ROOF-TOP TRAPPING OF URBAN MOURNING DOVES[a]

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Abstract: A total of 1,648 mourning doves (*Zenaida macroura*) was trapped on the gravel-topped roofs of buildings on the Texas A&M University campus during the period from February 1978 through January 1979. An average of 84.5 new doves and 52.8 recaptures per month were trapped in a maximum of 13 modified funnel traps baited with a combination of grain sorghum and cracked corn. The new captures were 74.3% adults of which 59.7% were males. Roof-top trapping minimizes human disturbance and travel while maximizing time available for trapping.

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The mourning dove is a highly adaptable, widely distributed and extremely desirable game bird in much of the U.S. The estimated annual harvest of nearly 50 million birds is more than that of all other migratory game birds combined (Keeler 1977). The total out-of-pocket expenditures for dove hunting is estimated to be $87 million annually (Keeler 1977).

The need to monitor populations of the mourning dove has inspired the search for more efficient, cost-effective techniques for trapping and banding doves. Reeves et al. (1968) reviewed the literature and prepared a comprehensive synopsis of the types of traps and trapping techniques. Lewis and Morrison (1973) compared the effectiveness of different types of traps and baits. Henry et al. (1976) compared the age and sex selectivity of different trap sites. We have used a single type of trap and used it at a site which combines most of the desirable attributes described by Reeves et al. (1968) while avoiding some of the extreme age and sex selectivity encountered by Henry et al. (1976) and other authors. This paper describes the technique and evaluates its selectivity.

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METHODS

Study Area

The main campus area at Texas A&M University, College Station, Texas, is approximately 325 ha of park-like fields surrounded by trees, predominantly live oak (*Quercus virginiana*) (Swank 1952), and has more than 120 buildings of various shapes, dimensions, and construction. Most of these buildings receive at least some use by mourning doves during the year. Many large buildings in the center of the campus have flat, gravel-covered roofs which are frequented by doves throughout the year.

Traps and Bait

A total of 13 modified funnel traps (Reeves et al. 1968), 61 cm x 91 cm, was used during the period from February 1978 to January 1979. Six wooden frame traps covered with 25 mm mesh chicken wire were used until September when 7 additional traps made

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from 25 mm x 25 mm 16-gauge welded wire were employed. The small size wire was used because it was cheaper than the standard 25 mm x 50 mm 14-gauge welded wire and the traps could also be used for small non-game birds such as Inca doves (*Scardafella inca*) and cardinals (*Cardinalis cardinalis*).

Trap sites, located on roofs of campus buildings, were pre-baited for 2 weeks using a mixture of grain sorghum with some cracked corn added to increase visibility. Casual observation of different baits of grain sorghum, cracked corn, and a combination of grain sorghum and cracked corn during the pre-baiting period, indicated that the combination baits received the most use by all birds. During the summer months, water was also made available at the trap sites to increase the use of the trap sites.

Traps were baited and set in various numbers and at various times of day depending on how much time the investigators had available for banding. Traps were placed near dove loafing areas in locations that could be monitored from a high vantage point without disturbing doves. The usual schedule was to set the traps in the afternoon and check them that evening, the next morning, and finally about mid-day. During periods of hot weather, the traps were checked approximately every 2 h. No doves were knowingly left in traps overnight. Doves were removed from traps and placed in burlap bags similar to the method described by Reeves et al. (1968) for transportation to an office on the roof of the wildlife building (Nagle Hall) in the central part of campus. When possible, they were aged according to methods of Swank (1955), sexed according to characteristics described by Petrides (1950), banded, and released. Doves that were injured or which could not fly well were held in a large flight cage until well enough to be released.

No effort was made to equalize the trapping effort between months. Trapping effort was accelerated during periods of high success or when other research required maximum data.

RESULTS AND DISCUSSION

During the trapping period from February 1978 through January 1979 a total of 1,648 mourning doves was captured (Table 1). Of these, 754 adult and 260 immature doves were new captures and were banded. The other 580 adults and 54 immatures were recaptures of which only 3 had been banded by other banders. An average 85.4 new doves and 52.8 recaptures per month were taken during the year. The rate of capture was estimated to be approximately 0.7 trap days per dove which was substantially better than the best rate of 2.5 trap days per dove reported by Lewis and Morrison (1973). Adults banded during September 1978 through January 1979 included known adults, some probable immatures, and birds of unknown age. Prior to September, immature doves which had completed primary feather molt could be separated from adult doves (Wight et al. 1967). However, recaptures of banded adults in late September included some which had also completed primary feather molt. Thus, it was no longer possible to separate age classes of doves which had completed primary feather molt. This agrees with the findings of Haas and Amend (1979).

The percentage of adults among the doves captured by month ranged from 100% to 15% (Table 2). The weighted mean for the percentage of adults taken from June through August was 26% which is in the range obtained by Henry et al. (1976) for field trapping. The percentage of males among the adult doves captured by month ranged from 95% to 41% (Table 2). The weighted mean of the percentage of adult males taken from June through August was 84.5% which exceeds the values obtained by Henry et al. (1976).

The high percentage of adult males captured (Table 2) seems to indicate that they are more easily caught during the major breeding months than are adult females. A Chi-square goodness-of-fit test (Steel and Torrie 1960) shows that the distribution of the percentage of adult males captured by month is significantly different ($P<0.005$) from a random distribution. Tomlinson et al. (1960) attributed such differences to hurried

TABLE 1. Captures and recaptures of mourning doves by age, sex, and month from the roofs of buildings on the Texas A&M University Campus, February 1978-January 1979.

	Captures			Recaptures			
	adult ♂	adult ♀	immatures	adult ♂	adult ♀	immatures	Totals
February	100	95	0	16	53	0	264
March	124	78	0	96	75	0	373
April	73	28	9	78	62	3	253
May	37	16	21	55	18	6	153
June	19	1	50	28	5	0	103
July	7	2	25	13	5	2	54
August	2	2	21	13	1	2	41
September	15	10	24	28	6	5	88
October	3	3	22	2	1	0	31
November	5	1	25	0	0	5	36
December	22	32	41	6	8	17	126
January	43	36	22	4	7	14	126
Totals	450	304	260	339	241	54	1,648

TABLE 2. Monthly age and adult sex composition of the mourning dove catch from building roofs on the Texas A&M University Campus, February 1978-January 1979.

	Age		Sex of Adults	
Month	Total No.	% Adults	No. Adults	% Males
February	195	100	195	51
March	202	100	202	61
April	110	92	101	72
May	74	71	53	70
June	70	29	20	95
July	34	26	9	78
August	25	16	4	50
September	49	51	25	60
October	28	21	6	50
November	31	19	6	80
December	95	52	54	41
January	101	78	79	54
Year	1,014	74	754	60

morning and evening feeding by nesting males. Additionally, this high percentage of males was accentuated during peak breeding months by the tendency of presumably unmated males to stay near the trap sites during the middle of the day. Numerous observations were made of unreceptive females being kept from feeding at trap sites by the courting behavior of males. Eventually, females left the trap sites without feeding.

Trapping results (Table 2) indicated that the immature doves were fairly well represented during the summer and fall. Henry et al. (1976) reported that site selection could bias the data toward adult doves. It may be that since our doves are mainly a resident population, trap sites are utilized by all age groups giving results which are more representative of the composition of the population.

The large number of doves captured (Table 1) during 12 months of trapping with a small number of traps attests to the effectiveness of the technique. During favorable periods, it was not unusual to catch more than 50 doves per day in 13 traps. Trapping success was low from July to November which was probably due to abundant natural seeds, especially crotons (*Croton* spp.) which are preferred dove foods. This was supported by examination of several crops from doves shot by local hunters during September which were almost exclusively filled with Texas croton (*C. texensis*).

The success of trapping on gravel-topped buildings may be the result of doves using these buildings for obtaining grit and seeking protection from extreme weather. Large numbers of doves were observed using the roofs of these buildings during the winter. Casual observation indicated that some were picking up grit while others selected areas sheltered from the wind and rain or were just loafing. In severely cold weather, many huddled together near warm air exhaust vents. During warm months, adult males used the roofs as coo perches. Since there was a continual potential to attract birds to the roofs, the trap sites were kept baited all the time. Consequently, an easy source of food and water was available during periods of stress.

A major advantage of trapping on building roofs is that problems with human disturbance and predators can be avoided. There were no problems with dogs, cats, and other mammalian predators which are abundant in urban areas. The only human disturbance, other than that due to investigators, was an occasional repair crew for the air-conditioning or exhaust fans.

Trapping on roofs in urban areas does involve problems with other types of birds. The only predators encountered were 2 American kestrels (*Falco sparverius*). However, the major nuisance birds were rock doves (*Columbia livia*), great-tailed grackles (*Quiscalus mexicanus prosopidicola*) and common grackles (*Quiscalus quiscula*). These birds also frequent urban building roofs and are attracted to the bait. Observations indicated that mourning doves were unlikely to enter a trap occupied by any of these 3 species. Trap funnels were made similar to Reeves et al. (1968) which was 127 mm x 127 mm at the mouth, 152 mm long, and closed to 51 mm x 51 mm at the end. However, since most of the funnels were made of chicken wire, these large birds were able to force the end of the funnel open or lift up the funnel to gain entrance. A reduction in size of the trap funnel mouth to approximately 76 mm x 76 mm excluded great-tailed grackles and substantially reduced the capture of rock doves and common grackles without adverse effects on the number of mourning doves captured. Many other species of small birds were also captured but these were not considered to be a problem.

Trapping on campus or in town allows better personnel management. Since there is little or no travel involved, personnel need only to allocate a few hours time out of any particular day for trapping.

The success of this project is that 1,648 doves have been banded using less than $500 excluding salaries which is less than $0.31 per dove. Most of this cost has been for bait with no money expended for travel. There are probably many other similar opportunities

in cities and on university campuses which could easily provide the type of long-term banding studies which are needed in mourning dove management.

CONCLUSIONS

1. Doves can be attracted to building roofs throughout the year which may offer the only practical trap sites in urban areas.
2. Trapping on building roofs limits problems with predators and human disturbance although it may increase problems with other species of birds.
3. Trapping on local buildings can maximize personnel utilization while reducing or eliminating travel and per diem costs.

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