

Biodiversity Conservation of Fruit Crops in India

Subramaniyan, P

Ph.D Research Scholar,
Dept. of Horticulture,
Central University of Tamil
Nadu, Thiruvavarur-610 005

prsrapo@gmail.com

The fruit crop biodiversity conservation play a important role in socio-economic level of human life, it was encompassing with preservation of genetic diversity, species diversity and also ecosystem diversity. The conservation of genetic diversity in fruit crops also immense importance in plant breeders. They are constantly looking source of gene, climate adaptation, resistant against biotic and abiotic factors (Gustavssona *et al.*, 2013). Vasudeva, (2023) reported that around 400 edible fruit species are important sources for supplement of food, balanced nutria-diet, and enrich the livelihood in Asia. In this contrast, about 117 cultivated fruits and nuts with 175 wild relatives which only 25 species domesticated in India. In the conservation of genetic resource of fruit crops maintained in field repository at SAU's and ICAR institutes.

Conservation of genetic resources in fruit crops through holistic approaches which was required both in-situ and ex-situ conservation approaches (Diengngan and Hassan, 2015). Large number of germplasm which were collected over the year sor systematic evaluation, characterization and conservation is done by various institutions (Singh *et al.*, 2020).

In India, presently conserving the fruit crop germplasm 1717 in ICAR-NBPGR and 1127 accessions which maintained by field gene bank.

Table-1: Crop based national active germplasm sites in India

Crop	Centre	Number
Arid fruits	Central institute on Arid Horticulture, Bikaner	1229
Banana, Plantain	NRC on Banana, Tiruchirapalli	907
Cashew	NRC for Cashew, Puttur	519
Citrus species	NRC on Citrus, Nagpur	150
Grapes	NRC for grapes, Pune	600
Litchi, Bael, Aonla & Jackfruit	NRC on Litchi, Muzaffarpur	2426
Mango, Guvava	CISH, Lucknow	848
Temperate Horticultural crops	CITH, Srinagar and CITH, NBPGR RS, Shimla	780 & 908
Tropical fruits	Tropical fruits IIHR, Bangalore	1983
Tropical fruits	AICRP on Tropical Fruits, Bangalore	1754

(Kiran Sagar *et al.*, 2023)

The JNTBGRI, Kerala having vast germplasm collection in wild fruits which serves as a genetic stock for selection and improvement. 648 germplasm accessions of wild edible fruits belonging to 184 species were collected through extensive field surveys all over the wild habitats in Kerala and the species were conserved ex-situ.

The dragon fruit (*Hylocereus* spp.) having five different genetically diversified germplasm available in cultivated and also wild relatives. The Cambodian Red, Combodian White, Oregano Red, Srilankan

Red and Malasian Red genotypes contain wider genetic variation for offering scope for future conservation, breeding and cultivation within the *Hylocereus* genus (Aarthi *et al.*, 2024).

Table-2: Germplasm conservation of underutilized fruits in India

Crop	Centre	Number
Jamun	IIHR, Bangalore	160
Aonla	ICAR-CIAH, Bikaner	50
Manila tamarind	ICAR-CIAH, Bikaner	24
Wood apple	ICAR-CIAH, Bikaner	10
Ber	ICAR-CIAH, Bikaner	340
Bael	ICAR-CIAH, Bikaner, CISH, Lucknow, CAZRI, Jodhpur	65
Lasoda	ICAR-CIAH, Bikaner	65
Karonda	CISH, Lucknow, ICAR-CIAH, Bikaner	30
Mahua	CIAH, Godhra, CISH, Lucknow	43
Phalsa	CISH, Lucknow	12

(Rajangam *et al.*, 2024)

The collection and conservation of genetic materials through cryopreservation in fruit crops which was widely acceptable for long term conservation, cost effective and safe. There are 357 accessions belongs eleven underutilizes fruit species are being cryo-preserved in gene bank (Malik *et al.*, 2010). Veena *et al.* (2024) reported that, the cashew pollen grains are conserved under short period at room temperature or in refrigerator condition.

Cryopreservation in liquid nitrogen did not affect in vitro

germination of pollen grains. Wild species of cashew viz., *Anacardium othoniuanum* (40.97 % fresh and 25.43% cryopreserved pollen), *Anacardium pumilum* and *Anacardium occidnetale* (82.32% fresh and 70.43% cryopreserved pollen), are cryopreserved for more than 3 months. The cryo-preserved pollen grains were used for in vivo hybridization process to getting better fruit set in cashew.

Table-3: Success of cryo-preservation using various techniques in different fruit crops

Species	Technique	Material	S (%)
<i>Litchi chinensis</i>	Vitrification	Embryonic axes	50
	Air desiccation	Embryonic axes	22-35
<i>Euphoria longan</i>	Vitrification	Embryonic callus	30
		Anthers	15
<i>Nephelium lappaceum</i>	Two step freezing	Shoot tips	10
<i>Citrus sinensis</i>	Encapsulat ion-dehydration	Shoot tips	25
	Vitrification	Embryonic axes	62.5

S:Survival; (Mal *et al.*, 2011)

The utilization of diversity collected and conserved in the gene banks needs a focused attention and the elite lines/germplasm with specific desirable traits need to be used by the breeders to develop improved varieties. Appropriate tools for quick estimation of genetic diversity at the field level need to be developed. Biodiversity has been supporting the idea of regional or sub-regional gene banks and sharing the responsibilities and benefits from such an effort. The fruit crop germplasm collection and conservation are major role in adopt systematic experiment, identifying important functional and nutraceutical properties, getting high yield for commercial cultivation.

Conservation of fruit crops, research and development, farmers awareness and feasibility for cultivation are to be given due consideration.