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Biological Science

OAK GRUBS AND THEIR ECOLOGICAL SIGNIFICANCE

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ABSTRACT

Between the prairie and the deciduous forest is a transition zone where all stages in the prairie-forest border succession may be observed. Evidence points to the fact that this zone has fluctuated in the past due to climatic changes, fires and perhaps other factors.

Oak grubs are one of the characteristic vegetative features of this transition zone. Oak grubs are bushy individual oaks, usually short, with many sprouts, which are prevented from becoming large trees by fires or other biotic factors. The roots, and usually a surface crown, continue to grow to large proportions.

The adaptations that enable oaks to form grubs are a deep tap root and a prolific ability to re-sprout. When an acorn germinates the tap root, with its stored food, soon becomes the largest part of the plant. If fire or some rodent should destroy the stem one or more sprouts will arise from near the base. Periodic destruction of the above-ground sprouts merely increases the size of the surface crown and the number of sprouts but does not prevent the root from increasing in size. Eventually a shrub-like individual is formed whose size or age above ground in no way indicates the size or age of the root below ground. John Muir estimated some in southern Wisconsin to be over a century old.

When the pioneers started plowing the prairie sod they soon learned that the harmless-looking little oak "shrubs" were more than a match for their plows, and thus had to grub out each of these oaks, hence the name.

When areas of oak grubs are protected from fire the sprouts grow up into dense thickets which may eventually become oak woods. This is the history of much of the prairie-forest border transition zone which is now wooded owing to the cessation of fires following settlement. Many trees in such woods may be doubles or triples indicating their earlier years as many-sprouted grubs.

In some oak grub areas in the past an occasional scattered oak grub grew above the height of fire damage and developed the open-grown form. In such an oak opening there still may be many oak grubs that never made the grade. When such an area is converted to forest by natural succession these old open-grown oaks usually look out of place among the younger straight-stemmed forest-grown trees.

The significance of oak grubs as indicators in the prairie-forest border struggle presents two possibilities. They may indicate an advance of a forest species into the prairie or they may indicate the best adapted last remnant of the forest as the prairie invades.

RECENT WATERFOWL BANDING IN MINNESOTA

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ABSTRACT

Banding is one of our best methods of securing accurate information relative to movements and distribution of waterfowl. Much of our present knowledge of flyways and migration routes has accrued from banding returns. Large scale banding of waterfowl after 1920 led to the knowledge of the four major flyways in the United States and later to the definition of four administrative flyways.

The administrative flyways (Pacific, Central, Mississippi, and Atlantic) have been regarded as separate management units and hunting regulations have varied within the flyways depending on waterfowl populations, number of hunters, and other factors. Many sportsmen's groups, especially those in the Mississippi flyway, have questioned or expressed dissatisfaction with the flyway system. Many Minnesota hunters cannot understand why the hunter across the state line in North or South Dakota should have larger bag limits and claim that discrimination is being directed at the Minnesota hunter. Some Minnesota hunters also claim we should have earlier seasons in order to harvest locally produced ducks and others desire a split season.

Much of the recent banding in the Mississippi flyway has been of an objective type that may give answers to some of these current questions or doubts of the flyway system. Emphasis is on the banding of ducks known definitely to have been produced in the different parts of the flyway. This necessitates the capture of flightless young ducks rather than bait trapping of adults and young already on the wing. The Minnesota Division of Game and Fish began banding flightless young ducks in 1950 and is continuing the program at the present time.

The data summarized in this paper are of 524 recoveries of waterfowl banded in Minnesota from 1948 to 1952. Two hundred seventy-six of the recoveries are from 2,149 ducks banded by the Minnesota Division of Game and Fish during this five-year period. This is a 12.8 per cent recovery rate. The other 248 recoveries are of ducks banded at the Mud Lake Federal Waterfowl Refuge in Marshall County, Minnesota.

The 524 band recoveries involve fourteen species. The five most prominent species are listed as follows in order of number of recoveries: mallard, 296; blue-wing teal, 69; redhead, 69; ringneck, 23; and pintail, 11.

Nearly all of these 524 ducks were banded during July, August, and September. Four hundred twenty-nine were shot during the hunting season of the same summer and fall that they were banded and are referred to as "Direct Recoveries." The other 95 were shot or recovered later than this first fall and are considered "Indirect Recoveries."

Of the 230 Direct Recoveries of mallards, 126, or 54.8 per cent, were recovered in Minnesota. The general distribution of these recoveries is as follows: Mississippi flyway, 89.1 per cent; Central flyway, 7.8 per cent; Atlantic flyway, 0.4 per cent; Canada, 2.6 per cent.

Blue-wing teal is the most abundant species of breeding duck in Minnesota. Since it is somewhat of an earlier fall migrant than other species, sportsmen sometimes claim that many of the blue-wings have left the state by the time the season opens. Of the 58 Direct Recoveries of blue-wing teal, 50, or 86.2 per cent, were shot in Minnesota. The general distribution of these recoveries is as follows: Mississippi flyway, 93.1 per cent; Central flyway, 1.7 per cent; South of the United States, 5.2 per cent.

Of the 62 Direct Recoveries of redheads, 40, or 64.5 per cent were shot in Minnesota. The general distribution of these recoveries is as follows: Mississippi flyway, 77.4 per cent; Central flyway, 14.5 per cent; Atlantic flyway, 3.2 per cent; Canada, 4.8 per cent.

There were 115 recoveries of ducks banded as flightless young. Seventy-nine, or 68.7 per cent of them were shot in Minnesota. The general distribution was as follows: Mississippi flyway, 78.3 per cent; Central flyway, 13.9 per cent; Atlantic flyway, 3.5 per cent; Canada, 1.7 per cent; South of the United States, 2.6 per cent.

Direct Recoveries of all species totaled 429. Two hundred fifty-eight, or 60.1 per cent, of them were in Minnesota. The general distribution was as follows: Mississippi flyway, 84.6 per cent; Central flyway, 9.8 per cent; Atlantic flyway, 2.3 per cent; Canada, 2.6 per cent; South of the United States, 0.7 per cent.

Of the 524 total recoveries, both direct and indirect, 53.8 per cent were in Minnesota. The general distribution was as follows: Mississippi flyway, 82.1 per cent; Central flyway, 10.3 per cent; Atlantic flyway, 2.7 per cent; Canada, 4.0 per cent; South of the United States, 1.0 per cent.

SUMMARY

1. There is a need for more quantitative banding of flightless young ducks that we know are produced in a definite location.
2. Present recovery data of young birds indicate a large harvest by Minnesota hunters of ducks produced in Minnesota.
3. Present recovery data indicate something of the proportion of ducks flying from Minnesota down through the Mississippi and Central flyways. Of the direct recoveries, 84.6 per cent of all species were in the Mississippi flyway, and 9.8 per cent were in the Central flyway.
4. Probably the best use of banding data is in summarizations and analysis by the flyways as a whole rather than by an individual state. Such summaries are being prepared by personnel of State Conservation Departments and the U. S. Fish and Wildlife Service.

THE TOXICITY OF THE EGGS OF THE LONGNOSE GAR (*LEPISOSTEUS OSSEUS*)

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ABSTRACT

The eggs of the various species of gars (*Lepisosteus*) have always been reported in the literature as poisonous, but little experimental evidence has ever been published. Several people known to the authors have tried to eat the eggs and have become violently ill.

Two species, the longnose gar (*Lepisosteus osseus*) and the shortnose gar (*Lepisosteus platosomus*), are common in many of the waters of southern Minnesota. In the spring of 1952, several quarts of ripe eggs were obtained from the ovaries of longnose gars caught in German Lake, Le Sueur County. The eggs were cleaned from the membranes and placed in deep freeze for future use.

During the summer the eggs were fed to experimental animals, mostly cats. The first group of cats suffered a violent diarrhea 45 minutes after eating the raw eggs. The usual feeding was 5 grams, but even less than one gram produced the same results. Alcohol and ether extracts and the residues were prepared from the eggs and fed to several series of cats using a dosage equivalent to 5 grams of eggs. No ill effects could be observed. Later in the summer raw eggs were again fed to several series of cats but the results varied. Some cats showed no ill effects while others soon developed a violent diarrhea. This indicated that either the potency of the eggs varied or that the experimental animals possessed various tolerances for the gar eggs. The former is probably true as reactions were usually uniform for each series of cats which involved 3 to 4 individuals.

Eggs fed to chickens and to several species of fishes produced no discernable results. The authors are collecting more eggs in 1953 to continue the study and to try to isolate the toxic agent.

ECOLOGICAL AND BIOLOGICAL ASPECTS OF RODENT POPULATIONS ON THE ISLAND OF NEW CALEDONIA, SOUTH PACIFIC

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ABSTRACT

The only terrestrial mammal on New Caledonia before the coming of the white man was *Rattus exulans*. *Rattus norvegicus*, *Rattus rattus* and *Mus musculus* have been introduced and are now found in a number

of habitats. During World War II Norway and roof rats and *Mus* were abundant in and about buildings and military camps and in adjacent vegetation. *R. rattus* was feral in woodlands; *Mus* was feral in grasslands of three densities. Norway rats were not feral except as wandering individuals; they rapidly invaded preferred habitat. *R. exulans* was feral only, occurring in taller grass, brush, savannah, lowland woods, bracken fern-heath scrub and gardens. Numbers of *exulans* near dwellings seemed to be determined by population densities of the larger rats. In woodlands few *exulans* were found where *rattus* was common and none where it was abundant. *R. exulans* and *Mus* occurred together in taller grassland and savannah. Only the mouse occurred in short grass. Breeding in *norvegicus* is reduced during early winter (June); in *rattus* for the same period breeding is reduced or absent. *R. exulans* has a major breeding period about April and a second period in December. *Mus* has a major breeding period in September; breeding is reduced in December. The fact that the major breeding periods of *R. exulans* and *Mus* occur at different times of the year is considered of prime importance in permitting both species to maintain high populations where they inhabit the same grasslands. Average number of embryos per pregnant female of the Norway rat was 9.3; of *R. rattus*, 5.0; and of *R. exulans*, 3.0. Sex ratios of feral and non-feral populations are also presented. Three types of *R. rattus*, the subspecies *frugivorus*, *alexandrinus*, and *rattus*, are considered color phases on New Caledonia, and occurred in the ratio of 12:2:1, respectively. The three types exhibit no ecological differences; they interbreed in the wild and in captivity, and produce various combinations of color types in a single litter, as well as different combinations in different litters.

A PRELIMINARY REPORT ON THE SOCIAL BEHAVIOR OF THE NORTHERN LARGEMOUTH BASS *MICROPTERUS SALMOIDES* (LACEPEDE) UNDER EXPERIMENTAL CONDITIONS

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In recent years problems concerning animal social behavior and social organization have been attracting considerable attention. However, this attention has been directed mainly toward birds and higher animals which are more colorful and perhaps easier to work with.

In brief review of the literature concerning animal behavior attention should be drawn to the work of Schjelderup-Ebbe, (1922) who first described the social hierarchy which occurs in chickens. He found that a flock of domestic hens is organized in what he calls "peck-order" or "peck-right." This means that the rank of an individual within a