

WLF 419 - Waterfowl and Wetlands Ecology and Management

Lecture 7 - Brood Care

Next Time - Ecology of Prefledging Waterfowl

Even though waterfowl have precocial young, ducklings, goslings and cygnates require parental care after hatching. Parental care may last for several weeks to the entire year. The intensity of care also varies about taxa. We will explore the diversity of strategies in brood care among waterfowl and the factors that influence this diversity.

?? Parental Involvement

- \$ Natural selection should favor parents that invest the least amount of energy necessary to assure the survival of their offspring
- \$ Parents should abandon young when the cost of remaining with the young exceeds the benefits
- \$ Male abandon mate and young if:
 - \$ Chance of remating or
 - \$ Male presence does not enhance survival of young or unduly increases risk of survival of male
 - \$ Abandon female because of long breeding period (ducks)
- \$ Female abandons young (and mate) if:
 - \$ Female presence does not enhance survival of young or unduly increases risk of survival of female
 - \$ Presence reduces opportunities for additional production in current or future breeding seasons

?? Length of Care

- \$ Anserini, Cygnini, Dendrocygnae
 - \$ Male and female care of young
 - \$ Generally lasting after fledging (Whistling ducks) and up to a year (swans)
 - \$ Superfamilies in swans and large bodied Canada geese (yearlings associated with adults beyond 1st year)
 - \$ Competitive interactions with our birds during winter
 - \$ Females spend little time feeding during incubation
 - \$ Physiologically challenged during brood rearing
 - \$ Nests are not concealed
 - \$ Male defense of nest

Table 3-18. Characteristics of brood care in Anatidae

Group	Sexes caring for young	Sexes brooding young	Brooding period (days)	Young carried on back	Young fed, or help given in feeding	Length of family life
Anseranatinae	m-f	m-f	28	-	+	6-12 months
Anserinae						
Dendrocygnini	m-f	m-f	21	- ^a	+	6-12 months
Anserini						
<i>Cygnus atratus</i>	m-f	m-f	21	+	+	6-12 months
Other <i>Cygnus</i>	m-f	f	21	+	+	6-12 months ^b
<i>Coscoroba</i>	m-f	f	21	-	-	?
<i>Anser</i> and <i>Branta</i>	m-f	f	14	-	-	6-12 months
Tadornini	m-f	f	14	- ^a	-	1-6 months
<i>Tachyeres</i>	m-f	f	7	-	-	< 4 months
Anatinae						
Cairinini	f ^c	f	14	- ^a	-	<10 weeks
Anatini	f ^c	f	14	- ^{a,d}	-	<10 weeks
Aythyini	f ^c	f	14	- ^a	- ^e	<10 weeks
Mergini	f	f	14	- ^a	- ^e	<10 weeks
Oxyurini	f	f	7	- ^a	- ^f	< 6 weeks

^aObserved in some species; see Johnsgard and Kear 1968, Erskine 1972, Serventy and Whittell 1976, Todd 1979, Carbonell 1984, Gillham 1987.

^bSome species may assist brood during second winter; see Scott 1980.

^cMales may assist in brood care; see text.

^dCommon in Salvadori's Duck (Todd 1979).

^eObserved in some species; see Kear 1970, Todd 1979.

^fCommon in Musk Ducks.

From Afton and Paulis (1992)

- \$ Anatinae
 - \$ Males abandon female during incubation or early brood rearing (northern latitudes)
 - \$ Bright plumage of males may attract predators?
 - \$ Males accompany broods in tropical or southern hemisphere latitudes
 - \$ In fact, pairs maintained throughout year
 - \$ Why?
 - \$ Plumage dimorphism lacking
 - \$ Irregular breeding
 - \$ Females generally remain with young until fledging
 - \$ Ruddy ducks abandon young before fledging
 - \$ Mergini and Aythyini abandon may abandon young sooner than Anatini
 - \$ Brood recesses

?? Types of Care

- \$ Brooding
 - \$ Thermo-regulation
- \$ Parental Feeding
 - \$ Musk duck and Magpie geese
 - \$ Some species may raise aquatic food to surface
 - \$ Locating food
- \$ Predator Protection
 - \$ Alarm calls common to all species
 - \$ Geese, swans, and whistling ducks
 - \$ Aggressive postures and attacks
 - \$ Anatinae
 - \$ Injury-feigning
 - \$ Less common in aquatic species

How would the response of Canvasback brood and Gadwall brood differ as you approach a pond?

- \$ Competition
- \$ Brood Amalgamation
 - \$ *Adoption* - a single female or pair accepting foster young
 - \$ *Creche* - a brood with any number of adults and at least 2 unrelated young
 - \$ adult females may be related
 - \$ adult females attending creche may not have any of their own young in brood
 - \$ *Gang brooding* - several females or mating pairs joining together with their broods
 - \$ *Kidnapping*
 - \$ A few young to 100+
 - \$ Why be a donor?
 - \$ Reduce predation risk
 - \$ Host or foster offspring
 - \$ Competition for food resources
 - \$ Limited food resources
 - \$ Accidental mixing
 - \$ Salvage strategy
 - \$ Energetics
 - \$ Age or experience

TABLE 1. Occurrence of pre-hatch and post-hatch brood amalgamation in North American Anatidae

	Pre-hatch ^a		Post-hatch ^a	r or K ^b	Nest site ^c	Reference ^d
	Inter-specific	Intra-specific				
Tribe Dendrocygnini						
Fulvous whistling-duck (<i>Dendrocygna bicolor</i>)	i	o	—	I	E	1, 2, 19, 22, 24
Black-bellied whistling-duck (<i>Dendrocygna autumnalis</i>)	i	o	—	I	H	1, 6, 10, 19, 22, 24
Tribe Cygnini						
Trumpeter swan (<i>Cygnus buccinator</i>)	—	—	—	K	U	1, 19
Tundra swan (<i>Cygnus columbianus</i>)	—	—	—	K	U	1, 19
Tribe Anserini						
Brant (<i>Branta bernicla</i>)	—	i	—	K	UC	19, 25
Canada goose (<i>Branta canadensis</i>)	i	o	o	K	U	1, 2, 12, 17, 19, 22
Emperor goose (<i>Anser canagicus</i>)	—	i	i	K	U	19, 25
Snow goose (<i>Anser caerulescens</i>)	i	o	i	K	UC	1, 4, 12, 19, 22
Ross goose (<i>Anser rossii</i>)	—	i	o	K	UC	19, 24
Greater white-fronted goose (<i>Anser albifrons</i>)	—	—	—	K	U	19, 24
Tribe Cairinini						
Wood duck (<i>Aix sponsa</i>)	o	o	i	r	H	1, 11, 14, 19, 22, 23
Tribe Anatini						
Mallard (<i>Anas platyrhynchos</i>)	i	i	—	r	U	2, 19, 22
American black duck (<i>Anas rubripes</i>)	—	i	i	r	U	25
Gadwall (<i>Anas strepera</i>)	i	i	i	r	U	1, 2, 19, 22
American widgeon (<i>Anas americana</i>)	—	—	—	r	U	1, 19, 24
Northern shoveller (<i>Anas clypeata</i>)	i	—	—	r	U	1, 2, 19, 24
Northern pintail (<i>Anas acuta</i>)	i	—	—	r	U	2, 19
Blue-winged teal (<i>Anas discors</i>)	i	—	i	r	U	2, 19, 24, 25
Cinnamon teal (<i>Anas cyanoptera</i>)	i	—	—	r	U	2, 19, 24
Green-winged teal (<i>Anas crecca</i>)	—	—	—	r	U	19
Tribe Aythyini						
Redhead (<i>Aythya americana</i>)	o	o	i	I	E	1, 2, 13, 19, 22, 24
Canvasback (<i>Aythya valisineria</i>)	o	o	i	I	E	1, 2, 19, 21, 22, 24
Greater scaup (<i>Aythya marila</i>)	o	o	i	I	U	1, 2, 19, 22, 24
Lesser scaup (<i>Aythya affinis</i>)	o	o	o	I	U	1, 2, 19, 24
Ring-necked duck (<i>Aythya collaris</i>)	—	—	i	I	E	18, 23
Tribe Oxyurini						
Ruddy duck (<i>Oxyura jamaicensis</i>)	o	o	i	I	E	1, 2, 13, 19
Tribe Mergini						
Common eider (<i>Somateria mollissima</i>)	i	o	o	K	UC	1, 2, 12, 15, 16, 19, 22
King eider (<i>Somateria spectabilis</i>)	—	i	o	K	U	1, 16, 19, 22
Spectacled eider (<i>Somateria fischeri</i>)	i	i	i	K	U	19, 24
Steller's eider (<i>Polysticta stelleri</i>)	—	—	i	K	U	19
Harlequin duck (<i>Histrionicus-histrionicus</i>)	—	i	o	K	U	1, 19, 22, 24
Oldsquaw (<i>Clangula hyemalis</i>)	—	i	o	K	U	1, 16, 19, 22
Surf scoter (<i>Melanitta perspicillata</i>)	—	—	o	K	U	1, 19
White-winged scoter (<i>Melanitta fusca</i>)	i	i	o	K	U	1, 2, 16, 19, 22, 25
Black scoter (<i>Melanitta nigra</i>)	—	i	—	K	U	25
Common goldeneye (<i>Bucephala clangula</i>)	o	o	o	K	H	1, 2, 3, 19, 22
Barrow's goldeneye (<i>Bucephala islandica</i>)	o	o	o	K	H	2, 19, 22
Bufflehead (<i>Bucephala albeola</i>)	i	o	o	K	H	1, 19, 20
Hooded merganser (<i>Lophodytes cucullatus</i>)	o	o	i	K	H	1, 2, 5, 11, 19
Red-breasted merganser (<i>Mergus serrator</i>)	i	o	o	K	U	1, 2, 8, 9, 19, 22, 24
Common merganser (<i>Mergus merganser</i>)	i	o	o	K	H	1, 7, 16, 19, 22

^ao, occurs; i, infrequent; —, not reported.

^br, r type; K, K type; I, intermediate.

^cE, emergent vegetation; U, upland; UC, upland colonial; H, hole or cavity.

^d1, Johnsgard 1978; 2, Weller 1959; 3, Andersson and Eriksson 1982; 4, Finney 1975; 5, Morse et al. 1969; 6, McCamant and Bolen 1979; 7, Bauer and Blutz von Blotzheim 1968, cited in Johnsgard 1978; 8, Hildén 1964, cited in Johnsgard 1978; 9, Peltz 1971; 10, Delnicki et al. 1976; 11, Titman and Lowther 1975; 12, Prevett et al. 1972; 13, Joyner 1976; 14, Morse and Wight 1969; 15, Munro and Bedard 1977a, 1977b; 16, Gorman and Milne 1972; 17, Williams 1974; 18, Mendall 1958; 19, Bellrose 1976; 20, Erskine 1972; 21, M. Anderson (personal communication); 22, Yom-Tov 1980; 23, Beard 1964; 24, Palmer 1976; 25, Bent 1962a, 1962b.

INCUBATION AND BROOD CARE

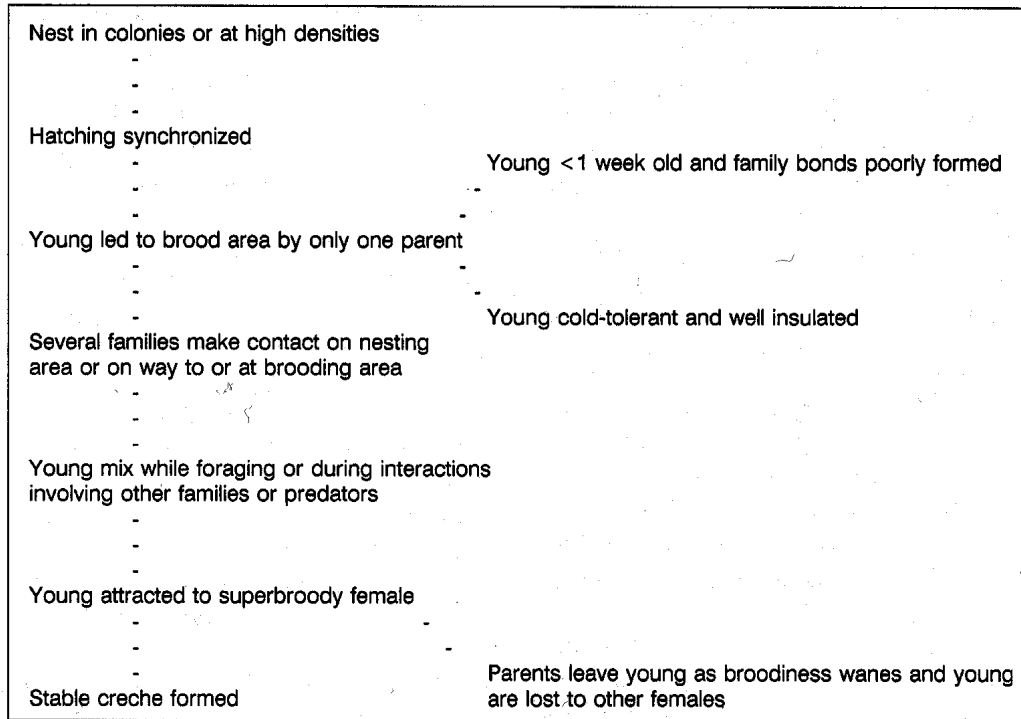


Fig. 3-5. Characteristics that favor formation of brood amalgamations in waterfowl

From Afton and Paulus (1992)

- \$ Why be a recipient?
- \$ Constraints
- \$ Neutral effect
- \$ Benefit
- \$ Parenting experience
- \$ Reciporical altruism

Factors Influencing Care

- \$ Time of Year
- \$ Less care late in breeding season
- \$ Time to reacquire nutrients for migration

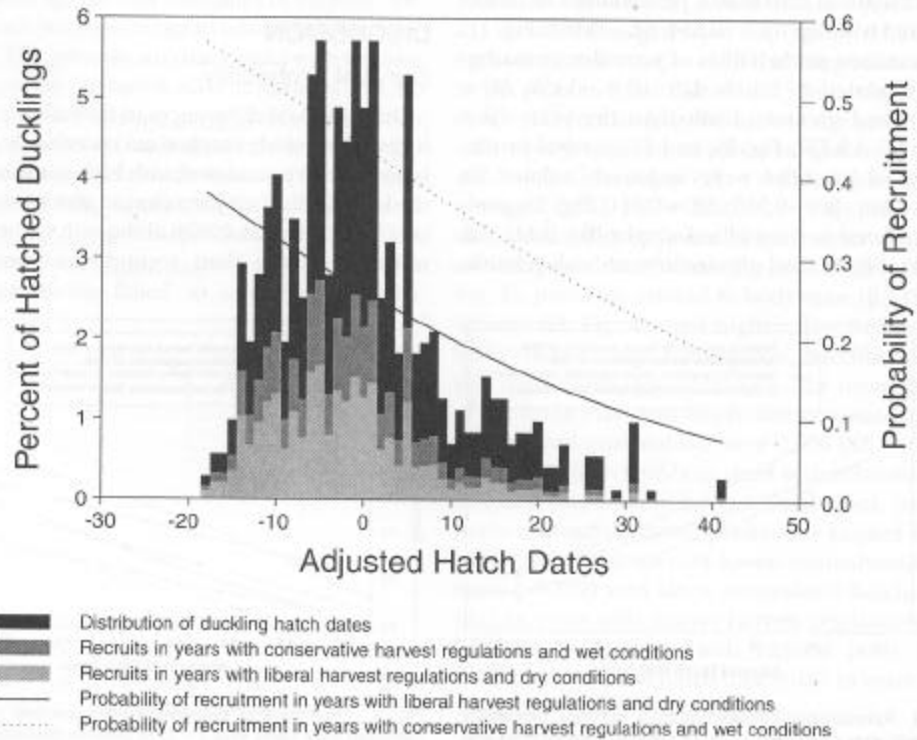


Fig. 5. Distribution of hatch dates and recruits (histograms) for canvasback ducklings hatched at Minnedosa, Manitoba, 1963–1988. Distribution of recruits relative to hatch date was determined by multiplying the percent of individuals at each hatch date and the probability of recruitment (juvenile survival \times detection probability) for that hatch date (lines).

From Anderson et al. (2001)

- \$ Time of Day
- \$ Age of Adult
- \$ Age of Brood
- \$ Brood Size
- \$ Habitat

Literature Cited

- Afton, A. D.; Paulus, S. L. 1992. Incubation and brood care. Pages 62-108 in B. D. J. Batt, A. D. Afton, M. G. Anderson, C. D. Ankney, D. H. Johnson, J. A. Kadlec, and G. L. Krapu, eds. Ecology and management of breeding waterfowl. Univ. Minnesota Press, Minneapolis. 635pp.
- Anderson, M.G., M.S. Lindberg, and R.B. Emery. 2001. Probability of survival and breeding for juvenile female canvasbacks. *Journal of Wildlife Management* 65:385-397.
- Eadie, J. McA.; Kehoe, F. P.; Nudds, T. D. 1988. Pre-hatch and post-hatch brood amalgamations in North American Anatidae: a review of hypotheses. *Can. J. Zool.* 66:1709-1721.