Report

On

Field Study Tour at the Vermicomposting Centre of ICAR, Lamphelpat, Imphal

LILONG HAOREIBI COLLEGE ★ DEPTT. OF ZOOLOGY ★

Submitted by

Name:_____

Roll No.:_____

Regd. No.:_____

B. Sc, 2nd. Semester,

SEC-2 , Zoology Practical. 2023,

EXAMINER

Under the guidance of

Dr. Abdul Hei (Asst, Professor)

Department of zoology, Lilong Haoreibi Collage, Lilong,

Content-

EXAMINER

Certificate

To whom it may concern

This is to certify that Shri/Md/Miss Md. Rohit Rayan is a bonafide student of B.Sc 2nd bearing roll 22102461 and registration No. _____.

Manipur University and he/she participated in the field study tour. The report of the field tour is his own work

done as a partial filfulment of practical syllabus of B.Sc.

2nd Semester-SEC-2. Practical. Zoo-2203-CP.

He/She is not slated to me.

Abdul Hei

Dr. Abdul Hei

Asst. professor in Zoology

Lilong. Haoreibi Collage.

Dr. L. Sanahanbi Devi

Associate Professor

HOD, Zoology, Department

Lilong, Haoreibi Collage

Dr. L. Sanahanbi Devi
Head,Department of Zoology
Lilong Haoreibi College
Government of Manipur

Actknowledgement

The study report based on the field tour give information about the significance of vermiculture and vermicomposting by Eisenia fetida, covered during tour programme. With the growing environment issues of wastes, vermicomposting has been developed as one of the solution of the environment wastes, increasing fertility, productivity and economy for human survival.

I am greatly indebted to Dr. Abdul Hei, Asst. Professor of our Zoology Department, HOD, Dr. L. Sanahanbi Devi and other faculty members for the cooperation and advice during the tour and preparation of the report.

I am also thankful to all class mates who share with me the tour programme and report preparation.

Date: 6/3/24

Place: Lilong

Your faithfully,

Name: Md Rohit Rossam

Roll No.: 22102461

B.Sc 2nd Semester Zoology

Lilong Haoreibi College, Lilong

Aim and objects of the field

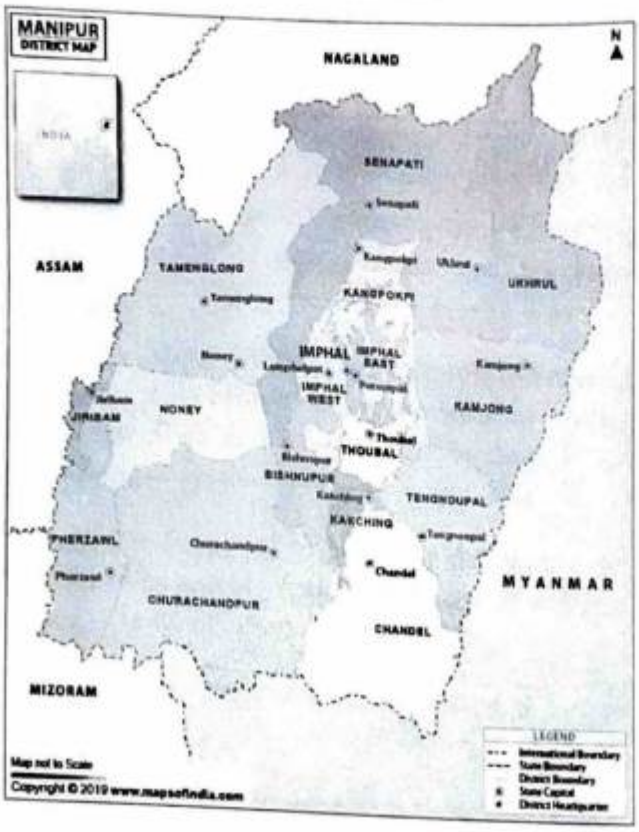
Study Tour

The purpose of the field study tour is to do a practical fulfillment for the prescriled syllabus of SEC-2, BSc , 2nd Semester Zoology practical exam. of Manipur University.

The aim of the work is to study vermiculture and vermicomposting by Eisenia fetida.

So a study tour programme was to be concluded at a vermicomposting centre , ICAR, Lamphal, Imphal.

MAP, ICAR CENTRE



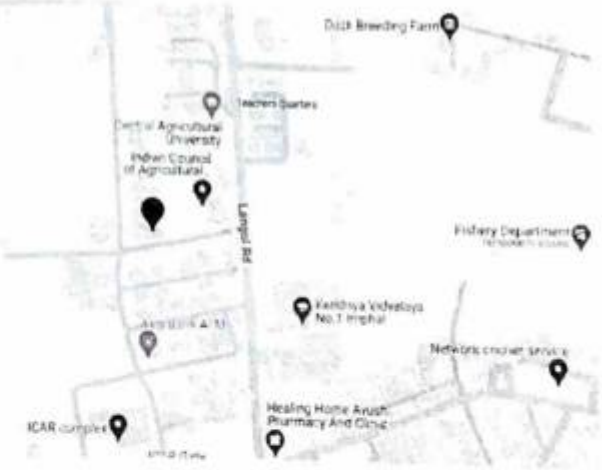
ICAR

Directions Save Nearby Send to phone Share

Langol Rd, Imphal, Manipur 795004, India

Add a label

Your Maps activity



Tour Diary

The field study tour programme of B.Sc 2nd semester zoology department ,Lilong Haoreebi College.Lilong was arranged on 22nd January2024 as one day tour programme at ICAR, Lamphelpat ,Imphalwest

The tour was conducted of Dr Abdul Hei, Asst. Professor, Md Shahid Khan, Asst Professor, Th.Binapati, Associate professor as officers in charge with the help of respected under the guidance Dr Md Abdul Sattar Shah and Dr L.Sanahanbi Devi, HOD, Zoology Department, Lilong Haoreibi College, Lilong.

The day of the tour programme happened to be a nice day with clear sunshine and weather, though there were frequent banths and blockades in the state. It was first difficult to fix the date of the tour programme due to law and order.

All the students arrived at the college ground before 9.30am at the prospect of the happy tour programme in nice dresses.

The tour programme was launched with a nice group photo session with the principal, teachers and students at the college ground. The tour was started by bus from 10.00am on 22nd January from the college towards th the ICAR, Lamphel, Imphal for one day tour programme. It took about 40 minute to reach ICAR, Lamphel.

On arrival at the ICAR centre, the scientist in charge of the vermicomposting centre welcomed our team at the gate and took a group photo, led us inside the laboratory of mineral analysis. , gave the students a brief lecture about the equipment and analysis of minerals of soil and he also showed other related lab and equipment systems. The students were well inspired bythe scientist showing his scientific work.Next he led us to the vermicomposting centre and explained to us one by one about the vermiculture and vermicomposing.

Really the tour programme gave the skill enhancement of the students about skill enhancement course (SEC-2).

The tour programme was greatly inspiring all the students after kowng the great potential of vermicomposting and its benefits.

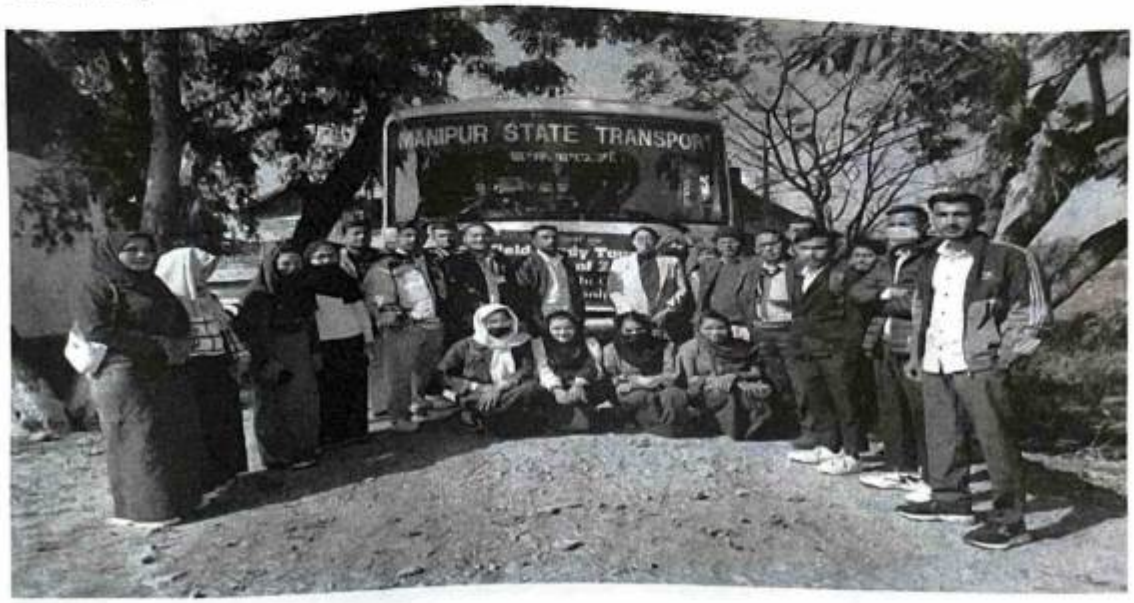
The tour programme was one of cooperation, sharing and love, leadership and memory among students, and teachers. Such programme also for promoting many such spirits among students.

In implementation of new education policy (NEP-2020), Field study tour is an effective part of the syllabus of SEC-2 of Zoology.

ICAR- Lamphal Overview-

Indian Council of agricultural Regard (ICAR). Lamphal, Imphal is within a distance from the city centre. It is surrounded by the Regional Institute of Medical Science and Agri University.

Surrounding area of ICAR, Lamphal.



Tour Lauching Photo Session

Introduction

Skill Enhancement Course (SEC)is a part of the degree course in national education policy 2020.Simply bookish knowledge or theory is not complete in meeting the challenges of the future. Practicable skills that are promoted for economic ends will serve the purpose of the masses of the degree holders that are graduated from the universities. Really skill enhancement course will help making the nation an economic power and giving self employed jobs to the graduates. With the growing harmful effects of chemical maneors, pesticides and environment consciousness,, vermiculture and vermicomposting is a potential skill development course(Sec) that deals with organic wastes, promoting fertility and productivity of life.

Vermiculture- it is artificial rearing or cultivation of worms.

Vermicompost- it is the excreta of the earthworm which is rich in humus.

EISENIA FETIDA : Features & Life

Eisenia fetida is a species of earthworm, which is widely used for vermicomposting. At 1½" to 2½" inches, it is the smallest of the earthworm species found in the world. These worms are generally raised by farmers and people who are into gardening, who use their compost as a fertilizer.

They are also used by fishermen as a bait for fishing trout, pan fish, etc. Additionally, people who own fish aquariums use these worms as fish food.

Eisenia fetida Facts

Common Name: *Eisenia fetida* is basically the binomial or scientific name of this species. (The term *fetida* means unpleasant or foul smelling, which is derived from the fact that these worms release a foul, pungent liquid when handled roughly.)

They are usually known by common names like redworms, brandling worms, red wiggler worms, tiger worms, manure worms, stink worms, fish worms, dung worms, fecal worms, striped worms, angleworms, bandlings, and so on.

Range and Habitat:

Native to Europe, the species is now found on all the continents of the world; except for Antarctica. They thrive in areas with rotting manure, compost, vegetation, etc. As opposed to other worms, these worms are epigeal in nature, i.e., they are found above the soil or in the top soil.

Anatomy: *Eisenia fetida* has a long, tube-like body, which is typically slimy on the outside. It has a simple closed circulatory system and two main blood vessels. The digestive system is present within the tube.

The anatomy shows the body is formed of segments that are become specialized towards the anterior part. It can be differentiated from other worms by their alternating red and buff stripes.

Reproduction: Like all earthworms, this species is also a hermaphrodite, i.e., a species possessing both male and female reproductive organs. However, they cannot undergo self-fertilization, and therefore, need a mate to reproduce.

When two worms that have reached sexual maturity come together, they undergo copulation. They align themselves side by side, with their heads pointing the opposite direction, and secrete a mucous-like substance that helps them seal their bodies together. Eventually, the exchange of sperms takes place.

The sperms are deposited on their skin surface, from where they move towards a pore, few segments above the clitellum. Then, each individual worm secretes its own eggs, and these eggs get fertilized by the sperm of the other worm. The eggs are formed within little cocoons.

The worm can continue producing such cocoons as long as it does not run out of sperms from its partner. These eggs hatch after an incubation period of about 32 to 72 days and the young ones come out of the cocoons.

Redworms attain sexual maturity within 8 to 10 weeks of their birth. In ideal conditions, the species can produce two to three cocoons per week for 6 to 12 months. Add to it the fact that these worms have an average lifespan of 3 to 4 years, and the rapid rise in their numbers makes perfect sense.

Ideal Temperature: These worms require an optimum temperature of about 68° to 77° F (20° to 25° C). They can tolerate temperatures in the range of 40° to 80° F. However, they undergo severe stress if the temperature of their surrounding reaches 85° F, and die when the temperature reaches 90° F.

Eisenia fetida species the easiest of all earthworm species when it comes to maintenance and thus, are very popular among farmers and gardeners.

Types of Vermicomposting

The amount of production and the structures used for composting determine the different types of vermicomposting.

- **Small-Scale Vermicomposting**: A farmer can collect 5 to 10 tones of vermicompost per year when vermicomposting is on a small scale to suit personal needs.
- **Large-scale vermicomposting**: It is carried out on a commercial scale, producing between 50 and 100 tonnes of organic waste per year.

Methods of Vermicomposting

There are many ways to create vermicompost, but the Bed and Pit procedures are the most popular.

- **Bed Method**: By constructing a bed of organic material measuring 6×2×2 feet, composting is done on the pucca or kachcha floor. This approach is simple to maintain and use.

- **Pit Method**: Composting in pits that are 5×5×3 feet in size and made of cement is the pit method. Thatch grass or any other native materials are used to cover the structure. This method is not favoured since it produces more waste, has poor aeration, and costs more to produce.

Objectives of Vermicomposting

The major objectives of vermicomposting are:

- To compost organic wastes to feed nutrient-deficient soil with high-quality manure as well as to dispose of solid organic wastes.
- A large amount of organic waste produced by agricultural operations, dairy farms, and animal shelters that is typically discarded as waste and emits an unpleasant odour can be used by correctly composting it to create an end product with added value.

Vermicomposting Materials

Animal waste, kitchen garbage, farm waste, and forest litter are all examples of decomposable organic waste that are frequently utilized as composting ingredients. The main raw sources are typically dried chopped crop wastes and animal manure, primarily cow dung. A mixture of both leguminous and non-leguminous crop leftovers improves the vermicompost's quality. There are several species of earthworms, including *Perionyx excavatus* (blue earthworm), *Eisenia foetida* (red earthworm), and *Eudrilus eugenia* (night crawler). Because of its rapid reproduction rate and ability to turn organic matter into vermicompost in about 45 days, red earthworms are recommended. Since it is a surface feeder, vermicompost is created by the top conversion of organic resources.

Process of Vermicomposting

The following describes the full vermicomposting procedure:

Preparation of Vermi Bed

The process of preparation of vermi bed involves the following steps;

- A thin (5 cm) layer of shattered bricks and coarse sand is laid on top of a layer of moist, loamy soil called the vermi bed, which is roughly 15 to 20 cm thick.
- The loamy soil is added with earthworms, which will make it their home there.
- A compost pit measuring around 2 meters by 1 meter preferably by 0.75 meters with a vermi bed layer between 15 and 20 cm thick can accommodate 150 earthworms.
- After that, a few random lumps of fresh cow manure are scattered over the vermi bed.
- After that, dry leaves or, preferably, chopped hay, straw, or agricultural waste biomass are stacked into the compost pit to a depth of about 5 cm.
- The pit is kept wet for the following 30 days by watering it as required.
- The bed should neither be dry nor wet.
- The pit can then be covered with a jute bag to keep the birds away.
- Plastic sheets should not be used on the bed, since they trap heat.
- After the first 30 days, it is covered with moist, pre-digested organic waste of animal and/or plant origin from the kitchen, hotel, hostel, or farm, with a thickness of around 5 cm. Do this twice per week.
- To maintain the pits moist, regular watering should be done.
- If the weather is very dry, it should be examined regularly.
- All organic wastes should be turned over or mixed frequently.

Preparation of Compost Pit

The following steps should be taken for the preparation of the compost pit;

- A compost pit of any practical size can be built in a field, garden, or backyard.
- It could be a single pit, two pits, or a tank made of brick and mortar with the appropriate water outlets in any size (a reasonable size is 2 m by 1 m by 0.75 m).
- To counteract the ant problem, place a water column in the middle of the vermipits' parapet wall.
- The "four chambers" pit will make it simple for earthworms to go continuously from one chamber that has fully composted material to the chamber that contains the pre-processed trash.

Nutrient Content of Vermicompost

The origin of the raw material and the type of earthworm used determine the amount of nutrients in compost. Beyond other nutrients, a fine worm cast is a rich source of N, P, and K. Vermicompost contains nutrients that are immediately available and released one month after application.

Parmeters	Content
pH	6.8
pH	6.8
Organic Carbon %	11.88
Organic Matter %	20.46
C: N ratio	25-30
Total Nitrogen (%)	1.02
Available Nitrogen (%)	0.50
Available Phosphorous (%)	0.30
Available Potassium (%)	0.24
Ca (%)	0.17
Mg (%)	0.06
pH	6.8
Organic Carbon %	11.88
Organic Matter %	20.46

Advantages of Vermicomposting

The principal advantages of vermicomposting are:

1. Aids in plant development, germination, and crop yield.
2. Enhances the soil's physical structure.
3. By using vermicompost, the soil becomes more fertile and water-resistant.
4. Develops the plant's roots.
5. Provides auxins, gibberellic acid, and other plant growth hormones to the soil as fertilizer.
6. Adds essential nutrients to the soil like nitrogen, phosphorus, and potassium.
7. Helps recycle organic waste in a useful manner.
8. Can be done indoors and in small structures allowing year-round availability of compost.

Disadvantages of Vermicomposting

The following are some major disadvantages of vermicomposting:

1. The process of transforming organic waste into useful forms is time-consuming and can take up to six months.

2. Vermicomposting requires a lot of maintenance. The feed must be added regularly, and it is important to watch that the worms are not overfed.
3. They promote the development of diseases and pests like fruit flies, centipedes, and flies.
4. It emits an extremely unpleasant smell.
5. The container for waste shouldn't be either dry or very damp. Periodically, the moisture levels must be checked.
6. Limitation on the amount of waste that can be composted at a time.
7. Hot and cold weather can affect the activity of the worms impacting the rate of composting.

Application of Vermicomposting

Following are some of the most common applications of vermicomposting;

1. The worm castings can be used as an alternative for fish feed.
2. Extracts and fluids from earthworms can be used in therapeutic products.
3. Improvement of the soil quality degraded by chemical fertilizers and pesticides.
4. Used in agricultural studies.
5. Worm cultivation can be used for commercial purposes also.
6. Can be used widely in horticulture settings.

Some photos taken at the vermicomposting centre of ICAR, Lamphelpat, Imphal and during the study tour an interaction session

Vermicompostong and Azolla culture with HOD

Experimental Vermicompostong in some boxes

Straw and cow dung mixture

Vermicompost produce at ICAR Centre

Conclusion

The field study tour was very fruitful helping us the practical aspects and skill development of vermicomposting, sharing related methods, a nd tools.

Knowing the great potentials of earthworms in fertility is really inspiring. Knowledge of the skill should be extended to students of batch for implementation of the skill and protection of the environments.

Such a field study tour at a vermicomposting centre is imperative for the future batch of student.