J. Indian bot Soc Vol 80 (2001) 1-4

COMMITMENT OF INDIAN BOTANICAL SOCIETY TO NATIONAL PRIORITIES*

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I am deeply indebited to the members of the Executive Committee of the Indian Botanical Society for the honour they have conferred on me by electing me President for the year 2000 - 2001. I took up this coveted office with great humility, conscious as I am of the stature, sagacity and academic excellence of the past presidents. Indian Botany in general and the Indian Botanical Society in particular owe great deal to those luminaries who strived all their life to lay strong foundation for teaching and research in plant sciences in this country.

Meerut enjoys the distinction of having hosted the first Botanical Conference. Today, it has earned a second distinction for holding the first Botanical Conference of this millennium. Meerut has also the distinction of producing outstanding Botanists whose research contributions have done proud to Indian Botany at the international level. It is indeed a matter of great pleasure to find the most towering among these, popular as the botanist's botanist, Professor V. Puri in the audience. On this occasion we greatly miss Professor Y. S. Murty who nurtured Indian Botanical Society for more than a decade. It is he who conceived the idea of holding Botanical Conference annually.

While inaugurating the First Annual Bo tanical Conference here at Meerut, Dr. M.S. Swaminathan who was then the Director General of I. C. A. R highlighted the importance of plants to humankind. He quoted Professor Panchanan Maheshwari who would often say that, "we live on this planet as guests of green plants". Plants are ubiquitous: they grow in water, on land, in air, oceans, deserts and on snow. Wherever they grow they trap solar energy and convert it into biomars which sustains animal life and humankind.

The end of cold war and establishment of unipolar world have changed global affairs in such a way that plants and animals have assumed much greater importance than they enjoyed ever before. Some of world's pressing problems are biological rather than military. The U. S Central Intelligence Agency, known more as C. I. A, has identified resource depletion as a flashpoint that can cause global conflict. As a consequence, biologists have been saddled with new responsibilities. Never before in history were biologists required to perform the role which they are required to play now.

The big wigs in the community of nations have their eyes on the rich and varied plant wealth of our country. Through various internationally funded projects, the International Bureau of Plant Genetic Resources and other agencies have collected much of our plant germplasm and stacked it in their Botanical Gardens and gene banks. Having done that they initiated the document on General Agreement on Trade and Tariff, popular as GATT, of which patent laws are a part.

After becoming signatories to the agreement, we have started realizing the actual issues involved. So far, all naturally growing plants had been considered a common resource. Following the imposition of GATT we shall be required to pay heavily for any information that western scientists may generate even on plants which are endemic to India.

There have been many cases of biopiracy. Patents have been granted wrongly on neem, piper, Tylophora, turmeric, basmati and a horde of other plants in total disregard of the hundreds of years of our indigenous knowledge of their use. About 100 plants used in ayurveda have been patented abroad. Eighty patents have been granted on products of neem alone. Filing and fighting suits in U. S courts against such illegal patents is time taking, expensive and highly demanding. The suit against U. S patent on turmeric was decided in our favour after we produced 32 books and documents, published from time to time, in support of our claim. Can

*Presidential address delivered during the 23rd All India Botanical Conference hold at C.C.S. University, Meerut.

we fight all cases of biopiracy with the same strength? It is unlikely, mainly for want of documentary evidence or faulty identification of the source plants.

Instances of faulty identification are galore in ayurveda and other Indian systems of medicine. The example of Indian *Phyllanthus niruri,* a much used medicinal plant in ayurveda and unani medicine, should serve as an eye opener about this morass. *Phyllanthus niruri* was recognized as species by Linnaeus on the material referred to him by Phillip Miller from Barbados. The confusion of Indian material arose when Linnaeus included the material collected from India by Plukenet in *P. niruri.* After many years it emerged that the material referred by Plukenet is in fact *P. amarus* assigned wrongly to *P. niruri* by none other than the father of taxonomy himself. Unfortunately, this taxonomic confusion does not only persist, but it has been compounded with the use of other names for the same species in different parts of the country.

Should any pharmaceutical house obtain a patent on any product of the Indian material *of "P. niruri",* it will not be easy to fight it. If we do not fight, or if we fight and lose, it will be great loss to the country. Incase, the U.S patent granted to basmati goes unchallenged our export worth 12 billion rupees will come to a naught. In India we were biased against patenting. What is the result? Out of 45,000 known species of herbal plants, as many as 16,000 are mentioned in ayurveda, and therefore were known in this country for ages. Yet, only a handful of patents are with Indians in India; 45% of the herbal patents are with the Chinese, and 20% with the Japanese. Our attitude has changed, but only after causing sufficient damage to the country. Today, we realize that bio-dynamic molecules are gold mines. And incase, we are able to locate only 10 such molecules from our immense biowealth, some 100 billion dollars will be in our kitty in no time.

The tragedy is that some of this hurt has been caused by our own country men for pecuniary or other material benefits. The patent granted to an American Company for marketing a health food having hepatoprotective property has the involvement of a Non-resident Indian with C.S.I.R. connections. The drug is made from roots of *Picrorrhiza kurrooa* that is found only in northwestern Himalaya. The patent has been granted in total disregard of the fact that RRL, Jammu had already made Picroline which is quite effective in curing liver diseases including hepatitis.

The intricacies of GATT and IPR have started unfolding. Recently, the French Customs Office seized a Valentine Day Consignment of 41,000 roses from Bangalore. This has shaken the Indian cut flower industry that had started offering challenge to traditional flower growing countries, namely Holland, France and Germany. Seizure of the rose consignment was essentially a fall out of the stiff competition in trade. On the Valentine's Day roses from India would have certainly had the price advantage, directly cutting into the profits of French Companies. By terming the rose consignment from Bangalore 'fake' the French have conveyed the message loud and clear. Their message is for royalty on the planting material supplied to India.

The story of seed of ornamentals including rose is by itself interesting. Intensive floriculture has ruined the land of European countries, rendering it almost unfit for cultivation. Two pesticide sprays every week and more than 47 tones of chemical fertilizers and 108 tones of manure per hectare added to flower beds have led to severe environmental pollution and contamination of ground water in those countries, resulting in health hazards. Knowing that countires like India are in desperate need of foreign investment, the flower industry was very conveniently translocated offshore. The European countries had wanted the Indian Flower industry to infiltrate the secondary flower market. But, once Indian flowers became a threat to Europe's indigenous flower industry, patent violations are being involved to deny access to its lucrative markets.

So far, 47,000 plant species have been identified ftom India; a sizeable number of these (about 4,000) do not grow any where else in the world. These species have come to light following exploration of 70% of the country's total area. That, only 30% area remains to be explored may give an impression that most part of the task of inventorising country's plant wealth is complete, but this is far from the truth. The left over area includes oceans, islands and Himalaya which though rugged and hazardous host very rich endemic flora. Therefore, exploration of this area is likely to yield rich dividends like recent discovery of *Trichopus zeylanicus* by

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Pushpangadan* and his associates of Tropical Botanical Research Institute (TBGRI), Kerala. We must also remember that some areas visited once have not been revisited. Population studies have not been undertaken. Genetic diversity has not been assessed even in the economically important species, not even for taxa which are at the verge of extinction. Who knows as we explore the left over area we may hit upon a jackpot.

The country's data base in respect of flowering plants is richer though incomplete. The data base of other plant groups, algae - gymnosperms is extremely poor. It is poorest for microbes. Who will fill these gaps and take care of the grey areas? Taxonomists have abandoned taxonomy saying it is laborious, less paying and least respected. Others dub taxonomy as a superficial subject of little relevance to urgent needs of modern man. Can we take this view now when biodiversity has all of a sudden become big business? No other branch of biology is as relevant to biological diversity as is taxonomy. "Without taxonomy to give shape to the bricks and systematics to tell us how to put them together, the house of biological sciences is a meaningless jungle".

But where are the taxonomists to take up the challenge of protecting our national wealth? The total number of actively practicing plant taxonomists in the country today is not more than 300. Is this number sufficient to take care of the variability of nearly 50,000 known and many more hitherto unknown species of the country ? Nearly, 75% of these taxonomists deal only with flowering plants. Rest of the plant groups, from algae - gymnosperms, are taken care of by just 75 specialists. For such large group as thallophyta including algae and fungi, the number of experts available in the country is 40. Embryophyte taxonomists number 32. For the important group of gymnosperms, the country has a single taxonomist. Age distribution of taxonomists is heavily skewed to older ages. Most of the taxonomists referred above are either superannuated or are nearing superannuation. The subject has unfortunately been attracting few bright teachers and fewer bright students. The future of taxonomy is bleak and therefore the security of biodiversity is questionable.

While emphasizing the need for more taxonomic studies it is necessary to point out the need for change in the attitude and approach of the taxonomists. "Taxonomy does not have to be more of the same, time worn, mutton-dressed as lamb, old wine in new bottles, but it has to be oriented towards society at large, to fulfill our responsibilities as true guardians of biological diversity".

Many disputes of species identification get resolved by reference to their chromosome count. The identification of Indian *Phyllanthus niruri* can be verified by its chromosome count; *P. niruri* is diploid and *P. amorus* a tetraploid. Despite lot of work done on cytology in the country during 1960's and 70's, chromosome numbers are known only for 45% of flowering plants. Other plants, from algae - gymnosperms have not even been scratched from the surface. The work undertaken on Indian angiosperms has changed many concepts in cytology, such as presence of B chromosomes in trees and lower vascular plants, relationship between polyploidy and altitude, infrequency of polyploidy in trees and fungi, existence of terminal and polytene chromosomes in plants etc. More work on Indian plants is required not only for academic reasons but also for biodiversity inventorisation.

Where are the cytologists who can fill this gap? Just as most taxonomist have run away from taxonomy, so have cytologists from cytology in favour of greener pastures in Molecular Biology and Biotechnology.

While the country's flora and fauna are yet to be explored fully, many species are getting sacrificed at the altar of development. The Red Data Book of Indian Plants lists 1,500 flowering plant taxa which are declared rare or endangered. The compilation is a praise - worthy document. Yet, it calls for periodic revision, because:

(i) the present document does not reflect threat perception to plants region - wise;

(ii) the extent of threat to a species changes with time and circumstances;

(iii) some additions may have become necessary;

(iv) similar studies are required on other plant groups.

As more than one - half of all prescription drugs are modeled on natural compounds and one - fourth are made directly from plants or chemically modified plant substances, widespread extinction of plant species would drastically affect medical science. Except for a few bright exceptions here and there, the Indian botanists have, by and large, shown indifference to this national catastrophe. Whatever little achievement has been made by the conscientious few has not been made use of by the development agencies of the State to restock natural habitats. Therefore, erosion continues unabated.

It is the duty of all those who profess love for the green gold to own one or more plants declared threatened and find ways to rehabilitate them. If University and College Botany Departments join hands in this mission, it should be possible to resurrect even critically endangered plants. The Indian Botanical Society must provide the lead.

But, at this juncture, when the nation requires services of its botanists, botanists are deserting botany, botany departments are being rechristened and botanists are disguising themselves in other hues. Botanists find no glamour in Botany. In search of glamour many have landed in fields of low national priority. Others have turned to specializations considered exalted but for which they are not trained. They forget that "an excellent plumber is infinitely more admirable than an incompetent philosopher. Those, who scorn plumbing because plumbing is a humble activity and tolerate shoddiness in philosophy because it is an exalted activity neither do good plumbing nor good philosophy".

In the prevailing situation, all botanists, particularly members of the Indian Botanical Society have the responsibility to,

(i) keep abreast with and appreciate national priorities;

(ii) dedicate themselves to the task of finding appropriate R and D strategies to realize national goals, and

iii) persuade concerned agencies of the State to adopt and implement the strategies they evolve for national reconstruction.

If members of this premier society fail to discharge this bounden duty, we should blame no one but ourselves for the consequences. If we fail the country what can it do. "When the salt looseth its savour, wherefrom shall we get the salt". "It is our tradition to have bells at the entrance of temples to awaken the deity within." Let the members of this Society, tie a huge knowledge bell & ring it to awaken the potential with in them to work for what Dr. Mashelkar calls "innovation untred India."