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Sunil Sahu
Department of Zoology, U R College Rosera, Samastipur, Bihar, India

Corresponding Author:
Sunil Sahu
Department of Zoology, U R College Rosera, Samastipur, Bihar, India

Prevalence of gastrointestinal helminth infections in chickens of selected areas of Darbhanga region of north Bihar India

Sunil Sahu

Abstract
Poultry rearing is one of the most appropriate income generating activities for rural women especially for landless and marginal farmers. The production of backyard poultry under Semi scavenging system is found suitable to the villagers as additional source of income and nutrient supplement. Backyard poultry is popular among rural people. However, the poultry production is hindered by many problems among which infectious diseases are most important. In fact the indigenous chickens of Bangladesh are parasitized by various parasites. Very few studies have been undertaken so far to determine the prevalence of gastrointestinal helminth infection in indigenous chickens in various regions. This paper describes the prevalence of gastrointestinal helminths infection in poultry.

Keywords: Prevalence, gastrointestinal helminthes, pathology, chickens.

Introduction
In recent years an ecological approach has been emphasized in order to understand the basic principles of parasitology, because the concepts of ecology in the study of parasites have been ignored in the past. Poultry rearing is one of the most appropriate income generating activities for rural women especially for landless and marginal farmers. The production of backyard poultry under Semi scavenging system is found suitable to the villagers as additional source of income and nutrient supplement (Latif, 2001) [38]. Backyard poultry is popular among rural people. However, the poultry production is hindered by many problems among which infectious diseases are most important (Ojok, 1993) [40]. In fact the indigenous chickens of Bangladesh are parasitized by various parasites. This becomes especially important in the context that the relationships between the parasites and their hosts may be viewed as "ecological" because the host provides the environment in which the parasite lives, and as such the host's environment, be it tropical jungle, a freshwater pond or even the open sea or ocean, affects the parasites through its host. Furthermore, this becomes quite apparent to believe, rather confirm, that the parasite, be it an endoparasite or ectoparasite, synthesizes its enzymes for digestion or other metabolic function from the constituents provided by the host's tissues, particularly the endoparasitic digenetic trematodes, tapeworms and nematodes too. Rather the food pre-digested by the host is absorbed via ultramicroscopic microvilli and other microscopic structures present on or immediately beneath the body surface of the trematodes or cestodes and used within their body. Of course, the ecology of parasites is not only limited to meet their nutritional requirements but also equally interesting to study the ecologic factors that influence the distribution of parasites and the parasite density- that is, in all, the parasite population dynamics. In recent years, some quantitative ecologists especially parasite ecologists viz. Force (1975) [9], Jennings & Callow (1975) [16], Cheng (1986) [3] and others have proposed that what have been designated as 'r'-and 'k'- selection could be conceptually useful in understanding the evolution of parasites. By definition, r-selection occurs where the factors comprising the selective forces on the organisms (r-strategists) are unstable and the environmental conditions are variable. On the other hand k- selection occurs where the factors acting on the organism (k-strategists) are relatively stable over a period of time. Species that are r-strategists are characterized by high fecundity rates, high mortality rates, short life span and the population sizes that are variable in time usually below the carrying capacity of the environment. On the other hand, species that are k-strategists are characterized by low fecundity and mortality, longer life spans, and relatively stable Population sizes.

Thus population of r-strategists is controlled by density-independent factors (IDDF) while k-strategists are controlled by density- dependent factors (DDF). For example, digenetic trematodes and cestodes are r-strategists since they have high biotic potential and high mortality as a result of the selection-pressure present in their unstable environment as manifest in different habitats practically at every phase of their complex life cycle.

Factors Influencing Parasite Density and Parasite Distribution:-

1. **Flora:** Vegetation that serves as food and shelter for hosts, both intermediate and definitive, greatly influences the parasite population. This is particularly evident in the case of helminth parasites. For example, various aquatic molluscan hosts of digenetic trematodes survive only where plants in the water or/and land and deciduous trees on the banks are abundant. Some of the aquatic plants provide not only food but also oxygen for the mollusca. Leaves dropping from the trees often serve as food for aquatic snails. If such flora are sparse or absent, the molluscan population will decline and the likelihood that the trematodes will complete their life cycles is proportionally diminished.

2. **Fauna:** Since parasitism can occur only when two distinct & different species enter the symbiotic relationship, the presence and abundance of the species are of critical importance. In nature, the presence of prey is absolutely necessary to carnivores and indirectly influences the parasite density. The importance of the faunistic population forming the food web, therefore, is obvious. For example, molluscs may serve as food, even cercariae released in water or some copepods too for fishes, and fishes too for carnivorous birds or mammals which act as definitive hosts. Some species of animals are migratory. This feature of hosts has important implications relative to parasite distribution. Hosts may carry their parasites with them but in time they may tend to lose most of the original parasites and pick up new ones that are endemic to the new habitats. Water plays a major role in the maintenance of many types of parasite fauna. This is obvious from the fact that absence of water would impede the development of a large number of helminths that use aquatic invertebrates (mollusks/copepods) as well as some vertebrates as intermediate hosts for completing their life cycle. Moreover, the infective forms of many parasites such as flatworms (trematods and cestodes) are free-swimming and require water in which they migrate and reach their hosts, for example- miracidium and cercariae of digenetic trematodes and ciliated coraciduim of tapeworm. Furthermore, not only is water of prime importance in the maintenance of certain parasites but its physical state may also be influential. Besides, the physical factors such as temperature (^{0}C), pO_2 and PCO_2 concentrations, pH, salinity and even mineral contents- all influence the number and survival rates of intermediate hosts.

3. **Behavior of the hosts:** In addition to the above factors, the feeding and other behavior pattern of hosts also affect the parasite density. For example, the predatory feeding habits of many definitive hosts make possible the active intake of larval parasites that can only complete their development after being ingested by the host. From the foregoing account it should be clear that a multitude of factors such as flora, fauna, water and its physical factors as well as the behavior pattern of the hosts are all important in governing the parasite fauna.

4. **Influence of seasons:** During collection of host animals from one type of habitat throughout the year it is appreciably found that fluctuations in both the number and kind of parasites occur throughout the seasons. This is especially true in temperate climates where the more marked seasonal changes are sharply reflected in the biotic organic life. To quote Dogiel (1964) [4] "the study of the relationship between the parasite fauna taken as one unit and the changes in the environmental and physiological conditions of the host as the other" constitutes what is called, in a better way, "Ecological Parasitology" Indeed the most important factors that influence the composition of the parasite fauna of any host animal include the host's age and seasonal changes. India recorded the fastest growth rate in poultry meat production during 1985-95 with a growth rate about 18% per annum which perhaps, no other country or agro- industry in the world, has recorded during that period. At present more than 400 million broiler chicks are produced annually. Intensive rising of poultry in commercial farms inevitably exposes flock to the various diseases which cause mortality of the birds and loss to the farmers. Diseased birds can also be hazardous to the human health on being taken in food. In India, huge loss of birds due to diseases is being felt by poultry farmers due to management related problems. Poultry carry heavy infection of varied types of parasites, i.e. helminth, protozoans, virus and arthropods etc of all there and particularly the intestinal parasitic helminthes have a serious impact on poultry health productivity, quality and quantity of meat. Further, Helminth parasites of broiler as well as desi birds are commonly divided into three main groups; cestode, nematode and trematode. Of these the cestodes of significant importance belong to two genera *Raillietina* and *Davainea*, and the nematodes include *Ascaridia* and *Heterakis*, thus constituting the most important group of helminth parasites in poultry (Naphade, 2013) [21, 22, 23]. Remarkably, no trematodes or any acanthocephala was recovered. The prevalence and intensity of parasitic helminths may be influenced by several factors, such as intermediate hosts and climatic conditions (temperature and humidity) etc which may alter the population dynamics of the parasites resulting in dramatic changes in the prevalence and intensity of helminths infection (Magwisha, Kassuku and Kyusgaard 2002) [18]. Many insects that usually act as vectors for helminths are also favoured by high temperature and to some extent humidity. These factors may explain the wide range and distribution of cestode and nematode species in poultry birds, especially during the tropical summer season (Dube Zindi, Mbanga and Dube 2010) [5]. As such the studies on the helminth parasites in chickens are needed to design for improvement of poultry eggs and meat production, because the parasitic helminths significantly affect the health of chickens and thereby causing stunted and reduced egg and meat production.

Conclusion

The present study has definitely shown that the helminthic infections in desi and broiler poultry birds as host are closely associated with the temperature of the habitats and feeding habits of the birds host particularly during their growth period as marked by their weight. Therefore, such parasite studies are useful for a better understanding of ecological aspects of helminth parasites in poultry birds as host particularly of the study area. Such information may be useful in designing improved poultry management in the area. Villagers rarely deworm their chickens as we have also observed that more than 90% chickens are infected with gastrointestinal helminths. Such a high burden will not only decrease the production potentials of the highly valuable indigenous chicken but will also cause mortality rendering serious economic loss to poor farmers. So, regular dowering at three months interval with appropriate anthelmintics is recommended against both nematodes and cestodes.

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