

Studies on Morphologic Evaluations of *Ascaridia galli* from Nandurbar (M.S.), India.

Balde Govind Hanmantrao

P.G.Dept. of Zoology , G.T.Patil College, Nandurbar (M.S), India.

Email:- govindbalde@gmail.com

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ABSTRACT

As we know that parasitology, it had profound influence on man and also on his domestic live stock and birds. Many people attempted to understand the parasitological problems from different angles like morphology, systematic life history, pathology, epidemiology control and management. Here the author has undertaken the studies of roundworm specially in association to the taxonomic aspects from *Gallus gallus domesticus* Much of the interest in parasite morphology comes from the way in which the various pathways have been modified to suit the highly specialized parasitic mode of life. In addition to this intrinsic interest parasite morphology has great practical importance through different production. As the production of vaccines against the nematode parasites necessitates routine in various cultures and for this the morphology knowledge is very important. Parasite morphology can contribute to the development of new drugs and to the elucidation of the mode of action of compounds. Moreover the study to know the mode of biochemical mechanism not only helps to understand the causes of the pathological changes in the hosts but will also help to adapt better prophylactic and epidemiological management. Man being anthropocentric, the accent of number of researchers was to study the pathological effects of nematodes on their hosts particularly himself and animals associated with him. In the present work the author has selected the morphological aspect of nematode {*Ascaridia galli*, (Schrank, 1778), Freeborn, 1923} parasites from *Gallus gallus domesticus* (Linnaeus, 1758), from Nandurbar region (M.S.) India Present study deals with morphology and taxonomical study of the *Ascaridia galli*, together with the distinguishing characteristics of male & female worms and systematics of host *Gallus gallus domesticus*.

Key words: *Ascaridia galli*, Morphology, Nandurbar.

INTRODUCTION

Parasitology, the study of parasites and their relationship to their hosts is one of the most facing phases of biology. This discipline actually encompasses several approaches to the study of parasitic organisms. Such studies include phylogenetic relationship, ecological, morphological, physiological, biochemical, Histochemical, serological, immunological and chemotherapeutic aspects.

Parasites are causative organisms of many diseases, causing a continual and unacceptable threat to millions of people and domestical animals in all parts of the world parasites have evolved a way of life in nutritionally abundant and immunologically hostile environment of their host. These adaptations make them unique and fascinating to study. The terms infection and disease are not synonymous. While animal must be infected with a parasite to produce disease it does not necessarily follow that all infected animals will show clinical signs of disease. When susceptible animals are infected with viruses, bacteria and protozoa. The hosts lack of immunity usually results in clinically obvious disease. The outcome of these infections will depend on an interaction of factors including the virulence of the organism and how rapidly and successfully the host can mount an effective immune response.

Protozoa are unique among the parasites in that they multiply rapidly in their hosts such that they may overwhelm them. This is particularly true of susceptible animals such as the young or older animals whose immune system has been compromised in some way.

Nematodes are more complicated than protozoa partly because they do not multiply inside their hosts. One nematode egg can only produce one infective larvae that develops into one adult worm. Therefore the development of clinical disease in hosts infected with nematodes depends almost entirely on the actual number of larvae infecting a susceptible hosts other words, the outcome of nematode infections is generally more dependent on the parasite burden and that is, in turn directly related to the infecting dose. Generally there is a direct co-relation between the number of infecting larvae and severity of any disease produced a small number of infective larvae will produce minor pathological changes and generally no obvious clinical disease. It will often take many larvae to incite pathological changes severe enough to produce serious clinical signs.

However, like all general rules there are often exceptions. Within the nematodes there are some whose anatomical locations in a host, are such that even a small number of nematodes will incite pathological changes that can have devastating consequences for a host.

Helminthic infections continue to be a major global public health concern because of their very high

prevalence and ill-effects on both nutritional and immunological status of human population. Their prevalence and impact are particularly intense in countries with tropical climate poor sanitation, low standard of living and poorer health education.

Birds are economically important vertebrates and are infected by various kinds helminths. The nematode infection is of considerable importance because it is responsible for reduced weight loss of meat productions, decreased egg production and mortality. The parasites may cause severe effect on energy metabolism the host to compensate for tissue and other pathological effects.

Host parasite relationship is a complex physiological phenomenon by continual interchange of materials of physiological and immunological importance through the parasite interface a steady state between two elaborate and viable components host and parasite is maintained. For deeper insight into his complex phenomenon the study of chemical composition of parasite is of great value, parasite are emerging as valuable models for the study of fundamental biological phenomenon because during their life cycle many species of parasite undergo remarkable morphological, physiological, cytological and biological adaptation related different environment.

An importance economic source of human population is at danger due to *Ascariasis*. Thus *Ascaridia galli* becomes an economic important nematode. It infects the intestine in such a large numbers to cause the complete stoppage the digestive tract detailed studies of intracellular food resource like Carbohydrates, Proteins, Fats, and requirements of inorganic substance vitamins trace elements etc. help a understanding of survivability of parasites. I hope the discipline of Parasitology continuous to attract students as an their field of research and carrier to find solution of parasitic problems of our economic livestock in the new millennium.

MATERIAL METHODS

TAXONOMY:

For the taxonomic study, the hosts were carried out regularly in each annual cycle. The host was dissected in the mid-ventral line for various organs of the viscera i.e. stomach intestine and caeca to keep separately in the

petridishes containing normal saline. These organs tested with needless and observe under binocular microscope (recorded infected and non-infected examined host.) The worms were first washed thoroughly in warm physiological saline and then killed and fixed in hot 70% alcohol. The worms were later preserved in fresh 70% alcohol to which 10% glycerine was added. [90 ml of 70% alcohol and 10 ml glycerine].

The smaller nematodes were cleared in glycerine. The worms were kept in open cavity blocks containing glycerine and then put in the desiccator. The smaller nematodes were completely cleared within a dry or two. For quick clearing of nematodes, lactophenol was used. This was especially helpful for large sized worms with thick cuticle smaller nematodes were cleared within half an hour or so while larger specimens were kept in lactophenol for 12-24 hours or more as required.

The composition of lactophenol (Gurr, 1962)

Phenol	20 grm
Latic acid	20 ml
Glycerine	40 ml
Distilled water	20 ml

In case of over clearing of specimen in lactophenol or glycerine a few drops of 70% alcohol were allowed run under the coverslips to help the study of smaller papillae and other details (Meyer and Olsen 1975).

Both glycerine and glycerine jelly were used for making semipermanent mounts of nematodes. Composition of the jelly given below Kaiser's glycerine jelly.

Gelatin	10 grm
Phenol	1 grm
Glycerine	70 ml
Distilled water	60 ml

Gelatine was dissolved in distilled water and heated just enough to dissolve it. Phenol and glycerine were then added to it and mixture was stored in a container in a caugulated state. The jelly was heated on a water bath before using. The worm was carefully placed in the medium and cover slip was carefully drawn over it avoiding any air bubbles.

The slide was left like that the jelly-coagulated drawing were made with the aid of camera lucida. All measurements are in millimeters, unless otherwise indicated.

Ascaroidea Railliet and Henry, 1915.

Heterakidae Railliet and Henry, 1914
 Ascaridia Dujardin, 1845.
Ascarida galli (Schrank, 1788), Freeborn, 1923

***Ascarida galli* (Schrank, 1788), Freeborn, 1923**

The genus *Ascarida* is erected by Dujardin, 1845. The types species *A.galli* is described (Schrank, 1788), Freeborn, 1923.

GENERIC DIAGNOSIS

The worms are large in size females are larger than male. Mouth usually bearing three lips, one dorsal and two subventral in position. Oesophagus straight and long. Ventrical and diverticula are absent. Spicules some what equal in size. Male caudal alae poorly developed or absent. Preanal sucker more or less rounded. Female valva near the middle of the body. Oviparous eggs with thick cell. Parasitic in birds.

DESCRIPTION

322 nematodes were collected from the intestine of *Gallus gallus domesticus* from Shahada, Nandurbar region, M.S., India, during September, 2017 to August, 2018. Out of them 5 males and 7 females are used for taxonomic study. These parasites are preserved in glycerol, mounted in glycerin and drawings are made with the aid of Camera lucida. All measurements are recorded in mm.

The worms are medium to large in size, elongated to cylindrical in shape, semi-transparent, creamy white in colour.

MALE:

Males are smaller in size than female, It measures 19.5 (19-20) x 1.45 (1.4-1.5) in length and breath. Buccal capsul is medium in size, present at the anterior end of body and measures 0.0068 (0.0063-0.0074) x 0.0137 (0.0127-0.0148) in length and breath. The nerve ring is surrounding by muscular portion of oesophagus and lies at 0.0487 (0.0477-0.0498) away from the anterior extremity. The excretory pore lies at 8.5 (8-9) from anterior extremity. The oesophagus is muscular and measures 0.2358 (0.2332-0.2385) x 0.0243 (0.0169-0.0318) in length and breath. The posterior end of male bears a narrow bursal memberance on each side. The pre anal sucker is predominant, oval in shape, lies at 0.0614 (0.0604-0.0625) from posterior extrimity and measures 0.0074 (0.0063-0.0084) x 0.0047 (0.0042-0.0053) in length and breath. The spicules are two in numbers, long, somewhat equal in size and measures

0.2173 (0.2141-0.2204) x 0.0042 (0.0031-0.0053) in length and breath. The caudal end of male bears seven pair of papillae. The positions of papillae are two pair are pre-anal, one pair is para anal and remaining four pair are post anal. The tail is some what curved, pointed at its tips and measures 0.0556 (0.053-0.0583) x 0.0143 (0.0053-0.0233) in length and breath.

FEMALE

The females are longer than males and measures 28 (27-29) x 1.6 (1.5-1.7) in length and breath. The body is elongated, long, semitransparent, wide anteriorly and tapering posteriorly. Buccal capsule is medium, lies at anterior end and measures 0.0148 (0.0137-0.0148) x 0.0265 (0.0254-0.0275) in length and breath. The nerve ring is surrounded by muscular protion of oesophagus and lies at 0.0402 (0.0392-0.0413) from anterior extremity. The oesophagus is long, muscular and measures 0.2809 (0.2756-0.286) x 0.0238 (0.0159-0.0318) in length and breath. The valva is pre equatorial, lies at 12.5 (12-13) from anterior extremity. The oesophagus is long, muscular and measures 0.2809 (0.2756-0.286)x 0.0238 (0.0159-0.0318) in length and breath. The valval opening is an oval slite at mid dorsal side of the body. The muscular vagina runes posteriely. The vagina gives uterine tubes. The eggs are large in size, oval in shape and measures 0.0054 (0.0051-0.0056) x 0.0040 (0.0037-0.0043) in length and breath. The tail is straight, without caudal alae and measures 0.1007 (0.0954-0.106) x 0.0254 (0.0159-0.0349) in length and breath.

Taxonomic Summary

SHOWING COMPARATIVE MEASUREMENTS (IN MM) OF *A.GALLI*, (Schrank, 1788), Freeborn, 1923.

MALE	ORIGINAL DESCRIPTION	PRESENT MATERIAL
Body length	33.80	19.5 (19-20)
Max. breath	0.49-1.21	1.4-1.5
Oesophagus length	2.1-7.2	0.2332-0.2385
Spicule length	0.54-1.25	0.2141-0.2204
Tail length	0.48-0.85	0.053-0.0583
Caudal papillae	10 pairs	7 pairs

FEMALE	ORIGINAL DESCRIPTION	PRESENT MATERIAL
Body length	60-123	27-29
Max. breath	0.9-1.86	1.5-1.7
Oesophagus length	3.9	0.2809(0.2756 - 0.2860)
Distance of valva from anterior end	Equatorial	Pre-equatorial, 12.5
Tail length	1.56-1.8	0.0954-0.106
Egg size	0.065-0.0088 x 0.04-0.05	0.0054(0.0051-0.0056) x 0.0040 (0.0037-0.0043)

Type species: *Ascaridia galli*, (Schrank, 1788), Freeborn, 1923.

Host: *Gallus gallus domesticus*.

Habitat : Intestine

Locality: Shahada District Nandurbar M.S., India.

Prevalence: 5 males and 7 females are used for taxonomic study.

Period of collection : September 2017 to August 2018.

No. of Specimen : 12

Accession number : PGZD/GTP/1-12/ September 17- August 18..

Deposition : P.G., Department of Zoology, G.T.Patil College, Nandurbar (M.S.) India.

RESULTS & DISCUSSION

Description of the adult nematode examined in this study, coincide with the known taxonomic characters and diagnostic features of *Ascaridia galli* which is a cosmopolitan species. Measurements of the various organs of the parasite lie in the ranges which have been recorded by previous authors.

Regarding the incidence of infection of *A. galli* in domestic fowl from Nandurbar, it is worthy to notice that it differs from the various incidences recorded from other countries. These differences may be attributed to the different breed susceptibilities. Besides, the other environmental and climatic factors which affect the life cycle of this worm may also play an important role in the incidence of infection.

SYSTEMATIC POSITION OF THE HOST THE *GALLUS GALLUS DOMESTICUS*, (Linn, 1758)

Phylum	:	Chordata
Group	:	Craniata
Sub-phylum	:	Vertebrata
Division	:	Gnathostomata
Super class	:	Aves
Sub-class	:	Neornithes
Sub-order	:	Carnatae/Neognathae
Order	:	Galliformes
Family	:	Phasionidae
Sub. Family	:	Phasianidae
Genus	:	<i>Gallus</i>
Species	:	<i>Gallus gallus domesticus</i>

SYSTEMATIC POSITION OF THE PARASITE *Ascaridia galli*, (Schrank, 1788), Freeborn, 1923

Class	:	Nematoda
Order	:	Ascarididea
Family	:	Heterakidae, Railliet and Henry, 1914
Genus	:	<i>Ascaridia</i> , Dujardin, 1845.
Species	:	<i>galli</i> , Freeborn, 1923.

The genus *Ascaridia* was erected by Dujardin, 1845, after going through literature the present worm resembles *Ascaridia galli* (Schrank, 1788), Freeborn, 1923 in having all the essential morphological characters i.e. body elongated, semitransparent, creamy white in colour, mouth is surrounded by three lips, oesophagus is without posterior bulb, spicule equal in size but differs from the same form due to presence of seven pair of caudal papillae, Vs against ten pair of caudal papillae i.e. two preanal as against three pair pre anal and four pair post anal and as against six pair post anal, some variability in measurement in organs.

As characters are minor it is redescribed here as *Ascaridia galli* (Schrank, 1788), Freeborn, 1923.

Conflicts of interest: The authors stated that no conflicts of interest.

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