successfully (Brown, Auk 90:442, 1973). Whether or not unmated males were available is not known.

Our bird tried the first option. The failure of the new nest was due to the intrusion of older young, a situation made possible by the balconies on man-made martin houses. In the old woodpecker holes where martins originally nested, this would not have happened. It is important to remember that a tactic does not have to work every time to be advantageous. It is obvious that pushing into a colony is a better option than not trying to breed at all.

As Purple Martins do not recognize their own young (Bitterbaum and Brown 1981), this bird would probably not have recognized these nestlings as Purple Martins, but, of course, she would have recognized the parents. Therefore, it seems that there is no inhibition against infanticide in the social system of the Purple Martin.

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Overlap of two broods of Eastern Bluebirds in the same nest and brood reduction.—Unusual nestings among House Sparrows (*Passer domesticus*) in which eggs of the successive clutches were laid while young of the previous broods still occupied the nests have been reported (Lowther, Bird-Banding 50:160–162, 1979). I have made a similar observation for Eastern Bluebirds (*Sialia sialis*) wherein simultaneous use of a single nest box by two females suggests that nest-sites (boxes) are an important and limited resource for reproduction by Eastern Bluebirds. In association with this dual occupation of a single nest box I recorded brood reduction that encouraged speculation about infanticide.

Female R426 was caught and color-banded on 23 April 1979 at nesting territory 133 on a study site in Pendleton, Anderson Co., South Carolina. During that spring she and an unbanded male produced a five-egg clutch of which four eggs hatched and four young fledged on 16 and 17 May (Table 1). On 25 May a new, completed nest was found in the box and on 29 May female R426, again accompanied by an unbanded male, completed laying a four-egg clutch; all eggs hatched on 12 or 13 June. On June 16 I began to mark and weigh nestlings (Table 1). On 22 June I found one of the nestlings dead on the ground (Table 1). This was the only time I had seen a dead nestling so close to a nesting box containing live siblings. (I have found dead nestlings in the box with their live siblings and noted nestling disappearances attributed to parental removal. Dead nestlings found in the box were all more than 8 days old. Nestlings which have disappeared from a nest containing live siblings were all under 8 days old.) I did not see female R426 during my visit to the nest; she did not respond to a tape recording of bluebird song, although an unbanded male observed me from a perch about 10 m away. I did not see female R426 after 18 June. On 25 June I found color-banded nestling L573 dead just beneath the nesting box. The remaining nestlings, female L572 and male L574, appeared healthy and had normal weights on all days weighed.

In addition to the two nestlings remaining in the box, three eggs were also there on 25 June. Four eggs and two nestlings were in the box on 27 June. Female L229 was near the box with an unbanded male on 27 June and I frequently saw her on the territory during the remainder of the nesting attempt. (I caught and color banded female L229 on 26 May 1978 at a study site about 3 km from territory 133. During 1978, she and her mate, color-banded male R696, fledged nine young from two clutches.) The two remaining nestlings, the apparent offspring of female R426, fledged at a normal age between 28 June and 1 July. Only three

TABLE 1

SUMMARY OF SEXES AND WEIGHTS OF NESTLINGS AT TERRITORY 133, AT A STUDY SITE IN PENDLETON, ANDERSON CO., SOUTH CAROLINA, 1979

			Parents: unbanded male and female R426			
	Date	4/23	4/27	4/30 weight (g)	5/3	5/7 sex	5/11
Nestling L934		hatch	7.0	18.0	24.5	♀	fledged
Nestling L935		hatch	6.5	18.0	25.5	♂	fledged
Nestling L936		hatch	5.5	18.0	25.5	♂	fledged
Nestling L938		hatch	6.5	17.5	24.0	♀	fledged
			Parents: unbanded male and female R426				
	Date	6/12	6/16	6/19 weight (g)	6/22	6/25 sex	6/28–7/1
Nestling L572		hatch	12.5	20.0	22.5	♀	fledged
Nestling L573		hatch	13.0	23.0	17.5	dead	—
Nestling L574		hatch	12.0	21.0	25.5	♂	fledged
Nestling ub[a]		hatch	10.0	19.0	dead	—	—
			Parents: unbanded male and female L229				
	Date	7/10	7/15	7/17 weight (g)	7/20	7/22 sex	7/25
Nestling L629		hatch	13.5	21.5	26.5	♀	fledged
Nestling L631		hatch	14.0	20.5	25.5	♂	fledged

[a] Indicates unbanded individual.

of the four eggs presumably laid by female L229 were consistently incubated; one was frequently found on the nest cup margin. Two of the four eggs hatched on 10 July. Female L229 and an unbanded male attended these nestlings, both of which developed normally and fledged before 2 August (Table 1).

Communal and cooperative nesting by these two females is an unlikely explanation for these observations because of the disappearance of one of the females. Nevertheless, kin-selected behavior is difficult to rule out. Because female R426 had disappeared by the time the eggs started to appear in the box with the nestlings, I am fairly certain that female L229 laid them. However, I do not know if these two females were related because each was caught and color-banded as an adult. It is possible, although I believe improbable, that the unbanded male with female L229 was unrelated to the nestlings, in which case the feeding of the two live nestlings by either or both the new female and the male might be attributed to altruism (Power, Science 189:142–143, 1975).

It is also possible, although improbable, that female L229 was attracted to the territory before female R426 was gone. Territorial males are able to attract more than one female to territories which contain more than one nest-site (Gowaty, unpubl.); however, there was only one box in this territory. The closest additional boxes were at least 50 m away and both were occupied. In addition, female-female aggression among Eastern Bluebirds can be fierce. I have seldom seen adult females tolerate other adult females in their territories (Gowaty, Anim. Behav. 29:1013–1027, 1981).

I think the most likely explanation for this overlap in reproductive events by two females is that female R426 died about 18 June. When female L229 was attracted to or discovered

a territory without an adult female resident, I think she fortuitously began a clutch in an already occupied box. This sort of opportunism may be an adaptive option for females of nest-site limited species such as bluebirds (Miller, Blue Jay 28:38–46, 1970; Zelany, The Bluebird, Indiana Univ. Press, Bloomington, Indiana, 1976). Intraspecific nest parasitism is not uncommon among bluebirds (Gowaty and Karlin, unpubl.) and also suggests the importance of nest-sites to females (Yom-Tov, Biol. Rev. 55:93–108, 1980). Access to nest-sites may be the single most important determinant of female breeding success among Eastern Bluebirds.

Although my observations are not extensive enough to discriminate amongst the explanations for brood reduction of the first female's nestlings, it is possible that female L229 killed the two nestlings that were found dead, thereby increasing the possibility that her own reproductive efforts would be successful. Such infanticide which makes critical resources available for reproduction by others has been described in langurs (*Presbytis entellus*) (Hrdy, The Langurs of Abu, Harvard Univ. Press, Cambridge, Massachusetts, 1977), lions (*Leo leo*) (Bertram, *in* Growing Points in Ethology, E. Bateson and R. Hinde, eds., Cambridge Univ. Press, Cambridge, England, 1976), and several other species as well. However, the first nestling was underweight (relative to its siblings) and the second lost weight markedly just before dying (Table 1), suggesting that they were not adequately fed after female R426 disappeared. Starvation might then be attributable to infanticide through neglect by the father, siblicide through competition or harassment (Stinson, Evolution 33:1219–1225, 1979), or suicide (O'Connor, Anim. Behav. 26:79–96, 1978).—PATRICIA ADAIR GOWATY, *Dept. Zoology, Clemson Univ., Clemson, South Carolina 29631. (*Present address: *Dept. Zoology, Univ. Oklahoma, Norman, Oklahoma 73109.)* *Accepted 15 June 1982.*

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Annual adult survival rates for Brown-headed Cowbirds wintering in southeast Texas.—For several years we have been studying the Brown-headed Cowbirds (*Molothrus ater*) which winter in large communal roosts in southeast Texas. One of us (KAA) has conducted a banding program in the vicinity of Bryan-College Station, Brazos Co., Texas, since 1969 (Coon and Arnold, N. Am. Bird Bander 2:7–11, 1977; Coon and Arnold, unpubl.; Arnold et al., unpubl.). The other (DMJ) has supervised studies of cowbird mortality at a roost on the Rice University campus in Houston, Houston Co., Texas (Good, Ph.D. diss., Rice Univ., Houston, Texas, 1979; Johnson et al., Auk 97:299–320, 1980; Johnson et al., The Ecology of Roosting Birds in Winter *in* Symp. Ecol. Soc. Am., in press). The roosts studied are near the southern limit of the winter range of *M. ater* (Meanley, U.S. Bur. Sport Fish. and Wildl. Resour. Publ. 100, 1971; Giltz and Burtt, Ecology of Roosting Birds in Winter *in* Symp. Ecol. Soc. Am., in press). Roost populations are usually composed of more than 70% males. We wished to know if cowbird mortality in winter in this region differed from that experienced by the whole population. Might migrating so far south provide an advantage due to mild winter weather, or a disadvantage resulting from migration? Might the preponderance of males in these roosts alter sex-specific survivorship?

The Bryan-College Station banding program for wintering cowbirds began in 1969 and has continued, essentially without interruption, through the 1980–81 season. The use of decoy traps and floodlight traps has resulted in banding over 75,000 cowbirds from 1969 through the 1976–77 season, the last year used in this analysis. Basically, all birds captured were banded and released. The sex ratios recorded in captured birds varied annually from more than 3:1 (males vs females) to in excess of 8:1 (males vs females) (Arnold et al., unpubl.). Recaptures suggest reasonable fidelity to wintering areas (Coon and Arnold, unpubl.).