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IMPLANTED RADIO TRANSMITTERS FACILITATE THE STUDY OF FORAGING LESSER SCAUP IN INDIANA HARBOR CANAL, INDIANA

Obtaining time-activity data on foraging diving ducks is difficult because visual contact is lost when an individual dives. Additionally, almost no data are available for feeding at night. To overcome these difficulties, we used radiotelemetry techniques to quantify feeding activities of individual lesser scaups (*Aythya affinis*) in Indiana Harbor Canal, East Chicago, Indiana.

VARIATION IN SIGNAL STRENGTH INDICATES DIVING

We implanted radio transmitters in 12 lesser scaups on 7 January 1994. In addition to the location data that we gathered over the next 7 weeks, we made detailed behavioral observations of five individuals. When a lesser scaup dived under water, the radio signal either disappeared or noticeably weakened. Direct observations of a radio-marked lesser scaup confirmed that dives were correctly inferred by radio signal strength. Once a lesser scaup began to feed, it did not interrupt its feeding activity with other behaviors, such as bathing, preening, or resting. Lesser scaup dived and surfaced with uninterrupted regularity. Mean duration of feeding bouts was 11.1 minutes (SE = 1.39, n = 15).

LESSER SCAUPS FEED FOR SHORT DURATIONS THROUGHOUT THE DIEL PERIOD

From fixed observation points we first determined which radio frequencies were present and then listened to each radio frequency (maximum of five ducks) for 2 minutes to determine whether the individual lesser scaup was feeding. We repeated this listening sequence every 10 minutes (10-minute scan observations) for 198 h of observations. We were able to make continuous 10-minute scan observations on one duck for almost 48 h (Figure). This male lesser scaup fed for short durations during all times of the diel period. Feeding bouts lasted for one (63% of observations), two (28%), or three (9%) consecutive 10-minute scan periods. Each feeding bout was followed by a nonfeeding period that varied from 1 to 15 consecutive 10-minute scans (median = five consecutive 10-minute scans). The other four lesser scaups in the Indiana Harbor Canal followed a similar pattern of feeding.

LESSER SCAUPS FEED LESS THAN 25% OF THE TIME

On the average, lesser scaups in the Indiana Harbor Canal spent 23.7 ± 2.5% of the time feeding. Lesser

scaups spent more time feeding between sunset and midnight than during daylight hours ($P = 0.003$; Table 1). Individual ducks varied in the amount of time they spent feeding ($P = 0.002$; Table 2); there was no interaction between the two variables ($P = 0.548$; time of day and individual scaup). Lesser scaups fed on oligochaete worms. These worms were readily available at all times and easily digestible which, coupled with lack of disturbance, may have influenced the observed feeding pattern.

Radiotelemetry is Useful for Observing Behavior

Monitoring the signal strength of implanted radio transmitters enables quantification of feeding behavior of diving ducks. One drawback was the limited range (about 500 m) of some implanted transmitters.

Collecting behavior data, especially continuous 24-h records, is time- and labor-intensive. A camcorder recording of the face of the receiver will simultaneously record the audio signal and the radio frequency being monitored; the data can be transcribed from the video tape at a later time. Using video increases efficiency by facilitating simultaneous data collection at more than one location without additional personnel. It also allows one person to collect continuous hours of observations by providing the mechanism for occasional breaks.

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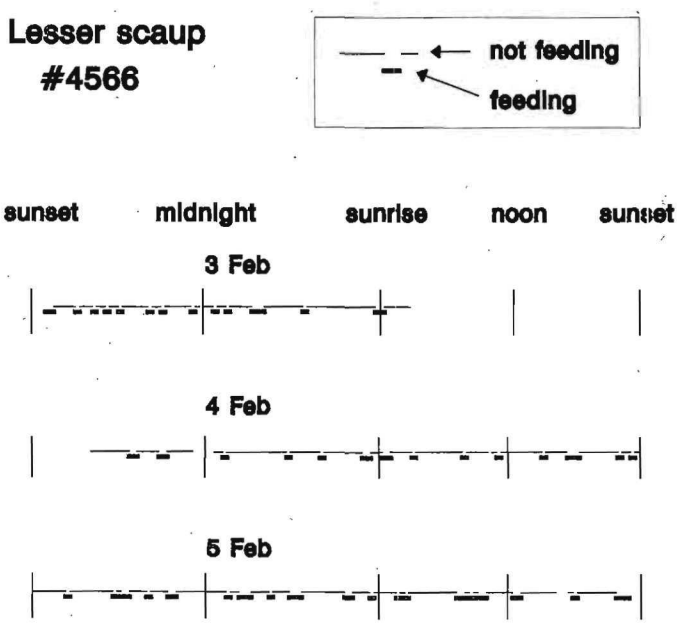

Figure. Summary of continuous 10-min. behavior scans, lesser scaup #4566, 2-5 February 1994, in Indiana Harbor Canal, Indiana.

Table 1. Average time spent feeding (%) by lesser scaups (*Aythya affinis*) during four time-of-day periods in Indiana Harbor Canal, East Chicago, Indiana, in February 1994.

		Percent	
Time-of-day period	*n*	Mean	SE
Sunset–midnight	16	31.9 a[1]	5.07
Midnight–sunrise	13	26.3 ab	4.16
Sunrise–noon	9	11.6 b	2.60
Noon–sunset	13	19.5 b	4.62

[1] Means sharing same letter are not different ($P = 0.003$, 3,33 df, $F = 5.75$). Percentages were arc sine, square root transformed to equalize the variances before analysis.

Table 2. Average time spent feeding (%) by individual lesser scaups (*Aythya affinis*) in Indiana Harbor Canal, East Chicago, Indiana, in February 1994.

		Percent	
Duck number	*n*	Mean	SE
4666	11	39.2 a[1]	6.67
4637	6	36.7 ac	7.04
4566	20	17.5 bc	1.86
4616	10	17.4 b	4.69
7029	4	9.0 bc	2.12

[1] Means sharing same number are not different ($P = 0.002$, 4,33 df, $F = 5.60$). Percentages were arc sine, square root transformed to equalize the variances before analysis.