Horizontal Mist Net For Capturing Upland Nesting Ducks

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Capturing and marking waterfowl at nests provides information on movement, homing, recruitment, and survival. We trapped nesting ducks from 1982-1989 to evaluate experimental management techniques for increasing waterfowl production (Evrard and Lillie 1987). The study area is located in the prairie pothole region of St. Croix and Polk Counties in northwestern Wisconsin and contains 2800 ha of federal and state waterfowl production properties. We used a cable-chain drag (Higgins et al. 1969) to search 400 ha of grassy upland cover annually for duck nests.

METHODS

We marked nests with 2 m stakes 3 m north of the nest bowl. A small piece of flagging tied on vegetation at nest bowls facilitated finding nests on future visits. We determined the incubation stage of the clutch at discovery by candling (Weller 1956) and projected hatching dates. We visited the nests 7-10 d before projected hatching in order to capture, band and mark hens with nasal saddles (Doty and Greenwood 1974).

Using a long-handled (2.5 m) hand net (Wheeler et al. 1984) (0.7 m diameter and 0.6 m depth), we tried to capture the hens on their nests. Once a nest was located, we slowly approached it with the outstretched hand net held horizontally, low over the grass cover. The nest was rushed for the final few meters, ending with the net being slapped over the nest.

Upon failure of one or more capture attempts with a hand net, other techniques were tried, including a vertical mist net at the nest (Zicus 1975) and a bow net set over the nest (Salyer 1962). Both methods required removing vegetation near the nest and two visits to the nest for each capture attempt. Due to problems with the bow net and vertical mist net, we developed another technique using a mist net. Two persons approached the nest while holding a 3 m x 12.8 m net with 10 cm (stretch) mesh in a horizontal plane between two 3 m sections of conduit. The mist net was stretched to its full width between the conduit sections and was quickly placed over the nest pulling the net into the vegetation, as low as possible. When the hen flushed, she became entangled in the mesh or dropped down into the vegetation. A second or third escape attempt would result in the head and/or wings going through the mesh. This technique has been used for Woodcock *(Scolopax minor)* (Clark 1966), but we were not aware of its use prior to our developing the technique.

Our success with the horizontal mist net prompted us to use it on first capture attempts late in the 1988 nesting season and on every nest except one in 1989.

RESULTS

Our sample included 194 Blue-winged Teal *(Anas discors)* and 103 Mallard hens *(A. platyrhynchos)* on 297 active nests in 1982-1988. Blue-winged Teal were significantly easier to capture (85%) than Mallards (58%) ($X^2=24.87$, $p<0.001$). In 1989, using the horizontal mist net on all but one nest, we captured 93% of the hens on 44 active nests. Again, Blue-winged teal (100%) were easier to catch than Mallards (86%).

We did not observe nest abandonment due to capture activities despite up to eight visits to a nest. Increased human activity at the nests may influence predation; however, we used the hand net for most initial capture attempts and when successful (56%) (Table 1), limited our activities to one visit. We also used the hand net for subsequent attempts, especially with Teal. If these attempts also failed, we used other capture techniques.

Because we captured Blue-winged Teal efficiently with the hand net (64% first tries successful) (Table 1), the bow net and vertical mist net were used only once each and the horizontal mist net 18 times prior to 1989. Both attempts with the bow net and vertical mist net failed when the Blue-winged Teal hen escaped beneath the edge of the netting. However, the horizontal mist net was successful on seven of eight second or third capture attempts (Table 2).

Mallards were warier and tended to nest in taller, denser vegetation (Evrard and Lillie 1987), making the use of the hand net difficult. After missing a Mallard on the initial attempt (only 43% first attempts with hand net were successful) (Table 1), it was nearly impossible to catch with a hand net on subsequent visits. Only 25% of 60 Mallard capture attempts with a hand net were successful after failed first

attempts. By comparison, 54% of 76 Blue-winged Teal repeat attempts with the hand net were successful (Table 2).

We successfully captured Mallards using the vertical mist net in three of six attempts (Table 2). Two of the failures occurred when hens failed to return to their nests while the mist net was set. They did return, however, after the net was removed. The other failure occurred when a hen was prevented from reaching her nest by the net.

We successfully used the horizontal mist net in five of 14 attempts on Mallards that already evaded the hand net (Table 2). Six failures resulted when hens flushed before the nests could be approached closely, and the other two nests were under barbed wire fences. The horizontal mist net was easily entangled in tall vegetation during the approach to the nest. Use of both the horizontal and vertical mist net was difficult in strong winds.

RECOMMENDATIONS

Hand nets should be used for the initial attempts to capture a hen on her nest during late incubation. This technique is efficient in terms of time and manpower, and disturbance to the hen and nest cover is minimal. If the first attempt is unsuccessful, then the horizontal mist net is recommended for subsequent attempts. This technique is also efficient and minimally disturbs the vegetation surrounding the nest. When capturing every hen with a minimum of disturbance is critical and two persons are available, it may prove beneficial to use a horizontal mist net on the first attempt, especially with wary species like Mallards. Both the bow net and the vertical mist net result in disturbance of the nest cover and require more visits to the nest.

This technique may also be useful in capturing ground-nesting non-game species of birds. The appropriate mesh size mist net would need to be used.

ACKNOWLEDGEMENTS

We acknowledge assistance of field technicians R. Kahl, T. Grunewald, P. Fassbender, B. Lueth, T. Trapp, student interns from the University of Wisconsin at Stevens Point and River Falls, and reviewers R. Gatti, L. Petersen, J. March and several anon. reviewers. Partial funding for this study was provided by the Federal Aid to Wildlife Restoration under Pittman-Robertson Wis. Proj. W-141-R.

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Table 1. Percent success of hand net and horizontal mist net capture attempts when used as the first means of capture, 1982-89.

Technique	Blue-winged Teal	Mallard	Both
Hor. Mist Net	98 (40)*	71 (14)	91 (54)
Hand Net	64(183)	43 (103)	56(286)

* Figures in ( ) are the number of capture attempts.

Table 2. Percent success of nesting hen capture techniques on second and subsequent capture attempts (after first attempt failed) in St. Croix County, Wisconsin, 1982-89.

Technique	Blue-winged Teal	Mallard	Both
Hand Net	54 (76)*	25 (60)	41 (136)
Bow Net	0 (1)	0 (2)	0 (0)
Vert. Mist Net	0 (1)	50 (6)	43 (7)
Hor. Mist Net	88 (8)	36 (14)	55 (22)
Total	56 (86)	28 (82)	42 (168)

*Figures in ( ) are the number of capture attempts.