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The Production of Ring-necked Pheasants in Winnebago County, Iowa[1]

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In the fall of 1935, the Iowa Cooperative Wildlife Research Unit inaugurated field investigations on the ring-necked pheasant, *Phasianus colchicus*, on the Winnebago Research Area, sections 9-12, 13-16, and 21-24, Eden Township, Winnebago County. Early investigations (Green, 1938) were centered around winter mortality of pheasants and the improvement of habitat to alleviate winter losses.

In 1939-41 intensive investigations were shifted to the nesting and production of the ring-necked pheasant on a 1520-acre plot lying within sections 13, 14, 15, 23 and 24 (Baskett, 1947). Although the pheasants were increasing in numbers during 1939 and 1940, in 1941 and accelerated rate of summer production was noted. Instead of the usual 150-175 percent rate of summer increase over the spring population, production jumped to 220 percent in spite of the largest observed spring density—125 birds per section. A parallel rise in the 1941 rate of production was also recorded in North Dakota (Bach, 1944).

World War II curtailed field activities, and personnel was not available to check further this phenomenon until 1949, when intensive work was again initiated on the 1520-acre plot.

The Winnebago Research Area, part of the primary pheasant range in Iowa, lies within the Wisconsin drift soil area, and its topography is characterized as level to rolling with rounded hills and ridges. Land usage studies indicate that 90 to 95 percent of the land is under cultivation. Hayfields, the most important nesting cover, comprised only nine percent of the 1520-acre area. Other cover types used for nesting were small grains (28 percent) and non-agricultural land (6 percent). Corn and soybeans (47 percent) are the major intertilled crops.

Field Techniques

The spring population was determined each year by field counts, by a modified spot census, and by the enumeration of crowing cocks. In the fall, enumerations were made by repeated field observations

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with the aid of a bird dog and by flushing counts during the hunting season (Baskett, 1947; Kozicky and Hendrickson, 1950).

During all of the nesting season, the 1520-acre segment was searched periodically in a systematic manner. When hayfields were mowed, they were given primary attention, and the cooperation of the farmers were enlisted. All hayfields were searched at least twice, when they were being mowed and again when the hay was in windrows. A clutch of two or more eggs was considered to constitute a nest. If one or more eggs in a clutch hatched, the nest was recorded as being successful. Investigators were in the field from May until mid-September in all years except 1950, when work was terminated in mid-July.

Analysis of Production

Some of the possible factors that may affect the rate of summer production are nesting and hatching success, brood size, and nesting effort. Losses of adult hens were accounted for in nesting success; that is, a high loss of hens through mowing accidents usually was indicated by low nesting success. As shown in Figure 1, the rates of production in 1939, 1940, and 1949 were more nearly the same than those in 1941 and 1950.

The reasons for the high rate of production (220 percent) in 1941 were not readily apparent. An investigation of weather records,

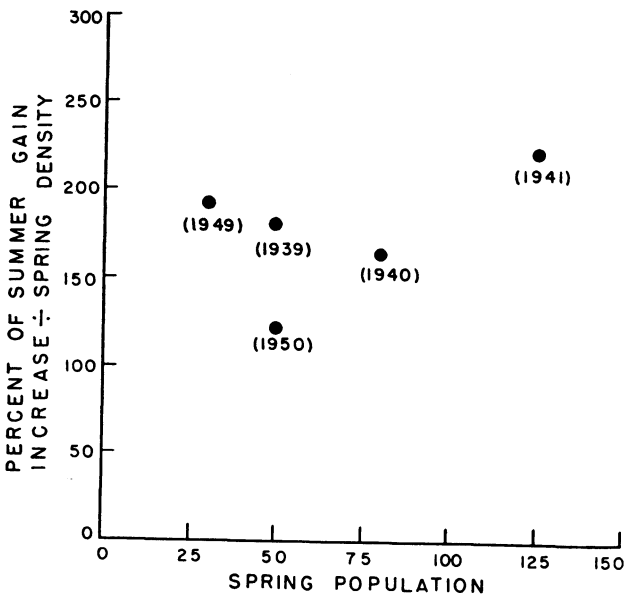

Figure 1. Ring-necked Pheasant Production per Square Mile, Winnebago Research Area

land usage, and crop harvest did not offer any plausible explanation (Baskett, 1947), and little more could be learned from analyses of hatching success, nesting success, and mean brood size at six to seven weeks of age (Table 1). The only evident explanation appeared to be in nesting effort. By determining the number of hens on the 1520-acre area during the spring of each year and dividing this into the number of observed nests, a ratio of 1.6 nests per female was derived in 1941 as compared to an average of about 1.0 in 1939, 1940, 1949, and 1950 (Table 2). Records for the five-year period of observation indicated that nesting commenced in May and ceased in September, with the bulk of the nests hatching in June and early July.

Production (120 percent) in 1950 was below the three-year rate, but this was believed due to the low percentage of observed successful nests. Phenological data indicated that in 1950 the flowers of dandelions and the appearance of leaves on cottonwoods and willows were delayed about two weeks. This delay in spring activities was reflected in nesting; that is, the majority of nests were not established until about late April and early May, which was about two weeks later than the nesting activity data gathered in 1939-41. The first mowing of the hay crop, however, was about normal (June 15-July 5) as weather conditions (cool and wet) were ideal for the growth of hay.

Prior to the average date of the first mowing of hay in 1939-41, 20 to 30 percent of all incubated nests hatched, or would have hatched; in 1950, only about 10 percent. Also, in 1939, with similar spring nesting populations, a nesting success of 34.6 percent was found in hayfields; in 1950, 9.4 percent. A total of 16 hens, 18.2 percent of the spring nesting population of 88 females on the 1520 acres, were injured or killed during the mowing of the first crop of hay in 1950. This is in contrast to the three hens, 3.6 percent of the spring population of 84 females, that were injured or killed in 1939, a year of similar spring breeding densities but high (34.6 percent) nesting success.

Discussion

Although the difficulties in enumerating spring and fall pheasant populations, the possible introduction of error by influx and egress, and the possibility of not observing nests make interpretation difficult, the data were gathered in a comparable manner for the five-year period and are presented as a basis for further investigation into the validity of the following phenomena. The effect of adverse weather conditions, such as in 1950, on production of ring-necked

pheasants is well known and explainable. The reasons for the high "nesting effort" in 1941 are obscure and merely in the speculative stage. Possibly an explanation may be found in factors such as age composition and physical condition of the breeding stock. Further, this increase manifested itself during the greatest observed spring density for the five-year period. This is diametrically opposed to one of the basic concepts of game production—as the spring density of a given game bird increases, the rate of summer production decreases. Inasmuch as the pheasant again shows every indication of being on the increase after the decline from 1943-47, it behooves us to investigate further the phenomenon of "nesting effort."

Summary

1. An analysis of ring-necked pheasant production factors on the Winnebago Research Area are given for 1939-41 and 1949-50.

2. The high rate of production in 1941 is postulated to be the result of an increased nesting effort.

Table I

Ring-necked Pheasant Production Data on 1520 acres, Winnebago Research Area

Year	Mean Number of Hatched Eggs per Nest	Mean Brood Size 6-7 Weeks of Age	Percentage of Observed Successful Nests
1939	8.7	6.1	36.0
1940	9.1	5.8	25.0
1941	8.6	5.3	23.2
1949	7.0	5.6	36.8
1950	8.4	....	7.7

Table II

Nesting Effort per Female Pheasant on 1520 acres, Winnebago Research Area

Year	Estimated Number of Females	Number of Observed Nests	Nests per Female
1939	84	75	0.9
1940	129	140	1.1
1941	198	318	1.6
1949	41	37	0.9
1950	88	91*	1.0

*Complete until July 16. Observations continued by farmers until September.

3. The low rate of production in 1950 resulted from the high percentage of nests lost and hens killed or injured during the first mowing of hay. Weather conditions, favorable for the growth of hay, forced the farmers to mow when a high percentage of the nests were in incubation.

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