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THE USE OF RADIO TRANSMITTERS TO MONITOR SURVIVAL OF SANDHILL CRANE CHICKS

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Abstract: To determine cause of death of Florida sandhill crane (Grus canadensis pratensis) chicks, in 1996-99 we glued short-term transmitters on newly hatched chicks. At about 10 days of age, these were replaced with surgically implanted subcutaneous transmitters in the field. Chicks were then recaptured at 55 to 65 days of age for more permanent transmitters. This combination of transmitter configurations allowed us to track individuals through their rapid-growth period.

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METHODS

In 1996, we placed sew-on transmitters on the backs of 5 chicks in the 10 to 19 day age class in Alachua County, Florida. Transmitters (≤5 g, with mortality switch, Advanced Telemetry Systems [ATS], Insanti, Minnesota, USA) were glued with epoxy to plastic insect screen for windows (2 x 3 cm) to increase the size of the attachment area. Four to 6 nonabsorbable sutures were placed through the screen and skin on the back between the wings.

In 1997-99, we placed temporary, glue-on transmitters (≤2 g, 7 x 7 x 18 mm, 15-cm antenna, expected 10-day life, 0.5-km range, ATS) on cranes 1-10 days of age in Alachua, Lake, and Osceola Counties. Epoxy glue (skin-adhering, Titan Corporation, Lynnwood, Washington, USA) was used to attach the transmitters to feathers and skin on the back between the wings. Transponders (Infopet Identification System, Burnsville, Minnesota, USA) were injected subcutaneously to identify individuals in the event of transmitter loss.

When these birds reached 10 days of age, or when they could be captured (range 10-50 days), the glue-on transmitter was removed by cutting the downy feathers with a blade or gently pulling it off the skin. Usually by this time most of these feathers had pulled out on their own. A subcutaneous transmitter was then inserted.

The subcutaneous transmitter location was chosen so that the transmitter (≤4 g, 7 x 13 x 24 mm, 15-cm antenna, with mortality sensor and a duty switch [12 hr on 12 hr off], 1-km range, 60-day expected life, ATS) would lie under the wing and the antenna would exit the skin behind and above the wing (Fig. 1). Local anesthesia was achieved with 0.05 ml 2% lidocaine injected subcutaneously and the area was cleaned with diluted betadine or alcohol. A 1-cm skin incision was made 1 cm cranial to the final resting place of the transmitter and perpendicular to the axis of the transmitter. Hemostats were then used to separate the skin from the underlying muscle to create a pocket for the transmitter. A small hole was made in the skin using a 16-gauge needle where the antenna would exit the skin. A blunt needle, large enough to accommodate the antenna, was then inserted into the antenna hole until it exited the incision. A corner of the plastic bag holding the transmitter was cut off, the disinfectant (0.2% chlorhexidine bath for >24 hrs prior to instrumentation, Nolvasan-S, Ft. Dodge Laboratories, Ft. Dodge, Iowa, USA) poured off, and the tip of the antenna worked out of the hole. The antenna tip was threaded through the blunt needle.

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Fig. 1. A schematic illustration of radio transmitter insertion. A: incision site to be closed with two absorbable sutures, B: pocket created for transmitter, C: blunt needle for threading antenna, D: plastic bag containing disinfectant and transmitter with corner cut off, E: final resting place for the transmitter, F: transmitter with antenna prior to insertion.

while holding the transmitter inside the bag. The blunt needle was removed. Hemostats were used to hold the incision open while the transmitter was worked into the pocket by pulling on the antenna. When in place, 2 absorbable sutures (such as 4-0 Vicryl, Ethicon, Somerville, New Jersey, USA) were used to close the incision.

RESULTS

Only 1 of the 5 chicks with sew-on transmitters remained alive by fledging age. The transmitter of this bird was attached by only a single suture by 59 days of age. The other chicks were lost to predation (Nesbitt and Schwikert 1999). There were no losses attributed to transmitter attachment. Because these transmitters were quite visible to the adult and because there was a great risk of sutures pulling out, we changed to small glue-on transmitters followed by a subcutaneous transmitter during 1997–99.

Glue-on transmitters were placed on 22 chicks from 1 to 11 days of age. Eight fell off or were pulled off before recapture, and 2 stopped transmitting before the chicks were recaptured or died. The attachment failure of these small radios was the weak point in our ability to monitor from hatching to fledging. In several cases, a sibling with an active transmitter aided the finding of the chick with a failed transmitter.

Subcutaneous transmitters were placed on 19 chicks between 7 and 32 days of age. The procedure was done in the field and took about 20–30 min from capture to release. The parent birds usually remained within sight and in all cases were observed to rejoin the chick. Two of the transmitters fell out before the chicks reached 55 days of age. In both of these cases, the chicks were less than 10 days of age when instrumented. We suspect that chicks <10 days of age are unsuitable for using transmitters of the size we used. In these chicks, the area of skin separated from the body was probably too large relative to the size of the chick and underwent necrosis, expelling the transmitter. When recaptured, a scar was found that had healed well. Although we were always able to recapture cranes with transmitters, we feel that failure to locate the bird and remove the transmitter would probably not present a significant hazard to the bird. Transmitters were easily removed from fledgling birds by cutting over the transmitter at the antenna hole with a razor blade and pulling the transmitter out. The area was cleaned with betadine and left open to heal.

Three chicks were recovered moribund or recently dead. In all cases, the transmitter site evidenced fibrosis and minimal inflammation, but showed no evidence of necrosis or bacterial infection on histological examination.

DISCUSSION

Because cranes grow from hatching size to near adult size in 2–3 months (Tacha et al. 1992), attachment of a permanent, long-distance transmitter at hatching is impossible using currently available equipment. We experienced good results with the use of 2 temporary radio transmitters, the first a glue-on one for neonatal chicks, followed by subcutaneous insertion of a larger transmitter after 9 days of age. This system provides an acceptable solution to the problem of continuous monitoring from hatching to fledging and enabled us to adequately locate chicks until the time that more permanent markers could be attached. Full-sized leg bands can safely be placed on sandhill cranes when they reach 55–65 days of age (S. A. Nesbitt and S. T. Schwikert, Florida Fish and Wildlife Conservation Commission, unpublished data). Nesbitt and Schwikert (1999) found no difference in survival between chicks with and without radio transmitters attached as described herein.

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LITERATURE CITED


