**Mass Rearing Technique of Parasitoid and Predator**

I. Introduction

Parasitoids and predators that attack stored-product pests are typically very small, and have a short life cycle and a high reproductive capacity. They can easily be removed from bulk grain using normal cleaning procedures before milling. In many ways the stored-product environment is favorable for biological control. Environmental conditions are generally favorable for natural enemies, and storage structures prevent these beneficial insects from leaving. Parasitoids are organisms living in or on their host and feeding directly upon it, eventually leading to its death. They are much like parasites in their close symbiotic relationship with their host or hosts. Like the previous two classifications parasitoid predators do not kill their hosts instantly. However, unlike parasites, they are very similar to true predators in that the fate of their prey is quite inevitably death. A well-known example of a parasitoids are the [ichneumon wasps](http://en.wikipedia.org/wiki/Ichneumonoidea), solitary insects living a free life as an adult, then laying eggs on or in another species such as a caterpillar. Its larvae feed on the growing host causing it little harm at first, but soon devouring the internal organs until finally destroying the [nervous system](http://en.wikipedia.org/wiki/Nervous_system) resulting in prey death. By this stage the young wasps are developed sufficiently to move to the next stage in their life cycle. Though limited mainly to the insect order [Hymenoptera](http://en.wikipedia.org/wiki/Hymenoptera), [Diptera](http://en.wikipedia.org/wiki/Diptera) and [Coleoptera](http://en.wikipedia.org/wiki/Coleoptera) parasitoids make up as much as 10% of all insect species.

The use of insect parasitoids and predators to control stored-product insect pests has many advantages over traditional chemical controls. These natural enemies leave no harmful chemical residues. Natural enemies released in a storage facility continue to reproduce as long as hosts are available and environmental conditions are suitable. Unlike chemicals that need to be applied to a wide area, natural enemies can be released at a single location and they will find and attack pests located deep inside crevices or within a grain mass. A parasitoid is an organism that spends a significant portion of its [life history](http://en.wikipedia.org/wiki/Biological_life_cycle) attached to or within a single [host](http://en.wikipedia.org/wiki/Host_(biology)) [organism](http://en.wikipedia.org/wiki/Organism) in a relationship that is in essence parasitic; unlike a true parasite, however, it ultimately sterilises or kills, and sometimes consumes, the host. Thus parasitoids are similar to typical [parasites](http://en.wikipedia.org/wiki/Parasite) except in the more dire [prognosis](http://en.wikipedia.org/wiki/Prognosis) for the [host](http://en.wikipedia.org/wiki/Host_(biology)). Parasitoids lay their eggs on or in the bodies of other species of insect, and the parasitoid   
larvae develop by feeding on the host, causing its eventual death. Parasitoids are insects that feed on the body of another insect or arthropod during the larval stage of the their life cycle. The host organism will die as a result. When the parasitoid completes its life cycle, it becomes a free-living insect, no longer dependent on the host.

In [ecology](http://en.wikipedia.org/wiki/Ecology), predation describes a [biological interaction](http://en.wikipedia.org/wiki/Biological_interaction) where a predator (an animal that is hunting) feeds on its prey (the animal that is attacked).

Predators may or may not kill their prey prior to [feeding](http://en.wikipedia.org/wiki/Feeding) on them, but the act of predation often results in the death of its prey and the eventual absorption of the prey's tissue through consumption. Other categories of [consumption](http://en.wikipedia.org/wiki/Heterotroph) are [herbivory](http://en.wikipedia.org/wiki/Herbivory) (eating parts of plants), [mycophagy](http://en.wikipedia.org/wiki/Mycophagy) (eating parts of fungi) and [detritivory](http://en.wikipedia.org/wiki/Detritivore), the consumption of dead organic material ([detritus](http://en.wikipedia.org/wiki/Detritus)). All these consumption categories fall under the rubric of [consumer-resource systems](http://en.wikipedia.org/wiki/Consumer-resource_systems). It can often be difficult to separate various types of [feeding behaviors](http://en.wikipedia.org/wiki/List_of_feeding_behaviours). For example, some parasitic species prey on a host organism and then lay their eggs on it for their offspring to feed on it while it continues to live or on its decaying corpse after it has died. The key characteristic of predation however is the predator's direct impact on the prey population. On the other hand, detritivores simply eat dead organic material arising from the decay of dead individuals and have no direct impact on the "donor" organisms.

[Selective pressures](http://en.wikipedia.org/wiki/Selective_pressure) imposed on one another often leads to an [evolutionary arms race](http://en.wikipedia.org/wiki/Evolutionary_arms_race) between prey and predator, resulting in various [antipredator adaptations](http://en.wikipedia.org/wiki/Antipredator_adaptation). Ways of classifying predation surveyed here include grouping by [trophic level](http://en.wikipedia.org/wiki/Trophic_level) or diet, by specialization, and by the nature of the predator's.

II. Objectives

* The appreciate importance of parasitoids and predators.
* Aim to use these learning process of the teachniques of mass in parasitoids and predators.
* To determined the effectiveness of parasitoids and predators.

III. Methodology

Used to estimate host ranges of parasitoids and predators are not as well developed as those used for weed biological control agents.

IV. Result and Discussion

This suggests some kind of negative interaction between predatory wasps and parasitoids regarding their action upon coffee leaf miner. Patterns of resource exploitation by predators and parasitoids overlap partially, with predators exploiting mines which are slightly larger than the mines attacked by the parasitoids.

V. References

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**DEPARTMENT OF AGRICULTURAL SCIENCES**

**BATAC CITY**

**CROP PROTECTION 30**

**LABORATORY EXERCISE NO. 4**

**MASS PRODUCTION TECHNIQUE OF PARASITOIDS/ PREDATORS**

Submitted by:

**Jessica Ruth I. Layaoen**

BSA III AGEXT

Submitted to:

**MR. EUGINE D. RAMOS**

Instructor

SEPTEMBER 17, 2013

**Earwig Culture**

**Earwig Culture**

I. Introduction

The name earwig comes from a European superstition that these insects entered the ears of a sleeping person and bored into the brain. This belief is totally unfounded. Earwigs do often cause alarm to homeowners when discovered indoors, despite the fact that they are harmless to humans. They have a frightful appearance, move rapidly around baseboards at the ground level and may emit a foul-smelling, yellowish-brown liquid from their scent glands. Active at night and hiding during the daytime, earwigs normally live outdoors and do not establish themselves indoors. They are harmless to humans and animals, although if handled carelessly, the earwig can give a slight pinch with the forceps. Earwigs can be responsible for serious feeding damage on flowers, vegetables, fruits and other plants, giving the leaves a ragged appearance with numerous, small, irregular holes. Earwigs are elongate, flattened insects, ranging from light red-brown to black and are easily recognized by their forcep-like appendages (pincers) on the end of the abdomen. The forceps (cerci) are unequal in length in the males. Earwig female forceps are straight-sided, whereas male forceps are strongly curved (caliper-like) and larger. They have chewing mouthparts and long, slender antennae. Some species are wingless but others have a pair of leathery forewings covering a few segments of the abdomen and the membranous hind wings, which have the tips protruding. There are many species of earwigs: the European earwig ranges from 13-20 mm (1/2 to 3/4 inch) in length, with banded legs and reddish head; the ringlegged earwig ranges from 13-18 mm (1/2 to 3/5 inch) in length and is black-yellowish underneath with legs having dark crossbands. Young earwigs (nymphs) are similar in appearance to adults. They are white to olive-green and lack wings. An earwig's forceps are used to defend the nest, capture prey, probe narrow crevices and fold or unfold wings. Earwigs are primarily scavengers on dead insects and rotted plant materials. Some species are predators, feeding on aphids. Only a few of the winged species are good fliers. They are often transported great distances in plant materials and occasionally in other freight. Earwigs require moist, cool places and are found in damp crawl spaces, flower gardens near the home, in mulches, compost piles, trash, under boards and in wood piles. After entering houses, they feed on sweet, oily or greasy foods or houseplants. They are attracted to lights. Earwigs develop from egg to adult through gradual metamorphosis with four to five nymphal instars or stages. During the spring or autumn, females lay 20 to 50 smooth, oval, pearly-white or cream-colored eggs in a below-ground chamber (upper two to three inches of soil). The female moves, cleans and provides maternal care by protecting the eggs and new young until the first molt. Young then leave the nest, fend for themselves and mature in one season. Most species in this country have one generation per year, overwintering as eggs or adults in the soil. Earwigs may dig as deep as six feet below ground to escape the cold temperatures.

II. Objectives

* To be able to produce a earwigs.
* To evaluate of the influence of earwigs on culture.
* This study was to give information about earwigs culture.

III. Methodology

* The materials needed in earwigs culture.
* Filled the container with (1/4) of vermicast.
* Mixed the stock cultured earwigs in the container.
* Sprayed water for moisture.
* Placed the dog food at the center with container of course.
* Placed the corn cob.
* Covered the container.

IV. Result and Discussion

Earwigs need and are very attracted to moisture. High populations, practically invisible during the day, may be present around foundations, in landscaped yards, in mulch, under boards, etc. Be sure to eliminate damp, moist conditions in crawl spaces under houses, around faucets, around air-conditioning units and along house foundations.

V. References

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**CROP PROTECTION 30**

**LABORATORY EXERCISE NO. 4**

**EARWIG CULTURE**

Submitted by:

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SEPTEMBER 17, 2013

1. Introduction

Insect parasitoids have an immature life stage that develops on or within a single insect host, ultimately killing the host, hence the value of parasitoids as natural enemies. Adult parasitoids are free-living and may be predaceous. Parasitoids are often called parasites, but the term parasitoid is more technically correct. Most beneficial insect parasitoids are wasps or flies, although some rove beetles (see Predators) and other insects may have life stages that are parasitoids.  
Most insect parasitoids only attack a particular life stage of one or several related species. The immature parasitoid develops on or within a pest, feeding on body fluids and organs, eventually leaving the host to pupate or emerging as an adult. The life cycle of the pest and parasitoid can coincide, or that of the pest may be altered by the parasitoid to accommodate its development.

The use of insect parasitoids and predators to control stored-product insect pests has many advantages over traditional chemical controls. These natural enemies leave no harmful chemical residues. Natural enemies released in a storage facility continue to reproduce as long as hosts are available and environmental conditions are suitable. Unlike chemicals that need to be applied to a wide area, natural enemies can be released at a single location and they will find and attack pests located deep inside crevices or within a grain mass. Parasitoids and predators that attack stored-product pests are typically very small, and have a short life cycle and a high reproductive capacity. They can easily be removed from bulk grain using normal cleaning procedures before milling. In many ways the stored-product environment is favorable for biological control. Environmental conditions are generally favorable for natural enemies, and storage structures prevent these beneficial insects from leaving.

Parasitoids are insects that feed on the body of another insect or arthropod during the larval stage of the their life cycle. The host organism will die as a result. When the parasitoid completes its life cycle, it becomes a free-living insect, no longer dependent on the host.

Parasitoids are organisms living in or on their host and feeding directly upon it, eventually leading to its death. They are much like parasites in their close symbiotic relationship with their host or hosts. Like the previous two classifications parasitoid predators do not kill their hosts instantly. However, unlike parasites, they are very similar to true predators in that the fate of their prey is quite inevitably death. A well-known example of a parasitoids are the [ichneumon wasps](http://en.wikipedia.org/wiki/Ichneumonoidea), solitary insects living a free life as an adult, then laying eggs on or in another species such as a caterpillar. Its larvae feed on the growing host causing it little harm at first, but soon devouring the internal organs until finally destroying the [nervous system](http://en.wikipedia.org/wiki/Nervous_system) resulting in prey death. By this stage the young wasps are developed sufficiently to move to the next stage in their life cycle. Though limited mainly to the insect order [Hymenoptera](http://en.wikipedia.org/wiki/Hymenoptera), [Diptera](http://en.wikipedia.org/wiki/Diptera) and [Coleoptera](http://en.wikipedia.org/wiki/Coleoptera) parasitoids make up as much as 10% of all insect species.

Parasitoids lay their eggs on or in the bodies of other species of insect, and the parasitoid   
larvae develop by feeding on the host, causing its eventual death. A parasitoid is an organism that spends a significant portion of its [life history](http://en.wikipedia.org/wiki/Biological_life_cycle) attached to or within a single [host](http://en.wikipedia.org/wiki/Host_(biology)) [organism](http://en.wikipedia.org/wiki/Organism) in a relationship that is in essence parasitic; unlike a true parasite, however, it ultimately sterilises or kills, and sometimes consumes, the host. Thus parasitoids are similar to typical [parasites](http://en.wikipedia.org/wiki/Parasite) except in the more dire [prognosis](http://en.wikipedia.org/wiki/Prognosis) for the [host](http://en.wikipedia.org/wiki/Host_(biology)).

In [ecology](http://en.wikipedia.org/wiki/Ecology), predation describes a [biological interaction](http://en.wikipedia.org/wiki/Biological_interaction) where a predator (an animal that is hunting) feeds on its prey (the animal that is attacked). Predators may or may not kill their prey prior to [feeding](http://en.wikipedia.org/wiki/Feeding) on them, but the act of predation often results in the death of its prey and the eventual absorption of the prey's tissue through consumption. Other categories of [consumption](http://en.wikipedia.org/wiki/Heterotroph) are [herbivory](http://en.wikipedia.org/wiki/Herbivory) (eating parts of plants), [mycophagy](http://en.wikipedia.org/wiki/Mycophagy) (eating parts of fungi) and [detritivory](http://en.wikipedia.org/wiki/Detritivore), the consumption of dead organic material ([detritus](http://en.wikipedia.org/wiki/Detritus)). All these consumption categories fall under the rubric of [consumer-resource systems](http://en.wikipedia.org/wiki/Consumer-resource_systems). It can often be difficult to separate various types of [feeding behaviors](http://en.wikipedia.org/wiki/List_of_feeding_behaviours).[[1]](http://en.wikipedia.org/wiki/Predation#cite_note-Ecology-1) For example, some parasitic species prey on a host organism and then lay their eggs on it for their offspring to feed on it while it continues to live or on its decaying corpse after it has died. The key characteristic of predation however is the predator's direct impact on the prey population. On the other hand, detritivores simply eat dead organic material arising from the decay of dead individuals and have no direct impact on the "donor" organisms.

[Selective pressures](http://en.wikipedia.org/wiki/Selective_pressure) imposed on one another often leads to an [evolutionary arms race](http://en.wikipedia.org/wiki/Evolutionary_arms_race) between prey and predator, resulting in various [antipredator adaptations](http://en.wikipedia.org/wiki/Antipredator_adaptation). Ways of classifying predation surveyed here include grouping by [trophic level](http://en.wikipedia.org/wiki/Trophic_level) or diet, by specialization, and by the nature of the predator's. A predator is an organism that hunts and kills other organisms for food. Some predators are [carnivores](http://marinelife.about.com/od/glossary/g/carnivore.htm) or 'meat-eaters', while others are [omnivores](http://marinelife.about.com/od/glossary/g/omnivore.htm) and feed on both animals and plants.

II. Objectives

* Aim to use these learning process of the teachniques of mass in parasitoids and predators.
* To determined the effectiveness of parasitoids and predators.
* The appreciate importance of parasitoids and predators.

III. Methodology

Used to estimate host ranges of parasitoids and predators are not as well developed as those used for weed biological control agents.

IV. Result and Discussion

This suggests some kind of negative interaction between predatory wasps and parasitoids regarding their action upon coffee leaf miner. Patterns of resource exploitation by predators and parasitoids overlap partially, with predators exploiting mines which are slightly larger than the mines attacked by the parasitoids.

IV. References

<http://en.wikipedia.org/wiki/Predation#Parasitoidism>

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**BATAC CITY**

**CROP PROTECTION 30**

**LABORATORY EXERCISE NO. 3**

**MASS PRODUCTION TECHNIQUE OF PARASITOIDS/ PREDATORS**

Submitted by:

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BSA III AGEXT

Submitted to:

**MR. EUGINE D. RAMOS**

Instructor

SEPTEMBER 17, 2013

1. Introduction

 Earwigs have characteristic [cerci](http://en.wikipedia.org/wiki/Cercus), a pair of [forceps](http://en.wikipedia.org/wiki/Forceps) [pincers](http://en.wikipedia.org/wiki/Pincer_(biology)) on their abdomen, and membranous [wings](http://en.wikipedia.org/wiki/Insect_wing) folded underneath short [forewings](http://en.wiktionary.org/wiki/fore_wing), hence the scientific order name, "skin wings." Some groups are tiny parasites on mammals and lack the typical pincers. Earwigs rarely use their flying ability. Earwigs are [nocturnal](http://en.wikipedia.org/wiki/Nocturnality); they often hide in small, moist crevices during the day, and are active at night, feeding on a wide variety of insects and plants. Damage to foliage, flowers, and various crops is commonly blamed on earwigs, especially the common earwig [Forficula auricularia](http://en.wikipedia.org/wiki/Forficula_auricularia). Earwigs have five [molts](http://en.wikipedia.org/wiki/Ecdysis) in the year before they become adults. Many earwig species display maternal care, which is uncommon among insects. Female earwigs may care for their eggs, and even after they have hatched as [nymphs](http://en.wikipedia.org/wiki/Nymph_(biology)) will continue to watch over offspring until their second molt. As the nymphs molt, [sexual dimorphism](http://en.wikipedia.org/wiki/Sexual_dimorphism) such as differences in pincer shapes begins to show. Some earwig specimen fossils are in the extinct suborders [Archidermaptera](http://en.wikipedia.org/wiki/Archidermaptera) or [Eodermaptera](http://en.wikipedia.org/w/index.php?title=Eodermaptera&action=edit&redlink=1), the former dating to the [Late Triassic](http://en.wikipedia.org/wiki/Late_Triassic) and the latter to the Middle Jurassic. Many orders of insect have been theorized to be closely related to earwigs, though the icebugs of [Grylloblattaria](http://en.wikipedia.org/wiki/Grylloblattaria) are most likely. Earwigs make up the insect order Dermaptera, found throughout the Americas, Africa, Eurasia, Australia and New Zealand. With about 2,000 species in 12 families, they are one of the smaller insect orders.

Earwigs are elongate, flattened insects, ranging from light red-brown to black and are easily recognized by their forcep-like appendages (pincers) on the end of the abdomen. The forceps (cerci) are unequal in length in the males. Earwig female forceps are straight-sided, whereas male forceps are strongly curved (caliper-like) and larger. They have chewing mouthparts and long, slender antennae. Some species are wingless but others have a pair of leathery forewings covering a few segments of the abdomen and the membranous hind wings, which have the tips protruding. There are many species of earwigs: the European earwig ranges from 13-20 mm (1/2 to 3/4 inch) in length, with banded legs and reddish head; the ringlegged earwig ranges from 13-18 mm (1/2 to 3/5 inch) in length and is black-yellowish underneath with legs having dark crossbands. Young earwigs (nymphs) are similar in appearance to adults. They are white to olive-green and lack wings.

An earwig's forceps are used to defend the nest, capture prey, probe narrow crevices and fold or unfold wings. Earwigs are primarily scavengers on dead insects and rotted plant materials. Some species are predators, feeding on aphids. Only a few of the winged species are good fliers. They are often transported great distances in plant materials and occasionally in other freight. Earwigs require moist, cool places and are found in damp crawl spaces, flower gardens near the home, in mulches, compost piles, trash, under boards and in wood piles. After entering houses, they feed on sweet, oily or greasy foods or houseplants. They are attracted to lights.

Earwigs develop from egg to adult through gradual metamorphosis with four to five nymphal instars or stages. During the spring or autumn, females lay 20 to 50 smooth, oval, pearly-white or cream-colored eggs in a below-ground chamber (upper two to three inches of soil). The female moves, cleans and provides maternal care by protecting the eggs and new young until the first molt. Young then leave the nest, fend for themselves and mature in one season. Most species in this country have one generation per year, overwintering as eggs or adults in the soil. Earwigs may dig as deep as six feet below ground to escape the cold temperatures.

1. Objectives

* To be able to produce a earwigs.
* Evaluation of the influence of earwigs on culture.
* This study was to give information about prospect of earwig as the biological control agent.

1. Methodology

* We buy the materials needed in earwigs culture.
* We filled the container (1/4) of vermicast.
* We mixed the stock cultured earwigs in the container.
* We sprayed water for moisture.
* We placed the dog food at the center with container of course.
* We placed the corn cob.
* We covered the container.

1. Result and Discussion

In the earwigs culture we prepare the container that is covered with the plastic nylon at the center of its cover, corn cob, vermin cast, dog food, small plastic trays, sprayer. We spray a little amount of water that will serve as the moisture to the soil. We placed the corn cob as well as the small container filled with dog food. We covered the container and placed it in a cool dry place.

1. References

<http://www.uri.edu/ce/factsheets/sheets/earwig.html>

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**CROP PROTECTION 30**

**LABORATORY EXERCISE NO. 4**

**EARWIG CULTURE**

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SEPTEMBER 17, 2013