Outflying climate change

Optimal timing of migratory geese breeding in a warming Arctic

Lameris, T.K.

BOX A

A novel harness for attaching tracking devices to migratory geese

Thomas K. Lameris, Andrea Kölzsch, Adriaan M. Dokter,
Bart A. Nolet, Gerhard J.D.M. Müskens

ABSTRACT

Harness attachments have been used already for almost 30 years to equip migratory swans and geese with tracking devices. Harnesses for geese need to be sturdy and have to possibility to be adjusted during deployment to fit individual geese. Here we present a novel harness for attaching tracking devices to migratory geese which fits these requirements. The harness is novel in two ways: it is premade but can be adjusted to the size of the bird during deployment, and it is constructed out of three layers (Teflon, Tygon and nylon) to ensure sturdiness as well as smoothness. We give instructions on how to construct the harness as well as how to deploy it on a bird and encourage others to use this harness to track migratory geese and possible other larger bird species.

Goose Bulletin (2017) **22**: 25-30

Introduction

Tracking devices attached using harnesses have already been used to track the migratory journeys of geese and swans for almost 30 years (Nowak et al. 1990; Seegar et al. 1996). Using harness attachments to equip birds with tracking devices is the best solution for most species including several smaller species of geese, as 1) the device can be brought above the centre of gravity of the bird and the weight can thus be best supported and 2) a sizeable surface for solar power cells can be optimally positioned for solar charging. However, ill-fitting harnesses can have strong negative effects on birds, and in some cases harnesses have been found to reduce survival rates (Ward & Flint 1995) and induce changes in behaviour (Glahder et al. 1997). Also, harnesses sometimes unintentionally break or wear down, and especially larger geese are capable of destroying harnesses with their strong beaks. The type of harness, the quality and sturdiness of the material and the way the harness fits the individual bird can be decisive in reducing the influence on the bird, the longevity of the harness itself, and eventually how representative the tracking data are for normal behaviour.

We developed a novel harness to attach tracking devices to larger birds, with the aim to make a sturdy harness which can be used on medium-sized geese, and that can be adjusted in size while fitting the harness on a bird. We have used this harness since 2012 to track migration of Arctic nesting geese, including brent geese *Branta bernicla*, barnacle geese *Branta leucopsis* and greater white-fronted geese *Anser albifrons*. Here we describe our methods to construct the harness, and to deploy it on a goose.

Harness construction

Materials

The harness consists of three main components: straps, attachment rings and cramping rings. The straps of the first made harnesses (used on brent geese) consist of two layers: Tygon tube (outside diameter 4mm, inside diameter 2.2mm, VWR) with nylon (2.2mm, Ledent) as inner layer. The Tygon gives the harness a tubular shape, in order to create a smooth harness which does not rub against the birds' skin and to prevent the bird from getting a good grip with its beak. For larger species of geese a third layer of tubular Teflon (pattern 8476, .25", Bally Ribbon Mills, USA) is added as outer layer to increase sturdiness. Attachment rings are 6 - 10mm stainless steel key rings. Stainless steel as material for the rings is important especially when the harness is used on species than occur in saline environment. Cramping rings are copper rings, 4 – 8mm in width, cut from a 12mm copper pipe. Copper can bend but does not break after bending, as would Aluminium for example. The harness is tailor-made to be fitting for the study species.

Material and tools needed to construct the harness include: superglue, a lighter, knitting pen, 0.3 mm sewing thread, small cutting pliers, pipe cutter, hand file, chainsaw file and a drill (including milling cutter).

Construction

Below we provide instructions how to construct the harness in text and include figures below. The size which we use here is to outfit a barnacle goose, the harness being 80 cm in length and weighing 16 grams.

Instructions including a larger set of pictures as well as film material will be placed on www.tobseda.com.

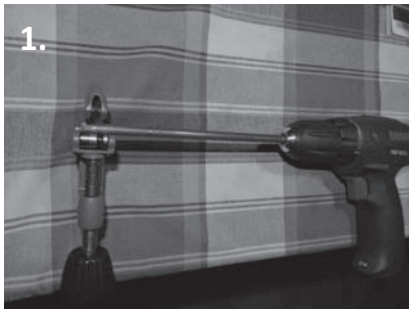
Making copper rings

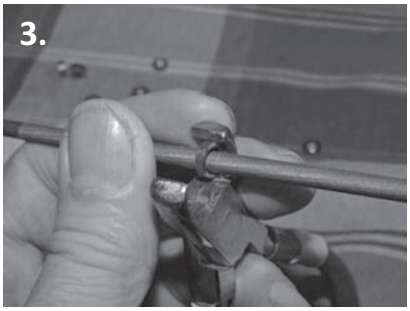
1. Cut small (4mm), medium (6mm) and wide (8mm) copper rings from a copper pipe, using a pipe cutter. The easiest way is to attach the copper pipe in a drill, firmly attaching the pipe cutter on the other end, and using the drill to rotate the pipe.
2. Now polish the inside of the ring on both sides, using a milling cutter in a drill, while holding the ring in a set of pliers (best used are ringing pliers for banding birds).
3. Polish the inside again, holding the ring in the pliers and filing with a long thin file (normally used to sharpen chainsaws)
4. Polish the outside of the ring, placing the ring on a pencil and using a hand file.
5. Make sure all sharp edges are gone, so the ring can shift smoothly on the harness.

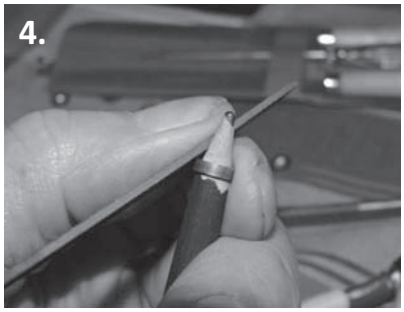
Constructing the harness

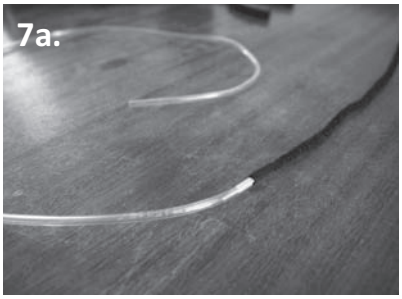
6. Clip off a piece of 75cm Tygon and roughly 80cm Teflon. 90 cm of Nylon rope is used, but not .
7. Put the Teflon on a knitting pen, and put the Tyfon tip on the tip of the needle (a). Now use pliers to pull the Teflon over the Tygon, and pull it (b), all the way until the Tygon sticks out of the Teflon on both sides.
8. Attach the Nylon rope to a strong thread or yarn. It is best to use thread normally used to sew buttons on coats. You can strengthen the tip of the rope by burning it slightly with a lighter, then put the thread through using a needle (a). Suck (using your mouth) the thread through the Tygon tube (b). If the thread is too heavy to suck trough, attach it to a lighter thread which you can suck trough. Pull the thread gently until the nylon pops out on the other end. This can be a quite difficult process as it depends on how well the thread is connect to the nylon and how smooth the tip is. Try improving the smoothness of the tip by clipping of most of the hardened parts after burning. When the nylon is entirely through the Tygon, you can pull the Nylon all the way through. Either pull the entire length of the nylon rope through,

9. Now fit the Teflon neatly around the Tygon by pushing and rubbing towards the ends of the strap.
10. Put an attachment ring around the Teflon. You can attach this attachment ring to a large keyring, which you can use to hang the harness on a doorknob for example, to be able to fit all the rings nice and straight.
11. Make sure both ends of the strap (including nylon) are of equal lengths. Then put a medium-sized copper ring next to the keyring, and pull the other end of the harness through the copper ring, to create a noose in which the keyrings sits. This is the top-end of the harness.
12. Put a wide copper ring on the strap, and pull the other end of the harness through the ring, so you now have both ends of the strap through the ring. You have now created a hole for the head.
13. Now, on both ends of the harness, place a small copper ring, followed by a keyring, and pull the end of the harness trough the copper ring, thereby creating a small noose in which the keyring sits.
14. Tie knots in the nylon at the end of the straps. Detach the large keyring from the attachment ring at the top-end of the harness and attach the tracking device to this attachment ring.

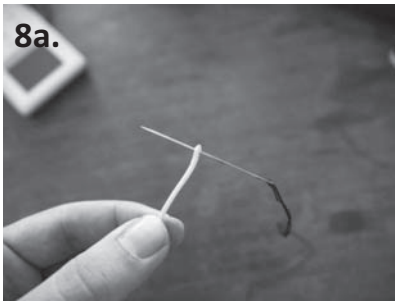




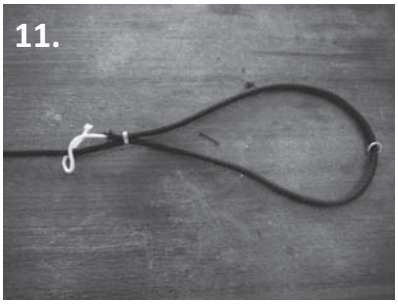


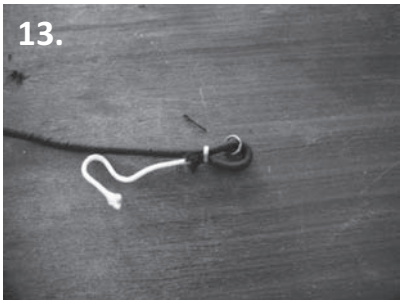

7a.

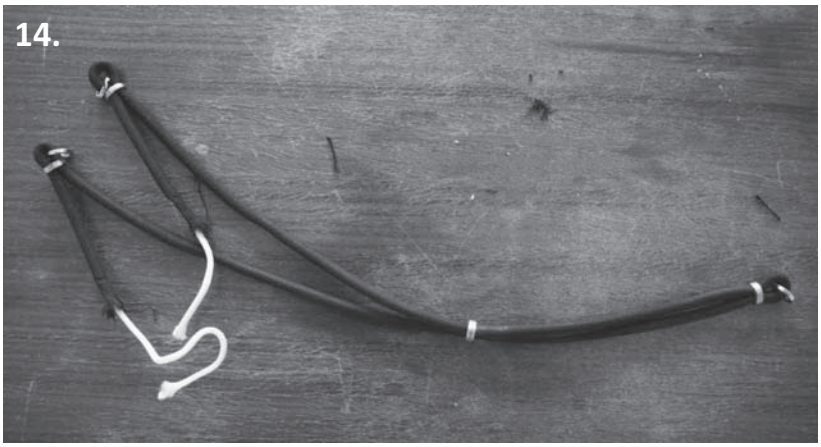

7b.


8a.


8b.


11.


13.


14.

Fitting the harness on a bird

By adjusting the location of the cramping rings it is possible to adjust the harness to the size of the individual bird during deployment. Attaching the harness is best done by two persons: an experienced person attaching the harness and another person holding the bird on the lap. It is best to sit facing each other, with the head of the bird facing the person attaching the harness. A short movie

1. Pull the head loop over the head of the bird.
2. Take one strap and pull it under the wing, while making sure not to get any wing feathers between the strap. Then reach the tracking device which now sits on the back with the straps. Attach the keyring of the strap to the tracking device, while making sure it does not sit too tight.
3. Repeat the process for the other strap and wing.
4. Check whether the parts of the strap sticking out from the outer copper rings (including nylon) are of equal length on both sides!
5. Make sure the harness sits well between the feathers of the geese in front of the breast, by actively putting the harness between the breast feathers. Check (by feeling) whether the copper ring is located right above the sternum. If not, shift it up or down.
6. The harness should be loose enough to allow for the bird to gain fat prior to spring migration. Check how tight the harness sits by feeling 1) whether you can put 1.5 – 2 fingers horizontally under the logger and 2) whether the loop around the neck is not too tight. The logger should sit flat while lifting it with your fingers, not leaning towards the front or the back.
7. Adjust the harness is necessary, making it smaller or larger by pushing the strap material through the copper rings. Make sure the straps on both sides are still of equal length!
8. If the harness is well adjusted to the bird, squeeze all 4 copper rings shut with a pair of plyers. Then you can fix the ends of both straps. Undo the knots. Then clip the Teflon + Tygon (not the nylon!) with a set of clipping pliers, until about 2cm above the copper ring. Pull the Teflon down a bit and cut a little bit more of the tygon, so the Teflon falls over it. Now make a not on top of the Teflon.
9. Put superglue on the knot (while making sure you don't put glue on the bird!), wait until it is dry, and clip the nylon until about 0.5 cm from the knot. Make sure you don't put glue on the birds' feathers.

Conclusion

We show how to construct a novel harness to attach tracking devices to migratory geese and want to encourage others to use this harness. We see scope to use this harness for other species or groups of larger birds, and the harness has been successfully used on European honey buzzards (Vansteelant et al. 2015), but we recommend careful forethought and tests in captivity before using it on wild birds. Expertise in making the harness but especially in attaching the harness on the bird is of vital importance, and we are happy to collaborate with any researchers interested in using the harness.