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# Failure to Establish Feral *Coturnix* Quail Populations in Arkansas in the Late 1950's

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## ABSTRACT

Although *Coturnix* introductions failed in the late 1950's, it was learned in Arkansas that birds survived longest after autumn releases especially where fallow fields were numerous, that *Coturnix* favored grasslands whereas the bobwhite preferred shrublands, and that *Coturnix* occurred singly, pairing only in the breeding season.

## INTRODUCTION

Dry years and intensification of agriculture in the early 1950's seemed to reduce considerably the lush grassy shrublands preferred by the bobwhite (*Colinus virginianus*). Thus many states tried massive introductions of the exotic *Coturnix* quail (*Coturnix coturnix japonica*) in the late 1950's in hope of providing a game bird that would occupy impoverished open upland habitats (Cottam and Stanford, 1958; Stanford, 1957, 1958; Wetherbee, 1961). These introductions were unsuccessful (Cottam and Stanford, 1958). Nevertheless, investigations of *Coturnix* released in Arkansas yielded information on its survival, habitat, and social behavior in the new environment. These findings could be useful in evaluating the potentialities of *Coturnix* in connection with possible future attempted introduction.

## RELEASES

A total of 1,633 yearling *Coturnix* raised in captivity for the Missouri Conservation Commission (Stanford, 1957) were liberated in five releases in each of three study areas in northwestern Arkansas during 1957 and 1958 (Table I). The areas ranged from 1 to 4 sq mi. Nearly equal numbers of both sexes were released. The birds dispersed slowly from opened carrying cartons placed on the ground. Often they crouched motionlessly, commonly in small groups, a short distance from the cartons and even could be touched by the investigators before moving. Yet the exodus from the vicinity of the release site nearly was complete the next day.

The Osage Springs and Robinson Farm study areas, both in central Benton County, appeared to have prime bobwhite habitat consisting of a very diverse mixture of pastures, cultivated fields, many grassy and shrubby old fields, and scattered small woodlands. The proportion of fallow

grassy-shrubby old fields was much greater at Osage Springs than at Robinson Farm. The Wedington study area in northern Washington County seemingly was poor bobwhite habitat. There were vast unbroken woodlands and most of the open land was utilized agriculturally, primarily as pasture.

## SURVIVAL

After all releases except one, the feral *Coturnix* populations persisted only one or two weeks. Both the *Coturnix* and bobwhite population levels, determined by using one to three bird dogs with one to five investigators approximately every five days, are shown in Table II for the first four releases. After the fifth release in February, done only at Robinson Farm and Wedington, four censuses yielded nine *Coturnix* and one bobwhite, all at Robinson Farm. The *Coturnix* disappeared after nine days.

Population levels represented by numbers of birds per census (Table II) were not significantly different among study areas in either quail ( $\chi^2$  test, 1 d.f.,  $\alpha=0.05$ ). This finding suggests that all three areas actually were similar in quail-habitat quality. Duration of occupancy also can reflect habitat favorability. Summing all *Coturnix* releases shows that the total duration of occupancy was 113 days at Osage Springs, 49 at Robinson Farm, and 74 days at the Wedington study area. The long survival at Osage Springs was significantly different from that at the other two areas ( $\chi^2 = 12.64$  and  $4.07$ , 1 d.f.,  $\alpha = 0.05$ ), but the longest survivals at Robinson Farm and Wedington did not differ significantly ( $\chi^2 = 2.54$ ). Apparently conditions were best for *Coturnix* at Osage Springs, the area with the greatest proportion of overgrown fields.

Fall and early winter were best for *Coturnix* introductions as the birds remained longest then, even persisting 100 days at Osage Springs (Table II). Regardless of the length of occupancy signs of mortality were unexpectedly few, particularly

Table I. Releases of *Coturnix* Quail in Northwestern Arkansas in 1957 and 1958

Study Area	No. Birds Released					Total
	Apr. 17 1957	Apr. 30 1957	July 2 1957	Nov. 5 1957	Feb. 25 1958	
Osage Springs	56	60	100	140	0	356
Robinson Farm	60	71	99	150	194	574
Wedington	60	85	199	160	199	703
Total	176	216	398	450	393	1633

considering the initial tameness. Only 48 instances of predation were found, representing merely 3% of the total releases. Thus, the small resulting populations apparently were the few birds remaining after widespread dispersal elsewhere, a well documented phenomenon in banded *Coturnix* (Cottam and Stanford, 1958; Jacobs et al., 1959).

#### HABITAT

Birds as closely related as *Coturnix* and the bobwhite probably would compete for the same food if they were present in the same vegetational habitat. The desirability of introducing *Coturnix* thus depends on its not occupying prime

Table II. Census Results for *Coturnix* and Bobwhite After First Four Releases of *Coturnix*

	Combined 3 Releases in April and July			November Release		
	Total Days Present <sup>1</sup>	Total Birds Counted	Birds Per Census <sup>2</sup>	Total Days Present	Total Birds Counted	Birds Per Census <sup>2</sup>
<i>COTURNIX</i>						
Osage Springs	13	28	7.0	100	35	2.1
Robinson Farm	12	20	6.7	37	13	2.6
Wedington	39	40	6.7	35	17	2.1
 <i>BOBWHITE</i>						
Osage Springs	*	39	4.9	*	31	2.1
Robinson Farm	*	43	6.1	*	51	7.3
Wedington	*	23	2.1	*	31	3.1

<sup>1</sup> The figures in this column are the cumulative sums for three releases. Thus the duration of occupancy after each release was less than these totals.

<sup>2</sup> Based on the number of censuses through the last occurrence of *Coturnix* in each area, but based on all censuses in each area with respect to the bobwhite.

\* The indigenous bobwhite was present throughout the study.

Table III. Habitat Utilization by *Coturnix* and Bobwhite

Habitat	<i>Coturnix</i>		Bobwhite	
	No. Encounters <sup>1</sup>	Percent	No. Encounters <sup>1</sup>	Percent
Forest	1	1	3	6
Shrubland	46	36	36	72
Grassland	78	61	10	20
Agriculture	2	2	1	2
Total	127		50	

<sup>1</sup> An encounter involved either a single bird or a group of birds at one place.

bobwhite habitat. Therefore, each encounter with either quail, whether a single bird or a group per encounter, was categorized according to habitat (Table III). Forest habitat was any woodland with a well developed tree-leaf canopy. Shrublands were bushy forest margins and fence-rows, and also extensive shrubby old fields. Grasslands were dense relatively tall grasses and weeds without trees or shrubs. Agricultural areas included cultivated crops and closely grazed pastures. Both species avoided forest and agricultural lands but overlapped considerably percentagewise in shrublands and grasslands (Table III). Still the bobwhite was found in shrublands twice as often as *Coturnix*, and *Coturnix* occupied grasslands three times as much as the bobwhite. This habitat difference is highly significant ( $\chi^2 = 21.15$ , d.f. = 1,  $\alpha = 0.001$ ) if one considers just the shrubland and grassland encounters for both species in a 2 x 2 contingency table. The preference of grassland by *Coturnix* corresponds to its behavior in its original range (Wetherbee, 1961) and would reduce the amount of habitat overlap with the bobwhite.

The most successful wintering *Coturnix* population, the one at Osage Springs (Table II), utilized a 25-acre grassy old field dominated by broom sedge (*Andropogon virginicus*) but heavily invaded by blackberry (*Rubus*) thickets and some sumac (*Rhus*). The *Coturnix* generally were found in or near the low leafless blackberry thickets where the ground was barer than in the adjoining dense grasses. Panic grass (*Panicum*) growing in these barer areas had many seeds all winter and may have attracted the *Coturnix*. The quickly vacated release field nearby was almost devoid of the blackberry thickets and panic grass.

#### SOCIAL BEHAVIOR

Field data on the social unit of *Coturnix* were obtained from November through May (Table IV). Clearly *Coturnix* is essentially solitary, avoiding coveys. Field observations indicated that the increase in two-bird groups in May was due to courtship pairings.

Table IV. Social Behavior of Feral *Coturnix*

	No. Individuals Encountered						Total
	1	2	3	4	5	6	
	No. Encounters						
November	32	2	2	1			37
December	6	1					7
January	5	2					7
February	1						1
March	6		1				7
April	6						6
May	26	16	3			1	46
Total	82	21	6	1	0	1	111

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