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A REMOTELY OPERATED TRAP FOR AMERICAN KESTRELS USING NESTBOXES

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Abstract.—American Kestrels (*Falco sparverius*) can be difficult to catch with standard trapping methods. We describe the use of a commercially available radio controller as a remotely operated trap for placement in a nestbox and relate trap utility to kestrel breeding behaviors. The ease of operation and immediate response of the remote device increase trapping success of breeding adults during feeding of the young. The design is scaleable for other species using nestboxes.

TRAMPA OPERADA A CONTROL REMOTO PARA LA CAPTURA DE INDIVIDUOS DE *FALCO SPARVERIUS* EN CAJAS DE ANIDAMIENTO

Sinopsis.—El falconcito (*Falco sparverius*) puede ser dificil de atrapar utilizando métodos convencionales de captura. Describimos el uso de un método de radio control, comercialmente disponible, para manejar una trampa a control remoto, que es colocada en la caja de anidamiento. Lo fácil de la operación y la respuesta inmediata del aparato de control remoto, incrementa la tasa de atrapamientos de adultos reproductivos durante la fase de alimentación de los pichones. El diseño puede ser utilizado para la captura de otras especies que aniden en cajas.

Ornithologists have used a variety of approaches to capture birds at nestboxes. Radio-controlled traps allow biologists to operate a trap from a distance with the use of model aircraft remote-control components. For example, Lombardo and Kemly (1983) placed the remote-control components on the underside of the nestbox lid and effected the obstruction of the entry hole with a swinging door for trapping Starlings (*Sturnus vulgaris*) and Tree Swallows (*Tachycineta bicolor*). However, in our work with American Kestrels nesting in boxes in the central valley of northern California, falling or swinging doors proved ineffective because kestrels could charge the door of the trap and escape. We describe a new design for a remotely operated trap that uses a rotating servo arm to capture kestrels (and possibly other large birds) inside a nestbox.

METHODS AND MATERIALS

A commercial remote-control unit, costing approximately U.S. $100, comprises a transmitter, receiver, and a servo effector. Our simple modifications to the Futaba FP-2CR model aircraft controller included a triangular vane for obstructing the nest hole and inconspicuous packaging for mounting on the inside and outside of the nest box. The nestbox face surrounding the entrance hole hides the vane from the outside. Exact measurements for the vane and mounting hook (Fig. 1) depend on the nestbox design and could scale for other bird species. When the

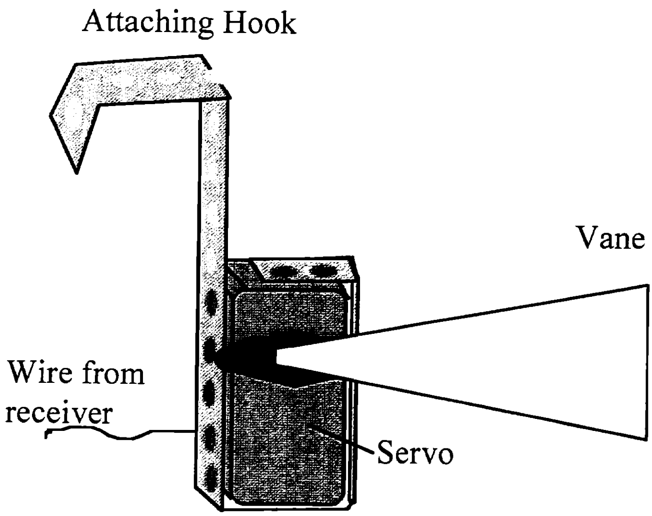

FIGURE 1. The servo component of a remotely operated trap for American Kestrel nestboxes. Plumber's tape forms a hook to hang the servo inside nestbox so the vane is flush against the front face and out of sight.

remote-control unit operates, the servo sweeps across and blocks the entry hole at 45°.

Our study used redwood nestboxes measuring 23 cm × 28 cm × 38 cm hanging 3–4 m high on utility poles near Davis, California (38°32′N, 121°47′W). The receiver and servo components hooked to the box, outside and inside, respectively (Fig. 2). Both components were attached securely, but temporarily, to the box with plumber's tape, out of the way of nesting activity. Four AA batteries powering the receiver allowed the unit to remain on throughout observations. Once an adult completely entered a nestbox, the hand-held transmitter, operated from a blind or car up to 150 m away, signaled activation of the servo, and the vane immediately trapped the bird inside the nestbox. A rapid approach ensured capture of the kestrel by hand.

Quick response was an important requirement of our trap design because prey deliveries by kestrels are brief. Over half (54%) of 64 observed prey deliveries to our nest boxes lasted 7 s or less. While some females had stays longer than 1 min (up to 30 min for rodent prey items), the longest observed male visit was 36 s. Wait times varied with daily hunting patterns; successful captures usually occurred within 30 min of trap activation. During cool peak hunting hours, kestrels made deliveries as often as every 2 min, with the females entering the box more often than the males. The longest trapping attempt with no inside deliveries was 2 h.

Opportunities for trapping kestrels during prey delivery with the remote-controller were best during a short period of the nesting season. A few days after hatching, the growing chicks demand feeding by both par-

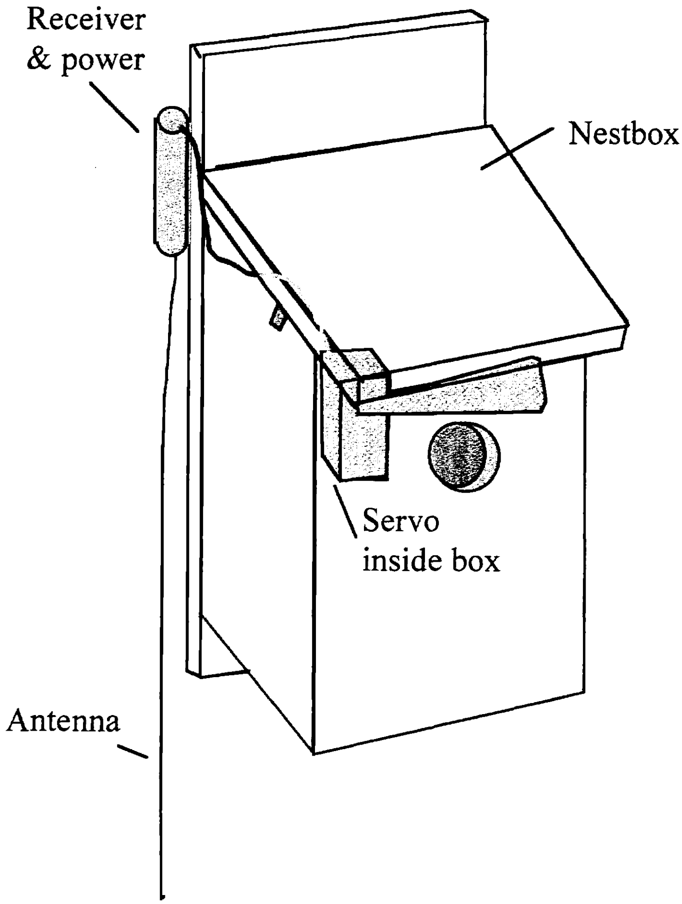

FIGURE 2. Attachment of the receiver and servo to an American Kestrel nestbox. The receiver and power supply, camouflaged inside a pipe, are attached to the backboard or mounting wire with plumber's tape. The servo is invisible from the outside.

ents (Balgooyen 1976); the opportunity for remote trapping occurred before the young were old enough to consume whole prey (5–16 days of age). At this stage, adults completely entered the nestbox to deliver food, maximizing the opportunity for trapping. About a week after the hatch date, the parental feeding began to include dropping prey items without entering the box. Inside visits for remote trapping diminished as whole-prey deliveries increased.

RESULTS AND DISCUSSION

In three years (1995–1997) of trapping at nestboxes in the Davis area, the remote trapping device proved particularly useful for catching males, improving capture rates for breeding male kestrels from 73% to 100% of

TABLE 1. Capture success for American Kestrels nesting in nestboxes near Davis, California.

Number of birds on study area	1995		1996		1997	
Males:	15		15		15	
Females:	15		15		15	
	Incubation	Feeding	Incubation	Feeding	Incubation	Feeding
Number of males captured						
Direct approach	3	0	5	0	11	1
Remote device	—	—	0	6	0	1
Bal-chatri	1	7	0	2	0	2
Number of females captured						
Direct approach	7	3	7	3	12	3
Remote device	—	—	1	2	0	1
Bal-chatri	0	4	1	0	0	2

nesting birds (Table 1). Introduced in the middle of the 1996 season, the remote trapping device captured otherwise uncatchable birds (6 of 15 birds) and saved considerable field time. In 1997, 100% of nesting males were caught, in part due to the use of the remote device; increased frequency of nestbox checks early in the breeding season also improved the capture total in 1997.

Trapping success of American Kestrels varied with nesting activity. During incubation, the remote trap was often unnecessary; a quiet approach often permitted capture of the adult inside the nestbox by obstructing the entry hole with a long pole. The sedentary behavior of the female during incubation (see Balgooyen 1976) favored high trapping success in the 1995–1997 seasons with the direct approach (46 captures in 68 attempts or 68%, including recaptures) with failed attempts including 3 escapes and 19 occasions when no adult was in the box. Female trapping before egg hatching yielded only one success with bal-chatri (Berger and Mueller 1959) with two attempts having no strikes, and one remote capture with one instance when the female did not enter the box.

Male occupancy of the nestbox during incubation allowed capture on 20 of 36 direct approaches (56% success, including a recapture). During the incubation period, relatively low hunting demand contributed to limiting the effectiveness of bal-chatri for male kestrels (one capture and eight sessions with no strikes). The remote trap had no captures of male kestrels during incubation.

After hatching, the utility of the remote trapping device relied on kestrel feeding behavior, taking adults as they entered the nestbox to prepare prey for the young chicks. The post-hatching success rate of the remote trap surpassed the other methods. In 1996–1997, the remote device succeeded on 46% of 15 male attempts and 60% of 5 attempts on females. On 12 additional attempts, no bird entered the box. For the 1995–1997 seasons, after the end of incubation, the success rate of the direct approach decreased to 2% for males and 17% for females out of 53 approaches, while the bal-chatri effected capture for 34% (11 out of 32 attempts) and 40% (6 of 15 attempts) male and female kestrels, respectively.

Our design of a rotating vane made this remote device a useful addition to field trapping techniques. The range of motion of the vane flush against the interior of the box front prevented any gaps for kestrels to escape. The rotating servo arm remained firmly in the closed position and did not swing through any interior nestbox space. The arrangement of the receiver and servo (Fig. 2) allowed normal lid operation, enabling a researcher to reach in without allowing the kestrel to escape. In contrast, the lid design in Lombardo and Kemly (1983) would interfere with removal of the kestrel from the nestbox. As additional advantages, the rotating arm reset under remote control and could not trip by accident or by movement of the chicks (compare Stutchbury and Robertson 1986).

Several factors contributed to the utility of remote nestbox trapping. Kestrels, which were difficult to take on noose traps or nets, were susceptible to the remote nestbox trap. The device was not apparent to the birds and did not interfere with nesting behaviors. Components were sturdy in field use, lightweight, and easy to set up, operate, and remove. Used in combination with direct approach and noose trap, the remote device enabled trapping success to reach 100% for breeding American kestrels in the Davis nestbox plot. Remote-control trapping could work for any species breeding in accessible nestboxes.

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LITERATURE CITED

BALGOOYEN, T. G. 1976. Behavior and ecology of the American Kestrel (*Falco sparverius*) in the Sierra Nevada of California. Univ. Calif. Publ. Zool. 103:1–83.

BERGER, D. D., AND H. C. MUELLER. 1959. The Bal-Chatri: a trap for the birds of prey. Bird-Banding 30:18–26.

LOMBARDO, M. P., AND E. KEMLY. 1983. A radio-controlled method for trapping birds in nest boxes. J. Field Ornithol. 54:194–195.

STUTCHBURY, B. J., AND R. J. ROBERTSON. 1986. A simple trap for catching birds in nest boxes. J. Field Ornithol. 57:64–65.

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