Biology report

Abune Gorgorios School (Aware branch)

SCHOOL TRIP TO THE ETHIOPIAN BIODIVERSITY INSTITUTE (EBI)



Before visiting the institute we did a research about the history of the place:

-The Ethiopian Biodiversity Institute (EBI) is a government institution responsible for conserving, researching, and promoting the sustainable use of Ethiopia’s biodiversity.

-It was originally founded in 1976 as the Plant Genetic Resources Center and later expanded into the Ethiopian Biodiversity Institute.

- It is an institute that works on local animals, forest and microorganisms with the aim of conserving, utilization and sharing benefits.

- We learned that renowned scientists like Gebissa Ejeta and Melaku Werede contributed to this institution.

During visit

- We took a tour around the institute; our plant pathologist guide Ms Wibanchi led us to the seed preparing room.

In this room we observed three types of seeds; orthodox, intermediate and recalcitrant seeds.

- **Orthodox seeds** are less moisture and have a high life span when conserved in cold weather, Research,

- **Intermediate seeds** are moderately moisture and have 5 years life span before they die if conserved in cold weather.

- **Recalcitrant seeds** are seeds whose moisture can’t be decreased or they will die.

Seeds are collected by farmers.

When preparing seeds, there are certain steps to follow:

1. cleaning and timigating the seeds

2. fortifying with chemicals for a week

3. putting in gene bank

To check the quality, they use:

1. Blower machine- to clear impurity while adjusting pressure.

2. Manually picking big-sized seeds from the small ones.

- Seeds that are used for conservation are homogenous (3200 in number), heterogenous (8000), and small (uncountable, 80 grams)

- Those seeds are divided to 8, three of them being for long term storage, the other three for utilization and the rest two for duplication

- In the drying room where agronomist Dr. Eshetu was our guide, we saw that:

-pulse crops have 10%-15% moisture while oil and cereal crops have 3%-4% and 5%-7% moisture content.

-medium-sized seeds are contained in fabric while small-sized in a container while using the machine.

The reason we dry the seeds is to stop it from respiration which causes energy loss.

-overdrying means when the temperature gets above 180°.

-underdrying means when the temperature gets below 103°.

- In Molecular laboratory where Dr. Alemayew Zewdu was our briefer, we observed:

-The institution does pre-breeding in order to pass it to breeders.

-after breeding, the seeds are selected and evaluated

- The conservation room (storage room) is the room where the seeds are kept after germination test.

-The room is very cold, and has lots of shelves with numbers to store and identify the seeds.

-When some seeds are used in distribution, their amount decreases, so the rest seeds are used for replication.

By the end of the trip we learned:

How Does EBI Breed Genes?

1. Plant Genetic Breeding

- EBI uses different techniques to breed plants with desirable traits such as high yield, drought resistance, and disease resistance.

- Selective Breeding: Farmers and scientists select plants with the best traits and cross them to create improved varieties.

- Hybridization: Two different plant varieties are crossbred to produce a stronger, high-yielding offspring.

- Mutation Breeding: Scientists use radiation or chemicals to create genetic changes and select beneficial mutations.

- Tissue Culture: Used to produce disease-free and fast-growing plant varieties.

Example: EBI has played a key role in preserving and improving Ethiopia’s indigenous crops like teff, enset, and coffee, making them more resistant to climate change and diseases.

2. Animal Genetic Breeding

- EBI also focuses on improving livestock breeds for better productivity and adaptability to Ethiopia’s climate.

- Artificial Selection: Selecting animals with the best traits (e.g., high milk production, disease resistance) for breeding.

- Crossbreeding: Mixing local and foreign breeds to enhance productivity while maintaining adaptability.

- Genetic Preservation: Storing semen and embryos in gene banks for future breeding programs.

- Example: Ethiopian indigenous cattle, such as the Boran and Fogera breeds, are being improved for higher milk and meat production.

3. Microbial Genetics

- EBI studies microbes for use in biofertilizers, disease control, and food production (e.g., fermentation).

- Certain microbes are stored in genetic banks for future applications in medicine and agriculture.

- Mandate: -Conservation

- sustainable use, and

- fair sharing of benefits derived from

biodiversity resources.

1. Overview

Established: Originally founded in 1976 as the Plant Genetic Resources Center and later expanded into the Ethiopian Biodiversity Institute.

Headquarters: Addis Ababa, Ethiopia.

Mandate: Conservation, sustainable use, and fair sharing of benefits derived from biodiversity resources.

2. Main Functions

- Conservation of Biodiversity:
- Maintains gene banks for plant, animal, and microbial genetic resources.
- Protects endangered species and ecosystems.

- Research and Documentation
- Conducts studies on Ethiopia’s diverse plant, animal, and microbial species.
- Publishes research findings on biodiversity conservation.
- Access and Benefit Sharing (ABS):

- Regulates the use of genetic resources and ensures fair sharing of benefits with local communities.
- Public Awareness & Education.
- Promotes sustainable use of biodiversity through training, workshops, and outreach programs.

3. Biodiversity Conservation Approaches

- Ex-situ Conservation: Preserving genetic resources in controlled environments (e.g., gene banks, botanical gardens).

- In-situ Conservation: Protecting species within their natural habitats, such as national parks and protected areas.

4. Importance of EBI

- Ethiopia is one of the world’s biodiversity hotspots, with diverse ecosystems ranging from highland forests to lowland savannas.

- The EBI plays a crucial role in safeguarding indigenous plants (e.g., teff, coffee, and enset) and native animal species.

THANK YOU!

