
I cannot explain the variability from year to year. However, the overall percentage fits well with that of Miller, which was derived from the examination of 1556 skins from many parts of the range of *hyemalis* (sensu stricto). Since I have no reports of my birds from other places, their provenance is unknown, but it seems safe to assume that they are predominantly from eastern populations far removed from the range of *aikeni*. It would be interesting to obtain data on the incidence of this trait in populations closer to that range.

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(Eastern)

Mist netting breeding female American Redstarts

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Procedures for capturing male warblers during the breeding season are more straightforward than those for females. Mist nets are set up in a male's territory and the species' song is broadcast to entice him into one of the nets (Johnston 1965). However, female warblers behave very differently from males (Ficken 1963) and their capture requires different techniques. In this paper, we present some suggestions for efficient mist netting and handling of female American Redstarts (*Setophaga ruticilla*), based on the capture of more than 100 females in six years near St. Andrews, New Brunswick, Canada.

The purposes of capturing and color banding female warblers are the same as those for males. For instance, color banding our population of American Redstarts enables us to recognize each individual and study social behavior, reproductive success, mate choice and territorial fidelity. In addition, biological data such as morphological measurement, plumage characteristics or ectoparasites are available from captured birds.

The appropriate mist-netting technique for female warblers is somewhat dependent on both the goal of the research and the stage of the female's breeding season. For instance, if a researcher's primary interest is gathering data on the bird's reproductive success, he must also be concerned that catching and banding the females may disturb their nesting activities and he should use techniques to minimize that possibility. Female American Redstarts have certain behavior patterns that are characteristic of the different stages in their breeding cycle

(Ficken 1963). The mist-netter should try to be aware of what reproductive stage the female is in and try to tailor the capture techniques to take advantage of the female's behavior.

The first opportunity for capture occurs when the females settle after their migration and "pair formation" (Ficken 1963) takes place. During this period, females can often be caught in the same mist net sets used to capture territorial males (Johnston 1965). Females will frequently investigate a male's song, perhaps either as a means of assessing the male's quality or as a result of following a male around his territory (Ficken 1963). To take advantage of this responsiveness, we often try to catch females in the male's territory by continuing to play the tape after catching a territorial male. In 1980, we tried to capture male American Redstarts by using a mounted male decoy together with a recording. However, we noted little improvement in capture efficiency over using just the recording. We have yet to determine if either a male decoy (Johnston 1965) or that of a predator (Root and Yarrow 1967) may be useful in attracting females.

Once the female has selected a male, she explores his territory with him in order to locate a suitable nest site. Ficken (1963) called this the "pre-nest-building" period. During this time, a series of nets strategically placed throughout the central part of the territory will often catch the female as she moves about the territory or she may be caught in the same net with the male.

After the female has selected a nest site, the bander can take advantage of her persistent nest-building behavior. Females often return to the same area to gather nesting material, and then fly directly to the nest site. Some 500 to 700 trips may be required for a female to construct her first nest of the season (Sturm 1945). A net placed across a preferred flight path near the nest will usually catch the female.

If a nest is found during either the incubation or the nestling period, the female can be flushed toward a net. One or two persons approach the nest slowly and quietly with their hands in the air to direct the escape of the female in the desired direction. Two nets set in a "V" configuration create a funnel in which a female flushed from her nest will usually be caught. Also, some females frequently leave a low nest by flying off quite low, so we set at least one net with its lower edge flush with the ground. Harris and Morse (1958) describe a similar technique using a three-man crew with a moving mist net.

Females can also be caught when nestlings just about to fledge (5-7 days of age) are banded. The presence of banders at a nest often arouses the parents' defensive behaviors so that they will fly very close to the banders and the calling young. If several nets are placed around the nest and banding location prior to removing the fledglings from the nest, the female will often be caught.

Despite some innovative methods to position mist nets high in the forest canopy (Greenlaw and Swinebroad 1967, Humphrey et al. 1968, Mease and Mease 1980), females on high nests pose special problems to the mist-netter. The best times to catch these females seem to be when the nests are being built and when the nestlings are banded. If a female is first discovered building a nest high in a tree, try immediately to capture her because this period of gathering nest material may be the only time when she will be close enough to the ground to be mist netted. When young are almost ready to leave the nest, the removal of these nestlings for banding may cause the female to come lower to the ground, affording a second opportunity for capture. A promising alternative method for capturing females off nests in trees involves the use of a small hoop net placed beside the nest (Nolan 1961). Although we have not yet tried this method, its advantages apparently include portability, convenience, selectivity and the elimination of extensive vegetation cutting often necessitated by the use of mist nets.

Desertion of nests by female American Redstarts following banding is a potentially serious problem. Some females caught during nest-building desert their nests, particularly those in the very early stages of construction. To minimize the possibility of nest desertion, postpone capture at least

until the female has laid her full clutch of eggs. The time of attempted capture has to be weighed against the possibility of nest loss from other causes. For nests of pairs including an adult male American Redstart, the rate of "natural" nest loss is about 2.7 times greater during the incubation period than in the nestling period (Lemon, unpubl. data). In addition, our observations suggest considerable changing of mates and movement after the loss of a first nest, particularly when the male is subadult (Lemon, unpubl. data), so the bander may get only one opportunity to capture a particular female.

To capture warblers and other small forest birds, it is often necessary to set nets in dense vegetation (Low 1957). For instance, our research on American Redstarts requires much netting in dense alder (*Alnus rugosa*) stands. For situations such as this, we suggest clearing only that vegetation which is absolutely necessary to set the nets. Try to use existing clearings and openings in the forest. Use a series of short (5 or 6 m) nets to cordon off an area rather than one long (10 or 12 m) net. Mist netting is most efficient during calm, overcast periods when the net is least visible. Take all necessary steps to minimize the time any bird is left in a mist net and is handled. Do not leave open nets unattended (Low 1957).

Practice the banding and data-gathering techniques. We use a two-person team, one handling the bird, banding it, and gathering morphological data while the other records the information.

Do not use mist nets during cold or wet weather because of possible trauma to the birds and danger of desertion. If, because of unforeseen circumstances, a bird is shivering or reluctant to fly when released, it can be placed in a warm, dark and dry place (such as a shirt pocket, a paper bag or cardboard box) for several minutes; it will usually recover quickly when warm and dry.

Summary

Mist netting female warblers presents unique methodological problems. The appropriate technique depends on the goal of the research and the stage of the target female's breeding cycle. Females may be caught in the same nets used to capture territorial males or in nets placed across preferred flight paths used during the gathering of nest material. If a nest is found after incubation has begun, the female can be flushed from the nest toward a net or caught when the nestlings are banded. Desertion of nests by female American Redstarts following banding can be reduced by postponing the capture at least until the female has laid her full clutch of eggs. We also advise minimizing the time a bird is left in a net and is handled to reduce the possibility of injury to the bird.

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(Eastern)

A Cautionary Note for Handling Woodpeckers

Anyone who has handled woodpeckers is familiar with their tendencies to peck vigorously and to use their extraordinary tongues to explore anything within their reach. It was this last fact that almost led to disaster.

In March, 1985, a female Pileated Woodpecker (*Dryocopus pileatus*) with a badly broken humerus was received at the Mass. Audubon Society's Animal Care Center in Lincoln. Due to the severity of the injury the bird could not be released. But after suitable treatment and recuperation, arrangements were made to place her in a large zoo for education and exhibit purposes.

In preparing the bird for the trip to her new home I wanted to make one last careful physical examination. Although I took all the normal precautions, I didn't think to remove my new wristwatch that had a velcro band.

Halfway through the exam the woodpecker's probing tongue encountered my wrist and instantly the

barbed tongue tip was ensnared by the numerous tiny loops of the velcro. Naturally the bird panicked and began thrashing. Luckily my assistant stayed calm and immobilized the bird while I hastily searched my emergency kit for a tiny pair of iris scissors. It was then only a minute's work to gingerly cut the 10 or 20 loops trapping the woodpecker's tongue. Other than a little initial discomfort and puzzlement, she showed no sign of lasting damage.

I conclude this cautionary tale by reminding banders and rehabilitators of the widespread use of velcro in today's outdoor wear. Had the bird been less tame or my assistant less experienced, the result would probably have been serious trauma to the bird.

One might also speculate on the potential for velcro to ensnare the specialized tongues of many hummingbirds and tropical frugivores or the pectinate nails possessed by a variety of species.

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