

# DEVELOPMENT OF ROOSTING CONGREGATIONS OF COMMON GRACKLES AND ASSOCIATED SPECIES

By PAUL A. STEWART

Although several early reports (Jones, 1897; Peck, 1905; Ripley, 1914) contained observations on summer congregations of Common Grackles (*Quiscalus quiscula*) and associated species in the eastern United States, little has been reported on how these congregations develop and how they are related to winter congregations. Maxwell and Putnam (1972) commented on the need for research on this subject, and my purpose here is to address this need. This paper is based on observations made in northcentral North Carolina, chiefly during 1970-73.

## METHODS

During all seasons of the year but particularly during April through June birds were watched as they entered and left their roosting sites. To determine the roosting places of birds in various segments of the roosting congregations, I followed the birds with an automobile as they flew around in the process of selecting roosting sites. Counts were made of birds leaving their roost in the morning of 15 April 1973. For 25 August and 7 October 1972 estimates of the numbers in congregations were made by placing papers on the ground on lines through the roosting sites and thus catching the droppings which were later dried and weighed as described by Stewart (1973), except that measurements were not made of droppings intercepted by tree branches as was done in the earlier study. Instead, estimates were rounded off to the nearest hundreds, except for birds represented by fewer than 100 individuals. To determine the relative density of grackles during the spring in rural and urban areas, counts were made from an automobile when driving through these areas.

## COMPOSITION OF ROOSTING CONGREGATIONS

The Common Grackle appeared to function as a nucleus or leader in formation of the congregations, with Starlings (*Sturnus vulgaris*), Red-winged Blackbirds (*Agelaius phoeniceus*), Brown-headed Cowbirds (*Molothrus ater*), and American Robins (*Turdus migratorius*) later joining the congregations as associates or followers. The role of grackles as leaders was apparent in the early formation of roosting congregations because they occupied specific sites first, with the other species later joining the grackles. This was particularly apparent during the spring.

During late March through May the grackles flew frequently from one potential roosting site to another, continually moving about until darkness. They then seemed to seek isolated roosting places, and some roosted in scattered small groups of fewer than 12 birds. For example, one such group of 8-10 grackles roosted in a clump of switch cane (*Arundinaria tecta*) in a backyard in Henderson during the nights 14-16 April 1973; another group contain-

ing three Starlings, two grackles, two cowbirds, and two robins roosted in a white pine (*Pinus strobus*) in a backyard in Oxford during the nights of 18-20 April 1973. Additional birds usually did not remain when they visited these small units of roosting habitat. However, even early in the spring there was at least one larger unit of roosting habitat occupied by the various species. In these larger mixed groups grackles were a minority species, as at Oxford on 15 April 1973 (Table 1). Then the main group of grackles

TABLE 1.  
Numbers of birds in roosting congregations at various stages of development.

| Date         | Location of roost | Starling | Red-winged Blackbird | Common Grackle | Brown-headed Cowbird | American Robin |
|--------------|-------------------|----------|----------------------|----------------|----------------------|----------------|
| 15 Apr. 1973 | Oxford            | 30       | 8                    | 20             | 100                  | 3              |
| 25 Aug. 1972 | Oxford            | 1,800    | 34                   | 2,400          | 400                  | 8              |
| 7 Oct. 1972  | Henderson         | 4,600    | 100                  | 7,500          | 2,300                | 24             |

settled just before darkness at other sites one kilometer or more from the mixed group, largely free from other species. Some Starlings also roosted separately from the congregation of redwings, grackles, cowbirds, and robins.

As the season advanced, particularly after the young fledged and increased the congregation size, the birds at Oxford increasingly roosted more centrally. By early August they gathered mostly into a single unit of roosting cover, often returning repeatedly to the same site on successive nights but also frequently shifting roost sites. With this increased concentration of roosting birds, the numbers of grackles in the congregations greatly increased (Table 1). Thereafter, throughout the late summer, fall, and early winter the grackle was normally the dominant species in roosting congregations. However, a large flock, chiefly of redwings, roosted several weeks in a woods 13 km from Henderson during the late fall of 1969. Also, approximately 5,000 Starlings roosted in association with Rock Doves (*Columba livia*) in an old building in Henderson during the winter of 1965-66; thus, in northcentral North Carolina grackles were usually but not always the leaders in development of roosting congregations.

The evening gathering of grackles into central areas gave the appearance that communal roosting was thus being effected. However, in the early spring, the continual leaving of preoccupied sites by birds seeking roosting places resulted in the birds actually roosting at scattered sites. Even when the birds roosted in the same tract of woodland, they roosted at rather scattered positions. The maximum density of roosting birds recorded per square meter in the Oxford roost on 25 August 1972 was eight birds, and in the Henderson roost on 7 October 1972 it was 17 birds. Birds in winter congregations attained densities as high as 195 birds per square meter of area (Stewart, 1973).

## MECHANISM FOR DEVELOPMENT OF ROOSTING CONGREGATIONS

All suitable dense trees or areas of dense vegetation were soon occupied by small groups of roosting birds as the grackles flew around within urban areas seeking isolated sites. With the scattered sites filled by these small groups, remaining birds found acceptable sites by using parts of larger units or scattered trees among groups of trees. Thus, birds were brought into roosting congregations by clumping of suitable facilities for roosting, and the congregations ultimately to contain literally millions of birds started with scattered small groups of less than a dozen birds.

During the winter erratic shifts were made between various sites, including those at Burlington, Durham, Goldsboro, Rocky Mount, and Scotland Neck. However, as the winter sites were selected from a larger area than summer sites, more selectivity was shown in the choice of the winter sites. The specific sites used were often different in successive years; however, the same sites were sometimes used continually through long periods. W. A. Kitchin advised me in 1971 that a congregation had used his woods beside Scotland Neck each winter since 1918, but even here the same part of the woods was not continually used. The relative permanence in use of the Kitchin woods was presumably related to the large size of the woods, 250 acres.

## COMMON GRACKLES ROOSTING IN URBAN AREAS

In northcentral North Carolina where my observations were made, roosting congregations with Common Grackles as the nucleus species were always formed in or adjacent to urban areas. During the summer of 1972 one group of 10-15 grackles roosted about three km from Warrenton, this being the farthest from a city where a summer roost was found, including the North Carolina cities of Burlington, Durham, Goldsboro, Henderson, Louisburg, Oxford, Raleigh, Roanoke Rapids, Rocky Mount, Scotland Neck, and Warrenton. All summer congregations containing grackles were associated with cities, and all cities with more than several thousand people had at least a small roosting congregation of these birds.

It seems probable that the movement of these birds into urban areas from surrounding rural areas was related to the social attraction associated with their higher density in the urban areas. To determine the relative density of nesting grackles in urban and surrounding rural areas, counts were made of grackles seen when I traveled through Oxford and Henderson and the surrounding rural areas. These counts were made in 1973 at mid-day on 10 March, 14 April, and 25 May. The same areas were covered on all trips; 74 km was covered each time in the rural areas and 12 km in the urban areas. With the counts showing a mean of 2.5 birds per kilometer of travel in the urban areas and 0.25 in the rural areas, the density of grackles was approximately 10 times higher in the urban than in the rural areas.

## DISCUSSION

Counts and estimates of the roosting populations were made additional to those presented in Table 1; in the interest of conserving space, a minimum number of representative counts are given.

Making counts of birds when traveling in an automobile was chosen as the best available method to gather information on the relative abundance of Common Grackles in urban and surrounding agricultural areas but because of possible differences in conspicuousness of birds in the two habitats, the resulting counts are not offered as precise measurements. Thus, it cannot be claimed that Common Grackles were exactly 10 times more abundant in urban than in surrounding rural areas. However, the difference was of a magnitude to indicate a substantial difference in the size of the population in the two habitats, and the exact difference is not essential to the conclusion which is derived.

## SUMMARY

Roosting congregations of Starlings, Red-winged Blackbirds, Common Grackles, Brown-headed Cowbirds, and American Robins were studied at and near their roosts in northcentral North Carolina. The Common Grackle was the usual nucleus species or leader in establishment of the roosting places, and the other species were associates or followers. In the spring small groups of birds roosted in isolated dense trees or clumps of dense vegetation. Final gathering into central locations in the spring seemed to result from grouping of trees and the resulting combination of suitable roosting places. With advance of the seasons, congregations increased in size by merging of smaller congregations. The birds also roosted more closely spaced as the season passed and as the roosting congregations increased in size. In the early stages of the annual development of roosting congregations, Common Grackles showed behavior indicating conflict between communal and noncommunal roosting, gathering into central sites only to fly about and finally roost separately or in small groups. Use of specific sites for roosting was usually temporary and seasonal. Correlated with a higher density of Common Grackles in urban than in rural areas during the summer, congregations with this bird as a leader always roosted in or near urban areas.

## LITERATURE CITED

- JONES, L. 1897. The Oberlin summer grackle roost. *Wilson Bull.*, 4: 39-56.  
MAXWELL, G. R., II, AND L. S. PUTNAM. 1972. Incubation, care of young, and nest success of the Common Grackle (*Quiscalus quiscula*) in northern Ohio. *Auk*, 89: 349-359.  
PECK, C. J. 1905. The Overbrook grackle roost. *Cassinia*, 1905(9): 36-39.  
RIPLEY, L. W. 1914. A successful campaign against grackles and Starlings in Hartford, Conn. *Bird-Lore*, 16: 362-364.  
STEWART, P. A. 1973. Estimating numbers in a roosting congregation of blackbirds and Starlings. *Auk*, 90: 353-358.

203 Mooreland Drive, Oxford, North Carolina 27565. Received 5 December 1973, accepted 2 April 1975.