Seasonality of Mourning Dove Nesting in Florida[1]

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Abstract: Seasonality of nesting by mourning doves (*Zenaida macroura*) in north-central Florida was investigated in 1979–80 by assessing changes in call (coo) counts, gonad size, nesting activity, and crop gland development. We assessed the incidence of nesting during the fall and possible impacts of hunting on dove productivity. Weekly call counts taken during this study indicated that incidence of cooing was highly variable; the highest levels of cooing occurred during February and March and they diminished as the spring and summer progressed. Very little cooing was recorded from October through December. Recrudescence of testes in adult males occurred in December, with some regression in size during September. Ovaries increased in size during February and March and diminished during August. Most adult ovaries appeared to be inactive in fall. Eggs and nests first appeared in late February of each year, peaked in both April and June, and were scarce by August and September. At least 95% of nesting activity was completed by 1 September. All birds collected during spring and summer had active crop glands but only 1 bird out of 25 (4%) collected between 1 October and 28 February had an active crop gland. All aspects of our study indicated that doves in north-central Florida nest primarily between late February and August. We found no evidence that an October–January hunting season would substantially reduce the productivity of mourning doves.

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Mourning doves nest in the 48 coterminous states in the United States (Aldrich and Duvall 1958) and use a wide variety of habitats. Nearly 50 million doves are taken each year by hunters in the 34 states that allow hunting (Keeler 1977). In total numbers taken, mourning doves are more "important"

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than all other game birds combined (Keeler 1977:276). Management efforts by wildlife agencies have included monitoring breeding populations by recording dove call-counts, setting hunting seasons, establishing bag limits, assisting with food plot establishment, and managing hunting areas.

Dove hunting seasons are generally among the earliest of game seasons to open; in 1981, 33 of the 34 states which permit dove hunting opened the season in September (Dolton 1982). In Florida, the dove season typically begins in early October (Marion et al. 1981). Mourning dove nesting continues into the early fall and concerns have developed over the potential impact of early fall hunting on nesting success and productivity of mourning doves. A need exists for further information on this subject from a number of states in the United States.

As 1 segment of a larger research effort to show seasonal dove nesting patterns throughout the United States and to facilitate effective management of dove hunting, we conducted this study in north-central Florida to determine the phenology of mourning dove nesting by recording annual changes in call counts, gonadal development, nesting, and crop gland activity. Also, we assessed the timing of these phenological events in relation to the hunting season and the possibility of detrimental effects on dove productivity.

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Methods

The Mourning Dove Call Count is a standardized censusing technique used nationwide since 1953 (Dolton 1982). Over 1,000 randomly located routes are surveyed by vehicle once a year between 20 May and 5 June. Each route is 37 km (20 mi) long on a secondary road and has 20 3-min. listening stations spaced 1.6 km (1 mi) apart. All doves heard calling or seen and number of coos heard at each station are recorded. In this study, a single call count route (No. 0100 located near the boundary between Alachua and Marion counties, Florida) was traversed once a week from mid-January 1979 to mid-January 1980.

Three study areas in the vicinity of Gainesville, Alachua County, Florida representing different vegetation and land use patterns, were intensively searched for mourning dove nests in 1979 and 1980. A 16-ha area on the northern edge of Paynes Prairie State Preserve was typical "old field" habitat; it was recovering slowly from heavy grazing pressure and was relatively free of disturbance by humans. Agricultural cropland was represented by a 22-ha

study area on the Gainesville Agribusiness Center, a community-funded, vocational training farm in northeast Gainesville. This area was surrounded on 3 sides by pine flatwoods and a suburban community on the fourth side. The third area, representing suburban land use, was a 10-ha area on the campus of the University of Florida. Roads, walkways, parking lots, and heavy human use during business hours (0730–1730 hours) characterized this area.

Each study area was searched weekly for nests from February 1979 through October 1980. A 10-m telescoping aluminum pole with a mirror was used to check nests. Nests were frequently checked from a distance, and all nests were observed at 10 days post-hatching to determine fledging success. Nestlings were aged using descriptions from Hanson and Kossack (1963). U.S. Fish and Wildlife Service data forms were used to record habitat type, height of nest, height and species of nest tree, dates visited, number of eggs, nestlings, or fledglings, their age and where applicable, type of predation or nest loss.

Trapping sites (2) were on the University of Florida campus. One site was near the campus Swine Breeding Unit where doves and other granivorous birds feed on spilled grain in pig feeding areas. The other site was in the Fruit Crops Orchard of the Agronomy Department. This area was heavily used by doves in all seasons. Bait (cracked corn/wheat) and decoys were used to lure doves into a trapping area. Traps were rectangular (75 × 100 × 15 cm), walk-in funnel traps of 2-cm mesh hardware cloth.

Birds were sacrificed with chloroform and measurements of standard external features were recorded. Internally, dimensions of the left testis were recorded and volume was determined by using the formula for an ellipsoid. For females, the outside diameters of the largest follicle and of any enlarged portion of the oviduct were recorded. Statistical analyses were performed for these data using the Kruskal-Wallis Test (Steel and Torrie 1960:406). Reproductive condition was noted as either active or inactive depending on the relative size of gonads. Also, the crop and esophagus were removed, emptied, and weighed. Using photographs and descriptions of dove crops from birds in inactive, developing, active, and regressing stages, the stage of crop gland activity was determined (Mirarchi 1978).

For the purpose of this study, the year was divided into 4 seasons based on air temperatures on study areas. Winter months (Jan. and Feb.) had relatively low, stable temperatures. Spring months (Mar., Apr., May) had steadily increasing temperatures. Summer (Jun.–Sep.) had fairly stable, high temperatures. Fall (Oct.–Dec.) was a time of steadily decreasing temperatures. Statistical comparisons were made using χ^2 tests (Steel and Torrie 1960:392) and, unless otherwise stated, differences were considered significant at the 0.05 level of probability.

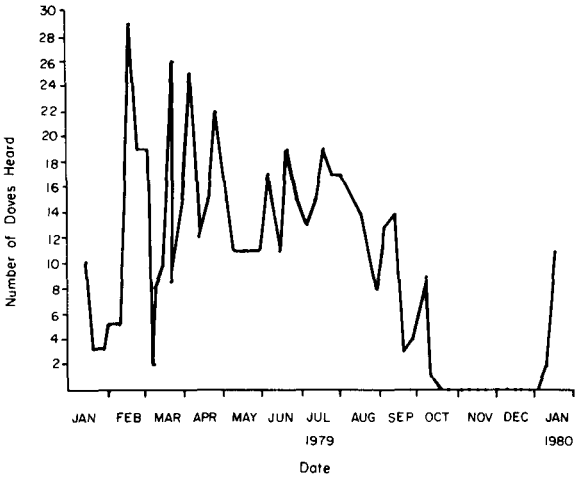

Figure 1. Number of doves heard on weekly call counts in north-central Florida, January 1979–January 1980.

Results

Weekly call counts from mid-January 1979 to mid-January 1980 (Fig. 1) showed the highest cooing activity occurred in February and March, possibly indicating doves paired off after little or no courtship activity. Cooing activity in males remained strong until September and then drastically declined. Courtship activities appeared lowest during the fall (Oct.–Dec.). Based on call counts, courtship activities of male mourning doves in north-central Florida occurred in 1979 primarily from late February through September.

Testes volumes were significantly ($P < 0.005$) different between seasons. Testes with volumes >0.4 cm^3 were considered active, while those that were <0.4 cm^3 were considered to be inactive. Of the 110 testes taken from doves, 102 (93%) were considered active. All 8 of the doves whose testes were considered to be inactive were collected during the fall ($N = 5$) and winter ($N = 3$) seasons. A monthly profile of testis size indicated that the gonads began to regress in late summer and recrudescence began in December. Overall, the majority of birds with enlarged (active) testes were collected at times other than during the hunting season.

Ovarian activity, as indicated by ovarian volume, increased in February and March and began to decline in August. Of the 113 ovaries examined in 1979, 86 (76%) were considered to be active and the majority of these were obtained in late winter, spring and summer seasons. Seasonally, there was a

significant ($P < 0.005$) difference in the proportion of doves with ovaries that appeared active. Also, there was a significant ($P < 0.005$) difference in ovary size between seasons; relatively small ovaries were observed throughout the fall.

Detailed observations of dove nesting were recorded for 90 and 30 nests in 1979 and 1980, respectively (Fig. 2). The majority of the nests observed were on the campus study area. Two major troughs are evident in the egg curve. The first, at approximately 31 March, was about 30 days after the first dramatic increase in nesting activity. The second, at approximately 31 April, is a month later. Since mourning doves complete a nesting cycle in a little over a month, these troughs possibly reflect a synchrony of several pairs of doves on the study areas.

Monthly fledging success peaked in May and June of 1979 and 1980, respectively (Fig. 3). The small peak during the fall of 1979 is the result of 2 nests and is insignificant compared to production in May. A significant difference ($P < 0.005$) in nesting activity by season existed for both 1979 ($\chi^2 = 115.8$) and 1980 ($\chi^2 = 32.4$), with the majority of nesting occurring in the spring and summer.

Only 3 nests were found in the fall and winter seasons, consequently only spring and summer were considered for comparisons of nesting success. Using the traditional method for computing nesting success (Nice 1957), spring had 45% and 40% and summer had 35% and 46% success for 1979

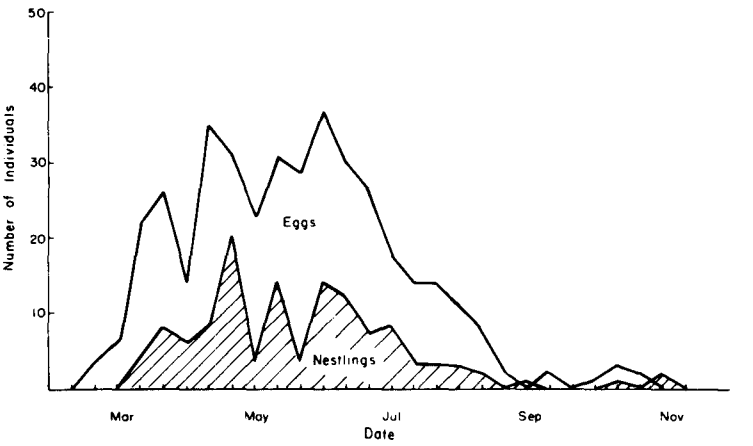

Figure 2. Mourning dove eggs and nestlings found on 3 study areas in north-central Florida, 1979 and 1980.

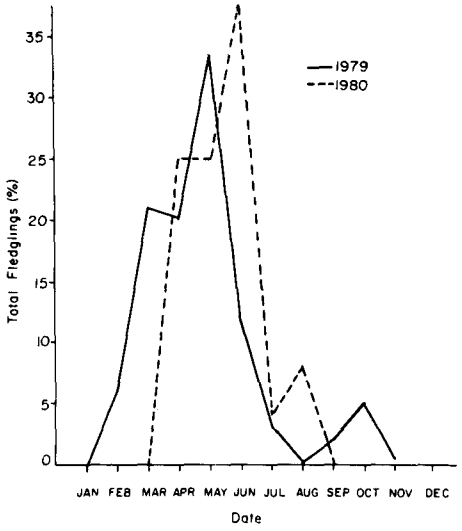

Figure 3. Percent monthly contribution to the annual total of mourning dove fledglings produced on 3 study areas in north-central Florida, 1979–1980.

and 1980, respectively. None of these nesting success rates were significantly different from each other.

Nesting success rates were re-calculated using the Mayfield (1961) method to avoid biases in time span of observation for each nest (Table 1). No significant differences in success rate between spring and summer of 1979 and 1980 during the incubation stage and nestling stage were indicated by these data.

Seasonally, there was no change in nesting success for either year, (Table 1). However, chances of an egg surviving to hatching were 39% for 1979 and 47% for 1980. Chances of surviving to fledging were 26% for 1979 and 43% for 1980.

Table 1. Nesting Success in Mourning Doves on 3 Study Areas in North-Central Florida, 1979–80, as Calculated Using Mayfield's (1961) Method

	Spring		Summer		Both Seasons	
	1979	1980	1979	1980	1979	1980
Incubation:						
Probability of daily survival	0.94	0.95	0.93	0.94	0.94	0.95
Success rate (%)	40	51	36	39	39	47
Nestling Stage:						
Probability of daily survival	0.97	0.99	0.94	1.00	0.96	0.99
Success rate (%)	70	85	51	100	66	91
Cumulative:						
Probability of daily survival	0.95	0.97	0.94	0.97	0.95	0.97
Success rate (%)	28	43	18	39	26	43

The proportion of active crop glands found in trapped adult doves also was used to indicate nesting activity as suggested by Books (1980). A significant difference in seasonal crop gland activity was found in both males and females with most crop gland activity occurring during spring and summer seasons. During fall and winter, only 1 bird (4%) had an active crop out of 25 doves examined.

Discussion

Mourning dove call counts showed high variability along the single route we monitored, similar highly variable counts have been reported and discussed by LaPerriere and Haugen (1972) and Armbruster et al. (1978). Since call counts are only useful as indices of relative breeding densities and annual population trends (Armbruster et al. 1978), our results were similarly interpreted on a limited basis. The general pattern of call counts (Fig. 1) was similar to several other indicators we measured to determine seasonal changes in courtship and nesting activities.

Recrudescence of gonads was observed to begin slightly earlier (Dec.) in adult male doves than in adult females (Feb.), a typical pattern for birds of north temperate regions (Immelmann 1972:132). Our observation, based upon gonad sizes, of a February–September breeding season for Florida was only slightly earlier than the March–September season reported for Alabama (Moore and Pearson 1941). This minor difference between the 2 states was probably due to Florida's warmer weather.

Nesting activity observed during this study was earlier than reported in other regions of the eastern U.S. (McClure 1942, Hanson and Kossack 1963, Caldwell 1964, Lehner 1965), but relatively similar to trends observed in Alabama (Moore and Pearson 1941) and Georgia (Hopkins and Odum 1953, Lowe 1956). Also, our results substantiate those obtained in an urban area of south Florida (Woolfenden and Rohwer 1969) and in a concurrent study in south Florida avocado groves (G. Spratt, pers. commun.). At least 95% of all dove nesting activity on our study sites was completed by 1 September and it was virtually 100% complete by 1 October. Similarly, the low level (4%) of crop gland activity we observed further substantiates our conclusion that nesting activities are minimal in Florida between October and February.

Management Implications

Several phenomena associated with mourning dove courtship and nesting activities in north-central Florida all indicated that, in this region, nesting occurs primarily between late February and August. Our results do not sub-

stantiate a need for concern over early fall hunting and possible adverse effects on mourning dove nesting success and productivity. Data from this study indicated that over 95% of reproductive efforts by mourning doves have concluded by 1 September; there is virtually no overlap between dove nesting activities and the 3-part hunting season (Oct.–Jan.) currently allowed in Florida.

Literature Cited

Aldrich, J. W., and A. J. Duvall. 1958. Distribution and migration of races of the mourning dove. Condor 690:108–128.

Armbruster, M. J., T. S. Baskett, W. R. Goforth, and K. C. Sadler. 1978. Evaluating call-count procedures for measuring local mourning dove populations. Trans. Missouri Acad. Sci. 12:75–90.

Books, P. J. 1980. The mourning dove crop gland cycle, emphasizing late summer development. M.S. thesis. Univ. of Mo., Columbia. 77pp.

Caldwell, L. D. 1964. Dove production and nest site selection in southern Michigan. J. Wildl. Manage. 28:732–738.

Dolton, D. D. 1982. 1982 mourning dove breeding population status. Admin. Rep., USDI Fish and Wildl. Serv., Off. of Migratory Bird Manage., Laurel, Md. 15pp.

Hanson, H. C., and C. W. Kossack. 1963. The mourning dove in Illinois. Ill. Dept. Cons. Tech. Bull. 2. 133pp.

Hopkins, M. N., and E. P. Odum. 1953. Some aspects of the population ecology of mourning doves in Georgia. J. Wildl. Manage. 17:132–143.

Immelmann, K. 1972. Role of the environment in reproduction as source of "predictive" information. Pages 121–147 *in* D. S. Farner, ed. Breeding biology of birds. Natl. Acad. Sci., Washington, D.C.

Keeler, J. E. 1977. Mourning dove. Pages 274–298 *in* G. C. Sanderson, ed. Management of migratory shore and upland game birds in North America. Univ. Nebr. Press, Lincoln.

LaPerriere, A. J., and A. O. Haugen. 1972. Some factors influencing calling activity of wild mourning doves. J. Wildl. Manage. 36:1193–1198.

Lehner, P. N. 1965. Some observations on the ecology of the mourning dove in New York. N.Y. Fish and Game J. 12:147–169.

Lowe, J. I. 1956. Breeding density and productivity of mourning doves on a county-wide basis in Georgia. J. Wildl. Manage. 20:428–433.

Marion, W. R., T. E. O'Meara, and L. D. Harris. 1981. Characteristics of the mourning dove harvest in Florida. J. Wildl. Manage. 45:1062–1066.

Mayfield, H. F. 1961. Nesting success calculated from exposure. Wilson Bull. 73: 255–261.

McClure, H. E. 1942. Mourning dove production in southwest Iowa. Auk 59:64–75.

Mirarchi, R. E. 1978. Crop-gland persistence, parental care, and reproductive physiology of mourning dove in Virginia. Ph.D. thesis. Va. Polytechnic Inst. and

State Univ. 249pp. University Microfilms International, Ann Arbor, Mich. (No. 7904153).
Moore, G. C., and A. M. Pearson. 1941. The mourning dove in Alabama. Ala. Dept. Cons. Bull. 37pp.
Nice, M. M. 1957. Nesting success in altricial birds. Auk 74:305–321.
Steel, R. G. D., and J. H. Torrie. 1960. Principles and procedures of statistics. McGraw-Hill Book Co., Inc., New York. 481pp.
Woolfenden, G. E., and S. A. Rohwer. 1969. Breeding birds in a Florida suburb. Fla. State Mus. Bull. 13:1–83.