

METHODS AND PROBLEMS OF SEXING AND AGEING AUSTRALIAN WATERFOWL

R. T. KINGSFORD

National Parks and Wildlife Service, P.O. Box 1967, Hurstville, NSW 2220

Received 15 February, 1988

Waterfowl (ducks, geese and swans) can be sexed and aged by plumage characteristics, cloacal examination or both (Hochbaum 1942, Humphrey and Clark 1964, Larson and Taber 1980). Nine of the 19 species of Australian waterfowl are known to be dimorphic (Frith 1982, p.42). Determining the sex of three of these, the Blue-billed duck *Oxyura australis*, Australasian Shoveler *Anas rhynchos* and Chestnut Teal *Anas castanea*, that are known to have a male 'eclipse' plumage, and of the sexually monomorphic species can be difficult, though morphological characteristics may help. Voice may also be useful.

All males in the waterfowl family (Anatidae) possess an intromittent phallus, a characteristic shared by other Anseriformes, ratites and tinamous (King 1981). Unlike mammals, erection is by lymphatic engorgement. The presence of the phallus allows birds in the hand to be reliably sexed, and its stage of development enables males to be aged.

The phallus is enclosed in the cloacal chamber and protrudes with cloacal manipulation. To do this, the bird is held with its belly up, either under the arm or against one's body. The wings must be held so the bird does not move. The tail is bent backwards to expose the cloaca. Pressure is then applied to either side of the cloaca, downwards along the body axis. The phallus will emerge from the cloaca if the bird is a male. The cloaca of females opens with the same technique.

It is also possible to age waterfowl through cloacal examination, but this is not reliable for

some age categories and should be used with caution. Juvenal males (*sensu* Eisenmann 1965) can be aged accurately by the stage of development of their phalli, which are short fleshy appendages in juvenals, in contrast to the sheathed and corkscrew-shaped phalli of the adult (Fig. 1). The juvenal phallus should not be con-

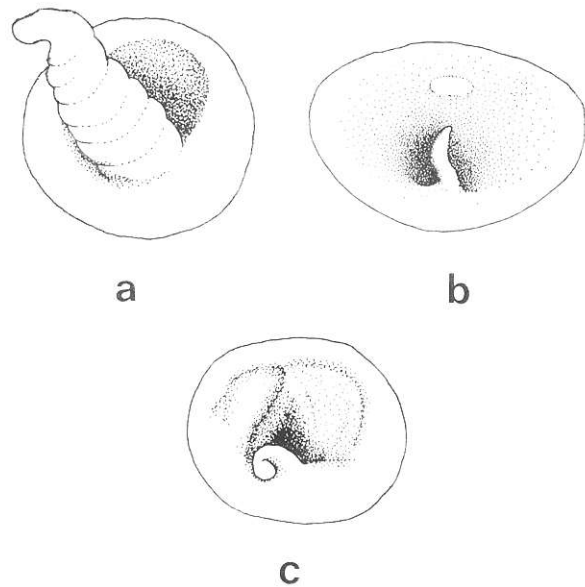


Figure 1. Attributes of waterfowl cloacas used for sexing and ageing. a — adult male; b — juvenal male, with bursa of Fabricius above phallus; c — female.

fused with the genital eminence of females which is more like a bud than an appendage (Fig. 1). The adult phallus develops soon after the post-juvenile moult in North American waterfowl (Hochbaum 1942); the same is true of the Maned Duck *Chenonetta jubata*.

The bursa of Fabricius, which has an immunological function, is also a sign of immaturity and has been widely used to age waterfowl (Larson and Taber 1980). It is a sac-like organ that opens to the cloaca (Fig. 1), and usually regresses when the bird reaches maturity. Examination of the bursa is difficult in live birds (Hochbaum 1942), and there is variability in its regression with maturity in some species (Hohman and Cypher 1986). These difficulties make it an unreliable method for ageing until specific criteria for different Australian waterfowl are established.

Frith (1982) describes 'immatures' of most Australian waterfowl as being similar to adults, usually the female. However, some plumage characteristics exist for ageing. Juvenals of all species have characteristically notched tail feathers (Fig. 2), like all waterfowl (Larson and Taber 1980). The notch is the result of a downy tip which breaks from the juvenile tail feather. There are

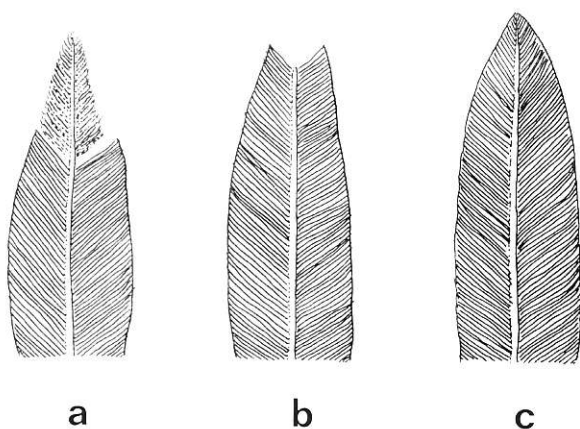


Figure 2. Tail feathers used to age waterfowl. a — Juvenile tail feather with down still attached to tip. b — Juvenile feather without downy tip, showing characteristic notch. c — Adult or post-juvenile moult tail feather.

also characteristic juvenile plumages for the Grey Teal *Anas gibberifrons* (Lavery 1972) and Maned Duck *C. jubata* (Kingsford 1986). The notched tail feathers and juvenile plumage of the latter last for about three months (Kingsford 1986).

Criteria exist for ageing a number of species of North American waterfowl based on morphological characteristics, with the tertials and primary and secondary coverts being useful for separating adults from young hatched in a year (Hopper and Funk 1970). There are little similar published data on Australian waterfowl. Until these are available, the use of plumage characteristics for ageing Australian waterfowl is of limited use.

REFERENCES

- Eisenmann, E. (1965). The use of the terms "juvenile" and "juvenile". *Auk* 82: 105.
- Frith, H. J. (1982). Waterfowl in Australia. 2nd ed. Angus and Robertson, Sydney.
- Hochbaum, H. A. (1942). Sex and age determination of waterfowl by cloacal examination. *Trans. Seventh N. Amer. Wildl. Conf.* 7: 299-307.
- Hohman, W. L. and Cypher, B. L. (1986). Age-class determination of Ring-necked Ducks. *J. Wildl. Manage.* 50: 442-445.
- Hopper, R. M. and Funk, H. D. (1970). Reliability of the Mallard wing age-determination technique for field use. *J. Wildl. Manage.* 34: 333-339.
- Humphrey, P. S. and Clark, K. C. (1964). The Anatomy of Waterfowl. In the Waterfowl of the World, Vol. 4. Ed. by Delacour, J., p. 167-232. Country Life, London.
- King, A. S. (1981). Phallus. In Form and Function in Birds, Vol. 2. Ed. by King, A. S. and McLelland, J. p.107-147. Academic Press, London.
- Kingsford, R. T. (1986). The moults and plumages of the Maned Duck *Chenonetta jubata* on the southern Tablelands of NSW. *Corella* 10: 108-113.
- Larson, J. S. and Taber, R. D. (1980). Criteria of sex and age. In Wildlife Management Techniques, 4th edition. Ed by Giles, R. H. p.143-202. The Wildlife Society, Washington, D.C.
- Lavery, H. J. (1972). Studies of waterfowl (Anatidae) in North Queensland. 8. Moults of the Grey Teal (*Anas gibberifrons gracilis* Buller). *Qld J. Agr. Anim. Sci.* 29: 209-222.