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# WINTER HABITS OF CROWS IN OKLAHOMA

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The crow is one of nature's most adaptable animals, else it would never have survived the persecution of the past 30 years. Instead of being reduced by diverse control activities, it has steadily increased. This has resulted from the extension of suitable wintering and summering grounds through agricultural development. Since the beginning of the present century, much of the nesting territory in Canada has been changed from bush into wheat farms, thus increasing and improving the summer range for the bird. Kalmbach (1937) and Kalmbach and Aldous (1940) showed that the northern limits of the crow's nesting territory closely approximate those of agriculture.

In its winter range, the extension of farming in western Oklahoma, Texas, and Kansas has provided an abundant winter food supply interspersed with ideal roosting sites. Kalmbach (1918) listed only a few large crow roosts in northeastern Oklahoma. Today, roosts are distributed over much of the state; there are eight large ones within a 25-mile radius in the central section. Because of this increase, depredations by crows on agricultural crops have increased in parts of the Southern Plains Area and farmers are forced to combat the birds and to alter certain old farming practices to save their crops. From October 1935 through March 1936, the author studied the situation and investigated the possibilities of control. The subject matter of this paper, however, deals with matters incidental to the main purpose of that project.

The crows wintering in central Oklahoma are referable to two forms. The weights and measurements of 301 taken February 11, 1936, near Verden, Oklahoma, and examined by Dr. Harry C. Oberholser and the author indicated that 72 per cent were *Corvus b. brachyrhynchos* and the others were *C. b. hesperus*. The average weights in grams were: *brachyrhynchos*, females, 446.4; males, 502.2; *hesperus*, females, 426.9; males, 472.9.

## Movements

Migrations into central Oklahoma start in September, but the incoming flocks are not of any great size until October with the first cold days of autumn. The maximum population usually is reached about mid-November, and from then until late January remains quite constant. The birds begin to drift out during early February toward spring roosts to the north, often at places where heavy concentrations do not occur during the autumn. The decrease is particularly noticeable during late February and early March. By March 21, when my studies terminated, only a few were left in the area. The seasonal migrations, as determined by banding returns, have been discussed elsewhere (Kalmbach and Aldous, 1940).

## Factors Conducive to Local Abundance

The winter concentrations in Okla-

homa result from a combination of favorable factors: (1) large acreages of thick brush as attractive roosting sites; (2) abundance of grain sorghums, Indian corn, spring oats, and wild fruits as a bounteous food supply; and (3) the relatively mild winters and many watering places. Crop reports from each county and an appraisal of the environment for winter abundance of crows provided material for the accompanying map (Fig. 1), which shows the location of known occupied roosts in 1935–36 and the effects of grain crops, roosting sites, and suitable terrain on the distribution of crows.

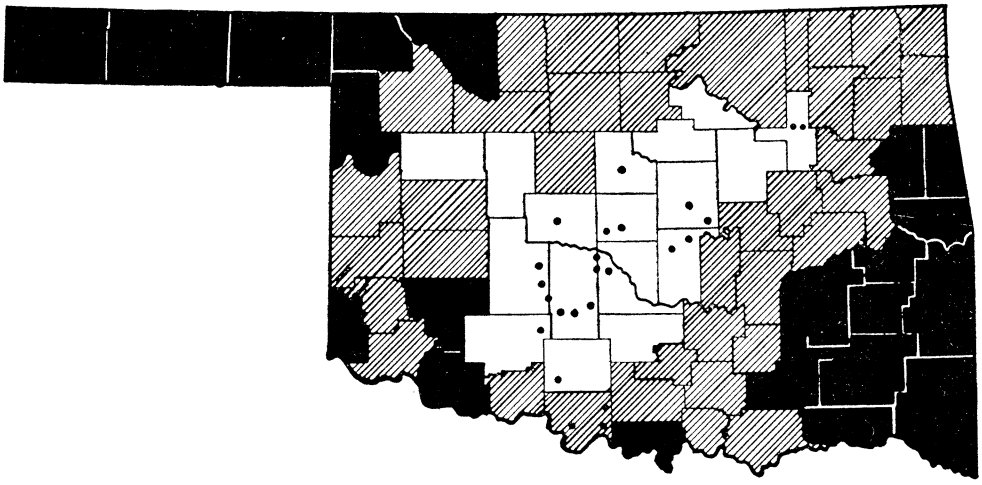

Fig. 1. Distribution of crops and of suitable roosting cover in Oklahoma in relation to winter abundance of crows. The black areas lack a proper balance between food and roosting cover. The shaded areas have acceptable crops in greater abundance and some suitable roosting cover. The unshaded areas have both abundant food and adequate terrain requirements for many crows. The dots indicate approximate location of crow roosts known to the author in the winter of 1935–36.

The western and northwestern counties have agricultural crops quite attractive to crows, but lack suitable sites for roosts. This area is colder and more windy than the central part of the state, and has fewer watering places. The eastern counties, on the other hand, abound in suitable roosting sites but the land is devoted largely to grazing and oil production and has no large acreages of sorghums or corn for food. The central part of the state possesses all necessary requirements and the birds are most numerous there.

## Roosts

In central Oklahoma crow roosts are most common in scrub oak thickets although trees of other species sometimes are used. Hillsides protected from the wind are usually chosen. The area of a roost varies with the number of birds occupying it, and may be from a few to 20 or 30 acres. Often the birds roost very compactly so that even small acreages of brush harbor unbelievably large numbers. Imler and Kalmbach (1939),

estimated that one bird per two square feet of ground surface covered by the trees was not uncommon in the roosts they studied. Applying this ratio to some roosts in thick brush would account for up to 20,000 birds per acre in the center of a roost.

A roost can be found by observing evening or morning flight lanes. At times this may be difficult by reason of rough country and impassable roads, but patience and effort usually are rewarded. The habit of crows to shift from a main roost to temporary locations during periods of disturbance, complicates matters and also gives the casual observer the impression that permanent roosts are more numerous than actually is the case; intensive campaigns of shooting and bombing tend to increase such changes. Such shifting is well illustrated by the history of one flock. In October the birds occupied a roost three miles west and one mile south of Norge, Oklahoma. Early in November they moved two and one-half miles to a roost one-half mile west of Laverty and remained until about January 20, then deserted the roost to move three miles and join an enormous roost five miles south and one mile west of Verden.

The exact location of 17 roosts was determined and the general position of seven others was reported by local residents. In each case, however, the number of crows in the vicinity was evidence of a nearby roost. The largest was five miles south and one mile west of Verden, Oklahoma; on November 19 it was conservatively estimated to harbor 200,000 crows. Quite accurate counts were made of the arriving birds until about 40,000 had entered, after which they came so fast that counting was impossible. They approached in a solid bank from three-fourths of the horizon and from as far as field glasses could reach; a rough estimate was of 25,000 in view at one time, and they continued to arrive at that rate for 45 minutes. The noise was almost deafening as each attempted to find its spot to roost. After the last had arrived, there was quiet, except for an occasional quarrel, and the roost location could not be detected by sound.

### DAILY MOVEMENTS

The birds started to leave the roosts shortly before daybreak and by the time it was light most of them had gone. By sunrise they usually were feeding in the fields. During the day they cruised as much as 8 to 12 miles from certain roosts, sometimes in all directions, but from other roosts in only one or two directions. Daily movements were governed by the direction of the feeding grounds. In the evening the crows started toward the roosts one or two hours before sunset. The first entered about sundown and shortly thereafter the main influx occurred. At some large roosts the return was not complete until an hour or more after dark.

The individual flight lanes radiating from the roosts are travelled largely by the same groups of birds from day to day. Proof of this was obtained by trapping and banding and by experiments directed towards reducing the numbers of crows. At one group of traps, where 476 were banded and released, a total of 188 re-entries into the traps were recorded. This indicated that many of the same individuals were returning to this area and also that crows are not unduly frightened by being caught and handled.

If the birds were in the habit of shifting to different flight lanes, such handling certainly should have been a sufficient cause for them to do so.

Along another flight lane, used by a large group when the study started, intensive control so reduced the number that few could be found there after the control was finished. Adjacent flight lanes were not altered so it was felt that again a particular group was using a given lane. This lane was practically unused for about 4 weeks after the control ceased, then a few birds started shifting to it from other lanes.

## UTILIZATION OF CROWS

The killing of thousands of crows by bombing directed attention to the possibility of utilizing the dead birds to offset the cost of control, aimed at curtailing their depredations.

A physician in Tulsa encouraged the eating of crows by serving them to friends at a banquet. His guests pronounced them delicious, and since then crows have been served at clubs, banquets, auctions, churches, and homes—*with the general conclusion that they are good meat.* My opinion, after eating them, is that they are as good as doves or ducks. In the spring of 1936 produce men in Oklahoma City collected bomb-killed crows by the thousands, and dressed birds were on sale in numerous meat markets at 19 cents each.

A few were dressed out, and the feathers, head, feet, and entrails proved to form about 42 per cent of the gross weight. Since the average crow weighs about 460 grams (16.2 ounces), the dressed weight would be 266.8 grams (9.4 ounces). If the eating of crows could be encouraged long enough to remove the current prejudice against this bird and its game qualities, this would go far toward solving the crow problem in areas of overabundance.

Several farmers said that crows make excellent hog feed and one near Agawam, where a crow roost was bombed, fed the birds to his hogs and reported them a good food. They would appear to be as good as the carcasses of horses and cows commonly fed to hogs.

An effort was made to induce farmers near bombings to use the dead birds as fertilizer and a few plowed them under. This practice would provide sanitary disposal of the carcasses and also help to build up the soil.

Feathers from the back and breast of the crow are excellent for pillows and feather beds. They are superior to chicken feathers because the tips of the quills are blunter, lessening the chance of passage through the ticking. One farmer's wife near Agawam, retrieved crows from a bombing and plucked the feathers; about 21 birds yielded a pound of feathers and between 700 and 800 were needed for one feather bed.

## FOOD HABITS

During most of October and until the first really cold weather, the crows fed largely in alfalfa fields and along creek bottoms, where their main diet was of insects and wild fruits. The cold weather killed most of the insects and started the grain sorghums to mature; as soon as these late maturing grains are in the dough stage they are subject to frequent visitations by crows. During years of drought or of poor crop production from other causes, the losses from crows are always greater than

when food is abundant. On November 11 the writer estimated 10,000 crows to be feeding in sorghum fields along a two-mile stretch of road. When the birds become too troublesome it has been necessary for the farmers to cut their grain and shock it around the farmyards to minimize losses by crows. The patrolling of fields is effective but must be done from daybreak until dark. The old practice of leaving shocked grain in the field until needed will have to be abandoned if a minimum of crow damage is desired. Planting earlier varieties will aid materially in reducing such losses, where soil and moisture conditions permit.

Indian corn, peanuts, watermelons, pecans, and small grains also are preyed upon by crows but in the aggregate the acreages are so small that they represent only very local problems. To individual farmers, however, losses inflicted on these crops may be serious, and must be dealt with if their livelihood is to be maintained.

During most of December and January the crows forage widely, eating almost anything available. Shocked grain left in the fields over winter is a marked attraction to them and unless efforts are made to remove the grain from the field or to fight the birds, there is little left by spring. Soft kerneled grains, such as milo maize, Hegari, and kafir corn, are much more subject to depredations than harder varieties, such as red-topped cane. Stock feeding lots and corrals usually harbor flocks of crows all winter as do slaughter houses and garbage dumps.

During the colder months much can be learned of the food of crows by studying their pellets which abound at long-established roosts. These pellets are regurgitated soon after the birds arrive at their nightly abodes, as was learned at a bombed roost. The stomachs of 295 crows killed two hours after entering the roost were opened for study and only 23 (7.8%) contained food: the remainder of the birds had already disgorged all indigestible matter in pellets.

Early in February spring plowing commences and is always attended by crows that make short work of grubs and other invertebrates so exposed. Plowing is soon followed by the planting of spring oats, which again attracts large flocks. Farmers usually accuse the birds of going down the drill marks and pecking out every kernel, but observations have shown that despite heavy crow visitations during planting, sufficient grain remains to produce a crop. A few kernels may be taken from covered drill marks but it is mainly the uncovered grain that attracts the birds. Proper preparation of the soil to avoid large clods and good drills with drag chains functioning properly will usually reduce such loss to a minimum. The greatest waste is at the turns where the drag chains do not cover the drilled grain; but cross drilling over these areas usually ensures a good stand. The interim, before these turn areas are redrilled, provides the birds with most of the grain they consume. All crow visitations cease in one to two days after the oats are planted, indicating that all the grain is not removed by the birds. It is quite certain that crow visitations to newly planted oat fields rarely make replanting necessary.

Shortly after the spring oats are sown,

the crows begin to leave these areas and to drift north and west into the wheat growing sections. No studies were made in the latter, but it is believed that the activities of the crows there are similar to those in the spring-oats area.

## SUMMARY

1. During the past 30 years, crow populations have increased in the wintering areas of Oklahoma because of more extensive agriculture both in Oklahoma and in the nesting areas in Canada. The favorable response of crows to the improved winter environment has more than offset the effect of control measures against them.

2. The birds start to migrate into central Oklahoma in September, reach their maximum winter population about mid-November, and begin to leave during early February.

3. Local factors conducive to large winter concentrations are the combination of an abundant food supply, favorable roosting sites, and mild winter climate.

4. Roost populations vary from small groups up to 200,000 or more. Roosts can be found by following evening flight lanes or by inquiry among local residents. Individual birds use the same flight lane and same general feeding area each day.

5. Crows can be utilized for human food, hog food, fertilizers, and feather products.

6. The food of crows in central Oklahoma in the early autumn is largely of insects, wild fruits, early-maturing grain sorghums, and Indian corn. During late autumn and winter they consume late-maturing grain, or that left in the field, and any that can be pilfered from corrals, hog lots, and feed stacks. In the spring the food changes largely to insects exposed by spring preparation of the soil and to spring oats.

7. Pellets are regurgitated within two hours after crows enter a roost.

8. Approximately 72 per cent of the birds taken from a roost near Verden, Oklahoma were *Corvus brachyrynchos brachyrynchos* and the others *C. b. hesperus*.

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