

TOENAIL-CLIPPING: A SIMPLE TECHNIQUE FOR MARKING INDIVIDUAL NIDICOLOUS CHICKS

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Abstract.—We tested the technique of toenail-clipping for identifying individual nidicolous chicks. Toenails of Tree Swallow (*Tachycineta bicolor*) and House Wren (*Troglodytes aedon*) nestlings were clipped within three days of hatching, and nestlings were monitored until they fledged. No nestling mortality or toe loss from clipping occurred. Clipping did not impair ossification or growth of cartilaginous material within the nail. We suggest toenail-clipping as a safe and simple technique for marking individual nestlings because of its advantages over other marking techniques.

CORTE DE LA UÑA DEL HALUX: TÉCNICA SENCILLA PARA MARCAR PICHONES NIDÍCOLAS

Resumen.—Pusimos a prueba la técnica de cortar la uña del halux para identificar pichones nidícolas. La uña fue cortada en pichones de *Tachycineta bicolor* y *Troglodytes aedon* de tres días de edad y se monitorearon las aves hasta que dejaron el nido. Ninguna de las aves perdió el dedo o murió a causa del experimento. El corte no evita la osificación o crecimiento del material cartilaginoso de la uña. La técnica es segura y sencilla para marcar pichones y ofrece ventajas sobre otras técnicas existentes.

Many techniques are available for marking individual birds (Day et al. 1980, Marion and Shamis 1977, Stonehouse 1978). Commonly used methods include ringing or banding (using color and/or aluminum government issue bands), neck collars, nasal saddles, non-toxic paints (including dyes and markers), and wing or foot tags. Some techniques have inherent problems. Paints and related materials tend to fade or wear off, necessitating constant remarking (Marion and Shamis 1977). Tags, collars, and bands may snag in vegetation (Canadian Council on Animal Care 1980). There is evidence that certain colors of bands or collars interfere with mating (Burley 1981). Furthermore, few techniques allow marking chicks at an early age. Fastening bands or pieces of colored thread (see Oniki 1981) around the tarsus at an early age may impair circulation and growth as individuals mature.

Toenail-clipping has been mentioned as a method to mark individual nestlings (Murphy 1981). No study has documented the technique of

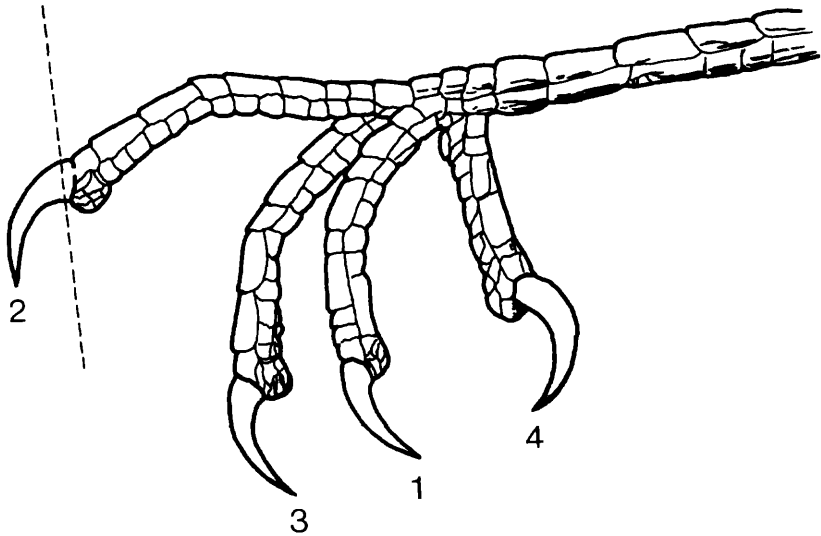


FIGURE 1. Pattern for clipping toenails of the left foot. Dashed line indicates site and angle of clipping. (Figure adapted from Wilson [1980].)

toenail-clipping or the relative success of the procedure in birds, and/or its advantages over other marking techniques. Here we discuss the technique to mark individual nidicolous chicks.

METHODS

Toenail-clipping is similar to toe-clipping used to mark small mammals (DeBlase and Martin 1981), but involves no amputation of bony phalanges. The nail is clipped at the base with a pair of dissecting scissors. We tested this technique at the Experimental Lakes Area, a Fisheries and Oceans Canada field camp, NW Ontario (Johnson and Vallentyne 1971). We are studying effects of lake acidification on birds and marked nestlings to assess individual growth rates. Between 20 May and 30 June 1987, we clipped toenails of 113 Tree Swallow (*Tachycineta bicolor*) and 18 House Wren (*Troglodytes aedon*) nestlings in nest boxes. Toenails were clipped as described above within 3 d of chicks hatching, including day of hatch. Patterns of clipping are shown in Figure 1. In brief, digits 4, 3, 2, and 1 of the left foot and digits 2, 3, 4, and 1 of the right foot corresponded to nestlings 1 through 8, respectively. Toenails were only clipped once and most nestlings were observed every 2–3 d until they fledged (approximately day 18 for Tree Swallows and day 15 for House Wrens).

Clipped toenails were X-rayed in various stages of regrowth to determine if ossification of cartilagenous material within the nail was inhibited by clipping. Only birds which had been sacrificed for tissue analyses (to

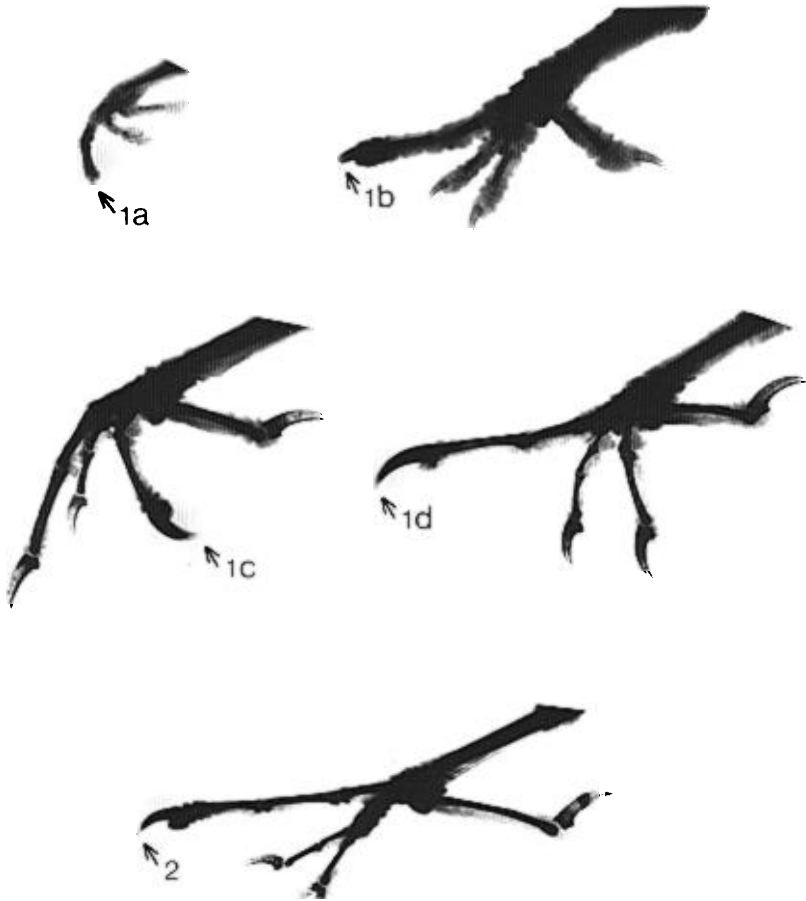


FIGURE 2. Reverse prints of X-rays of toes of Tree Swallows (1) and House Wren (2) (darkest regions are bone). Arrows indicate clipped nail. Age of chick: 1a = 2 d; 1b = 8 d; 1c = 15 d; 1d = 17 d; 2 = 14 d.

determine trace element toxicity resulting from lake acidification) were X-rayed. Birds were stored at -80°C prior to being X-rayed. X-rays were taken using a Hewlett-Packard 43805N faxitron system. Kodak Industrex AA film was exposed for 30 s at 15 kvp in a black polyethylene bag.

RESULTS AND DISCUSSION

We observed no nestling mortality or toe loss from toenail-clipping. X-rays showed that ossification of cartilage within the nail sheath was not inhibited by the clipping (Fig. 2). Although cartilage within the nail

was clipped, bone grew normally (Fig. 2) as a result of proliferation of cartilage near the clipped end. As new cartilage was formed, it was progressively converted into bone (Strauch 1985).

In all cases, the clipped toenail was almost as acute by fledging day as toenails that were not clipped. We noted no handicap to birds after fledging from toenail-clipping. However, clipped toenails remained blunt enough at the tip to be distinguished throughout an 18-day nestling period. In contrast to other marking techniques for nestlings (such as felt marking pens which fade or colored thread which periodically requires loosening [Oniki 1981]), toenail-clipping is useful in studies in which nests are not frequently visited. Furthermore, nestlings can be marked on day of hatch, an impossibility with techniques such as banding.

We propose a numbering system similar to that in Figure 1. When nestling numbers exceed the number of toes, combinations of 1 toenail per foot and 1 nail on 1 foot and 2 on the other (with reciprocals) yield 120 nestlings marked. Number (3 or 4) and orientation of toes varies among species with nidicolous chicks, so individual researchers should modify their numbering scheme accordingly.

In conclusion, based on our work with Tree Swallows and House Wrens, toenail-clipping is a safe, simple, and inexpensive technique available to researchers wanting to recognize individual nidicolous chicks.

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LITERATURE CITED

- BURLEY, N. 1981. Sex ratio manipulation and selection for attractiveness. *Science* 211: 721-722.
- CANADIAN COUNCIL ON ANIMAL CARE. 1980. Guide to the care and use of experimental animals, Vol. 2. Canadian Council on Animal Care, Ottawa, Ontario.
- DAY, G. I., S. D. SCHEMNITZ, AND R. D. TABER. 1980. Capturing and marking wild mammals. P. 61, in S. D. Schemnitz, ed. *Wildlife management techniques manual*. Fourth edition. Wildl. Soc., Washington, D.C.
- DEBLASE, A. F., AND R. E. MARTIN. 1981. A manual of mammalogy with keys to families of the world. Wm. C. Brown Co. Publ., Dubuque, Iowa.
- JOHNSON, W. E., AND J. R. VALLENTYNE. 1971. Rationale background and development of experimental lake studies in northwestern Ontario. *J. Fish. Res. Board Can.* 28: 123-128.
- MARION, W. R., AND J. D. SHAMIS. 1977. An annotated bibliography of bird marking techniques. *Bird-Banding* 48:42-61.
- MURPHY, M. T. 1981. Growth and aging of nestling Eastern Kingbirds and Eastern Phoebe. *J. Field Ornithol.* 52:309-316.
- ONIKI, Y. 1981. Individual recognition of nestlings. *J. Field Ornithol.* 52:147-148.

- STONEHOUSE, B. (ed.) 1978. Animal marking. MacMillan Press, London and Basingstoke, U.K.
- STRAUCH, J. G., JR. 1985. Skeleton, post cranial. P. 543, in B. Campbell and E. Lack, eds. A dictionary of birds. T & A D Poyser Ltd., Calton, England.
- WILSON, B. W. 1980. Diversity and distribution of birds; introduction. Pp. 3-8, in Sci. Am., ed. Birds. W. H. Freeman Co., San Francisco, California.

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