

PARENTAL ATTENDANCE AND BROOD CARE IN FOUR ARGENTINE DABBLING DUCKS¹

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Abstract. The presence of males with broods of Silver Teal (*Anas versicolor*), Speckled Teal (*A. flavirostris*), Red Shoveler (*A. platalea*), and Brown Pintail (*A. georgica*) was recorded, and the behavior of brood-tending males and females was observed, during parts of three breeding seasons, November–December, 1985–1987, on various wetlands in Buenos Aires Province and in the vicinity of Bariloche, Rio Negro Province, Argentina. Biparental care was well developed in Silver Teal. Some Speckled Teal broods were escorted by both parents, but others were cared for by the female only. Brown Pintail males were present at times with one-third of the broods seen, but they showed no brood-care behavior. Males were rarely seen with Red Shoveler broods and there was no indication of male brood care. Our observations suggest that pair bonds may be long-term in Silver Teal and perhaps in some Speckled Teal, but males deserted their brood-tending females in Red Shoveler and Brown Pintail. We emphasize that behavioral observations are needed to determine whether males associating with broods are really contributing to parental care in Southern Hemisphere *Anas* species.

Key words: Argentina; parental care; pair-bond duration; wing molt during brood care, *Anas versicolor*; *Anas flavirostris*; *Anas platalea*, *Anas georgica*.

INTRODUCTION

In Northern Hemisphere dabbling ducks (genus *Anas*) only females care for the ducklings, but in certain Southern Hemisphere species males also accompany broods (Kear 1970; Siegfried 1974; Weller 1975a, 1975b, 1975c). However, few of the latter species have been studied intensively and evidence on active male participation in brood care is scarce. Gross species-characteristic differences in the behavior of males accompanying broods have been noted for certain Southern Hemisphere *Anas* species (reviewed in McKinney 1985). For example, biparental care is the usual pattern in the Cape Teal (*A. capensis*), Chestnut Teal (*A. castanea*), and Chiloe Wigeon (*A. sibilatrix*), while female-only care is usual in the African Black Duck (*A. sparsa*) and Pacific Black Duck (*A. superciliosa*). For most of the other Southern Hemisphere species, including *A. flavirostris* and *A. georgica* discussed here, records are inconsistent; either one or two adults have been noted with broods. The possibility that brood-care patterns are variable within these species raises intriguing, and as yet unexplored, questions about the duration of pair bonds, male

parental investment, and the factors that influence these patterns.

In this paper, we present observations on the behavior of the adult(s) escorting broods of four poorly-studied species: Silver Teal (*A. versicolor versicolor*), Speckled Teal (*A. flavirostris flavirostris*), Red Shoveler (*A. platalea*), and Brown Pintail (*A. georgica spinicauda*) (nomenclature follows Johnsgard 1978). We paid special attention to the behavior of males when they were present, but brood-care behavior of females, duckling behavior, and brood-habitat preferences are also reported.

METHODS

Records of the presence of one or two parents with broods were collected in Argentina during parts of three breeding seasons, November–February, 1985–1987. Locations at which the broods were observed are grouped in four categories according to regions and habitat differences (Fig. 1): (1) Buenos Aires Province: Costanera Sur Reserve on the edge of the city of Buenos Aires, wetlands near Trenque Lauquen, Coronel Pringles, Claromeco, and Juarez; (2) Bariloche area: various wetlands within 60 km of Bariloche, Rio Negro Province (Fig. 1A–G); (3) Laguna Los Juncos: a small lake 35 km east of Bariloche, and

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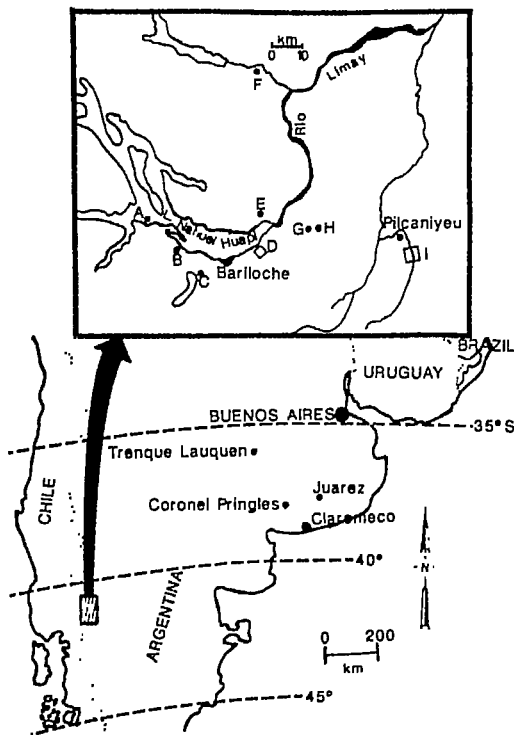


FIGURE 1. Map of locations where broods were observed in Argentina. Inset map areas referred to in the text are as follows: (A) Puerto Panuelo, (B) Kilometer 14, (C) Lago Gutierrez, (D) Nirihuau, (E) Estancia Jones, (F) Trafal, (G) Estancia San Ramon, (H) Laguna Los Juncos, (I) Pilcaniyeu.

(4) Pilcaniyeu: various wetlands near Pilcaniyeu, 70 km east of Bariloche. Typical aquatic vegetation of Buenos Aires Province is described in Weller (1968). Near Bariloche, reeds (*Juncus* spp.), milfoil (*Myriophyllum* spp.), and pondweeds (*Potamogeton* spp.) are common. Localities, dates, and other habitat characteristics are detailed in Table 1.

Repeated visits were made to certain wetlands in the Costanera Sur Reserve and near Bariloche and, in the course of intensive fieldwork on parental care in Chiloe Wigcon by GB, brood records were collected during November and December at Laguna Los Juncos (1986) and Pilcaniyeu (1987). Undoubtedly some of the same broods were resighted repeatedly at these places, and we took care to eliminate all records that might have been duplicates from the totals. Adults present were reported in Table 2 for the initial sighting, with the exception of four identifiable

broods of Brown Pintail and one brood of Speckled Teal which were reclassified when a male was later seen with them. Almost all broods were watched for at least several minutes after being sighted, and some broods were watched for up to 3 hr. No birds were individually marked, but we could identify some families by their location, number and size of ducklings, and sometimes by adult plumage features. Observations of brood behavior were made using 20× scopes from a parked car or from vantage points overlooking wetlands. Although broods usually retreated from us when we first arrived, most attending adults habituated to our presence and permitted observations of apparently undisturbed behavior.

We attempted to age broods using the criteria of Gollop and Marshall (1954), assigning each to one of seven categories (Ia, Ib, Ic, IIa, IIb, IIc, III). In view of the many variables involved, however, the records have been grouped into three categories only: I—downy, II—mixed down and feathers, and III—feathered. Broods were not tallied unless they were seen well enough to allow an accurate count of the ducklings, an estimate of their age, and a clear decision on whether a male was with them or not. Ducklings without attending adults were not tallied as “broods.” Although adult plumages of males and females are similar in three of these species, we had no difficulty sexing birds accompanying broods by differences in body size, head shape, calls, and other distinctive behavior. (See Johnsgard 1965, 1978 and McKinney 1970 for descriptions of displays.)

RESULTS

SILVER TEAL

Eight of 10 broods (80%) tallied were closely escorted by both male and female (Table 2). The remaining two broods could have had a male associating loosely with them; both were in dense emergent cover, and single males were seen in the vicinity. All broods spent most of the time in heavy cover provided by dense stands of emergent aquatic plants (cattail, *Typha latifolia*, arrowhead, *Sagittaria montevidensis*, and smartweeds, *Polygonum* spp.). Ducklings fed by probing in mud and dabbling in shallow water; they were not seen to dive for food. When disturbed by people they retreated into cover or, when the zone of emergent plants fringing the shoreline was narrow, by swimming rapidly across

TABLE 1. Habitat types, locations, and dates of observation for study areas.

Habitat type	Location	Dates of observation
Shallow ponds (field and roadside ditches)	Juarez	18-19 November 1987
	Coronel Pringles	19 November 1987
	Trenque Lauquen	20 November 1986
	Nirihuau	28 November, 3 and 7 December 1985
	Kilometer 14	6-19 December 1986, 23 and 27 November 1987
Ponds formed from rivers by dams or landfill	Costanera Sur	6-16 November 1987, 9 December 1987
	Estancia Jones	28 November 1985
	Estancia San Ramón	17 January-3 February 1987
	Pilcaniyeu	26 November 1987-15 February 1988
Shallow lakes with associated marshes	Claromecó	13-14 December 1985
	Traful	28 November 1987
Shallow steppe lake with <i>Myriophyllum</i>	Laguna Los Juncos	3-10 December 1985, 29 November 1986-14 January 1987, 22 November-2 December 1987
Sheltered sections of large, deep lakes	Lago Gutierrez	22, 25, 29 November 1987
	Puerto Pañuelo	30 November 1985, 23 November 1987

open water to reach another section of secluded cover. When surprised by us at close range, females gave squeaky quacks and quickly led their ducklings away. In one instance, the male gave quiet alarm calls as he swam out from cover, and then the female and ducklings swam to join him. Once, when a female was away from her brood, the male stayed with the ducklings; when she swam back toward them she gave a *decrecendo call*, the ducklings responded by swimming fast to her, and the male followed them. Males escorting broods were very vigilant and spent much time with head high in alert postures. Broods were difficult to watch because of their preference for dense cover, but a time budget for the adults with five (1c) ducklings was made (ac-

TABLE 2. Presence of both male (M) and female (F) with broods observed in four localities in central Argentina between 6 November and 14 December 1985-1987.

Species	Locality	Broods with M + F/total broods			Totals M + F/all broods
		Duckling age class			
		I	II	III	
Silver Teal	B.A. Province	5/5	1/2	2/3	8/10 ^a
Speckled Teal	B.A. Province	2/2	1/1	1/1	4/4
	Nr. Bariloche	1/2	1/1	1/1	3/4
	L. Los Juncos	1/1	0/3	—	1/4
	Pilcaniyeu	1/2	1/1	—	2/3
Totals		5/7	3/6	2/2	10/15 ^b
Red Shoveler	B.A. Province	1/3	0/1	—	1/4
	L. Los Juncos	4/12	—	—	4/12
	Pilcaniyeu	0/9	0/1	—	0/10
Totals		5/24	0/2	—	5/26 ^c
Brown Pintail	B.A. Province	2/2	2/2	—	4/4
	Nr. Bariloche	2/3	3/7	1/2	6/12
	L. Los Juncos	2/4	0/1	0/1	2/6
	Pilcaniyeu	1/11	0/6	—	1/17
Totals		7/20	5/16	1/3	13/39 ^a

^a ns, binomial test (two-tailed); H₀: p = 1/2)
^b ns, binomial test
^c P < 0.01 binomial test.
^d ns, binomial test.

tivity every 30 sec for 28 min) while they swam undisturbed in open water. During this watch the male was more alert than the female (31:10), the female fed more than the male (44:19), and the ducklings fed steadily throughout. When the family swam near other waterfowl, only the male behaved aggressively; he rushed across the surface at other Silver Teal (five times) and at Black-headed Ducks, *Heteronetta atricapilla* (twice).

On a visit to Costanera Sur on 9 December 1987, a pair of Silver Teal was found with four class III ducklings (fully feathered but not yet adult-sized and lacking full-grown primaries). Both adults were flightless. The males of three additional pairs (without broods) were also in wing molt. (One flightless pair had been seen in the same area on 14 November also). The bonds between these birds were conspicuously strong: while sleeping they remained side by side, and while feeding they kept within a few meters of one another. These records suggest that at least some birds maintain pair bonds during the post-breeding molt in this population.

RED SHOVELER

Of the 26 broods tallied, a male was present with only five broods (19%; Table 2). All five broods with a male present were class I, and four of them were recorded at Laguna Los Juncos in 1986 or 1987. Frequent (at least weekly) censuses of waterfowl on this lake in 1986 showed that all males, including the mates of six brood-tending females, left the area by 11 December. Therefore, in this instance, pair bonds had definitely broken by early in the brood-rearing phase.

Observations on three broods that had an accompanying male gave no clear evidence of male parental care. These males associated only loosely with females and ducklings, often spending time apart from them and rarely escorting them closely. The behavior of the birds indicated that they were indeed the females' mates: they were neither rejected nor avoided by the females when they came close to them, and two of these pairs engaged in *hostile pumping* (mutual threat displays) toward other males that approached and tried to follow these families. These males appeared interested in courting the female, and the escorting males repeatedly tried to keep them away from the female by swimming toward them.

Two other instances of courtship of females with broods were recorded. On 14 December 1985 at Claromec  (Buenos Aires Province), a

male gave three *preen-behind-wing* displays to a brood-tending female who responded with *hostile pumping* and swam him off seven times. On 7 November 1987 at Costanera Sur, a male persisted in courting a female by performing *jump-flights* away from her, then swimming back to give *precopulatory head-pumping* at her side. The female's response was to avoid the male indicating that the two were not paired.

Four females threatened and/or chased several species of birds that approached, or were approached by, their broods: Brown Pintail ($n = 4$), Chiloe Wigeon (1), Black-headed Duck (1), Rosybill (*Netta peposaca*) (1), Common Gallinule (*Gallinula chloropus*) (3), and White-winged Coot (*Fulica leucoptera*) (3). One female actively defended her class Ia ducklings by giving open-bill threats upward at a Kelp Gull (*Larus dominicanus*) that swooped down at them. Hostility (fighting and *hostile pumping*), apparently over access to a favored loafing site, between a brood-tending female and another female Red Shoveler was seen once. Accompanying males were seen to behave aggressively only toward conspecific males.

The behavior of Red Shoveler broods contrasted with that of Silver Teal broods in several other ways. They occupied many more open habitats along shorelines and mud-flat areas devoid of emergent cover, and they frequently swam in open water where the ducklings repeatedly dived for food. One brood of four class II ducklings was left temporarily unescorted by the female while they continued to feed actively in an exposed area.

SPECKLED TEAL

Ten of 15 broods were accompanied by two adults (67%; Table 2), and the seven identifiable broods that were sighted on more than one occasion were all consistent in the presence or absence of a male. In three cases there was no male present each time the brood was sighted (four times in 18 days, four times in 20 days, twice in 9 days); in four cases a male was present on each occasion (twice in 3 days, twice in 8 days, twice in 4 days, four times in 7 days). No additional males were seen following or courting brood-tending females, and when two adults were present their behavior indicated that they were paired.

In two instances ducklings were left temporarily unescorted. In one of these cases, three (Ic) ducklings were heard giving *distress calls* and

several minutes later the male and female flew back to join them. Apparently the pair had been feeding on a nearby wetland.

An interesting reaction to the sudden appearance of three people near a family was observed on a small reservoir near Bariloche. Shortly after our arrival, a pair of teal swam out from shore toward the middle of the dam in "sneaking" postures with heads held forward and low over the water. Then the female left the male and swam toward us giving a continuous series of loud quacks: when about 15 m from us, she began swimming back and forth in front of us, still calling. This behavior was similar to the "tolling" described in other *Anas* species as a form of predator distraction (e.g., SOWLS 1955). Meanwhile, as the female approached us, a tight group of four (Ia) ducklings swam out from the same place on shore, joined the male in midpond, and swam with him away from us scurrying ahead of him to take cover on the opposite shoreline. About 2 min later, the female flew to join the male, whereupon the ducklings swam out from cover to meet her, and the whole family swam away toward the far end of the dam. Just before they disappeared from sight, the female again adopted a sneaking posture and the ducklings followed her closely. A similar quacking response by a female was recorded at a small pond near Bariloche when a brood of four class III ducklings accompanied by two adults was approached by two people; then the group swam out of sight into reeds.

These episodes indicated tendencies for parents to skulk and hide in cover. We saw similar behavior also in some other broods of this species, although several broods were using open wetlands with little emergent plant cover. Escorting males typically stayed very close to the female and ducklings, and at times appeared to be in alert postures but, apart from this episode in which the male alone accompanied the ducklings for several minutes, males were not seen to play active roles in brood care. We had few opportunities to observe broods that were not disturbed by our presence, however, and the extent to which males participate in brood care remains to be established.

BROWN PINTAIL

Thirty-nine broods were tallied, of which 13 (33%) were accompanied by both a male and female (Table 2). Fourteen broods could be iden-

tified with confidence from day to day. One of these was accompanied consistently by a male on 5 days between 30 November 1986 (with two class Ia ducklings) and 8 January 1987 (now one class III duckling). Nine broods were resighted on one or more days near Pilcaniyeu in early December 1987 and all were consistently without a male. On the other hand, four broods (two in 1986, two in 1987, all on the Kilometer 14 pond near Bariloche) were initially classed as "no male" but were reclassified as a result of subsequent sightings when a male was present. Further evidence that some males have only part-time associations came from watching broods at this pond. Single males were heard giving *burp calls* in the vicinity of broods (suggesting that they were trying to reestablish contact with their mates), one female gave a *decrecendo call* when a male arrived nearby (as paired females do when calling to their mates), and several males were watched joining broods and being accepted by the female. Studies of marked birds will be needed to establish whether such behavior reflects the persistence of loose pair bonds into the brood-rearing phase.

Pintail broods were seen in various kinds of wetland habitats, with and without emergent plant cover. Ducklings often dived repeatedly for food while the female fed by upending, and at times the female dived also. Broods tended to become dispersed during feeding, but females apparently monitored the ducklings' positions visually.

Females were vigilant and gave warning calls. They gave loud alarm quacks if a predator came near, and ducklings responded by becoming alert and moving to the female's side. This was seen in response to close approach by humans, dogs, and flying raptors (Northern Harrier, *Circus cyaneus*, Black-chested Buzzard-Eagle, *Geranoaetus melanoleucus*, and Chimango Caracara, *Milvago chimango*). Brood females tilted their heads sideways and watched Black Vultures (*Coragyps atratus*) and Kelp Gulls when they flew overhead.

Responses to dogs and people were observed several times. On one occasion, three broods (without males) responded by tolling to a dog running along the edge of the pond. Each family assembled in tight formation, swam toward the dog, and then moved along parallel to shore, the female quacking while watching the dog intently. In another incident, a dog waded into the water and approached a pair with class I ducklings: the

ducklings followed the male and disappeared into emergent cover, but the female quacked loudly, flew around the dog, alighting and giving distraction displays (Stephen 1963) near it, until the dog left a few minutes later. Another female, surprised suddenly by three people at the edge of a marsh, gave a vigorous distraction display presumably because she had a brood nearby. When walking or swimming away after being alarmed by people, several females with broods lowered their heads into a crouch posture; one escorting male also adopted this posture as he followed the family into emergent cover.

The female of a pair with four (Ic) ducklings began quacking loudly when a Northern Harrier flew nearby. When the harrier swooped down over the brood, the female jumped up out of the water pecking toward it and the harrier flew off. The escorting male became alert but made no move to attack the raptor. This male lunged at a Chiloe Wigeon that alighted near the family, but he gave no other responses to waterfowl on the pond.

One brood-tending female (no male present) chased another brood female once and she also chased ducklings belonging to other broods four times during a 3-hr watch. Three females left their class II ducklings temporarily unescorted when they flew off presumably to visit other feeding sites.

BROOD SIZE AND AGE

Sizes of class I broods ranged from 1–8 for Silver Teal, 1–4 for Speckled Teal, 2–9 for Red Shoveler, and 1–9 for Brown Pintail. (One exceptionally large Brown Pintail brood of 18 was also seen). Mean brood sizes for class I were not significantly different for Silver Teal, Red Shoveler, and Brown Pintail (5.0, 4.6, 5.3 respectively) but Speckled Teal class I broods averaged significantly smaller (2.3) than Red Shoveler and Brown Pintail ($P < 0.05$, nonparametric multiple comparison procedure). This may reflect the smaller clutch-size characteristic of Speckled Teal (Delacour 1956, Martin 1972).

There was no obvious relationship between the presence of both parents and the age or size of broods in either Speckled Teal or Brown Pintail. For Speckled Teal, broods averaged 2.3 (class I), 3.3 (II), and 3.0 (III) ducklings, and both parents were present in 71% ($n = 7$), 50% ($n = 6$), and 100% ($n = 2$) respectively. For Brown Pintail, broods averaged 5.9 (class I), 4.9 (II), and 5.3

(III), and both parents were present in 35% ($n = 20$), 31% ($n = 16$), and 33% ($n = 3$) respectively. Much larger samples will be required to statistically test relationships between the presence of one or two adults and the sizes and ages of broods. Comparisons should control for possible influences of locality and within-season breeding chronology.

DISCUSSION

Our records suggest clear species differences in the incidence of male parental care in these four species. The most consistent and active biparental care was seen in Silver Teal. This agrees with records of both parents with broods in captives of this species (Wintle 1968; Kear 1970; Todd 1979; M. Omsted, pers. comm.) and of two adults with wild broods (Weller 1968, 1972). We noted that males escorted broods closely, spent time in vigilant postures, gave alarm calls, and behaved aggressively toward other waterfowl near the brood. In these respects, the behavior of males was similar to that of Chestnut Teal (Norman and McKinney 1987). The record of both adults in wing molt while still escorting ducklings is significant because similar incidents have been recorded in three other Southern Hemisphere species (wild Cape Teal, captives of Speckled Teal and Brown Teal, *Anas aucklandica chlorotis*; FM, pers. observ.) In Northern Hemisphere *Anas* species, females do not usually begin the wing molt until after their ducklings fledge (e.g., Gilmer et al. 1977). More information is needed on overlap of these activities in tropical and Southern Hemisphere ducks.

The records indicating persistence of pair bonds during the wing molt in birds without broods support Weller's (1968) opinion that at least some Silver Teal have long-term pair bonds. The climate permits Silver Teal to reside at Costanera Sur year-round, and this could favor prolonged bonds. However, birds that breed in southern Argentina must migrate north for winter. Weller (1968) thought that migratory ducks may not be able to maintain prolonged pair bonds in Argentina, and nothing is known about the situation in migratory populations of Silver Teal. Further studies are needed to determine if biparental care is characteristic of all populations of this species, and to establish the duration of pair bonds.

Only a few male Red Shovelers attended broods part of the time, and we saw no evidence of male brood care. Although some Red Shovelers breed

in areas with mild winters (e.g., Costanera Sur), in the Bariloche area males deserted their mates early in the brood-rearing season, indicating that this population has a similar annual routine to that of the Northern Shoveler (*Anas clypeata*) in the Northern Hemisphere (Bellrose 1976, Cramp and Simmons 1977). The Red Shoveler has a southerly breeding distribution in South America, and throughout most of its range pairs are likely to have a restricted annual breeding season, postbreeding movements to traditional molting lakes, followed by a regular migration to northern wintering areas. (Enormous molt assemblies have been reported in Santa Cruz Province in November–February by Fjeldså and Krabbe 1986). Therefore, it is likely that male parental care is absent in this species. Females were notably aggressive toward other waterbirds near their broods, but more detailed studies are needed to document the effectiveness of female-only care in this species.

Courtship of brood-tending females by males other than their mates was seen several times in Red Shovelers but not in the other three species. Similar behavior has been seen in White-cheeked Pintails (*Anas bahamensis*) in the Bahamas (L. Guminski, pers. comm.) and in Chiloe Wigeon in Argentina (GB, pers. observ.) The factors promoting this behavior in these species, but not in others, remain to be investigated.

The records for Speckled Teal and Brown Pintail are especially intriguing because they suggest that males of both species vary in the extent to which they escort broods. While intraspecific variability might be expected in these two species because of their extensive geographic ranges (spanning climatic zones that require seasonal breeding and annual migration to those that may favor year-round residency and perhaps breeding twice per year), this does not explain intrapopulation variations in male attendance in the migratory populations we studied in Rio Negro Province. Furthermore, there appear to be important differences between the behavior of males in these two species.

Our records suggest that individual Speckled Teal males were making a clear-cut decision either to stay ($n = 10$) or to leave ($n = 5$) their families. When present, males escorted very closely, and several remained with the brood until the ducklings fledged. We have little direct evidence of brood care by wild males, but our observations on captive broods indicate that some escorting

males were interested in their ducklings, and one male showed close escorting of ducklings after his mate had been temporarily removed. We suspect that male Speckled Teal have alternative strategies with regard to their females and ducklings, but the factors influencing their decisions to stay or leave remain to be investigated.

The prevalent pattern in Brown Pintails was for males to leave females to care for their broods unaided. Like Red Shovelers, Brown Pintail females were vigilant and protective of their ducklings, and they were active in responding to potential predators by loud calling, distraction displays, and (once) by attacking a predator. Males seemed to be associating only part of the time, and when present they did not contribute obviously to brood care. Nevertheless, it is possible that males do provide subtle forms of assistance (e.g., leading ducklings to cover) that complement the activities of females toward predators.

This pattern agrees with observations by Wetmore (1926) and Weller (1968) indicating that Brown Pintail males leave the breeding grounds before broods fledge and perform long-distance migrations to molting and/or wintering areas.

We conclude that the incidence and extent of brood care by males varies greatly between these four species, and that male roles can be evaluated only by observing the birds' behavior closely. Records of two adults with broods should not be used as an indicator of biparental care. Special attention needs to be given to species such as the Speckled Teal and Brown Pintail in which male presence is variable, male breeding strategies appear to be complex, and male contributions to parental care may be subtle.

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