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Seaweed R&D Program of UP-MSI

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Seaweed researches were the earliest activities of the Marine Sciences Center since it started operations in 1975. Farming techniques for *Eucheuma*, *Caulerpa* and *Gracilaria* were being developed by the Marine Botany Group. Microbiological aspects of the "ice-ice" disease of *Eucheuma* was reported by MSC researchers during the 3rd International Seaweed Symposium while the enzyme carrageenase from sea urchins that grazed on farmed *Eucheuma* was reported earlier. The Center held the first Philippine patent on the refined carrageenan extraction process. Because of its efforts and accomplishments in seaweed and invertebrate research, the Philippine Council for Agriculture Resources Research and Development (PCARRD) honored the Center with Tanglaw Recognition Award in 1982.

Upon the transformation of the Center to Marine Science Institute in 1985, more researches on seaweeds as well as other aspects of marine sciences were conducted earning the recognition as: National Center of Excellence in the Marine Sciences by PD 518 (1994), National Center of Excellence for Marine Sciences by CHED (1998-2001)

Goals

The Institute has three main goals corresponding to research, teaching and technology generation functions. An appreciation of the background goals and research philosophy of the Institute allows better understanding of the Seaweed R&D program of the Marine Plants Academic Group:

- to generate information necessary for optimal and sustained utilization, management, and conservation of the marine environment and its resources;
- to provide graduate level training and extension services to develop manpower requirements in the marine sciences; and
- to develop appropriate and environmentally sound marine-based technologies for industrial and economic development.

Seaweed research, extension and teaching thrust

The March 2001 Research Workshop of the Institute defined the medium and long term research thrust of MSI. These are: Marine Ecosystem Research; Restoration Ecology; Biology and Mariculture of Seaweeds and Invertebrates; Marine Bioindustries (e.g. Biotechnology); Oceanography; Marine Biodiversity; and Applied Marine Research and their associated facilities.

In harmony with the general research thrust, the Seaweed Research Extension and Teaching Thrusts were formulated to include six major areas: Taxonomy and Biodiversity; Biology, Physiology and Culture; Environmental Concerns; Chemistry, Natural Products Utilization: Process and Product Engineering; Molecular Genetics; and Algal Biotechnology. Furthermore, formal and informal training on different aspects of Applied Phycology are envisioned to be offered to fill-in the gap of technical manpower and information in the seaweed industry.

Approaches and issues

As agreed upon, major project and programs incorporated the implementation of the approach and issues raised during the workshop such as the multiplier effect, integrative, multidisciplinary, collaborative, wholistic, pioneering, strategic, group effort, innovative, responsive to needs of science and society, and work and professional ethics and courtesy.

Consequently, the approaches and issues mentioned above are reflected in the current projects funded by Department of Agriculture - Bureau of Agricultural Research (DA-BAR). Examples of these projects are: 1) Development of mitigating strategies for seaweed diseases to sustain/enhance production in farms; 2) Development of quality criteria for cultured carrageenophytes based on harvest time; 3) Development of culture and postharvest technology for small-size and /or mucilaginous seaweed species with high value natural products; 4) Assessment of coastal polyculture system to reduce environmental impact and increase production; and 5) Marine biodiversity of East Asia.

It is interesting to note that while in collaborative research, fairness and equality among collaborators are goals to be achieved, while nurturing aspects also are infused to the collaboration with research- challenged research institutions.

Facilities

It is worth mentioning that MSI maintains the G. T. Velasquez Phycological Herbarium that houses a collection of seaweeds and seagrasses from all over the country. The collection consists of 53,000 mounted specimens belonging to 500 genera and 1100 species of marine plants. The availability to access and retrieve the herbarium data are facilitated with an efficient computerized system.

Worth mentioning too is the Seaweed and Invertebrate Information Center (SICEN). With funds from IDRC, the SICEN project endeavored to collect literature on seaweeds and invertebrate researches here and abroad for easier access by interested parties to pertinent articles and information. At present, the SICEN collection is now a part of the MSI Library.

Recently, with funding from UNDP and DOST-PCAMRD, a seaweed gene bank was established and maintained. The gene bank contains 3 *Gracilaria* species for agar production and 15 strains of *Kappaphycus* and *Eucheuma* that are being fanned for carrageenan production. The seaweed branchlet culture is a source of material for micro-propagation and genetic improvement via biotechnology protocols such as protoplast fusion and gene insertion.

The Institute also has the Seaweed Chemistry Laboratories and Pilot Plant building located some 500 m away from the main building. The seaweed chemistry facility is dedicated to applied seaweed chemistry research. Initial funds to establish the laboratory and pilot plant were provided for by the Ministry of Natural Resources.

Linkages

Similar to the Marine Science Institute, the Marine Plants Academic Group maintains also linkages with local, national and international organizations. Group members represent the institute in a number of national and international committees and organizations concerned with macrobenthic marine plants and marine coastal resources. Some of the members are currently part of editorial boards of local and international journals. Incidentally, the group has produced collectively over 200 publications as journal articles, proceedings and extension materials.

Marine Plants Academic Group

The members of the Marine Plants Academic Group are composed of three professors, one research associate professor, one research assistant professor and one professor emeritus:

Rhodora V. Azanza, Ph.D. Botany
Professor
Algal Physiology, Morphology, Seaweed Culture

Edna Ganzon-Fortes, Ph.D. Marine Sciences
Research Associate Professor
Seaweed Taxonomy, Seaweed Culture, Eco-physiology

Miguel D. Fortes, Ph.D. Botany
Professor
Marine Plant Ecology, Restoration Ecology, Resource Inventory

Arturo O. Lluisma*, Ph.D. Biology
Research Assistant Professor
Molecular Genetics, Algal Culture

Marco Nemesio E. Montaña*, Ph.D. Biological Chemistry
Professor
Marine Natural Products, Algal Polysaccharides, Marine Pollution Chemistry

Gavino C. Trono, Jr., Ph.D. Botany
Professor Emeritus
Seaweed Taxonomy, Ecology, Mariculture

** also belongs to Marine Biotechnology Academic Group*

Assisting the members of the group are highly qualified research assistants who are mostly students of the institute and are on apprenticeship in the field of marine plants.

Conclusion

The marine plants academic group of the Marine Science Institute is capable of responding to the research needs of the seaweed industry. It is ready to collaborate with academic and research institutions in facing the challenges in marine plants research both in the national and international scene.