

SOCIAL BEHAVIOR OF WHITE-THROATED SWIFTS

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ABSTRACT: The social behavior of the White-throated Swift includes Chases Without Contact, Chases With Contact, and Courtship Falls. These behaviors have a strong seasonal pattern. Chases Without Contact were the most common interaction and occurred most frequently during the winter and spring. Chases With Contact and Courtship Falls occurred less frequently and peaked during spring prior to breeding. White-throated Swifts also have social behaviors that may be termed the Raised-Wing display, Screaming Party, and Silent Dread.

The White-throated Swift (*Aeronautes saxatalis*) is widespread and common in western North America. Despite this, remarkably few details are known about its intraspecific behavioral interactions, even though it is a highly social species. In winter, nocturnal roosts may contain up to 500 individuals (Hanna 1909, Hanna 1917, Bent 1940, Ryan and Collins 2000). By day, White-throated Swifts usually forage in groups, often far from the roost, and occasionally with other species (Ryan and Collins 2000).

The extreme mobility and extensive daily foraging range of most swifts, including the White-throated, have hampered detailed studies of their behavior. Social displays of the White-throated Swift include subtle, difficult-to-observe glides on raised wings as well as the more obvious rapid noisy chases. During the spring courtship period, these swifts engage in dramatic Courtship Falls in which members of a pair cling together in mid air and fall, whirling and tumbling, sometimes for several hundred feet (Michael 1926, Bent 1940). As described by Dawson (1923), "the birds come together from opposite directions, engage with the axes of their bodies held at a decided angle laterally, and begin to tumble slowly downward, turning over and over the while for several seconds, or until earth impends, whereupon they separate without further ado." Some researchers suggest mating takes place during this fall, an assertion supported by the collection of only male-female pairs engaging in these falls (Bradbury 1918). However, the birds have also been reported to mate in the nest crevice (Bent 1940).

Because the scarcity of information about the social interactions of swifts is, in part, due to the difficulty in observing them for extended periods, the gathering of flocks near roost sites provides a unique opportunity to gain insight into the social interactions of these birds. The goal of this study was to document and describe the social behavior of White-throated Swifts at three roost sites in southern California and determine the seasonal patterns of the most commonly observed interactions.

STUDY AREA AND METHODS

As part of a broader study of swift behavior from late February 1994 to March 1995 (Ryan 1996), Ryan studied swifts at two locations in Orange County: Santiago Oaks Regional Park and Caspers Wilderness Park. Ryan and Collins (2003, this issue) detail the study sites and data collection further.

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We focused our observations on three types of interactive displays: Chases Without Contact, Chases With Contact, and Courtship Falls. We defined Chases Without Contact as interactions in which one bird actively pursued another. Chases Without Contact were often accompanied by vocalizations. The pursued bird often changed flight direction to evade the pursuer's approach. Chases With Contact were recorded when contact was made between two birds involved in a chase. Courtship Falls were recorded when two birds came together and remained attached to one another long enough to begin to fall, losing altitude in a relatively uncontrolled manner, as previously described (Dawson 1923, Bradbury 1918, Michael 1926). We used Kruskal-Wallis tests to compare the frequencies of behaviors by season.

RESULTS

Although Chases Without Contact, the most commonly observed behavior, occurred during all seasons, the frequency of this interaction was significantly higher in winter and spring than in summer ($H = 6.86$, $df = 2$, $P = 0.03$; Figure 1). Frequencies in winter and spring did not differ from each other ($P = 0.82$; Figure 1). Although Chases With Contact tended to be least frequent during winter (Figure 1), differences by season were not significant ($H = 2.36$, $df = 2$, $P = 0.31$). Courtship Falls tended to occur

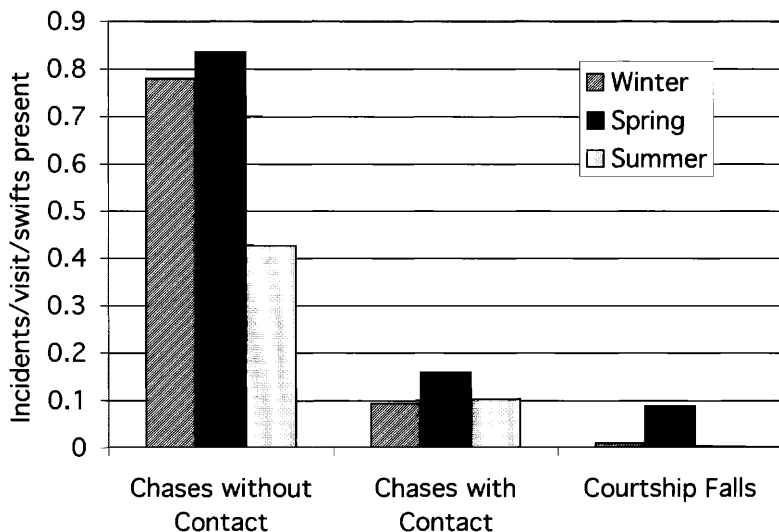


Figure 1. Seasonal patterns of Chases Without Contact, Chases With Contact, and Courtship Falls of White-throated Swifts in southern California. To correct for variation in the numbers of swifts by site and date, the data are presented as the number of incidents of the behavior occurring per observation period (= visit) per bird present.

most frequently during the spring (Figure 1), although this result was only marginally significant ($H = 4.62$, $df = 2$, $P = 0.10$).

During our observations, we also noted several other behaviors whose seasonal occurrence we did not quantify. In particular, we noted a Raised-Wing or "V" display (Ryan and Collins 2000) performed by two birds in paired flight. The bird in the lead position brought both wings to an angle of $<30^\circ$ above the horizontal plane and held that position briefly (<5 seconds). No side-to-side rocking motion was observed at this time, although the bird giving the display appeared slightly unstable in flight for a brief period. The displaying bird, which was in all cases the lead bird, maintained a straight glide path for the few seconds during which the wings were elevated. During the display, both participants called repeatedly. Courtship Falls frequently followed this display rather than preceded it, as we previously reported erroneously (Ryan and Collins 2000).

White-throated Swifts also engage in two group behaviors involving larger numbers of birds. One of these behaviors is the formation of Screaming Parties as described for the genus *Apus* by Lack (1956). The other behavior we term Silent Dreads. During a Screaming Party, a large group of swifts passes together near the roost or nesting crevices. During the pass many if not all individuals call simultaneously. They often repeat this behavior several times before resuming foraging. At times, some individuals from the flock entered or exited the roost during or immediately following this behavior. A Silent Dread event occurs while the flock is either in the air foraging or during group flights close to the roost site shortly before entering. Prior to a Silent Dread, the swifts actively vocalize in a loose swirling group. During a Silent Dread, the entire group stops calling and silently rushes away from the site. The whole flock departs in an uncoordinated rush, regrouping at a substantial distance from the previous center of activity. This rapid silent departure is consistent with an evasive response to aerial predators, hence the name we apply to it.

DISCUSSION

White-throated Swifts are highly social and can frequently be observed calling and chasing. The social interaction most often observed is the frequent calling that comes from the individuals in flocks. The intensity of these vocalizations increases when individuals engage in chases. Chases generally involve only two individuals, although a third sometimes joins in the pursuit. Subsequently, others may be attracted to the commotion.

The frequency of Chases Without Contact is higher during winter and spring, when roosts contain the largest number of birds (Ryan 1996, Ryan and Collins 2003). During the summer, populations at the roost are reduced and this and other social behaviors decrease. Chases of this type have been recorded for the Black (*Cypseloides niger*) and Vaux's (*Chaetura vauxi*) Swifts (Rathbun in Bent 1940). The peaking of Chases With Contact during spring suggests that this behavior is associated with courtship or an increase in the level of aggression among individuals prior to and during the courtship process.

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Courtship Falls peaked in spring, during the time of courtship, mating, and the onset of nesting. This behavior is believed to be, in part, a courtship display, and may involve mating (Bradbury 1918). In the genus *Apus* aerial copulation occurs while both individuals are in a long shallow glide and does not involve interlocked falls (Lack 1956, Cramp 1985). A similar touch-and-grasp behavior in the Black Swift appears to be more of an aggressive interaction (Marin 1997). We have also observed Courtship Falls identical to those of the White-throated Swift in the White-tipped Swift (*Aeronautes montivagus*) in Venezuela.

Raised-Wing displays have been recorded for a variety of species of swifts. They have variously been described as "V-displays" (Ryan and Collins 2000), "V-ing" (Fischer 1958), "Wing-Raising" (Rothganger and Rothganger 1973), and "Wings-High displays" (Lack 1956, Cramp 1985). The behavior is equally varied in form. In the Common Swift (*Apus apus*), it is the lead of two birds in paired flight that gives the display, which seems to be a precopulatory solicitation display given by males (Lack 1956, Cramp 1985, Rothganger and Rothganger 1973). The position of the wings is similar to that of the male during aerial copulation (Rothganger and Rothganger 1973). In the Chimney Swift (*C. pelagica*) it is not the lead but the following bird that initiates the display by suddenly raising "its wings so they form an acute angle with one another" (Fischer 1958); the lead bird may follow suit by raising its wings and continuing with a paired glide, particularly late in the breeding season. In the Chimney Swift, the display seems to be related to physiological synchronization and maintenance of the pair bond; the birds copulate only when perched near the nest site (Fischer 1958). In the Chimney and Vaux's Swifts (Fischer 1958, Bull and Collins 1993) the wings are raised higher ($>45^\circ$ above horizontal) than in either the White-throated or Little Swift (*Apus affinis*; Collins unpubl.), which raise the wings at $<30^\circ$ above the horizontal. Further study is needed before these differences in the form of the display can be safely associated with the different sexual functions that have been suggested.

Screaming Parties have been described for a number of species of swifts, particularly in the genus *Apus* (Lack 1956, Cramp 1985). We have also observed this behavior in *Aeronautes montivagus*. Although Screaming Parties of White-throated Swifts closely approach the roosting and nesting cliffs and stimulate audible vocalizations from swifts remaining within the roost, we never noted the participants in the Screaming Parties to make contact with the surface of the cliff. This differs from the behavior of the Common Swifts in which individuals ("bangers") strike the openings of their nest chambers during similar flight displays (Lack 1956, Cramp 1985).

During Silent Dreads, we occasionally noted a Cooper's Hawk (*Accipiter cooperii*) or Peregrine Falcon (*Falco peregrinus*), or birds that could be mistaken for predators, such as the Turkey Vulture (*Cathartes aura*) or Common Raven (*Corvus corax*), nearby. We never observed this behavior during an overt attack, however, and in most cases, we observed no obvious stimulus for this group behavior. We observed Silent Dreads more frequently near or after sunset, on cloudy, windy days, and particularly during the period of rapid group circling just prior to the swifts' entering the roost. The

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decrease in light intensity at this time may have contributed to the seeming false-alarm nature of this response.

The Silent Dread behavior of White-throated Swifts is described here for the first time. It may be present but simply overlooked in other species of swifts, but the dramatic change from a nearby noisy social group to a silent departure from the immediate area makes this unlikely.

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