

16. Traditional Vegetable Varieties of Goa for Conservation and Sustainable Utilization

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Goa has a total geographical area of 361,113 ha, which lies between 14°16' North latitude and 73°75' East longitude bound by the Arabian Sea on the west, on the north, Maharashtra on the north, and Karnataka on the east and south. The climate is hot and humid with the temperature ranging from 18–35°C throughout the year. The annual rainfall ranging from 2500 to 3500 mm is received in about 100–120 days between June and October. It is estimated that around 60% of the total cultivated area in the state is under horticultural crops. But the area under vegetable crops is less, i.e., only 5% of the total cultivable area. The data for the past one decade shows that the area under vegetable cultivation increased slightly from 7550 ha in 1997–98 to 8213 ha in 2006–07, but later it reduced to 6498 ha in 2011–12. Compared to the national average of 18 t/ha, the average productivity of vegetables in Goa is also very low. Presently, more than 85% of the requirement of vegetables in the state is met from the neighboring states of Karnataka and Maharashtra.

Major vegetable crops, which are grown in Goa, include brinjal, okra, chili, cucurbits, sweet potato, vegetable cowpea, amaranthus, etc. Goa also harbors minor and underutilized vegetables like yams, aroids, Chinese potato, edible ferns, etc. Portuguese introduced chili besides introducing pepper from Brazil into India prior to 1885. The species was probably introduced by the Portuguese into India perhaps in Goa. Domestication of introduced crops like chili and okra, and that of native crops like brinjal, amaranthus, etc. is apparent in Goa, ascribing to its present-day's floristic diversity. A brief account of these major vegetables found and cultivated in Goa is given below.

Brinjal: Basically, there are two local landraces, viz., Taleigao and Agassaim. The Taleigao type produces violet, round fruits with average fruit weight being 350 g and yield about 2.5–3.5 kg. The Agassaim type produces violetpurple, elongated fruit weighing about 300 g with yield of about 2.0–2.5 kg fruits/plant. The Agassaim type has soft and puffy flesh whereas the fruit is hard in Taleigao, which accounts for its longer shelf life compared to the former. Both are susceptible to bacterial wilt disease. There is scope for pure line selection in these types, as both are very much preferred by the local people. It is obvious that regional preference is very high in case of brinjal when compared to any other vegetable crop.

Okra: Okra forms an important vegetable in Goan cuisine. The evaluation study in okra at ICAR-Research Complex for Goa, conducted for two years, revealed that there is significant variation in duration, and fruit length, weight, and color. These types were identified by the local growers based on the number of nodes at which they come to bearing. Majority of the local types are long fruited, tender, and light green in color, which retain their tenderness, even when they attain a length of 20–22 cm. The only lacuna in local type is its susceptibility to yellow vein mosaic (YVM) disease. But, here also, local preference plays an important role and these landraces can be appropriately used in the breeding programs.

In India, wide diversity of *Abelmoschus esculentus* has been recorded, which has been unfortunately eroded due to the popularity of the improved and disease tolerant varieties and hybrids. In this context, conservation and improvement of local types of okra in Goa assume great significance as a value added germplasm.

Chili: This crop (both hot and sweet pepper) was first introduced by the Portuguese into India more particularly into Goa. Presently, there are three basic types of chilies viz., Tarvatti, Lovongi, and Portugali, based on their place of cultivation, usage, pungency, etc., in Goa. Among these, Portugali has become almost extinct because of several factors. The Tarvatti type alone is available as it is perennial bush type and its seeds are disseminated through birds. It is very pungent and is a source of virus resistance.

Another local type called “Khollachilli”, named after its place of cultivation in Goa, is a pungent chili, exclusively used for papad making and fetches premium price in the market. It is grown as rainfed crop on the hill slopes of Canacona taluk in Goa. The work on screening and evaluation in chili will result in value added germplasm for the future crop improvement programs.

Vegetable cowpea: Though the origin of cowpea is Africa, India is also considered as one of the centers of origin. This crop is locally referred as “Wall”. Evaluation study conducted at ICAR-Research Complex for Goa showed that there are three basic types of vegetable cowpea viz., long fleshy podded, red seeded, and black seeded. Among these, the most promising types is long fleshy podded with red seed, which is also the highest yielder (4.9 t/ha).

Wide variability exists in this crop in pod color (light green to dark green) and length (30–60cm), and seed color (red and black), size, and yield (1.8–5.0 t/ha). This creates scope for pure line selection as this is one of the important vegetables preferred by the local people. Besides all these virtues, the crop also grows well in residual moisture after harvest of *kharif* paddy.

Amaranthus: A native of India, it is grown as an important *rabi* season leafy vegetable crop in *Goa*. There are two types, viz., red and green. Red *amaranthus* is very popular among the local people apart from green types. Here also, there is a scope for selection among red and green types.

Sucurbits: Variability exists in crops like cucumber, ridge gourd, snake gourd, and bottle gourd. These crops are the major gourds grown in *Goa*. Among these, cucumber is exclusively grown as a *kharif* season crop on the hill slopes. Other gourds are grown as *rabi* season crops. Bitter gourd, (*Momordica dioica*), is available in forest areas of *Goa* and fetches premium price in the market because of its limited supply. There might be some variation in this crop as it might have originated in India. But there is no systematic study on the origin of this gourd.

Wide variation existing in the above mentioned crops needs to be conserved, which otherwise may get lost due to introduction of newly bred cultivars. Conservation of these natural resources shall aid in evaluation and selection processes and effective utilization of this repository in breeding programs.