

## Bigamous behaviour of captive Cape Teal

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Monogamy is thought to be the usual mating system in dabbling ducks and documented cases of bigamy are very rare for any *Anas* species (Lebret 1961). The following observations on wild-caught Cape Teal *Anas capensis*, breeding in flight pens, show that bigamy is possible in this species and suggest that it may be expected to occur in wild birds.

On 3 May 1976, 11 full-winged Cape Teal (5 males, 6 females) were released in a flight pen measuring 27.5 m x 27.5 m x 3.6 m (described in McKinney 1967). These birds had been captured as adults at Strandfontein, Cape Province, South Africa in 1974. They were individually marked with coloured plastic nasal discs (females) or nasal saddles (males). Observations were made for 3 hours, starting at first light, on 2 of every 3 mornings from 4 May to 24 August (total 228 hours). Other watches at various times of day totalled 36 hours.

One pair-bond existed before the birds were released (pair A) but after a period of intense social courtship 2 more pairs had formed by 13 May. During these courtship bouts, females directed the pointing (= threat) component of inciting toward other females as well as toward males, an unusual pattern in dabbling ducks where typically inciting is used to indicate rejection of a courting male (Lorenz 1951-53; Weidmann 1956; Johnsgard 1965; Standen 1980). Unpaired females tended to threaten paired females while aligning themselves with paired males (Table 1), indicating that

there was strong competition among the females for certain preferred males.

On 13 May the remaining 5 birds were removed, social courtship ceased, and by 22 May males A and B had established exclusive territories, with pair A controlling about two-thirds of the pen. Pair C rapidly became subordinate to pairs A and B and by 20 May pair C spent most time hiding in cover. On 23 May female B laid the first egg of her clutch of 9 eggs and thereafter male B expanded his territory. Both pairs behaved territorially but female A did not start to lay a clutch of 6 eggs until 14 July.

While female B was laying (23-31 May) female C showed pre-laying behaviour (persistent quacking, inspecting nesting cover, scrape-making). On 4 days (7 occasions) just before and during this period, male B tried to force copulation on female C and several times apparently succeeded. Most of these incidents took place while female B was on her nest. By this stage, male C was subordinate to all birds in the pen and he made no attempt to defend his mate against the assaults of male B.

On or close to the day female B started to incubate (31 May), the relationship between male B and female C began to change (Figure 1). He spent more and more time with her, stopped trying to force copulation, and she stopped retreating from him. Within 2 days they were performing normal pair copulations, female C threatened male C while inciting beside male B, and she cooperated with male B in territorial aggres-

Table 1. Incidence and orientation of inciting displays given by paired and unpaired females during the period 4-13 May.

Performer	Bird rejected				Bird favoured	
	Paired males (3)	Unpaired males (2)	Paired females (3)	Unpaired females (3)	Paired males (3)	Unpaired males (2)
Paired females (3)	26	16	13	18	99	0
Unpaired females (3)	1	1	10	0	16	2

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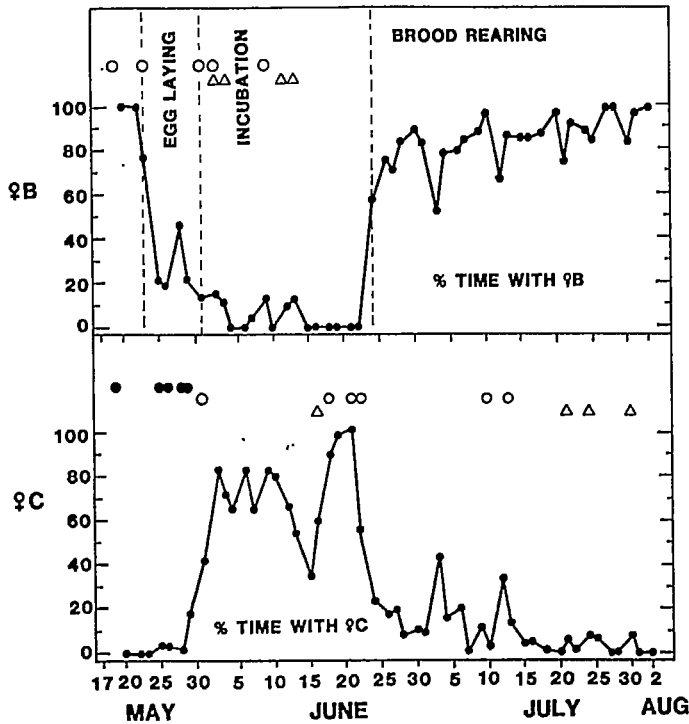


Figure 1. Percentage of observation periods male B spent with females B and C. ● = forced copulation attempts, ○ = pair copulations, initiator uncertain, △ = pair copulations initiated by female.

sion toward pair A. Although she showed pre-laying behaviour, female C did not lay.

During female B's first week of incubation, male B spent most time during observation periods with female C, but usually immediately left her to join female B when she came off the nest. During the second week (7-15 June), male B did not attend female B so closely when she came off the nest, and female B vigorously chased female C if the latter was in view. On 12 and 13 June female B solicited copulations from male B immediately after chasing female C. Six of 9 pair B copulations observed during female B's incubation period were initiated by the female (the beginning of the other 3 sequences were not observed). On 15 June male C and female C were seen fighting and, although their pair-bond seemed in danger of breaking, it persisted, at least on a part-time basis. Although male C spent much of the 4 month study period hiding in cover, he was often joined by female C, especially after she had been chased by female B.

During the third week of incubation (16-23 June), female B did not come off the nest while we were observing and her relationship with male B could not be assessed. However, male B and female C were seen copulating 3 times (once at least clearly initiated by the female).

After female B's brood left the nest male B associated closely with them much of the time and his bond with female C weakened. In late July, however, female C began a second period of pre-laying behaviour (persistent quacking, inspecting nesting cover) and 3 times she was seen to solicit copulation from male B. At the same time both male B and male C began directing courtship displays toward female C. From 18 July to 24 July and again in early August pair C performed pre-copulatory behaviour and female C incited beside male C, indicating that their pair-bond still persisted.

All 3 females chased each other during the study ( $n = 139$ ) but chases by B after C were most frequent, especially after B's brood left the nest (23 times before,

50 times after, during observation periods totalling 81 hours in each phase). Most of these chases appeared to be associated with rivalry over male B; the remaining chases occurred on days when territorial conflict between pairs A and B was intense.

#### Discussion

At the beginning of the breeding season, the behaviour of male B followed a pattern similar to that observed in various Northern Hemisphere *Anas* species (e.g. Mallard *A. platyrhynchos*). He established a territory, escorted and copulated with his mate, and made forced copulation attempts on other females. Once his mate began to incubate, however, male B's behaviour diverged from the familiar pattern. He stopped assaulting female C and began treating her as a second mate. Thereafter he actively maintained his bonds with both females, switching his attention back and forth from one to the other.

The behaviour of females suggested that males of this species have polygynous tendencies and that females compete actively to maintain pair-bonds with preferred males. This was shown by the orientation of inciting performances, overt hostility between females, and by the soliciting of copulations by neglected females. We interpret the copulation soliciting behaviour of females B and C as a mate-holding tactic peculiar to this competitive situation because females of Northern Hemisphere species of *Anas* do not usually take the initiative in pre-copulatory behaviour, especially while they are incubating (McKinney 1967; McKinney & Stolen 1982).

The strong interest shown by male B in escorting his female and ducklings after they left the nest was not unexpected because the Cape Teal is one of the Southern Hemisphere dabbling ducks in which two adults are almost always seen accompanying broods (Kear 1970; Siegfried 1974). In this case, however, male B did not give full-time attention to his family; when female C came into pre-breeding phase again, he courted and copulated with her.

Cape Teal breed irregularly and opportunistically in response to favourable

water conditions in semi-arid habitats (Siegfried 1974). This is likely to result in complexities in pair-bonding relationships that do not arise in temperate zones where breeding occurs on a regular annual schedule during a 3-4 month period. Male Cape Teal may be expected to keep their options open in respect to their allocation of co-operative mate-guarding and brood-care. If the primary mate loses her clutch or brood, the best course for a male to follow may be to switch his reproductive effort to support of a secondary female. This could be especially adaptive for the male if the secondary female is in the pre-laying phase and ready to initiate a clutch.

Female Cape Teal seem to have fewer options open to them than males, but they are capable of competing strenuously for mates. This is to be expected if males play significant roles in brood-care and if they have polygynous tendencies.

Comparable studies of breeding pairs of other *Anas* species have been carried out in the same flight pens. No instances of bigamy were observed in Northern Shovelers *A. clypeata* (McKinney 1967), Mallard (Barrett 1973) or Northern Pintail *A. acuta* (Derrickson 1977) but examples of simultaneous bigamy, very similar to that reported here, have been documented in Chilean Teal *A. flavirostris* and Bahama Pintail *A. bahamensis*. It seems likely that the potential for polygyny is greater in tropical and subtropical species with extended breeding seasons and field studies are needed to investigate this possibility.

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Summary

During a flight pen study of 3 wild-caught, full-winged pairs of Cape Teal *Anas capensis* one male was paired simultaneously with 2 females. While the primary female was laying, the male attempted forced copulations on female 2 whose mate was subordinate and did not defend her. While female 1 incubated, the

male formed a second pair-bond with female 2. During female 1's period off the nest, she solicited copulation from the male and chased female 2. After hatching the male spent most time with female 1 and brood but continued a part-time bond with female 2. Such relationships may be more likely to occur in tropical and sub-tropical species with extended breeding seasons.

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