

asynchronously, males directed most of their activities to females that nested first. Males switched their efforts to the second female when the breeding attempt of the first female failed or when her young fledged.

In 1980, two females (A and B) were associated repeatedly with a male (AB) at the Dearborn locality (Fig. 1). The nesting activities of these two females were synchronized from 7 June through 23 June. Following the apparent predation of female A's nest on 13 June, male AB spent most of his time with female B. On 23 June, when female B's young fledged, male AB was found with female A at her replacement nest.

Male AB and female A returned to Dearborn in 1981, and were once again paired (Fig. 1). Male AB was associated with female A and her original nest from 25 May through 2 June, and with her replacement attempt from 6 June through 27 June. On 19 June, male AB was also observed with another female (C), who nested unsuccessfully. The location of this female prior to the discovery of her nest was unknown.

Polygyny was also witnessed at Metrobeach in 1981. A male (AB') was repeatedly and simultaneously associated with two females (A', B') (Fig. 1, Table 1). Associations with female A' included two breeding attempts (from 28 May through 10 June, 13 June through 7 July). Male AB' was also observed with female B' from 10 June through 12 June. This nest was parasitized by a cowbird (8 June) and deserted on 12 June. No further breeding attempts were made by female B'.

Yellow Warblers maintained type A territories (Nice, *Am. Midl. Nat.* 26:441–487, 1941); however, several males were observed off territory singing near females. Wandering behavior, also observed by M. R. Lein (pers. comm.), Ford (1983), and Nolan (*Ornithol. Monogr.* 26, 1978) for Prairie Warblers (*D. discolor*), was most prevalent during the incubation period of each male's first mate (pers. obs.). Territory size of polygynous males ($\bar{x} = 0.78$ ha, $N = 3$) was significantly greater than that of monogamous males ($\bar{x} = 0.21 \pm 0.05$ ha [SD], $N = 20$; Mann Whitney $U = 59$, $0.002 < P < 0.005$).

Productivity (no. young fledged per breeding bird) was higher for polygynous males ($\bar{x} = 3.67 \pm 0.33$, $N = 3$), and females mated to polygynists ($\bar{x} = 1.83 \pm 0.70$, $N = 6$) than for monogamists ($\bar{x} = 1.40 \pm 0.36$, $N = 20$). The difference was significant for males ($\chi^2 = 6.97$, $df = 1$, $P < 0.01$) but not for females ($\chi^2 = 0.458$, $df = 1$, $P > 0.25$).

Nolan (1978) found that polygynous Prairie Warblers acquired first mates earlier than their monogamous counterparts, and that instability of sex bonds was associated with a high incidence of nest mortality due to predation. In this study, polygynists claimed territories first and then were apparently selected first by females.

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Two male Bobolinks feed young at the same nest.—Male “helpers at the nest” have been reported for many species of birds (Brown, *Am. Zool.* 14:63–80, 1974; Woolfenden, *Proc. Int. Ornithol. Congr.* 16:674–684, 1976; Emlen, pp. 245–281 in *Behavioral Ecology*, J. R. Krebs and N. B. Davies, eds., Sinauer, Sunderland, Massachusetts, 1978); however, this

situation has rarely been reported for species that are generally regarded as polygynous. Beason and Trout (Wilson Bull. 96:709–710, 1984) described the first case of this phenomenon in an unmarked population of Bobolinks (*Dolichonyx oryzivorus*). Here, we describe a second situation in which two male Bobolinks simultaneously fed young at the same nest. In addition, we present electrophoretic phenotypes for all members of this “family.”

The nest was in a 19-ha upland hayfield 6.4 km south of the Cornell Biological Field Station near Bridgeport, New York. The field contained a dense breeding population of Bobolinks. Fifty of 52 (96%) territorial males and 54 of 56 (96%) nesting females were individually color marked. In addition, we took blood samples for electrophoretic analysis from each adult that we captured and from all nestlings that survived to day 7 (Gavin and Bollinger, Auk 102:550–555, 1985). A “two-male” nest was found with a complete clutch of 4 eggs on 28 June 1984, in the territory of O (orange) male. His territory was directly adjacent to territories of trigamous, bigamous, and monogamous males. The attendant female was captured at the nest and marked as Y (yellow) on 2 July. The eggs hatched on 8 July. We observed feeding trips at this nest daily from 9 July through 17 July (when the young fledged) for a total of 8 h ($N = 151$ feeding trips). From 9 July through 11 July, only O male and Y female fed young at this nest. The second male first fed young on 12 July and continued to feed until after the young had fledged. On 13 July, we captured the second male as he attempted to feed the nestlings. This male (marked W, white) made 17% (26 of 151 trips) of all observed feeding trips to this nest, O male made 36% (54 trips), and Y female was responsible for the remaining 47% (71 trips). On the two days before fledging, W male made 23% of the feeding trips and O male made 27%. Four young fledged from the nest on 17 July and the three adults continued to be seen together in the vicinity of the nest until 22 July. We never observed any aggression between the two males and on several occasions they arrived together at the nest and both perched on a stake placed 2 m from the nest.

The help of the second male may have increased the success of the nest as it fledged the highest number of young (4) of the 9 nests fledging young in July. Conditions for rearing young appeared to be more difficult at this time, when a median number of 2 young fledged from 9 successful nests, compared with a median of 5 young from 29 successful nests in June ($P < 0.001$, Mann-Whitney U -test).

Why W male fed young at this nest is unclear, but several explanations are possible. Firstly, he may have sired some of the nestlings at this nest. For example, Y female may have arrived at our site carrying viable sperm from W male after they were unsuccessful at another site. Clutches sired by more than one male have been documented conclusively in this species (Gavin and Bollinger 1985). Electrophoretic analyses indicated that W male did not father two of the nestlings. The data also strongly suggest that O male fathered the two nestlings because of the presence of a rare allele in each of the three birds. This allele was present in 8% of this population, and only 3 of the other 49 marked males had the allele. Either male could have fathered the other two nestlings. We assumed that intraspecific nest parasitism did not occur and that Y female was the mother of all nestlings in her nest (Gavin and Bollinger 1985). Secondly, W male may have been an offspring from the previous year of one or both of the other adults and not a father of any of the nestlings. The electrophoretic data do not exclude this possibility, and helpers at the nest in other species are often male offspring from previous clutches (e.g., Pinkowski, Auk 92:801–802, 1975; Woolfenden 1976). Thirdly, W male simply may have made a “reproductive mistake” (Power, Science 189: 142–143, 1975; Pinkowski, Auk 95:606–607, 1978). He may have still been physiologically motivated to feed young after a recent nest loss (Beason and Trout 1984). Obvious reproductive mistakes (e.g., feeding young of another species) have been described for other species of birds (Shy, J. Field Ornithol. 53:370–393, 1982).

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Conspecific nest takeovers and egg destruction by White Ibises.—This report describes cases of conspecific nest usurpation seen in a breeding colony of White Ibises (*Eudocimus albus*) during four breeding seasons (1980–1983) on a 9 ha island in Winyah Bay, near Georgetown, South Carolina (33°16'30"N, 79°12'30"W). Between 6000 and 12,000 pairs of ibises nest there annually on clumps of needlerush (*Juncus roemarianus*), and nests are subject to occasional catastrophic washouts by high tides. My observations, which lasted 12–14 h a day, were made from a 3-m high blind set approximately 20 m from groups of 20–50 nesting pairs. Individuals could be identified reliably by facial characteristics, and sexes were determined by behavior and size (Kushlan, *Wilson Bull.* 89:92–98, 1977). Over the four seasons, 15,580 pair-h were spent observing 134 pairs during courtship, nestbuilding, egg laying, and occasionally early incubation. For a more detailed description of the study site and methods, see Frederick (Ph.D. diss., Univ. North Carolina, Chapel Hill, North Carolina, 1985).

During these observations, I saw eight cases of nest takeover, all of which involved a similar sequence of events. Without apparent warning, a pair that had built a nest would begin to jab with their bills at a lone female on a nearby nest (<3 m). The lone female (resident) would not attack the intruders, but instead she would spread her wings over the nest cup and lie prone with her head behind her wing. The attacks continued for 15–30 min, during which time the intruding pair jabbed the resident's head, back, neck, and wings hard enough to draw blood and remove contour feathers. The intruding female sometimes appeared to be jabbing underneath the prone resident. In one case a resident female appeared to have been beaten into an unconscious state after >30 min of attacks. The resident female was forced from her nest in five of the eight encounters.

If the resident was evicted, the intruders immediately occupied the nest; if eggs were present, the intruding female stabbed them with her bill and threw them out of the nest. The intruding pair usually rearranged the nesting material and in two cases copulated on the nest within 10 min of the eviction.

In all cases the mate of the resident female returned within 30 min of the eviction and attempted to chase off the intruders. He was always joined by his mate as soon as he returned. In the ensuing fight, males fought males and females fought females. Jabs were aimed at the head, and contestants frequently held each other's throats tightly clamped for several min at a time. The resident pair always chased off the intruding pair after a 20–30-min fight. Contested nests failed in all four of the cases in which their fates were followed.

All initial attacks were made by the intruding female, with her mate following. In two cases, the intruding female also remained fighting on the nest for at least 5 min after the intruding male had given up.