Mallard and Blue-winged Teal Philopatry in Northwest Wisconsin

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ABSTRACT

This study reports on the breeding and natal philopatry, expressed as return rates, of 4,093 marked male and female, adult and young, Mallards and Blue-winged Teal during 1982-1990 in northwest Wisconsin. Ducklings were captured at the nest and marked with web-tags. Older ducklings and adults were captured by drive-trapping, night-lighting, bait and decoy trapping, and at the nest and were marked with leg bands and nasal saddles. Return rates were higher for adult and yearling female Mallards than for adult and yearling male Mallards. The return rate for adult female Blue-winged Teal was higher than for adult male and yearling male and female Blue-winged Teal. The return rate for adult females of both duck species combined was higher than the other three cohorts. Return rates for both duck species was higher for females than males and was higher for adults than for yearlings.

INTRODUCTION

Philopatry in waterfowl may have evolved for ecological, demographic, and genetic advantages (see Anderson et al. 1992 for a detailed discussion of waterfowl philopatry). Two types of philopatry were defined by Anderson et al. (1992). Breeding philopatry is the return of a migrant animal to its former adult home breeding range and natal philopatry is the return to the area of birth or hatching. Anderson et al. (1992) defined return rate as the product of survival, homing, and detection of the animal on the same study area the year following marking and homing rate as the return rate adjusted for annual survival.

Many North American ducks form pair-bonds on wintering areas or during spring migration (Mayr 1942, Hochbaum 1944, Rohwer and Anderson 1988). Females generally select new mates each year and males follow females homing to their natal and breeding areas (Lincoln 1939, Sowls 1955, Johnson and Grier 1988).

Lincoln (1934) first documented female philopatry in dabbling ducks (*Anas* spp.), including Mallards (*A. platyrhychos*), based upon recaptures of leg-banded birds. Barclay (1970) and Dwyer et al. (1973) were among the first to report male Mallard philopatry. Sowls (1955) reported female philopatry in Blue-winged Teal (*A. discors*) using color-banded birds. No information has been published on philopatry of male Blue-winged Teal.

The objective of my study was to document breeding and natal philopatry for Mallards and Blue-winged Teal by using return rates for 4,093 males and females of both species marked in northwest Wisconsin during 1982 - 1990. I used return rates rather than homing rates since I did not know the survival variability existing between years.

Study Area - The study area was located in the prairie pothole region of northwestern Wisconsin. This 1,300-km^2 area in northern St. Croix and southcentral Polk counties has been described by Evrard and Lillie (1987). Most of the land area was used for agricultural crops and pasture. Corn, oats, and hay are the main crops with emphasis on dairy and livestock production. About 11% of the area was wooded and 13% was wetland. Approximately 2,800 ha or 2.2% of the study area were in federal and state Waterfowl Production Areas (WPAs) managed, until recently, by the Wisconsin Department of Natural Resources (WDNR).

METHODS

From 1982 - 1990, day-old Mallard and Blue-winged Teal ducklings were captured by hand at the nest during early morning hours and marked with numbered monel fingerling tags in the foot webbing (Alliston 1975). Ducklings had hatched during the night or late the previous day and were being brooded in the nest before being led to water during the morning by the adult female duck. Ducklings were returned to the nest following marking. Sex was not determined for newly hatched ducklings, but a 52 male:48 female sex ratio was used for Mallards (based on work of Sowls [1955], who had sexed 763 ducklings) and a 58:42 sex ratio was used for Blue-winged Teal (based on Bennett [1938], who had sexed 36 ducklings).

During the same years, flightless Mallard and Blue-winged Teal ducklings were captured by drive-trapping (Cooch 1953) and night-lighting (Cummings and Hewitt 1964). Flightless, 4 - 8 week-old ducklings were sexed by cloacal examination and marked with standard U.S. Fish and Wildlife Service leg bands and nasal saddles (Doty and Greenwood 1974, Greenwood 1977) color coded to capture sites. The presence of nasal saddles apparently did not increase mortality (Evrard 1996). Ducklings too small to leg-band (those <4 weeks old) were web-tagged.

In addition, adult (yearling and older) female and male Mallards and Blue-winged Teal were captured using a combination of hand and mist nets at the nest (Bacon and Evrard 1990), swim-in bait traps (Hunt and Dahlka 1953), and decoy traps (Anderson et al. 1980). Most adult hens were captured on the nest one to two days prior to hatch. A few hens and all males were captured from late April to late May in bait and decoy traps. Adult ducks were leg banded and marked individually with color-coded nasal saddles. Presence of nasal saddles apparently did not increase mortality or interfere with normal breeding and nesting activities (Evrard 1996).

Natal philopatry was documented by determining return rates for web-tagged ducklings returning in subsequent years by recapture on the nest, in bait and decoy traps, while night-lighting and drive-trapping, and in hunter bag checks in the study area. Breeding philopatry was documented for leg-banded and nasal-saddled duckling and adult ducks using return rates determined by recapture, observation of the nasal saddles, hunter bag checks, and band returns.

WDNR personnel were instructed to check every Mallard and Blue-winged Teal they observed during the course of their daily work for the presence of nasal saddles. Aided by binoculars and spotting scopes, color codes on observed nasal saddles were recorded. To encourage hunters to look for and report duck markers, containers with illustrated instructions were placed in WPA parking lots throughout the study area.

I used χ^2 analysis in the Epistat statistical package (Gustafson 1984) to compare differences in return rates and independent t-tests to compare time intervals between marking and recovery among the duck cohorts.

RESULTS AND DISCUSSION

Banding and recapture studies provide minimum estimates of philopatry due to biases associated with varying rates of predation, thoroughness of nest searches, and trapability of prior-trapped birds (Anderson et al. 1992). However, color-marking birds can reduce some of the biases and improve return rate estimates. Additionally, return rates obtained in this study should be considered minimum estimates of homing since mortality occurring between marking and return was not determined.

Mallard – Seventy percent (710) of marked Mallard ducklings were web-tagged and 30% (301) were marked with leg bands and nasal saddles (Table 1). Of web-tagged ducklings, 93% were captured at the nest with the balance captured by night-lighting and drive-trapping. Since there was no difference ($\chi^2 = 0.008$, df = 1, P = 0.93) in return rates between web-tagged female ducklings (3.5%) and leg-banded and nasal-saddled female ducklings (2.9%), the two groups were pooled for comparison of return rates with adult ducks.

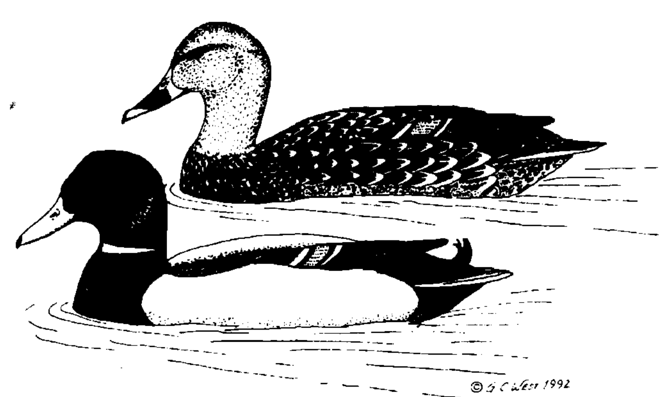

Table 1. Return rates (%) for Mallard and Blue-winged Teal marked as adults or ducklings, St. Croix and Polk counties, Wisconsin, 1982-90.

Species and Sex	Adult	Duckling	
		Web-tagged	Leg-banded
Mallard			
Male	5.0 (357)	0.0 (369)	0.6 (161)
Female	33.0 (118)	3.5 (341)	2.9 (140)
Blue-winged Teal			
Male	1.8 (112)	0.0 (878)	0.0 (402)
Female	18.4 (223)	2.2 (636)	2.2 (356)

Numbers marked in ( ).

There were no differences in mean time elapsed between marking and recapturing/reobserving female ducklings (1.8 years) and adult females (1.7 years; t = 0.474, p = 0.64) and between male ducklings (2.8 years) and adult males (2.3 years; t = 0.423, p = 0.68) .

Pooled return rates were higher for adult females (33.0%; χ^2 = 63.26, P <0.01) and yearling females (3.3%; χ^2 = 13.18, P = 0.0003) than for adult (5.0% and yearling (0.2%) males (Table 1).

Nearly half (47%) of the 55 female Mallard returns in this study were from recaptures, primarily on the nest, and the balance (53%) were from observations of nasal-saddled birds. Most (84%) of the 19 male Mallard returns were from observations rather than recaptures (16%).

Blue-winged Teal – Sixty-seven percent (1,514) of marked Blue-winged Teal ducklings were web-tagged, with the balance (758) marked with leg bands and nasal saddles (Table 1). Of web-tagged ducklings, 92% were captured at the nest and 8% were captured by night-lighting and drive-trapping. Since there was no difference (χ^2 = 0.04, df = 1, P = 0.84) in return rates between web-tagged female ducklings (2.7%) and leg-banded and nasal-saddled female ducklings (2.2%), they were pooled for comparisons with adult ducks. There were no returns for either web-tagged or leg-banded male Blue-winged Teal ducklings.

There was no difference (t = 0.587, p = 0.56) in mean time between marking and recovery for female ducklings (1.6 years) and adult females (1.7 years). A similar comparison for males could not be made since no marked male ducklings were recovered. Pooled return rates for adult females (18.4%; χ^2 = 16.91, P <0.01) were higher than for adult males (1.8%) and for yearling females (2.5%; χ^2 = 63.26, p <0.01; see Table 1). None of the 1,159 male ducklings were recovered as yearlings. Most (68%) of the 66 female Blue-winged Teal returns in my study were from recaptures and 32% from observations. Both male Blue-winged Teal returns were observations.

Species, Sex, and Age Comparisons – There was no difference (t = 0.134, P = 0.89) in time between marking and recovery for adult female Mallards (1.7 years) and Blue-winged Teal (1.7 years). Adult female Mallard return rates (33.0%) were higher (χ^2 = 8.44, P = 0.004) than rates for adult female Blue-winged Teal (18.4%) in this study. This agrees with findings of other studies (Lokemoen et al. 1990, Anderson et al. 1992). Apparently, Blue-winged Teal are opportunistic, responding in numbers quickly to habitat changes that can only be explained by immigration (Anderson et al. 1992). However, there is some evidence that Mallards are somewhat opportunistic, homing better during wet years with normal habitat conditions than during dry years (Majewski and Beszterda 1990). There were no differences between return rates for yearling female (χ^2 = 0.51, p = 0.48), adult male (χ^2 = 1.49, p = 0.22), and yearling male (χ^2 = 0.21, p = 0.65) Mallards and Blue-winged Teal.

When pooling both species in this study, return rate of females was higher (χ^2 = 90.84, P <0.01) than for males; this finding supports conclusions of Johnson et al. (1992) and Anderson et al. (1992). Most marked Mallard males that returned in this study were unpaired on arrival (see results of Titman 1983, Evrard 1990, Anderson et al. 1992, Johnson et al. 1992), but two males were considered paired since they each were seen on several occasions with a female (see results of Dwyer et al. 1973, Blohm and Mackenzie 1994). Anderson et al. (1992) stated that: "Most migratory male ducks show little natal or breeding philopatry. Some males, without mates to constrain their movements, return to familiar breeding areas, if only briefly."

Pooled yearling Mallard and Blue-winged Teal females returned at a lower rate ($\chi^2 = 237.90$, $P < 0.01$) than adult females in this study. Yearling females have lower return rates due to lower survival (Sowls 1955, Johnson et al. 1992) and greater dispersal (Anderson et al. 1992).

Management Implications – Management to increase waterfowl production depends in part on nest success. Nest densities increase by adult females returning to the site of their previous year's hatched nests (i.e. breeding philopatry) and yearling females returning to the site of the nests from which they hatched (i.e. natal philopatry). Return rates in this study for female Mallards were 33.0% for adults and 3.3% for yearlings. Comparable return rates for female Blue-winged Teal were 18.4% for adults and 2.5% for yearlings. As discussed earlier, return rates in this study were minimum estimates of philopatry since factors such as detection and survival rates between marking and recapture/resighting were unknown. Nonetheless, it appears that sufficient female philopatry occurs to justify intensive management of nesting habitat, especially for Mallards.

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An Improved Method of Preparing Small Color Bands

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ABSTRACT

Commercially available plastic leg bands are too large for California Gnatcatchers and several other small passerine species. We reduced bands of 2.3 mm inside diameter to 1.95 ± 0.05 mm, filed the ends squarely, and sealed them with acetone. This technique is faster and more effective than previous methods and additionally reduces in-field handling time.

INTRODUCTION

The Coastal California Gnatcatcher (*Polioptila californica californica*) is a small, federally threatened, passerine species. Adult California Gnatcatchers usually weigh between 5 and 7 g. Color bands of appropriate size for marking California Gnatcatchers are not commercially available. The smallest available plastic color band size (XF, A. C. Hughes, Ltd.) is too big and without modification may result in leg injury. In order to minimize the occurrence of injury, XF color bands (inside diameter: 2.3 mm) must be re-sized to approximately 1.95 mm ± 0.05 mm inside diameter. Thomas (1983) published a generally accepted method of band preparation suitable for use with California Gnatcatchers. The method is effective but time-consuming. The heating process may change the properties of the plastic, leading to difficulty when sealing the band. In addition, the re-sizing process deforms the band, thus requiring glue or a plastic weld to close bands. Our primary criteria in designing an improved technique were speed of bonding and longevity of bond in the field.

METHODS

To prepare our bands we begin with the oversized plastic band closest in size to our need. Using a nail file or emery board inserted between the butt ends of the band, we remove sufficient plastic material to create a band of appropriate inside diameter and ensure a nearly parallel surface on