

# A Simple and Effective Laboratory Method of Growing Larvae of *Lucilia sericata* Using Clean and Moistened Sharp Sand Mixed with Groundnut Powder

\*Sabo, A.M.<sup>1</sup> Jibrin, Y. B.<sup>2</sup> Yilgwan G.<sup>1</sup> Longwap A.S.<sup>3</sup>

1.Department of Human Physiology, Faculty of Medical Sciences, University of Jos

2.Department of Medicine, Abubakar Tafawa Balewa University Teaching Hospital Bauchi

3.Department of Chemical Pathology, Jos University Teaching Hospital

## Abstract

Maggot is a general name given to larvae of many different insects. Some of these larvae are biotherapeutically used in debridement of infected, necrotic and non-healing wounds. The laboratory growing and management of many different larvae are important to medical units interested in maggot debridement therapy, research centres interested in studying the physiology of a given larvae and forensic entomology units that use linear regression method of determining time of death of a decomposing body. This study aims at developing an accessible and effective method of growing larvae of *Lucilia sericata*. A piece of putrid beef is hung out in the open to attract flies that deposit eggs which on hatching were able to burrow into the clean dried silica-based sharp sand mixed with 1:10 groundnut powder in a 20 litre capacity plastic bucket. The bucket has a cover cut out to allow ventilation over a net. A tinge of iodized salt (0.5 gram) is added to help in metamorphosis. The soil was kept moist by 8 hourly sprinkling of water. The larvae counted were 300 and subsequently they were allowed to metamorphose to pupae and adults. The flies hatched were exposed to cold temperature of 10 °C for 10 minutes to reduce their activity and were then counted and the species identified. The different species identified may be use in growing a second generation of the desired larvae. Of the 286 units of flies, 10 were *Musca domestica* specie while 276 were *Lucilia sericata* specie. This effort has produced a 95% successful hatch that metamorphosed into adult flies. This introduces a reliable alternative of growing larvae in the laboratory.

## INTRODUCTION

Interest in maggots of some insect (larval stage) has surged recently due to renewed interest in their use for debridement of wound among other things. Over the course of history, Napoleon military surgeons have observed that soldiers injured on the battlefield with infected wound infested by maggots do better than those with infected yet non-infested wound. Similar thing was observe in the 2<sup>nd</sup> world war and William Baer re-introduces maggot therapy back to the US in 1931 for the treatment of osteomyelitis (Baer, 1931). Maggot Debridement Therapy MDT was previously replaced by surgical debridement due advances in anaesthesia and discovery of antibiotics. The larvae of *Lucilia sericata* have also been demonstrated to have anti Leishmania effect (Sanei-Dehkordi et al, 2016). Forensic expert in Crime Scene Investigation have found in maggots a veritable tool in unraveling the situation surrounding the death of a decomposing corpse (exposed carrion) infested by maggots (Isaac et al, 2011). Forensic entomology thus adds to the increasing need and the necessity of developing techniques of growing maggots in the laboratory within controlled settings. Sherman and Tran (1995) developed a technique involving the use of putrid meat to attract flies to deposit egg on its surface. The moist piece of meat is kept in the dark and eggs allowed to hatch and then transferred to a mix of sawdust and honey (Sherman and Tran 1996). Honey is not cheap and the hot tropical temperature in Jos Nigeria where this study is conducted melts honey readily and constitutes drag on the larvae. A modification of Sherman and Wyle method is here adopted where the inexpensive powdered groundnut is used with clean sharp sand instead of honey and sawdust.

## AIM AND OBJECTIVE

This work aims at developing a successful alternative of growing the larvae of *Lucilia sericata* in the laboratory using clean sharp sand and groundnut powder instead of sawdust and honey.

## MATERIAL AND METHOD

A piece of beef is cut to a thickness of 0.5 cm and a surface area of 10 by 10 cm<sup>2</sup>. At a room temperature of 39 °C, this fresh piece of beef is allowed to undergo putrefaction for 48 hours and then exposed, hanging in the air where flies thrive. Mango tree populated area was chosen for its rich population of *Lucilia sericata* flies, also called green bottle fly. Seventy two hours later, this putrid piece with the eggs deposited by various species of wild flies is transferred to the top of washed and dried sharp sand that is mixed with groundnut powder in the ratio of 10:1. Regular sprinkle of water is administered 6 hourly to prevent desiccation. The eggs are allowed to hatch into larvae that start showing up after 72 hours of incubation at average room temp of 38 °C.

## RESULTS

The eggs deposited by the wild flies hatched into larvae that were able to burrow into the clean dried silica-based sharp sand mixed with 1:10 groundnut powder in a 20 litre capacity plastic bucket which has a cover cut out to allow ventilation over a net and to trap the flies at adulthood. The larvae counted were 300 and subsequently they were allowed to metamorphose to pupae and adults. 286 of such flies were exposed to cold temperature of 10 °C for 10 minutes to reduce their activity and were counted and the species identified. Of the 286 units of flies, 10 were *Musca domestica* specie while 276 were *Lucilia sericata* specie. This has produced a 95% successful hatch that metamorphosed into adult flies. These findings thus introduce a reliable alternative of growing larvae in the laboratory.

## DISCUSSION

Flies are usually attracted to decomposing organic matter. The cocktail of gases emitted act as agent of chemotaxis and thus steering the direction of these insects to lay their egg on the organic matter that supposedly can nourish their young larvae on hatching from eggs. The eggs need moisture and the right environmental temperature to hatch. The maggots do not possess gills and thus can drown if over flooded with water and die. This informs the modest use of water (sprinkle) that trickles down the larger particle sized and porous sharp sand that allows adequate aeration.

Washed sharp sand provides a protective environment for the larvae to thrive. The silica based sand is a poor conductor of heat and insulates the larvae as they hatch and grow. The porous nature of the sand ensures that water that is sprinkled sieve down to nourish the larvae that burrow down into the soil. The groundnut powder used provides to the larvae the basic organic compounds and the macronutrients required such as carbohydrate, protein and lipid. This is in contrast to the use of sawdust as base and honey for the growth of the larvae as developed by Sherman and Wylie (1995). This newer method also involves the use of the putrid meat to attract wild flies for the initial deposit of their eggs.

The combination of the inexpensive groundnut powder and clean sharp sand constitute an affordable and inexpensive material that cost less than \$10 (US Dollar) and it can help researchers on insect larvae gain access to their management and use, to a greater extent.

## REFERENCE

1. Baer W.S.(1931). The treatment of chronic osteomyelitis with the maggot (larvae of the blowfly). *Journal of Bone and Joint Surgery*. 13: 438.
2. Sherman, R.A. and Tran, J. (1995) A sterile, homogenous food source for *Phaenicia sericata*. *Medical and Veterinary Entomology*. 9(4): 393-398.
3. Sherman, R.A. and Wyle, F.A. (1996). Low cost, low maintenance rearing of maggot in hospitals, clinics and schools. *Journal of the American Society of Tropical Medicine and Hygiene*. 54 (1): 38-41.
4. Sanei-Dehkordi, A., Kameisipour, A., Akbarzadeh, K., Akhavan, A.A., MirAmin Mohammadi A., Mohammadi Y., Rassi, Y., Oshaghi, M.A., Alebrahim, Z., Eskandari, S.E. and Rafinejad, J. (2016). Anti Leishmania activity of *Lucilia sericata* and *Calliphora vicina* maggots in laboratory models. *Exp Parasito*. 170: 59-65.
5. Isaac Joseph, Deepu G Mathew, Pradeesh Sathyan and Geetha Varghrse. (2011). The use of insects in forensic investigations: An overview on the scope of forensic entomology. *J Forensic Dent Sci*. 3(2):89-91.