

Pupil and Iris Variation in Doves during Courtship

Amar-Singh HSS

Introduction

The courtship behaviour of doves involves a combination of visual and auditory displays, often including bowing, cooing, head-bobbing, wing-flapping, tail-fanning, billing and allopreening, prior to copulation (Mitoyen *et al.*, 2021, Romagosa & Mlodinow 2022). At times I have observed aerial displays, chasing of potential mates and physical interactions with conflict between males.

I observed a previously unrecorded courtship behaviour that involved a change in pupil and iris during courtship displays in doves.

Observation 1: Little Cuckoo-Dove *Macropygia ruficeps*

On 17 April 2023 I was in Cameron Highlands, Pahang, Malaysia at a roosting site for Little Cuckoo-Doves where up to 200 birds congregate. I observed a number of birds expressing courtship behaviour. The courtship behaviour of pairs involved them disengaging from the social group. The female would sit on a branch often watching the male. The male would ruffle up the neck feathers and then proceed to bow many times while making low intensity calls (Plate 1). At times the female would also make responsive calls. I also saw males 'chasing' females, as is often seen with other dove courtship.



Plate 1: Little Cuckoo-Dove courtship (male right) showing pupil and iris change, Cameron Highlands, Pahang, Malaysia, 17 April 2023.

What struck me during observation, of different courting pairs, was the iris colour and pupillary changes of the male. The male's pupil would be constricted, at times near pinpoint, giving the iris a 'white-out' look. The female iris would be unchanged. Plates 1 and 2 show two different courting pairs to illustrate this. The males and females were in similar lighting environments. I also saw males that were not in courtship with irises similar to the females. The iris colour of the Little Cuckoo-Dove has been described as pale grey (Wells 2007) or pale blue to white (Baptista, *et al.*, 2020).



Plate 2: Little Cuckoo-Dove courtship (male right) showing pupil and iris change, Cameron Highlands, Pahang, Malaysia, 17 April 2023.

I looked for similar observations on the Little Cuckoo-Dove posted online. Sam Hambly has an image of courtship from Kamphaeng Phet, Thailand, July 2024 (Macaulay Library ML621366148) that shows similar changes.

Observation 2: Zebra Dove *Geopelia striata*

Having seen this unusual feature in courtship, I went back to look at my prior photographs of dove courtship in other species. I found two sets of images for the Zebra Dove in courtship that suggest some pupillary changes; both were seen in Ipoh, Perak, Malaysia (Plate 3). Although not as striking or apparent as in the Little Cuckoo-Doves, the male pupil is smaller and the iris more prominent during courtship.

I looked for similar observations on the Zebra Dove posted online. There are 75 images tagged as courtship in the Macaulay Library. Of these a few suggest that the pupil is smaller and iris more prominent in the male during courtship; for example, ML621366721 by Owen

Lawton. Another by Redzlan AR on [his blog site](#) shows the same. Surprisingly, in one Macaulay Library observation by Karyne Wee (ML615127136), the female's iris was more prominent at copulation.



Plate 3: Zebra Dove courtship showing pupil and iris change, Ipoh, Perak, Malaysia. First image June 2017 with male on the left. Second image July 2011 with male on the right. Despite the bright light when both these images were taken, the male's pupil was smaller.

Care needs to be taken with these observations of the Zebra Dove as the change is more subtle and appears to be a brief occurrence. Posture and lighting may affect perception of pupil size.

There is a possibility that pupillary and iris changes during courtship also occur in the Spotted Dove *Spilopelia chinensis*. See courtship images in the Macaulay Library by Jhih-Wei (ML467449261) and Ken Tay (ML473217321).

Discussion

There is limited information in literature discussing pupillary and iris changes during courtship of birds. I suspect it is easier to see this in birds that have a lighter or brighter iris.

Recent work done by the Avian Sleep Group at the Max Planck Institute for Ornithology in Germany (Ungurean *et al.*, 2021) showed that the pupil of male pigeons became constricted when courting females. The pupils were less constricted during copulation. Their work also shows that pupil size changes in birds are the opposite of those observed in mammals. They attribute this difference to the iris in birds being controlled by striated muscles as opposed to smooth muscles in mammals (Ungurean & Rattenborg 2024). This research suggests that birds can regulate their pupil size voluntarily and possibly intentionally.

In exploring the literature, there are a number of reports about iris and pupillary changes in courtships. These include:

1. An interesting Netflix documentary called 'Our Planet' in which a courting male Western Parotia *Parotia sefilata* bird-of-paradise changes its iris colour from blue to yellow with the pupil becoming pinpoint, during a mating dance. Link to video:

<https://www.youtube.com/watch?v=rX40mBb8bkU&t=135s>).

2. The Crested Auklet *Aethia cristatella* male is noted to have full pupillary constriction during intense courtship displays, "creating peculiar glassy-eyed appearance" (Jones 2020).
3. In describing the courtship of the Black-crowned Night Heron *Nycticorax nycticorax*, Noble and colleagues (1938) state that for the courting/breeding male "the pupil is contracted and the eye ball actually protruded from its socket, exposing the red iris to its maximum extent".

It is possible that a number of bird species can regulate their pupil size and use the iris as part of courtship, possibly even with a change in colour. It would be very useful if birdwatchers were alert as to this possibility and recorded videos of courting birds to explore this further. It would aid our understanding of use of the pupil and iris in social communication during courtship.

References

1. Baptista, L.F., Trail, P.W., Horblit, H.M., Boesman, P.F.D. & Garcia E. (2020). Little Cuckoo-Dove *Macropygia ruficeps*, version 1.0. In Birds of the World (J. del Hoyo, A. Elliott, J. Sargatal, D. A. Christie, and E. de Juana, Editors). *Cornell Lab of Ornithology*, Ithaca, NY, USA. <https://doi.org/10.2173/bow.licdov1.01>.
2. Jones, I.L. (2020). Crested Auklet *Aethia cristatella*, version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). *Cornell Lab of Ornithology*, Ithaca, NY, USA. <https://doi.org/10.2173/bow.creauk01>.
3. Mitoyen C., Quigley C., Boehly T., Fusani L. 2021. Female behaviour is differentially associated with specific components of multimodal courtship in ring doves. *Animal Behaviour*, 173:21-39. <https://doi.org/10.1016/j.anbehav.2020.12.014>.
4. Noble, G.K., Wurm, M. & Schmidt, A. (1938). Social Behavior of the Black-crowned Night Heron. *The Auk*, Vol. 55: Iss. 1, Article 2.
5. Romagosa C.M. & Mlodinow S.G. 2022. Eurasian Collared-Dove *Streptopelia decaocto*, version 1.1. In Birds of the World (P. Pyle, P. G. Rodewald, and S. M. Billerman, Editors). *Cornell Lab of Ornithology*, Ithaca, NY, USA. <https://doi.org/10.2173/bow.eucdov.01.1>.
6. Ungurean, G., Martinez-Gonzalez, D., Massot, B., Libourel, P.A. & Rattenborg, N.C. (2021). Pupillary behavior during wakefulness, non-REM sleep, and REM sleep in birds is opposite that of mammals. *Current Biology* 31, 5370–5376.
7. Ungurean G. & Rattenborg N.C. (2024). A mammal and bird's-eye-view of the pupil during sleep and wakefulness. *Eur J Neurosci.*; 59(4):584-594.
8. Wells, D.R. (2007). *The Birds of the Thai-Malay Peninsula*. Vol. 2 (Passerines). London: Christopher Helm.

Acknowledgement

I would like to thank Jia-En Ho for reviewing the manuscript.

Citation: Amar-Singh HSS. (2025). Pupil and Iris Variation in Doves during Courtship. *Malaysian Bird Report*. Volume 3/2025, Sept 2025: pg. 28-31.