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Short Communication

FIRST REPORT OF *CHEILOSPIRURA HAMULOSA* INFECTION IN POULTRY IN CENTRAL INDIA

P.G. KOKATE, S.W. KOLTE, N.D. PHATE, S.P. MANDHALE, S.D. BORKAR and S.G. JADHAO*
Department of Veterinary Parasitology, Nagpur Veterinary College, Nagpur-440006 (MS) India

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SUMMARY

Cheilospirura hamulosa is a nematode infecting the domestic poultry worldwide. Its life cycle involves transmission via intermediate hosts like insects or earthworms. Symptoms in chickens include decreased feed intake, weight loss, and gizzard issues. This study examined the gastrointestinal tracts of desi birds from Nagpur for nematode parasites. Total 40 samples were collected and sections of the intestines, gizzard, and proventriculus were analyzed. Two samples were positive for *Cheilospirura hamulosa* worms, which were identified through morphological analysis using established guidelines. Worms were embedded in the caudal lobe muscles of the gizzard. Although the prevalence was low, the mean intensity of infection was moderate. The worms were examined using Lactophenol and 10% ethyl alcohol to clarify their structure under a compound microscope, confirming their identification as *C. hamulosa*. Diagnosis was made through fecal examination or necropsy. Treatment involves use of anthelmintic drugs, with prevention focused on controlling intermediate hosts and improving farm biosecurity. Understanding *C. hamulosa* biology is essential for managing this parasitic disease in poultry.

Keywords: *Acuria hamulosa*, *Cheilospirura hamulosa*, Gastrointestinal nematodes, Gizzard worm, Poultry,

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Parasitic diseases are a major constraint in backyard poultry production. Common internal parasitic infections occur in poultry include gastrointestinal helminths (cestodes, nematodes) and *Eimeria* species which causes significant damage to the poultry industry. It affects poultry production as it leads to malnutrition among birds causing weight loss which ultimately hampers FCR, reduces egg production and often causes death in young chickens (Puttalakshmamma, 2008). Moreover, parasitic infections can weaken the overall immunity of the flock, increasing their vulnerability to other diseases and worsening pre-existing health issues (Gary & Richard, 2012; Katoch *et al.*, 2012). Nematodes are the most common and important helminth species and more than 50 species of nematodes have been described in poultry; the majority of which cause pathological damage to the host. According to Oniye *et al.* (2001), domestic hens often consume a diverse array of foods, including fruits, grains (cereals) and insects that may harbor the eggs or larval stages of specific helminth parasites. This puts them at risk of developing a number of parasitic diseases, chiefly gastrointestinal parasites.

Cheilospirura hamulosa is a nematode belonging to the family Acuariidae of order Spirurida, that infects the gizzards of poultry, especially of the domestic chickens and it is found worldwide where poultry farming is prevalent. The parasite has an indirect life cycle that involves intermediate hosts, like insects or earthworms. By consuming these intermediate hosts that contains the larvae (L3) of *C. hamulosa*, domestic birds become infected.

Infection can lead to decreased feed intake, weight loss, reduced productivity, and mortality in severe cases. Symptoms include anemia, weakness, diarrhea and potential neurological issues due to gizzard inflammation and ulceration caused by adult worms. Post-mortem examination of birds may reveal adult worms in the gastrointestinal tract, alongside characteristic lesions like hemorrhagic gastritis and ulceration. Diagnosis of *C. hamulosa* infection in poultry typically involves fecal examination of parasite eggs or larvae, necropsy and histopathological examination of affected tissues. Molecular techniques like PCR may also be used for specific identification. Treatment includes the use of anthelmintic drugs that are effective against nematodes. Control measures targeting intermediate hosts and enhancing biosecurity on poultry farms are essential to prevent parasite spread and reduce the risk of infection (Permin & Hansen, 1998; Soulsby, 1982).

In this study, Whole Gastrointestinal system was obtained from freshly slaughtered desi birds from the Nagpur region, procured from various butcher shops and transported to the Veterinary Parasitology laboratory at Nagpur Veterinary College, Nagpur, Maharashtra. The intestinal segments were separated into the proventriculus, gizzard, small intestine and large intestine and each was stored in a normal saline solution. The outer layers of the proventriculus and gizzard were carefully dissected and examined to detect any nematode infestations. Of the 40 samples examined, two were identified as positive for *C.*

*Corresponding author: drpratikkokate@gmail.com

Fig. 1. Showing Cheilospirura hamulosa worm (40X). **(a)** Anterior end showing cuticular cordons extending along the body (100X) **(b)** posterior end showing characteristic digitiform tail in female (100X).

hamulosa worms. After separation, the worms were placed in Petri dishes containing Normal Saline solution. To facilitate further examination and identification, live worms were immersed in boiling 10% ethyl alcohol. Subsequently, under a compound microscope at 40X magnification, a drop of Lactophenol was applied to the worms and allowed to settle for clarification. Subsequently, worms were examined microscopically. The nematodes were recognized morphologically using the key guidelines provided by Skrjabin *et al.* (1965) and Ebrahimi *et al.* (2015). Microscopic analysis revealed distinct morphological features that confirmed the worms as *C. hamulosa*.

Parasitological examination confirmed the identity of the worms as *Cheilospirura* (*Acuaria*) *hamulosa* based on their distinct morphological features. The anterior region of the worm displayed a cuticle adorned with double cuticular ridges or cordons, which had an irregular outline that extended along the body and looped back toward the surface (Fig. 1a). In female worms, the posterior two-thirds of the body were filled with eggs, and the tail ended in a characteristic digitiform shape (Fig. 1 & 1b). Female worms were observed to be slightly longer than their male counterparts. The worms were found firmly embedded within the muscle tissue of the caudal lobe of the gizzard. They were detected only after carefully cutting and removing the koilin layer that lines the gizzard. Worms were discovered after cutting and removing the koilin layer of the gizzard. The observed prevalence was low, although the mean intensity of infection was moderate.

Similar low prevalences have been reported in other regions of India (Chhabra and Ruprah, 1983). The observed pathological changes included ulceration along with a noticeable thickening of the gizzard's mucosal lining and cuticular layer. The intensity of infection recorded for this parasite was low. Similar findings were reported by (Freitas & Hipolito, 1949; Grisi & Carvalho, 1974; Machado *et al.*, 1980) in Brazil, where the highest prevalence of approximately 30% was recorded by Costa *et al.* (1975). Similar lower prevalence of infection has been recorded in *C. hamulosa* nematode parasitizing chickens in Portugal (Leitao *et al.*, 1969), Cuba (Barus *et al.*, 1970), India (Chhabra & Ruprah, 1983), Pakistan (Hussain, 1967) in the Guinea fowl population. Despite parasitic infection in birds, there was low pathogenicity in the affected proventriculus and gizzard. This may be attributed to low parasitic burden. The studies conducted by Alicata (1947) reported that this nematode causes anemia, emaciation and death in chickens. The site of infection found in this study was prominent in the mucosa of the gizzard. Ruff and Norton (1997) stated that the parasites were found beneath the cuticle of the gizzard, typically in the pyloric or cardiac regions, where the lining is soft and flexible.

This investigation holds importance as it documents the first confirmed occurrence of *Cheilospirura hamulosa* infection in backyard poultry from Central India, offering new regional insights to the field of veterinary parasitology. It draws attention to the possible effects of this parasite on poultry health and productivity, even when infection rates are low. The results emphasize the need for regular parasitological surveillance in rural poultry populations. Future studies should aim to explore the genetic identification of *C. hamulosa*, understand its life cycle within this geographic context and identify the involvement of local intermediate hosts. Moreover, expanded epidemiological research and evaluation of resistance to anthelmintic drugs will be essential for

developing effective prevention and control measures.

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