

MOVEMENTS OF THE GREAT-TAILED GRACKLE IN TEXAS

KEITH A. ARNOLD AND LEON J. FOLSE, JR.

The Great-tailed Grackle (*Quiscalus mexicanus*) is an interesting species in that it has expanded its distribution rather dramatically in the 20th century (Selander and Giller 1961, Oberholser 1974). The species has received much attention, including systematics (Selander and Giller 1961), vocal behavior (Kok 1971), food habits (Davis and Arnold 1972), and growth rate and thermoregulation (Gotie and Kroll 1973). Little information is available on the movements of this grackle, especially in the area of its range expansion. This paper is intended to present such information for the Great-tail in the central parts of Texas.

METHODS AND STUDY AREA

Arnold initiated a banding and color-marking program in April 1967, as part of a study on the population dynamics and social structure of the Great-tailed Grackle. Except for minor interruptions, this banding program has been continued by Arnold and his graduate students to the present. Emphasis in mode of capture has varied from one year to the next. Thus most bandings of nestlings took place in the breeding seasons of 1967, 1968, 1971, and 1972, while mass banding at roosts with a light trap was limited to 1969, 1970, and 1971. Decoy traps were used every year, generally from September through March since 1969, but were used through July in 1973 and used continuously since September 1973. This latter method caught relatively few Great-tails until November 1973, when the permanent trap began to catch this species almost exclusively.

We banded most birds in the area of Bryan-College Station, Texas. However decoy traps have been operated up to 15 km from these cities, and a light trap was used at a roost approximately 17 km west of Bryan.

The area encompassed by our banding operations included the Bryan-College Station metropolitan area, flood plains of the Brazos and Navasota rivers, plus many hectares that were originally post oak (*Quercus stellata*) savannah and blackland prairie (see Coon 1974, for detailed description of the study area). The Brazos River lowlands were used primarily for production of cotton (*Gossypium hirsutum*), grain sorghum (*Sorghum bicolor*), and soybeans (*Glycine max*), while much of the uplands and the Navasota River lowlands was used for pasturing livestock (Coon 1974).

We grouped our recoveries for analyses by location of recovery, sex, and age at banding. The age groups differ between males and females, but these differences reflect breeding characteristics of the birds. For males in the spring, second year birds can be distinguished from older birds by plumage characteristics, and these second year males do not breed. Among females in the spring, second year birds are difficult to distinguish from older birds. However, these second year females do nest along with the older females. Consequently, we class second year males as immatures, but second year females as adults.

Kruskal-Wallis statistical tests were from Conover (1971) and are based on ungrouped

TABLE 1
NUMBER OF BIRDS BANDED BY YEAR IN EACH SEX-AGE CATEGORY

	1967	1968	1969	1970	1971	1972	1973	1974	Total
Males									
Adults	97	78	114	288	131	8	71	239	1026
Immatures	30	19	37	25	76	1	28	894	1110
Nestlings	42	51	18	6	61	26	-	-	204
Females									
Adults	109	58	106	286	542*	113	121	507	1842
Immatures	122	23	22	49	-*	2	249	1207	1674
Nestlings	50	34	12	2	53	32	-	-	183
Totals	450	263	309	656	863	182	469	2847	6039

* No attempt made this year to age females in roost-trapping.

data, and other statistical tests were from Steel and Torrie (1960). We used a .05 significance level in all statistical tests.

RESULTS

Between April 1967 and December 1974, we banded over 6000 Great-tailed Grackles within the study area (Table 1). We received 117 recoveries, of which 60 were from outside the study area (Fig. 1). All recoveries but one are from Texas. The exception is a winter-banded adult male recovered the second spring after banding in Oklahoma City, Oklahoma. These recoveries may be roughly grouped into 3 categories: (1) those recovered south (S) of the study area in the drainage of the Brazos River and adjacent portions of the coastal plain; (2) those recovered to the west and northwest (WNW) of the study area, generally within the drainage of the Brazos River; and (3) those recovered to the north (N) of the study area and outside the drainage area of the Brazos River. The remaining 57 recoveries were within the Bryan-College Station area (BCS).

The recoveries from the different areas did not occur at the same times of year (Fig. 2; Kruskal-Wallis test, based on days to recovery after 1 December). Basically, those recoveries from the south (S) occurred in late winter or spring migration, while those from the remaining areas were made at other times of the year.

There were no significant differences among areas, between the sexes or between birds banded as adults and fledglings in mean time to recovery after banding. Mean time to recovery of birds banded as nestlings was less than

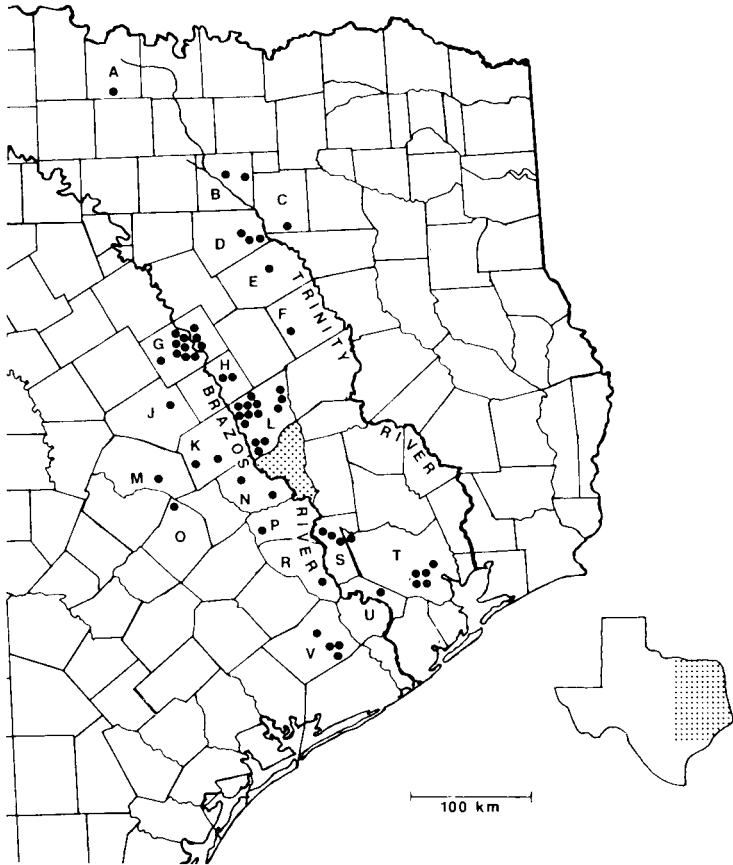


FIG. 1. Locations of Great-tailed Grackles recovered in Texas outside the study area (stippled). Counties as indicated by letters: A, Montague; B, Dallas; C, Kaufman; D, Ellis; E, Navarro; F, Freestone; G, McLennan; H, Falls; J, Bell; K, Milam; L, Robertson; M, Williamson; N, Burleson; O, Bastrop; P, Washington; R, Austin; S, Waller; T, Harris; U, Fort Bend; V, Colorado. Insert shows relative portion of Texas depicted on map.

that for birds banded when older (Kruskal-Wallis tests, based on days to recovery after banding).

Recoveries were classified by location, sex, and age at banding (Table 2). An analysis of variance with these 3 factors revealed no significant variation with respect to sex and age upon percent of banded birds recovered. There was significant variation in percent recaptures among the recovery areas. Single degrees of freedom comparisons showed that percent recoveries were

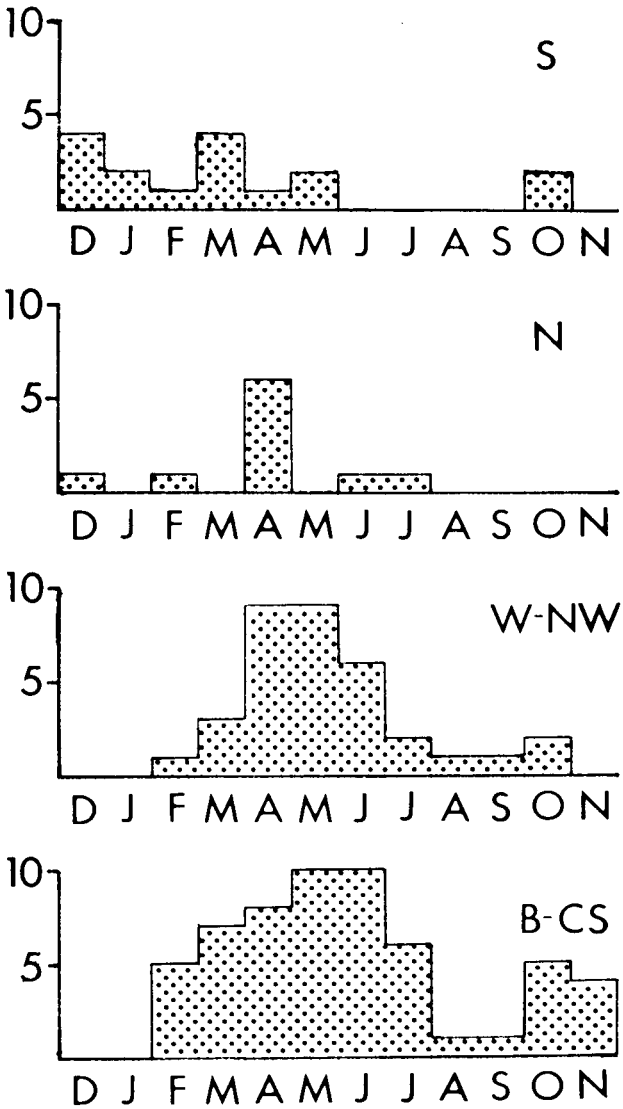


FIG. 2. Recoveries of Great-tailed Grackles by month and location. (See text for locations.)

TABLE 2
NUMBER AND PERCENT OF TEXAS RECOVERIES BY REGIONS

	North*	Northwest & West	South	Bryan-College Station	Total
Males					
Adults	3 (.29) **	6 (.58)	2 (.20)	13 (1.27)	24 (2.34)
Immatures	1 (.09)	8 (.72)	6 (.54)	12 (1.17)	28 (2.52)
Nestlings	0	1 (.49)	0	4 (1.96)	5 (2.45)
Females					
Adults	5 (.27)	13 (.71)	6 (.33)	16 (.87)	40 (2.18)
Immatures	1 (.06)	4 (.24)	2 (.12)	7 (.42)	14 (.84)
Nestlings	0	2 (1.09)	0	4 (2.19)	6 (3.28)

* Includes the Oklahoma recovery.

** Percentages are based upon numbers originally banded in each sex-age category from 1967 through 1974.

greatest in Bryan-College Station with WNW next, followed by S and N which were indistinguishable from each other.

DISCUSSION

The Great-tailed Grackle has expanded its range northward into Kansas in the past few years and has become established there as a summer resident (Schwilling 1971). In this northward expansion, the status of the species has changed dramatically in central and northern Texas (Davis 1940, Arnold 1973). These northern Texas populations are apparently partially migratory as evidenced by recoveries in this study and by the dramatic increase in numbers of this species that occur in the local fall and winter roosts.

Our banding studies demonstrate southward shifts in blackbird populations of the Bryan-College Station, Texas area in mid-winter with replacement by populations from the north; this is indirectly indicated by the lack of recaptures for Great-tails banded in the earlier part of the winter even though large numbers of this species continue to be captured. These population shifts, which generally coincide with the onset of the severe portion of our winter, do not always occur in mild winters. We know of several winter roosts in the Dallas-Ellis county area that have Great-tails associated with them, so not all Great-tailed Grackles migrate south from that area. We have a number of recaptures and sightings in the Bryan-College Station area of color-marked birds or birds marked during the breeding season or fall and early winter that were made in the severe portion of the winter. Further, at least 2 Great-tails have been recovered in the Dallas-Ellis county area

during the winter months subsequent to their banding on the study area in a preceding October. It is not clear whether these birds represent an age class with migratory patterns different from other age classes or whether this represents a failure to migrate due to mild climatic conditions; only further recoveries will resolve this point. The latter possibility is likely since 2 winters occurred (1969-70 and 1973-74) without a mid-season population shift for Great-tailed Grackles in our study area.

We believe that the Brazos River valley serves as a natural migration route, based on recoveries south and west-northwest of our area. The grackles recovered to the north, however, are in the Trinity River drainage. Area N (Fig. 1) lies at the eastern edge of the post oak savannah and black land prairie regions and at the western edge of the East Texas pinelands. As the Great-tail is essentially a bird of the open country, it appears to us that the southward migration from the Dallas-Ellis county area represents avoidance by this grackle of unsuitable vegetation zones. Recoveries from Navarro and Freestone counties, intermediate in geographic position, support this idea. The presence of livestock operations and extensive growing of grain sorghum in the Brazos River valley may offer attractive food sources to flocks of migrating Great-tails.

Two female grackles recovered to the south of Bryan-College Station represent another problem; both were recovered in May (one each in Waller and Washington counties). The date is late for migrant grackles, but the locations are geographically intermediate between wintering areas on the coastal plain and the study area. As one of the females was banded as an adult the previous May, the possibility exists that the bird had changed breeding areas.

Many of the birds recovered from the north and west-northwest were banded in September and October as immatures. We do not know whether these birds were hatched locally or were migrants. Some of these recoveries must represent dispersal of young birds in a species that is rapidly expanding its range. This is supported by recoveries of 3 birds banded as nestlings on the study area: a male and a female recovered in Robertson County, and a female recovered in McLennan County, both northwest of our study area.

It is possible that birds entering the local roosts in late summer and early fall (August to October) may represent the coalescing of adjacent breeding populations with those of the Bryan-College Station area; however additional studies are needed to clarify this. We know that many breeding colonies of this species exist in surrounding communities, but Great-tails are difficult to observe in those areas during the winter months. Further recoveries will clarify our knowledge of the migration of Great-tailed Grackles.

SUMMARY

Between April 1967 and December 1974, over 6000 Great-tailed Grackles were banded in Brazos County, Texas. Through September 1976, 117 recoveries were reported, with 60 from outside of Brazos County. These outside recoveries were grouped into 3 geographic areas: birds recovered to the south that represent a mid-winter population shift; those recovered to the west and northwest, representing migration along the Brazos River valley; and birds from the north that may represent migration along the edge of the East Texas pine lands. These latter 2 groups probably also include young birds dispersing away from breeding colonies in the study area.

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LITERATURE CITED

- ARNOLD, K. A. 1973. The birds of Brazos county; Thirty years in retrospect. Bull. Texas Ornithol. Soc. 6:4-6.
- CONOVER, W. J. 1971. Practical nonparametric statistics. John Wiley, New York.
- COON, D. W. 1974. Daily movements of the Brown-headed Cowbird in south-central Texas during winter. Ph.D. thesis, Texas A&M Univ., College Station.
- DAVIS, W. B. 1940. The birds of Brazos county, Texas. Condor 42:81-85.
- DAVIS, W. R., II and K. A. ARNOLD. 1972. Food habits of the Great-tailed Grackle in Brazos County, Texas. Condor 74:439-446.
- GOTIE, R. E. AND J. C. KROLL. 1973. Growth rate and ontogeny of thermoregulation in nestling Great-tailed Grackles, *Cassidix mexicanus prosopidicola* (Icteridae). Condor 75:190-199.
- KOK, O. B. 1971. Vocal behavior of the Great-tailed Grackle (*Quiscalus mexicanus prosopidicola*). Condor 73:348-363.
- OBERHOLSER, H. C. 1974. The bird life of Texas. 2 vols. Univ. Texas Press, Austin.
- SCHWILLING, M. D. 1971. Rapid increase and dispersal of Boat-tailed Grackles in Kansas. Kansas Ornithol. Soc. Bull. 22:15-16.
- SELANDER, R. K. AND D. R. GILLER. 1961. Analysis of sympatry of Great-tailed and Boat-tailed Grackles. Condor 63:29-68.
- STEEL, R. G. D. AND J. H. TORRIE. 1960. Principles and procedures of statistics. McGraw-Hill, New York.