

Prevalence of Cestode Parasites of *Gallus Domesticus* in Karachi, Sindh, Pakistan

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ABSTRACT

Poultry production in Pakistan is growing remarkably and contributing significantly to its economy. But disease outbreak is the biggest challenge in decreasing productivity. Among other diseases that cause huge damage to poultry, parasitic diseases are also included but no significant work has been done on this area of concern in Pakistan. This study is carried out to evaluate the prevalence rate of one of the major helminth parasite groups; Cestodes and their effects on the health of chickens in the district Korangi Karachi, Sindh. For this purpose 76 chickens have been examined for Cestodes infection from February 2018 to January 2019. Overall prevalence is 52.6%. Parasite burden is high in Male 63.8% as compared to females at 45.6%. Six species of Cestodes parasites were identified from the intestine of the infected chickens. The identified Cestodes species are *Raillietina tetragona*, *R. cesticillus*, *R. echinobothridia*, *R. ransomi*, *Choanotaenia infundibulum*, *Raillietina* sp. and their prevalence was 42.1%, 34.21%, 26.31%, 22.26%, 15.78%, and 7.89% respectively. The prevalence rate also varies from season to season. The highest infection has been observed in spring 60% followed by summer 58.3% and in autumn and winter similar rate of infection 40% has been observed. The research concludes that heavy infestation causes severe effects on the physical health of chickens and suggested that there is a great need to control Cestodes parasites infection to avoid the mortality rate and to increase the poultry yield.

Keywords: Poultry, Prevalence, Cestodes parasites, chickens, Karachi.

INTRODUCTION

The family Paramphistomidae In Pakistan the poultry sector is playing a significant role in the economy by producing the cheapest available resources of proteins in terms of egg and meat. Poultry production contributes 29% of the total meat production of the country. 5.8% in the agriculture sector and 1.3% overall GDP. It has shown excellent growth and become a source of 1.6 million people's employment. Among other diseases of poultry parasitic diseases are the major constraints of poultry production in Pakistan but no significant work has been done or information on the Cestodes parasites of chicken is inadequate. The common gastrointestinal helminths parasites cause effects on the health of chickens which then leads to considerable damage and great economic losses to the poultry industry due to malnutrition, decreased food conversion ratio weight loss, lowered egg production and death in young birds (Puttalakshamma, 2008). Parasites also make the flocks less resistant to diseases and exacerbate existing disease conditions (Lamy et al., 2012 and Kaur et al., 2016). Chicken cestodiasis not only cause loss of body weight of raised chickens but also may cause several problems in affected flocks such as enteritis, loss of blood, loss of production, nervous manifestations and death (Okech et al., 2006; Derakhshanfar et al., 2002). According to Kurkure et al., 1998 parasitic infection cause villous atrophy, catarrhal enteritis, granuloma formation in the duodenum, desquamation of villi and submucosal glands congestion, inflammatory reaction and vacuolation of epithelial cells.

MATERIALS AND METHODS

Viscera of 76 freshly dead chickens have been collected from common shops located in Korangi, Karachi during a period extended from February 2017 till January 2018. These samples were subjected to necroscopic and parasitological examination. Cestodes were collected from the gastrointestinal tract and preserved in AFA solution for 8012 hours. Then it is kept in 70% alcohol overnight and stained with Alum carmine for 3-5 minutes and was continuously checked to prevent overstraining. Then it is dehydrated through 70%, 90% and 100% alcohol for 20-30 minutes each grade. It is then bathed in clove oil for 1-2 minutes and washed in xylol for 2-3 minutes. Finally, permanent slides were prepared by using Canada balsam. Cestodes were identified under a light microscope with 10x magnification according to their morphological characteristics by Yamaguti 1952. The current values are all the authors own calculations.

Observations

Table 1. Overall Prevalence of Cestodes Infection.

| Helminthes group | Host Examined | Host Infected | Prevalence % |
|------------------|---------------|---------------|--------------|
| Cestodes | 76 | 40 | 52.6 |

Table 2. Prevalence of Cestodes parasites.

| Genus | Host examined | Host infected | Prevalence (%) |
|------------------------------------|---------------|---------------|----------------|
| <i>Raillietina tetragona</i> | 76 | 32 | 42.1 |
| <i>Raillietina cesticillus</i> | 76 | 26 | 34.21 |
| <i>Raillietina echinobothridia</i> | 76 | 20 | 26.31 |
| <i>Raillietina ransomi</i> | 76 | 17 | 22.26 |
| <i>Choanotaenia infundibulum</i> | 76 | 12 | 15.78 |
| <i>Raillietina</i> sp. | 76 | 6 | 7.89 |

Table 3. Prevalence of Cestodes in Relation to Host's Sex.

| Sex of Host | Host examined | Host infected | Prevalence (%) |
|-------------|---------------|---------------|----------------|
| Male | 30 | 19 | 63.8 |
| Female | 46 | 21 | 45.6 |

Table 4. Seasonal Incidence of Recorded Cestodes' Species.

| Season | Host Examined | Host Infected | Prevalence % |
|---------|---------------|---------------|--------------|
| Spring | 15 | 9 | 60 |
| Summer | 36 | 22 | 58.33 |
| Autumn | 15 | 6 | 40 |
| Winter | 10 | 3 | 40 |
| p-Value | 0.046 | 0.097 | 0.003 |

Table 5. Seasonal Incidence of Each Specie of Recorded Cestodes.

| Season | <i>R.tetragona</i> | | <i>R.cesticillus</i> | | <i>R.echinobothrida</i> | | <i>R.ransomi</i> | | <i>Choanotaenia Infundibulum</i> | | <i>Raillietina sp.</i> | | P-Value |
|--------|--------------------|------|----------------------|------|-------------------------|------|------------------|------|----------------------------------|------|------------------------|------|---------|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | |
| Spring | 8 | 88.8 | 6 | 66.6 | 4 | 44.4 | 2 | 22.2 | 2 | 22.2 | 0 | 0 | 0.028 |
| Summer | 17 | 77.2 | 15 | 68.1 | 13 | 59 | 11 | 50 | 8 | 36.3 | 4 | 18.1 | 0.002 |
| Autumn | 5 | 83.3 | 4 | 66.6 | 3 | 50 | 2 | 33.3 | 2 | 33.3 | 1 | 16.6 | 0.005 |
| Winter | 2 | 66.6 | 1 | 0 | 0 | 0 | 2 | 66.6 | 0 | 0 | 1 | 33.3 | 0.041 |

Table 6. Monthly Incidence of Different Types of Recorded Cestodes' Species.

| Month | <i>R.tetragona</i> | | <i>R.cesticillus</i> | | <i>R.echinobothrida</i> | | <i>R.ransomi</i> | | <i>Choanotaenia infundibulum</i> | | <i>Raillietina sp.</i> | | P-Value |
|------------|--------------------|------|----------------------|------|-------------------------|------|------------------|------|----------------------------------|------|------------------------|------|---------|
| | No | % | No | % | No | % | No | % | No | % | No | % | |
| Feb | 3 | 100 | 2 | 66.6 | 2 | 66.6 | 1 | 33.3 | 1 | 33.3 | 0 | 0 | 0.017 |
| Mar | 2 | 100 | 2 | 100 | 1 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0.093 |
| Apr | 3 | 75 | 2 | 50 | 1 | 25 | 1 | 25 | 1 | 25 | 0 | 0 | 0.025 |
| May | 7 | 77.7 | 7 | 77.7 | 6 | 66.6 | 5 | 55.5 | 3 | 33.3 | 2 | 22.2 | 0.002 |
| Jun | 3 | 75 | 3 | 75 | 2 | 50 | 2 | 50 | 2 | 50 | 1 | 25 | 0.001 |
| Jul | 7 | 77.7 | 5 | 55.5 | 5 | 55.5 | 4 | 44.4 | 3 | 33.3 | 1 | 11.1 | 0.004 |
| Aug | 1 | 100 | 0 | 0 | 1 | 100 | 1 | 100 | 1 | 100 | 1 | 100 | 0.004 |
| Sep | 2 | 100 | 2 | 100 | 1 | 50 | 1 | 50 | 1 | 50 | 0 | 0 | 0.013 |
| Oct | 2 | 66.6 | 2 | 66.6 | 1 | 33.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0.093 |
| Nov | 1 | 50 | 1 | 50 | 0 | 0 | 2 | 100 | 0 | 0 | 0 | 0 | 0.102 |
| Dec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Jan | 1 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 100 | 0.175 |

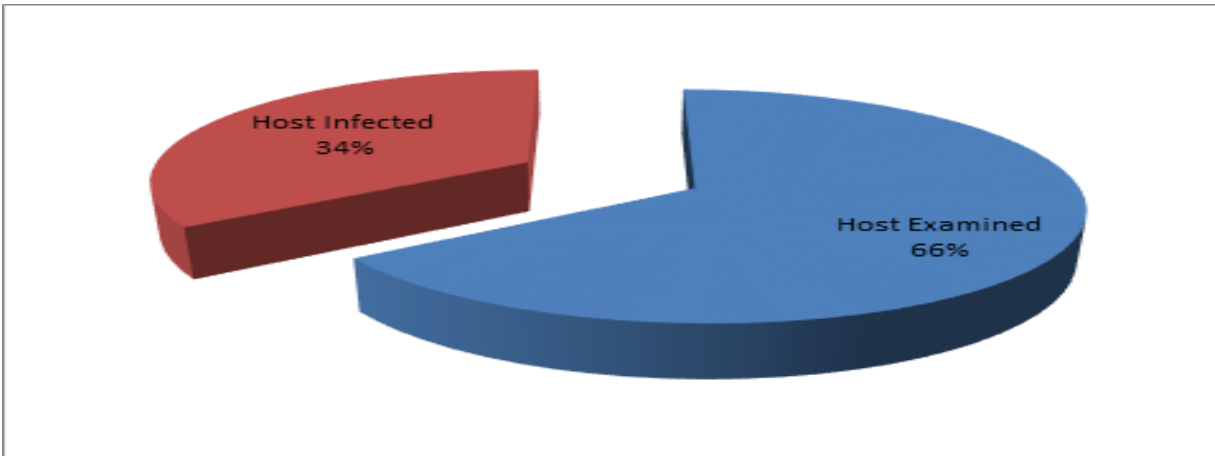


Figure 1. Overall Prevalence of Cestodes Infection.

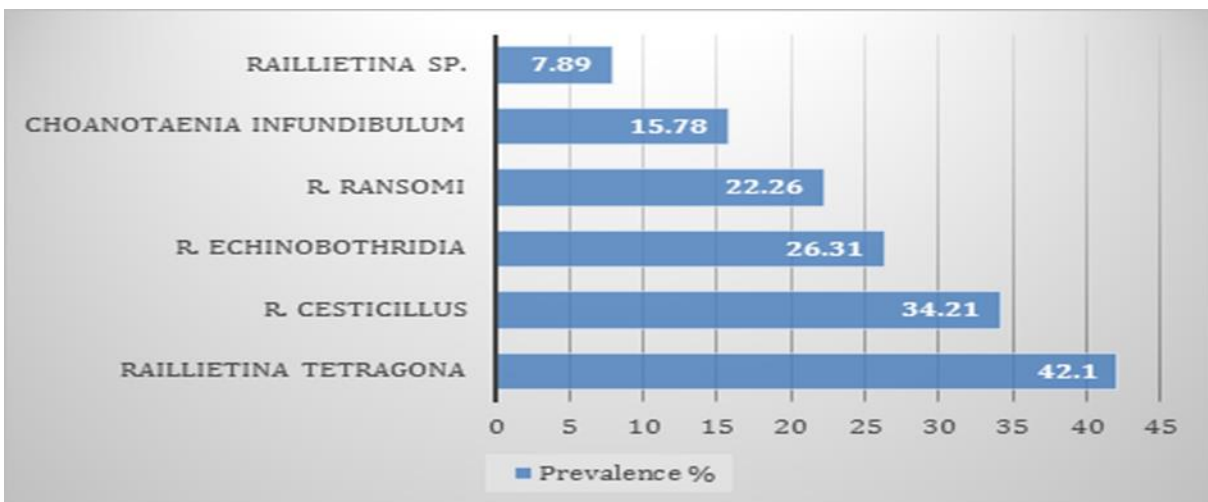


Figure 2. Prevalence of Cestodes parasites.

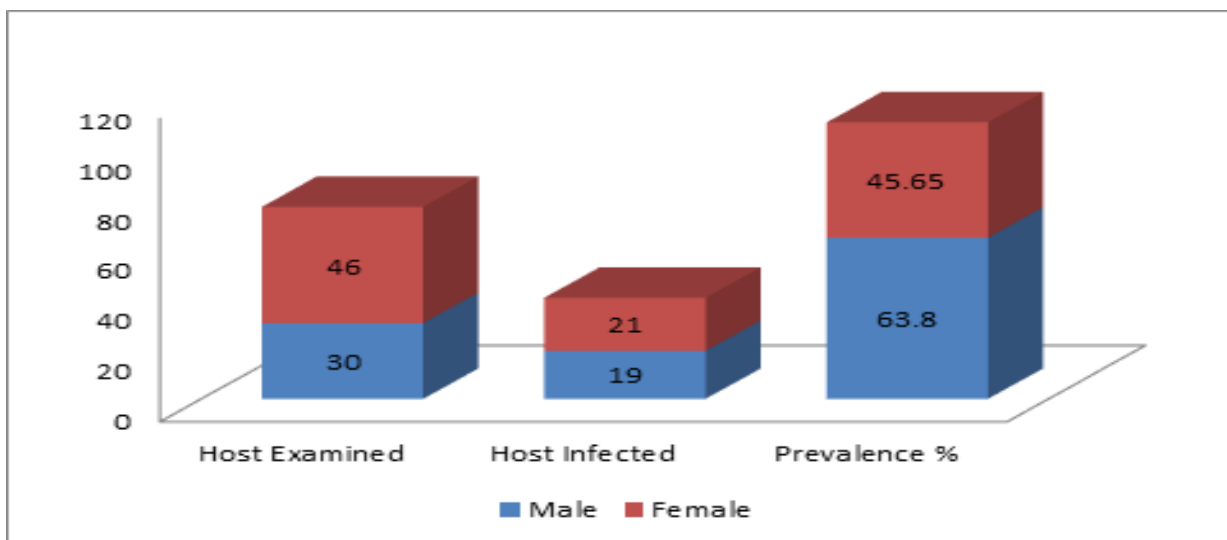


Figure 3. Prevalence of Cestodes in Relation to Host's Sex.

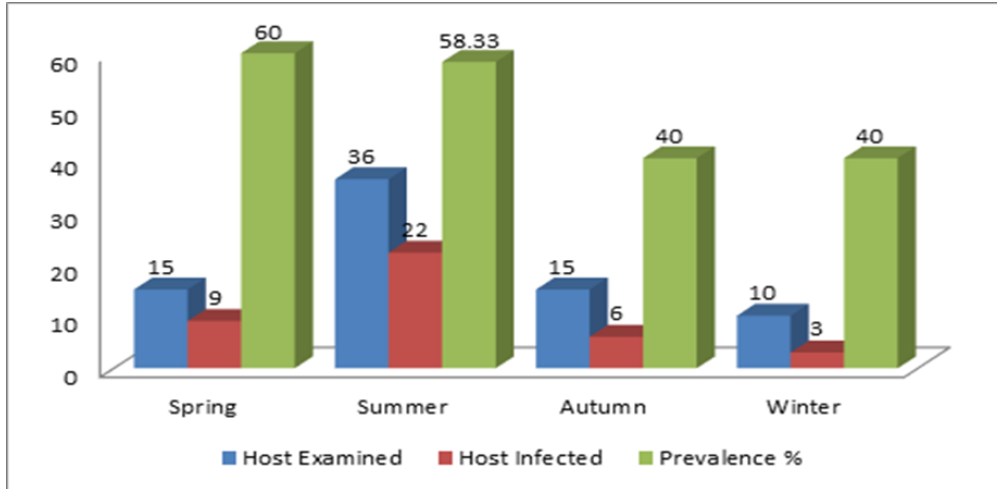


Figure 4. Seasonal Incidence of Recorded Cestodes' Species.

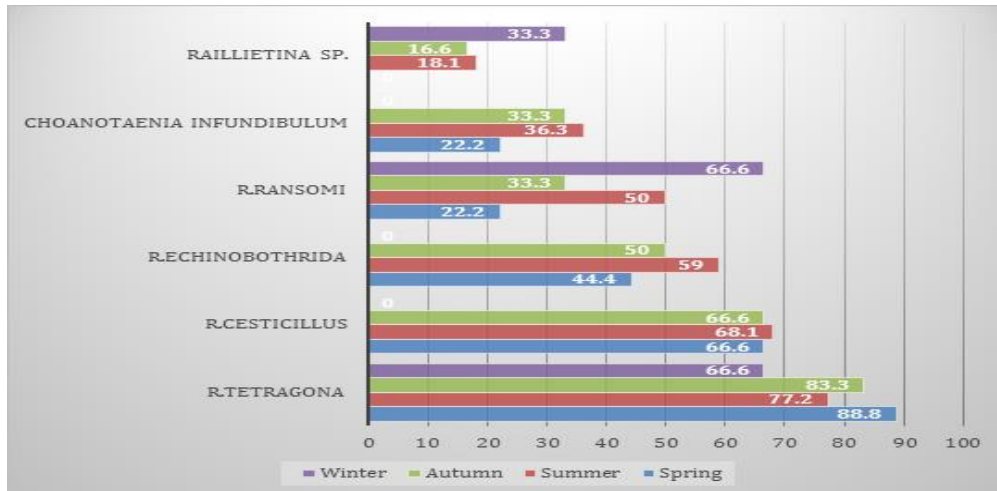


Figure 5. Seasonal Incidence of Each Species of Recorded Cestode.

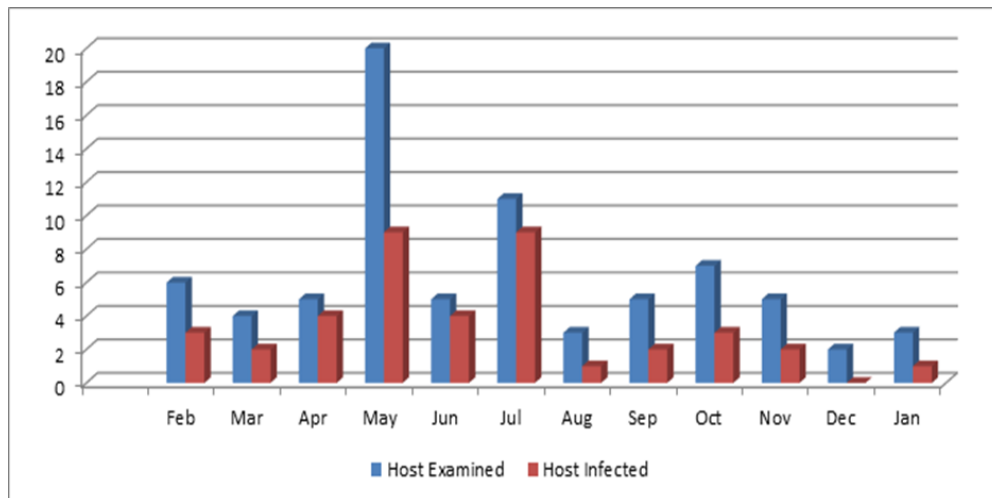


Figure 6. Monthly Incidence of Different Types of Recorded Cestodes' Species.

RESULTS AND DISCUSSION

Among 76 chickens 40 were positive with different Cestodes species. Six species belong to three genera were found from the digestive tract of chickens. The overall prevalence of Cestodes is 52.6%. Parasite burden is high in Male 63.8% as compared to females at 45.6%. Six species of Cestodes parasites were identified from the intestine of the infected chickens. The identified Cestodes species are *Raillietina tetragona*, *R. cesticillus*, *R. echinobothridia*, *R. ransomi*, *Choanotaenia infundibulum* and *Raillietina* sp. and their prevalence was 42.1%, 34.21%, 26.31%, 22.26%, 15.78%, and 7.89% respectively. *Raillietina tetragona* reported in chicken by Faizullah et al., 2013 (48.3%) and Tasawar et al., 1999 (51.66%) from Pakistan, Mpoame and Agbede 1995 (14.5%) from Western Cameron, Permin et al., 2009 (21.3%) from Tanzania, Ola-Fadunsin et al., 2019 (2.0%) from Nigeria, Loubna et al., 2013 (7.4%) from Egypt, Dama et al., 2012 (33%), Ayshia and Showkat 2015 (51.42%) and Singh and Nana 2018 (9.16%) from India, Butbooncho 2007 (57.5%) from Thailand, Ilyes and Ahmed 2013 (68.75%) from Algeria, Alam et al., 2014 (19.68%) from Bangladesh and Berhe et al., 2019 (65.94%) from Ethiopia. *R. echinobothridia* reported from the chicken by Faizullah et al., 2013 (19.2%) from Pakistan, Bahramiet al., 2015 (10.4%) from Iran, Butbooncho and Wongsawad 2017 (48.3%) from Northern Thailand, Adanget al., 2014 (25.3%) from Nigeria, Silva et al., 2016 from Brazil, Shahin et al., 2011 (91.9%) and Loubna et al., 2013 (6.6%) from Egypt, Berhe et al., 2019 (39.86%) from Ethiopia, Ilyes and Ahmed 2013 (83.33%) from Algeria, Phalee et al., 2017 (37.83%) from Phitsanulok province, Baboolal et al., 2012 (2.3%) from Trinidad, Begum & Sherin 2012 (100%) and Begum et al., 2019 (50%) from Bangladesh and Permin et al., 2009 (46.3%) from Tanzania while the same specie has been reported in pigeon by Diakau et al., 2013 (61.76%) from Greece and Alkharigy et al., 2018 (32%) from Libya. *R. cesticillus* was reported by Begum and Sherin 2012 (100%), Begum et al., 2019 (56.6%) from Bangladesh, Berhe et al., 2019 (55.07%) from Ethiopia, Butt et al., 2014 (83.5%) from Pakistan, Salam et al., 2010 (23.22%) from India, Ilyes and Ahmed 2013 (29.16%) from Algeria and Adanget al., 2014 (21.3%) from Nigeria, Baboolal et al., 2012 (0.9%) from Trinidad, Tasawar et al., 1999 (5.83%), Permin et al., 2009 (2.7%) from Tanzania and Faizullah et al., 2013 (0.8%) from Pakistan, Butboonchoo, 2017 (12.5%) from Thailand. And, also reported by Silva et al., 2016 from Brazil and Weir 2016 in natural laying hens. *Choanotaenia infundibulum* was reported by Butt et al., 2015 from Hyderabad Pakistan with a prevalence of 89.5% while Faizullah et al., 2013 reported *Choanotaenia* sp. (20%) from the same host in Quetta Pakistan. The same species had also been reported from out of Pakistan in Chicken by Percy et al., 2012 from Zimbabwe, Baboolal et al., 2012 (3.3%) from Trinidad, Permin et al., 2009 (3.7%) from Tanzania and by Ilyes and Ahmed 2013 (11.8%) from Algeria and, found in Japanese quail by Gamra et al., 2015 from Nigeria and Monte et al., 2018 from Brazil. The prevalence rate also varies from season to season. The highest infection has been observed in spring 60% followed by summer 58.3% and in autumn and winter same infection has been observed 40%. Multiple infections of helminths parasites have also been found in many chickens. High intensity of parasites has been observed. The intestine was fully blocked with the worm burden. Grossly intestine showed heavy infestation with Cestodes due to which the mucosal lining of intestine was damaged. Chronic catarrhal enteritis, hemorrhagic enteritis, nodular enteritis has been observed. The intestinal wall was thickened and inflamed with hemorrhagic necrotic spots.

CONCLUSION AND RECOMMENDATIONS

The present study concludes that the prevalence of parasitic infection of cestodes is very high resulting in the mortality of chickens. The high prevalence of infection leads to invisible production and economic losses. Raring area, season and availability and contact with the intermediate host also affect the prevalence and intensity of infection. Based on the result, the following recommendations are forwarded. As the cestodes parasites have a sub-clinical occurrence, studies in the focus of these ideas should be conducted. The public especially those who are related to poultry farming should be aware of the occurrence and economic

significance of gastrointestinal parasites. Elimination of intermediate host in rearing area and extensive early-season larval control has been recommended.

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