



BIODIVERSITY OF HELMINTH PARASITES IN BIRDS FROM KHANDESH REGION

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ABSTRACT:

Biodiversity is the biological variety and variability of life on Earth. Biodiversity is a measure of variation at the genetic, species and ecosystem level. Biodiversity is not distributed evenly on Earth and is richer in the tropics. Generally, there is an increase in biodiversity from the poles to the tropics. The latitudinal distribution of parasites does not appear to follow this rule. Roughly one in ten parasitic worms has been described by taxonomists, while the majority of species remain unknown to science. The objective of the present study was to study the biodiversity of Helminth parasites of Khandesh region. A total of 30 types of Bird host were examined, out of which 12 types of host were infected with cestode parasites, which belongs to 16 genera, and 01 host was infected with nematode parasites which belongs to 02 genera respectively (Viz., Cotugnia, Raillietina, Eugonodaeum, Pseudochoanotaenia, Similuncinus, Panuwa, Ophryocotyloides, Krimi, Killigrewia, Mogheia, Vampirolepis, Dilepis, Parorchites, Diplophallus, Davainea and Sureshia cestodes while Heterakis and Ascaridia nematodes) from Birds. The author compiles the data studied by various researchers during 1990 to 2023 from the Khandesh region. Various types of parasites observed during compilation of the research work. The present study will be helpful to database and status of biodiversity of Helminth parasites from Khandesh region.

Keywords:- Biodiversity, Cestode, Nematode, Khandesh region, Genera.

INTRODUCTION :

Biodiversity is the biological variety and variability of life on Earth. Biodiversity is a measure of variation at the genetic, species, and ecosystem level. Parasitologists have estimated that parasites comprise over half of all animal species. Helminths parasitic in animals represent a large assemblage of worms. The animal parasitic helminths include members of three phyla, the Acanthocephala, Platyhelminthes and Nematoda. Parasitic worms are usually parasitic at the adult stage, but many are also parasitic as larvae. Many have complex life-cycles involving the 'definitive' or 'final' host, which harbors the adult stage, and one or more 'intermediate hosts', which harbor the larval stage(s). Transmission of the parasite to the definitive host is often by ingestion with its food, or via the direct

penetration by a larval stage. The classification and identification of parasitic worms have been based mainly on morphological features, although other factors, such as the host, distribution, site and life-cycle, may also be taken into consideration. In recent years, classifications based on molecular findings, which are thought to approximate closer to a true phylogenetic system, have been introduced. Although molecular evidence is considered in some recent classifications, taxonomic arrangements still tend to be based mainly on morphological and other biological criteria.

The Cestoda (tapeworms) is a relatively large and diverse group of parasites, the majority of which are found in the intestine of vertebrates. They lack an alimentary canal and absorb their nutrients through their surface layer (tegument). Tapeworms are long, tape-like and segmented,



with one, or occasionally two, complete sets of reproductive organs in each segment. New segments (proglottids) are formed in the neck region behind the head (scolex); these develop and mature as they pass down the body (strobila) and old, 'gravid' segments containing eggs are lost terminally. Tapeworms vary in size from just a few millimeters to many meters in length. Since most adult tapeworms absorb nutrients through their tegument, they extract valuable resources from the intestine and can cause bowel obstruction in the case of heavy infections. These worms do not roam freely in the intestine but attach to the wall of the intestine.

Nematodes are symmetrically bilateral, unsegmented, normally dioecious worms which are usually filiform in shape. Their main features include a body-cavity with a high hydrostatic pressure, a straight digestive tract with an anteriorly terminal mouth and posteriorly subterminal anus, no circulatory system, a simple excretory system and a body wall consisting of an outer layer of cuticle and an inner layer of longitudinal muscles. Those parasitic in animals occur in virtually all invertebrate and vertebrate groups. All nematodes have five life-history stages, four larval and one adult, which are separated by a moult of the cuticle. It is common for the first one or two moults to occur within the egg.

Why parasites are rarely discussed?

This is probably because parasites tend to be hidden within their hosts—and therefore easy to ignore. Despite their small size, parasites have important roles to play in ecosystems, and we ignore them at our own peril. Parasite life cycles can be difficult to describe because many parasites have multiple hosts during their lifetime and each parasite must be tracked through each host. Parasite life cycles may include direct transmission or complex lifestyles. Parasites with direct life cycles are

those in which a parasite infects a single host throughout its entire life span, whereas complex life cycles include several transitions between host species during the lifespan of a single parasite.

Parasite Effects on Communities:

Important ecological role played by parasites is regulating host community structure and biodiversity. By regulating host populations, some parasites can influence the outcome of competition of hosts in the environment. Specialist parasites may facilitate species coexistence by keeping a singular dominant species in check while allowing rare species to persist. Generalist and specialist parasites can also regulate community composition on a diel (daily) cycle

Parasite Effects on Evolution:

Parasitism can drive the evolution of species, both parasite and host, in a number of ways. First, parasitism can induce an evolutionary arms race between a parasite and its host. This occurs when the parasite damages the host (i.e., causes decreased fitness of the host), and the host responds by improving their defenses against that parasite. In turn, as long as these defenses do not completely clear the parasitic infection, the parasite may evolve novel strategies to circumvent host defenses. This can become an ongoing cycle: host improves defenses, parasite circumvents defenses, host reinforces defenses, and so on. This cycle is termed the "Red Queen hypothesis," This type of arms race or competition has enabled the development of several amazing adaptations and may have even been responsible for the evolution of sex. This is because asexual populations are clonal (i.e., genetically identical), while sexual populations allow for selection of traits that can defend them against parasites.

MATERIALS AND METHODS :

Following 12 University researchers "Studies on Helminth parasites of Birds from Khandesh region "are referred for the review.

- 03 Theses from Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon.
- 05 Theses from Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
- 04 M. Phil. Dissertation of Alagappa University, Karaikudi, and
- Number of reference books and research papers.

OBSERVATIONS :

Roughly one in ten parasitic worms has been described by taxonomists, while the majority of species remain unknown to science. Decades of work have resulted in much larger, detailed datasets on host-parasite interactions, but their utility is limited by these major data gaps. At current rates, those gaps could take hundreds of years to be filled. This work will require new funding streams, and a concerted effort among several research communities. Describing the global diversity of parasites involves two major processes: documenting and describing diversity through species descriptions, geographic distributions, host associations, etc. and consolidating and digitizing lists of valid taxonomic names and synonyms.

CONCLUSION:

Knowledge of parasite diversity, particularly definitive identification, geographic distribution and host association, is critical. Achieving this goal requires field-based research, networks with local capacity, scientific and local community engagement, coordination and collaboration to facilitate collections, plus methodologies that provide timely or rapid identification of parasites. Parasite collection and identification has often been a laborious process dependent on special expertise and knowledge of specific taxonomic groups.

Molecular-based methods increasingly complement microscopic identification

From 1990 to 2023, 33 years research data of Khandesh region shows that-

- Cestode and Nematode parasite infection is the common problem in Birds all over the Khandesh region.
- From 12 birds genera 16 types of Cestode parasites were recorded.
- From 01 bird genus 02 types of Nematode parasites were recorded.

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Table 1: 33 years Data of Host, locality, collection date and genus of Cestode

Host Birds	Locality	Collection date	Genus of Cestode Parasite
<i>Gallus gallus domesticus</i> ,	At., Dholi, Tq. Parola, Dist. Jalgaon	17/07/2008	<i>Cotugnia</i>
<i>Gallus gallus domesticus</i>	At., Mehunbare, Tq. Chalisgaon, Dist. Jalgaon	03/09/2009	<i>Cotugnia</i>
<i>Gallus gallus domesticus</i>	At., Tq. & Dist. Dhule	18/09/2011	<i>Cotugnia</i>
<i>Gallus gallus domesticus</i>	At., Songir, Tq. & Dist. Dhule,	16/11/2011	<i>Cotugnia</i>
<i>Gallus gallus domesticus</i>	At. & Tq. Shirpur, Dist. Dhule	27/05/2012	<i>Cotugnia</i>
<i>Gallus gallus domesticus</i>	At., Gangapuri, Tq. Amalner, Dist. Jalgaon	12/12/2021	<i>Cotugnia</i>
<i>Gallus gallus domesticus</i>	At. Hated, Tq. Chopda, Dist. Jalgaon	04/02/2022	<i>Cotugnia</i>
<i>Columba livia</i>	Bramhanpuri, Tq. Shahada, Dist. Dhule	25/05/1991	<i>Cotugnia</i>
<i>Columba livia</i>	Shewali Tq. Sakri, Dist. Dhule	15/12/1999	<i>Cotugnia</i>
<i>Columba livia</i>	Bambrood Tq. Bhadgaon Dist. Jalgaon	08/09/1990	<i>Raillietina</i>
<i>Columba livia intermedia</i>	Parole, Dist. Jalgaon	11/01/1991	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	Bambrood, Dist. Jalgaon	10/09/1990	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	Dondaicha, Tq. Shindkheda, Dist. Dhule	10/01/1991	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	Nandurbar, Dist. Dhule	21/03/1991	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. Khiroda, Tq. Raver, Dist. Jalgaon	25/05/1993	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	Kharde (B.) Tq. Shirpur, Dist. Dhule	06/01/1999	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. & Tq. Chalisgaon, Dist. Jalgaon	21/01/2007	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. Bahal, Tq. Chalisgaon, Dist. Jalgaon	21/03/2007	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. Mashwa Tq. Parola, Dist. Jalgaon	10/05/2007	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. Mandana, Tq. Shahada, Dist. Nandurbar	24/09/2007	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. & Tq. Shindkheda, Dist. Dhule	28/10/2007	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. Ranipur Tq. Shahada, Dist. Nandurbar	04/11/2007	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At Tamswadi, Tq. Parola, Dist. Jalgaon	23/02/2008	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At Dahivad, Tq. Chalisgaon, Dist. Jalgaon	11/04/2008	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. & Tq. Shindkheda, Dist. Dhule	07/08/2011	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. & Tq. Sakri, Dist. Dhule	14/02/2012	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. Betawad, Tq. Shindkehda, Dist. Dhule	12/10/2012	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. Songir, Tq. & Dist. Dhule,	09/01/2013	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. Nardana, Tq. & Dist. Dhule,	24/05/2013	<i>Raillietina</i>
<i>Kadaknath</i>	At. Marwad, Tq. Amalner, Dist. Jalgaon	15/09/2021	<i>Raillietina</i>
<i>Kadaknath</i>	At. Amalgaon, Tq. Amalner, Dist. Jalgaon	08/11/2021	<i>Raillietina</i>

<i>Kadaknath</i>	At. Dhanora, Tq. Chopda, Dist. Jalgaon	10/03/2023	<i>Raillietina</i>
<i>Gallus gallus domesticus</i>	At. Mondhale, Tq. Parola, Dist. Jalgaon	03/08/2008	<i>Eugonodaeum</i>
<i>Gallus gallus domesticus</i>	At. Dholi, Tq. Parola, Dist. Jalgaon	22/07/2008	<i>Pseudochoanotaenia</i>
<i>Gallus gallus domesticus</i>	At. Dahivad, Tq. Chalisgaon, Dist. Jalgaon	24/10/2008	<i>Similuncinus</i>
<i>Gallus gallus domesticus</i>	At. Velhane, Tq. Parola, Dist. Jalgaon	31/12/2009	<i>Panuwa</i>
<i>Gallus gallus domesticus</i>	At. Chalisgaon, Tq. Chalisgaon,	09/11/2010	<i>Ophryocotyloides</i>
<i>Gallus gallus domesticus</i>	At. Kapadana, Tq. & Dist. Dhule	28/09/2011	<i>Krimi</i>
<i>Gallus gallus domesticus</i>	At. Songir Tq. & Dist. Dhule,	09/10/2011	<i>Krimi</i>
<i>Gallus gallus domesticus</i>	At. Shirud, Tq. & Dist. Dhule	15/02/2012	<i>Krimi</i>
<i>Gallus gallus domesticus</i>	At. Songir Tq. & Dist. Dhule	17/07/2012	<i>Krimi</i>
<i>Gallus gallus domesticus</i>	At., Tq. and Dist. Dhule	26/12/2012	<i>Krimi</i>
<i>Columba livia intermedia</i>	At. Khadki (BK), Tq. Chalisgaon, Dist. Jalgaon	05/08/1994	<i>Killigrewia</i>
<i>Corvus splendens splendens</i>	Pachora, Tq. Pachora, Dist. Jalgaon	08/10/1994	<i>Raillietina</i>
<i>Turdoides malcolmi</i> (Seven brothers)	Nagardevla, Tq. Pachora, Dist. Jalgaon	24/06/1994	<i>Mogheia</i>
<i>Acridotheres tristis tristis</i> (Indian Myna)	At., Tq., Dist. Dhule	12/05/1993	<i>Vampirolepis</i>
<i>Turdoides malcolmi</i> (Seven brothers)	Nagardevla Tq. Pachora, Dist. Jalgaon	20/06/194	<i>Vampirolepis</i>
<i>Acridotheres tristis tristis</i> (Indian Myna)	Malpur, Tq. Sakri Dist. Dhule	08/05/2000	<i>Vampirolepis</i>
<i>Francolinus pictus</i> Painted partridge (Titar)	Shahada, Dist. Dhule	24/06/1994	<i>Dilepis</i>
<i>Sturnus pagoarum</i> (Brahminy Myna)	At. Ozar, Tq. Chalisgaon, Dist. Jalgaon	10/07/1994	<i>Dilepis</i>
<i>Himantopus himantopus</i> (Black winged Stilt)	Chalisgaon, Dist. Jalgaon	17/01/1995	<i>Parorchites</i>
<i>Himantopus himantopus</i> (Black winged Stilt)	Chalisgaon, Dist. Jalgaon	15/03/1995	<i>Diplophallus</i>
<i>Passer domesticus</i> (House sparrow)	Shahada, Dist. Dhule	24/02/1991	<i>Davainea</i>
<i>Partridge</i> (Chakor) <i>Francolinus pondicerianus</i>	Maheji, Tq. Pachora, Dist. Jalgaon	11/11/1991	<i>Davainea</i>
<i>Micropus affinis</i> (House Swift)	Amalner, Dist. Jalgaon	26/01/1991	<i>Sureshia</i>
Host Birds	Locality	Collection date	Genus of Nematode Parasite
<i>Gallus gallus domesticus</i>	At. Chimthane, Tq. Shindkheda, Dist. Dhule	05/03/1999	<i>Heterakis</i>
<i>Gallus gallus domesticus</i>	At. & Tq. Chalisgaon, Dist. Jalgaon	07/10/2007	<i>Heterakis</i>
<i>Gallus gallus domesticus</i>	At. Mondhale, Tq. Parola, Dist. Jalgaon	23/08/2008	<i>Ascardia</i>