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Early Season Nesting Success of Mourning Doves *(Zenaida macroura)* in Central Illinois

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ABSTRACT

Early season mourning dove (*Zenaida macroura*) nests are subjected to cold weather which may reduce fledging success. In a residential setting in central Illinois, a wind storm destroyed 50% of all nests and fledging success was only 13.7% because of the storm and low hatching success of eggs that remained in the nests. Although early season nests may often have low reproductive success, if they are successful, they may result in fledglings that can breed by the end of the season.

INTRODUCTION

Mourning doves *(Zenaida macroura)* are common nesting birds on the campus of the University of Illinois in Urbana/Champaign. They begin to nest in early March and continue until early October (Hanson and Kossack 1963, Geissler et al. 1987). Young are initially fed protein-rich crop milk, which causes quick growth of the young, but also constrains clutch size to two eggs (Lack 1948, Westmoreland and Best 1987, Blockstein 1989). Partly because of their small clutch size, mourning doves can and must produce multiple clutches throughout a long nesting season to produce enough young to compensate for mortality (Westmoreland et al. 1986).

Many aspects of the mourning doves' life history are based on the need to produce multiple clutches in a year (Westmoreland et al. 1986). For example, mourning doves produce eggs that are smaller than would be expected for the size of the adults and the young do not fledge at their maximum size. The pair bond is strong, saving time between clutches because they don't have to find new mates. The nest is a simple platform of sticks usually placed along the branches of a fir, pine or spruce or it may be placed on top of an existing nest of another species (Hanson and Kossack 1963). The nest may be reused and if it is destroyed, it is easy to replace. The result of these adaptations is that if one clutch fails, it can be replaced quickly and easily. Therefore, losses early in the breeding season may have little effect on the adult's overall fitness, and successful nests may produce young that may be able to reproduce later in the breeding season, before the period of high winter mortality (Irby and Blakenship 1966, Armstrong and Noakes 1977, Mirachi et al. 1980, White et al. 1987). With the increased reproductive success of the young there is a corresponding increase in the fitness of the

parents. Such a potential for increased fitness and the low cost of a single clutch selects for nesting as early as the environment allows.

One of the major obstacles to successful nesting may be cold and inclement weather. Hanson and Kossack (1963) noted that the beginning of the nesting season was correlated with temperature. Mourning doves nested early in warm years and later in cold years. Late winter and early spring weather is not entirely predictable though, and sudden cold, strong wind, rain, or snow may adversely affect the survival of offspring and may destroy poorly constructed nests (Coon et al. 1981).

In my study, a population of mourning doves in and near the campus of the University of Illinois in Urbana/Champaign was studied to determine the fledging rate of early nesters in relation to early spring weather.

METHODS

Starting in early March, 1991, I initiated a thorough search of trees and shrubs on the campus of the University of Illinois and the immediate surrounding areas in Champaign/Urbana for the presence of mourning dove nests. Particular attention was paid to evergreen trees where mourning doves seem to prefer to lay their eggs in Illinois (Hanson and Kossack 1963), although bushes and deciduous trees, as well as the ground, were searched.

Every other day, I checked for the presence of eggs or young by the use of a mirror attached to a long pole. The two nests that were beyond the length of the pole were excluded from the study. All clutches observed had successfully fledged, or were either abandoned or naturally destroyed by the second week of April.

The incubation period for eggs is 14 days and the young usually fledge 12 days later. Since it was possible for the offspring to leave the nest 10 days after hatching (Geissler et al. 1987), young were said to have successfully fledged on their tenth day. Eggs were considered to be dead after 16 days and were opened to check for fertility after the parents had abandoned them. Dead eggs were assumed to have survived for fourteen days. Nests that were destroyed due to an unknown cause on an unknown day were assumed to have been destroyed on the day between visits.

Nesting data were analyzed using the Mayfield (1961) estimate for survival rate during the incubation and nestling periods:

$$\text{Fledging Rate} = \left(\text{Daily egg survival rate}\right)^{E} \times \left(\text{Daily nestling survival rate}\right)^{N} \times 100$$

$$= \left(1 - \frac{\text{Dead Eggs}}{\text{Egg Days}}\right)^{E} \times \left(1 - \frac{\text{Dead Nestlings}}{\text{Nestling Days}}\right)^{N} \times 100$$

where E is the maximum number of days exposed as an egg (= 14 days) and N is the maximum number of days exposed as a nestling (= 10 days). Egg days and nestling days are defined as the total number of days that all eggs and nestlings, respectively, were observed in nests.

RESULTS

Based on the data from the twenty-five nests (Table 1) that were found containing a total of 48 offspring, the daily egg survival rate was 88.4% with an overall egg survival rate of 17.8%. The daily nestling survival rate was 97.4% with an overall nestling survival rate of 77.1%. The fledging rate for the population was 13.7%.

The main cause of mortality was a wind storm on 27 March, 1991, which destroyed 12 of 24 nests (50%). The winds were the strongest of the year, reaching gusts up to 22.3 m/sec (Illinois State Water Survey pers. com.). Any egg-bearing nest that was not protected from the wind was blown down and the eggs were lost. Wind also destroyed nests on other days, but it never affected any offspring after they hatched.

None of the eggs were removed by predators. All the eggs that were counted as dead had either fallen out of the nest or remained in the nest beyond 16 days, but never hatched. All abandoned eggs were in an advanced state of development, thus, they were not abandoned because they were infertile. The fate of the two nestlings that were considered dead is unknown.

DISCUSSION

Early season mourning dove nesting success for the University of Illinois population was very low. In comparison, Geissler et al. (1987) determined a 33% fledging rate for non-hunted areas of the United States and a 26% fledging rate for areas in which the birds were hunted. The 13.7% fledging rate for this study fell much below the previous studies' findings due to cold and inclement weather, particularly the wind storm, and its effects on egg mortality.

In addition to wind, cold temperatures may also have an effect on egg survival. The average low temperature for March 1991 was only 0.7° C (Illinois State Water Survey, pers. comm.). A correlation between daily temperature and nest success could not be performed because adults guarded eggs long after they had presumably died so that the exact day on which the eggs died could not be determined. However, it is likely that low temperatures during the night may stress the eggs and may be a cause of egg mortality for unhatched eggs that were not otherwise destroyed.

Predation was not a source of egg mortality in this population although I have seen several potential predators in the area, including eastern gray squirrels (*Sciurus carolinensis*), cats (*Felis domesticus*), opossums (*Didelphis marsupialis*), common grackles (*Quiscalus quiscula*), and blue jays (*Cyanocitta cristata*). In fact, abandoned nests often still had eggs in them several days after the parents stopped guarding them, even though the bright white eggs were conspicuous in the nests. Grackles were commonly observed roosting in one particular tree where a nest had been abandoned. The grackles, however, did not touch the single egg and it eventually was blown from the nest.

When I checked the nests, the guarding parent usually flushed, thereby exposing the eggs to the elements. The effects of such exposure are unknown, however, no pair ever

abandoned the nests because of my frequent visits. When nests were abandoned, the embryo always appeared to be in an advanced state of development and had presumably been abandoned because it could not hatch.

For early nesting mourning doves, a major threat to fledging success is cold and inclement weather. Mourning doves, however, continue to nest early because the loss of an individual clutch does not represent a great deal of investment and it can be replaced quickly. With the benefits of multiple clutching and the ability to nest by hatching-year birds, mourning doves would be expected to nest as early as the environment allows.

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Table 1: Suvivorship Data based on number of eggs originally in the nest

# of Eggs in Nest	# of Nests	# of Eggs	# of Eggs Hatched	# of Nestlings Fledged	Egg Days	Nestling Days	Daily Egg Survival Rate	Daily Nestling Survival Rate	Fledging Rate
One	3	3	0	0	10	0	70.0%	0.0%	0.0%
Two	19	38	6	4	246	58	87.0%	96.6%	10.0%
Three	2	6	2	2	80	20	95.0%	100%	18.8%
Totals	24	47	8	6	336	78	88.4%	97.4%	13.7%