

A review on brood parasitism in Passeriformes, with an emphasis on Asian Koel (*Eudynamys scolopacea*) and House crow (*Corvus splendens*) in Pakistan Forest Institute Peshawar, Khyber Pakhtunkhwa

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Abstract

The Asian Koel (*Eudynamys scolopacea*) does not develop its own nest and it exploits the nests of House Crow (*Corvus splendens*) for laying eggs which stay there till hatching as the egg-laying season of both the species takes place at the same time. The instant study was conducted by authors at Research Garden in Pakistan Forests Institute Peshawar, Khyber Pakhtunkhwa, Pakistan during the months of August & September which fall during the peak breeding season of Asian Koel. The phenomenon of brood parasitism between Asian Koel and House crow was observed in the *Bombax ceiba* and *Melia azedarach*. During the field visits for this study, such association was also checked between Asian Koel (*Eudynamys scolopacea*) and Jungle Crow (*Corvus macrorhynchos*), but nothing as such came into the observation of the authors at the study sites. In the study area; the sighting of both the species i.e., Asian Koel and House Crow was mostly noted at the same trees in the early morning as well as in the evening. A total of Eight nests of house crow were recorded in the area which was physically checked by the authors to witness the phenomenon of brood parasitism, but such association was only recorded in the two nests of *Bombax ceiba* and *Melia azedarach*, the sighting in the study area concluded with the success percentage of 25%.

Keywords: Asian Koel, Brood parasitism, House crow, Pakistan Forest Institute Peshawar

Introduction

This paper is intended to serve as an informative document to provide information on the phenomenon of Brood Parasitism between Asian Koel and House Crow. House Crow is a monogamous and the pair's bond remains unbroken for successive seasons (Archer, 1998). Brood Parasites are such birds that do not develop their own nests but deposit their eggs in the nest of other birds (Clotfelter & Yasukawa, 1999). The hosts dupe them into rearing their children, therefore bypassing the expense of maternal support (Nahid, 2021). The mating season of the crow begins with the arrival of the monsoon and lasts until August. The Koel's mating season, which runs from March to September, coincides with that of the crow (Mariyam, 2020). Brood parasitism is a unique occurrence because of the host and parasite species' adjustments and counter-adaptations. (Habib et al., 2007). The host provides all parental care for parasite eggs and nestlings, therefore, decreased clutch size, hatching success, nest success, and fledgling success in the host species are reported consequences of the parasitism (Lack 1968; Payne, 1977, Rothstein, 1990). The incubation period of House Crow is 16-17 days and Asian Koel is 12-13 days. Less incubation period of Asian Koels compared to House Crow in the association of Brood Parasitism benefits the hatchling of Asian Koel as it has extra fostered at an earlier stage (Lamba, 1963).

In the study area Research Garden of Pakistan Forest Institute Peshawar, two sample sites were opted to substantiate the study. Moreover, to witness the phenomenon of Brood Parasitism in the Research Garden of Pakistan Forest Institute Peshawar; therein 10-12 different tree species were checked whereupon a total of eight nests of house crow were sighted; among them, only two nests were recorded as active brood parasitism nest and the same was having the deposited eggs of Asian Koel. During the study period, thorough monitoring of the nests serving the study's interest was carried out. It was recorded that the phenomenon was accomplished up to fledgling in both the nests till September as no signs of failure around nesting sites came into the observation.

Materials and methods

The study area is situated in Northwestern Pakistan (Peshawar: 34.020359° latitude and 71.486515°. Moreover, two days were spent in the study area. The study on Brood Parasitism was observed during August & September which fall in the breeding season of both Asian Koel and House Crow. To accomplish the study, a review of the literature was done through Google Scholar and Google Drive Library. Moreover, Nests of House Crow were checked in the dense vegetation of the study area (Lamba 1976). Furthermore, to identify the nests that came into the observation during the study; assistance was obtained from Google Explorer. Each nest was inspected twice a day; trees were climbed to check the interior of the nest. The nest of the crow

was made of different types of content mainly twigs, grass, tendrils. House construct its nest 3.0m or more above the ground level. Trees were harbored with one nest.

During the study, the maximum number of house crows recorded in a day (on the 2nd day of study) was 56 in the study area with the proportion π of 0.164 and relative abundance of 16.422 while Asian Koels Two in numbers were seen in the study area with proportion π of 0.006 and relative abundance 0.587 as compare to total existing avian biodiversity of the study.

Whereas, following is the details of nests came into the observation during the study period:

In the observation total number of eight nests were observed in which two of them having brood parasitism, while in six nests it was not observed.

Besides above Direct Observations were made at noon & in evening to collect the data for the sake of study and pictures of Asian Koel and House Crow and their nests were also captured. Moreover, the method of Inquiry from local people was also conducted to gather information about Brood Parasitism. The eggs of Asian Koel were found small in size and dark in color, moreover, the color of chicks of Asian Koel were recorded as dark in color. While the chick of House Crow was found pink in color.

Result and discussion

The Brood Parasitism definitely takes place between House Crow and Asian Koel, moreover, the breeding season of both the species Asian Koel and House Crow also coincides in the months of August of September. The instant study in its area concluded with the success percentage in terms of brood parasitism at 25%. Whereas, the egg of the Asian Koel after having the fostering make fledges right after hatching. Externally, there is a slight variation of color in Eggs of both the species. Avian Brood Parasitism is a reproductive strategy where parasites foist the cost of rearing their offspring on to another individual (Davies, 2000). Moreover, to improve the results further studies are also intended by the authors.

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References

- Ali, S. (2002). The Book of Indian Birds. Bombay Nat. Hist. Soc., Oxford University Press.
- Archer, A.L. (1998). The Indian House Crow *Corvus splendens*: a control programme recommendation for the Republique de Djibouti. A consultant report to National Biodiversity Action Plan Project (NABSAP) and IUCN.

- Clotfelter, E.D., & Yasukawa, K. (1999). Impact of Brood Parasitism by Brown-Headed Cowbirds on Red-Winged Blackbird Reproductive Success. *The Condor*, 101(1), 105–114. <https://doi.org/10.2307/1370451>
- Davies, N.B., & Brooke, M.D.L. (1988). Cuckoos versus Reed Warblers: adaptations and counter adaptations, *Animal Behaviours*, 36: 262-284.
- Grimmett, R., Inskipp C., & Inskipp, T. (1988). *Birds of the Indian subcontinent*. Oxford University Press.
- Habib, A., Hasan, S. A., Rana, S. A., Beg, M. A., & Mahmood-ul-Hassan, M. (2007). Brood parasitism of Asian Koel (*Eudynamys scolopacea*) on the house crow (*Corvus splendens*) in Pothwar Region of Pakistan. *Pakistan Journal of Agricultural Sciences*, 44(4), 627–634.
- Jones, A.E. (1916). Number of Koel's eggs found in one nest. *J. Bombay Natural History Society*, 24:370.
- Lack, D.L. (1968). *Ecological adaptations for breeding in birds*, London, Methuen.
- Lamba, B.S. (1976). The Indian Crows, A contribution to their breeding ecology, with notes on brood parasitism on them by the Indian Koel. *Records of the Zoological Survey of the India*, 71:183-300.
- Mariyam, D. (2020, July 9). Host v. Parasite: How the Crow and the Koel Contend to Protect Their Eggs – The Wire Science. *Science the Wire*. Retrieved from: <https://science.thewire.in/environment/house-crow-asian-koel-breeding-brood-parasitism-evolutionary-adaptation/>
- Nahid, M.I., Fossøy, F., Stokke, B.G., Abernathy, V., Begum, S., Langmore, N.E., Røskaft, E., & Ranke, P.S. (2021). No evidence of host-specific egg mimicry in Asian koels. *PloS one*, 16(7), e0253985. <https://doi.org/10.1371/journal.pone.0253985>
- Rothstein, S.I. (1990). A model system for coevolution: avian brood parasitism. *Annual review of ecology and systematics*, 21(1), 481-508.