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SUCCESS OF WILD-TRAPPED COMPARED TO CAPTIVITY-RAISED BIRDS IN RESTORING WILD TURKEY POPULATIONS TO NORTHWESTERN ARKANSAS

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ABSTRACT

Reintroduction of wild turkeys into northwestern Arkansas was studied at 10 release sites in the late 1950's. Native birds trapped in southern Arkansas were released at five study areas, and birds from wild Pennsylvania stock reared in captivity were released in five other areas. Although both types of turkeys reproduced, most populations of captivity-raised turkeys decreased sharply whereas all populations of wild-trapped birds exhibited marked increases. Range extension averaged nearly 2.5 miles per year in expanding wild-trapped populations. Captivity-raised birds were comparatively tame and often were found near human habitation. Current expanding turkey populations in the Arkansas Ozarks undoubtedly are due to the introductions of wild-trapped birds.

INTRODUCTION

Holder (1951) documented the past history of decline in turkey populations in the Ozarks through the 1940's. In 1957 at the onset of the present study, an inventory of existing turkey populations in the Ozarks was completed (James and Preston, 1959). The findings showed that in the region surveyed the nearly 1000 birds reported by Holder (1951) had declined to about 39 flocks, which equals a total of a little over 300 birds using the average value of 8 turkeys per flock reported by James and Preston (1959). Of these, only about half the birds were in areas where indigenous Ozark populations formerly had occurred. The rest existed at release sites where introductions of wild birds from southern Arkansas had begun in the early and mid 1950's. Thus apparently only about one-tenth of the original Ozark stock reported by Holder in the 1940's persisted to the late 1950's.

Kafka (1979) recently described the increase in numbers of wild turkeys (*Meleagris gallopavo*) that has occurred in Arkansas since the 1950's. This statewide trend also was evident in the Ozark Plateau Region where in 1950 only four wild turkeys were taken by hunters (Holder, 1951), but in Spring 1979, according to information from the Arkansas Game and Fish Commission, hunters harvested 804. Two approaches to restoring turkeys to the Ozarks were attempted in the 1950's. One method was to release wild birds native to Arkansas that were trapped from high density populations in the southern part of the state. The other technique involved the release of artificially propagated wild turkeys raised from eggs of the hybrid strain developed in Pennsylvania (Kozicky and Metz, 1948). Leopold (1944) described the method of producing the wild strains of turkeys raised in captivity. The present study was designed to evaluate the relative success of the two methods of turkey introductions in the Arkansas Ozarks.

The study was conducted from July 1957 through June 1961, and this paper mainly includes findings from the initiation date to June 1960.

After June 1961 the study was terminated with the expectation of continuing it again to evaluate the situation after several years, but this never materialized. Therefore, the initial findings are now presented. Even though there have been other comparisons of the relative success of reintroductions of wild-trapped and captivity-raised turkeys in the Ozarks (Leopold and Dalke, 1943; Leopold, 1944; Dalke et al., 1946; Holder, 1951; Lewis, 1957, 1961) and elsewhere (Donohoe and McKribben, 1970; Wunz, 1971) our study is the only one where moderate numbers of both wild-trapped and captivity-raised birds were released over relatively the same time period at several separated sites in the same general region. It thus represents the field-experimental, test with replication, of Leopold's (1944) expectations. Also this study provides a historical prospective documenting the sources of the present thriving wild turkey populations in the Arkansas Ozarks.

STUDY AREAS

Five study areas were established for each of the two types of turkeys released. Native birds from southern Arkansas, hereafter called wild-trapped turkeys, were studied at the following sites, 1) Black Mountain, in the Ozark National Forest west of Cass in Franklin Co., 2) Buffalo Tower, in the Ozark National Forest east of Redstar, but in Newton Co., 3) Devil's Den, in the Ozark National Forest near Devil's Den State Park in Washington Co., 4) McIlroy Wildlife Management Area, between Forum and Rockhouse in Madison Co., and 5) Weddington, in the Ozark National Forest west of Savoy in Washington and Benton Counties. Since the turkey releases at Buffalo Tower were too late in the study to be investigated adequately, this site will be omitted from further consideration, and is mentioned only for the historical record.

The five study areas for releases of turkeys of the Pennsylvania strain raised in captivity, hereafter called captivity-raised turkeys, were as follows, 1) Bellefonte, 6 miles south of Bellefonte on Boat Mountain near the junction of Boone and Newton Counties, 2) Carrollton, near the border of Carroll and Boone Counties east of Carrollton, 3) Fort

*Deceased

Chaffee, the military reservation in northern Sebastian Co., 4) Koen Forest, in the Ozark National Forest north of Jasper in Newton Co., and 5) Ozone, a mile east of Ozone in the Ozark National Forest in Johnson Co.

METHODS

The distribution and abundance of turkeys in the vicinity of study areas were determined through personal interviews with local residents, hunters, and with personnel of the Arkansas Game and Fish Commission and National Forest Service. Addressed post card questionnaires for reporting turkey sightings were distributed to residents living in areas inhabited by turkeys and to personnel working there. This assistance was supplemented by intensive searches in the field for turkeys and turkey signs conducted by project personnel at all seasons.

Population estimates were determined from appraisal of maps of study areas showing locations of reported turkey sightings. From these plotted records duplication in observations were detected and eliminated, which improved accuracy in population estimations. If it was not known whether two reports in close proximity were separate flocks, they were assumed to be different only if the localities were separated by at least two miles. This is based on the findings of Mosby and Handley (1943) that a turkey flock has a cruising radius of two miles.

When flock size was not recorded, or when only turkey signs were reported, the number of turkeys in a flock was assumed to equal the average flock size (see below) observed in the particular study area during the various autumns and winters of the study. When in final analysis it was not clear if one or two flocks were involved, or when flock size estimates were contradictory, minimum and maximum population values were calculated. This pertained only to wild-trapped birds, which were elusive and difficult to survey. Captivity-raised birds were characteristically unwary and easy to approach, so direct counts could be made.

Estimates of turkey range expansion from release sites were made in each study area. This was done by locating on a map a point of origin central to the cluster of various release sites in a particular study area and measuring the distance of the most distant turkey dispersal points from the point of origin. The least distance moved and average dispersal distances also were obtained for captivity-raised turkeys for reasons to be explained later. Since release sites were in areas that were devoid of existing wild turkeys, the dispersed turkey sightings over the years in these areas were assumed to be associated with the corresponding releases.

The incidence of reproduction was detected through reports of broods of turkey poults encountered in study areas. Many nests of captivity-raised turkeys were found and monitored by repeated visits.

RESULTS

Populations Levels: Basic information concerning the numbers of wild-trapped turkeys in the study areas are shown in Table 1. This includes number released, year of releases, estimates of minimum and maximum numbers, and percent increase, all based on surveys completed in the autumn months of 1959 and winter of 1959-60. The important finding is that in all areas numbers of turkeys increased significantly from the number released. The average increase was 225% (Table 1), and the biggest increases were at Black Mountain and Devil's Den deep in the Ozark National Forest, the most isolated study areas.

On the other hand, the captivity-raised birds did not show significant increases in any study area (Table 2) based on a survey in summer 1959. Although young birds were produced in all areas, this was not sufficient to replace the disappearance of adults. Thus populations decreased sharply after release in 3 areas, and remained relatively unchanged in the other two.

Average flock sizes in autumn and winter in the study areas with wild-trapped turkeys were 12.3 birds at Black Mountain, 10.3 at Devil's Den, 5.3 at McIlroy, and 7.5 at Wedington. Combining all areas, a total

Table 1. Turkey numbers determined during fall 1959 and winter 1959-60 in the study areas where wild-trapped turkeys were released.

Study Area	Turkey Releases		Numbers in 1959-1960		Percent Increase
	Number	Year	Minimum	Maximum	
Black Mountain	37 (13W, 24F)	1959, 51, 53	144	155	295-319
Devil's Den	15 (4W, 11F)	1959, 56, 57	64	77	140-411
McIlroy	35 (14W, 21F)	1959	47	73	91-109
Wedington	14 (3W, 11F)	1955, 57	24	37	71-164
Total	101 (40W, 59F)		303	342	Avg. 225*

* The average of the average maximum-minimum percent increase for the 4 areas.

Table 2. Status of turkey populations in July 1959 in the study areas where captivity-raised turkeys were released in March 1958 and February 1959.

Study Area	Number Released	Number Present in July			Percent Total Change
		Adult	Young	Total	
Belleville	47 (17W, 30F)	15	19	34	-29
Cerrillos	34 (21W, 13F)	11	5	16	-70
Port Chaffee	60 (24W, 36F)	25	27	52	-13
Koen Forest	44 (25W, 19F)	19	50	69	+5
Ozone	16 (11W, 5F)	4	12	16	-2
Total	203 (106W, 157F)	113	113	226	Avg. -22

of 73 flocks was observed averaging 8.6 birds per flock, and ranging in size from two to 30 birds.

Range Expansion: The mileage values for wild-trapped birds represent true range expansions (Table 3) whereas the same information for captivity-raised birds (Table 4) are simply dispersal rates. This difference is explained further later.

Table 3. Rate of range expansion from release sites exhibited by wild-trapped turkeys after date of release through February 1960.

Study Area	Number of Years	Maximum Range Expansion (miles)		Average Range Expansion (miles per year)
		Minimum	Maximum	
Black Mountain	10.08	15		1.4
Devil's Den	4.21	12		2.8
McIlroy	2.08	8		3.8
Wedington	4.33	6		1.4
				Avg. 2.4

Table 4. Dispersal rates from release sites exhibited by captivity-raised turkeys after date of release through January 1960.

Study Area	Number of Records	Number of Years	Dispersal from Release Site (miles)			Average Dispersal Rate (miles per year)
			Minimum	Maximum	Average*	
Belleville	8	2.6	1.8	5.1	2.3	1.1
Cerrillos	11	2.6	2.6	4.6	3.9	1.5
Port Chaffee	4	2.6	2.5	11.0	5.7	2.2
Koen Forest	8	2.6	1.6	5.5	2.6	1.4
Ozone	5	2.6	0.1	14.8	3.9	1.5
Total	36		Avg. 1.6	8.4	4.0	1.5

* Grand average for all records at site.

Success of Wild-Trapped Compared to Captivity-Raised Birds in Restoring Wild Turkey Populations

Maximum rates of range expansion in wild-trapped turkeys from release points varied from 1.4 miles per year at Black Mountain and Wedington, to 3.8 miles per year at the McIlroy study area (Table 3). The average rate was 2.4 miles per year.

The same calculation for captivity-raised turkeys (divide the maximum column by the years column in Table 4) produced an average dispersal rate of 3.2 miles per year, which is greater though not significantly different from the wild-trapped birds ($t = 0.824$, $df = 7$, $P = 0.3$). However, it may be more appropriate to compare the average dispersal rates in captivity-raised birds (Table 4) with the maximum rates in wild-trapped ones. This is because the areas occupied by populations of wild-trapped birds enlarged gradually due to ever increasing population pressures (Table 1), a true range expansion. The captivity-raised populations, however, were not increasing (Table 2). Thus the movements were just widespread wanderings or scatterings from the release site, best represented by an average value, and best called a "dispersal" (Table 4). Leopold (1944) and Holder (1951) noted these wanderings in captivity-raised birds but Proud (1969) found they were rather sedentary. The matter is further confounded by the ease in finding the flocks of the comparatively tame captivity-raised birds that often sought areas of human habitation.

The overall average dispersal rate for captivity-raised birds was 1.5 miles per year (Table 4). This is lower but still not significantly different from wild-trapped rates (Table 3, $t = 1.476$, $df = 7$, $P > 0.2$).

By the end of the study the ranges of the Black Mountain and Devil's Den turkeys had expanded to merge in the Lake Fort Smith area. Also, the Black Mountain birds had become well established east of state highway no. 23, well to the east of the release site.

Reproduction: Young birds were seen in all study areas. Obvious reproduction was high in the wild-trapped turkeys because a large population increase was exhibited (Table 1). Yet detectability was low since only 22 broods were observed in the four areas over the two summers in 1958 and 1959. This contrasts with a total of 30 actual nests found in one year, summer 1959, for captivity-raised hens (out of a total 175 females released). These rather tame birds nested in conspicuous places. Eighteen of the 30 nesting female turkeys did hatch young, and for 16 of these the average brood size four days after hatching for the five study areas was 6.9 poults per brood. Nevertheless, the captivity-raised populations did not increase (Table 2). Apparently later survival of young was too low to compensate for the adult rate of disappearance shown in Table 2 (compare the number released with adults present in July) and the population declined.

DISCUSSION

The results of the present study show that wild-trapped turkeys were highly successful in becoming established in the Ozarks after release, while the captivity-raised birds were not. The important difference in the turkeys from the two sources was evident only in the population studies following release (Tables 1 and 2). The studies of range expansion and dispersal rates, and incidence of reproduction, none of which were notably different in the groups of turkeys, produced confounding results that did not reflect relative success of establishment and subsequent population increase. Therefore, it is recommended that future studies of this kind focus only on population level investigations.

Based on this study, it is evident that the current restoration of viable wild turkey populations in the Arkansas Ozarks resulted mainly from the introduction of wild-trapped birds obtained in the southern part of the state. The failure of captivity-raised birds in this regard also was noted by Leopold and Dalke (1943), Leopold (1944), Dalke et al. (1946) and Lewis (1957, 1961) in the Missouri Ozarks, and by Holder (1951) in the Arkansas Ozarks, and by Donohoe (1965) in Ohio. The reason for this failure has been amply traced to inherited physiological and behavioral difficulties in the captivity-raised birds (Leopold, 1944). In the present study, the extreme tameness of the released captivity-raised birds probably led to the lack of success. Released birds commonly frequented barnyards and the like at all release sites and persisted there, sometimes roosting with chickens in barns, and one even was suspected

of breeding with a domesticated turkey. Mortality factors were analyzed too but were difficult to appraise accurately. At one phase in the study, 17 out of 72 released captivity-raised birds were found dead within seven months of release. Deaths were due to a variety of causes less than half of which were attributed to predation. The success of released wild-trapped birds in colonizing new turkey ranges was shown in most of the studies cited above and has been repeated in Texas (Gore, 1970), Alabama (Speake et al., 1970, 1975), Florida (Powell, 1965), West Virginia (Bailey and Rinell, 1968), Iowa (Little, 1980; Little and Varland, 1981), Minnesota (Porter, 1977), Nebraska (Suetsugu and Menzel, 1963) and elsewhere (Schorger, 1966). In Texas it was found that establishment depended on releasing the appropriate subspecies of wild-trapped turkey for the habitat concerned (Gore, 1970).

Both types of turkeys in the present study showed somewhat greater overall movements (Tables 3 and 4) than did telemetered wild-trapped birds released in Iowa (Little and Varland, 1981). However, overall rates of movement in Arkansas populations were comparable to movements shown by individual telemetered birds in Georgia (Eichholz and Marchinton, 1976).

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