position of the female gonopore is variable, no doubt depending upon the species . To cite few examples, in species like *Protellus shamimi* (Fig.-2) and *Protrellima imphalica* (Fig.-2) , the position of female reproductive opening is very much anterior to normal midbody location and is situated at the mid - oesophageal region. Again on the other hand quite contrary to it yet in another specimen described from Manipur (from an insect as n. g. and n. sp. by R.K.Gambhir et al. 2009) - *Lanceolata hexalatum* (Fig.-2) , the female reproductive

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opening is very much posterior being shifted downwards and located near the anal opening .

Besides the above mentioned positions of female reproductive openings, a rare specimen is encountered in 2006 , in which the position of gonopore is quite shifted from the above mentioned areas. This specimen is recovered from the house/ wall-lizard (*Hemidactylus* sp.) from two localities (in April, 2006 and May, 2008) .It was named as *Anterogoniporus filicaudatus* (Fig.-3). In this particular nematode (which is rare in occurrence and less in number) the female gonopore is found situated near the mouth opening , side by side at the terminal oral end . In this specimen the ovary is two in number, one arm extending downwards in the posterior region , even below the region of anal opening , extending up to some part of the tail region . The other arm is extending upward coming up to the oesophageal region. The vaginal region is very elongated and the point of bifurcation of the two arms are in the 1/4th of the region of the whole body length. The length of the vaginal tube is slightly more than twice the length of the oxyuroidoesophagus. Due to the presence of the gonopore at the anterior terminal near the mouth , the position of the mouth opening is shifted slightly away from the centre, to accommodate both the openings side by side (Fig. 3 / 3) enface. The vulval opening is simple , muscular, rounded without any extra structure such as vulval lip, flap, papillae, etc.

Such type of female reproductive system having the gonoporal opening at the anterior terminal , near the mouth is quite a rare occurrence . This peculiar type of arrangement of female reproductive system is still don't have a proper name but it must be assigned with a proper name . Few terms /names like the following can be considered by selecting only one :

- antero-amphidelphic
- antero-didelphic
- oralo-amphidelphic
- oralo-didelphic
- giving the emphasis on the presence of gonoporal opening at the oral-anterior end , near the mouth opening (side by side).(In my opinion **oralo-amphidelphic** is more preferred).

Such findings even though late may be treated as an addition of a piece of knowledge in the ocean of zoological science . It is also true that the solving of Nature's mystery in the biological world is not complete yet as many things

are still remaining hidden waiting for their exploration and discovery for recognition by the humankind.

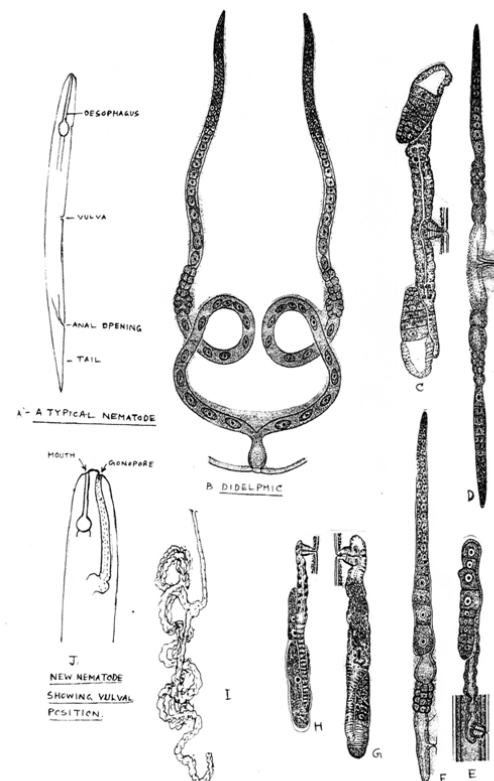


Fig. 1. Female reproductive organs of nematodes. B- didelphic, C,D - Amphidelphic, E,F Monodelphic, G,H - Monopisthodidelphic, I - name wanting

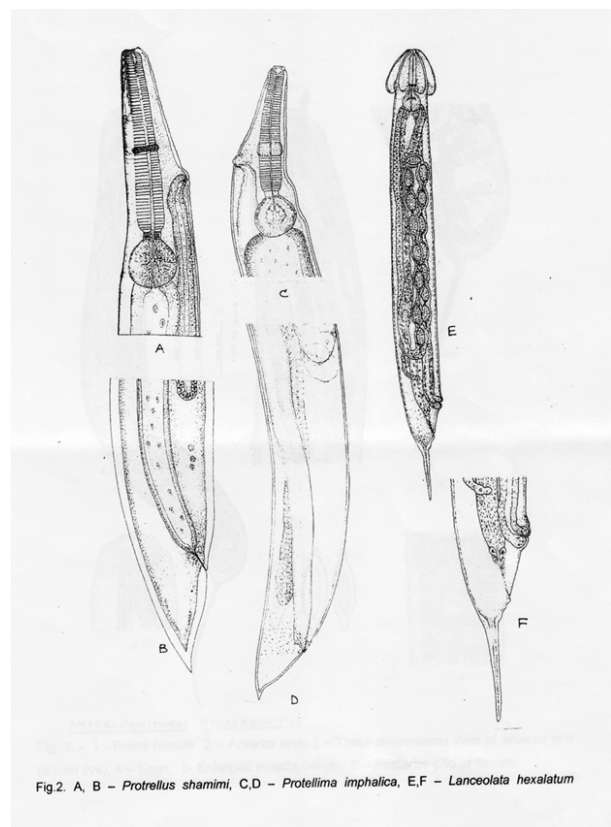
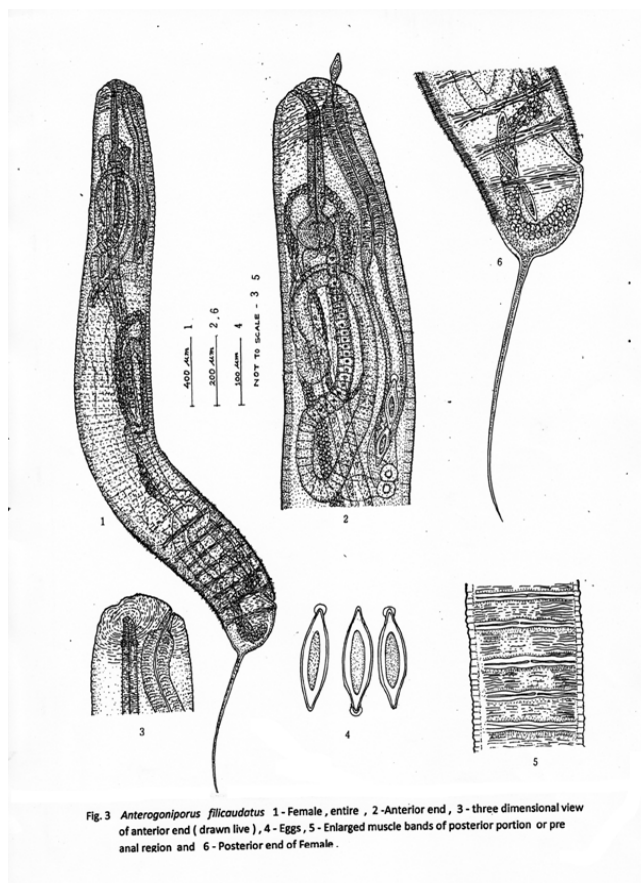


Fig.2. A, B - *Protrellus shamimi*, C,D - *Protellina imphalica*, E,F - *Lanceolata hexalatum*



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