# Reproductive Disorders in Parrots

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**KEYWORDS**

• Avian • Psittacine • Coelomitis • Egg-binding • Avian reproductive disease • Dystocia

**KEY POINTS**

- Medicine pertaining to the avian reproductive tract is commonly a multimodal approach consisting of both physiologic and environmental management.
- Egg binding represents a common reproductive disorder of Psittacine species, which can predispose to serious life-threatening complications, including dystocia and oviduct rupture.
- Use of synthetic, long-acting gonadotropin-releasing hormone (GnRH) agonists may help with certain reproductive diseases, including chronic egg laying.
- Inflammatory conditions of the reproductive tract are often linked to oviduct rupture or tear, resulting in coelomitis.
- Coelioscopy is often the best diagnostic tool to help diagnose most reproductive disorders and allow for assessment of tissues through biopsy and histopathology.

## AVIAN REPRODUCTIVE ANATOMY: A RAPID REVIEW

### *Female*

With the exception of certain avian species, most birds demonstrate development of the left reproductive tract exclusively, whereas the right gonadal tissue remains a vestigial organ system. Anatomically, the left ovary lies between the cranial division of the kidney, the adrenal gland, and the caudal aspect of the lung. It is attached to the coelomic wall by the mesovarian ligament. The main blood supply to the left ovary arises from the left cranial renal artery, which then branches into the ovario-oviductal artery, supplying the ovary and oviduct. Coming from the ovary are numerous vessels that allow return of blood to the vena cava. In a sexually active bird, these vessels may be difficult to distinguish due to follicular development.

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For avian species that are seasonal layers, follicular development occurs in separate stages. In birds classified as seasonal layers, as the numerous follicles begin to develop, they do so based on a "tier system," whereby the more developed follicles reach maturity first.[1] This system allows for the passing of a follicle along with its primary oocyte into the oviduct without immediate competition.[2,3] Changes in appearance to the ovary are observed during the different stages of development and are easily perceived via coelioscopy. A quiescent ovary (during the nonbreeding season) will be small, have a coarse surface, and is typically uniform in color, whereas an active ovary may look like a bunch of variably sized and colored spheres. As follicular development advances, yolk proteins are deposited, giving the maturing follicles a yellow appearance. Species variation is also appreciated with some parrots having more melanistic follicles than others.

The avian oviduct is composed of 5 separate regions that are mainly distinguished on the cellular level. The funnel-like infundibulum receives the ovum directly from the ovary and is the location of fertilization. During the approximately 1-hour transit time in the infundibulum, the outer yolk membranes and chalazae are added.[4,5] The ovum then reaches the magnum, where sodium, calcium, and magnesium are added. The magnum is easily distinguished from the rest of the oviduct due to its large size, coiled appearance, and large mucosal folds, all of which can be observed macroscopically. Microscopically, the magnum is associated with glandular tissue, consistent with its secretory role in egg development. After several hours in the magnum, the egg enters the isthmus, where the inner and outer shell membranes are added. The uterus (shell gland) is very short in avian species and is the site of shell deposition. The egg remains in the uterus for the longest period of time, whereby it accumulates salts, water, and shell pigment. The last segment of the oviduct, the vagina, is the shortest, but thickest-walled section and is solely responsible for oviposition. In a reproductively active bird, the left oviduct will grow markedly in size and may incorporate a large portion of the left coelom. Conversely, in young reproductively inactive birds, the oviduct may be small enough to be confused with the ureters coursing nearby. In most psittacine species, the interval between subsequent oviposition is 48 hours.[5]

### *Male*

The oblong pair of testes is located in the dorsal coelomic body cavity between the cranial pole of the kidneys and the caudal aspect of the lungs. The avian testes are suspended from the body cavity by the mesorchium and are surrounded by an abdominal air sac. The male avian reproductive organs may appear light or dark in color depending on age, species, and reproductive activity. It is common for melanistic testes to be observed in some Psittaciformes (eg, conures, macaws, cockatoos).[5] The outer capsule of the testes is smooth due to lack of lobation (an observation in most mammalian species). Unlike their female counterparts, both testes are hormonally active and functional in birds.

The epididymis in birds is much smaller than the mammalian equivalent. Located at the dorsomedial aspect of the testes, the epididymis is often difficult to observe during coelioscopy, even when engorged due to reproductive activity. The epididymis functions as a conduit for spermatozoa from the rete testes to the ductus deferens. The ductus deferens will be tortuous, which will help distinguish it from the nearby tracking ureters. The distal-most aspect of the ductus deferens joins the urodeum, creating an ejaculatory papilla. Although some avian species have a phallus for copulatory function, Psittaciformes do not have a phallus. Instead, copulation is achieved through eversion of the cloacal wall and transfer of sperm from the ejaculatory papilla to the female cloaca.[2,5] Although the ejaculatory papilla can serve as a potential aid in sex