

## A note on the use of backpack radio-tags on medium-sized woodpeckers

Jørund Rolstad & Erlend Rolstad

*Rolstad, J. & Rolstad, E., Norwegian Forest Research Institute, Høyskoleveien 12, N-1430 Ås, Norway*

*Received 2 March 1995, accepted 29 May 1995*

### Introduction

Radio-telemetry is a useful tool for studying wild animals. However, there is always a risk that the radio-gear will influence their behavior negatively. During the course of a woodpecker project in south-central Scandinavia, at the Varaldskogen study area (60°10'N, 12°30'E), we used backpack transmitters on several species to study habitat use and survival (Rolstad et al. 1992). For year-round monitoring the backpack mounting is useful because the tags are not peeled off during the molting, which happens to the tail-mounted tags. Furthermore, the antenna on tail-mounted tags, which extend far beyond the tail feathers, may be caught in bark crevices. This was a problem in a study of Red-cockaded Woodpeckers *Picoides borealis* in Georgia, USA (Jackson et al. 1977). On the other hand, the backpack may be questionable to use on hole-nesting birds due to the potential interference when the birds pass through the entrance hole. Here we report our experience with backpack tags mounted on seven nesting Great Spotted Woodpeckers during the summer of 1993 (Rolstad et al. 1995).

### Methods

The birds, four males and three females in four breeding pairs, were captured at the nest-holes

with a hoop net on a telescope pole and fitted with a 5 gram (inclusive harness) SS-2 type, backpack transmitter (Biotrack, UK). The tags (20 × 10 × 7 mm) were attached with a nylon harness enclosed in silicon rubber (Brander 1968) and constituted 4.8–5.6% of the body mass. The radio-instrumentation took about 10 minutes. All birds were released into their nests to minimize the risk that they should perceive the nest to have been depredated. This procedure was successfully implemented with Black Woodpeckers *Dryocopus martius* in the same study area.

### Results

*Nest A:* The male (020) and the female (270) were captured on 27 and 28 May with 3–4 days old nestlings. The female behaved normally when she left the entrance hole, but the male seemed to be somewhat hampered by the radio-gear, presumably because the entrance hole was narrow. On 29 May the nest was deserted. A week later the pair adopted an old hole 50 m away and successfully bred there.

*Nest B:* The male (182) and the female (280) were captured on 20 and 21 May while they were incubating eggs. Both left the nest without problems after release. They flew well and continued the incubation after being relieved by the other parent. The eggs hatched on 28 May and the

course of the breeding went normally. At one occasion, however, we observed the male excavating the walls of the entrance hole to enlarge it.

*Nest C:* The male (310) and the female (060) were instrumented on 28 May and 1 June, respectively. The nest contained eggs. We did not observe any anomalous behavior after the capture of the male, and both parents were incubating the eggs. Neither did we observe that the birds had problems with passing through the entrance hole. However, the female was stressed after the capture. On 2 June the nest was deserted. We lost radio-contact with the male, but the female stayed as a non-breeder within the nesting area the rest of the summer.

*Nest D:* The male (057) was instrumented on 17 June with 14 days old nestlings. We did not radio-instrument the female. There were no signs of complications during the course of the breeding.

## Discussion

Although we monitored only a few birds, the negative impact was obvious. The backpack hampered some of the birds, most notably male 020, when they passed through the entrance hole. Two of the pairs deserted the nest, although one of them re-nested. On the other hand, we observed some of the birds roosting in old holes later in the season without having any problems entering the holes. We also radio-instrumented three Grey-headed *Picus canus* (Rolstad & Rolstad 1995) and nine Green Woodpeckers *P. viridis* (Løken 1993) without observing any problems. However, except for three Green Woodpeckers, these birds were instrumented previous to the nesting, so they may have had the opportunity to adjust their entrance hole. An extensive study of the Black Woodpecker (Rolstad et al. 1992) did not reveal such problems, although several birds were captured and instrumented during nesting. Black Woodpeckers do, however, excavate larger holes relative to their body mass, than the other woodpeckers. In their study of Red-cockaded Woodpeckers in Georgia, Jackson et al. (1977) used radio-tags glued to the back of the birds. They did not observe that the birds had problems passing through their entrance holes.

It may well be that the ultimate reason for the desertions was the capture and handling of the birds, and not the backpack tags. We have observed female Black Woodpeckers deserting their nests when they were released outside the nest. Releasing them into the nest cavity successfully solved the problem. However, based on the limited experience with medium-sized woodpeckers we caution against backpack radio-instrumenting during nesting. Radio-tags could be mounted on the tail and replaced with backpacks when birds can be captured in roosting holes after the nesting period. However, this may be difficult because the birds start to molt soon after nesting, and in mid-summer few birds roost in holes.

Demographic data is badly needed to implement proper management of endangered woodpecker species, such as the White-backed Woodpecker *D. leucotos* in Scandinavia (Carlson & Stenberg 1995). Because the Great Spotted Woodpecker is a common species it may be a suitable species for further experiments with different types of radio-mounting. Besides different mounting techniques, such studies should involve alternative release methods, for example, releasing the birds outside the nest holes. Furthermore, nests should be carefully monitored to reveal details in the behavior of the birds.

*Acknowledgement.* We thank Pekka Helle and Arto Marjakangas for comments and Raimo Virkkala and Hannu Pietiäinen for urging us to elaborate on the problem.

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