Glue method of radio tag attachment to passerines, near passerines and shorebirds

1. Scope and Field of Application

Gluing radio transmitters to clipped feathers, or skin on a bird's back is a preferred method for studies that require only short-term attachment (less than 5 months), though retention can be quite variable depending on species, moult schedule, and specific methods employed (Warnock and Warnock 1993; Warnock and Takekawa 2003; Mong and Sandercock 2007; Diemer et al. 2014). This relatively short attachment period generally limits the application of this method to studies that use battery-powered radio tags with lifespans comparable to the length to the attachment period. This attachment method is not appropriate for data loggers, satellite tags, or any other tag requiring longer-term attachment.

The assured detachment of glue-attached radio-tags minimizes the chance of any long-term effects on study animals (Anich et al. 2009), which is an attractive benefit when working with species of conservation concern; however, this method may impede the thermoregulatory abilities of study animals, so should be used with caution in extreme environments (Warnock and Warnock 1993). Past studies have highlighted some species that do not tolerate glue-attached tags well, specifically European Starling (*Sturnus vulgaris*), Northern Cardinal (*Cardinalis cardinalis*), and Bobolink (*Dolichonyx oryzivorus*), though the method has proven effective for many passerines and shorebirds (Raim 1978; Hill and Talent 1990; Sykes Jr et al. 1990; Johnson et al. 1991; Woolnough et al. 2004; Anich et al. 2009; Diemer et al. 2014). Gluing transmitters may also be effective for nightjars (E. Knight, pers. comm.), and hummingbirds, though more study is needed (Zenzal et al. 2014).

2. Purpose

To ensure safe and proper procedures for gluing radio transmitters to birds.

3. Considerations

Bird handlers should be familiar with all content and references found within the North American Banding Council's (NABC), North American Bander's Study Guide and the NABC North American Bander's Manual for Banding Shorebirds (Charadriiformes, suborder Charadrii).

The procedures differ slightly for transmitters that have a flat surface and rounded tags to allow for good contact between the tag and the bird.

This method is best done by a team of two: one person will hold the bird, and the other will glue the tag. If tagging shorebirds, ensure that legs are free to dangle during handling to avoid capture myopathy. This can be done by holding the bird with head towards the handler, and legs dangling between the ring and middle finger. The thumb and index finger can then be used to hold the wings and part the rump feathers for the tagger (Fig 1).

Migratory Bird Permits (CWS) are required, with specific permissions related to attaching tracking devices to birds. Additional permissions will be needed if the study species is a Species at Risk.

4. MATERIALS AND EQUIPMENT

- Polyacrylamide glue (e.g. LePage Ultra Gel Control superglue)
- Surgical Scissors
- Non-stretch, non-fraying fabric (for rounded tags)
- Tags and activator
- Acetone/nail polish remover

5. PROCEDURE

We strongly recommend that the glue is tested before using it on a live bird to know roughly how long it takes to dry.

5.1 Preparation of rounded tags

- Cut a piece of non-stretch, non-fraying fabric to be slightly larger than the tag profile
- Add glue to cover the base of the tag (i.e., side that does not show a tag label), and attach piece of fabric

5.2 Tag deployment

- Activate tag and record tag number alongside your other banding data
- A second person holds the bird and parts the feathers where the tag will be attached. Tags are generally attached on the rump on shorebirds, just above the uropygial gland (Fig 2a), and the interscapular region on passerines and other small birds (Fig 2b).
- Expose a patch of skin the size of the transmitter or fabric (for rounded tags) without feather tracts or trim feathers with small scissors if needed leaving a small length (0.5-1mm) of feather shaft. Some birds (e.g. nightjars) do not require feather trimming as they have a bare patch in the interscapular region where the feather tracts meet.
- Add glue to cover the base of the tag (i.e., side that does not show a tag label) or fabric (for rounded tags) and place tag on the exposed patch of skin or feather stubble. Gently hold the tag on the bird and ensure the antenna is leading straight down the tail (Fig 3). Place your thumb over the tag to secure it in place until the glue dries.
- Gently tug on the transmitter to ensure the tag is firmly attached and surrounding feathers are not attached to the tag. Reposition feathers to cover the tag.
- Release the bird low to the ground, in case it has some initial trouble flying, then watch for several minutes to ensure it can fly unhindered; the bird can be left once it appears to have returned to normal behaviour. If working at night, ensure headlamps are turned off before releasing a bird because the light may disorient them.

5.3 Emergency Tag Removal

Remove the tag if the bird is not responding appropriately to the attachment and you can safely recapture the bird. To remove the tag, apply a small amount of acetone where the tag makes

contact with the skin. Acetone will dissolve the glue upon contact. The use of a cotton swab or pad to deliver the acetone is recommended to help control application and quantity of the solution.

6. CATEGORY OF INVASIVENESS

- C – Minor stress or pain of short duration (e.g. capture using methods with little or no potential to cause injury and marking of animals for immediate release; short periods of restraint beyond that for simple observation or examination, but consistent with minimal distress). Category selected based on the *Categories of invasiveness in animal experiments* outlined by Canadian Council on Animal Care (CACC 1991).

7. REFERENCES (INCLUDING POLICIES)

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8. REVISION HISTORY

9. APPENDICES

Appendix 1. Figures

Figure 1. Holding a shorebird for tagging. Ensure legs are allowed to dangle between ring and middle fingers to avoid capture myopathy. Photo Stuart Mackenzie

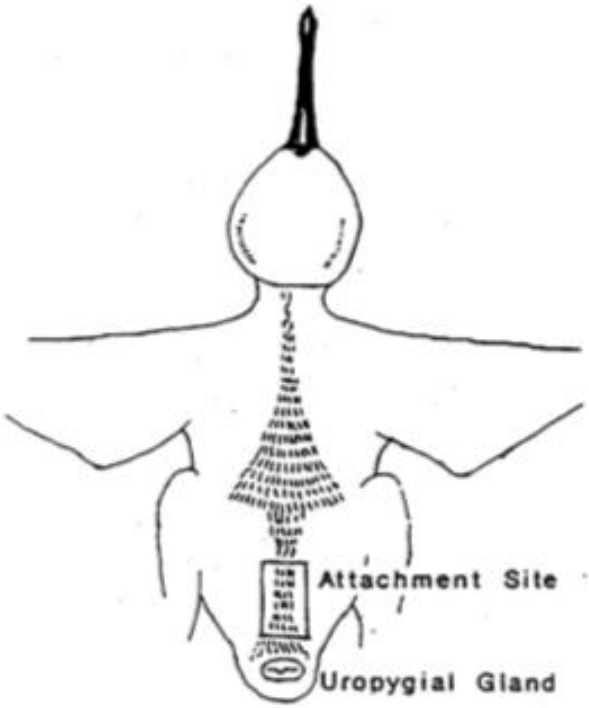

Figure 2a. Dorsal view of a shorebird, showing attachment site (Warnock and Warnock 1993).

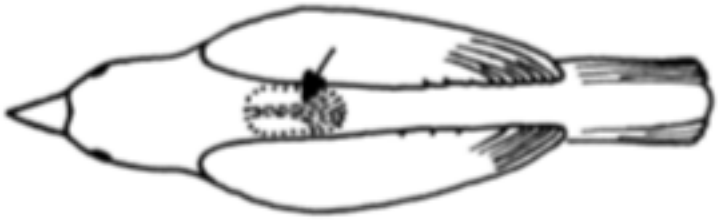

Figure 2b. Dorsal view of a passerine, showing tag attachment site (Raim 1978)

Figure 3. Holding a tag in place until the glue dries. Photo Amie MacDonald