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A Central Iowa Pheasant Nesting Study, 1961[1]

VERNON WRIGHT[2] and PAUL OTTE[3]

Abstract. A study of nesting success of pheasants (*Phasianus colchicus*) on three areas in central Iowa in 1961 showed that the peak of nest establishment occurred between May 16 and May 30. Hatching success varied inversely with pheasant population density. Twenty-four of the 96 nests found hatched successfully. Roadsides sheltered the highest percentage of nests on a per acre basis (46 nests/100 acres), followed by hayfields (24 nests/100 acres) and oatfields (4.7 nests/100 acres). Idle land and fence rows contained the fewest number of nests. Most nests were located in cover from 16 to 22 inches in height. No significant relationship was found between the height and/or density of cover and the success of the nests. Farm machinery operations, especially hay mowing, caused the greatest destruction of nests.

INTRODUCTION

The rapid decrease of pheasant (*Phasianus colchicus*) numbers from Hamilton County southward has long been a mystery. This study is part of a larger investigation to study factors which may be the cause of decrease in numbers in this area. The central Iowa pheasant study was initiated in 1960 by Roger Bolstad, a Graduate Assistant at Iowa State University. Observations on nesting activity were continued by the authors.

This report deals mainly with an evaluation of differences in pheasant nesting intensity and success in central Iowa in 1961.

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vestigators, and research activities were conducted from June to August, 1961.

Description of the Area

The central Iowa, pheasant nesting study was conducted in sample areas in Hamilton, Story, and Boone counties in 1961. This area, lying entirely within the Wisconsin soil drift area, represents a zone between northern Iowa's heavy pheasant population and southern Iowa's generally sparse population of pheasants.

Klonglan and Kozicky (1950) state, "The topography of the area is flat to gently rolling with soil being equally divided between Webster and Clarion types." Three study areas, one with high, a second with an intermediate and a third with a low pheasant population were selected for study. Area A (northernmost) represents the better pheasant population with an estimated 66 birds per section wintering on the area in 1961. Area C (southernmost location) represents an area with a sparse density of pheasants, with a winter population of 7.5 birds per section. The outside boundaries of the northernmost and southernmost areas are 21 miles apart. Area B lies intermediate both geographically and in respect to pheasant numbers. Detailed descriptions of the areas are presented by Bolstad (1962). They are conveniently located for study by staff and students at Iowa State University.

Approximately 52 per cent of the land included in the study

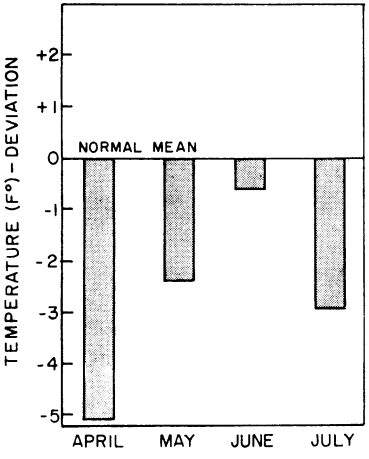

Figure 1. Temperature deviations from normal during the pheasant nesting season in Story County, Iowa, 1961.

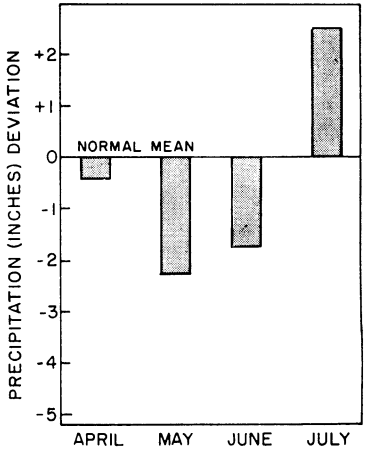

Figure 2. Deviations from normal precipitation during the pheasant nesting season in Story County, Iowa, 1961.

Table 1. Agricultural use of land in the three pheasant nesting study areas in central Iowa, 1961

	Area B		Area C		Totals	
Land use	Acres	Per cent of total area	Acres	Per cent of total area	Acres	Per cent of total area
Row crops	615	48.1	701.6	54.9	672.3	52.8	1988.9	51.7
a. corn	467	36.5	482	37.7	482	37.7	1431	37.1
b. soybean	148	11.6	219.6	17.2	190.3	15.1	557.9	14.6
Hayfields	148	11.6	92	7.2	158	12.3	398	10.4
a. hay	138	10.8	67	5.2	158	12.3	363	9.5
b. conserv. reserve (hay)	10	.8	25	2	0		35	.9
Oatfields	281	22.0	285	22.1	241	18.8	807	21.0
a. combined oats	208	16.3	129	10.0	145	11.3	482	12.5
b. oats for hay	9	.7	20	1.6	5	.4	34	.9
c. conserv. reserve (grain)	64	5.0	136	10.5	91	7.1	291	7.6
Pasture	118	9.2	101	7.9	109	8.5	328	8.6
Idle	22	1.7	16	1.3	22	1.7	60	1.6
Fence rows	7	.5	8.4	.7	5.7	.4	21.1	.5
Homesites	49	3.8	36	2.8	32	2.5	117	3.1
Roadsides	40	1.3	40	1.3	40	1.3	120	1.3
Totals	1280	100.0	1280	100.0	1280	100.0	3840	100.0

areas was in row crops, consisting of 37 per cent corn and 15 per cent soybeans (Table 1). Approximately 40 per cent of the land was devoted to oats, hay and pasture with the remaining 8 per cent in miscellaneous uses, i. e., roadsides, homesteads, and fencerows.

The weather was generally favorable for pheasant nesting in 1961. April was considerably cooler than normal, while average temperatures for May, June, and July were slightly below normal (Fig. 1). Precipitation was below normal in April, May and June; July had above normal precipitation (Fig. 2).

Techniques of Investigation

Hayfields, oatfields, roadsides, fencerows and idle land areas were searched for pheasant nests. The fields were searched immediately after mowing, windrowing, or combining operations and again after raking in hayfields. Roadsides were searched by the two investigators as they walked, side by side. Sticks were used to part the tall grass. With two investigators doing the searching, it was considered sufficient to cover half of the strip while going out and the other half in coming back to the starting point. Idle land and fencerows were checked similarly in an attempt to locate nests.

When a nest was discovered, all available data concerning location, position in the roadside, cover characteristics, fate of nest, and fate of the hen were recorded on a special form designed for convenient recording and subsequent transfer of the data to I.B.M. cards for analysis. The use of this standardized from will permit comparison of data collected in future years, and will make data additive from year to year.

Dates for nest esablishment and hatching dates were determined by "aging" the embryos and comparing their stage of embryonic development with photographs of known-aged embryos as described by Labisky and Opsahl (1958). Nest establishment dates were estimated by multiplying the number of eggs in the nest by 1.3, the usually accepted interval in days between the laying of eggs by pheasants.

An attempt was made to determine the species of predator involved whenever a nest was destroyed by predation. Evidence was checked with the aid of information from the publication, "Determination of some predator species by field signs" by Arthur Einarsen (1956). Most predators involved, however, did not leave enough evidence to permit positive identification of the "culprit" involved.

Cover surrounding the nesting site was recorded as the dominant type within a three-foot radius of the nest. Cover density was

estimated in tenths and indicated the percentage of the surrounding area (sides and top) from which the nest was hidden from view at any position above ground; a density of 1.0 indicates the nest was completely concealed from sight of both avian and terrestrial predators.

Cover was measured with the aid of a steel tape, and horizontal distances were paced in yards. The acreages studied were determined from aerial photographs with the aid of an acreage grid.

All statistics used in the analysis of the data were used as described by Huntsberger (1961) in "Elements of Statistical Inference." Because of the scarcity of nests found in Areas B and C, it was necessary to combine the data from these areas for statistical comparison.

Results

Placement of the Nest

Pheasant hens in the central Iowa study areas nested in a variety of cover types (Table 1). More than half (53%) of the 96 nests were located in hayfields, although hayfields made up less than one-third of the total area searched. There was a decrease of hayfield nests from 43.5 nests per 100 acres in Area A to 30.4 and 6.3 nests per 100 acres in Areas B and C, respectively.

Oatfields with 4.7 nests per 100 acres had substantially fewer nests than the 24.0 nests per 100 acres in hayfields. As in hayfields, a considerable decrease (from 13 to 6) in nests from Area A to Area B occurred in oatfields. No nests were found in the 121 acres of oats searched in Area C.

The number of nests found along roadside cover strips varied considerably in the tree study areas. Area A's 15 roadside nests is larger when compared to the 3 and 2 nests found in Areas B and C, respectively.

The nesting cover ranged in height from 4 to 36 inches with a mean of 20.3 inches and a standard deviation of 7.4. Cover density values for the nests ranged from 0.2 to 0.9, with an average of 0.7.

A record of the position of 20 nests in roadside ditches showed that half were located in the bottom of the ditch, where they were most subject to flooding.

Available data show that the earliest nest was established April 26 and the latest on July 19. Evidence indicates the greatest nesting activity started during the period May 16 to May 30.

A test for independence in the two-way table showed no significant differences among the three areas with regard to

selection of the nesting site.

A null hypothesis that there was no difference between the percentage of nests in each cover type, height of nesting cover, and density of nesting cover was formulated and tested with

Table 2. Intensity and success of pheasants nesting in cover types in central Iowa, 1961

	Cover type in acres	Acres checked	Number nests found	Number nests per 100 acres	Number nests successful	Per cent of nests successful
Area B						
Oats	281	143	13	9.1	7	54
Hay	148	69	30	43.5	4	13
Roadsides	40	15	15	100.0	1	7
Idle	22	16	2	12.5	0	..
Fencerows	7	2	1	50.0	0	..
Total	498	245	61	25.0	12	20 per cent
Area B						
Oats	285	131	6	4.5	0	..
Hay	92	52	16	30.4	6	38
Roadsides	40	13	3	23.1	2	67
Idle	28	0	..	..	..	..
Fencerows	8.4	2	1	50.0	0	..
Total	453.4	198	26	13.3	8	31 per cent
Area C						
Oats	241	121	0	..	..	..
Hay	158	96	6	6.3	2	33
Roadsides	40	15	2	13.4	0	..
Idle	22	2	1	50.0	1	100
Fencerows	5.7	1.8	0	..	..	..
Total	518	235.8	9	3.9	3	33 per cent

Table 3. Relationship between fate of nests and nesting cover type in three central Iowa study areas, 1961

	Area A			Area B			Area C			Total		
Cover type	No. successful	No. unsuccessful	Per cent successful	No. successful	No. unsuccessful	Per cent successful	No. successful	No. unsuccessful	Per cent successful	No. successful	No. unsuccessful	Per cent successful
Legumes												
Clover (red & sweet)	0	3	..	0	1	..	0	0	..	0	4	..
Alfalfa & red clover	0	0	..	0	0	..	0	1	..	0	1	..
Alfalfa	0	3	..	3	6	33	1	1	50	4	10	27
Grasses												
Bromegrass	5	22	18	4	1	80	0	0	..	9	23	28
Timothy	0	0	..	0	1	..	1	2	33	1	3	25
Bluegrass	0	3	..	0	1	..	0	0	..	0	4	..
Mixed grasses	0	8	..	1	2	33	0	2	..	1	12	8
Oats	7	6	54	0	6	..	0	0	..	7	12	37
Mixed weeds	0	4	..	0	0	..	1	0	100	1	4	20
Totals	12	49	20	8	18	31	3	6	33	23	73	24

Chi-square at the 1- per cent level. The null hypothesis was accepted in all cases.

Success of Nests

Success of nesting efforts of pheasants in the three study areas appeared to vary inversely with the density of the nesting population (Table 3). In Area A, which had the highest population of pheasants, 20 per cent of the 61 nests were successful. Area B with an intermediate level of population had 31 per cent of the 26 nests successful, while the lowest population, in Area C, had 33 per cent of the 9 nests successful. Twenty-four per cent of the 96 nests were successful.

The contingency table shows a high degree of significance in the relationship between agricultural use of the land and the success of the nest. This is to be expected since mowers destroyed many nests located in hayfields. The high per cent of nests successful in Area B hayfields can be partially explained by noting that two adjacent hayfields totaling 14 acres were cut June 28 and 29, after the peak of the hatching had passed. These two fields yielded 12 nests of which 5 were successful. The other 38 acres of hay searched in this area yielded only one successful and three unsuccessful nests.

Statistical analysis shows no significant relationship between the height of the cover and success of the nests. The calculated chi-square for 3 degrees of freedom is 8.43. The tabular value is 11.34 for the 1-percent level of significance. The calculated chi-square relating density of nesting cover to success of nests is 1.24 for 2 degrees of freedom, which is far below the 1-per-cent value as given in the table. Hence, it may be concluded that there was no significant relationship between the amount of cover and the chances of the nest succeeding.

Cause of Nest Destruction

Agricultural machinery was the primary cause of nesting failure of pheasants in the study areas. Operation of farm machinery caused the destruction of 43 per cent of the 71 nests in hay and oats. One-fourth of the nested were destroyed by predators, and 8 per cent were listed as deserted. There is no way to determine if the nests destroyed by predators (and in some cases by mowers) were being incubated at the time of destruction or if they may have been deserted for some unknown reason before being destroyed.

The peak of the hatch (very late June) in the areas occurred just as the mowing of the first crop of hay was completed This was before the start of oat harvesting (second week in July), so more of the nests located in oats had time to hatch before they were disturbed by farming operations.

Eight nests were found that had been deserted by the hen. Twenty-three nests were successful, 24 nests were destroyed by predators, and 41 nests were destroyed by farm machinery.

Cause of Loss of Nesting Hens

Twenty-eight per cent of the 52 hens nesting in hayfields were killed or injured by mowers. Two hens nesting in oatfields were killed by predators and two were injured when they were hit by windrowers. Two hens were injured by a farmer when he hit them while mowing the weeds in an idle patch of ground. Twenty out of 96 nesting hens are known to have been either killed or injured while on their nests.

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Bobwhite Quail, Winter Weather and Agriculture

M. E. STEMPEL[1]

Abstract. Bobwhite quail are still found in most of their historic range which extends north into Minnesota. The best Iowa populations are in the three southern tiers of Iowa counties. Their peak abundance occurred before 1900. Long cold winters and deep snows usually decrease quail numbers. However, in the best brushy cover near grain fields, they have persisted in good numbers even though the bitter cold winters of 1912, 1936 and 1960. The 1960 winter losses were estimated at about 70 per cent in scanty cover, but as low as 10 percent in high quality cover.

[1] Iowa Conservation Commission, Des Moines, Iowa.