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# A Technique to Prevent Capturing Birds in Unattended, Furled Mist Nets

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A study of the endangered Kirtland's Warbler (*Dendroica kirtlandii*) on its breeding grounds in Michigan required the use of 12m-long, 13mm mesh, 4-shelf, black nylon, tethered mist nets (N=134 in 1987, 200 in 1988) at three study areas in immature Jack Pine (*Pinus banksiana*) habitat. The operation of nets was rotated among study areas daily to prevent birds from habituating to the nets.

When not in use, the nets were tightly furled, tied in three places, and stretched 1.5m above the ground between support poles. A problem arose when wind or rain partly unfurled the nets, leaving 1m ( $\pm$ ) of mesh hanging bag-like for one or more days while the nets were unattended. On several occasions, small passerines (N=10; but no Kirtland's Warblers) became entangled in the drooping mesh and died.

Discussions with several bird-banding colleagues revealed that accidental capture of birds in furled, unattended nets was more widespread than generally realized, but I found no references on this topic in the literature. In an attempt to avoid this problem, the furled nets were lowered to the ground when not in use. Fewer passerines were caught then (N=2), but thirteen-lined ground squirrels (*Citellus tridecemlineatus*) (N=6) became entangled, died, and had to be cut from the nets. Also, the nets became fouled with debris, particularly if it had rained.

Because mist nets were being used to capture an endangered species whose population was low (207 singing males were recorded on the 1988 annual census [J. Weinrich pers. comm.], and the number of singing males has remained around 200 for the last 18 years [Weinrich, J. 1987. The Kirtland's Warbler in 1987. Michigan Dept. Nat. Resources, Wildl. Div. Rep. No. 3074, December 1987]), the above described procedures were unacceptable. A new method was needed to eliminate accidental captures.

Some other methods considered were: (1) remove nets each day, (2) add more ties per net, and (3) cover nets with a long sleeve of plastic or cloth fabric when not in use. All were

deemed to be too time consuming or not adequate for the job. After some experimentation, a solution was devised using strips of roofing felt under each net (Fig. 1A). The tightly furled net was centered on top of the strip. These felt strips prevented inadvertent capture of birds, small mammals, and large insects (beetles, in particular) and enabled us to leave the nets in place for extended periods (several days to a week or more) during which they were not used.

Asphalt-saturated, 30-pound, rolled felt roofing was used to make the strips which were placed on the ground beneath each mist net. This material comes in 36-inch wide rolls and is available at building supply and hardware stores. To make the strips, the felt roll was marked at 9-inch intervals along the long axis and fiber tape was wrapped completely around the midpoint of each marked interval to keep the material tightly rolled. Using a chain saw, the roll was cut completely through at a right angle to the long axis at each 9-inch mark. A chain saw was found to be the best tool to cut the felt rolls; it did not bind when cutting, made the straightest and cleanest cuts, was the quickest of five methods tried (the three cuts per roll could be completed in three minutes or less), and the bar and saw chain did not gum up with asphalt. Four 9-inch wide strips of felt were made from each roll. The strips were kept rolled until put in place in the field. Each 36-inch wide roll of felt provided enough strips for 6.5 to 7 12m nets, depending on how tightly the nets were stretched.

Each felt strip was centered between the net poles in a cleared net lane. A staple gun with 1/2-inch, heavy-duty staples was used to attach each strip to four wood laths -- (1-1/2 x 3/8 x 12 inches) -- laid at right angles to the long axis of the strip. A lath was set at each end of the strip, while the other two were evenly spaced in between. Each lath was held in place on the ground by a 6-inch common spiral-type nail at each end (Fig. 1B). A 5/16-inch diameter hole was drilled in each lath one inch from each end to accommodate the two nails. In cases where two pieces of felt strip had to be joined, a fifth lath was used. The two ends of felt were overlapped on top of the lath and stapled together. No nails were used in

this fifth lath. During the first few days, minor adjustments were required to accommodate initial shrinkage of the felt or stretching of the net. Caution was taken not to pull the felt strip too tightly when first installed, as shrinkage with exposure to the weather may pull the felt free of the staples at one end. When this occurred, the lath was moved and restapled in place. The nails held the felt strips in place, even in sandy soils.

The felt strips are easy to make, install, and remove from the field. When netting activity was concluded, the strips were rolled and stored in a dry condition for use for the next field season (Fig. 1C). Fiber tape was used to keep the strips with laths attached from unrolling in transit to and from the field and during storage. The approximate cost per net for materials for a felt strip complete with laths and nails was \$3.00 (1988).

No birds or small mammals were inadvertently captured in unattended, tightly furled mist nets using this felt strip technique in approximately 403,000 furled net hours during the 1987 and 1988 field seasons. The use of felt strips made opening and closing nets easy (generally, it took one to two minutes to open and the same to tightly furl and drop the net onto the strip).

**Figure 1A**



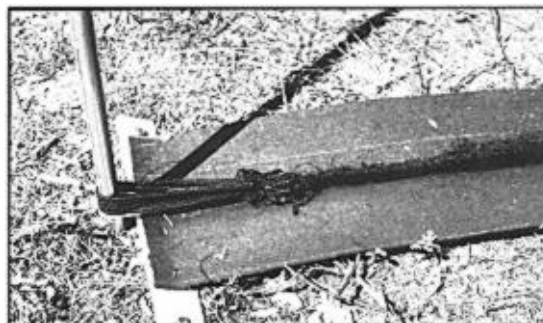
**Figure 1C**



Additionally, the nets laid flatter on the smooth felt than was possible on stubble on the ground, and were kept out of the wind and tightly furled when on the felt and, since the nets were closed, released tension (weight) from the trammels and end loops. This technique eliminated having to tie the furled nets to keep them closed and kept most debris out of the nets when they were closed and out of the bottom shelves when the nets were opened (Fig. 1D). Felt strips also enabled the bottom shelf of the net to be operated at the ground surface to capture those species that remain on or near the ground, made birds captured in the bottom shelf easier to see on routine checking of the nets, and made birds easier to remove from unentangled nets versus nets entangled in vegetation.

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**Figure 1B**



**Figure 1D**

