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MALE-BIASED BREEDING SITE FIDELITY IN A POPULATION OF NORTHERN SHRIKES[1]

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Key words: Northern Shrike; Lanius excubitor; *Israel; breeding site fidelity; shrike.*

Northern Shrikes (*Lanius excubitor*) are the most widely distributed of true shrikes (Laniinae) with a circumpolar breeding range. In Israel, it is a permanent resident (Paz 1987). I studied sex-biased, nest site-fidelity of a population of this species during three breeding seasons (mid-January to mid-June, 1987–1989). The study area was on Sede Zin, a loess-covered plateau, near Sede Boqer (30°52′N, 34°47′E; 475 m altitude) in the Negev Desert highlands. The region is arid with mild winters and warm summers. The Sede Zin plateau supports a sparse dwarf-shrub community dominated by *Hammada scoparia, Zygophyllum dumosum, Raemuria hirtella, Anabasis syriacus,* and *Artemesia herba-alba.* The major woody species are *Tamarix nilotica, Atriplex halimus, Retama raetam,* and *Thymelaea hirsuta* (Danin et al. 1975).

METHODS

I trapped Northern Shrikes using a modified Bal-Chatri noose trap (Clark 1967), and banded all individuals included in the study area with a unique combination of aluminum and colored plastic leg bands. I visited active nests every 2–5 days, and mapped territories based on activity of males and their aggressive responses to playbacks of other males and a taxidermic mount. Seven breeding pairs were observed during 1987–1989.

In all three years, Northern Shrikes were the earliest nesting passerines in the area. Their nests are bulky structures made of sticks and twigs and are anchored to the surrounding branches of the nesting tree or bush. I observed 31 nest initiations. The period of nest initiation was 23 January–19 May in 1987, 1 March–21 May in 1988, and 23 March–17 May in 1989. Average time for completion of the nest was 9.0 ± 3.2 days ($\bar{x}$ ± SD; n = 27 pairs). The shrikes nested in a variety of trees and bushes situated in open areas, building mainly in *Atriplex halimus* (74%), but also in *Tamarisk nilotica* (11%), *Ochradenus baccatus* (6%), and *Colutea istria* (4%). Two nests (4%) were built in a roll of barbed wire. The average height of the rim of the nests above ground was 95.2 ± 27.9 cm ($\bar{x}$ ± SD; n = 33).

In Loggerhead Shrikes (*Lanius ludovicianus*), nest sites used for two or more consecutive years have been taken as an indication of nest-site fidelity (e.g., Atkinson 1901, Miller 1931, Porter et al. 1975). Because some pairs of Northern Shrikes were multi-brooded within a breeding season, I used three measures of nest site fidelity within and among breeding seasons: (1) repeat use of same supporting structure; (2) second or additional nest within a radius of 25 m from the initial nest of the season, which can be described as the core territory; and (3) all nests beyond the core territory.

In 1987, of nine second or third nesting attempts,

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TABLE 1. Nest-site reoccupancy by seven color-banded Northern Shrikes, *Lanius excubitor*, during the 1987–1989 breeding seasons on Sede Zin, Israel.

		Subsequent nest location			
		Same bush	Within core territory	Outside core territory	Total
Within season	male	25	1	1	27
	female	25	1	1	27
	pair	25	1	1	27
Among seasons	male	32	6	0	38
	female	0	0	0	0
	pair	0	0	0	0

five nests were built in the same site as the initial nest, three within the core area, and one outside the core area. Of 12 second or third nests constructed in 1988, nine were in the same bush and five within the core area. In the 1989 breeding season, of 11 second or third nesting attempts, seven re-nested in the same bush and four within the core area. None of the seven territories lacked shrubs or trees of at least 1 m in height within the core territory. This eliminated the possibility of lack of nest-site as a limiting factor that forced pairs to nest in the same structures every year. No changes in territory size or configuration were observed throughout the study period.

RESULTS AND DISCUSSION

During the 1988 breeding season, all seven males had different females, and initiated nest building in bushes or trees that had been used in 1987, as were all the subsequent renestings. Similar results were obtained for 1989, with one exception. A saltbush that had been used by the shrikes of that territory was cut down during the winter and the male chose another bush within the core area. In the 1989 season, one female that had bred in 1988 returned to breed with a different male. A within-breeding seasons comparison shows that males and females, when considered separately or as a pair, do not differ in their nest location (Table 1). However, an among-season comparison shows that no females returned to breed at a location from the previous seasons; and this also affects the nest-site reoccupancy for the pairs. However, males exhibit great reoccupancy rates by breeding 38 times in the same bush or tree. These data indicate the need for continuous, long term monitoring of the species in order to understand their breeding system.

Extreme sexual bias is also evident in this territorial population of Northern Shrikes. Males did not migrate and held territories all year, while females remained on territories only for the breeding season (Yosef and Pinshow 1989). All seven males were observed during the 1987–1989 breeding seasons; however, only 1 out of the 20 (5%) females bred on the study site in two separate years (1988 and 1989). This low return rate is similar to that observed by Kridelbaugh (1983, 0%), and Haas and Sloane (1989, 5%) for Loggerhead Shrikes.

Males initiated nest building by bringing twigs (n = 31) to the proposed nest site, although the female built most of the nest by herself. The males then perched on the bush and sang a 'trilling' song with an occasional bobbing of the head. After 6 to 10 such sequences, the female would continue the building of the nest. Twigs brought by the males were incorporated into the external structure of the nest. When females started to build alone, males resumed hunting and fed the female.

Additional evidence of nest site fidelity was the occurrence of nests from previous breeding seasons in bushes and trees with current nests. One saltbush in 1987 contained 13 nests from previous years. During 1987–1989 breeding seasons, six more nests were added to this bush. This suggests that shrikes had returned to nest at the same site at least for the six years prior to 1987. That is, the bush had been occupied for about nine consecutive breeding seasons. If all these nests are attributed to a single male, it is indicative of his longevity. Although nine years may seem to be a long lifespan for a passerine, records for Loggerhead Shrikes indicate that they live up to 12 years (Klimkiewicz et al. 1983).

In summary, males are resident, females remain only for the duration of the breeding season, males initiated nest building in all three breeding seasons, and although not lacking suitable nest-sites in their core territories, nests were built in the same supportive structures. This suggests that nest sites were chosen by males who then lead the females to them.

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HAND-REARED LOGGERHEAD SHRIKES BREED IN CAPTIVITY[1]

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Key words: Loggerhead Shrike; captive breeding; incubation; reintroduction; conservation; shrike.

Many continental populations of the Loggerhead Shrike (*Lanius ludovicianus*) have been declining in abundance for a number of years (Robbins et al. 1986, Brooks and Temple 1990, Lowe and Butcher 1990), and the San Clemente Island subspecies (*L. l. mearnsi*) in California is highly endangered (Scott and Morrison 1990). Consequently, biologists have become increasingly interested in using manipulative techniques to study factors underlying the decline and to augment or restore wild populations. These techniques include the release of captive-raised and captive-bred shrikes, the translocation of adults, their eggs and young, and related manipulations (Kuehler et al., in press). It seems worthwhile, therefore, to report some details on the successful breeding of this species in captivity in 1971, especially as the loggerhead has not previously bred in captivity, and the few successful attempts with Eurasian species (*L. collurio, L. excubitor, L. schach,* and *L. vittatus*) have, with one exception (Günther 1904), involved wild-caught, adult pairs (England 1970, 1971a, 1971b; Weischner 1989).

The breeding pair of loggerheads came from a group of eight young shrikes taken from nests in northeastern Colorado in June, 1970, and hand-reared from the age of 8–9 days. These shrikes were transported to Dryden, New York as nestlings and were kept together until late September, when increasing aggression necessitated separation. During this period the birds were trained (Cade 1962, 1967) and allowed daily flights outside their cage as part of a study of the development of their hunting and impaling behavior. During fall and winter, individuals were housed indoors in separate, wire-mesh cages measuring 1.2 m in each dimension. The cages were arranged so that all the birds could see and hear each other. Five birds contracted avian pox and died during the winter; the three survivors were two males and a female.

In mid-April, 1971 one of the male shrikes began a daily routine of singing and displaying in an extreme upright posture, leaning somewhat backward with its beak pointed straight up, and often turning slowly to one side or the other in this extreme upright posture while quivering its wings and singing. The behavior appeared identical to that of captive Northern Shrikes (*Lanius excubitor*) observed previously (Cade 1962).

On 19 April, this bird was transferred to the Behavioral Ecology Building (Hawk Barn) at the Cornell University Laboratory of Ornithology and placed in a chamber measuring 3 m wide by 6 m long and varying from 4.2–6 m high. The room had been provided with several freshly cut, leafless willow (*Salix* sp.) shrubs and hawthorns (*Crataegus* sp.) ranging from 2–3 m high to simulate a natural environment. Some branchlets were broken and sharpened to provide convenient impaling devices. Throughout the breeding season, laboratory mice, nestling sparrows and starlings, and day-old cockerels were provided for food. In addition, some insects (beetles, wasps, flies) entered the room from an open, wired front and were eaten. Later, an old but well-formed nest of the Brown Thrasher (*Toxostoma rufum*) was affixed 1.5 m up against the trunk of a hawthorn, and twigs, dry grass, cotton tufts, and wool yarn were placed on the floor for nesting materials.

In a few days, the male appeared at ease in his new chamber, singing and displaying from several prominent perches. On 27 April, the female shrike was let loose in the chamber. She perched low in the middle of a hawthorn and did not move. The male flew down and hopped all around in branches near her. She did not flee, vocalize, or attempt to fight but sat still in a

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