6

Conservation practices and awareness activities

6.1 Introduction

CBD (1993) after coming into force has put a major impact world-wide for effective conservation of biodiversity, and put mechanisms to be implemented for both *in-situ* and *ex-situ* conservation (Wyse and Sutherland, 2000). Various forms of *ex-situ* conservation are needed to supplement the *in-situ* action, such as conservation collections in arboreta and botanic gardens, properly sampled accessions in seed banks, clone banks, field trials and seed production areas (Palmberg-Lerche, 2002). *In-situ* conservation thus covers a wide range of different activities and goals. Integrated conservation was proposed by Richardson (1992) as a term that covered both *ex-situ* and *in-situ* conservation on the basis that both were part of a spectrum of techniques rather than mutually exclusive methods.

6.2 Observations and discussion

The *ex-situ* conservation of endemic and threatened plants was done at the Arboretum of The Maharaja Sayajirao University of Baroda, Vadodara.

Figure 282: Saplings of endemic and threatened species

Figure 283: Saplings of *Sterculia guttata*

Figure 284: *Hardwickia binnata* conserved at the arboretum

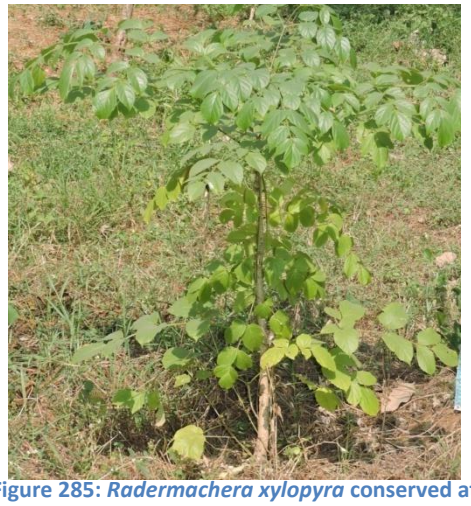

Figure 285: *Radermachera xylopyra* conserved at the arboretum

Figure 286: Seeds of *Tephrosia jamnagarensis*

Figure 287: *Tephrosia jamnagarensis* conserved at the arboretum

Figure 288: *Dolichandrone falcata* conserved at the arboretum

Entada rheedii is best propagated from seeds. The biggest challenge is the removal of seed coat. Though, sand paper can be used but for more tough situations, the embryo can be exposed by hammering a crack or hole in the seeds until the embryo is visible. Treated seeds were soaked in water for 24 hours until they showed swelling. Seeds were sown at least 50mm below the soil, with the exposed part facing upwards. After sowing the seeds, they were covered with polythene to create a humid environment. Watering was done when the soil becomes slightly dry, mostly every alternate day. Seeds showed germination in 3 to 4 weeks. While transplanting special attention was given to keep roots wet to prevent any damage.

Collection of *Entada* pods

Acid treatment of seeds for germination

Seed germinated

Seedling developed

Sa

Bombax insigne

Cansjera rheedii

Dactyliandra welwitschii

Indigofera caerulea **var.** *caerulea*

Indigoferacaerulea **var.** *monosperma*

Sterculia guttata

Talinum portulaecifolium

Tephrosia collina

Ceropegia odorata and *Flemingia tuberosa*were propagated by means of itsunderground tubers. The potted tuberswere watered sparingly, until new roots established, which took around six to eight weeks. When the young plantswere established and growing well, the tubers were then transferred gradually into the soil.

Figure 289: Tubers of *Flemingia tuberosa*

6.3 Awareness on endemic and threatened plants of Gujarat

To create an awareness regarding endemic and threatened species among local people and tribals, the local workshops were organized at botanic gardens and gram panchayat offices and also at some temples in the villages. Booklets and posters were prepared which contained coloured images of the plants, information on its phenology, and vernacular names.

Figure 290: A. Inauguration session, B. Techincal session, C. Refreshments, D. Filling of Taxon sheets, E. Renumeration awarded to local experts, F. Group Photograph

Local workshops were conducted under guidance of experts, with an aim to create awareness on endemic and threatened species, alsowhatever additional information was obtained was taken into consideration for ground truth survey and then documented.

Figure 291: Posters prepared for awareness

Figure 292: Distribution of certificates for plantation of endemic and threatened species of Gujarat

The above image shows distribution of certificates to the volunteers for planting saplings of endemic and threatened tree species during the Botany Fest 2017 at the Waghai Botanical Garden, Dangs.

Moreover, articles were also published in the local newspapers to create awareness among the urban public.

40 endangered plant species battle to survive amid growing tourists footfall, agriculture: MSU study

KUMAR ANAND
VADODARA, APRIL 21

AS MANY as 40 rare and endangered plant species found in different regions of Gujarat are on the verge of extinction, and several of them may no longer be located in a few years from now if proper steps are not taken towards their conservation, a field study conducted by the Botany Department of the MS University has concluded. Among these plants is a rare finding: the only insectivorous plant ever sighted in Gujarat which is also the only one of its kind in the world.

Found in Valsad, and that too growing on a small patch of 32 square metres land near a natural water spring at Shankar Dhodh in the district's Dharampur taluka, 35 individuals of this rare species known botanically as drosera indica are battling to survive amidst growing tourism and agricultural activities in the region, MSU researchers from the university's botany department have concluded as part of a Rs 19-lakh project conducted for the Gujarat Biodiversity Board (GBB). Drosera indica is among 40 plants chronicled as part of a study on "endemic and threatened plants of the state."

"In 2005, M Parabia, a retired a faculty member of Vir Narmad South Gujarat University (VNSGU) in Surat first sighted the plant near Dabkhal, also in Valsad district. He could only locate five plants of the rare species which were spread over an area of 2 hectare open grazed pastureland. This is the second finding of the species which has only been found in Gujarat," said PS Nagar, a faculty with the MSU's botany department who has worked as a principal investigator on the project.

MSU researchers discover a rare species of plant in Valsad that eats insects. EXPRESS

Because this plant is only 2-10 centimetres in height, it remains hidden among grass that grows around it, making it hard for the plant to get sunlight and thus pass through the process of photosynthesis for food. In the absence of this, the plant has to depend on small insects for food. It has tiny tentacles that excrete sticky substances. When an insect sits on it, it gets stuck, upon which the plant cover it up on all sides and sucks all vital nutrients from the insect. Since the plant is not much known among locals, it does not have any local name.

Situated in a region that has seen increasing farm activity in the past few years and being close to the famous Shankar Waterfalls near Wilson Hills, which is being projected as a tourism site, the rare tiny plant could disappear forever if steps are not taken to keep it alive and in abundance, a research student Karan Rana said. Drosera indica is among plants that were chronicled by researchers associated with the department through field trips conducted in the last one and a half years as part of a Rs 19-lakh project given to the university by the state government's Gujarat Biodiversity Board (GBB) to study endemic and threatened plants of the state.

Among forty plants that have been chronicled by the department for the GBB, twenty four plants find mention on the list prepared by the International Union of Conservation of Nature (IUCN) of species that are threatened and on the verge of extinction. Among the remaining seventeen plants are several that are endemic to only Gujarat and are not found anywhere else, including the rare insectivorous plant found in Valsad.

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Vadodara

યુનિ.ના સંશોધકોને ધરમપુરના જંગલમાં જોવા મળી અનોખી પ્રજાતિ

મચ્છરોનો શિકાર કરતો ગુજરાતનો એક માત્ર નોન વેજ પ્લાન્ટ લુપ્ત થવાના આરે

(પ્રતિનિધિદ્વારા) વડોદરા,સોમવાર

ગુજરાતમાં જમીન પર ઉગતા સેંકડો પ્લાન્ટસમાંથી એક જ પ્લાન્ટ એવો છે જે મચ્છરોનુ ભક્ષણ કરીને જીવે છે.૨૦૦૫ બાદ પહેલી વખત એમ.એસ.યુનિવર્સિટીના સંશોધકોને આ પ્લાન્ટ જોવા મળ્યો છે.સંશોધકોનુ કહેવુ છે કે ગુજરાતનો એક માત્ર આ નોનવેજીટેરીયન પ્લાન્ટ હવે લુપ્ત થવાની કગાર પર છે.

ગુજરાતમાં લુપ્ત થનારા પ્લાન્ટસની યાદીમાં ૪૦ પ્રજાતિઓનો સમાવેશ

બાયોડાયવર્સિટી બોર્ડ માટે સંશોધકોએ હાથ ધરેલો પ્રોજેક્ટ

ગુજરાત બાયોડાયવર્સિટી બોર્ડ દ્વારા ગુજરાતમાં ઉગતા પ્લાન્ટસ અને તે પૈકી કયા પ્લાન્ટસ પર લુપ્ત થવાનુ જોખમ તોળાઈ રહ્યુ છે તે જાણવા માટે એમ.એસ. યુનિવર્સિટીના બોટની વિભાગને ૧૯ લાખ.રુપિયાની ગ્રાંટ આપવામાં આવી હતી.બોડની વિભાગના વરિષ્ઠ અધ્યાપક પીએસ નાગર અને તેમના માર્ગદર્શન હેઠળ પીએચડી સ્ટુડન્ટસ કરણ રાણા અને સંકેત જયસ્વાલે આ પ્રોજેક્ટ પુરો કર્યો છે.જેમાં સંશોધકોએ ગુજરાતમાં વિવિધ સ્થળોએ ઉગતા ૨૮૦૦ જેટલા પ્લાન્ટસ પૈકી એવા ૪૦ જેટલા પ્લાન્ટસની પ્રજાતિઓને ભયજનક એટલે કે લુપ્ત થવાની શક્યતા ધરાવતી કેટેગરીમાં મુકી છે.

યુનિવર્સિટીના બોટની વિભાગના સંશોધકોની ટીમે લુપ્ત થતી વનસ્પતિઓની પ્રજાતીની યાદી બનાવી છે.જેમાં ગુજરાતના એક માત્ર નોન વેજીટેરીયન પ્લાન્ટનો પણ સમાવેશ થાય છે.આ પ્લાન્ટની વિશેષતા એ છે કે તે મચ્છરને શિકાર બનાવે છે.

પ્રો.નાગર કહે છે કે આ પૈકી વલસાડ નજીક ધરમપુરના જંગલોમાં શંકરધોધ પાસે જોવા મળેલી ડ્રોસેરા ઈન્ડિકા નામના પ્લાન્ટસે અમને આશ્ચર્યમાં મુક્યા હતા.કારણકે ગુજરાતમાં આ એક માત્ર પ્લાન્ટ એવો છે જે પોષણ મેળવવા માટે મચ્છરોનો શિકાર કરે છે.માત્ર એક ઈંચના કદનો પ્લાન્ટસ ઓક્ટોપસને મળતો આવે છે.તેના જે હિસ્સા પર મચ્છર બેસે તે હિસ્સા આપોઆપ વળી જાય છે અને મચ્છરને પોતાના ફંદામાં ફસાવે છે.વરસાદની સીઝન પુરી થવા આવે ત્યારે આ પ્લાન્ટ ઉગતો હોય છે અને તેનુ આયુષ્ય લગભગ બે મહિનાનુ હોય છે.આ પ્લાન્ટ

Figure 293: Awareness notes regarding some endemic and threatened plants of Gujarat through media coverage

For conservation of the wildlife in Gujarat, all the existing protected areas are mainly due to protection of large animals. There is not a single protected area in the state specifically for wild plants. During conservation movement, only the category of threat is not necessarily sufficient to determine priorities for such action. The category of threat simply provides an assessment of the likelihood of extinction under current circumstances, whereas a system for assessing priorities for action will include numerous other factors concerning conservation actions such as costs, logistics, and chances of success and even perhaps the taxonomic distinctiveness of the subject. Different types of protective measures have been proposed by various scientists from time to time to conserve the threatened plants. However, based on the present study the following measures are suggested:

i. *Tephrosia jamnagarensis*, taxa which are threatened and restricted in a single locality should be conserved by creating protected areas at the community or species level.
ii. Developmental activities cannot be stopped, but during such activity efforts have to be made to do minimum harm to the habitat of threatened plants. If any construction or developmental work is essential at any place, the area should be explored properly and all the endemic as well as threatened plants to be transferred carefully to other similar habitats and should also be preserved in botanical gardens as an *ex-situ* method.
iii. Plants like *Ceropegia odorata* which are sensitive to climatic changes, and can be propagated only natural habitat should be transplanted to other habitats having similar climatic as well as edaphic conditions.
iv. *Ex-situ* conservation of some plants, particularly those having aesthetic values like *Begonia* sp., *Arisaema* sp., *Jasminum* sp., should be done.
v. Overgrazing must be controlled particularly to conserve the threatened grasses and other herbaceous vegetation.
vi. Awareness should be created among the local people regarding the importance of conserving the plant species also, as they are aware of importance in conserving wild animals at present.

vii. Natural calamities like soil erosion, floods, land-slides should be controlled by various available methods to save the critical habitat of threatened plants.

viii. University and college teachers should be made aware about the threatened plants, which will subsequently refrain the students from collecting it, particularly on mass scale. In fact, teachers can keep a specimen or photo of such plants to show to students.

ix. However, the most effective method to conserve the threatened plants is considered to multiply these plants through tissue culture technique and then transplanting the offspring to the natural habitats. This should be given top priority where habitat destruction is contemplated in the immediate future.