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COLLECTING GENETIC DIVERSITY OF EGG-PLANT AND ITS WILD RELATIVES FROM SOUTH INDIA

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From five exploration and collection trips undertaken in Southern Peninsular region, 216 accessions of *Solanum melongena* var. *melongena*, 1 of *S. macrocarpon* and 134 lines belonging to 25 wild species, exhibiting rich variability in plant and fruit morphology were sampled. This includes a number of rare genotypes/ land races of egg plant and its related species. A large number of indigenous and introduced naturalized species widely occur, particularly in pockets of Western Ghats.

Key words : Germplasm, *Solanum*, egg plant, wild relatives, land races, local cultivars, variability, diversity

In India, the genus *Solanum* is represented by 45 species including 22 indigenous (Deb, 1949). Three species such as *S. melongena, S. tuberosum,* and *S. macrocarpon* are cultivated and a total of 32 species are reported to be useful. The *S. melongena* has wide diversity and hence Vavilov considered it of Indian origin (Vavilov, 1951). A large number of local varieties/landraces occur in the country and adapted to different situations. The third species being an introduced one, is mainly cultivated in homesteads in Kerala as vegetable. The landraces/strains are being evolved due to influx of new varieties. Hence, collaborative explorations were undertaken by NBPGR and IBPGR for collection of eggplant and its wild relatives from Southern region during 1989-1991.

MATERIALS AND METHODS

Five explorations were undertaken in parts of Southern peninsular region comprising Kerala, Karnataka, Andhra Pradesh and Tamil Nadu during 1989-1991 for collection of egg-plant and its wild relatives. Few small trips were also made for collection of wild species in pockets of Western Ghats. Sampling sites included traditional egg-plant cultivation belt, tribal areas, places of ethnic importance, forest pockets and market places. Latest nomenclature and taxonomy of the genus were followed. In most of the cases mature/ripened fruits were collected for extraction of seeds except in certain cases where vegetative cuttings were obtained.

RESULTS AND DISCUSSION

From five exploration trips undertaken, a total of 351 samples belonging to 27 species were collected. Distribution of egg-plant is noticed from sea level to elevations as high as 1800 m in Western Ghats. The crop is commercially raised in all states except in Kerala, where homestead cultivation is practiced. In most of the areas, traditional landraces have been replaced by improved cultivars to a great extent. Statewise collection of *Solanum spp.* is given in Table 1.

Table 1. Statewise collection of *Solanum* spp.

S.No.	Species name	Kerala	Karnataka	TN	AP	Total
1.	*Solanum melongena* var. *melongena*	40	45	81	50	216
2.	*S.melongena* var. *insanum*	11	3	1	1	16
3.	*S.melongena* var.*incanum*	6	-	-	-	6
4.	*S.pubescens*	-	-	3	3	6
5.	*S.surattense*	-	1	3	3	7
6.	*S.trilobatum*	-	2	3	1	6
7.	*S.torvum*	10	2	2	2	16
8.	*S.nigrum*	1	2	1	2	6
9.	*S.anguivi* var. *anguivi*	13	4	6	-	23
10.	*S.anguivi* var. *multiflora*	5	-	3	-	8
11.	*S.myriacanthum*	4	5	3	1	13
12.	*S.seaforthianum*	1	1	2	-	4
13.	*S.aculeatissimum*	2	1	-	-	3
14.	*S.erianthum*	1	-	4	-	5
15.	*S. mammosum*	1	-	-	-	1
16.	*S.sisymbriifolium*	-	-	1	-	1
17.	*S.capsicoides*	-	-	1	-	1
18.	*S.elaeagnifolium*	-	-	1	-	1
19.	*S.mauritianum*	-	-	3	-	3
20.	*S.giganteum*	-	-	1	-	1
21.	*S.jasminoides*	-	-	1	-	1
22.	*S.stramoniifolium*	1	-	-	-	1
23.	*S.convolvulus*	1	-	1	-	2
24.	*S.barbisetum*	-	-	1	-	1
25.	*S.hispidum*	-	-	1	-	1
26.	*S.macrocarpon*	1	-	-	-	1
27.	*S.vagum*	-	-	1	-	1
Total		98	66	124	63	351

In Kerala, local land races of egg-plant are cultivated between the attitude 0-1770 m in red sandy and alluvial soils during the rainy season as a rainfed subsistant crop where as in Andhra Pradesh both local and improved cultivars are grown between 0-1000 m in clayey, sandy, red sandy loam and alluvial soils throughout the year. In Tamil Nadu, predominantly improved types are grown between 0-1700 m under irrigated condition. In Karnataka also cultivation of egg-plant has been noticed from coastal plains to plateau and in hills.

Variability in egg plant

Depending on certain morphological characters, the local varieties are known by different names. Based on fruit shape, varieties are called as 'gundu kathiri' for round fruited type in Tamil, 'jammu badanai' for very large round fruited type in Kannada and 'poonathalai kathiri' for fruits having the shape of a cat's head in Tamil. With respect to colour of the fruits, landraces are known as 'myla kathiri', for purplish blue types, 'vellai kathiri' for white fruited types and 'varikai' for scriped fruits in Tamil. 'Tella venkai' for white types, 'gulab venkai' for pinkish fruits and 'kappu venkai' for purplish blue types in Telugu, 'vella vazhuthina' in Malayalam, 'vellai badanai' for white types and 'kappu badanai' for blue types in Kannada. Plants with spiny stem, leaf or calyx, are known by the name 'mullu kathiri' in Tamil and 'mullu venkai' in Telugu. Small fruited type is known as 'cheru vazhuthina' in Malayalam. 'Puliyampoo kathiri' in Tamil denotes the type with purple and green stariated fruits. 'Nattu kathiri' in Tamil and 'sada venkai' in Telugu indicate the common local types. 'Nalla venkai' in Telugu is an antonym to wild brinjal. 'Guthi venkai' in Telugu stands for erect plant type.

In general variability in plant types, plant height and branching pattern was also observed. The plant types varied from tall erect branching to bushy, highly branching and dwarf spreading. A total of 34 spiny plant types mostly from Karnataka, Kerala an Andhra Pradesh were collected.

Frequency distribution of 195 collections of egg-plant in relation to their fruit shape include spherical (81), oval (34), oblong (80). Based on fruit size 203 accessions are grouped in large (56), medium (105) and small (42). Fruit colour varied considerably from white in 78 collections, purple tinge or shade in 27, purple in 35, light green with purple tinge in 13, green with purple shade in 14, dark purple in 10, purple with white lines in 5, green with light purple shade in 3, green with white shade in 6, light purple in 3, green in 8, light green in 1 and bluish purple in 1.

Geographic distribution of these types is presented in Fig. 1 which indicates that the distribution of these types is area specific. Large oblong types were common in Kerala. Spherical fruit types were common in Tamilnadu

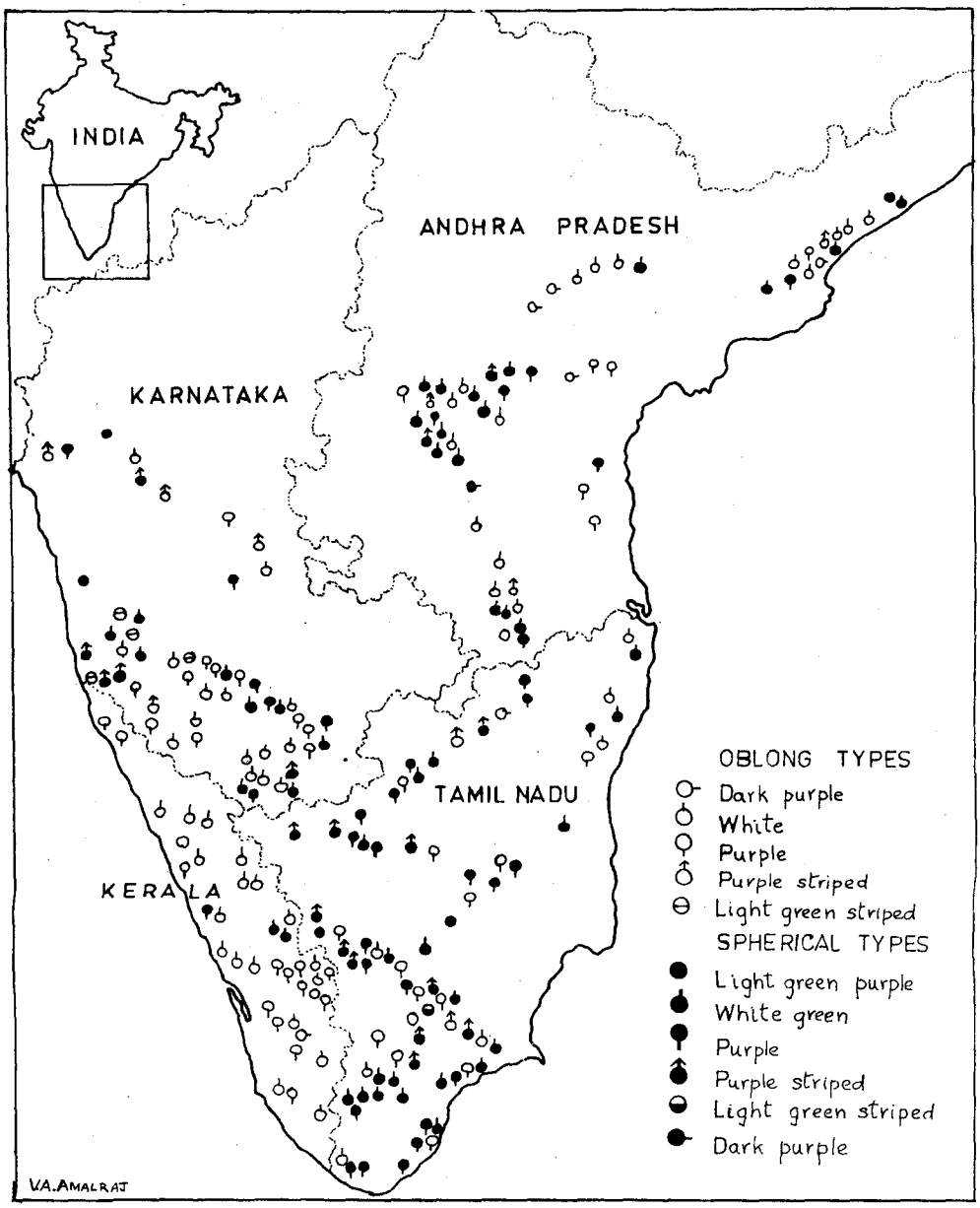

Fig. 1. Distribution of Brinjal types in southern India

and less common in other states. Large fruit type was very common in the coastal sandy plains of Tamil Nadu and Karnataka. Purple pigmentation on fruits was common in Tamil Nadu and Andhra Pradesh. In Kerala, purple fruited type were less common. However, a local type known as Wynad giant was more common in Wynad district.

Diversity in *Solanum* species

The review of literature on the genus *Solanum* in India indicates that species/taxa in the southern region can be broadly classified on the basis of their origin into indigenous and exotic with 17 and 20 taxa, respectively (Clarke, 1883; Rama Rao, 1914; Gamble, 1921; Saldanga & Nicolson, 1976; Sharma et al., 1977; Deb. 1980; Yoganarasimhan *et al*, 1981; Mathew, 1983; Sharma *et. al.*, 1984; Henry *et al.*, 1987; Subramanian *et al.*, 1987; Manilal, 1988; Ellis, 1990 and Mohanan & Henry, 1994. Out of the 37 taxa reported to occur in Southern Region, 27 taxa including 2 cultivated species viz. *S. melongena* and *S. macrocarpon* were collected.

From the distribution pattern of *Solanum* spp (Table 2), it is clear that maximum number of exotic and indigenous species are distributed in Western Ghats and its surrounding areas in the states of Tamil Nadu, Kerala and Karnataka. This is due to the fact that most of the introduced species have been naturalised inhabitants in hill stations. *S.myriacanthum, S.convolvulus, S.erianthum, S.capsicoides, S.seaforthianum* and *S. aculeatissimum* were found in these pockets. Many indigenous species were also found to occur under situations of high rain fall and cool weather of the hills. Species such as *S.pubescens* and *S.surattense* were confined to dry situations in plains. An exotic species *S.elaeagnifolium* has been naturalised in black soils in plains of Tamilnadu. The widest distribution was noticed in the case of *S.torvum,* which is very rarely cultivated for its fruits. *S.trilobatum* has been restricted distribution in black soils in all the three states except Kerala.

The closest wild relatives of cultivated brinjal, *S.melongena* var. *insanum* and *var. incanum* were found to occur around human inhabitations and near the egg-plant fields. These species also possesses considerable variability in fruit size, shape and colour. Taxonomically, these two varieties are disputed. However, *S.melongena* var. *incanum* was usually found to grow in interior isolated forest pockets or along the disturbed roadside vegetation in Tamilnadu and in Kerala. It has spherical fruits with withering and non-inflated calyx lobes at maturity as compared to highly inflated persistent calyx lobes on slightly oblong fruits in *S.melongena* var. *insanum.* Both varieties are being used for medicinal purposes. Among all the species collected *S.vagum* is the rarest, restricted to Tirunelveli hills in Tamil Nadu followed by *S.stramoniifolium,* a species that is adapted to the tropical evergreen forests in Kerala.

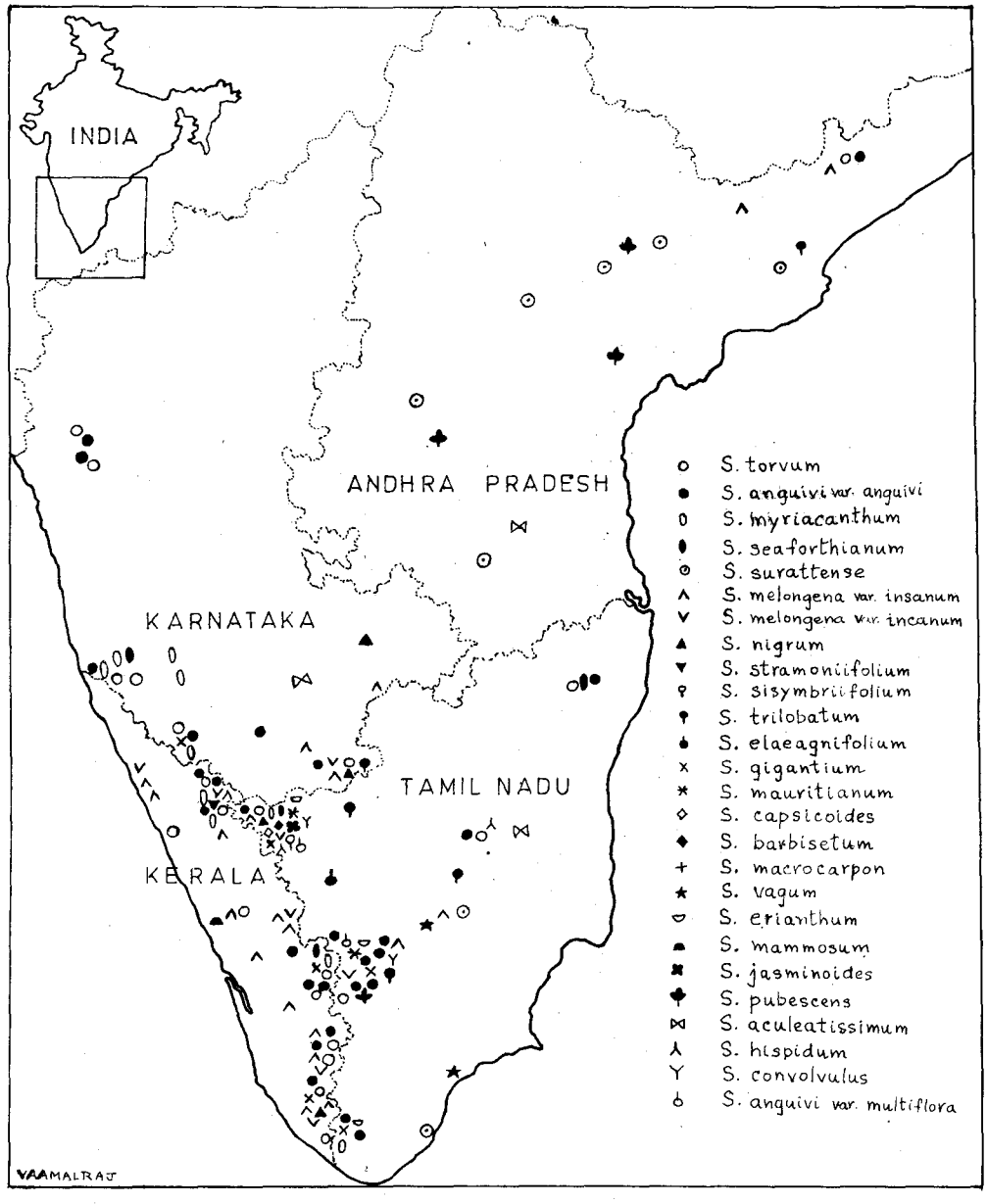

Fig. 2. Distribution of *Solanum* species in southern India

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