First eleven Swarnajayanti fellowships awarded

The Government of India, on the occasion of the 50th anniversary of our independence, launched the 'Swarnajayanti Fellowships' scheme to attract young talent and enable young scientists to pursue and set world-class standards in basic scientific research.

The Swarnajayanti Fellowships are open to Indian scientists in the age group of 30–40 years with 'proven track record for outstanding research work exploring new frontiers in their field of expertise'. The fellowship includes, in addition to an attractive fellowship amount of Rs 25,000 per month, a research grant for equipment, supplies and consumables (in the neighbourhood of a crore of rupees), travel (including international travel) and any other special requirements. The selected fellow may remain one for up to 5 years, and is entitled to port the fellowship to any institution of his or her choice.

To attract the best candidates, the Swarnajayanti Fellowships have been widely advertized within the country and abroad. The 3-tier system for selection of candidates for the fellowships includes sub-committees in six subject disciplines, a National Expert Committee, and an apex Empowered Committee of Secretaries under the Chairmanship of Secretary, Department of Science & Technology. The rigorous selection process involves initial screening by the sub-committees, followed by technical presentations in the sub-committees as well as to the National Expert Committee.

The 1998 awardees of the first eleven Swarnajayanti Fellowships are: S. Bhattacharya and A. Choksi (Indian Institute of Science, Bangalore); P. P. Chakrabarti (IIT, Kharagpur); D. V. Khakhar (IIT, Mumbai); T. P. Radhakrishnan (University of Hyderabad); Monit Randeria and V. Srinivas (Tata Institute of Fundamental Research, Mumbai); Madan Rao (Institute of Mathematical Sciences, Chennai); V. K. Singh (IIT, Kanpur); Subroto Sinha (AIIMS, Delhi); and Jayant Udgaonkar (National Centre for Biological Sciences & TIFR, Bangalore campus).

OPINION

Regulating export of endangered medicinal plant species – Need for scientific rigour

D. K. Ved, Anjana Mudappa and Darshan Shankar

India is home to a variety of traditional medicine systems that support many of the health care needs of this country's nearly one billion people. These traditional systems rely, to a very large extent, on native plant species for obtaining their raw drug materials. The Indian Herbal Drug Industry is estimated to have a turnover of around Rs 2300 crores and is projected to reach Rs 4000 crores by the turn of the century. It is also involved in limited exports of finished products, intermediates and bulk raw materials. More than 90% of the plant species used by the industry are, however, collected from the wild and more than 70% of these plant drugs involve destructive harvesting (see Figure 1).

It is unfortunate that while the demand for plant materials is huge and growing, many of the plant resources are dwindling and threatening both health care practices and local livelihoods. Consumption and commercial trade of wild plants and their parts/products is not detrimental in itself, but poses a major problem if the demand exceeds supply and if it involves over-exploitation. The user groups at various levels are now conscious of the decline and non-availability and factors like short supply, high prices and a forced substitution of certain species, signaling that medicinal plants are getting endangered in the wild.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), already ratified by over 130 countries, regulates the international trade in species threatened with extinction. The three appendices to the Convention list the species for which these regulations currently apply. At present eleven of the Indian medicinal plants are included in the appendices of CITES, wherein only one namely *Saussurea lappa* (= *S. costus*) is included in Appendix I, while Appendix II includes ten Indian Medicinal Plants which are *Aquilaria malaccensis, Dioscorea deltoidea, Rauvolfia serpentina, Cibotium barometz, Podophyllum hexandrum, Pterocarpus santalinus, Saussurea costus, Nardostachys grandiflora, Picrorhiza kurrooa* and *Taxus wallichiana*.

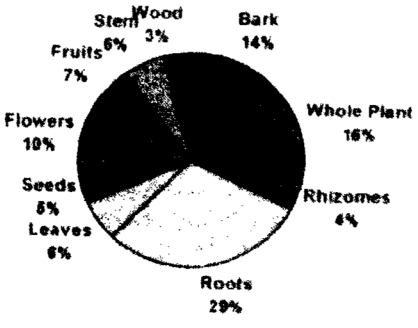

Figure 1. Medicinal plants – breakup by parts used.

Professional norms suggest that each of the species to be banned should be evaluated on several parameters including its habit/life form, habitat availability, the part/s being harvested (leaf, flower, fruit, root, bark, etc.) with special concern for those involving destructive harvesting for trade and the ease in propagation. The volume of domestic and export trade, population sizes, the range of distribution as well as the distribution pattern within the range should also be considered. Experience has shown that the issues of livelihood implications for the collectors belonging to local communities have also to be taken into account. Finally a systematic threat status assessment is arrived at by following a rigorous procedure with consideration of a set of standard criteria.

In the national context in 1994 vide public notice 47 (PN)/92–97 dated 30 March 1994, the Ministry of Commerce, Govt of India, on the recommendations of the Ministry of Environment and Forests, banned around 56 medicinal plant entities for export. This was the first official step taken by the GOI to regulate trade in endangered medicinal plant species. The move has been welcomed 'in principle' by conservation circles and is a landmark in conservation policy. Whereas there can be no doubt that trade in endangered species must be regulated by government and those species which are critically endangered, on account of perceived threat of extinction, should be banned before they become extinct, in practice such decisions should involve a rigorous appraisal on norms indicated above of each species intended to be regulated. The 1994 Public Notice unfortunately seems to have been based on insufficient homework and consequently till the end of 1997, it has remained unimplementable and there are worrying indications that much of the current trade is either unsustainable and/or illegal!

Industries that were affected by the ban, expectedly, protested and have thus far been successful in evading the ban, because of the lacunae in the order of 1994. From their own positions, however, it seems that although the government decision was based on incomplete data, the industry, on its part, does not appear to be showing due concern for the need for conservation and sustainable utilization of medicinal plant resources from their natural habitats. No industry has started investing in agrotechnology or cultivation/plantation of medicinal plants on a substantial scale in collaboration with the forest or farming communities; large-scale cultivation projects will help to even out the supply, regularize trade, ensure and provide certifiable products of uniform quality. They seem to be motivated only by the immediate and short term economic gains at the cost of Nature!

In recent times there is also a conflict of interest developing between different segments of commercial users involved in export, viz. manufacturers of finished products, manufacturers and exporters of herbal extracts which are used as intermediates for finished products and exporters of bulk raw materials. Manufacturers of finished goods claim they are engaged in 'real' value addition and use proportionate to their volume of export a smaller percentage of raw materials whereas they complain that those engaged in trading semi-processed or unprocessed material obtain a poor value addition on the large volumes they export.

It is regrettable to comment on the state of policy making that, even today there is no comprehensive data available with policy makers in government or user industry on

- a complete check list of plant species in trade,
- the volumes of specific species that are consumed every year by commercial, semi-commercial and non-commercial users,
- the natural distribution, conservation biology and threat status of species in trade,
- the agrotechnology of species in high consumption (it is known that out of an estimated 700 medicinal plant species that are consumed by the industry and traded all over India, less than 70 species are cultivated and the rest are collected from the wild).

Ideally the threat status of a particular species is best evaluated by a first hand study of the populations across its entire range of distribution. In an entire group of species like 'medicinal plants' of India, one may certainly not have access to field data on the populations of each species, across its entire distribution range. When the BSI published three volumes of the *Red Data Book of Indian Plants*, enlisting more than 600 taxa, in three volumes during 1987 to 1990, each taxon was classified into one of the five Red Data Categories in vogue at that time, namely 'extinct', 'endangered', 'vulnerable', 'rare' and 'indeterminate'. These classifications were, however, based entirely on the study and analysis of voucher specimens housed in different herbaria. IUCN has, since, revised the Red List categories in 1994 and assigned revised definition to each category based on a number of quantified criteria like extent of occurrence/area of occupancy, population reduction over 10 years /3 generations, limited number of individuals existing/surviving in the wild, etc.

In the light of limited information available with authorities and the urgency for administrative action to conserve threatened species, the Conservation Assessment and Management Plan (CAMP) exercises designed and developed by Conservation Breeding Specialist Group (CBSG) of IUCN, seem to offer the best practical way of carrying out rapid 'threat status assessment' of each prioritized taxon.

In a CAMP exercise, firstly, the assessment is done on the basis of explicit and quantified parameters like extent of occurrence/area of occupancy, population reduction, estimated mature individuals in the population, etc. Secondly, the recording of assessments on each of these parameters is based on collective inputs of several experts who are field taxonomists, foresters, conservationists and representatives of user groups. Finally, in keeping with the urgency for initiation of conservation action, this process helps in quickly generating a checklist of threatened taxa with standard gradation of their 'threat status'. It must, however, be clarified that the outcomes of such a CAMP process, are only as reliable as the quality of the data that is fed into the process and in the absence of reliable data, the process becomes as dysfunctional a tool as would indeed be the case with any other tool in the absence of necessary operating materials. The finest chisel when put to test does need fine wood

for it to perform its task and prove its worth!

The CAMP exercise if suitably carried out, can be an improvement over an assessment that relies upon herbarium records as the only source of information (as was the case with the red data books brought out in the past). The CAMP process appears to provide the best available tool and framework for a rapid assessment of the threat status for guiding urgent conservation action. CAMPs are dynamic and are 'live' documents that will be continually undergoing refinements with time, as global and regional priorities shift. It is forescen that the CAMP is expected to undergo improvements in terms of the detailed process in future. FRLHT's experience in the CAMPs conducted so far have led to the modification of the original CAMP procedure suggested by the IUCN and has incorporated the system of prioritization prior to embarking on a CAMP and the introduction of assessments at regional levels; wherever the taxon is distributed outside the area of assessment also.

An ideal CAMP should be preceded by shortlisting a set of taxa prioritized for conservation assessment. Below are given some of the criteria for prioritization of medicinal plant taxa.

1. Endemicity (as reported in published studies).
2. Taxa already red listed as per *Red Data Book of Indian Plants* (largely based on assessment of herbarium records).
3. Taxa used in high quantities by herbal industries (as per limited data available from major herbal industries and trade agencies).
4. Taxa which are reported to be in short supply by the traders/consumers and those commanding abnormally high price in the market indicating scarcity of the resource.

It should be evident from the earlier mentioned description of the process that the quality of a CAMP could be seriously flawed if

- a preliminary prioritization exercise is not conducted to shortlist species for assessment, based on previously known, published and recorded data and / or
- the participating experts contributing to the assessment through the CAMP process, have not done sufficient fieldwork in the region for which the assessment is undertaken.

It may be worthwhile to mention that the CAMP process does provide for assignment of a 'Data deficient' category if the available information is insufficient for a reasonably accurate assessment of threat status.

The analysis of data relating to the plant entities included in the 1994 negative list indicates that the kind of careful and detailed appraisal required for inclusion in a negative list of exports was perhaps not undertaken.

Table 1. Sample analysis of data relating to plant entities

Plant entities	Sl.No. in 47 (PN)	Remarks
Aristolochia spp.	3	Listing is at **genus level** and is insufficient as, many **species** of this **genus** are found distributed across India. Some of these **species could** be threatened. There is a need to identify each plant taxon at least at **species level** to avoid any ambiguity.
Drosera spp.	12	
Artemisia spp.	28	
Acorus spp.	27	Listing at **genus level** is inadequate. The species *Acorus calamus* is used in Indian Systems of medicine and occurs across a very wide range of climatic zones almost all over the Northern hemisphere along moist and marshy localities – micro habitat specific. It is also reportedly under cultivation in many pockets. Such species need not be included in the 'Ban list'.
Costus speciosus	30	It is a herb occurring in the moist and wet evergreen areas of the Indo-Malayan region and Srilanka. Within India it occurs from Central and Eastern Himalayas to Southern India. Assessment of threat status, at global level, will require data on the required parameters from all over the region of its occurrence.
Hydnocarpus spp.	35	It is incommensurable to do listing at **genus level** as a few **species** of this **genus** are endemic to Western Ghats while others are of North Eastern region of India. The threat status needs to be assessed for each of these species, in respect of the region of its occurrence, before deciding their inclusion in the negative list.

A sample of this analysis is given in Table 1.

Some glaring examples of medicinal plant species which are not included in the 1994 public notice and which need to be considered for inclusion in the negative list of exports are given below:

i) *Dysoxylum malabaricum* – a tree species endemic to Western Ghats (India) and assigned the threat status 'endangered' (Ref. CAMP Workshop II, 1996).

ii) *Decalepis hamiltonii* – a woody climber endemic to peninsular India, with high volume of domestic trade of its roots (involving destructive harvesting) and assigned the threat status 'endangered' (Ref. CAMP Workshop III, 1997). It is a monotypic species of

genus *Decalepis* and is, therefore, of higher conservation concern.

iii) *Myristica malabarica* – a tree species endemic to Western Ghats (India). Fruits and arils being traded mixed with *Myristica fragrans* (cultivated). It has been assigned threat status 'vulnerable'. (Ref. CAMP Workshop I, 1995).

iv) *Nilgirianthus ciliatus* – a shrubby species of Western Ghats, which is used in large quantities by the traditional medicine industry. It has been assigned the threat status 'endangered' (Ref. CAMP Workshop II, 1996). The genus is endemic to Western Ghats.

MoEF in 1997, set up an expert committee to review the 1994 ban notice. This committee has suggested a more rational and comprehensive framework for drawing up negative lists of plants for regulating their trade. The committee has recommended the preparation of negative lists at four levels – the first level is to enlist plants for immediate ban, while, the listings for levels 2, 3 and 4 will involve staggering the ban on other threatened plant species over different periods of time, depending on various criteria discussed mentioned above, in order to allow the industry sufficient time to initiate cultivation/plantation of these plants and thus develop alternative sources of supply for their use. These four levels of negative lists may operate in a 7–8 years time frame. The committee further recommended that such negative lists need to be made applicable not only for exports but also for regulating domestic trade because the volume of domestic trade in respect of most of these threatened plant species is higher than their export trade and it makes little sense to ban export of a critically-endangered species while permitting its unregulated consumption through domestic trade.

Conclusion

Government regulation on wild collections of endangered species is necessary and inevitable given the loss and degradation of natural habitats and overharvesting of some of these species. A reasonable degree of scientific rigour is needed to assess the threat status of species to be banned and evaluation must be done on several parameters. If government has to perform its governance role effectively, it has to take the task of scientific evaluation more seriously and not merely take populist decisions to show its concern. Regulating trade in natural products harvested from the wild, is a serious business. Government needs to immediately take steps to collect from licensed Industry and Trade (by threatening to revoke licenses if necessary) reliable information on current and projected consumption of medicinal plants. The conservation status of all species in trade and the conservation biology of threatened species should also be studied.

Banning trade needs transparent guidelines and scientific inputs in order to take balanced administrative decisions. Where species are not on the verge of extinction and consumption level is high and plant parts used do not involve destruction, i.e. leaf, flower, fruit, etc., a reasonable time can be given to industry to develop cultivation strategies. In the absence of a rigorous and balanced approach to regulations, the conservation movement will earn a bad name and be accused of merely crying 'wolf' and industry will continue to make merry with its irresponsible plundering of nature.

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Animal experiments and biomedical advance

V. Ramalingaswami

The reported move of the 17-member Committee, the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), to bring about wide-ranging rules and regulations on the use of animals for research as reported in *Express Pharma Pulse*, 2 July 1998 is fraught with serious consequences to the progress of biomedical research in India. I am appalled that the heads of research agencies concerned with biomedical research are shown as members of the Committee. Are they also signatories to the proposed rules? Apparently, the CPCSEA draws its authority from Section 15 of the Prevention of Cruelty to Animals Act, 1960. If the rules proposed by the CPCSEA are brought to Gazettee notification, research into new vaccines and new drugs, leave alone research into a better understanding of physiological processes in the human body, cannot advance in Indian laboratories. As I had written elsewhere, India is now well poised for major advances in new drug development and new vaccine discovery, on account of the high level of relevant scientific capabilities and the growing interest in this regard in Indian industry. It will be a great pity if new drug and vaccine development is impeded at this juncture on account of the proposed rules.

Research is the only way to win the fight against diseases still on the ascendancy, viz. the emerging and the re-emerging infectious diseases, heart diseases, strokes and cancer. Just now, as I write this note, a report has appeared in the *New Scientist*, 20 June 1998 that most recent animal experiments demonstrated that a new protein may speed the recovery of patients with strokes. According to this report, all the rats that received the protein recovered 'far faster' than those in the control group. The report goes on to say 'it may be