

Cashew: Scope, Importance and Its Breeding Objectives

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Introduction

Though, cashew (*Anacardium occidentale* L.), is an exotic horticultural crop brought to India by Portuguese travellers in 16th Century but now adapted well in Indian conditions. It is grown along the coastal regions of Maharashtra, Goa, Karnataka and Kerala in the West Coast and Tamil Nadu, Andhra Pradesh, Odisha and West Bengal in the East Coast (Saroj, 2015). Cashew, the Wonder nut of the world belongs to family Anacardiaceae (2n=42), is native to Brazil in Latin America with about 75 genera and 700 species. It was introduced in India by Portuguese travellers in the 16th century for afforestation and soil conservation. India was the first country in the world to exploit international trade in cashew kernel in the early part of 20th century. Cashew is a versatile tree nut presently cultivated in more than 10 tropical countries and consumed in almost all over the world. Botanically, cashew is a wonder nut because it is the only nut which appears outside the fruit. The nut is a store house of nutrients. It contains about protein 21 per cent, fat 47 per cent, moisture 5.9 per cent, carbohydrate 22 per cent, phosphorus 0.45 per cent, calcium 0.05 per cent, iron 5mg for every 100 g and other mineral nutrients (Rao and Venkataraman, 1995).

Importance

Cashew nut is now treated as a health friendly nut. This is primarily due to high fat (47 percent) content, out of which 82 percent are in unsaturated form and the proportion of the monosaturated fatty acid and polysaturated fatty acid in 4:1 ratio, thereby reduce the cholesterol (Rao and Venkataraman, 1995). The high dietary fiber & high monosaturated fatty acid lower the blood glucose and improve insulin resistance. Cashew nuts are also very good for cold & flue due to presence of Vitamin E and protein. Selenium rich cashew kernels can help to protect against lungs, liver, skin, brain and gastrointestinal cancer (Sacks, 1999). As a whole, cashew nuts are becoming established as a food item that can protect human beings against major diseases including heart diseases, diabetics, cancer etc., with its rare combination carbohydrates and protein. Cashew kernel is a rich source of energy and a snack of great

taste. Cashews are especially rich in unsaturated fats- a category of fats linked to a lower risk of premature death and heart disease. They're also low in sugar, a source of fiber, and contain almost the same amount of protein as an equivalent quantity of cooked meat. In addition, cashews having good amount of copper, a mineral which is essential for energy production, a strong immune system and for healthy brain development. They're also a rich source of magnesium, manganese and nutrients which is important for bone health. Cashews are rich in carotenoids and polyphenols, and of antioxidants which may help to reduce inflammation and offer protection from different diseases. Cashews are low in sugar and rich in fibre, and plant protein. Cashews appear to provide fewer calories than once thought. Their rich fibre and protein content can help reduce hunger and increase feeling full. Put together, all of these factors may help you lose excess weight. Cashews are low in sugar and rich in fibre- two factors which, when combined, may help reduce blood sugar levels and protect against the development of type 2 diabetes.

Status and Scope

Cashew is presently grown in about 991'000ha with a production of 692'000MT having a productivity of about 749 kg/ha in India (DCCD, Kochi, Kerala). In India, most of the cashew area confined to the East-Coast and West-Coast regions. It is grown mainly in Maharashtra, Goa, Karnataka and Kerala along with West-Coast, while Tamil Nadu, Andhra Pradesh, Odisha and West Bengal along with the East-Coast. It is also grown in a limited extend in non-tropical areas such as Baster region of Chhattisgarh, Kolar region of Karnataka, Gujarat, Jharkhand, North-East regions etc. India is the third largest producer and exporter of cashew in the world next only to Vietnam and Nigeria. The current cashew production of the country accounts for 23.0% of the global production (Pradeep and Yogish, 2019). Nearly 2.00 lakh workers, more than 90% of whom are women, are directly employed in cashew processing factories which are concentrated mostly in Kerala, Andhra Pradesh and Maharashtra (Anonymous, 2018). It is estimated that nearly two million people are involved, directly and indirectly in cashew cultivation, processing and marketing. Cashew cultivation is taken up in small and marginal holdings and as more than 70% (Pradeep and Yogish, 2019) of the cashew area is under this category, cashew plays an important role in the development of small and marginal farmers.

Breeding objective in cashew

- ✓ **High yield with bold nuts:** Cashew being primarily export oriented crop, it is necessary to give utmost priority for developing varieties and hybrids with export grade kernels. Nuts should be big and plumpy to produce more of W-180 grades. Yield of more than 10 kg per tree per year.
- ✓ **Fruit setting percentage in cashew:** 1 to 18 %
- ✓ **Dwarf and compact canopy:** To facilitate high density planting.
- ✓ **Short flowering phase:** To reduce the chances of losing crop due to pest infestation and also to minimize the cost of collection of nuts.
- ✓ **High sex ratio:** Adequate care should be exercised in selecting the trees with high bisexual flowers. Recent studies have also emphasized the importance of staminate flowers to provide more efficient pollen so the trees with mixed phase and also high sex ratio are to be preferred as parents over types which have distinct male phase and hermaphrodite phase.
- ✓ **Breeding for tea mosquito resistance:** One of the production constraints in cashew is the severe incidence of tea mosquito bug in some areas. So production of varieties which show field tolerance to tea mosquito bug needs priority.
- ✓ **High shelling percentage:** Processing industries look forward for high recovery of cashew kernels. Currently, for release of any variety standards fixed stipulate that a minimum of 28 % shelling percentage should be recorded.
- ✓ **Nutrient quality index:** Develop varieties with high nutritive value. In cashew high protein (> 35 g protein, lysine > 50 micro gram per mg protein and < 14 g of sugar is suggested). Cashew kernel is good even compared to almond. It contains protein = 32 to 70 g and have more of lysine i.e., quality protein, Starch = 21 to 33.

Breeding achievements in Cashew

- In the past cashew was primarily propagated for soil conservation and forestation. At present due to the effort of research more than 40 varieties/hybrids have been released. Of these 25 varieties are selection from germplasm and 15 are developed through hybridization and selection.

Varieties and hybrids

- Since cashew is primarily a cross-pollinated crop, it is highly heterozygous and segregation has resulted in considerable variations in its seedling population. An ideal cashew plant should have

dwarf and compact canopy with intensive branching habit, short flowering and fruiting phase, > 20% perfect flowers, 8-10 nuts/panicle, medium to bold nuts (8-10 g) with higher shelling percentage of > 28, high yield potential (> 20 kg/tree/year) and tolerance to major pests and diseases. Evaluation of seedling progenies at different cashew research stations resulted in the identification of superior genotypes for several economic characters.

- In order to combine prolific bearing with other desirable traits like bold nut, cluster-bearing habit and compact canopy, hybridization with parents selected for these characters were attempted. Hybrids performed better than the selections. Hybrid vigour could easily be commercially utilized in cashew through softwood grafting. Among the 15 hybrids released in India 11 have kernel grade of W 180 to W 210.
- These 11 hybrids have at least one of the parents with bold nut character (Brazil-18, K-30-1 and Vetore-56) and thus prove the usefulness of selecting parents with bold nut character for transmitting this trait to hybrid. Short duration of flowering (Anakkayam1), high sex ratio and longer mixed phase, intense branching, high shelling (%) and high nutritive value of kernels are also looked in the parents

State	Recommended varieties
Andhra Pradesh	BPP-4, BPP-6 and BPP-8
Goa	Goa-1, Goa-2, Vengurla-1, Vengurla-4, Vengurla-6 and Vengurla-7
Karnataka	NRCC Sel-2, Bhaskara, Ullal-1, Ullal-3, Ullal-4, Vengurla-4, Vengurla-7, Madakkathara-2, Chintamani-1 and Chintamani-2.
Kerala	Madakkathara-I, Madakkathara-2, K-22-I, Kanaka, Dhana, Priyanka, Amrutha and VRI-3.
Maharashtra	Vengurla-1 Vengurla-3, Vengurla-4, Vengurla-6, Vengurla-7 and Vengurla-8.
Odisha	Bhubaneswar-I, BPP-8 and Dhana.
Tamil Nadu	VRI-1, VRI-3 and VRI H-1
West Bengal	Jhargram-I, Bidhan Jhargram-2 and BPP-8
North Eastern States	Ullal-3, Ullal-4, Vengurla-1 and Vengurla-4



References

- Bhaskara Rao, E.V.V., Swami, K.R.M., 1994, Genetic resources of cashew, In: *Advances in Horticulture Vol.9. Plantation and spice crops, Part-1* (Eds. K. L. Chadha and P Rethinam). Malhotra Publishing House, New Delhi, pp 79-97.
- DCCD, 2017-18. Area and production of cashew 2017-18, Directorate of Cashew and Cocoa Development, Ministry of Agriculture and Farmers Welfare, Government of India, Kochi, Kerala. <http://dccd.gov.in>
- <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=12389#:~:text=High%20yield%20with%20bold%20nuts,kg%20per%20tree%20per%20year>
- Pradeepa K.S. and Yogish S.N. 2019. Cashew Cultivation in South India: Problems and Potentials, *Journal of Emerging Technologies and Innovative Research*, 6(6), 2349-5162.
- Rao SIK and Venkataraman S. 1995. Nutritional qualities of cashew, Cashew industry, KJP Research foundation, Trivandrum, pp: 40.
- Sacks FM. 1999. Harvested Nut Research Revealed to Japan nut Association, The cracker, No.3, *International Tree nut Council*, Spain.
- Saroj. P.L. 2015, Cashew Cultivation in India: Issues and Challenges, *National Training on Advances in Cashew Production Technology*. 24: 1-9.