pollen exchanges (Shivanna,and Rangaswany, 1992) hence they are subjected to less stringent quarantine restrictions. The binucleate pollen which has considerably longer life span compared to trinucleate pollen, can be transported to long distances without loss of viability. Their viability has been extended to as long as 10-14 years (Shivanna,and Rangaswany, 1992). Large amount of pollen can be transported packed in small vials and directly used for breeding at different locations.

Hence germplasm can be transported across international borders in the form of *in vitro* cultures of seeds, embryos, embryonic axes, apical and axillary meristems, dormant buds, proliferating shoot cultures or encapsulated propagules as well as in the form of pollen grains maintaining minimum phytosanitary risks, space economy and high regeneration values.

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The Exotic Shrubs and Trees in Indian Arid Regions

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Key Words: Exotic Perennials, Shrub, Trees, Fodder

The Indian deserts comprising mostly of arid regions are characterized by sandy plains more or less devoid of vegetation except in the rainy season where multitudes of ephemerals come up and transform the barren lands into green carpet. The perennial components of these habitats comprising of scrubby, xerophytic vegetation characterized chiefly by *Salvadora oleoides, Prosopis cineraria, Capparis decidua* and *Zizyphus* spp. occur in open clumps. The exotic *Acacia tortilis* and *Prosospis juliflora* introduced long ago have been naturalized and they now occupy a significant place in the ecology and economy of these deserts and its inhabitants respectively.

Efforts to systematically introduce useful genetic material of exotic perennials by the Station date back to almost four decades now (the Station was a part of the Plant Introduction Division, IARI, New Delhi). Since then a large number of accessions have been introduced (Bhandari *et al.*, 2000). Some of these successful introductions are bound to have significant role if introduced on a large scale.

The seed material after being received through the Germplasm Exchange Division, NBPGR, New Delhi is subjected to required/recommended pre-treatment and is sown in pots for raising saplings. The data on germination percentage and early vigor is recorded and the 3-4 month old sapling is transplanted in pits in the field at specified distance. Periodic data on morphological characters of plant habit, reproductive

phenomenon and post harvest data on fruit and seed characters are recorded. Some of these shrub and tree introductions of significant importance are described here below.

Acacia albida (Del.) A. Chev., (EC 123793 ex. Senegal) is a tall thorny tree found suitable to this region. It is a peculiar tree in that it bears green leaves throughout the dry season but shed them on the onset of wet season thereby providing fodder at the time of scarcity. The accession exhibited a maximum height of 8-10m with a canopy of 3-6m and thick foliage of pinnate leaves. It has been widely accepted for agro-forestry programmes.

Acacia ampliceps B.R. Maslin (EC 170437 ex. Australia) also called salt wattle, jila-jila bush - is a small tree suitable for warm to hot, semi arid to tropical climate. It is useful for fuel, low windbreaks, sand dune rehabilitation and fodder (Turnbull, *et al* 1986; Thomson, 1986). This accession established in the field in 1986 exhibited a maximum height of 3.8 m with a 2-3 m wide canopy and 10 cm thick bole in ten years. It has been reported to have high DMD of 45.6 % and crude protein value of 15.6%. The dried phyllodes are highly preferred by sheep. The species is excellently adapted to arid environmental conditions of west Rajasthan (Harsh *et.al.*, 1993)and can play an important role in rural afforestration programmes.

A. holosericea A. Cunn. ex. G. Don (Wahroon) (EC 170441 and EC 191246 ex. Australia) is a silvery small tree and is one of the most promising *Acacia* species for dry tropical region. Its major positive features are drought resistance, easy initial establishment of saplings, fast growth rate and satisfactory adaptation to most soil types. Two accessions have exhibited profuse growth and attained a height of 3.5-6 m, canopy of 2-6 m and bole diameter of 5-13 cm. The species has exhibited profuse podding. The plant is though not readily grazed by livestock in Australia but reports from Senegal indicate high palatability of dry phyllodes. The species is suitable for windbreaks and amenity plantings.

Acacia maconochieona (EC 170446 ex Australia) is slender umbrella shaped, beautiful ornamental tree with excellent survival and growth rate. Its 10-year old trees attained a height of even more than 6 m with a range of 3.9-6.6m. The canopy was 2.3m x 4.5m wide with a long bole of 1.5-2.5m, bifurcated into 2 at 0.5-1m height from ground with several branches arising at top of plant giving a dome shaped appearance on top supported on a thick stout, forked bole. It has been reported that this is one of the most salt tolerant Australian *Acacia* species. Plants withstand waterlogging upto 2.5m. The plants are highly suitable for fuel wood, charcoal and stock fodder. They have good coppicing ability.

Cassia sturtii R. Br. (syn. *C nemophila* var. *coriaceae*) (EC 129010 ex. Australia) is a spheroid bush and is seen to have attained about 2m height and a canopy 1-2m wide in five years. It has a small axis with 20-150 cm height with 6-10 primary branches, which spread all around and give the plant a spherical, symmetrical appearance. Primary, secondary and tertiary branches arise successively from the main axis. Beautiful yellow caeselpinoid flowers are borne by the plant.1-3 kg pods per plant have been harvested from the plants. In their native habitat they are eaten by sheep at the time of extreme fodder shortage (Anon., 1975). Its initial establishment trials have shown that it holds great promise for arid and semi arid regions.

Cassia helmsii is a spheroid bush, almost similar in appearance to C. *sturtii.* An accession EC 191260 introduced from Australia attained a height of 1.5m with a canopy of 1m. The leaves are more expanded and broader than *C sturtii* and the flowers and pods are also bigger. Profuse flowering and fruiting has been observed.

Simmondsia chinensis (Link.) Schneid) jojoba or hohoba (EC 33198 ex. USA) is a shrub with high potential as this the sole substitute for sperm whale oil (45-58% of liquid wax in its seeds). It is a hardy shrub which can withstand droughts, tolerate salinity and has been reported to adapt to wide range of temperature, rainfall and habitat conditions. It exhibited initial slow growth and then attained a height of 1-2.5 m in 10 years. Several branches arise at 10-15 cm from the ground level and spread out to form a bushy habit. Primary, secondary and tertiary branches arise all around forming a spheroid bush. Pale green, single female and yellow clustered male flowers are borne on leaf axils. Flowering was observed in 3-4 year old plant in winters. Single fruit on each alternate node is the common flowering pattern though multiple fruiting has been reported in few cases. Its oil is used as lubricant and finds many uses as chemical intermediate in industrial processes, in cosmetic and pharmaceutical industries, etc.

Carissa grandiflora (E 37513 ex USA) is a tall evergreen shrub with scarlet red fruits and is a rich source of Vitamin C besides sugar, protein and fats.

The bush has exhibited good initial growth and heavy fruiting pattern indicative of its suitability for semi arid regions and has been recommended for large-scale cultivation.

As evidenced the potential for greater utilization of exotic shrubs and trees is high. A multiple use management policy for desert rangelands should provide an incentive for including selected exotics in seeding mixtures for improvement of livestock forage, wildlife habitat, biomass, fuel wood, oil and reclamation of disturbed areas. The proportion and extent of use of exotics however needs to be ascertained before introductions to ensure economic and ecologic benefit to the existing system.

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Pests Intercepted in Imported Transgenic Planting Material during 2002-2004

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Key Words: Pests, Transgenic, Interception

The National Bureau of Plant Genetic Resources (NBPGR) is the nodal agency to issue import permit and undertake quarantine for imported transgenic planting material meant for research purposes as per the Plant Quarantine (Regulation of Import into India) Order 2003. The import permit is issued only after the import clearance from Review Committee on Genetic Manipulation, Department of Biotechnology is obtained.

Plant quarantine ensures introduction of valuable germplasm meant for use in the crop improvement programmes in a pest-free state (Khetarpal *et al.*, 2001). A containment facility of the level-4 has been built at NBPGR to ensure that during quarantine processing of transgenics, no viable biological material/ pollen/ pathogen may enter or leave the facility keeping in view the biosafety requirements.

During 2002-2004, 6746 samples of transgenic crops comprising *Gossypium* spp.(11), *Nicotiana tabacum* (2), *Oryza sativa* (6721), *Triticum aestivum* (11) and *Zea mays* (1) imported from Belgium, Canada, China, Germany, Philippines, Singapore, South Africa, Vietnam and USA were processed from quarantine point of view. Most of the material was imported by private sector viz., De Nocil Crop (3), Hybrid Rice International (75), Mahyco (38), Metahelix Life Sciences (6598), Monsanto (1), Nath Seeds (7), Syngenta (1), whereas 23 samples were meant for public sector i.e. Directorate of Rice Research and University of Hyderabad.

Quarantine processing involved detection of pests in imported material and salvaging of infested material by using suitable detection and disinfestation procedures/ techniques. All the samples were processed through visual and/ stereo-binocular microscopic examination to detect and remove abnormal/ infected/ infested seeds, dead insects/ stages thereof, fungal fructifications, nematode galls, plant debris, soil clods, weed seeds etc. These were then subjected to various techniques for detection of specific pests.

Seed samples of all the crops were subjected to incubation and/ or washing test for detection of fungi and bacteria. Seeds of *Gossypium* spp. were screened through X-rays generated at 22kV 3mA for 10 seconds at a distance of 30cm from the source to detect likely presence of hidden infestation caused by insects. Seeds of *O. sativa* were subjected to soaking, washing and staining test to detect seed-borne nematodes. The post-