Nesting Mortality of Mourning Doves in Central Texas[1]

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Abstract: Mourning dove (*Zenaida macroura*) nests were located on the Texas A&M University Campus from February–October 1981. Mortality differed between the various stages of the nesting cycle, and in different months within each stage. The number of days in which wind speed exceeded 27.6 km/h (15 kts) each month explained 34% of the variability ($P = 0.10$) associated with total nesting mortality. Mean monthly temperature was positively correlated ($P < 0.10$) with mortality occurring during the 1st nestling week and negatively correlated during the 2nd week after hatching. Loss of nestlings was correlated ($P < 0.05$) with an index to blue jay (*Cyanocitta cristata*) production and total monthly rainfall ($P = 0.10$).

Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies 36:537–542

The mourning dove is an important game bird. It is estimated that over 49 million are harvested annually (Keeler 1977). As with any exploited animal resource, analysis of annual production has an important role in management decisions. Although a number of mourning dove nesting studies have been conducted (McClure 1950, Boldt and Hendrickson 1952, Swank 1952, Randall 1955, Fichter 1959, Caldwell 1964, Schroeder 1970, Bivings 1980), temporal variations in mortality of eggs and young have rarely been examined. We studied the variation in mortality of mourning dove eggs and nestlings over a 9-month nesting season and over 4 stages of development.

The authors thank the Caesar Kleberg Research Program in Wildlife Ecology, and The Texas Agricultural Experiment Station, Texas A&M University for their support.

[1] The Texas Agricultural Experiment Station Technical Article 17929.

Methods

From February–October 1981, a 325-ha portion of the main campus of Texas A&M University was systematically searched each week for mourning dove nests. This area is park-like in nature and dominated by live oak (*Quercus virginiana*) trees. Nests were checked weekly until hatching, at which time the young were aged by plumage characteristics (Hanson and Kossack 1963). All nestlings were banded at approximately 9–10 days of age. Most nests were revisited after banding to ascertain nest fate.

Monthly mortality was determined using the Mayfield method (Mayfield 1975) using each week of the nesting cycle as age classes. Nestlings were considered capable of fledging after they reached 10 days of age in order to keep data comparable to those collected in other studies (Anonymous 1979, Bivings 1980). Chi-square goodness-of-fit tests (Steel and Torrie 1960) were used to test for differences in mortality between age classes and between months for each age class.

Data on several environmental factors we hypothesized might affect nesting mortality were also collected. These factors included the number of days each month that wind speed exceeded the lowest maximum wind speed for any month (27.6 km/h; 15 kts), the mean monthly temperature, total monthly rainfall, the intensity of blue jay nesting for each month as indicated by the number of new hatch-year jays caught in modified funnel traps (Bivings and Silvy 1979) during the following month, and the occurrence of trichomonosis in nestlings. Weather data were obtained from the Office of the Texas State Climatologist located on the Texas A&M University Campus. Correlation coefficients were calculated for each of these factors with the monthly mortality for each age class using simple linear regression techniques (Steel and Torrie 1960).

Results

Observations useful in determining mortality for the nesting cycle were obtained from 1,556 nests. For the February–October season, an estimated 22% of those eggs laid survived to fledging, with the highest mortality occurring during the first week of the egg stages (Table 1). Higher mortality was observed for eggs than for nestlings. Total mortality across age classes was also found to be different ($P < 0.001$) between months. Except for February which showed a 68% nesting cycle mortality, total mortality was high (82–85%) from March–June, declined to a lower level (64–70%) from July–September, and then increased to 82% in October.

Mortality between age classes was different ($P < 0.05$) within month except for February, March, July, and October. Likewise, differences

Table 1. Percent Mortality (Mayfield 1975) Occurring in the Nesting Cycle of the Mourning Dove, Texas A&M University Campus, College Station, February–October 1981

	Period																			
	Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Feb–Sep	
	N[a]	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Eggs																				
0– 7	38	17	460	44	2,357	41	2,036	46	2,105	48	1,209	28	1,318	35	179	29	0	[b]	9,701	41
8–14	26	43	222	33	1,390	34	2,014	32	1,815	24	2,005	22	1,822	20	436	16	13	70	9,742	26
Total	64	49	682	65	3,647	62	4,050	62	3,910	60	1,414	42	3,140	46	615	36	13	91	19,443	56
Nestlings																				
15–21	32	0	120	26	1,067	27	1,344	38	2,159	37	1,796	28	2,019	23	673	32	53	32	9,261	31
22–Fledging[c]	30	38	44	28	631	20	709	36	1,402	25	813	28	1,126	12	483	14	54	24	5,290	17
Total	52	37	164	46	1,698	44	2,053	60	3,561	55	2,609	49	3,145	34	1,156	44	107	48	14,551	45
Total	112	68	846	85	5,345	82	6,103	85	7,471	82	4,023	70	6,235	64	1,771	66	120	82	33,994	78

[a] Individual observation days.
[b] No observations.
[c] Nestlings classified as capable of fledging at 10 days (nest age = 24 days) of age.

($P < 0.01$) were observed between months for each age class. The highest egg mortality occurred during the first week for all months except February, reaching a high of 48% in June and a low of 17% in February. The highest mortality for nestlings occurred for all months during the first week following hatching except in February and March. In July, mortality was equal for both nestling age classes. The highest mortality for the first nestling week was 38% in May and the lowest in February when no first-week nestling losses occurred out of 32 nestling days of observation.

Early in the nesting season, total mortality for eggs was higher than total mortality for nestlings. During July and September this was reversed with nestling mortality being higher (Table 1). However, total egg and total nestling mortality were different only in April ($P < 0.001$) and August ($P < 0.01$) when egg mortality was higher.

Calculation of correlation coefficients of mortality with selected environmental factors revealed that correlations existed between wind and total mortality across age classes ($r = 0.58$, $P = 0.10$). Correlations of nesting mortality with mean monthly temperatures revealed a positive correlation ($r = 0.59$, $P < 0.10$) for first-week nestlings and a negative correlation for second-week nestlings ($r = -0.59$, $P < 0.10$). Total monthly rainfall was positively correlated with first week nestling mortality ($r = 0.58$, $P = 0.10$). A positive correlation ($r = 0.82$, $P < 0.05$) was also observed for the index to blue jay production and total nestling mortality. Nonsignificant correlations ($P > 0.10$) were found for nesting cycle mortality and the incidence of trichomonosis in nestlings.

Discussion

Data analyses revealed that seasonal differences in mortality do occur. The observed high early season mortality and lower late season mortality was similar to that reported by Nice (1923) in Oklahoma and Hanson and Kossack (1963) in Illinois. The most important factor correlated with total mortality across age classes on a seasonal basis was wind. Bivings (1980) found no correlation between nest success and maximum wind speeds of 37.1 and 46.3 km/h; however, our data show that lower wind speeds will affect success. Randall (1955) and Fichter (1959) reported that wind appeared to have little affect on nests in their studies.

Another important factor indicated by the correlations was temperature. The positive correlation with first-week nestlings indicates that mortality increases with temperature. Data collected by Hopkins and Odum (1953) suggested that total nest mortality increases with summer temperatures. The negative correlation for second-week nestlings and temperature indicated that as temperature decreased, mortality increased. This is probably a reflection of the inability of the adults to adequately brood the nestlings as they became larger. In addition, the adults are increasingly absent from the nest during this part of the nesting cycle (Swank 1952).

The correlation observed for total nestling mortality with the blue jay production index suggests that mortality increases as the level of blue jay nesting activity increases. Nice (1923), Pearson and Moore (1939), and Swank (1952) all indicated that blue jays contributed to mortality of mourning dove nests. On at least 12 occasions while checking nests in our study, blue jays flew to the nests and attempted to steal the nest contents. Additionally, we received several reports of blue jays attacking dove nests and stealing or killing young. Based on these observations, it is our opinion that blue jays were more of a factor in total nesting mortality than indicated by the correlation analyses.

The results of these correlation analyses suggested some reasons for mortality observed in the mourning dove nesting cycle in Central Texas. At most, our correlations explained only 34% (wind) of the variation occurring in the nesting cycle. Multiple regression techniques would have considered interactions between factors and thereby may have explained more of the variability in nesting mortality. However, due to the nature of our data, these techniques could not be employed. In addition, other factors may have been more important to seasonal nestling mortality than those included in our analyses. For example, September hunting has been suggested as causing significant loss of nestlings during that period (McClure 1950, Schroeder 1970, Anonymous 1979). Bivings (1980) and Haas (1980) reported significantly reduced survivorship of nestlings <6 days old after 1 parent had been removed in a simulated hunting study. Some other factors possibly contributing to nesting mortality may include periodicity and intensity of rainfall rather than total amount, food availability, and/or changes in nesting habitat. Further research in this area is definitely recommended.

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