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Maceration of Delicate Osteological Material by Fly Larvae

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Abstract: For embryological researches to study the development of fetal bones of different phases of pregnancy, we choose fly larvae for maceration as a gentle creature to consume all the soft tissue of the specimen leaving the bones very clean within few days. We had to simulate the natural process and do it in the laboratory. We invented several tools to collect fly eggs and transfer it to the maceration jar where the specimen kept in. We also made an incubation box to save larvae in cold weather.

Key words: Eggs collecting tray, maceration jar, incubation box, maceration, dermestid beetle, fly larvae

INTRODUCTION

Preparing bones of aged animals is simple. There are variety of methods can be used, like boiling, burying, putrefaction, enzymes and larvae of various arthropods (Tompsett, 1970; Hildebrand, 1968). We choose fly larvae as a vastly available and easy to obtain. The research can be done within few days by simulating the natural process in the laboratory. We invented the necessary tools to do this job.

MATERIALS AND METHODS

The eggs collecting tray: The key of the research is how to collect enough eggs from the right flies. We invented what we called eggs collecting tray. By exposing the tray, which is covered with smelly meat to environment like slaughter house or butcher shop, flies interested in meat like the genus *Calliphora robineau* (blue bottle flies) from the sub family *Calliphornae* of the family Tachinidae (Soulsby, 1968), which is available here will find its way to the tray easily. For the flies to lay eggs, they look for tiny spaces to hide their eggs over the smelly meat. We made these spaces by cutting 1.5 cm wide strips of discarded X-ray films. Cut the long strips to 7 cm long pieces. Bend these pieces to U-shapes. Make about 20 pieces and glue them on a sheet of 15×25 cm X-ray film. Cover up the smelly meat, over the tray, by the sheet of the hiding spaces (Fig. 1). You can make any number of this tray depending on the amount of the eggs you need. Within 1 day, enough eggs could be collected in this method.

The maceration jar: It is a transparent plastic jar with big mouth, usually used in jam canning. Choose a jar suitable to the size of the specimen. The mouth cover should be replaced by very fine porous rag (women stockings), encircle it with elastic band. This is to allow ventilation and prevent newly hatched larvae to escape. Make drainage at the bottom of the jar, cover it by similar rag of the top mouth. This will help draining out the continuously accumulating debris of maceration (Fig. 2).

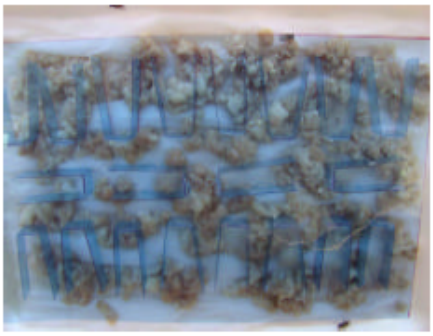

Fig. 1: Eggs collecting tray containing smelly meat, covered by the sheet of hiding spaces

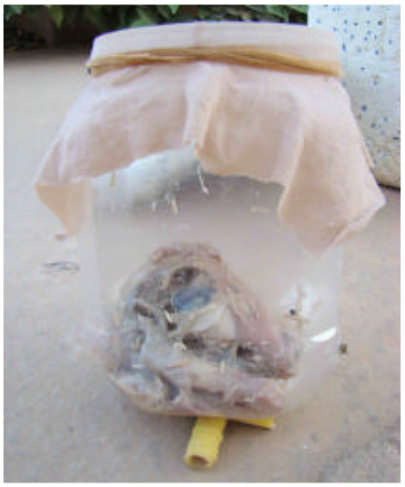

Fig. 2: Maceration jar containing specimen with fly larvae

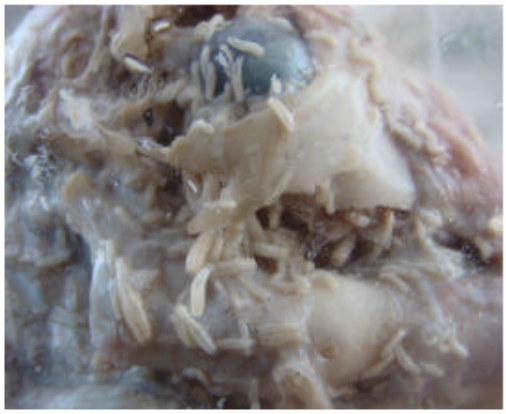

Fig. 3: The process of maceration of 100 days old of goat's fetus head by fly larvae

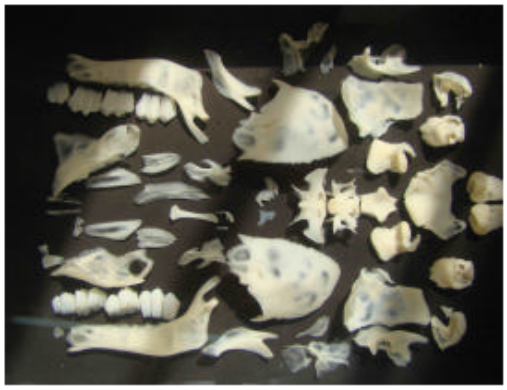

Fig. 4: Complete set of skull bones of 100 days old of goat's fetus

The incubation box: In case of cold weather, an incubation box (preferably polystyrene box) equipped with fish aquarium heater and thermostat, supplying the box with controllable source of heat, necessary for the larvae to survive.

Maceration: The specimen used in this research is head of goat's fetus, about 100 days old (estimated according to Richardson (1976) formula). Put the skinned head in the jar and transfer the eggs very gently from the eggs collecting tray to the jar.

In about 10 h, the larvae start hatching out. They will easily find their way to the specimen (Fig. 3). The process of maceration may take about 3-5 days to show the skull bones clear. Once, the soft tissue vanishes, all larvae will die.

Fill up the jar with water and the larvae will float up. Get rid of them and drain the water out. Rinse it many times and bleach the bones for 1 h with diluted chlorine water. Finally, the bones should be kept wet, preferably with 70% alcohol. Dryness will change the shape of the bones.

RESULTS AND DISCUSSION

By the end of the process of maceration we will get a very clean, delicate and un articulated bones (Fig. 4). This will give a chance to study each bone individually and to compare the parameters of the same bone of different phases of pregnancy.

Arthropods have been used to clean skeleton. Meal worms, ants, clothes moth and marine crustaceans have been used, but the best are the larvae of the beetles of the family dermestidae. The insects could be used with dry specimen or to get articulated skeleton. It is used by Borell (1938), Hall (1933), Hooper and Russel (1956) and Russell (1947). The problem with beetles is that it takes 2 months to make a colony or to buy a colony with a lot of mony and much attention to maintain it. With fly larvae, it's very easy to collect enough eggs of proper flies in 1 day and to clean the bone will take 3-5 days.

The eggs may take about 10 h to hatch. It is not easy to get ride of the beetles and their larvae after finishing the job, while fly larvae may die as soon as the soft tissue of the specimen vanish. Fly larvae are very efficient to macerate all kind of animals and of all ages especially in the embryological research where non of the other methods is compatible. We used this method in the department since many years with great efficiency.

CONCLUSION

Fly larvae is ideal for the preparation of delicate bones. It is easy to obtain, safe to handle and easy to get rid of. The whole operation my take few days and will cost only few dollars.

REFERENCES

Borell, A.E., 1938. Cleaning small collections of skulls and skeletons with dermestid beetles. J. Mammal., 19 (1): 102-103.

Hall, E.R. and W.C. Russel, 1933. Dermestid beetles as an aid in cleaning bones. J. Mammal., 14 (4): 372-374.

Hildebrand, M., 1968. Anatomical preparations, 21-23. Barkley. Los Angeles, Univ. California Press, ISBN: 978-0520005594.

Hooper, E.T., 1956. Selection of fats by dermestid beetles dermestidae. J. Mammal., 37 (1): 125-126.

Richardson, C., 1976. Estimation of the developmental age of the ovine fetus and lamb. Vet. Record., 99: 22. PMID: 951923.

Russell, W.C., 1947. Biology of the dermestid beetle with reference to skull cleaning. J. Mammal., 28 (3): 284-287.

Soulsby, E.J.L., 1968. Helminths, Arthropods and Protozoa of Domesticated Animals. 6th Edn. Baillier-Tindall and Cassell, pp: 428-429. ISBN: 978-0702002373.

Tompsett, D.H., 1970. Anatomical Techniques. 2nd Edn. Churchill Edinburgh, London, Livingston, pp: 35-37. ISBN: 978-0443007170.