

DISTRIBUTION AND ABUNDANCE OF THE GRAY PARTRIDGE IN ILLINOIS

ALLEN L. FARRIS
Western Illinois University
Macomb, Illinois 61455

ABSTRACT. — Through use of a rural letter carrier survey, hunter kill data, and a County Conservation Inspector survey the present distribution and relative abundance was determined for the Gray Partridge (*Perdix perdix*) in Illinois. Since 1943 the species has spread westward, southwestward, and southward in Illinois and is now distributed over the northern quarter of the state. The present area of highest relative abundance in the state, 5.9 birds observed in late August per 100 miles of roadside, is Lee County. The climate during summer for that part of Illinois having Gray Partridge may be too hot and wet to allow a high rate of reproduction and may keep partridge populations relatively low.

The Gray Partridge was introduced into the United States as early as 1790 (Leopold, 1933), but most introductions were made during the late 1800's and early 1900's (Edminster, 1954). Within its native range of Europe and southwestern Asia the species is most abundant and common in central and southeastern Europe (Edminster, 1954).

During the period 1906 through 1927 over 12,000 Gray Partridge were released in Illinois by the state (Leopold, 1931). The locations of most of these releases are not known. The Gray Partridge now present in Illinois originated from these releases, local releases by private individuals or groups, population spread from releases made in southern Wis-

consin, 1908 through 1929, or a combination of these.

Leopold (1931) for 1929 and McCabe and Hawkins (1946) for 1942 provide previous descriptions of the geographic range of the Gray Partridge in Illinois. Since 1943 there has been no description of the geographic range of the Gray Partridge in Illinois. This research was designed to determine the present distribution and relative abundance of the species in Illinois.

Acknowledgment is made to the following: to Drs. J. Henry Sather and John E. Warnock of Western Illinois University, for advice and counseling received and critical reading of the manuscript; to Mr. William Preno of the Illinois Department of Conservation, the United States Postal Authorities, the Illinois Rural Letter Carrier Association, and the County Conservation Inspectors of the Illinois Department of Conservation for aid in gathering the distribution and relative abundance data; to Mrs. Allen L. Farris for encouragement and critical reading of the manuscript.

METHODS

Surveys:

Three techniques were used to de-

termine the distribution of the Gray Partridge in Illinois: a rural letter carrier survey, hunter kill information, and a County Conservation Inspector questionnaire survey. The rural carrier census also provided data on relative abundance.

A summer rural letter carrier survey was conducted in 41 northern counties in Illinois from August 24 through 28, 1964. A form letter of instruction was sent to postmasters and rural letter carriers associated with the 458 post offices located in these 41 counties. To aid in the identification of the partridge, line drawings of a Gray Partridge and a Bob-White Quail (*Colinus virginianus*), along with a written description of each species, were included in the materials sent to the letter carriers.

Census cards returned by the postmen were analyzed using the method described by Greeley, Labisky, and Mann (1962). The number of birds observed and the number of miles driven during the five day census period in each township were used to calculate the number of partridge per 100 miles of roadside in each township. If the route of a mail carrier extended into two or more townships, the reported data were divided equally among all the townships listed on the questionnaire. The distribution and abundance of the Gray Partridge in Illinois were plotted on the basis of these calculations.

Rural letter carrier censuses have been used in several states as a technique for censusing various types of wild animals. Biases in the technique have been recognized (Greeley, *et. al.*, 1962); however, the data obtained are considered to be generally

reliable and year to year fluctuations in distribution and relative abundance of various species of wildlife over wide geographical areas are detectable.

Hunter kill information was obtained from the Illinois Department of Conservation. This information was obtained by the department from a sampling of two percent of the resident hunting license holders in the state (Preno, personal communication).

The third censusing method employed questionnaires sent to County Conservation Inspectors, of the Illinois Department of Conservation, of 33 northern counties in Illinois in December, 1965. A letter of introduction and explanation was included with each questionnaire. The questionnaire was used to obtain the opinions of the inspectors with regard to distribution of the species in each county, species population trends in Illinois, and hunter utilization of the species in Illinois.

Climographic test of range:

Twomey (1936) used climographs to compare the climates of the native European range of the Gray Partridge with various American ranges to which the species had been introduced. To construct a "standard" climograph representing the European range, he superimposed on one another various local European climographs and then connected their extremities. The resulting figure is assumed to represent the range of temperature and precipitation for areas in which the Gray Partridge thrives. For comparison with the Illinois range, the Twomey polygon for the European optimum was

transposed on a series of Illinois climographs. Climographs for five different areas in Illinois are shown: Rockford airport, Dixon, Galesburg, Ottawa, and three miles south of Kankakee (Fig. 1). Temperature and precipitation data are presented as long term averages (1931-1960) from United States Weather Bureau data.

RESULTS AND DISCUSSION

Surveys:

A total of 768 census cards were mailed to the rural letter carriers,

and 560 or 72.9 percent were returned; 521 or 93 percent of the 560 cards returned were usable or 67.8 percent of all cards sent. This rural letter carrier survey indicated that the Gray Partridge was distributed over a continuous range including all or parts of 16 counties (Fig. 2 and Table 1). Four other counties were reported to contain isolated populations (Table 1). The highest concentration of 19.1 birds per 100 miles on a township basis was reported in Somonauk Township, DeKalb County, and Adams Township, LaSalle County. The lowest concentra-

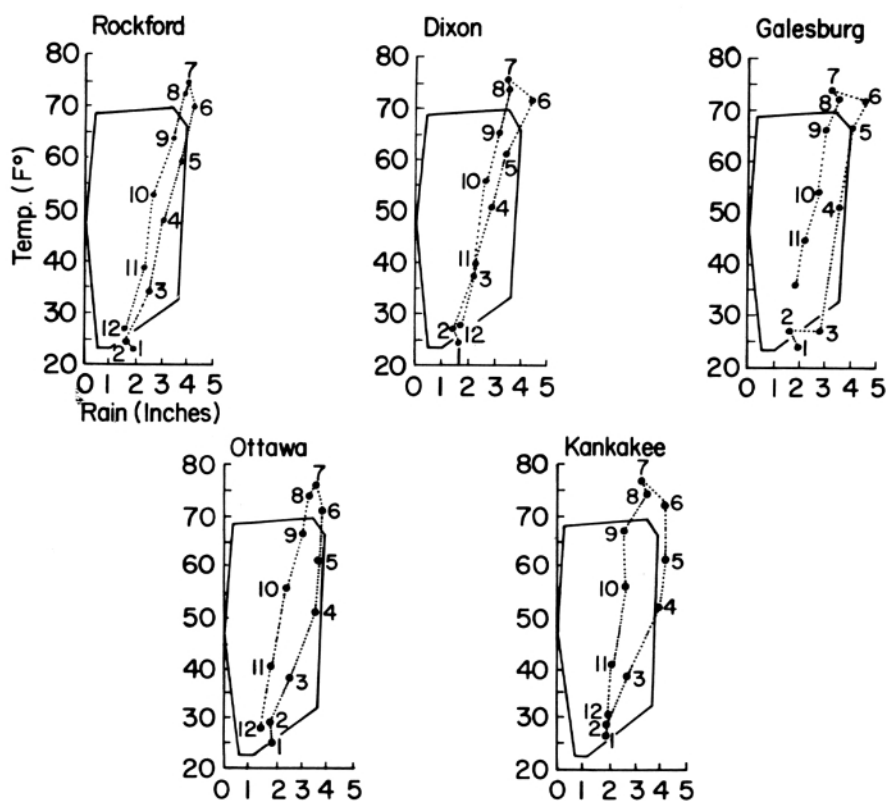


FIGURE 1. Climographs for five cities in northern Illinois (dotted lines) compared with the climograph for the optimum range for the Gray Partridge in Europe. Numbers indicate months, January through December. (Adapted from Twomey, 1936.)

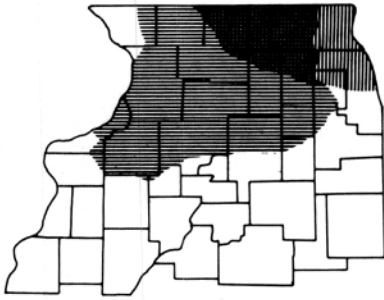


FIGURE 2. Distribution of the Gray Partridge in Illinois in 1943 (crossed and vertical lines) and 1966 (crossed and horizontal lines).

tion in the continuous range occurred in Naperville Township, DuPage County, which was 0.1 birds per 100 miles. The population indices indicated by the rural letter carrier survey provide a basis for comparison of relative abundance among Illinois counties within the Gray Partridge range. The highest concentration of partridge on a county basis was reported from Lee County and the lowest concentration from Knox and Livingston Counties.

During August the development

TABLE 1. Gray Partridge relative abundance, hunter kill, and county distribution from County Conservation Inspector responses.

County	Average Number of Partridge Observed Per 100 Miles		Total Kill/Trip 1961-1965	County Inspector Response
	County ¹	Township ²		
Lee.....	5.85	7.85	0.49	Yes
Ogle.....	3.27	4.59	1.33	Yes
DeKalb.....	2.98	3.78	0.93	Yes
Boone.....	2.80	2.80	0.46	Yes
Carroll.....	2.43	3.10	0.33	Yes
Kane.....	1.93	3.38	0.56	Yes
Kendall.....	1.45	3.38	P	Yes
Whiteside.....	1.40	2.30	0.34	Yes
Bureau.....	1.31	2.34	0.38	Yes
McHenry.....	1.31	2.81	0.51	Yes
Stephenson.....	1.22	2.08	P	Yes
LaSalle.....	0.76	4.70	P	Yes
Winnebago.....	0.76	1.53	0.95	NI
Henry.....	0.40	3.22	NR	Yes
Will ³	0.20	1.63	P	Yes
Rock Island.....	0.12	0.75	P	Yes
JoDaviess.....	0.06	0.24	NR	Yes
DuPage.....	0.04	0.17	P	NI
Warren ³	0.03	0.17	NR	No
Knox ³	0.01	0.06	NR	NI
Livingston ³	0.01	0.10	NR	No
Cook.....	NC	NC	P	NI
Grundy.....	NR	NR	NR	Yes
Lake.....	0.00	0.00	P	Yes-No ⁴
Stark.....	NR	NR	NR	Yes

1. Values obtained by adding together the values for all townships within a county of Gray Partridge observed per 100 miles and dividing by the number of townships within a county. 2. Values obtained by adding together the values for all townships within a county of Gray Partridge observed per 100 miles and dividing by the number of townships reported to contain Gray Partridge in each county. 3. Isolated populations reported. 4. Two Conservation Inspectors reported for Lake County.

of the vegetation is extensive and restricts the field of vision of the observer. Greeley, *et al.* (1962) working with Ring-necked pheasants (*Phasianus colchicus*) in Illinois, state that during August, the number of pheasants observed by the rural letter carriers was below the number seen in the winter or spring, even though more pheasants were present in late summer than in winter or spring. The same situation probably exists for the partridge; therefore, from this information and my observations I believe that a spring and/or early summer census would have shown higher population indices in the state.

Hunter kill data, obtained for the 1961 through 1965 hunting seasons from Mr. William Preno of the Illinois Department of Conservation, aided in determining the current distribution of the Gray Partridge in Illinois. These data indicate 18 counties in which one or more partridge were killed in one or more of the years 1961 through 1965 (Table 1); no information concerning abundance is inferred.

Replies were received from 28 of the 33 County Conservation Inspectors contacted. Comparison of the rural letter carrier distribution data and the County Conservation Inspectors distribution data revealed close agreement except for the southern portions of the range. Information obtained from the inspectors may be more accurate if we assume that they are more familiar with the species and the county than would be the mail carriers.

Combining the distribution data obtained from the three surveys, a generalized distribution map of the

Gray Partridge in Illinois was compiled (Fig. 2). Comparison of this map with that presented by McCabe and Hawkins (1946) shows that in the last 23 years the Gray Partridge has spread westward, southwestward, and southward in Illinois. The area of established populations now encompasses approximately the northern one fourth of the state.

Hunting pressure on the Gray Partridge in Illinois is light. County Conservation Inspectors report that most of the partridge are taken while hunting other upland game species, especially pheasants. Population trends, as indicated by information obtained from County Conservation Inspectors, seem to be upward; however, no long term population trends are available.

Climographic test of range:

The effects of climate on an introduced species play a vital role in the success of establishment and densities attained by that species in a new area. A technique used to evaluate the effects of climate on a species is the climograph (hythergraph) (Twomey, 1936).

McCabe and Hawkins (1946) used this technique for investigating the effects of climate on Gray Partridge distribution and abundance in Michigan, Ohio, and Wisconsin. They found that compared with the European optimum, climatic conditions protrude outside the optimum in Michigan, Ohio, and Wisconsin during the period in which the chicks are raised. These three states have established populations of Gray Partridge that are reportedly existing at low levels. From the data presented by McCabe and Hawkins (1946) it

appears that winter departures from the optimum conditions are tolerated; but, unless the summer climatic conditions, which affect the survival of the young, fall within the Twomey polygon, the species fails or does not thrive.

The climate of Illinois is similar to that described by McCabe and Hawkins (1946) for Michigan, Ohio, and Wisconsin. The climatic averages for Illinois for the period of chick rearing, June, July, and August, protrude outside the optimum conditions of the native range (Fig. 1). Dale (1942), working in Michigan, found that following a series of wet summers Gray Partridge populations were low, and following a series of dry summers partridge populations were relatively high. He states that in contrast to the pheasant, the Gray Partridge requires relatively dry weather during the hatching season for satisfactory reproduction.

These climographic data indicate that in summer, temperature (too high) and rainfall (too much) may well be limiting factors for the distribution and abundance of the Gray Partridge in Illinois. Illinois probably will retain partridge in relatively low densities. If this hypothesis is correct, their numbers can be ex-

pected to fluctuate in conjunction with variations in summer weather conditions; dry, cool summers should result in higher population levels than wet, hot summers.

ACKNOWLEDGMENTS

This research is a contribution to Illinois Federal Aid Project No. W-75-R. Western Illinois University, the Illinois Department of Conservation, and the Bureau of Sport Fisheries and Wildlife, cooperating.

LITERATURE CITED

- DALE, F. H. 1942. Influence of Rainfall and Soil on Hungarian Partridge and Pheasants in Southeastern Michigan. *Jour. Wildl. Mgmt.* 6(1): 17-18.
- EDMINSTER, F. C. 1954. *American Game Birds of Field and Forest*. Charles Scribner's Sons, New York City, New York. xx+490 pp.
- GREELY, F., R. F. LABISKY, and S. H. MANN. 1962. Distribution and Abundance of Pheasants in Illinois. *Illinois Nat. Hist. Survey Biol. Notes* 47. 16 pp., 2 tables, 16 figs.
- LEOPOLD, A. 1931. *Report on a Game Survey of the North Central States*. Sporting Arms and Ammunition Manufacturers' Institute, Madison, Wisconsin. 299 pp.
- _____. 1933. *Game Management*. Charles Scribner's Sons, New York City, New York. xxi+481 pp.
- MCCABE, R. A., and A. S. HAWKINS. 1946. *The Hungarian Partridge in Wisconsin*. *Amer. Midl. Nat.* 36 (1): 1-75, 14 tables, 29 figs.
- TWOMEY, A. C. 1936. *Climographic Studies of Certain Introduced and Migratory Birds*. *Ecology* 17 (1): 122-132, 12 figs.

Manuscript received October 12, 1969