

INTERACTIONS BETWEEN EUROPEAN STARLINGS AND LEWIS' WOODPECKERS AT NEST CAVITIES

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Abstract.—I monitored 59 Lewis' Woodpecker (*Melanerpes lewis*) nests in southeastern Colorado during the 1992 and 1993 breeding seasons in order to determine the possible impact of competition with European Starlings (*Sturnus vulgaris*) for nest cavities. I recorded 73 interspecific interactions during 418 hours of observation. Out of the 59 breeding Lewis' Woodpecker pairs observed, only one lost its nest cavity to starlings. Lewis' Woodpeckers were dominant in over 90% of the interspecific interactions with European Starlings, and such interactions occurred infrequently (1.7 interactions/10 h of observation). The nesting phenologies of the two species overlapped minimally because Lewis' Woodpeckers initiated breeding approximately 4–6 wk after European Starlings. These data suggest that, at least in southeastern Colorado, European Starlings are not major nest-cavity competitors of Lewis' Woodpeckers, and that widespread population declines observed in Lewis' Woodpeckers may be due to other factors.

INTERACCIONES ENTRE *STURNUS VULGARIS* Y *MELANERPES LEWIS* EN CAVIDADES

Sinopsis.—Durante la época de reproducción del 1992 y 1993, se monitorearon 59 nidos del carpintero *Melanerpes lewis* en el suroeste de Colorado. El objetivo del trabajo fue determinar el posible impacto y competencia por cavidades con el estornino (*Sturnus vulgaris*). Durante 418 h de trabajo, se observaron 73 interacciones interespecíficas. De las 59 parejas de carpinteros que se reprodujeron, tan sólo una pareja perdió el nido a mano de estorninos. Los carpinteros fueron los dominantes en el 90% de las interacciones, y las mismas fueron poco frecuentes (1.7/cada 10 h de observación). La fenología de anidamiento entre ambas especies solapa en un mínimo, dado el caso de que el carpintero comienza su época de cría de 4–6 semanas más tarde que el estornino. Los datos sugieren, que al menos en Colorado, los estorninos no son fuertes competidores por las cavidades de los Carpinteros de Lewis, y que la disminución poblacional de los últimos se debe a otros factores.

Lewis' Woodpecker (*Melanerpes lewis*) populations are declining across their range in North America (Behle et al. 1985, Carter et al. 1996, Sorenson 1986, Tashiro-Vierling 1994), and nest-cavity competition by European Starlings (*Sturnus vulgaris*) has been suggested as one possible cause (Sorensen 1986). Starlings are major nest-cavity competitors of many species, including Red-bellied Woodpeckers (*Melanerpes carolinus*) (Ingold 1989, 1994), Red-headed Woodpeckers (*Melanerpes erythrocephalus*) (Ingold 1989), Acorn Woodpeckers (*Melanerpes formicivorus*) (Troetchler 1976), and Gila Woodpeckers (*Melanerpes uropygialis*) (Kerpez and Smith 1990). The impact of starling competition on the breeding activities of melanerpine woodpeckers varies. Delayed nesting by Red-bellied Woodpeckers and Red-headed Woodpeckers may decrease the impact of starling competition (Ingold 1989, 1994). Acorn Woodpeckers responded by drilling new cavities (Troetchler 1976), while Gila Woodpeckers that lost nest cavities to starlings often did not re-nest (Kerpez and Smith 1990).

Lewis' Woodpeckers may be susceptible to nest-cavity competition by

European Starlings, but no studies have explicitly addressed this question. The primary objective of this study was to determine if European Starlings were major nest-cavity competitors of Lewis' Woodpeckers in southeastern Colorado. Specifically, I quantified (1) the number of nests usurped by European Starlings, (2) the dominant individuals in European Starling-Lewis' Woodpecker interactions, (3) the frequency and location of these interactions during the breeding season, and (4) the nesting phenology of Lewis' Woodpeckers and European Starlings.

STUDY AREA AND METHODS

I studied 59 Lewis' Woodpecker pairs in 1992 and 1993. The birds were not banded so it is unknown if some of the same pairs were observed during both years. Interactions between starlings and Lewis' Woodpeckers were recorded at two riparian woodland sites in southeastern Colorado. One site was on the plains of the Arkansas River Valley (38°05'N, 103°45'W, 15 km from Rocky Ford, elev. 1285 m). The second was in the foothills of the Wet Mountains (38°05'N, 104°58'W, 15 km from Beulah, elev. 1939 m) approximately 128 km west of the Arkansas River Valley site.

I located Lewis' Woodpecker nest cavities by observing parental behavior from April-July during the two breeding seasons. Because Lewis' Woodpeckers are easily disturbed (C. E. Bock, pers. comm.), nesting data were collected entirely through observations of adult behavior outside the nest. The onset of incubation was characterized by increased attendance of a parent inside the nest cavity. Incubation was assumed to be complete when the birds began bringing food to the nest cavity. Usurpation was defined as European Starlings occupying a nest cavity previously occupied by actively nesting Lewis' Woodpeckers before the fledging of woodpecker young.

I also recorded interactions between the two species, which included the displacement of individuals from their perches, chases, and physical attacks. Dominant individuals were those that successfully displaced or chased other individuals. I recorded the dominant individual in each interaction and the frequency of interactions. The site of each interaction was recorded as either (1) at the nest hole, (2) in the nest tree but not at the nest hole, or (3) not in the nest tree. I observed Lewis' Woodpecker nesting activities for a total of 418 h during the two breeding seasons, recording a total of 73 interactions between starlings and woodpeckers.

RESULTS AND DISCUSSION

Starlings successfully usurped only one nest cavity out of the 59 cavities observed during the two years of study. In this instance, Lewis' Woodpeckers were apparently incubating, but starlings occupied the cavity before the woodpeckers began bringing food to the cavity.

Lewis' Woodpeckers dominated the majority of the interspecific interactions, and the frequency of interactions were rare. European Starlings successfully chased or displaced Lewis' Woodpeckers in only 8% of observed interactions (6/73). The majority of interactions (60%) occurred

in the nest tree but not directly around the nest hole; 32% occurred at the nest hole, and the remaining 8% of the interactions occurred away from the nest tree. The average number of interspecific interactions per nest was low (1.2 ± 2.38 SD), and 62% of the Lewis' Woodpecker pairs had no interactions with starlings. Overall, only 1.7 interactions occurred for every 10 h of observation.

The aggressive response of Lewis' Woodpeckers to European Starlings contributed to the successful defense of their nest cavities, as has been seen in other woodpeckers. For instance, Red-headed Woodpeckers and Northern Flickers (*Colaptes auratus*) lost few nests to starlings and were highly aggressive. In contrast, Red-bellied Woodpeckers were not as aggressive and lost nest cavities to European Starlings more frequently (Ingold 1994).

The nesting phenology of Lewis' Woodpeckers may have contributed to the low number of interactions with starlings. The onset of incubation for Lewis' Woodpeckers ranged from 6 May to 9 June (median = 24 May). The onset of incubation for 10 starling nests ranged from 20 March to 5 May (median = 18 April). This suggests that direct interference by starlings in Lewis' Woodpecker breeding activities was at least partially avoided due to the non-overlap of their nesting phenologies (see Ingold 1994).

It is possible that the exclusion of Lewis' Woodpeckers from potential nest cavities by the earlier-nesting starlings negatively affected their breeding activities. However, Lewis' Woodpeckers usurp nest cavities from Northern Flickers, Hairy Woodpeckers (*Picoides villosus*), Western Bluebirds (*Sialia mexicana*), and Mountain Bluebirds (*Sialia currucoides*) (V. Saab, pers. comm.). This suggests that occupation of nest cavities by starlings prior to the onset of this study would not necessarily exclude Lewis' Woodpeckers from occupying these cavities later in the breeding season. However, additional observations of these species prior to the onset of the Lewis' Woodpecker breeding season are needed to determine whether nest-cavity competition occurs earlier in the breeding season.

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LITERATURE CITED

- BEHLE, W. H., E. D. SORENSEN, AND C. M. WHITE. 1985. Utah birds: a revised checklist. Utah Museum of Natural History, Univ. of Utah, Salt Lake City, Utah. 108 pp.
- CARTER, M., G. FENWICK, C. HUNTER, D. PASHLEY, D. PETIT, J. PRICE, AND J. TRAPP. 1996. Watchlist 1996. Field Notes 50:238-240.
- INGOLD, D. 1989. Nesting phenology and competition for nest sites among Red-headed and Red-bellied Woodpeckers and European Starlings. *Auk* 106:209-217.
- . 1994. Influence of nest-site competition between European Starlings and woodpeckers. *Wilson Bull.* 106:227-241.

- KERPEZ, T. A., AND N. S. SMITH. 1990. Competition between European Starlings and native woodpeckers for nest cavities in saguaros. *Auk* 107:367-375.
- SORENSEN, E. D. 1986. A precipitous decline in Lewis' Woodpeckers in Salt Lake and Davis counties. *Utah Birds* 2:45-54.
- TASHIRO-VIERLING, K. 1994. Population trends and ecology of the Lewis' Woodpecker (*Melanerpes lewis*) in southeastern Colorado. M.A. thesis. Univ. of Colorado, Boulder, Colorado.
- TROETCHLER, R. 1976. Acorn Woodpecker breeding strategy as affected by starling nest-hole competition. *Condor* 78:151-165.

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