

FATIMA MATA NATIONAL COLLEGE

AUTONOMOUS

(Reaccredited with 'A' Grade by NAAC)

Affiliated to University of Kerala



2.2.1 Field Study

IQAC INTERNAL QUALITY ASSURANCE CELL

FIELD STUDY

The II MSc Botany students of FMNC undertook a field visit on 10th of March 2022 to Jawaharlal Nehru Tropical Botanical Garden and Research Institute (JNTBGRI) and Ponmudi. The Head of Department of Botany Dr. Nirmala Jayarani and Class in charge Dr. Rubin Jose accompanied the students. The purpose of the visit was to provide the students with hands-on experience in botanical exploration and to deepen their understanding of plant diversity, ecological interactions, and field research techniques.

Jawaharlal Nehru Tropical Botanical Garden and Research Institute formerly called Tropical Botanical Garden and Research Institute renamed to the memory of visionary Prime Minister of India Sree Pandit Jawaharlal Nehru. It is an Autonomous Institute established by the Government of Kerala on 17 November 1979 at Thiruvananthapuram, the capital city of Kerala. The first visit was to the Biotechnology and Bioinformatics Labs and National Gene bank. The sight of the greenery calmed and increased enthusiasm towards nature. There were many conservatories of xerophytes, fruit trees, medicinal plants etc present on either side of the road.



Dr. Abdul Jabbar gave a detailed description about the Gene Bank and its importance. His valuable words taught about the Gene Bank maintained in the institution. His words gave us knowledge about the modern technologies for the protection and conservation of endangered, vulnerable, rare and endemic plant.

He talked about the ways to conserve the plants through Gene Bank and how different plants are conserved in India.

There are three major centers in India for the conservation of plants, Central Institute of Medicinal and Aromatic Plants (CIMAP), Luknow, National Bureau of Plant Genetic Resources (NBPGR), Pusa, New Delhi. and JNTBGRI. Former ones conserve the crop plants while JNTBGRI is concerned with the conservation of medicinal plants. They are usually four components in the conservation like seed, pollen, cryo and field. In accordance to these four components, there are four kinds of preservations, Pollen preservation, Seed preservation, Cryo- preservation and Field preservation. Pollen preservation means the pollen of the plants were preserved which can be make the use for the development of plants. Cryo-preservation uses liquid Nitrogen to preserve the plant of plant parts at -195°C . They can be preserved according to a standardized model for the preservation of the particular plant. In Seed preservation the seed of the plant is preserved in dry atmosphere so that they will stay at the state of dormancy and can be preserved for many years. Field preservation is a kind of preservation is done by planting the endangered and endemic plants in the different conserved fields to protect it from extinction. Thus, are can preserve any endemic, threatened, culturable, endangered plant in this manner. One example: *Janakia arayalpathra*, a rare endemic plant found in the southern forest of Western Ghats regions of Kerala is used by the Kani tribes as effective remedy for peptic cancer like afflictions and as a rejuvenating tonic. This is referred to as Mritha Sanjeevani or Sanjeevani or *Thampea rasayani* in Ayurveda books. Such plant which is present only at certain part and was a very high medicinal values are useful for mankind, should be protected before it is endangered due to the various climatic or human interventions. Once conserved are can used it for production of other medicines without fear of it being extinct. For such preservations, medicinal plants with elite genotype should to chosen. According to the morphological, cytological, ecological and chemical creations of the plants. Example: *Bacopa monneri* is present at different places of Kerala. The active compound is bacopin. Bacopin content in the plant is checked at different places

and the one which has the highest percentage of bacopin for several generations is multiplied while the rest of the accession is conserved.

Acorus calamus the cultivated plant is diploid while the one which is wild is carcinogenic and cannot be used.

The next destination was the biotechnology lab at JNTBGRI, where a brief account of the biotechnical advancements in the field of Botany was given. Later the visit was to the tissue culture lab and molecular biology lab, to understand about the various instruments used in Tissue Culture, DNA extraction etc. It was a good chance to see the plant growth using different Tissue Culture medium and to know more about the culture medium and the usage of charcoal in the culture medium etc.



Then the visit was to the Molecular Biology lab where equipments like the water bath, thermo cycler, PCR, Real time PCR etc. are were explained by the staff the use of each of the instruments in the lab.

Next destination was Ponmudi. Ponmudi peak is a part of the Western Ghats, It is known as the Golden Peak or the Kashmir of Kerala. The normal temperature is less between 18- 25⁰C. Ponmudi hills were situated 2000 meters above the sea level. The lands of Ponmudi are an interspersing of valleys and hills with forest land and plantations. This place is rich in its biodiversity. It is having many bryophytes, gymnosperms and angiosperms. There are many endemic plants present in Ponmudi and the nearby areas, where few plants could be collected. The study trip to JNTBGRI and Ponmudi was very enjoyable and informative. One day studying and observing the plant was more effective than the class room learning about plants. Replete with such lush green valleys, plantations and the chill air surrounding was a relief for minds too.





The field visit provided the II MSc Botany students with a valuable opportunity to connect theoretical knowledge with practical applications. It deepened their appreciation for the complexities of plant life and ecological relationships. The experience also promoted teamwork and critical thinking among the students. The success of the field visit can be attributed to the guidance of the faculty members and the active participation of the students. The knowledge and skills gained during this excursion will undoubtedly contribute to the students' academic growth and passion for botany.

REPORT ON VISIT TO A POLLUTED LOCAL AREA

Ashtamudi Lake: a collapsing Ramsar site

Pollution is any undesirable change in physical, chemical or biological characteristics of air, land, water or soil. Agents that bring about such an undesirable change are called as pollutants. Pollutants can be solid, liquid or gaseous substances present in greater concentration than in natural abundance and are produced due to human activities or due to natural happenings. Pollution currently poses one of the greatest public health and human rights challenges, disproportionately affecting the poor and the vulnerable. Pollution is not just an environmental issue, but affects the health and well-being of entire societies.

Despite the huge impacts on human health and the global economy, and the opportunity to apply simple and affordable solutions, pollution has been undercounted and insufficiently addressed in national policies and international development agendas. Pollution of all kinds can have negative effects on the environment and wildlife and often impacts human health and well-being.

A visit conducted to investigate and assess the pollution in Kollam by the students of 1st MSc Botany (Semester 2) of Fatima Mata National College, Kollam. The destination was Ashtamudi Lake near the KSRTC stand in the heart of the city. The purpose of the visit was to identify the extent and nature of the pollution at the site and propose potential remediation measures.



A gateway to the backwaters, Ashtamudi Lake is the most popular place in Kollam, which is surrounded by lush green trees and swaying coconut palms. This 16 km long lake is the second largest lake in Kerala, which has found its way into the sea through the Neendakara estuary. This place is so beautiful that tourists from different parts of the country and abroad, visit this natural paradise to catch a glimpse of one of many splendours of Ashtamudi. A lot of tourists come here to experience boat ride, which gives a glimpse of village life, natural habitat, and abundant flora. This lake is known for its panoramic beauty and eight channels that connects to one lake. It is because of its eight 'arms' or channels, that the lake is named Ashtamudi.



The Ashtamudi lake has become a victim of urban pollutants as the water body shares a major portion of the Kollam corporation. Studies have revealed that biological oxygen demand in the lake was 9 mg per litre, which is nearly three times the standard set by the Central Pollution Control Board (CPCB) for outdoor bathing. Dissolved oxygen was as low as 1mg per litre -- just one-sixth of the standards. While the Union Ministry of Environment and Forest had sanctioned funds since 2005 for three years, it was spent on unscientific purposes including construction of concrete boundary walls.



Environment activists say wanton reclamation, pollution, and sand-mining have destroyed Ashtamudi Lake. The pollution factor includes hydro-carbon discharge from over 1,000 mechanized fishing boats that operate through vast portions of the lake. The lake has also become a solid waste dumping ground of Kollam city. Restaurants, hospitals, and industrial and commercial establishments discharge solid and liquid waste, including toilet waste, into sewers which find their way into the lake, creating a stink in certain sections. “The hospitals near the lake have no storage tanks for sewage. They also lack proper treatment plants. Sewage including biomedical waste flows into the lake either through canals or by disposing it in tankers,” a source said.

Threats to the lake:

- Oil spillage from motorboats affecting the fish population.
- Lack of proper sewage treatment and runoff from agriculture is causing eutrophication.
- Waste dumping from Kollam town and houseboats is reducing dissolved oxygen.
- Small-scale industries like coconut husk retting contribute to organic pollution.
- The loss of mangrove forests surrounding the lake has destabilized the shoreline.
- Rampant sand mining has taken the fish population of the lake to near extinction as it destroys the spawning grounds of the lake’s fish.
- Huge tracts of the lake had been encroached upon for tourism activities.



“Very pathetic” is how the Kerala State Legal Services Authority’s (KELSA) report to the High Court describes the condition of the lake spread over an area of around 1,700 sq km and surrounded by swaying coconut groves and palm trees and spotted by several small islands.



On August 19, 2022, it has past 20 years since the brackish water Ashtamudi Lake with eight creeks was declared a Ramsar site by designating it as a wetland of international

importance. The lake was recommended by the Ramsar Convention's partner organisations as a wetland of 61.4 sq km. And the lake entered the Ramsar list as site number 1,204. The main purpose of declaring an important wetland as Ramsar site is to enable its conservation through local and national-level action with international cooperation for achieving sustainable development. Even after 10 years, no signboards have been put up on its banks to indicate that it is a Ramsar site. Vast areas of the lake have been reclaimed for so-called development projects and more areas have been earmarked for upcoming projects. The District Tourism Promotion Council employs people to collect plastic from the lake, rather than prevent it using a trap.



In 2007, some earnest efforts were made by the district administration to recover huge tracts of the lake that had been encroached upon. More than 100 hectares of the lake that had been reclaimed through landfill process was identified. However, no steps have been taken to recover such land.

A massive drive has been launched by the Kerala Government to clean and conserve the state's once scenic Ashtamudi Lake which is highly polluted due to dumping of sewage and encroachments.

In the previous budget, Rs 500 crore was allocated in the first phase for rejuvenating water bodies across the state and a portion of this fund was used for cleaning and rejuvenating the Ashtamudi lake facing the risk of permanent damage due to dumping of waste. But still, we cannot visualize any possible improvement in the process.

Necessary steps have to be taken to combat this problem and protect the lake in order to raise it up to the standards of a Ramsar site. I personally wish to see great changes taking place in the form of new initiatives, more rules and regulations so that Ashtamudi Lake can take a breathe of fresh air, regain its beauty and get back to its past glory.