

## ON EARLY SPRING ARRIVAL OF PURPLE MARTINS

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Rohwer and Niles' (1977) hypothesis to explain the early spring arrival of Purple Martins (*Progne subis*) prompts me to report pertinent data I have collected in Sherman, Grayson County, Texas. Additionally, I offer an alternative to Rohwer and Niles' female/colony limitation hypothesis.

### NONBREEDING POPULATION

Rohwer and Niles (1977) state that no published studies of martins report a nonbreeding, floating population of females during the nesting season. From 1969 to 1977, however, in Sherman, Texas, I detected nonbreeding, vagrant Purple Martins in the local population every year. These vagrants were both males and females, adults and first-year birds. Daily observations at the study colony in Sherman showed that one to five vagrant males and one to five vagrant females visited the colony daily from February through July. These vagrants constituted a surplus of available mates that always seemed to be present; no resident male or resident female Purple Martin at the study colony failed to attract a mate from 1969 to 1977. This colony consisted of 3, 3, 7, 7, 19, 20, 21, 35, and 27 martin pairs from 1969 to 1977, respectively.

I determined rather conclusively that these aforementioned vagrant martins were actual nonbreeders. About 80–85% of them appeared singly rather than in pairs. Since Purple Martins maintain close pair bonds which usually are formed only when colony residence is established (Allen and Nice, 1952; Johnston and Hardy, 1962; Brown, unpubl.), it seems doubtful that these lone vagrants were established elsewhere. They likely were nonbreeders that were hunting for nesting sites. Furthermore, my semi-intensive fieldwork at six martin colonies within 1 km of the main study colony never revealed a banded or distinctively marked resident martin from the study colony that was visiting one of the peripheral colonies. Once *established*, Purple Martins in Sherman, Texas, exhibit strong intra-season colony site-tenacity.

A male-biased sex ratio is a cornerstone of Rohwer and Niles' (1977) hypothesis. Since others apparently have not observed surplus females, I do not wish purposefully to denigrate Rohwer and Niles' hypothesis, but the many vagrant females I noted make their hypothesis difficult to accept for Purple Martins in northcentral Texas.

### HOLE-LIMITATION HYPOTHESIS

Nice (1957) and Johnston and Hardy (1962) hypothesized that Purple Martins arrive early because the birds' specialized nesting sites are limited and intraspecific nesting site competition is keen. I see no reason to abandon this hypothesis, but some modification might be needed. Before the widespread installation of artificial multicelled martin nesting houses by man, Purple Martins nested in abandoned woodpecker cavities in trees (Allen and Nice, 1952). Colonies in woodpecker holes likely

were small; support for such an assumption comes from Arizona, where *P. s. hesperia* still nests primitively in saguaro cacti and colonies are small (Phillips et al., 1964). In primitive nesting sites, martins likely faced severe intraspecific competition for the few available cavities.

The martins that occupied my study colony from 1969 to 1977 did not use all the available rooms. But it is an oversimplification to state that these surplus holes therefore show that martins are not hole-limited. Purple Martins in Sherman defend territories that many times may consist of at least 18 rooms. Apparently this species has not yet adapted to the high density potential of artificial nesting houses (Johnston and Hardy, 1962; Brown, unpubl.). Martins in Sherman commonly control a number of rooms, repelling recently arrived would-be colonizers. Although superficially there appear to be an adequate number of rooms, actually an insufficient quantity exists. Regardless of colony size or numbers of martins present, I have never found over 35% of the available rooms occupied by martins. But the nonbreeding vagrants still strongly suggest a shortage of nesting sites.

However, territorial defense did not account for all rooms that were unoccupied by martins. House Sparrows (*Passer domesticus*) and Starlings (*Sturnus vulgaris*) used some of these rooms. Even in primitive nesting sites, Purple Martins were forced occasionally to compete with other species, notably with Picids, *Myiarchus* flycatchers, other Hirundinids, and bluebirds. Today, martins sometimes must compete with Common Flickers (*Colaptes auratus*), Great Crested Flycatchers (*Myiarchus crinitus*), Violet-green Swallows (*Tachycineta thalassina*), Tree Swallows (*Iridoprocne bicolor*), and Eastern Bluebirds (*Sialia sialis*) in artificial nesting houses (Allen and Nice, 1952; Brown, unpubl.).

With the recent increase in artificial martin houses, Rohwer and Niles (1977) state that intraspecific competition should be reduced and later spring arrival should result. But such an idea overlooks a recent increase in interspecific competition from introduced House Sparrows and Starlings (Allen and Nice, 1952; Brown, 1977b). Concurrent with the widespread installation of martin houses, which worked to reduce intraspecific competition in martins, was the introduction of the successful, now abundant House Sparrow and Starling into North America, which worked to increase interspecific nest site competition in martins. Instead of arriving early to compete mainly intraspecifically for nest sites as in the past, it would seem that Purple Martins now may arrive early to compete interspecifically with House Sparrows and Starlings.

House Sparrows were introduced into North America in the 1850's (Bent, 1958) and Starlings in the 1890's (Kessel, 1957). The early literature on martins is mostly incomplete, but as early as 1878 in Pennsylvania sparrows were chasing martins away from nesting sites (Ziegler, 1923). By 1889, sparrows were serious martin competitors throughout much of eastern North America (Barrows in Allen and Nice, 1952). House Sparrows may have been present in Baltimore, Maryland, throughout the time of Rohwer and Niles' (1977) chart, since they were

introduced in the Philadelphia area in 1869 or earlier (Bent, 1958). Little information is available on early martin-Starling interactions. Today, House Sparrows and Starlings occupy significant percentages of apartments in martin houses (Jackson and Tate, 1974).

In Sherman, House Sparrows begin carrying nesting material into martin houses on warm days as early as December (Brown, 1977b). By late January and early February, they often spend much time on the houses. Starlings enter martin houses in Sherman in winter only on warm, sunny days (Brown, 1977b), but by early February several days in succession often are warm, and Starlings show intense interest in claiming compartments of martin houses. Concurrent with the inception of sparrows' and Starlings' nest defense interests is the arrival of the first Purple Martins in mid-February each year.

The first martin arrivals occasionally are repelled by established Starlings, but most martins are able to secure rooms where sparrows are established. More martins continue to arrive in late February and March, and many colonies are half-full by the end of March, when the first arrivals of other Hirundinids appear in Sherman. Also by the end of March, sparrows and Starlings have engaged in nest building, and some sparrows have laid eggs.

If Purple Martins arrived at the same time as other exclusively insectivorous species in Sherman—late March to early April—they would find many nest sites occupied by House Sparrows and Starlings. Even if martins were then able to chase away sparrows and Starlings, many rooms of martin houses would be stuffed with bulky sparrow nests and unsuitable for martin use. No quantitative figures are available, but I received the general impression that House Sparrows and Starlings in Sherman tend to become more pugnacious and defensive as their nesting cycle advances. This could result in great difficulty for martins moving into a martin house claimed by sparrows and Starlings in late March or later. Although more than one Starling pair is seldom found in a martin colony, Starlings in particular can be serious threats because they can kill adult martins (Brown, 1977b), and Starlings largely come and go in a colony as they please (Brown, 1977a,b). Small martin colonies in Sherman are especially vulnerable to Starling interference (Brown, 1977b). Sparrows constitute problems for martins mainly by "clogging up" potential nesting compartments with grass.

Purple Martins, therefore, may continue to arrive early to compete with winter resident House Sparrows and Starlings for nesting sites. More martin houses in North America in recent times may have reduced intraspecific nest site competition as Rohwer and Niles (1977) suggest, but stronger interspecific competition still necessitates early spring arrival by Purple Martins.

#### SUMMARY

In Sherman, Texas, local Purple Martin populations include a non-breeding, floating group of males and females. These nonbreeding birds

weaken a previously published hypothesis to explain early spring arrival in martins. The hole-limitation hypothesis of early arrival is modified. Instead of arriving early to compete mainly intraspecifically for nest sites as in the past, Purple Martins now may arrive early to compete interspecifically with House Sparrows and Starlings.

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