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BOBWHITE NESTING SUCCESS ON TWO SELECTED AREAS WITH DIFFERENT POPULATION DENSITIES¹

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ABSTRACT

Bobwhite nesting success data was collected during a five year (1967-71) study on an area with a high population density (2 + quail/acre) and a three year (1969-71) study on an area with an "average" density (4 acres/quail). Despite the differences in population density and the intensity of habitat management, the season nesting success on both areas averaged approximately the same, 17.5 percent on the high density area (based on 1,412 nests studied) and 20.8 percent on the "average" density area (based on 313 nests studied).

Bobwhite quail (*Colinus virginianus*) populations in excess of one bird per acre have been reported in the literature (Kellogg et al. 1970, 1972). The literature is void, however, of any studies of quail nesting success for populations with fall densities of 1 to 3 quail per acre as Kellogg found. In fact, only a few intensive studies have been made of bobwhite nesting success at lower

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densities (Stoddard 1931, Klimstra 1957, Parmalee 1955, Lehmann 1946). Average success percentages found in these studies ranged from 36 percent to 62.9 percent. An intensive study by Dimmick (1971) revealed considerably lower nesting success percentages, ranging from 15.4 to 37.2 percent and averaging 23.4 over a five year period. Spring densities on Dimmick's study area averaged about one quail per two acres.

The influence of density on nesting success, one of the factors effecting reproductive success, has also not been investigated in wild bobwhite quail populations. However, managers generally consider nesting success to be lower at high population densities than at low population densities.

The purpose of the paper is to present nesting success data obtained from an area with densities in excess of one quail per acre and to compare the nesting success on this area with that on an area with densities of less than one quail per acre.

STUDY AREAS

Two study areas located in southwest Georgia were utilized in the study, one on Nilo Plantation and the other on land owned by International Paper Company. The Nilo Plantation study area consisted of a 1,262 acre tract in Dougherty and Baker counties. The fall population during this study exceeded two quail per acre. As might be expected from the population density, the area is managed very intensively for quail. Management consists mainly of prescribed burning (66 percent of area each year), planting food patches (annual and perennial), and cultivating well distributed small fields usually no more than five acres in area. Supplemental feeding is conducted during the winter and early spring. Predator control using steel traps was more intensive during 1967 and 1968 than for 1969 through 1971.

The International Paper Company study area consisted of a 580 acre tract in Decatur county. Quail habitat management on the area consisted only of prescribed burning during the spring. Annual burn acreage averaged 75 percent of entire area during the study period. Fall densities averaged about 1 quail per 4 acres.

METHODS

The nesting study was conducted during the nesting season from 1967 through 1971 on the Nilo Plantation area and from 1969 through 1971 on International Paper Company area. Personnel, consisting usually of three individuals on each area, made daily searches for nests from May through August each year. All cover areas, whether considered prime nesting habitat or not, were searched on foot with the aid of a staff for parting vegetation. When found, a nest was flagged with colored plastic surveying tape. Flags were placed far enough away from active nests to avoid attracting predators to the nest sites. Active nests were usually checked once a week. Some nests near their estimated hatch date visited more frequently.

RESULTS AND DISCUSSION

Of the 1,412 nests on the Nilo study area, 247 (17.5 percent) were successful (Table 1). The nesting success on Nilo during the three seasons corresponding to the International Paper Company study period (1969-71) was slightly higher than the five year average. One hundred and fifty-nine (18.6 percent) of the 854 nests found were successful. Yearly nesting success ranged from 15.4 percent in 1968 to 19.0 percent in 1971.

Table 1. Results of nesting attempts on the Nilo Plantation and International Paper Company study areas.

Area	Year	Nest Classification			Total
		Successful	Destroyed	Abandoned	
Nilo Plantation	1967	33(16.4%)	160(79.6%)	8(4.0%)	201
	1968	55(15.4%)	291(81.5%)	11(3.1%)	357
	1969	57(18.8%)	230(75.9%)	16(5.3%)	303
	1970	47(17.9%)	197(75.2%)	18(6.9%)	262
	1971	55(19.0%)	219(75.8%)	15(5.2%)	289
	Total	247(17.5%)	1,097(77.7%)	68(4.8%)	1,412
International Paper Company	1969	23(17.8%)	97(75.2%)	9(7.0%)	129
	1970	20(25.0%)	56(70.0%)	4(5.0%)	80
	1971	22(21.2%)	79(76.0%)	3(2.9%)	104
	Total	65(20.8%)	232(74.1%)	16(5.1%)	313

The average season nesting success on the International Paper Company study area was similar to that found for the Nilo area. Sixty-five (20.8 percent) of the 313 nests hatched out young (Table 1). Season nesting success was 17.8 percent in 1969, 25.0 percent in 1970 and 21.2 percent in 1971.

Nest losses to destruction, resulting almost entirely from predation, made up a large percentage of the unsuccessful attempts on both areas. This loss amounted to 77.7 percent of the total nests found on the Nilo area and ranged between 81.5 percent in 1968 and 75.2 percent in 1970. The destroyed nest percentage on the International Paper Company area, 74.1 percent, corresponded closely to that on Nilo for 1969-71 which averaged 75.6 percent. The highest rate of loss on the International Paper Company area was 76.0 percent in 1971. Destruction totaled 75.2 percent in 1969 and 70.0 percent in 1970.

The percentage of nests abandoned on both areas was low. On the Nilo area abandonment for all five years averaged 4.8 percent. The yearly percent of deserted nests ranged from a low of 3.1 percent in 1968 to a high of 6.9 percent in 1970. The 1969-71 average was 5.7 percent. Percentages on the International Paper Company areas again varied little from that found on the Nilo area with nest abandonment averaging 5.1 percent. Yearly nest abandonment averaged 7.0 percent in 1969, 5.0 percent in 1970, and 2.9 percent in 1971.

Nesting success percentages found in this study for Nilo Plantation with its high quail densities and intensive management were considerably lower than was found in the studies previously cited, with the exception of Dimmick's study. Data gathered on the International Paper Company study area with its relatively low densities indicated that the season nesting effort there, nesting success being the measure, was just as great as on the Nilo area. The similarity of the percentages of nesting success, abandonment, and destruction for both study areas strongly suggests that population increase on Nilo was not being measurably restricted by reduced nesting success due to the present population density.

Inadequate cover the first half of the nesting season resulting from the necessary management practice of prescribed burning was the major factor contributing to the low nesting success on both areas (Simpson 1972). If the population on the Nilo Plantation with the existing habitat conditions was high enough to produce a low nesting success response, such an effect was obscured by the greater response due to reduced early nesting cover.

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