

Vertebrate Prey of the Loggerhead Shrike in Oklahoma

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Sixty-four vertebrate kills by shrikes were observed in Oklahoma. Twenty of them were herptiles, 24 birds, and 20 mammals. Sixty-four percent of these vertebrate prey were taken in spring, 22% during winter, 13% in fall and 2% in summer.

INTRODUCTION

Loggerhead shrike (*Lanius ludovicianus*) numbers are declining throughout most of the United States (1-7). Information relative to the ecology of this species is badly needed. In the southern Great Plains, where shrikes are still numerous (6), little has been published on them except in annual Breeding Bird Surveys and Christmas Bird Counts.

Shrikes subsist primarily on animal material, principally arthropods during the warmer months, supplemented occasionally with small vertebrates (8-11). During winter, when invertebrates are not generally available, vertebrates may constitute more than half the total food (8).

While studying the nesting ecology of the loggerhead shrike in Comanche County, Oklahoma, from 1985 to 1988, I recorded its vertebrate prey. The study area was within a 24-km radius of Lawton in mixed-grass pastureland interspersed with cultivated fields and small intermittent streams.

METHODS

During late February and March, prospective nesting habitat throughout the study area was visited to locate paired shrikes. Nests were checked for progress weekly and more often during egg deposition until all shrike activity had ceased. Second nestings, were common, extending investigations into July. Data were filed separately for each nest and recorded in my personal field records at Cameron University in Lawton.

Occasionally, I found shrike larders. Prey were typically impaled on prongs of barbed wire and less often on thorns. Usually, single impaled prey items were discovered near nests with young. My 23 observations were supplemented by 27 others from veteran naturalists throughout the state and by 14 published records.

RESULTS

Thirty-three species of vertebrates were prey for shrikes in Oklahoma (Table 1). Of the 64 kills, 20 were herptiles (14 species), 24 were birds (11 species), and 20 were mammals (8 species). The seasonal distribution of all such prey was: 64%, spring; 22%, winter; 13% fall; and 2%, summer. Table 2 shows the percentages of each of these three major vertebrate groups taken by season.

Herptiles

There were two frogs, a turtle, three species of lizards and eight snakes killed by shrikes, for a total of 14 species of amphibians and reptiles. They made up 31% of all vertebrate captures and 42% of all species taken.

Amphibians. The two amphibians were killed in Comanche County. I found a Blanchard's cricket frog (*Acris crepitans*) impaled on a loose cable wire in late fall and a juvenile plains leopard frog (*Rana blairi*) on a barbed wire fence in late spring.

Reptiles. In late April 1986, Don Verser discovered a juvenile (48 mm carapace length) common snapping turtle (*Chelydra serpentina*) on the thorn of a hawthorn tree (*Crataegus* sp.) in Washington County, northeastern Oklahoma. Photos are on file at the Cameron University Museum of Zoology in Lawton.

The three species of lizards were the six-lined racerunner (*Cnemidophorus sexlineatus*; two, one in October), the ground skink (*Scincella lateralis*; one in February) and the Texas horned lizard (*Phrynosoma cornutum*; one, in December).

Shrikes took small snakes (shorter than 30 cm) of eight species in Oklahoma. Half were water snakes.

TABLE 1. Vertebrates captured by loggerhead shrikes in Oklahoma.

Species	Date ^a	County	Source	
Class Amphibia				
Blanchard's cricket frog	<i>Ascris crepitans</i>	84-12-18	Comanche	J.D. Tyler
Plains leopard frog	<i>Rana blairi</i>	87-06-04	Comanche	J.D. Tyler
Class Reptilia				
Common snapping turtle	<i>Chelydra serpentina</i>	86-04-24	Washington	D. Verser
Texas horned lizard	<i>Phrynosoma cornutum</i>	84/85-12	Oklahoma	J.S. Shackford
Six-lined racerunner	<i>Cnemidophorus sexlineatus</i>	69-xx-xx	Comanche	D.S.Parnsley
		87-10-21	Grady	L.P. Mays
Ground skink	<i>Scincella lateralis</i>	84-02-19	Tulsa	(13)
Diamond-backed water snake	<i>Nerodia rhombifera</i>	88-04-23	Comanche	J.W. Wheatley
		88-05-12	Comanche	J.D. Tyler
Blotched water snake	<i>Nerodia erthrogaster</i>	87-04-21	Comanche	J.D. Tyler
Graham's crayfish snake	<i>Regina grahami</i>	86-04-12	Oklahoma	J.S. Shackford
Texas brown snake	<i>Storeria dekayi</i>	83-03-28	Comanche	J.D. Tyler
Western ribbon snake	<i>Thamnophis proximus</i>	75-02-13	Comanche	L. Felis
Prairie ringneck snake	<i>Diadophis punctatus</i>	86-05-xx	Washington	M. Droege
Yellowbelly racer	<i>Coluber constrictor</i>	85-04-05	Comanche	J.D. Tyler
Central lined snake	<i>Tropidoclonion lineatum</i>	73/75-xx	Pottawatomie	(14)
		86-05-14	Washington	M. Droege
		86-06-10	Comanche	J.D. Tyler
		86-11-18	Tulsa	P.W. Wilson
Class Aves				
Horned lark	<i>Eremophila alpestris</i>	85-01-21	McClain	(15)
American robin	<i>Turdus migratorius</i>	---	Washington	E. Messerly
Northern cardinal	<i>Cardinalis cardinalis</i>	67-12-31	Cleveland	(16)
		78-03-25	Washington	(17)
Dickcissel	<i>Spiza americana</i>	75-05-xx	Canadian	J.S. Shackford
Savannah sparrow	<i>Passerculus sandwichensis</i>	77-01-09	Kiowa	D. Mills
Grasshopper sparrow	<i>Ammodramus savannarum</i>	78-04-29	Noble	(18)
		87-06-01	Comanche	J.D. Tyler
		87-06-25	Jefferson	(19)
Song sparrow	<i>Melospiza melodia</i>	---	Cimarron	(20)
Brown-headed cowbird	<i>Molothrus ater</i>	16-10-24	Bryan	(21)
Pine siskin	<i>Carduelis pinus</i>	78-02-17	Payne	(18)
		84/85-w	Lincoln	E. Cheesman
American goldfinch	<i>Carduelis tristis</i>	85-01-20	Pontotoc	(22)
		84/85-w	Lincoln	E. Cheesman
House sparrow	<i>Passer domesticus</i>	---	---	(20)
		75-03-29	Comanche	J.M. McGee
		76-01-08	Cleveland	(23)
		---	Lincoln	E. Cheesman
		85-06-12	Comanche	J.D. Tyler
		86-05-06	Washington	M. Droege
		87-04-21	Comanche	J.D. Tyler
		88-05-08	Comanche	J.D. Tyler
		---	---	(21)
Class Mammalia				
Bat	---	84-06-xx	Pontotoc	D. Noble
Least shrew	<i>Cryptotis parva</i>	75-12-12	Tillman	D. Mills
		88-03-26	Comanche	J.D. Tyler ^b
Hispid pocket mouse	<i>Perognathus hispidus</i>	88-04-28	Comanche	J.D. Tyler
Plains harvest mouse	<i>Reithrodontomys montanus</i>	62-11-05	Woods	P.F. Nighswonger
White-footed mouse	<i>Peromyscus</i> sp.	72-03-02	Cotton	J.D. Tyler
		74-03-02	Cotton	D.C. Parmley
		80-04-29	Cimarron	T.L. Flowers
		87-04-30	Bryan	J. Ridge
		87-05-04	Bryan	J. Ridge
Cotton rat	<i>Sigmodon hispidus</i>	83-12-09	Comanche	J.D. Tyler ^c
Prairie vole	<i>Microtus ochrogaster</i>	83-04-26	Harper	J.T. Burkhart
		86-04-30	Comanche	J.D. Tyler
House mouse	<i>Mus musculus</i>	86-05-14	Comanche	J.D. Tyler
		87-04-21	Comanche	J.D. Tyler

^a in yy-mm-dd format; xx=unknown; w=winter. ^b also on 88-05-11 (twice), and 88-05-20. ^c also on 86-05-09 and 87-04-21.

Birds

Of the 64 vertebrate kills, 24 (38%) were birds and the 11 avian species caught made up one-third of all species taken by shrikes in Oklahoma (Table 1). Among these were eight finches (four sparrows), a thrush, lark, and blackbird. The house sparrow (*Passer domesticus*) was reported most frequently: five of nine kills took place in spring, one during winter.

Mammals

Thirty-one percent (20) of all captures were mammalian, as were 24% (8) of the 33 different species killed. A bat, a shrew, a rat and five species of mice were represented (Table 1). Most frequently reported genera were *Cryptotis* and *Peromyscus*, five times each.

DISCUSSION

Herpetofaunal captures were most frequent in spring (71%). A probable reason is the greater demand for food exerted by growing young shrikes. Also in spring, juvenile herptiles are most numerous, and more observers are afield. It was not surprising that snakes were reported more frequently than other herptiles, because they constitute more than half of all reptilian species in the state. They are not uncommon in the shrike's diet (8, 10, 11), but frequency of occurrence varies with season, location, availability, and size of the snake. The herptiles taken in fall and winter were probably a result of Oklahoma's warm weather that usually persists well into fall and recurs periodically in winter, allowing some poikilothermal stirring. The lack of summer reports may be because of the inactivity of both herptiles and naturalists when temperatures are extreme.

Birds were equally important in winter and spring (42% and 47%, respectively). In winter, shrikes depend most heavily on endothermal prey, but the high winter percentage may be biased by reports from feeders, which attract small birds and in turn, shrikes. The single summer record possibly reflected a lessened demand for food once the young shrikes had attained full growth and dispersed. Paucity of observers may have contributed as well. One reason for the scarcity of fall reports may be that shrikes which immigrate or emigrate may find it easier to obtain arthropods or terrestrial vertebrates, with which to build winter fat reserves than to expend the energy required to pursue birds. Also, many summer resident birds migrate southward in fall.

Except for the American robin (*Turdus migratorius*), avian prey species were all smaller than or approximately the same size as a shrike. The species most often taken was the house sparrow (38% of all avian prey). This species is a frequent food item (8,10,12).

Small mammal prey were more numerous in spring than in winter (74% versus 11%). However, they were comparatively fewer in winter than birds (11% versus 42%). Many small mammals hibernate during cold periods, but birds must feed in the open, being exposed to shrike predation. The number of fall and winter reports of herptiles and mammals were the same: 3 and 2, respectively. The high incidence of mammal captures in spring is probably due to the demand for food by young shrikes. In addition, the increased number of juvenile animals in spring provides more prey, which is undoubtedly easier to catch. Shrews and mice were reported most often, particularly mice of the genus *Peromyscus*, *Perognathus*, *Reithrodontomys*, *Microtus*, *Mus*, and *Sigmodon* have also been reported as shrike food in other studies (8, 9, 11, 12).

These data must be interpreted with discretion. The relative abundance of prey items reported herein should not be construed to correlate exactly with either consumption or predation rates of shrikes. Rather, they should serve as an index of frequency. Moreover, they do not necessarily indicate food preferences, because the relative availability of prey species is unknown. Nevertheless, small vertebrates are important in the diet of loggerhead shrikes in Oklahoma, especially during spring. This is probably because of the ever-increasing demand for food imposed by growing young shrikes and to the greater availability of prey (especially juveniles) at that season.

TABLE 2. Seasonal distribution of shrike prey

Prey	Percent of Prey in Season ^a			
	Fall	Winter	Spring	Summer
Herptiles	18	12	71	--
Birds	5	42	47	5
Mammals	16	11	74	--

^a Spring: Mar 21–Jun 20; summer: Jun 21–Sep 20; fall: Sep 21–Dec 20; winter: Dec 21–Mar 20.

Mammals were important prey in spring, but some birds and herpetofauna, particularly snakes, also fell prey then. In winter, however, birds appeared to have been taken more often than were members of the other two groups.

These findings are comparable to those of most other studies, except that the American robin, dickcissel, and savannah sparrow have never previously been reported as prey.

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