

Should plant breeders be denied of genetic resources from protected areas?

Cultivated plants have evolved from their close wild relatives through thousands of years of evolution and selection. Crop wild relatives (CWRs) are taxa closely related to crop plants and form an important source for incorporation of useful traits like biotic and abiotic stress tolerance, which are critical for food and nutritional security and environmental sustainability^{1,2}. Over 167 crops and about 320 high priority CWRs are believed to have originated in India³, which has been designated as the Hindustani Centre of Origin and Diversity by Vavilov⁴. India is the primary centre of origin of rice, sugarcane, green gram, black gram, jute, mango, citrus, banana, jackfruit, snake gourd, yams, taro, turmeric, ginger, cardamom, black pepper, etc.

The ICAR-National Bureau of Plant Genetic Resources (ICAR-NBPGR) is the Government of India designated nodal institute for *ex situ* conservation of plant genetic resources (PGRs). The germplasm entering the National Gene Bank (NGB) of ICAR-NBPGR is multiplied, studied, conserved and maintained for supply to bonafide users under Material Transfer Agreement (MTA). Plant breeders look forward to CWRs for widening the genetic base of crops and to incorporate useful traits. Whereas CWRs of majority of annual crops are usually found in disturbed habitats and field borders, those of many perennial horticultural crops like fruit trees, spices, etc., are generally found inside the forests. Germplasm collection from the forests for utilization and conservation is of utmost importance for sustained crop improvement. In this context, a large part under protected areas is yet to be explored for germplasm of potential use, especially that of rare, endangered and threatened (RET) species. Some species are not even represented for namesake in the NGB, and many remote forest pockets like the Little Nicobar are yet to be surveyed for enumeration of agriculturally important plant species. Only through meticulous plant expeditions, meaningful germplasm collection is possible, which along with vital information on habitat ecology and floral biology, breeding be-

haviour and seed storage physiology of the target species will help in devising a viable conservation protocol.

The passive conservation attitude of the Forest Departments, preventing access to PGRs, is something like a barbed wire approach that restricts utilization of CWR germplasm in crop breeding. Obtaining permission for collection is a cumbersome process and even if permission is granted in a few cases, it often materializes after the intended phenological phase of the plant, which will be of little use for the researcher. Undescribed species will remain so; not even the biology, breeding behaviour and ecology of less known species can be worked out to devise a meaningful conservation strategy for them. Studies on forest plant ecology and conservation, including floristics are mainly done by researchers from outside the Forest Department like BSI, CSIR, ICAR, ICFRE and universities, including agricultural universities. It is only the researchers who describe new species from the forests, advise the foresters about invasive alien species and threat status of the species. A major question therefore arises: should researchers be denied of the valuable PGRs for crop improvement, blindly in the name of conservation? *The Gazette of India: Extraordinary* [PART II-SEC. 3(i); Dt. Nov. 21, 2014, p. 15–16] under para ‘a’ and ‘d’ stipulates that ‘Indian citizens or entities accessing biological resources and/or associated knowledge, occurring in or obtained from India, for the purposes of research or bio-survey and bio-utilization for research in India’ and ‘accessing of biological resources for conventional breeding or traditional practices in use in any agriculture, horticulture, poultry, dairy farming, animal husbandry or bee keeping, in India’ are exempted from approval of National Biodiversity Authority (NBA) or State Biodiversity Board (SBB) (F. No. NBA/Tech/2/11). This indicates that Government guidelines are conducive in acquiring germplasm for bonafide uses, including those from protected areas.

Conservation of PGRs has to be complementary, as *in situ* conservation alone may not be a safe approach. The main

aim of protected areas in the country is to protect wildlife; hence, only passive conservation of flora without their routine management or monitoring exists. Without proper monitoring, there is a threat of species becoming threatened or their population declining due to genetic drift, inbreeding, spread of invasive alien species, changing climate, habitat loss, pest incidence, etc. In nature, majority of the plant species produce abundant seeds, but due to various reasons more than 99% of these seeds do not establish as plants. Hence there is no reason for not permitting non-destructive collection of a small sample for a scientific cause, which will also enhance the knowledge base of the Conservators of Forests. Do we need to be so stringent to prevent access of researchers to protected areas? The decision makers at the Forest Department need to be sensitive to the requirements of the scientific community, and their efforts to collect and conserve valuable PGRs to ensure food and nutritional security of the country. Bonafide research institutes need to be given blanket permission for unrestricted access to PGRs from the protected areas in India.

1. Prescott-Allen, R. and Prescott-Allen, C., *Genes from the Wild: Using Wild Genetic Resources for Food and Raw Materials*, Earthscan Publications, London, UK, 1988.
2. Hoyt, E., *Conserving the Wild Relatives of Crops*, IBPGR/TUCN/WWF, Rome, Italy, 1988.
3. Arora, R. K. and Nayar, E. R., *Wild Relatives of Crop Plants in India*, NBPGR Scientific Monograph 7, National Bureau of Plant Genetic Resources, New Delhi, 1984.
4. Vavilov, N., *Tr. Prikl. Bot. Genet. Sel.*, 1926, **16**, 1–248.

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