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Some Aspects of Pheasant Reproductive Success in Iowa, 1948-1963

RICHARD C. NOMSEN

Abstract. A summer sight record project was conducted in Iowa from 1948 through 1963 to check annual production of pheasants. The ratio of juveniles to adult hens, or young per hen, indicated the rate of reproductive success. Young per hen figures indicated trends in the fall pheasant populations each year except 1950. There was a close relationship between reproductive success and mean temperatures for April. This correlation was significant at the 0.05 probability level when results for 1954 were eliminated. Temperatures averaged 12 degrees below normal during the first week of May in 1954, which reduced pheasant production. Results of the survey illustrate the importance of annual production and indicate that production is closely associated with spring weather conditions.

Several census techniques have been used since 1936 to determine fluctuations of Iowa's ring-necked pheasant, *Phasianus colchicus*, population. The fall roadside count, taken in late September or early October, was the primary technique used from 1936 through 1953 (Fig. 1). Since 1954, this annual survey has been taken the first 2 weeks of August (Fig. 1). Studies on the Winnebago Research Area showed less variability in the population indices during this period than in results obtained in late September or early October (Klonglan, 1955a).

METHODS FOR SIGHT RECORD PROJECT

Prior to this 1954 change in the fall population survey, a sight record project was started in 1948 to learn more about Iowa's pheasant population. During the first several years, conservation officers reported at 2-week intervals all pheasants sighted from January 16 through August of each year. It was soon apparent that one of the most informative periods of the project was during the summer when broods were observed and counted. So beginning in 1951, the sight record project was condensed to include a 6-week interval from July 15 through August 31 to obtain information on reproductive success and a winter count during January and February to collect sex ratio data.

Officers recorded all pheasants observed during the summer period as cocks, hens without broods, hens with broods and the number of chicks in each brood. These observations were made while the officers concluded their regular patrol duties. A report

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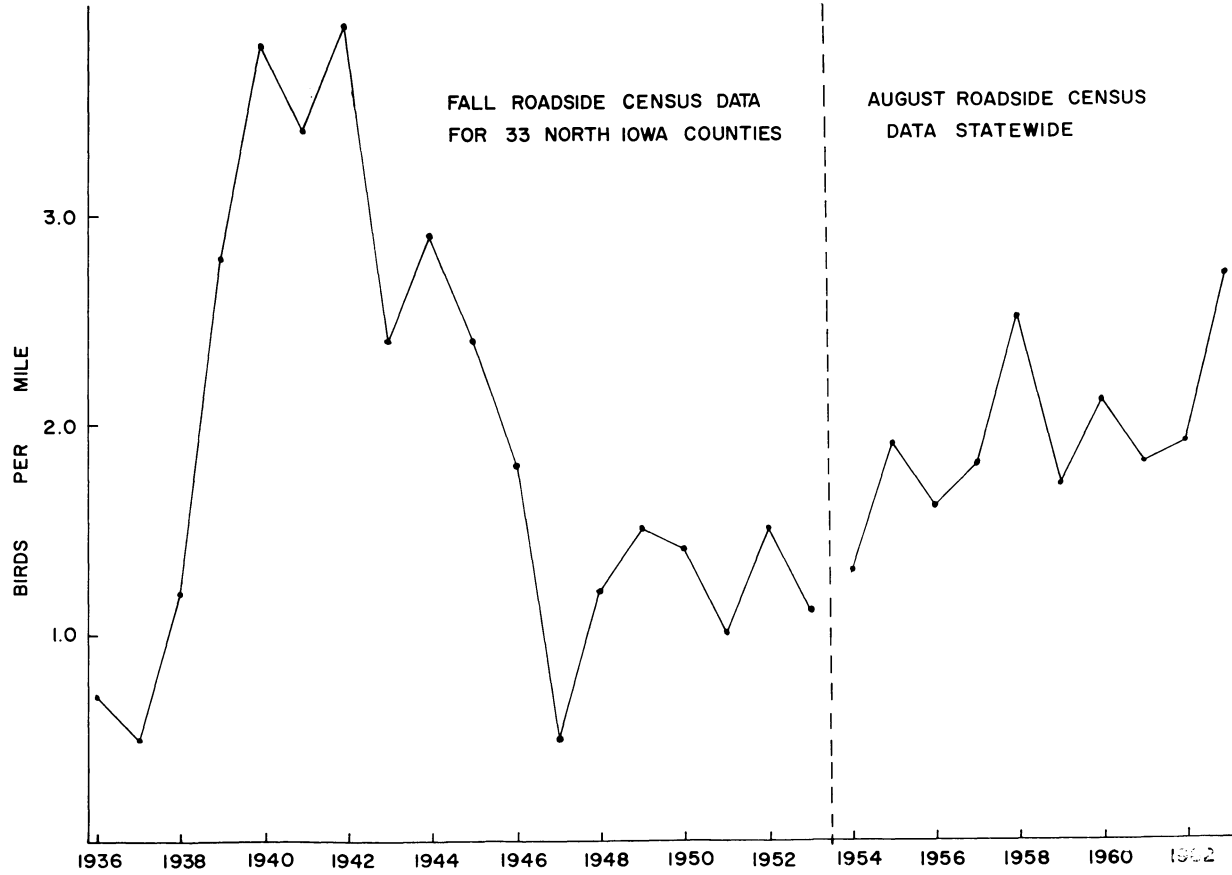


Figure 1. Pheasant population trends in Iowa 1936-1963.

card required for each 2-week segment of this period; however, data were analyzed for the first 2 weeks of August for annual comparisons.

Records of this summer survey were grouped by agricultural districts, as well as statewide, and results were reported annually in the July-September volume of the "Quarterly Biology Reports" of the State Conservation Commission. Reproductive success was indicated by the per cent of hens with broods, average number of chicks per brood, and young per hen (Table 1). The young per hen figure, or the ratio of juveniles per hen sighted, represented the primary index of reproductive success. For the purpose of this analysis, it was assumed that a hen was present with each brood whether or not she was seen with them at the time of observation. The number of broods reported varied between 450 and 600 from 1948 through 1953. Beginning in 1954, all broods and hens recorded during the August roadside count were included with the sight records, which increased the sample to between 1700 and 2000 broods. Several changes were made in the August roadside count in 1962, so only sight records were used for 1962 and 1963.

Table 1. Reproductive success of pheasants in Iowa, 1948-1963.

Year	Young per hen	Average brood size	Per cent of hens with broods
1948	4.1	6.6	63%
1949	4.4	7.2	62
1950	4.8	7.0	69
1951	3.9	6.2	62
1952	4.3	6.6	66
1953	3.4	6.4	53
1954	3.7	5.7	64
1955	5.2	6.8	77
1956	4.2	5.9	71
1957	4.4	5.9	74
1958	4.5	6.2	72
1959	3.5	5.5	64
1960	4.1	5.6	72
1961	4.0	6.3	63
1962	4.3	6.2	69
1963	4.5	6.2	72
Mean	4.2	6.3	67

RESULTS AND DISCUSSION

The ring-necked pheasant population in Iowa has fluctuated considerably during the past 25 years. A startling increase which occurred from 1937 to 1942 was followed by a corresponding decrease during the next 5 years. Since 1948, the statewide population has experienced smaller annual changes with a general upward trend.

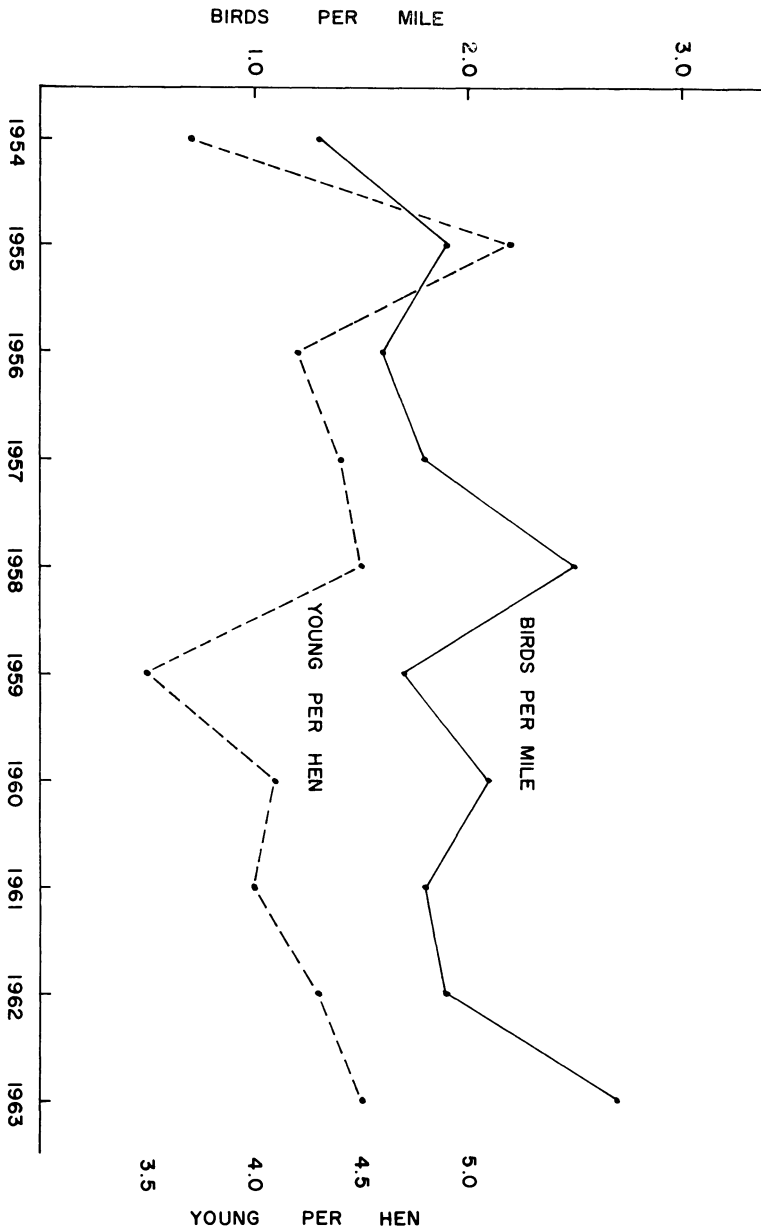


Figure 2. Comparison of pheasant population and reproductive success in Iowa, 1954-1963.

The reproductive index, or young per hen figure, obtained from the sight record project accurately indicated trends in the pheasant population, as shown by the fall roadside count, each year with the exception of 1950. Although the fall roadside count showed a slight population decrease, hunting success was excellent that fall. This would indicate that the population survey was in error and not the index of reproductive success.

Since 1954, when the fall population survey was changed to the August period, changes in reproductive success was reflected in similar population trends (Fig. 2). In 5 of the 10 years, the population change closely paralleled the rate of production. The reproductive success index for 1955 was the highest recorded for the period but the population figure did not show a similar increase. However, hunter success figures for the 1955 hunting season were the best in recent years. Very dry census conditions in August probably reduced the number of birds seen during the roadside count. It was also noted that 2 successive years of increased annual production resulted in a greater than expected population increase the second year, such as occurred in 1958 and 1963.

The statewide annual production of pheasants no doubt depends upon many complex factors. The increase of row crops has reduced safe nesting cover, and this tends to reduce the population (Faber, 1948). The decrease in quality and abundance of suitable winter cover is believed by the author to have a limiting effect on Iowa's pheasant population. These changes, however, take place over a period of years.

Abrupt changes in production from year to year must therefore be related to a factor or factors which tend to fluctuate annually. It has been reported previously that winter and spring weather influence fall pheasant populations (Kozicky, *et al.*, 1955). Generally, it is believed that a warm early spring denotes a successful hatch while a cold wet nesting season results in a poor hatch.

Data obtained during this study were analyzed to determine if a relationship existed between reproductive success and spring weather conditions. There appeared to be a close relationship between the young per hen figures and mean temperatures for April (Fig. 3). The statewide figures for reproductive success appeared to have no relationship with mean May temperatures, however, the very cold May in 1954 was known to lower production on the Winnebago Research Area in the primary north-central range (Klonglan, 1955b). Temperatures averaged 12 degrees below normal during the first week of May, and this apparently reduced pheasant production over a large area of the primary pheasant range.

After eliminating the 1954 results, further examination revealed a correlation, significant at 0.05 level, between hatching success and mean April temperatures. In 1959, three severe March snowstorms and a near record snowfall on April 20 lowered production considerably. If both years are eliminated, the correlation coefficient becomes 0.767, which is significant at the .01 probability level.

Pheasant production is probably influenced by April temperatures both directly and indirectly. Numerous nesting studies in

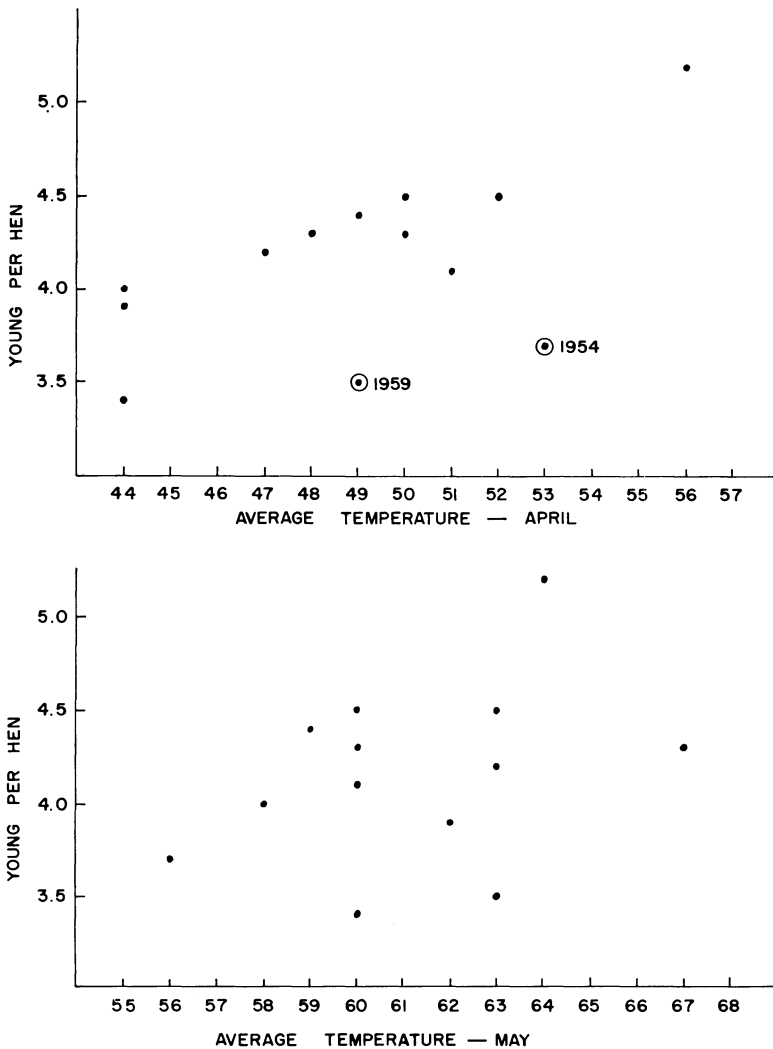


Figure 3 Relationship between pheasant reproductive success and spring temperatures in Iowa, 1951-1963.

Iowa have shown that early nest establishment is prompted by a warm early spring and that early nests are more successful than late attempts. Of indirect, and probably more, importance is the timing of farm field work in relation to nesting activities. Pheasant production in Iowa is closely associated with agriculture since more than 90% of the land within the pheasant range is under crop rotation. Normally, more than half of all successful nests on the Winnebago Research Area are found in oat fields. The seeding and development of this primary pheasant production crop occurs during April and its progress is controlled by weather conditions. The 'timing' must be favorable for a maximum number of nests to insure a successful hatch.

The special sight record project discussed herein was discontinued after the 1963 season. More complete and better information concerning reproductive success and pheasant population trends will in the future be collected during the August roadside count, as recently revised. Results of the sight record survey have, however, illustrated the importance of annual production and have indicated that production is closely associated with spring weather conditions.

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