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Interspecific hybridization in Brinjal (*Solanum melongena* L.): Cross compatibility and morphological characterization of interspecific hybrids

Pradip Karmakar and YV Singh

Abstract
The present investigation was conducted to study the crossability relationship among the two commercial cultivars Pant Rituraj, Pant Samrat and wild relatives *viz. Solanum gilo*, *S. aethiopicum* and *S. khasianum* and to characterize the parents and their viable interspecific hybrids for various morphological traits. All the crosses except crosses involving *S. khasianum* as female parent found to be successful. The crosses, *S. melongena* cv. Pant Rituraj × *S. khasianum* and *S. gilo* × *S. khasianum* produced shrunken seeds which did not germinate possibly due to somatoblastic sterility characterized by degeneration of embryo. The findings of the present investigation revealed that cultivated species *S. melongena* was cross-compatible with *S. gilo* and *S. aethiopicum* despite the parthenocarpic fruit set in the cross with *S. gilo*. Among the parents, maximum pollen fertility observed in cultivated brinjal varieties and minimum reported *S. aethiopicum*. Maximum and minimum pollen fertility observed in the in the interspecific hybrids *S. aethiopicum* × *S. khasianum* (78.63%) and *S. aethiopicum* × *S. melongena* cv. Pant Samrat (8.17%), respectively. With respect to morphological characterization, all the parents and their viable interspecific crosses showed ample variation for growth habit, texture of stem, stem colour, leaf colour, leaf size, prickle in leaf, midrib colour, prickle in mid rib, petiole colour, prickle in petiole, pedicel size, prickle in pedicel, calyx type, calyx colour, prickle in calyx, flower colour, flower size, anther colour, fruit size, fruit shape, fruit apex, fruit colour and fruiting habit. Thus crops wild relatives (CRWs) of eggplant may be regarded as a valuable genetic resources to generate genetic variation and are valuable for improving yield, quality and resistance to biotic stresses.

Keywords: Brinjal, wild relatives, interspecific hybrids, cross ability, morphological characterization

Introduction
Brinjal (*Solanum melongena* L.,) is also popularly known as eggplant or aubergine, or guinea squash and extensively grown not only in India, but also other tropical and subtropical part of the globe, where it is cultivated as a source of minerals, dietary fiber, and various bioactive compounds. Brinjal occupies primary position among the fresh vegetables. Brinjal is reported to be the sixth most important vegetable after tomato, watermelon, onion, cabbage, and cucumber and the supreme *Solanaceous* crop (Kaushik *et al*. 2016) [8]. Brinjal is originated in India and considered as one of the utmost common and popular vegetable of the country and it is also acknowledged as poor men's vegetable. The wild species *Solanum incanum*, is reported to be the progenitor of the cultivated brinjal which spread over at least 10 ecological habitats in India (Lester and Hasan, 1991) [11]. Though very rich diversity of this crop presents in various corners of the Indian sub-continent (Devi *et al*., 2015) [4], but the narrow genetic base also reported, which may have resulted from a genetic bottleneck during its domestication (Meyer *et al*., 2012) [12].
Wild relatives of a crop species are able contributor to disseminate the genetic background of crops for adaptation them to challenging environment (Dempewolf *et al*., 2014) [3]. Among the various biotic stresses shoot and fruit borer, bacterial wilt and phomopsis blight are considered as major threat of brinjal production (Karmakar and Singh, 2017) [7]. The wild relatives of brinjal may well represent as source of genetic variation in generating new populations of brinjal for improving yield, quality and resistance to biotic stresses (Kaushik *et al*. 2016) [8].
The wild genetic resources of brinjal are regarded as a rich source of resistance genes for diseases and insect pest (Ghani *et al*., 2020) [5]. For instance, *S. aethiopicum* reported to harbour bacterial wilt resistance gene (Collonnier *et al*., 2001) [2]; *S. indicum* is reported as source for resistance to little leaf, shoot and fruit borer (Bahgat *et al*., 2008) [1]; for *Verticillium* and *Fusarium* wilt *S. incanum* can be utilized as source of resistance (Prohens *et al*., 2013) [13];

and *S. gilo* and *S. khasianum* are showed resistance to phomopsis blight (Karmakar and Singh, 2017) [7]. Interspecific hybridization is well recognised and essential approach in plant breeding to introgress useful genes to cultivated back ground from wild species (Devi *et al*., 2015) [4]. Nevertheless, in distant hybridization, the development of crossed seed is critically hindered because of various pre and post fertilization barriers. The information related to both interspecific cross ability and morphological characters of interspecific hybrids are equally important in formulating an inclusive breeding scheme to develop resistance cultivar in eggplant. With this view, the present experiment was formulated to study the cross compatibility among cultivated genotypes & wild relatives and to characterize the resultant interspecific hybrids in Brinjal.

Materials and methods

The present experiments related to the present study was carried out for two successive years at the Vegetable Research Centre of the G. B. Pant University of Agriculture and Technology, Pantnagar, Udham Singh Nagar, Uttarakhand. In first year seeds of cultivated and wild relatives were sown to execute interspecific hybridization followed by the characterization of viable interspecific hybrids in the second year. The experimental material for this study encompassed two cultivars of *Solanum melongena* and three wild relatives of eggplant such as *S. melongena* cv. Pant Rituraj (PR), *S. melongena* cv. Pant Samrat (PS), *Solanum gilo* (Sg), *Solanum khasianum* (Sk) and *Solanum aethiopicum* (Sa); and their 9 viable interspecific hybrids PR × Sg, PR × Sa, Sg × PR, Sa × PR, Sa × PS, Sa × Sk, Sg × Sa, Sa × Sg, Sg × PS.

For cross-pollination, first mature buds with long style or medium styled flower buds of female parents were emasculated a day before anthesis. First mature buds in the clusters of the male parent were also bagged for collection of uncontaminated anthers. After anthesis of male flowers, the pollen grains were dusted on the stigma of the emasculated flowers of the female parent by rupturing the anther wall. The female flowers were re-bagged after pollination and labeled. Selected parents were crossed in all possible combination to produce intra and interspecific hybrids. Crossability relationship among cultivated species and its wild related species was evaluated by taking observation on percentage of fruit set in interspecific crosses, number of F_1 seedlings grown, percentage of F_1 plant with fruit, percentage of F_1 plants with seeded fruit and pollen viability of the F_1 plants and their parents. All the interspecific hybrids along with the parents were grown with three replications and all the recommended package of practices were followed to grow a successful crop. Besides, pollen fertility of parents and interspecific crosses also studied and compared.

With respect to the morphological characterization, observations of following morphological characters also recorded:

1) Habit- bushy / erect / semi-erect / spreading. 2) Texture of stem- pubescent/ thorny / smooth. 3) Stem colour- green / purple / purplish-green. 4) Leaf colour - green / dark green / purple. 5) Leaf size –Large/ medium/ small. 6) Prickle in leaf-present/absent. 7) Midrib colour- green / purple /whitish-green. 8) Prickle in mid rib- present/absent. 9) Petiole colour-green / purple / purplish-green. 10) Prickle in petiole-present/absent. 11) Pedicel size-short / medium / long. 12) Prickle in pedicel- present/absent. 13) Calyx type-papery/fleshy. 14) Calyx colour- purple / green. 15) Prickle in calyx- present/absent. 16) Flower colour- white/ purple. 17) Flower size- small / medium / large. 18) Anther colour-yellow / white. 19) Fruit size- small / medium / large. 20) Fruit shape- round / oblong / ovoid / long. 21) Fruit apex-blunt/pointed. 22) Fruit colour- green / purple / whitish-green. 23) Fruiting habit- solitary/cluster.

Results and Discussion

The important criteria generally recognized for evaluating species relationships from crossbaility point of view are related to a) the direction and ease at which two species can be crossed, b) the nature and fate of hybrids, c) the pollen fertility of the interspecific hybrids. These parameters indicate genetic compatibilities which signify the crossability relationship among the species.

Crossability relationship in related species and two varieties of eggplant: The crossability relationship among *Solanum* species and two cultivars of eggplant and the crossing pattern and pollen viability has been presented in Table 1 & 2. All the crosses except crosses involving *S. khasianum* as female parent found to be successful. However, *S. melongena* cv. Pant Rituraj × *S. khasianum* and *S. gilo* × *S. khasianum* produced shrunken seeds which did not germinate. Crosses like *S. melongena* cv. Pant Rituraj × S. gilo and its reciprocal cross, *S. gilo* × *S. melongena* cv. Pant Samrat and *S. aethiopicum* × *S. gilo* produced parthenocarpic fruits. Among the parents *S. melongena* cv. Pant Rituraj had maximum pollen fertility of 93.04 percent followed by cv. Pant Samrat (92.43%), *S. khasianum* (87.25%), *S. gilo* (81.20%) and *S. aethiopicum* (79.18%). Data also revealed that maximum pollen fertility was recorded in inter-varietal cross Pant Rituraj × Pant Samrat (90.06%) followed by different inter specific hybrids which ranged from 8.17 to 78.63 percent. Maximum pollen fertility was recorded in the interspecific cross *S. aethiopicum* × *S. khasianum* (78.63%) followed by *S. aethiopicum* × *S. gilo* (73.19%), *S. gilo* × *S. aethiopicum* (71.26%), *S. aethiopicum* × *S. melongena* cv. Pant Rituraj (65.36%), *S. melongena* cv. Pant Rituraj × *S. aethiopicum* (61.30%), *S. melongena* cv. Pant Rituraj × *S. gilo* (13.40%), *S. gilo* × *S. melongena* cv. Pant Rituraj (12.14%), *S. gilo* × *S. melongena* cv. Pant Samrat (9.84%) and *S. aethiopicum* × *S. melongena* cv. Pant Samrat (8.17%).

In the present studies the degree of crossability varied with each combination. Some crosses produced fruits with inviable seeds while other produced fruits with viable seeds, some other produced mature plants with seeded or parthenocarpic fruits. The experimental results revealed that intra-specific cross *S. melongena* cv. Pant Rituraj × cv. Pant Samrat had no problem regarding seed germination, fruit set and pollen fertility (90.06%). Among the inter specific crosses *S. khasianum* × *S. gilo* had highest percent of fruit set followed by *S. aethiopicum* × *S. melongena* cv. Pant Rituraj (76%), *S. gilo* × *S. melongena* cv. Pant Samrat (66%), *S. gilo* × *S. melongena* cv. Pant Rituraj (62%) and *S. melongena* cv. Pant Rituraj × *S. gilo* (54%) and lowest fruit set of 6% was obtained in the crosses *S. melongena* cv. Pant Samrat × *S. khasianum* and *S. gilo* × *S. khasianum* followed by *S. aethiopicum* × *S. khasianum*. There was no problem in seed germination except in crosses involving *S. khasianum* as male parent. There was no problem in fruit set in F_1 hybrid in almost all crosses having a highest value of 100 percent plants set fruit in *S. melongena* cv. Pant Rituraj × *S. gilo*, *S. melongena* cv. Pant Rituraj × *S. aethiopicum*, *S. gilo* × *S. melongena* cv. Pant Rituraj, *S. aethiopicum* × *S. melongena* cv. Pant Samrat and lowest value of 66.7 percent was recorded in *S. aethiopicum* × *S. khasianum*. Crosses involving *S. khasianum* as female parent failed to set fruit might be due to pollen tubes of the other species were unable to reach the ovary of *Solanum khasianum*. F_1 seeds failed to germinate in crosses like *S. melongena* cv. Pant Rituraj × *S. khasianum* and *S. gilo* × *S. khasianum* possibly due to somatoblastic sterility characterized by degeneration of embryo. The results are encouraged by the previous reports of Singh *et al*. (2002) [14] and Devi *et al*. (2015) [4]. The results also revealed that pollen fertility of F_1 hybrids was reduced as compared to their respective parents which may be due to microspore degeneration. In interspecific crosses higher pollen fertility was observed in *S. gilo* × *S. khasianum* (78.63) and lowest in *S. gilo* × *S. melongena* cv. Pant Samrat (8.17%). This report was in conformity of the previous reports of Kirti and Rao (1983) [10].

From the above results it is well understood that *S. gilo* and *S. aethiopicum* are crossable to cultivated *S. melongena* but for obtaining F_2 and backcrossed seed it is advisable to practiced late season pollination as at that times hybrids produced some seeded fruits particularly in cross like *S. melongena* cv. Pant Rituraj × *S. gilo* (Table 3). While to make successful gene transfer from *S. khasianum* to cultivated *S. melongena* needs the help of embryo culture otherwise horizontal gene transfer through transgenic approaches.

Morphological characterization of the parents and their interspecific hybrids: The morphological characters of the parents and their F_1 hybrids were presented on the Table 4. The plant morphological characters like growth habit, stem colour, leaf colour, midrib colour, flower colour, presence or absence of prickles, fruit size, shape and colour etc. are qualitative traits and governed by one or two major genes and they generally show dominance relationship. But results revealed that growth habit of *S. melongena* cv. Pant Rituraj was spreading, while semi-erect and erect in *S. melongena* cv. Pant Samrat and *S. gilo* respectively and it was bushy in *S. gilo* and *S. khasianum*. Among the F_1 hybrids *S. melongena* cv. Pant Rituraj × *S. aethiopicum*, *S. melongena* cv. Pant Rituraj × *S. melongena* cv. Pant Samrat, *S. aethiopicum* × *S. khasianum*, *S. gilo* × *S. aethiopicum*, *S. aethiopicum* × *S. melongena* cv. Pant Rituraj, *S. aethiopicum* × *S. melongena* cv. Pant Samrat had spreading growth habit while it was erect and bushy in *S. gilo* × *S. melongena* cv. Pant Samrat, *S. melongena* cv. Pant Rituraj × *S. gilo* and its reciprocal cross. But the cross *S. aethiopicum* × *S. gilo* had bushy growth habit. Stem texture was pubescent in *S. melongena* cultivars and most of the hybrids except *S. gilo*, *S. aethiopicum*, hybrids of *S. melongena* cv. Pant Rituraj × *S. aethiopicum*, *S. aethiopicum* × *S. khasianum* and *S. gilo* × *S. aethiopicum* where it was smooth, while it was thorny in *S. khasianum.* Wild relatives like *S. khasianum*, *S. gilo*, *S. aethiopicum* and hybrids like *S. melongena* cv. Pant Rituraj × *S. aethiopicum*, *S. aethiopicum* × *S. khasianum*, *S. aethiopicum* × *S. melongena* cv. Pant Rituraj had green colour stem, while it was purple in all other genotypes.

Leaf colour of all the genotypes was green, while it was dark green in *S. gilo*. Medium size leaves were found in all genotypes except *S. melongena* cv. Pant Rituraj, *S. melongena* cv. Pant Samrat, *S. melongena* cv. Pant Rituraj × *S. aethiopicum*, *S. gilo* × *S. melongena* cv. Pant Samrat, *Solanum melongena* cv. Pant Rituraj × *S. gilo* and its reciprocal cross having large size leaves. With respect to midrib colour, it was purple in all the genotypes except *S. khasianum, S. gilo, S. aethiopicum*, *S. melongena* cv. Pant Rituraj × *S. aethiopicum*, *S. aethiopicum* × *S. khasianum*, *S. gilo* × *S. aethiopicum* and *S. aethiopicum* × *S. melongena* cv. Pant Rituraj. In the case pedicel size, it was large in *S. melongena* cv. Pant Rituraj, *S. melongena* cv. Pant Samrat, *S. melongena* cv. Pant Rituraj × *S. aethiopicum, S. melongena* cv. Pant Rituraj × *S. melongena* cv. Pant Samrat but it was short in all other parents and their hybrid derivatives.

Fleshy type calyx (generally cooked with brinjal fruit; having high mineral content) was found in cultivated *S. melongena* cv. Pant Rituraj, *S. melongena* cv. Pant Samrat, *S. gilo* and hybrids like *S. melongena* cv. Pant Rituraj × *S. aethiopicum* and *S. melongena* cv. Pant Rituraj × *S. melongena* cv. Pant Samrat while in other genotypes calyx was papery type. White flower colour was found in *S. khasianum, S. gilo, S. aethiopicum*, *S. aethiopicum* × *S. khasianum*, *S. gilo* × *S. aethiopicum*, *S. aethiopicum* × S. *melongena* cv. Pant Rituraj but in all other genotypes flower colour was purple. Small size flowers were found in all the genotypes except *S. melongena* cv. Pant Rituraj, *S. melongena* cv. Pant Samrat, *S. melongena* cv. Pant Rituraj × *S. melongena* cv. Pant Samrat, *S. melongena* cv. Pant Rituraj × *S. aethiopicum, S. melongena* cv. Pant Rituraj × S. gilo and its reciprocal cross. Except *S. khasianum* prickle in leaf, midrib, petiole, pedicel and calyx was absent in all the genotype though presence of prickle is a dominant trait.

S. melongena cv. Pant Samrat produced long fruits in cluster, but the cross *S. melongena* cv. Pant Rituraj × *S. melongena* cv. Pant Samrat produced oblong shaped fruits. While it was pear shaped in *S. aethiopicum* and all other genotypes produced almost round shaped fruit. Large size fruit was found in *S. melongena* cv. Pant Rituraj, *S. melongena* cv. Pant Rituraj × *S. aethiopicum*. It was medium in *S. melongena* cv. Pant Samrat but all other genotypes had small size fruits. Fruit apex was blunt in all the genotypes except *S. melongena* cv. Pant Samrat. Purple colour of fruits was observed in *S. melongena* cv. Pant Rituraj, *S. melongena* cv. Pant Samrat. Fruit colour was purplish green in *S. melongena* cv. Pant Rituraj × *S. gilo* and its reciprocal cross, while it was green in all other genotypes.

It was found that when *S. aethiopicum* was involved in the crosses with *S. melongena* cultivars either as male or female parent, F_1 showed wild type morphological characters instead of expressing dominant traits. This was also true in the cross *S. aethiopicum* × *S. khasianum* where prickles were absent in the F_1, in spite of being a dominant trait. The report about different morphological characters was encouraged by the report of Wanjari and Khapre (1977) [15]. This result was also supported by the report of Ignatova (1971) who studied the morphological and biological characteristics of F_1 hybrids of *S. melongena* × *S. aethiopicum* and reported that the hybrids fell in to two different groups- high fertile and viable plant with complete dominance of all the characters of wild parent and almost completely sterile plants showing intermediate inheritance for several characters together with new characters not typical of the parents. Reports of Khapre *et al*. (1988) [9], Devi *et al*. (2015) [4] and Kaushik *et al*. (2016) [8] support the findings of the present investigation.

Table 1: Cross ability relationship between three related species and two varieties of eggplant

Crosses	No. of flowers pollinated	No. of berries set	Berry set (%)	Ave. no. of seeds /fruit	Germination (%)	No. of F_1 seedlings grown	%F_1 plants with fruit	%F_1 plants with seeded fruit	%F_1 plants without seeded fruit
PR × PS	50	40	80	469	90.67	81	100	100	0
PR × Sg	50	27	54	175	52.10	66	100	0	100
PR × Sa	50	20	40	127	50.34	63	100	100	0
PR × Sk	50	5	10	45	00.00	#	#	#	#
PS × PR	50	30	60	315	89.50	76	100	100	0
PS × Sg	50	19	38	57	48.45	46	100	0	100
PS × Sa	50	21	42	109	44.00	37	100	100	0
PS × Sk	50	3	6	27	00.00	#	#	#	#
Sg × PR	50	31	62	119	44.67	67	100	0	100
Sg × PS	50	22	44	97	47.33	71	92.7	0	100
Sg × Sa	50	37	74	54	48.67	73	88.2	100	0
Sg × Sk	50	3	6	63	00.00	#	#	#	#
Sa × PR	50	38	76	71	45.33	68	100	100	0
Sa × PS	50	33	66	51	42.67	64	100	100	0
Sa × Sg	50	41	82	81	46.00	69	81.25	0	100
Sa × Sk	50	8	16	26	23.55	28	66.7	100	0
Sk × PR	50	0	0	-	-	-	-	-	-
Sk × PS	50	0	0	-	-	-	-	-	-
Sk × Sg	50	0	0	-	-	-	-	-	-
Sk × Sa	50	0	0	-	-	-	-	-	-

#: Seeds not germinated; –: 0 fruit set recorded
PS – *S. melongena* cv. Pant Samrat; PR – *S. melongena* cv. Pant Rituraj; Sa – *S. aethiopicum;* Sg – *S. gilo;* Sk –*S. khasianum*

Table 2: Pollen fertility in parents and their F_1 hybrids

F_1 Hybrids	Female Parent	Male Parent	F_1 hybrids
PR × PS	93.04	92.43	90.06
PR × Sg	93.04	81.20	13.40
PR × Sa	93.04	79.18	61.30
Sg × PR	81.20	93.04	12.14
Sa × PR	79.18	93.04	65.36
Sa × Sk	79.18	87.25	78.63
Sg × PS	81.20	92.43	9.84
Sg × Sa	81.20	79.18	71.26
Sa × Sg	79.18	81.20	73.19
Sa × PS	79.18	92.43	8.17

PS – *S. melongena* cv. Pant Samrat; PR – *S. melongena* cv. Pant Rituraj; Sa – *S. aethiopicum;* Sg – *S. gilo;* Sk –*S. khasianum*

Table 3: Crossability relationship among the different species of *S. Melongena*

Parents	*S. melongena*	*S. gilo*	*S. aethiopicum*	*S. khasianum*
S. melongena	©	*	®	Δ
S. gilo	*	©	®	Δ
S. aethiopicum	®	®	©	+
S. khasianum	÷	÷	÷	©
©	No problem in Selfing			
*	Successful cross but F_1 produce parthenocarpic fruit			
®	Successful cross and F_1 produce seeded fruit			
÷	Unsuccessful cross			
Δ	Cross produced fruit but F_1 seeds fail to germinate			
+	Reduced seed germination			

Table 4: Morphological characters of parents and F_1 hybrids

Genotype	Habit	Stem texture	Stem colour	Leaf colour	Leaf size	Prickle in leaf	Midrib colour	Prickle in midrib	Petiole colour	Prickle in petiole	Pedicel size
Sk	B	Th	G	G	M	P	G	P	G	P	Sh
Sg	B	S	G	DG	M	A	G	A	G	A	Sh
Sa	E	S	G	G	M	A	G	A	G	A	Sh
PS	SE	Pb	Pu	G	L	A	Pu	A	Pu	A	Lo
PR	Sp	Pb	Pu	G	L	A	Pu	A	Pu	A	Lo
PR × Sa	Sp	S	G	G	L	A	G	A	G	A	Lo
PR × Sg	E & B	Pb	Pu	G	L	A	Pu	A	Pu	A	Sh
Sg × PR	E & B	Pb	Pu	G	L	A	Pu	A	Pu	A	Sh

Sa × Sg	B	Pb	Pu	G	M	A	Pu	A	Pu	A	Sh
Sa × Sk	Sp	S	G	G	M	A	G	A	G	A	Sh
Sg × PS	Sp	Pb	Pu	G	L	A	Pu	A	Pu	A	Sh
Sg × Sa	Sp	S	Pu	G	M	A	G	A	G	A	Sh
Sa × PR	Sp	Pb	G	G	M	A	G	A	G	A	Sh
Sa × PS	Sp	Pb	Pu	G	M	A	Pu	A	Pu	A	Sh
PR × PS	Sp	S	Pu	G	L	A	Pu	A	Pu	A	Lo

Table 5: Morphological characters of parents and F_1 hybrids

Genotype	Prickle in pedicel	Calyx type	Prickle in calyx	Flower colour	Flower size	Anther colour	Fruit shape	Fruit size	Fruit apex	Fruit colour	Bearing habit
Sk	P	Pa	P	W	Sm	W	R	Sm	Bl	G	So
Sg	A	Fl	A	W	Sm	Y	R	Sm	Bl	G	C
Sa	A	Pa	A	W	Sm	Y	R	Sm	Bl	G	So
PS	A	Fl	A	Pu	L	Y	Lo	M	Po	Pu	C
PR	A	Fl	A	Pu	L	Y	R	L	Bl	Pu	So
PR × Sa	A	Fl	A	Pu	L	Y	O	L	Bl	G	So
PR × Sg	A	Pa	A	Pu	L	Y	R	Sm	Bl	PG	C
Sg × PR	A	Pa	A	Pu	L	Y	R	Sm	Bl	PG	C
Sa × Sg	A	Pa	A	Pu	Sm	Y	R	Sm	Bl	G	C
Sa × Sk	A	Pa	A	W	Sm	Y	R	Sm	Bl	G	C
Sg × PS	A	Pa	A	Pu	Sm	Y	R	Sm	Bl	G	C
Sg × Sa	A	Pa	A	W	Sm	Y	R	Sm	Bl	G	C
Sa × PR	A	Pa	A	W	Sm	Y	R	Sm	Bl	G	C
Sa × PS	A	Pa	A	Pu	Sm	Y	R	Sm	Bl	G	C
PR × PS	A	Fl	A	Pu	L	Y	Ob	L	Bl	Pu	C

Sk = *Solanum khasianum* **Sg =***S. gilo* **Sa =***S. aethiopicum* **PS =** *S. melongena* cv. Pant Samrat **PR =** *S. melongena* cv. Pant Rituraj
B –Bush, E – Erect, SE – Semi erect, Th – Thorny, S – Smooth, Pb –Pubescence, G- Green, Pu – Purple, DG – Dark green, M – Medium, L – Large, P – Present, A- Absent, Sh- Short, Lo – Long, Pa – Papary, Fl – Fleshy, W – White, Sm – Small, Y – Yellow, R – Round, O – Oval, Ob – Oblong, Bl – Blunt, Po- Pointed, PG – Pale green, So – Solitary, C - Cluster

Conclusion

From the findings of this study it is quite conclusive that the wild relatives of *S. melongena* have great significant in the crop improvement. Among the wild relatives *S. khasianum* was totally cross incompatible to the cultivated species *S. melongena* but it carries resistant gene(s) for shoot and fruit borer, jassid, phomopsis blight, and bacterial wilt. Despite the parthenocarpic fruit set in F_1 hybrids *S. gilo* showed great promise for resistant to shoot and fruit borer, jassid, phomopsis blight and bacterial wilt. While *S. aethiopicum* showed resistant to bacterial wilt in spite the morphological variation in the F_1 hybrid with cultivated *S. melongena*. Late season pollination was most effective to obtain F_2 or backcrossed seeds in the interspecific hybrids involving *S. gilo* as one of the parents. Nevertheless, wild relative of brinjal and very useful creating morphological variation in cross derived population.

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