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**Tree Swallow pairs raise two broods in a season.**—Although Tree Swallows (*Tachycineta bicolor*) are normally single-brooded, Wetherbee (Bird-Banding 4:160, 1933) recorded one instance in Connecticut of a female laying a second clutch after raising one young from a first brood. The second attempt, however, was unsuccessful. Chapman (Bird-Banding 26: 45–70, 1955) mentioned one pair which had two broods in a season (the only case in 22 years) but gave no other details. Weydemeyer (Bird-Lore 36:100–105, 1934) stated that second broods occurred in Montana, but gave no evidence that marked pairs had been followed. Here I report on two pairs of Tree Swallows which raised two broods in a single season.

Nest boxes suitable for Tree Swallows have been maintained by the Long Point Bird Observatory at two sites near Port Rowan, Haldimand-Norfolk Regional Municipality, Ontario: the Backus Conservation Area (B) and the Sewage Lagoons (S), since 1975 and 1977, respectively. The boxes are on metal poles spaced at 24-m intervals in lines or grids. The S site has an exceptionally abundant food supply of flying insects (mainly Chironomidae), while the B site usually has a smaller food supply (unpubl.). During the breeding season, boxes are checked frequently, often daily, and contents recorded. After the eggs hatch, adults are trapped and banded at the nest. Females and males are sexed by presence of a brood patch or cloacal protuberance, respectively.

In 1979 one pair raised a brood in box S20, then moved to box S19 (24 m distant) and raised a second brood. On 11 May there was a complete nest in box S20 and the first egg was laid on 14 May. Eggs were laid daily until a clutch of six was completed on 19 May. The eggs hatched between 31 May and 2 June. On 12 June female A and male B were trapped as they visited the box to feed the young (swallows designated by capital letters refer to banded individuals verified by trapping). Female A had been banded as an adult at the same box in 1978. The brood of six in 1979 was banded on 13 June and left the nest between 18 and 22 June. At least one of the banded young is known to have survived the post-fledging period as it was captured as a breeding female in 1980 and 1981.

Meanwhile, box S19 had been occupied by another pair (female C and male D, trapped on 3 June) whose first egg had been laid on 13 May and last young of four fledged on 18 June. The nest was empty on 24 June, but it contained four eggs on 28 June and a clutch of six was completed on 30 June. Five eggs hatched, two by 12 July, three others by 14 July. Female A was trapped at box S19 on 16 July and again, with food in her bill, on 18 July, when male B was also trapped there. No other adults were in attendance. Five young were banded on 25 July when they averaged 12 days old. Their mean weight of 19.8 g (range = 18.5–21.4 g) was 3 g lower than that of the first brood at the same age (mean 22.8 g, range = 21.9–24.6 g). On 29 July (age 16 days) two were dead and the other three were underweight, one chronically (14.0, 17.5, and 18.1 g compared with 20.9–22.1 g for six young in the first brood at 16 days), and all were heavily parasitized by *Protocalliphora* larvae. Thus, three young were raised to at least 16 days of age. Whether or not they all fledged successfully is uncertain, as the box was not checked again until 1 September, but there was then no evidence of additional mortality. Neither the young nor the adults were found again in subsequent years.

In 1982 a pair raised two broods in box B43. The first egg was laid on 7 May, the earliest laying date ever recorded in either the S or B areas and 3 days earlier than in any other 1982 nest. Eggs were laid daily until a clutch of six was completed on 12 May. The eggs hatched 25–26 May and female E was captured on the nest on 26 May. She had been banded as an adult at the same box in 1981. Male F was captured in B43 on 4 June 1982. One of the young died between 6 and 7 June, but the others fledged in good condition between 12 and 17 June.

Adult swallows were noted exhibiting territorial behavior in the vicinity of B43 on several

dates until 29 June when one new egg was present. A clutch of four was completed probably on 3 July (no egg was laid on 1 July). Two eggs had hatched by 16 July and the other two were pipped. Male F was captured in the box with four young on 30 July. On 31 July female E was captured as she carried food to the nest box. This second brood was also underweight; they averaged 19.1 g (range = 17.6–20.0 g) at 14 days compared with a first brood average, interpolated from 12 and 16 day weights, of 23.4 g (range = 21.6–24.4 g). Nevertheless they fledged successfully between 3 and 7 August. Female E and male F had both started post-nuptial molt of the primaries when captured.

To raise two broods instead of one a pair of birds must lengthen its breeding season by starting earlier or ending later. Time can be gained by reducing the period of parental care (Blancher and Robertson, *Wilson Bull.* 94:212–213, 1982) or the between-brood interval. The 1979 double-brooded pair was among the earliest breeders that year and the 1982 pair was the earliest ever recorded. Most of the time gained for raising second broods, however, resulted from an extension of the end of the season. Unfledged young of first broods are rarely found at this locality after the first week of July.

Blancher and Robertson (1982) provide evidence (but see Peck, *Wilson Bull.*, in press) that a pair of another normally single-brooded species, the Eastern Kingbird (*Tyrannus tyrannus*), attempted to raise a second brood. They (1982:213) suggest that the "decision whether or not to start a second brood immediately after the first brood fledges should be governed by the probability of rearing young from the second brood compared to the probability of decreasing the first brood's chances of survival." This relationship is unlikely to be important in the Tree Swallow, in which there appears to be little post-fledging parental care. Moreover, the relative fitnesses of the single-brooded and double-brooded strategies depend not only upon the success of first and second broods and interactions between them, as suggested by Blancher and Robertson (1982), but also upon the effects of the two strategies on parental survival and probability of future reproductive output. The rarity of second broods in Tree Swallows is most likely governed primarily by the net effect on fitness of the probability of success of second broods and the probability of reduced future reproduction. An abundant food supply and an early season may be factors which could tip this balance in favor of second broods and may have influenced the pairs reported here. In the Cliff Swallow (*Hirundo pyrrhonota*) the incidence of second broods apparently varies between years (Samuel, *Wilson Bull.* 83:284–301, 1971), so possibly this species has evolved the ability to assess whether the one- or two-brood strategy is likely to be more favorable under a given set of conditions. Brown and Bitterbaum (*Wilson Bull.* 92:452–457, 1980) suggest that second broods in Purple Martins (*Progne subis*) may be limited both by greater mortality of the young and by conflicting energetic requirements of parents who raise second broods while starting the postnuptial molt. Low weights of young Tree Swallows in second broods and concurrent flight feather molt in their parents lend support to these ideas. Similar selective factors may operate on late broods in birds which are normally single-brooded (Hussell, *Ecolog. Monogr.* 42:317–364, 1972), presumably indicating that in these species second broods would be, for the same reasons, even less adaptive than late first broods.

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