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The hole saw method for accessing woodpecker nestlings during developmental studies

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A method allowing the easy access of nestlings of cavity nesting species is outlined. Briefly, a hole saw fitted to an 18-V cordless drill is used to cut a hole between 5 cm and 8 cm below the cavity entrance. The aperture created allows extraction of nestlings by hand. After manipulation, the wooden disk cut during the formation of the hole is wrapped with duct tape, fitted into the hole and secured in place with two screws. The technique was tested on 25 occupied black-backed woodpecker cavities. No mortality occurred during the drilling process, no nest was abandoned and adults returned to feed nestlings within a few minutes of completion of the manipulations. Furthermore, some opened cavities were reused, either by black-backed woodpeckers or by secondary cavity nesters, suggesting that the nests conserved their natural aspect.

Introduction

The study of nestlings has been widely used in order to obtain information concerning different aspects of nesting biology. Such studies include the monitoring of the growth rate of nestlings, the energy expenditure of adults while rearing young and nesting habitat quality (Hoyt 1944, Hadow 1976, Haggerty 1994, Conner & Saenz 1996, Brua 1999, Burhans & Thompson 1999). Once the nest of the species under study has been located, the collection of data is relatively simple for those species constructing open-cup nests. However, for cavity nesting species, data collection can be difficult or hazardous due to the position of the entrance hole. Researchers studying nestlings of cavity nesting species have developed different techniques for accessing individuals in the nest; however, these methods are rarely published. Of the methods that exist in the literature (e.g., Jackson 1982, Richardson *et al*. 1998), several exhibit a number of important disadvantages: perhaps the most important being the difficulty of recapturing a given nestling, especially when the individual is either very young or well grown (Hess *et al*. 2001). This can be particularly important during dietary studies where ligatures are placed around the neck of a chick, which must then be re-extracted from the nest half an hour later.

Although Walters and Miller, studying red-naped sapsuckers (*Sphyrapicus nuchalis*) in the early 1990s, were possibly the first to use a hole saw to open woodpecker nest cavities (E. Walters pers. comm.), and that a similar technique was recently used to access Barrow's golden-

Fig. 1. Opening made with the aid of a cordless drill fitted with a hole saw. Note that a small wooden lip has been left in order to prevent the cut disc from falling into the nest cavity.

Fig. 2. Opening closed using the wooden disc produced by the hole saw. Note that wrapping several layers of duct tape around the wooden disc ensures a tight fit.

eye (*Bucephala islandica*) eggs (M. Evans pers. comm.), the methods used were not published (*see* Walters 1996, Evans *et al*. 2002). In this note, we outline a quick and easy method for accessing woodpecker nestlings that was developed during a study on black-backed woodpeckers (*Picoides arcticus*).

Description of the hole saw method

This technique consists of using a hole saw (external diameter of 95 mm) fitted to an 18V cordless drill, to cut a hole between 5 cm and 8 cm below the cavity entrance (Fig. 1). When the hole saw begins to approach the inside of the cavity (either at the top or bottom of the cut), the saw is stopped and the final extraction of the disk produced is achieved using a chisel. We suggest not completely piercing the hole with the drill (Fig. 1) as the hole saw and the resulting dust and splinters could injure nestlings (especially in the case of well grown young). The aperture created gives easy access for the extraction of nestlings by hand. Once the necessary manipulations have been carried out, several layers of duct tape are wrapped around the edge of the wooden disk. This compensates for the thickness of the saw mark and ensures that the disc fits neatly into the hole (Fig. 2). Finally, the disk is secured in place with two screws. During subsequent visits, manipulations are simple and rapid. At the end of the nesting season, the disk is fixed in place with mastic used for sealing windows. This ensures that secondary cavity nesters can use the cavity. Given that the opening created is round, we assume the reduction in trunk strength to be minimal.

Results

We tested this technique on 25 black-backed woodpecker cavities during the summers of 2004 and 2005. No mortality occurred during the drilling process. This technique had little or

no impact on the behaviour of the breeding pair, which always returned to feed nestlings within a few minutes of our departure.

Several of the cavities opened in 2004 were reused by black-backed woodpeckers (the same pair) in 2005, or by other bird (e.g., tree swallow (*Trachycineta bicolor*)) or mammal (e.g., red squirrel (*Tamiasciurus hudsonnicus*)) species. All trees containing cavities opened in 2004 were still standing in 2005.

Discussion

The hole saw method outlined above has many advantages over existing techniques for accessing the chicks of cavity nesting bird species. Notably, manipulation of the young is less hazardous than when using either nooses or tools designed for grabbing nestlings within the cavity (Jackson 1982, Richardson *et al*. 1998). While the noose and pick up tool methods have been used on many cavity nesting species (Richardson *et al*. 1998), and appear to be safe and rapid when carried out by experienced individuals (but *see* Hess *et al*. 2001), it is impossible to know by which body part (e.g., head, leg, toe or wing) a nestling has been caught. Therefore, these techniques seem less appropriate when nestlings need to be manipulated on a regular basis (e.g., every 2 days). Recently, Proudfoot (2002) developed a camera system to help removal of nestlings which will help overcome the above problem. However, using the hole saw method, even an inexperienced operator can, using readily available equipment, rapidly (10–20 min, depending on the density of the wood: this varies with the state of decomposition of the trunk and the sharpness of the hole saw blade) cut a suitable hole to access black-backed woodpeckers nests in black spruce (*Picea mariana*) trunks. Moreover, this method allows access to very young nestlings (0–1 days). By contrast, most other techniques allow access only to nestlings of 4 days of age or more (Jackson 1982).

The hole-saw method is similar to the technique developed by Hadow (1976), which consists of opening the nest by sawing a 6-inch cut diagonally downwards from the entrance hole to the right and to the left, and then connecting the base of these cuts with a third one. The resulting triangular "door" is then hinged along the third cut and held closed with adhesive tape. To limit the time needed to open the cavity, certain researchers replaced the traditional saw used by Hadow (1976) by a cordless reciprocating saw, which allows a square-shaped door (11 × 11 cm) to be cut 4 cm above the cavity bottom with a blade thinner than that of a hole saw (K. Wiebe pers. comm.). However, in many situations, woodpecker nests are often located using the begging calls of nestlings. In the presence of young it could potentially be dangerous to insert a blade into the cavity (although the use of a camera has shown that nestlings normally remain at the bottom of the nest during such operations). This is particularly so in the late stages of nestling, when nestlings tend to cling to the cavity walls. Therefore, the use of a hole saw offers a possible safety advantage over either reciprocating or conventional saws. The fact that with the hole saw technique, the drill is stopped just before the blade reaches the cavity space, and that final extraction of the wooden disk is achieved using a chisel, greatly reduces the risk of wounding nestlings. This is supported by the fact that while 96% of the nests opened in the present study were at the nestling stage, no individuals were injured.

With the hole saw method, the opening produced is round (like that created by the woodpecker itself) and we assume that this conserves trunk strength. One possible problem associated with the construction of an access door is that the door may be lost between nest visits by the research team (either due to activity inside the cavity or from the outside). This problem can be easily overcome by both leaving a wooden lip (Fig. 1) on one or both sides of the access hole when the wooden disc is removed using a chisel and by securing the door in place with two screws after the necessary manipulations have been completed.

The fact that one pair of black-backed woodpeckers in the present study reused an opened nest cavity (which is a rare phenomenon for this species), and that other cavities were also readily used by secondary cavity nesters, indicates that the opened nests conserved their natural aspect.

The hole saw technique is an interesting approach when an operator needs to manipulate

nestlings on a regular basis during the nestling period. The operation time is rapid, the impact on adults and nestlings seems minimal, and the risks for the operator are low because the amount of time spent in a given tree is short. This technique is, in theory, applicable to all cavity nesting species, and it could be particularly interesting for species that do not use nest boxes, as is the case for most woodpecker species. However, it should be noted that the black-backed woodpeckers breeding in the black spruce dominated boreal forest of Québec use trees of relatively small diameter as compared with northern flickers (*Colaptes auratus*) and pileated woodpeckers (*Dryocopus pileatus*). In studies involving the latter two species, or other large woodpeckers, where cavity walls may be thicker, the use of the hole saw technique may be limited. While it is possible to extract successive pieces of wood with a hole saw before reaching the cavity, a hand-held keyhole saw (which can cut a door up to 20 cm thick) would probably be more appropriate. Another potential problem, not experienced during the present study, could arise if nest cavities are excavated in trees in an advanced state of decomposition. Under such conditions, a hole saw should not be used as this technique could severely damage the cavity.

Finally, because the hole saw technique allows access to very young nestlings (0–1 days), it could be used in concert with ligatures (Johnson *et al*. 1980, Mellott & Woods 1993, Johnson & Lombardo 2000) to facilitate the study of fresh food items delivered to nestlings. This, in turn, will provide the potential for carrying out growth studies, which have rarely been done for woodpecker species (but *see* Hadow 1976).

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