

FLY LARVAE

an easy and odorless way

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Introduction

Fly larvae have been used for many years as a live food for captive birds. Until recently, culture methods have usually involved the use of rotting meat which is objectionable both because of the odor and the necessity to cleanse the larvae prior to using them for food.

In a very interesting and amusing article, Sir Godfrey Davis (1966) describes a number of rather unusual culture methods. While in India he discovered that decomposing bran was a successful medium for breeding house flies, but he was unable to get them to reproduce in this way in the more temperate climate of England.

Moistened Purina dog chow placed in the shade during warm weather will induce flies to oviposit and provides a satisfactory food for larval growth. Presumably any of the prepared dry dog foods would work as well and large numbers of larvae may be raised in this way. Methods which involve attracting flies and inducing them to lay eggs on prepared media are dependent however on suitable weather conditions, and thus are effective only during periods of relatively warm weather.

A number of methods are available to maintain a continual culture the year around. The more recent methods, such as those of Ficken and Dilger (1961), and Spiller (1966), involve the use of yeast supplemented milk products as the larval food. The method presented in this paper uses dog chow as the primary food, is quite simple, odorless, requires little time to maintain, and will produce large numbers of larvae.

Materials and Methods

The first essential is a suitable cage to house the adult flies. This can be of any design, but should be constructed in such a way that it can be cleaned and sterilized easily. Figures 1 and 1a illustrate such a design. It is made in three parts: a base, the wire screen, and a small drawer which slides into one end. An 18 inch length was chosen because this is the smallest width of galvanized screen that is commercially available. The cage is 8 $\frac{3}{8}$ inches high and 6 inches wide. This size will maintain a


culture of 75-100 flies. The drawer is about 8 inches long, 2 $\frac{3}{4}$ inches wide and 1 $\frac{1}{2}$ inches deep. The two cut ends of the screen are each stapled to a strip of wood and attached to the base using bolts and wing-nuts. The wood portions should receive at least two coats of a gloss or semi-gloss paint to keep the cage easy to clean. The small drawer in one end gives easy access to the cage and is used to hold food, water, and breeding medium.

A fly culture may be started in either of two ways. Adult flies can be caught and introduced into the cage, or moistened dog chow can be used to attract flies to oviposit, and either the eggs or the larvae placed in a rearing medium. The simpler way is to use the eggs. These are laid in small white masses which can easily be removed and placed in the rearing medium. Two species of blow flies (family Calliphoridae) have been used. These have been identified as **Phaenicia cuprina** and **Phaenicia sericata**. Cuprina is a greenish bronze color and sericata is a bright metallic green. Both are very common, particularly around decaying organic matter, and culture of either species should be relatively easy.

Adult flies do well at a temperature of 80 degrees F. Their food mixture consists of two parts of ordinary granulated sugar mixed with one part of Brewer's yeast. Water is supplied by a moistened piece of white facial tissue. The containers for these as well as for the ovipositing medium are made from cut-down 5-oz. plastic cups. These fit easily into the small drawer.

The diet of sugar and Brewer's yeast will maintain adult flies nicely, but will not induce them to lay eggs. For this purpose an enriched medium is required. This is made as follows:

1. Powdered milk 1 volume
2. Brewer's yeast 1 volume
3. Hot water 15-20 volumes
4. Purina dog chow
Let sit until the dog chow is thoroughly softened.
5. A small piece of raw liver may be placed on top of the moistened dog food as an additional incentive. This



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is not absolutely essential, but may result in a larger number of eggs being laid.

This is placed in the cage and egg laying should begin within a few hours. Water may have to be added to keep the material moist. After 12-24 hours the container with the eggs (Fig. 2) is removed and placed in a rearing assembly. This consists of a large plastic cup (10-16 oz.) placed in a smooth-walled plastic bowl containing

about ½-inch sand. The use of sand as mentioned by Ficken and Dilger (1961) makes the collection of both larvae and pupae extremely simple. The eggs usually hatch within 24 hours and the larvae are fed as necessary with moistened dog chow. Fly larvae are prodigious eaters and the amount of food material that passes through them is surprising. A temperature of 85-90 degrees F. is advantageous at this time.

As the larvae approach maturity, they will seek a drier place in which to pupate. They will crawl out of the container and fall onto the sand but a few will succeed in escaping, so proper precautions need to be taken. To remove the larvae the sand is simply sifted through a kitchen sieve (Fig. 4). They may be fed to the birds immediately or they can be kept for several days in bran in a refrigerator in the same way that mealworms are kept.

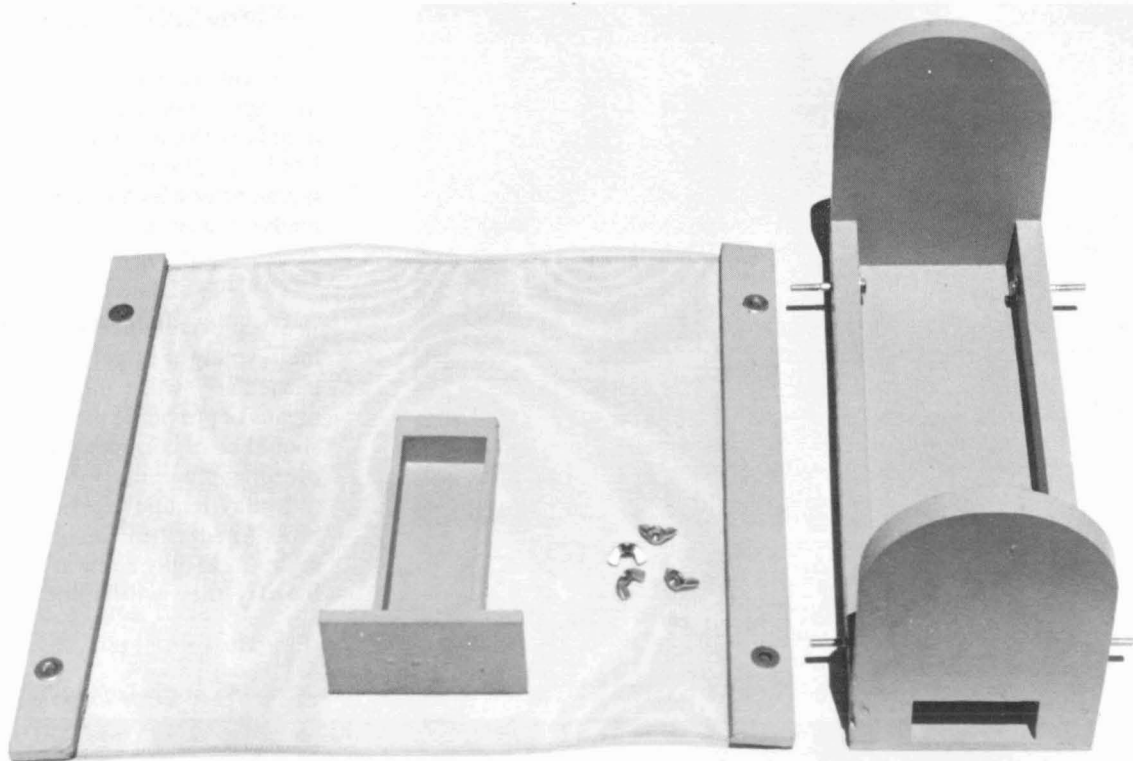
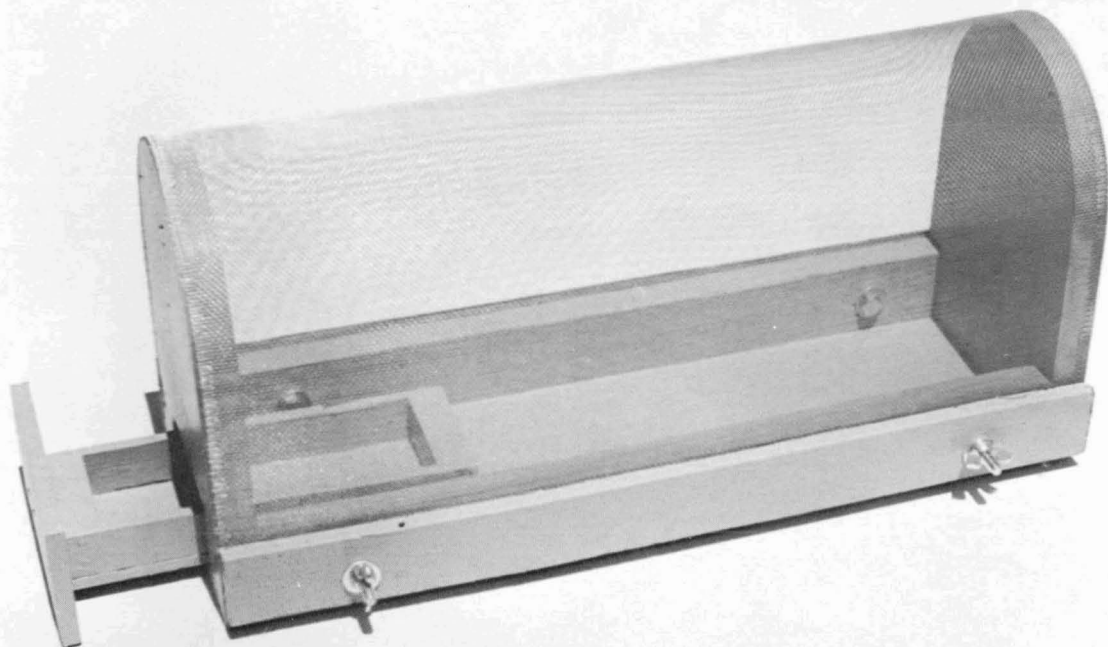


Fig. 1a - Cage for housing adult flies.

Fig. 1 - Three main components of cage.



photos by Dr. Paul G. Engen



To maintain the culture, some of the larvae are permitted to continue their life cycle. This is probably best done by selecting the largest larvae and putting them in a jar containing sand. In a few days they will have pupated (Fig. 5) at which time the pupae are removed from the sand by sifting and placed in another cage. The adult flies will emerge in about a week, but they will not lay eggs for an additional 10 days or so. After they begin to lay, they may be egged 2-3 times a week. The life span of the adult fly seems to be about 4-8 weeks.

Following the termination of a culture, the cage is taken apart and scrubbed thoroughly with a brush and water. It is "sterilized" by leaving it in the sun for a few hours, after which it is reassembled and is ready for use again.

Discussion

Since even most seed-eating birds feed their young a largely insectivorous diet, particularly when they are first hatched, means of providing them with suitable fare should be of considerable value in captive breeding programs.

It may require a period of time for the birds to adjust to eating fly larvae. They seem to eat only a few at a time but during the day they will continue to eat them.

Fig. 2 - Container with eggs.

Fig. 3 - Fly larvae on sand bed.



Baby button quail devour them avidly and presumably this would be true of other species as well.

The method which has been described makes it possible to rather easily maintain a fly culture and to have this additional food item to supplement a bird's diet.

Acknowledgement

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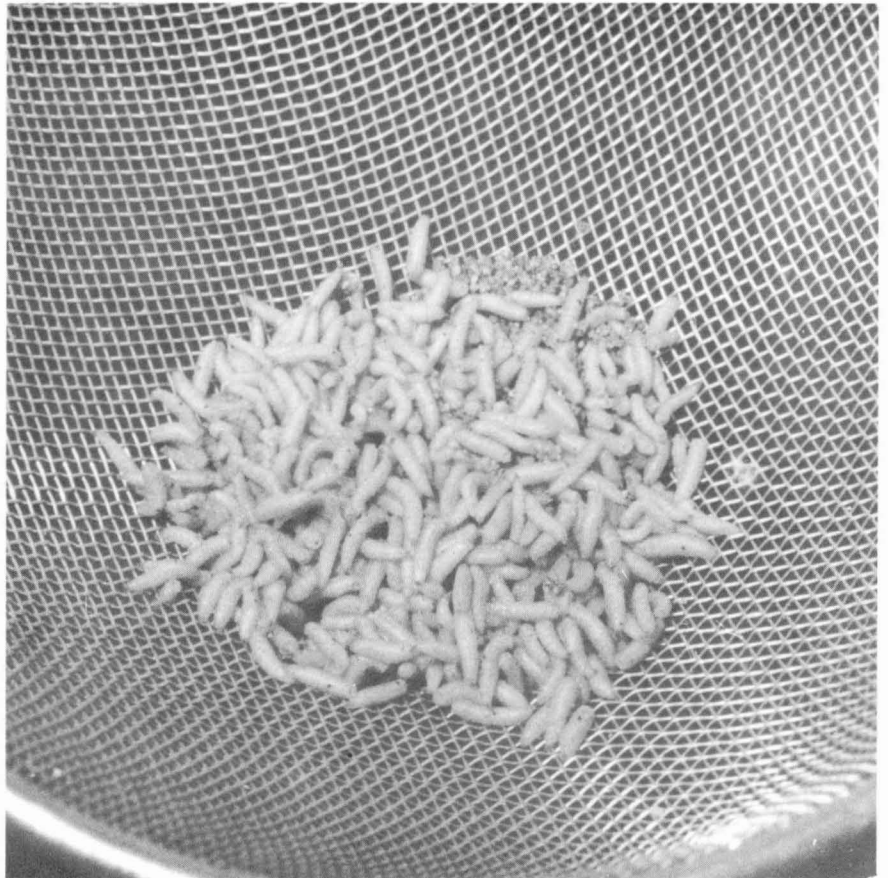
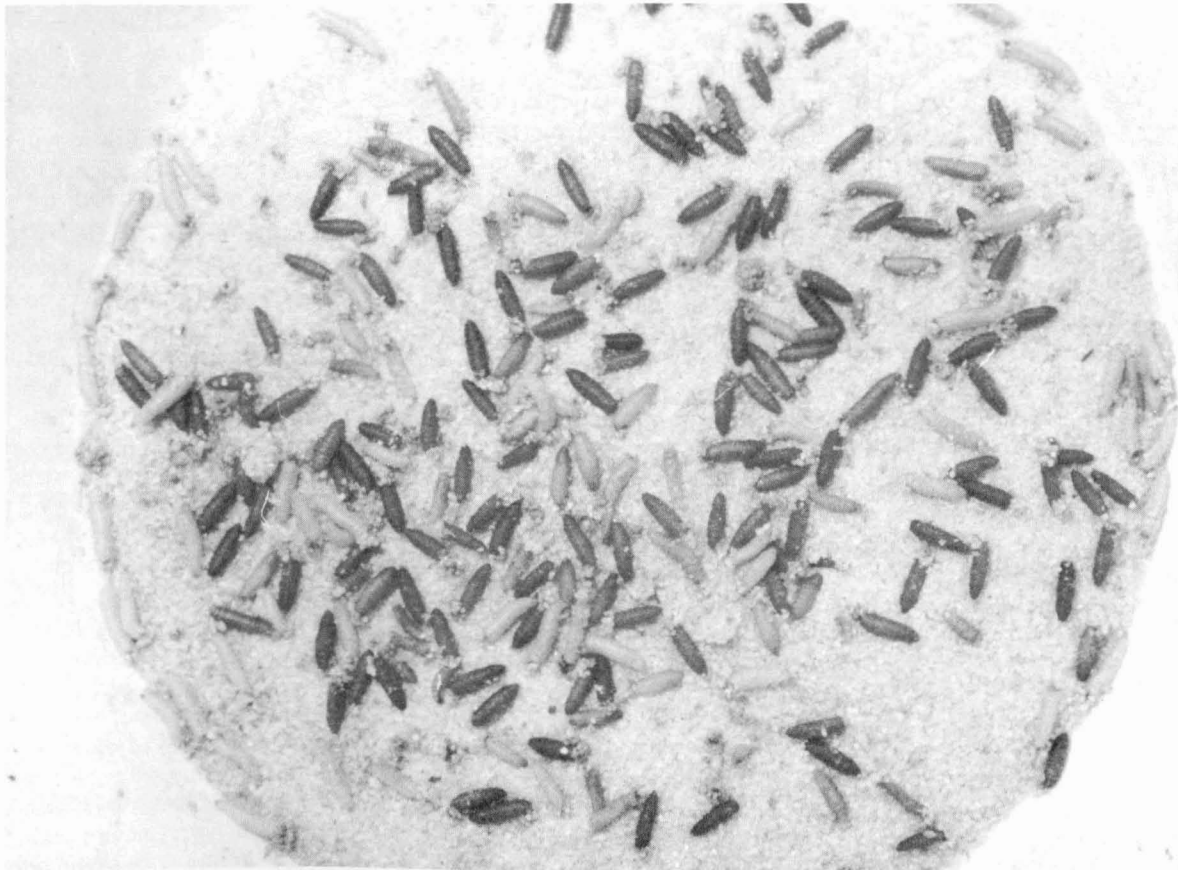


Fig. 4 – Sand falls through sieve leaving larvae clean and ready to use.

Fig. 5 –

To maintain the culture, the largest larvae are put into a jar with layer of sand and allowed to continue their life cycle.



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