

USE OF SUBMERGED MIST NETS TO CAPTURE DIVING BIRDS

ANDRE M. BREAUULT

*Department of Zoology, University of British Columbia
Vancouver, British Columbia V6T 2A9, Canada*

KIMBERLY M. CHENG

*Department of Animal Science, University of British Columbia
Vancouver, British Columbia V6T 2A2, Canada*

Abstract.—We used submerged mist nets to capture 86 adult and 34 young Eared Grebes (*Podiceps nigricollis*), three American Coots (*Fulica americana*), one Blue-winged Teal (*Anas discors*) and four diving ducks in central British Columbia, Canada. Submerged mist nets are inexpensive, efficient, and can be used by one person to capture both flightless and flight-capable diving birds. Our technique can be used with birds that can be herded or are repeatedly found at locations such as nest sites.

LA UTILIZACIÓN DE REDES SUMERGIDAS PARA ATRAPAR AVES ZAMBULLIDORAS

Sínpesis.—Utilizamos redes sumergidas tipo HTX y ATX, para la captura de 86 adultos y 34 juveniles de *Podiceps nigricollis*, tres individuos de *Fulica americana*, y cuatro patos zambullidores en una localidad de la Columbia Británica, Canadá. Las redes son de bajo costo, eficientes y pueden ser utilizadas por una persona para la captura tanto de aves no voladoras como voladoras zambullidoras. La técnica es útil para capturar aves que pueden ser forzadas a moverse a un área determinada o que reptidamente visitan una localidad particular, como lo puede ser su nido.

Studies of bird populations often require the use of marked individuals. Our study on the breeding biology of Eared Grebes (*Podiceps nigricollis*) in central British Columbia involved capturing and marking both flight-capable adults and flightless young Eared Grebes. Techniques used to capture diving birds include: cloverleaf traps, for both flightless (McClure 1984) and flight-capable (McTaggart-Cowan and Hatter 1952) birds; mirror traps (Savard 1985); decoy traps (McClure 1984); gill nets (Ferguson 1980, Johnson 1972, Lensink 1957); pursuits of flightless birds from a boat (Jehl and Yochem 1987) and mist nets dragged from shore in narrow shallow canals (Okill 1982). These techniques were of limited value in our study because they either: (1) applied to flightless birds only, (2) depended on lake layout or water depth, (3) necessitated extensive equipment, time, and manpower, or (4) created high levels of disturbance. In this paper, we describe how submerged mist nets can be used to capture adult and young Eared Grebes and other diving birds.

METHODS

The equipment used to capture grebes consisted of discarded mist-nets (Association of Field Ornithologists mist nets type HTX and ATX), wooden poles and floats. The nets were rolled on rectangular wooden frames, and one person could unroll and set the nets in 5-15 min. We

set the nets in approximately waist-deep (1.5 m) water and used quarter-ounce (7.1 g) fishing weights attached to the net bottom at 1.5 m intervals to insure that the nets would sink. In order to keep the weights from tangling the nets, we taped with 5 cm wide tape a 10 × 10 cm area of the net around each weight. We used small pieces of wood and dowels as floats.

We banded Eared Grebes on lakes used by 1–85 breeding pairs by setting nets in open water within 5 m of nesting areas. On lakes with muddy substrates, we tied up net ends to poles anchored in mud. The net top was set at roughly 2 cm below surface by adjusting tension on the upper trammel line and tethering cord. On rocky substrates or in deep lakes, floats alone supported the nets. We attached weights to the end floats on each net to keep the net taut, and controlled net height by adjusting the number of floats and the distance between them. On those lakes, the net top was set at less than 10 cm below surface.

We took the following steps to avoid drowning netted birds: we (1) attached only the top 2 end loops of each mist net to posts (so that tangled birds could surface), (2) kept nets under constant shore supervision, (3) set nets only on days with warm weather and no wind, when movements in the nets were easily detected, and (4) immediately removed any captured bird. We conducted no netting during egg-laying or early incubation to minimize chances of nest desertion.

Nets were set near nesting areas. A slow approach allowed time for the grebes to dive and swim away. Upon observer departure, grebes usually swam back to their nests within 5–15 min or resumed previous activities. After most birds had returned to their nests, a disturbance was created to drive the grebes towards submerged nets. The disturbance consisted of slowly walking or canoeing from behind the birds towards submerged nets. Young birds were captured in a similar fashion, most often on open water.

RESULTS

Submerged mist nets captured 86 adults and 34 young Eared Grebes in 45 netting attempts from 1985 to 1987. Netting success was higher in larger colonies. During the best banding bout, 15 adults from a colony of 80 pairs were captured in a 90-min period in two driving attempts involving two submerged nets. We captured and marked an average of two birds per hour. This capture rate could have been higher but for the following restrictions: (1) most netting and banding were done by one person only; (2) a maximum of three nets were used simultaneously to insure proper supervision from shore; (3) emphasis was placed on capturing breeding pairs and not unpaired individuals; (4) during the incubation period, adults were given time to incubate before initiating the disturbance (low impact on hatching rate was more important than high capture rates); (5) birds were retrieved and marked as soon as captured, and handling time of previously captured birds limited the number of drives towards submerged nets; and (6) banding was conducted more

frequently in small colonies. Capture rates should be higher in the absence of those considerations.

Although netting was aimed at Eared Grebes, the following species were also caught: one Red-necked Grebe (*Podiceps grisegena*), three American Coots (*Fulica americana*), one Ruddy Duck (*Oxyura jamaicensis*), one Blue-winged Teal (*Anas discors*), and two Barrow's Goldeneyes (*Bucephala islandica*).

DISCUSSION

Reviews on the use of mist nets (see Kayes and Grue 1982) reported only one case (Okill 1982) where they were used to capture diving birds. In this case, mist nets were attached to poles and pulled from the shore to capture Red-throated Loons (*Gavia stellata*) in shallow narrow lochs. Submerged mist nets offer many advantages over other diving bird capture techniques. Little equipment is needed, and mist nets, floats, and poles are light and inexpensive. Our technique is fast, efficient, and can be used in a variety of habitats by one person to capture individuals or groups of diving birds. The technique relies upon being able to herd individuals towards nets or on placing nets near repeatedly visited areas such as nest sites. The use of submerged mist nets would mostly benefit population studies of flight-capable diving birds whose escape behavior consists of diving and swimming away when disturbed (i.e., loons and grebes) and of flightless diving birds.

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