

A PORTABLE CANDLER FOR BIRDS' EGGS

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Abstract.—I describe a portable candler for field use on a variety of birds' eggs. It is easy to make and carry, uses available sunlight, and allows easy viewing of virtually the entire egg by both skilled and novice candlers. These requirements are not all met by other field candlers described in the literature.

ALUMBRADOR PORTÁTIL PARA HUEVOS DE AVES

Resumen.—Se describe un aluminador portátil que puede ser utilizado en el campo para examinar huevos de una gran variedad de aves. El aparato es fácil de construir y llevar al campo. Utiliza como fuente de luz el sol, y permite tanto a novatos, como a personas de experiencia el examinar el estado de desarrollo del huevo en su totalidad. Este aparato puede construirse a partir de un envase plástico rectangular con cabida para 4 l, similar a los envases de aceites comestibles. Parece tener ventajas sobre sus predecesores.

Candling birds' eggs is useful in nesting studies because, among other things, it may determine initiation dates of laying and incubation, expected hatch date or if unhatched eggs are infertile or contain dead embryos. Weighing or floating eggs can provide reliable estimates of embryo development (Westerkov 1950), but in most cases these methods are not practical in the field (Weller 1956).

Evans (1951) first used a cardboard mailing tube or rubber radiator hose to candle waterfowl eggs. Using this technique, the egg was candled by holding it tightly against the open end of the tube so that the long axis was perpendicular to the tube while looking up the tube towards the sun. This candler is very easy to make and to carry. Unfortunately, only the portion of the egg enclosed by the tube can be viewed at any one time. Also, the technique requires practice and acquired skill to block off light leakage, which makes viewing difficult. Lastly, candling is difficult on overcast days because the method requires adequate light to candle effectively. Using this method of candling, age determination is difficult and time consuming, especially for novices.

Hanson (1954) developed a battery-operated field candler that provides excellent viewing of embryo development. Because of its complexity, this candler may be undesirable because it is harder to make and more susceptible to mechanical failure than other methods.

Sobkowiak and Bird (1984) constructed a candler in which an egg could be placed inside a dark cavity against a hole where sunlight penetrates and illuminates the egg from inside. This technique allows viewing of virtually the entire egg at one time. The egg can easily be moved around

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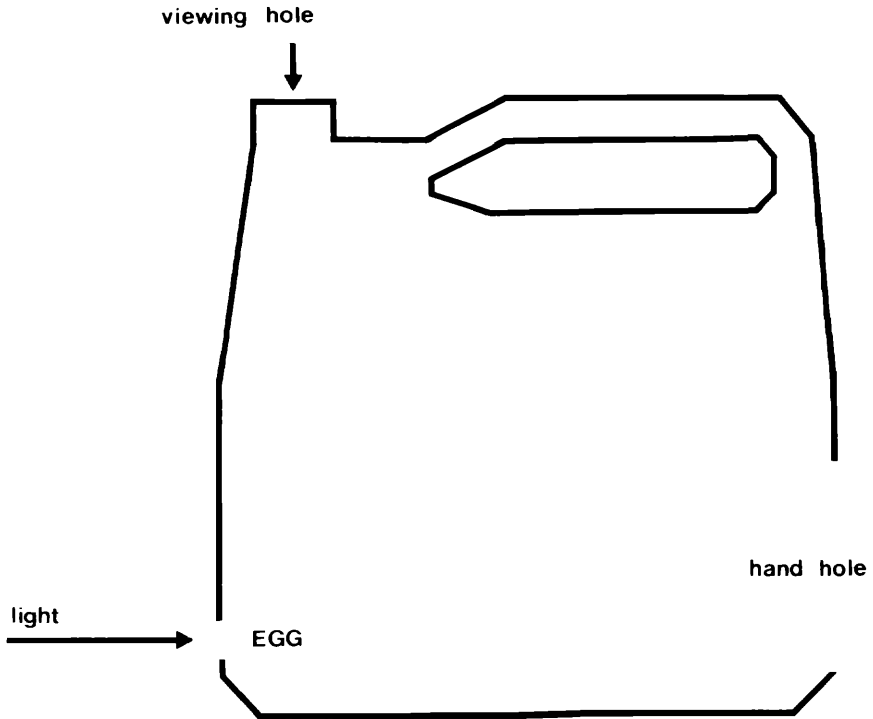


FIGURE 1. Side view of field candler.

to view different details at various angles, greatly facilitating age determination. A disadvantage of this candler is that it is made of 1.3 cm plywood, which makes the unit heavy and therefore awkward to carry about in the field.

During a study of the nesting ecology of Red-breasted Mergansers (*Mergus serrator*), I needed a candler that was easy to make and carry, used available sunlight, and allowed easy, quality viewing of the egg embryo by novice candler. Based on Sobkowiak and Bird's (1984) design, I made a simple candler by using a 4 l size, rectangular shaped, plastic jug, the type often used to hold car or cooking oil. A hole approximately 9.5 cm wide \times 7.0 cm high was cut in the narrow side of the container opposite the spout (Fig. 1). The hole should be large enough for the candler's hand and enclosed egg to pass through easily. Next a small round hole was cut in the narrow side of the container below the spout and as far away from the spout or viewing hole as possible to better focus on the egg. This hole should not be too close to the container bottom because then holding and rotating the egg in the container is difficult. The size of this hole can be varied to accommodate different sized and shaped eggs. The hole should allow about one tenth of the egg to pass

through. For example a 2.0 cm diameter sized hole was used for candling the eggs of Red-breasted Mergansers. It is important that a perfect circle be cut to ensure a good fit between the egg and container, otherwise light will leak in and obscure viewing. A black plastic container or container spray-painted black inside and out should be used to block light transmission through the container. If light seepage through the large hole is a problem some fabric can be attached around the hole with contact cement.

The egg is candled by placing it inside the container through the large hole and one end is pressed against the small round hole so that part of the egg protrudes outside the container. The egg side of the container is then held towards light and the egg viewed through the spout at the top. A complete picture of embryo development is obtained by placing both the blunt and pointed ends of the egg in the hole. Red-breasted Merganser eggs were candled under all lighting conditions, including extremely over-cast days. This candler was used successfully on eggs of all species candled, including those of Mallards (*Anas platyrhynchos*), Gadwalls (*Anas strepera*), White-winged Scoters (*Melanitta fusca*) and Domestic Chickens (*Gallus domesticus*).

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