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A TECHNIQUE FOR CAPTURING NESTING GRASSLAND BIRDS WITH MIST NETS

By STEPHEN G. MARTIN

Careful investigations of the social behavior and population dynamics of birds often require the capture and marking of individuals so that they may be recognized and followed. Studies of this nature on grassland bird species are faced with the task of capturing sufficient numbers of individuals in a habitat which affords little or no concealment for mist nets arranged in the standard linear fashion. In mature forests, secondary growth, or forest edge, net lines can be positioned so that the vertical elements of the vegetation disrupt the net pattern and provide a dark backdrop into which the mesh appears to blend. Mist nets arranged in this manner in an open grassland, however, are silhouetted against the light background of sky and are highlighted by reflected sunlight. In addition, even slight breezes increase the visibility of nets and greatly reduce netting efficiency in open areas, while breezes upon woodland nets are buffered by the surrounding flora. Netting in woodlands may thus be carried on under conditions which inhibit field netting. To capture an adequate number of birds in an open situation one must therefore use a large number of nets arrayed in a pattern such that birds become confused and blunder into one net while attempting to avoid another. The work involved in

opening, maintaining, and relocating this number of nets is correspondingly great. The methodology used by Odum and Hight (1957), in which a number of men slowly drove flocks of overwintering grassland sparrows into a line of mist nets, is impractical when applied to widely-spaced territorial birds. Furthermore, during the breeding season many grassland species are not easily baited to mechanical traps, so this alternative to mist netting is also unproductive.

During an investigation of the ethology and ecology of the grassland-inhabiting Bobolink (*Dolichonyx oryzivorus*) in Wisconsin, I encountered considerable difficulty in obtaining birds for color-banding. After attempting several other netting techniques, I discovered that adult Bobolinks could be captured at the nest while they were engaged in incubating or tending young with nearly 100 per cent effectiveness using a simple V-shaped arrangement of two upright mist nets combined with a direct flushing approach toward the open end of the V. This technique has certain advantages in open situations over a similar procedure devised by Walkinshaw (1939) and Nolan (1961), as related beyond, and requires no decoy bird such as Dykstra (1968) employed.

I use two 30 or 36 mm mesh four-shelf mist nets, six meters long, linked by a common conduit pole. This center pole is placed about four meters from the nest, and the two nets are extended on opposite sides of the nest, each passing about 1.3 meters from the nest site and about two meters beyond (Figure 1a). The soil in many grasslands is soft enough to permit temporary stationing of the three poles in proper position without using other anchoring devices. This allows rapid rigging of the two nets, which are rolled onto the end poles with the central pole attached to the shelf-string loops of each for transportation and storage. In one or two minutes the nets can easily be unrolled and spread open to the standard height. In Wisconsin most grassland birds construct nests when the vegetation is less than 25 cm high; consequently there is usually no difficulty in arranging the lower shelf-string close to the ground.

Once the nets are open I leave the area, returning after a minimum of 20 or 30 minutes. Commonly, an adult will have become entangled in a net through its normal movements of approaching and leaving the nest. If not, the bird is flushed as I approach directly toward the open end of the V. Because most birds flush when I am less than two meters from them and since the open end of the netting is extended two meters beyond the nest site the bird is completely surrounded by netting except above the nest or toward the flusher. Birds have never escaped by moving toward me, but occasionally birds have avoided the net by flying upward. In this event the blind tunnel arrangement of nets depicted in Figure 1b is used. In this arrangement, the two end poles are positioned closer together (the nets pass about 0.8 meter from, and on opposite sides of, the nest) and are crossed near their tops, providing a slight overlap of the two nets along their entire length, preventing vertical escape. Generally 12-meter nets are more practical for this procedure, since they allow increased flexibility in

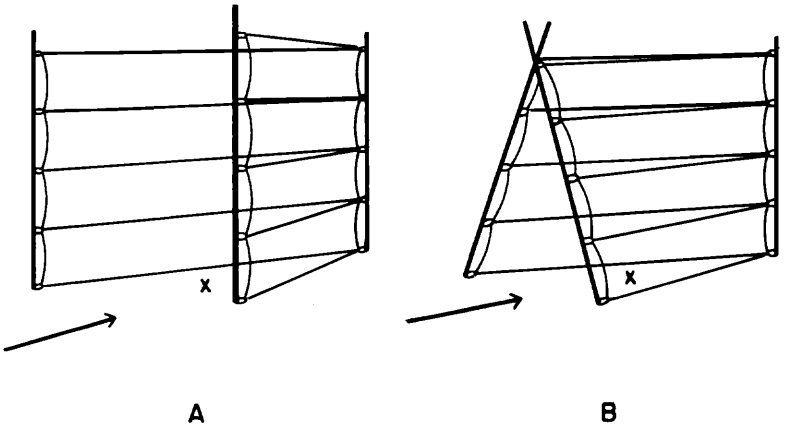

FIGURE 1. ARRANGEMENT OF NETS AT NEST SITE (X).

the amount of overlap and pocket sag. It is also advisable to bind together the two vertical end strings (one from each net) which anchor the mesh at the closed end of the tunnel to prevent birds from escaping between the nets. Clothes pins work admirably for closing this gap. As in the V-shaped arrangement, some birds will be automatically captured during their normal movements to and from the nest. Others must be flushed. In either case, after measuring, banding and releasing the bird, the nets are quickly rolled onto the end poles and removed from the nest area.

In species where both sexes are involved in tending nestlings, both are equally susceptible to capture at the nest once young are hatched. Prior to hatching only the incubating sex can be caught by most techniques. Although the male Bobolink does not participate in incubation, a number of males were caught prior to egg hatching, when their mates became entangled in the nets and served as a decoy which attracted the male. Accordingly, this method is effective in capturing both sexes in the incubation period as well as through the nestling stage.

During the latter part of the 1967 breeding season and in 1968, attempts were made to capture 73 Bobolinks using these techniques. Seventy-two of these attempts were successful (49 females, 23 males). The lone escapee, a male, attended a nest which was destroyed by a predator the night of my first netting attempt which was unsuccessful; thus I was unable to use the blind tunnel nets on this individual. No birds deserted the nest after capture and banding, although one female deserted the following day after being recaptured in a different net system which was widely scattered over the meadow.

The applicability of this method to catching other grassland species was tested by using nets in the V-arrangement at nests of the Eastern Meadowlark (*Sturnella magna*), Savannah Sparrow (*Passerculus sandwichensis*), Henslow's Sparrow (*Passerherbulus henslowii*) and Red-winged Blackbird (*Agelaius phoeniceus*). Sixteen individuals of these species were caught, and none deserted the nest following banding. Hence, the use of this procedure can undoubtedly be extended to a large number of open-nesting species without fear of high desertion rates.

Certain advantages of this method are clearly evident: the materials required consist of unmodified mist nets and poles; therefore, cutting and sewing of netting, and manufacture and placement of wire hoops or other specialized supporting elements required in other devices are unnecessary. The mist nets can serve equally well for general netting following their use at the nest. The hoop net described by Nolan (1961) was devised primarily for capturing brush- and tree-nesting birds, where after cutting out interfering vegetation many limbs were still available for suspending the hoop and net. He suggested that the system could be applied in open situations as well, using artificial supports of cut saplings, and with necessary alterations of the area immediately surrounding the nest. It should be clear that in nesting and population studies one must be exceedingly cautious in altering vegetation close to nests, since there is a possibility that predators can learn to cue on such matted regions after one or two reinforcing experiences. Either of the arrangements of mist nets I have proposed above allows the capture of nesting birds at a discreet distance from the nest, since the nets can be unrolled in a direction at right angles to the line passing through the nest and center pole, and then the end pole carried in an arc to its final position, still more than 2 meters distance from the nest.

Although birds are certainly aware of both hoop nets and mist nets, it appears that the close, more compact nature of the hoop net may affect their natural movements more than the more distant, diffuse mist nets, for Nolan noted only two captures independent of flushing, compared to more than 30 in the present study. It seems that birds adjust to the presence of mist nets close to the nest and eventually leave the nest by following habitual flight routes, often directly into a net. Furthermore, returning birds show no reluctance in moving past mist nets to the nest while with the hoop net, which is conspicuous and arranged directly over the nest, some birds showed temporary hesitation.

As indicated previously, males are often attracted into nets by captured females, and occasionally other individuals are independently caught. Hoop nets capture both sexes only after feeding of nestlings commences. Use of 12-meter nets increases the probability of such "bonus" catches but has the disadvantage of the additional time required for rigging and striking the outfit. Regarding the logistics of setup, it appears that mist nets can be placed more quickly in open fields than can hoop nets, where an additional structural framework must be positioned and where care must be

taken to avoid damage to vegetation in the immediate nest vicinity. Adjustment of the bag portion of hoop nets is crucial, whereas adjustment of mist net bag is normally simple and easily standardized.

Finally, the major drawbacks of general mist netting on open fields are not applicable to nest-set nets combined with a flushing procedure, for it is unnecessary that the nets be inconspicuous if a bird is to be flushed into nets which cover all avenues of escape. I have efficiently captured birds in brisk winds, because a bird can be cornered and picked off against a taut mesh. Although the use of these techniques of netting is impractical in woodlands due to the height of nests and the density of brush and other vegetation, the methods should have wide-spread applicability in grasslands, savannahs, low marshes, tundra and other open regions.

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