The Progressive Fish-Culturist 59:253–255, 1997
© Copyright by the American Fisheries Society 1997

An Alternative Egg-Incubation Jar

DONALD W. GLENN III AND TERRENCE R. TIERSCH[1]

School of Forestry, Wildlife, and Fisheries, Louisiana Agricultural Experiment Station
Louisiana State University Agricultural Center, Baton Rouge, Louisiana 70803, USA

Abstract.—Inexpensive hatching and incubation jars have been constructed in the past from polyvinyl chloride fittings or plastic bottles. Most cost less than $50 each, but contain numerous parts. The incubation jar described in this report was easy to assemble, recyclable, and cost about US$2.50. It took about 10 min to construct and 24 h for the sealant to cure before use. Eggs of common carp *Cyprinus carpio* in quantities of 2,000–80,000 were hatched in these jars by adjusting water flow. The small size (2.3-L volume) provided separation of many treatments in a confined area.

The need to provide a suitable environment for fertilized eggs while reducing fungal growth has created a market for commercially constructed hatching jars. Presently, these jars can cost as much as $90 each. Limited budgets have encouraged breeders (including researchers) to seek alternatives. The hatching jar described in this study is comparable to commercial jars, but it is smaller and costs about US$2.50 each for materials.

The design of all hatching jars must consider dissolved oxygen, water quality, the number and size of eggs, and the specific requirements of each species, while at the same time, minimize costs and construction time. Early glass jars were customized for mass production by Woynarovich (1962) and were not applicable to small numbers of eggs. Recently, hatching jars have been constructed from polyvinyl chloride (PVC) pipe and fittings. These jars cost between $35 and $50 each (Dewey and Wagner 1993; Sloan 1996) and required about 1–2 h for construction. The disadvantages of these jars were high cost and the inability to observe egg maturation. Other hatching jars included glass or plastic bowls and plexiglass piping, required 1 h for construction, and cost about $7 (Holland and Libey 1980). Other reports describe jars built from disposable polycarbonate plastic bottles that take about 5 min to construct and cost about $2 (Goodfellow et al. 1985; Rottmann and Shireman 1988; MacIntosh and Little 1995). Overflow designs in these jars caused problems in the placement of the hatching jar and the loss of eggs and larvae. Inverted plastic bottles have also been used as culture units in recirculating systems for fry (Bates and Tiersch 1995).

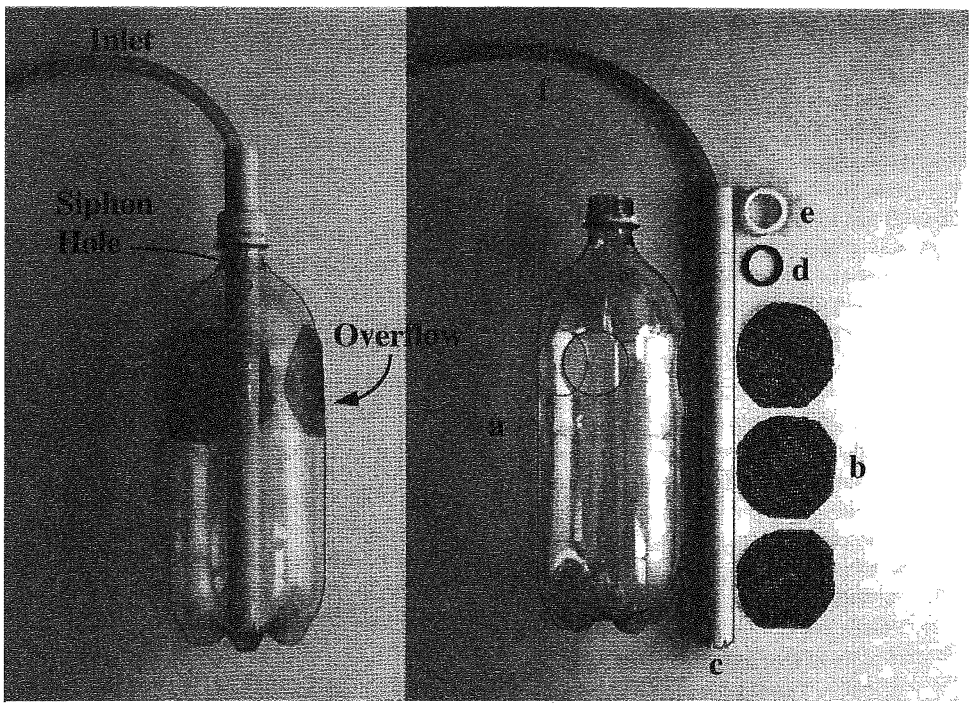
The design reported here combines features of previous designs with ease of assembly, low cost, and practicality. The jars were tested with eggs of an ornamental strain of the common carp *Cyprinus carpio* (koi) during an 8-month spawning season in 1995 and during 1996. These jars held 2.3 L of water and were suitable for incubating individual batches of eggs or replicates for research purposes. The hatching rate (N = 20 jars) was 91 ± 6% (mean ± SD, calculated from fertilized eggs) with as many as 80,000 eggs/jar, although hatching success varied according to gamete quality and fertilization rates. Eggs of goldfish *Carassius auratus* were incubated with similar results. Concentrations of 0.4% NaCl and 0.3% urea were used to remove the adhesive properties of the eggs before incubation to ensure adequate oxygenation (Woynarovich 1962).

We used self-standing, one-piece, 3-L plastic beverage bottles (Coca-Cola Bottling Co., Baton Rouge, Louisiana) designed to contain phosphoric acid solutions (soda) for human consumption. The composition of this plastic (polyethylene terephthalate) is stable when exposed to organic or inorganic chemicals, and does not leach toxic substances (Goodfellow et al. 1985). Embryo development could be monitored through the clear plastic sides of the jars. Cement and specialized tubes were not required in this design, which facilitated disinfection and repairs. Materials for construction of the jar could be obtained from any hardware store.

For construction, the plastic bottles and caps were cleaned (Figure 1). Three 5.08-cm-diameter circles were cut into the upper third of each bottle at equal distances to drain overflow water. Rough edges were sanded. At opposite sides of the bottle, 2.54-cm above the circles, a 0.95-cm bit was used to drill two holes. These holes provided easy access for plastic tubing into the jar and minimized disturbance of the developing embryos in the jar when the tube was used as a siphon to collect dead eggs or samples.

Three 7.62-cm-diameter circles were cut from

[1] To whom correspondence should be addressed.


Inlet
Siphon
Hole
Overflow
a
e
d
b
c