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# Criteria for Distinguishing Breeding Male Tree Swallows from Brightly Colored Females Prior to Capture

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Most banding studies on Tree Swallows (*Tachycineta bicolor*) have been limited in scope and value by the difficulty of capturing the breeding males. Males are seldom encountered in the nest cavity because they do not incubate the eggs or brood the nestlings (Low 1933; Weydemeyer 1934; Sheppard 1977). Males also are more difficult than females to trap in the nest box during the nestling period because they tend to feed the nestlings less often (Cohen unpubl. observ.). Furthermore, it is difficult to distinguish the male from the female in the field prior to capture, for selective capture of the male, when the female is ASY (After Second calendar Year; older-than-yearling) and has attained the mature plumage coloration (Dwight 1900; Kuerzi 1941; Cohen 1980; Hussell 1983).

Here I list a series of behavioral and coloration criteria for distinguishing males from ASY females prior to capture, which I have compiled since 1975 from observations on my study population in Gilpin and Boulder counties, in the Front Range of north-central Colorado. I have applied these criteria successfully in over 90% of 350 trapping occasions during 1982 and 1983. Some of these differences have been noticed by other workers as well, as cited below. Most males were captured with a manually-operated hole-blocking device (Cohen and Hayes 1984). Visual determinations of sex were verified upon capture according to the presence of a brood patch (female) or cloacal protuberance (male) (North American Bird Banding Manual, Vol. II, Part 6). None of the following criteria is absolute, and therefore I have based each sexing decision on as many of the criteria as possible. The criteria are:

1. Males are more likely to loaf near the nest box for periods of at least 15 min, during the nesting period.
2. Males are more likely to be sufficiently alarmed by the presence of the investigator that they interrupt foraging for the nestlings for at least 10 min. Females are more likely to continue bringing food to the nestlings, or to resume bringing food, in spite of being slightly to moderately alarmed.
3. Males are generally more vocal while sitting calmly near the nest box, especially in giving the two-syllable social call and the six-note gurgling call (Weydemeyer 1934).
4. Males are much more likely to have the feathers of the forehead and crown raised while sitting near the nest box, especially if the female is perched nearby.
5. The male's dorsal iridescent color almost always includes all feathers of the forehead, whereas it is not unusual for the front of the forehead of ASY females to be brownish (Kuerzi 1941).
6. The male's dorsal iridescent color tends to be richer and more lustrous (Forbush 1929; Low 1933; Roberts 1955) and more toward a pure blue (i.e., lacking any green component). With experience, binoculars, and good lighting conditions, this difference is distinguishable from distances of up to 50 m especially if the male and female provide a direct comparison by perching near each other. However, a very small proportion of ASY females (less than two percent in my study population) may be indistinguishable by plumage from males even in the hand (unpubl. observ.).
7. The male's breast is always pure white, whereas in some ASY females the breast is shaded with light dusky gray (Forbush 1929; Roberts 1955).
8. Males are more likely to approach the box in a slow glide from a height above the level of the box, when bringing food for the nestlings. Females typically approach the box rapidly, with flapping flight, at or below the level of the entrance-hole, although if they are alarmed they may approach the box in the same manner as the male.
9. The male is much more likely to give the low two-syllable social call while approaching or reaching the nest box with food for the nestlings. This call, along with the male's slow approach, alerts the female and allows her to stop brooding the nestlings and leave the box before the male enters. Females usually approach silently.
10. The male is much more likely to hesitate at the entrance-hole and look around before entering (Low 1933; Kuerzi 1941). This, too, allows the female to leave the box before the male enters. However, females may hesitate at the hole if they are alarmed.

11. *The male is much more likely to come up to the entrance-hole immediately after feeding the nestlings and sit in the hole, looking out, until the other parent returns, during the first several days of the nestling period. However, during especially warm days the female may do the same, rather than brood the nestlings.*
12. *The male is more likely to feed the nestlings at the hole or from the hole during the last week of the nestling period, rather than to fully enter the box (Cash 1933). The female enters the box more frequently for nest sanitation during that time (Cash 1933; Kuerzi 1941).*

A complication can arise in distinguishing the male parent of a brood, especially for pairs nesting unusually late in the breeding season, when extraneous Tree Swallows congregate at the nest box. These birds, which include juveniles as well as adults of both sexes, are usually tolerated by the parents, show great curiosity toward the box, and often enter the box, sometimes carrying food (Cash 1933; Chapman 1955; Cohen 1961; Sheppard 1977; Lombardo pers. commun.), although they rarely if ever feed the nestlings (Burt pers. commun.; Lombardo pers. commun.). In such cases I have judged a bird's status according to its behavior after release: Almost all parents remain near the nest and immediately give alarm calls and dive at me, whereas extraneous birds tend to be silent and to fly away immediately.

Through the use of these criteria I have been able to band almost all breeding males of my study population of 250 to 300 pairs, beginning in 1982. This is providing extensive data on many life history variables for this species, including mate selection and mate fidelity, as well as the dispersal, nest-site selection, nest-site tenacity, and survivorship of the males.

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