

A Comparison of Individual and Nest Survival of Mourning Doves and Implications to Nesting Studies¹

Michael E. Morrow, *Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843*

Nova J. Silvy, *Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843*

Abstract: Mourning dove (*Zenaida macroura*) nests were located on the Texas A&M University campus during the 1981–1982 nesting seasons. Daily survival rates, calculated using nests and individuals as units of analysis, were compared for eggs, nestlings, and eggs and nestlings combined. No difference ($P > 0.05$) was detected in any of the comparisons, indicating that equivalent data were obtained by knowing only the fate of the nest and not of individuals within the nest. Thus, disturbance at the nest can be minimized without loss of accuracy. Nest data tended to underestimate survival for eggs while overestimating slightly for nestlings, and eggs and nestlings combined when compared to survival rates calculated for individuals.

Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies 37:19–22

Information on production is of critical importance in the management of any wildlife population. Such information for avian species is often obtained through nesting studies. Typically, nests are checked at intervals throughout the nesting cycle to determine survival or loss of nest contents. The degree and frequency of disturbance at the nest is governed by time constraints of the investigator, the type of information needed, and the tolerance of the species to disturbance. In this paper we present a comparison of 2 different analyses of mourning dove nesting data and its implications with respect to the amount of disturbance necessary to obtain adequate information on production.

¹ The Texas Agricultural Experiment Station Technical Article 18979.

Methods

From February to October 1981, and February to September 1982, an approximately 325-ha portion of the main campus of Texas A&M University, located at College Station, Texas, was systematically searched on a weekly basis for mourning dove nests. Nests were checked weekly with a 4.3-m aluminum mirror pole until hatching, at which time young were aged by plumage characteristics (Hanson and Kossack 1963). Nestlings were banded at approximately 9 to 10 days of age. Nests were revisited if possible after banding to determine nest fate (Morrow and Silvy 1982).

Two estimates of daily survival were calculated for eggs, nestlings, and eggs and nestlings combined using the Mayfield method (Mayfield 1975) by month. The first of these estimates used the nest as the unit of analysis and the second used individuals within a nest as the unit of analysis. Nests were classified for the analysis according to the stage of its contents, i.e., eggs or nestlings. Nests were considered successful if at least 1 individual survived. Paired *t*-tests (Steel and Torrie 1980) were used to test for differences between the 2 estimates of survival within each age class.

Results

Information useful in estimating daily survival rates was obtained from a total of 2,920 nest located during 1981 and 1982. Differences in daily survival rates for eggs as estimated by nest data and individual data ranged from -5.3% to +2.7% with a mean difference of -0.4%, indicating a slight tendency for nest data to underestimate daily survival (Table 1). In contrast, differences between the 2 estimates indicated a tendency for nest data to overestimate nestling survival with differences ranging from 0.8% to +1.6% and averaging 0.8%. For both age classes combined, differences between the 2 estimates ranged from -3.1% to +1.8% with a mean difference of 0.1%, indicating a slight tendency for nest data to overestimate survival. However, no significant ($P > 0.05$) differences between the 2 estimates were detected by the paired *t*-test in any of the 3 comparisons.

Discussion

The tendency indicated for nest data to underestimate daily survival is of interest. Intuitively, one would reason that nest survival has to be greater than individual survival since loss of a nest necessarily involves loss of all individuals in the nest, whereas individuals can be lost without the nest being lost. However, this greater survival of individuals indicated that a higher proportion of nests were lost while containing 1 individual than nests containing more than 1 individual. For example, suppose that a sample of 10 nests are observed for 10 days. Nine of these nests were successful and 1

Table 1. Comparison of 2 estimates of daily survival rate (DSR) (Mayfield 1975) of mourning dove eggs, nestlings, and eggs and nestlings combined during 1981 and 1982 on the Texas A&M University campus, College Station, Texas.

Month	Eggs				Nestlings				Eggs/Nestlings			
	Nest ^a		Indiv. ^b		Nest		Indiv.		Nest		Indiv.	
	N ^c	DSR	N	DSR	N	DSR	N	DSR	N	DSR	N	DSR
2	215	98.6	426	98.8	54	98.1	106	98.1	268	98.5	532	98.7
3	1,908	87.3	3,605	92.6	969	97.1	1,624	96.1	2,878	90.6	5,229	93.7
4	3,592	92.3	6,822	92.4	1,513	94.4	2,558	93.6	5,106	92.9	9,381	92.7
5	4,090	93.0	8,146	93.3	2,275	94.9	3,900	93.6	6,364	93.7	12,046	93.4
6	3,169	93.4	6,458	93.9	3,138	95.8	5,263	96.6	6,307	94.6	11,721	95.1
7	2,687	95.9	5,448	95.9	2,335	96.6	4,228	95.5	5,022	96.2	9,676	95.7
8	2,544	95.0	5,012	95.2	2,786	97.4	4,858	96.1	5,330	96.3	9,870	95.6
9	392	95.4	806	95.4	956	97.0	1,721	95.8	1,348	96.5	2,526	95.6
10	8	86.7	12	84.0	66	97.0	98	95.4	74	95.9	111	94.1

^a Daily survival rates calculated using the nest as the unit of analysis. Nests were considered successful if 1 individual survived.

^b Daily survival rates calculated using individuals within a nest as the unit of analysis.

^c Number of observation days.

failed at day 5. Each nest contained 2 young. In this case the daily survival rates estimated by the nests and individuals would be equal at 98.9%. However, now suppose that the nest that failed contained only 1 young. In this case the daily survival rate estimated by individuals is 99.4% while that estimated by nests is 98.9%. This is particularly apparent for the egg stage, when the probability of observing 1 egg is higher as the nesting cycle is being initiated.

Minimization of observer bias is a goal in every scientific investigation. In general, the greater the disturbance created by the investigator in making observations, the greater the possibility of introducing bias into the results. This was particularly obvious in this study when on several occasions, blue jays (*Cyanocitta cristata*) flew in and attempted to steal nest contents while we were checking nests (Morrow and Silvy 1982). The analyses described in this paper indicated that statistically equivalent data on nesting success of mourning doves can be obtained with a minimum of disturbance if only the fate of the nest is known. In most cases, this information could be obtained by flushing the adult only once to determine the stage of the nest contents at the beginning of the observation period, if information is desired by age class. After this, at least for mourning doves, the nest can be considered still active if the adult is observed on the nest. If information is needed only on fledging success, and not on survival of age classes within the nesting cycle, then the adult never needs to be flushed. Survival or failure of the nest can be ascertained at the end of the nesting attempt by the size and number of droppings present (Hanson and Kossack 1963). Simply checking to see if the nest is active or not will also take less time, allowing the investigator to check more nests or use his time elsewhere.

Literature Cited

- Hanson, H. C. and C. W. Kossack. 1963. The mourning dove in Illinois. Tech. Bul. 2. Ill. Dep. Conserv. 133pp.
- Mayfield, H. F. 1975. Suggestions for calculating nest success. The Wilson Bul. 87:456-466.
- Morrow, M. E. and N. J. Silvy. 1982. Nesting mortality of mourning doves in central Texas. Proc. Annu. Conf. Southeast. Assoc. Fish. and Wildl. Agencies. 36:(In press).
- Steel, R. G. D. and J. H. Torrie. 1980. Principles and procedures of statistics, 2nd ed. McGraw-Hill Co., Inc. New York, N.Y. 633pp.