

NESTING EFFORT AND TERRITORIAL MALE BIRDS IN A BREEDING BIRD COMMUNITY

JAMES G. DICKSON, USDA Forest Service, Southern Forest Experiment Station, Wildlife Habitat and Silviculture Laboratory, Nacogdoches, TX 75962
JOHN W. GOERTZ, Department of Zoology, Louisiana Tech University, Ruston, LA 71270

Abstract: Number of active nests was compared with number of territories of singing male birds determined by spot mapping for 16 common species in north Louisiana. The number of active nests per number of territories ranged from 0 to 2.3. Carolina wrens (*Thryothorus ludovicianus*), white-eyed vireos (*Vireo griseus*), yellow-billed cuckoos (*Coccyzus americanus*), northern orioles (*Icterus galbula*), orchard orioles (*Icterus spurius*), common grackles (*Quiscalus quiscula*), eastern meadowlarks (*Sturnella magna*), and bobwhites (*Colinus virginianus*) had less than 0.6 nests per territory. American robins (*Turdus migratorius*), mourning doves (*Zenaida macroura*), brown thrashers (*Toxostoma rufum*), and loggerhead shrikes (*Lanius ludovicianus*) had more than 1.4 nests per territory. Caution is urged when using spot map results to infer reproductive efforts.

Proc. Ann. Conf. S.E. Assoc. Fish & Wildl. Agencies 35:97-100

Spot mapping is a common technique for censusing passerine breeding birds (Robbins 1978). Little information relates spot map census data to other aspects of bird communities. Williamson (1964) was concerned about surplus males, i.e., birds categorized as (1) migrant, (2) visiting males outside their territory, (3) wandering unmated males, (4) males temporarily holding territories, and (5) wandering males which stayed on the study area. Best (1975) found that spot-map population estimates of 15 known pairs of field sparrows (*Spizella pusilla*) ranged from 8 to 13 pairs from 5 different evaluators. However, many other questions remain unanswered. Are all singing males mated? What does the number of territorial male birds censused mean in terms of reproductive efforts, and how does this vary within a species and between species?

By evaluating nesting effort in relation to spot map censuses of territorial males, this investigation suggests answers to the above questions and provides another insight into bird community dynamics.

Financial support for data collection for this manuscript was provided by the School of Forestry and the Department of Zoology, Louisiana Tech University, Ruston, Louisiana. We thank Louis B. Best for reviewing a previous draft of the manuscript.

METHODS

The study was conducted on the Louisiana Tech University Arboretum in Ruston, Louisiana. The arboretum covers about 14.6 ha and is roughly rectangular. The study area consists of about 5.7 ha of pine (*Pinus taeda*, *P. echinata*, *P. elliottii*) habitat over 20 years old, 0.5 ha of fallow field, and has 8.4 ha in open

grassy areas with shrubs and trees, most under 5 m in height. Ground cover was predominantly Bermudagrass (*Cynodon dactylon*) and carpetgrass (*Axonopus affinis*). The study area is bounded on the east by a privet (*Ligustrum sinense*) thicket and on the other 3 sides by pasture. The terrain is gently rolling and elevations are near 92 m.

The area was censused for breeding birds by spot mapping by the 1st author using procedures described by the International Bird Census Committee (1970). Eight counts were made of birds on the study area between 4 and 24 May. All counts were conducted between 0603 and 1005 h. The 2nd author and several students conducted intensive nest searches for new nests and reinspected old nests on the study area periodically from 10 to 24 May. Prior experience of the 2nd author in nesting studies on the area aided in nest location. Numbers of nests constructed and eggs laid by species were recorded. Although the clumped vegetation of the area facilitated nest detection, a few nests probably were overlooked. The number of active nests (those in which eggs were laid) was compared with the number of territorial male birds for each species having 2 or more territories. Species having fewer than 2 territories were omitted because of the small sample size.

RESULTS AND DISCUSSION

Interspecific variation in number of nests per active territory varied widely (Table 1). The number of active nests per territory for 16 species ranged from 2.3 to 0.0. In Sweden, Nilsson (1977), using 3 years of data for 5 passerines, found the

Table 1. Territorial male birds and nests found.

Species	Number of		
	Active nests	Territorial males	Nests per territory
Loggerhead shrike (<i>Lanius ludovicianus</i>)	7	3	2.3
Brown thrasher (<i>Toxostoma rufum</i>)	16	7.5	2.1
Mourning dove (<i>Zenaida macroura</i>)	5	3	1.7
American robin (<i>Turdus migratorius</i>)	3	2	1.5
Cardinal (<i>Cardinalis cardinalis</i>)	5	4.5	1.1
Mockingbird (<i>Mimus polyglottos</i>)	8	10	0.8
Blue jay (<i>Cyanocitta cristata</i>)	2	3	0.7
Red-winged blackbird (<i>Agelaius phoeniceus</i>)	12	19	0.6
Bobwhite (<i>Colinus virginianus</i>)	2	4	0.5
Eastern meadowlark (<i>Sturnella magna</i>)	2	4.5	0.4
Common grackle (<i>Quiscalus quiscula</i>)	1	3	0.3
Orchard oriole (<i>Icterus spurius</i>)	1	7	0.1
Northern oriole (<i>Icterus galbula</i>)	0	2	0
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	0	2.5	0
White-eyed vireo (<i>Vireo griseus</i>)	0	3	0
Carolina wren (<i>Thryothorus ludovicianus</i>)	0	4	0
Total	64	82	
Mean	4.0	5.1	0.8

number of nests per "best estimate" of territorial male birds ranged from 0.92 to 0.41.

American robins, mourning doves, brown thrashers, and loggerhead shrikes had 1.5 or more nests per territory. Singing male birds were detected infrequently in relation to active nesting efforts. A polygynous mating system would explain the high ratios of nests to singing males. But according to Verner and Wilson (1969), Mackey (1965), and Sherman (1912) the 4 species with high ratios are probably monogamous. The 5 mourning dove nests found were clumped in 2 areas, and cooing in these areas was interpreted as 3 territories. Swank (1955) found as many as 3 active dove nests in single trees in Texas. Few loggerhead shrikes were heard, because they are not persistent singers (Graber et al. 1973). The study area was ideal nesting habitat for brown thrashers. Active thrasher nests were abundant and easy to locate in the dense shrubs surrounded by mowed open areas. However, male thrashers did not sing often when paired, and simultaneous detections of adjacent territorial male birds were infrequent. Therefore a low proportion of territorial males was detected. The red-winged blackbird (*Agelaius phoeniceus*), blue jay (*Cyanocitta cristata*), mockingbird (*Mimus polyglottos*), and cardinal (*Cardinalis cardinalis*) had nest-to-territory ratios near 1.0.

Orchard orioles, common grackles, eastern meadowlarks and bobwhites had less than 0.6 nests per territory. Several different explanations could account for the low nest-to-territory ratios. Orchard oriole nesting usually extends beyond May and peak nesting was probably later than our census. Also, some of the singing orchard orioles were distinguishable as males about one year old, and they probably did not mate. Thomas (1946) found that 1st-year male orchard orioles were crowded into less desirable habitat by mature males. Common grackles do not have a regular song and are community nesters; therefore, territorial mapping for grackles was probably not accurate. Eastern meadowlark and bobwhite nests were difficult to find in the grass and mowing may have destroyed some.

No active nests of Carolina wrens, white-eyed vireos, yellow-billed cuckoos, or northern orioles were located. Carolina wrens and white-eyed vireos generally inhabit low vegetation (Dickson and Noble 1978) which was limited in the study area. These birds probably nested in a thicket adjacent the study area. Additionally wren nests could have been well hidden in the mulch at the base of trees. Yellow-billed cuckoos commonly have large territories compared to most passerines. A census taker would likely overestimate number of territories of a species with large territories, as the males move about the area vocalizing intermittently. Cuckoos are also vocally conspicuous during breeding season (Dickson 1974). Northern orioles commonly sing when migrating and rarely nest in north Louisiana. Most or all of the singing males probably did not establish territories in the area.

Reproductive effort, or nesting, is not reflected in standard spot mapping censuses. Considerable variation between species exists in the ratio of active nests to number of territories. Therefore caution is urged in extrapolating results from spot map censuses.

Spot mapping has been widely used in bird censusing (Robbins 1978). Bird population estimates from spot mapping are probably closer to actual populations than bird population estimates from transect censusing (Dickson 1978, Franzreb 1976). But in studies of treatments (e.g., habitat) effects on bird communities, transect censusing is appropriate and is recommended (Conner and Dickson 1980).

LITERATURE CITED

- Best, L. B. 1975. Interpretational errors in the "mapping method" as a census technique. *Auk* 92:452-460.
- Conner, R. N., and J. G. Dickson. 1980. Strip transect sampling and analysis for avian habitat studies. *Wildl. Soc. Bull.* 8:4-10.
- Dickson, J. G. 1974. Seasonal populations and vertical distribution of birds in a south central Louisiana bottomland and hardwood forest. Ph.D. Thesis. La. State Univ., Baton Route. 130pp.
- _____. 1978. Comparison of breeding bird census techniques. *Am. Birds* 32:10-13.
- _____, and R. E. Noble. 1978. Vertical distribution of birds in a Louisiana bottomland hardwood forest. *Wilson Bull* 90:19-30.
- Franzreb, K. E. 1976. Comparison of variable strip transect and spot-map methods for censusing avian populations in a mixed-coniferous forest. *Condor* 78:260-262.
- Graber, R. R., J. W. Graber, and E. L. Kirk. 1973. Illinois birds; Laniidae. III. *Nat. Hist. Surv. Biol. Notes* No. 83. Urbana, Ill. 18pp.
- International Bird Census Committee. 1970. An international standard for a mapping method in bird census work recommended by the international bird census committee. *Audubon Field Notes* 24:722-726.
- Mackey, J. P. 1965. Cooing frequency and permanence of pairing of mourning doves. *J. Wildl. Manage.* 29:824-829.
- Nilsson, S. G. 1977. Estimates of population density and changes for Titmice, Nuthatch, and Tree-creeper in southern Sweden — an evaluation of the territory mapping method. *Ornis Scand.* 8:9-16.
- Robbins, C. S. 1978. Census techniques for forest birds. Pages 142-163 in R. M. DeGraaf, Tech. Cor., *Proceedings of the Workshop Management of Southern Forests for Nongame Birds*, USDA For. Serv. Gen. Tech. Rep. SE-14.
- Sherman, A. R. 1912. The brown thrasher, (*Toxostoma rufum*) east and west. *Wilson Bull.* 24:187-191.
- Swank, W. G. 1955. Nesting and production of the Mourning Dove in Texas. *Ecology* 36:495-505.
- Thomas, R. H. 1946. An orchard oriole colony in Arkansas. *Bird-Banding* 17:161-167.
- Verner, J., and M. F. Willson. 1969. Mating systems, sexual dimorphism, and the role of male North American passerine birds in the nesting cycle. *Ornithol. Monogr.* No. 9. AOU. 76pp.
- Williamson, K. 1964. Bird census work in woodland. *Bird Study* 11:1-22.