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UD Pansare
Post Graduate Institute,
Department of Horticulture,
MPKV, Rahuri, Maharashtra,
India

VR Joshi
Horticulturist, AICRP on Arid
Zone Fruit PGI, MPKV, Rahuri,
Maharashtra, India

SD Gaikwad
Agriculture Assistant,
Department of Horticulture,
MPKV, Rahuri, Maharashtra,
India

DA Patil
Ph.D., Scholar, MPKV,
Rahuri, Maharashtra, India

VR Dhakne
Department of Horticulture,
College of Agriculture Latur,
Rahuri, Maharashtra, India

Corresponding Author:
UD Pansare
Post Graduate Institute,
Department of Horticulture,
MPKV, Rahuri, Maharashtra,
India

Assessment of morphological, phenological and yield parameters of roasting type Brinjal hybrids (*Solanum melongena* L.)

UD Pansare, VR Joshi, SD Gaikwad, DA Patil and VR Dhakne

Abstract

The present investigation entitled, "Assessment of Morphological, Phenological and Yield Parameters of Roasting type Brinjal Hybrids (*Solanum melongena* L.)" was carried out at AICRP on Vegetable Crops, Department of Horticulture, Mahatma Phule Krishi Vidyapeeth, Rahuri during *kharif* 2020. The experiment was laid out in the RBD with three replications. The experiment was comprised of seven hybrids and three checks. Among all the hybrids and checks hybrid RBH-1 (T₁) recorded maximum plant height (112.96 cm) at last picking and maximum number of branches (7.62). RBH-1 (T₁) recorded minimum days (52.20) to first flowering, minimum days (64.97) to 50% flowering also minimum days (86.32) to first harvest. Maximum fruiting period (days) recorded by RBH-7 (T₇) (95.92 days). Hence, result revealed that RBH-1 (T₁) is an early maturing hybrid. Among all the treatments, RBH-1 (T₁) recorded significantly maximum number of fruits per plant (18.83), fruit length (17.02 cm), fruit weight (228.09 g), fruit diameter (8.32 cm), pericarp thickness (0.79 cm), fruit yield per plant (4.30 kg), yield per plot (103.16 kg) and yield per ha (520.99 q).

Keywords: brinjal, assessment, growth, yield, roasting

Introduction

Brinjal, often known as eggplant (*Solanum melongena* L.) (2n=24), is a popular solanaceous crop in the subtropics and tropics. Brinjal is mostly grown in the Indo-Burma region. The word brinjal is widespread in the Indian subcontinent and is derived from *Arabic* and *Sanskrit*, whereas the name eggplant is derived from the shape of some types' white fruits, which resemble chicken eggs in shape. In Europe, it is also known as *aubergine* (French term). Brinjal has been dubbed the "King of Vegetables" (Khan and Singh, 2014)^[9].

The eggplant is a popular warm-weather crop with a high economic value. Eggplants are an essential component of everyday dishes in many Asian and Mediterranean countries. Because eggplants are picked at an immature stage and have a low storage value, selling them in local markets requires a careful production approach. (Kumar *et al.*, 2012)^[12].

It is a perennial, but it's usually planted as a frost-sensitive, warm-season annual. It grows to be 0.4 to 1.5 meters tall and branching, with wide, broad leaves and a spiny stem. Fruits that are physiologically mature are brown or golden in colour. Spherical, oblong, ovoid, oval long, and various intermediate shapes are among the shapes available (Kumar *et al.* 2011)^[11].

Brinjal is a poor perennial that is produced as an annual crop economically. Brinjal fruits that are immature and tender are primarily served as a cooked vegetable in a variety of ways. Its popularity arises from its versatility and variety, which it brings to our diet as an ingredient in a number of dishes ranging from vangi bhath to a well-seasoned filled brinjal, sliced bhaji, bharta, chutney and pickles.

It has a lot of promise as a raw material for processing industries like canning, dehydration, pickling, freezing, and frying. For some dishes, fruits of various shapes, sizes, and colours are not used. For stuffing, utilize round or oval fruits, long green or purple black fruits for vangi bhath and sambhar preparation and larger size for bharta and other dishes (Gayatri and Patil, 2003)^[5].

Materials and Methods

During the *kharif* season of 2020-21, the field experiment was undertaken at the AICRP on

Vegetable Crops, Department of Horticulture, MPKV, Rahuri. Seven brinjal hybrids and three checks were used in the experiment, which was carried out in a Randomized Block Design (RBD) with three replications.

The treatments consisted of hybrids RBH-1, RBH-2, RBH-3, RBH-4, RBH-5, RBH-6, RBH-7 and checks Phule Harit, Gallon and Bartok.

The following observations were recorded during the crop growth period on five randomly selected competitive plants. Observation were recorded on morphological parameters such as plant height, number of branches per plant. Phenological parameters likes days to first flowering, days to

50% flowering, days to first harvest, fruiting period (days). Yield parameters such as number of fruits per plant, fruit length, fruit weight, fruit diameter, pericarp thickness, fruit yield per plant, yield per plot and yield per ha.

The data was statistically analysed using the statistical procedures recommended by Panse and Sukhatme (1985) [14]. Wherever the results were significant, the standard error (S.E.) of means was determined, and the critical difference (CD) between two means was calculated at a 5% level of significance. The data on individual plant characters was subjected to the analysis of variance approach, which is often used in randomised block design.

Table 1: Morphological parameters of roasting type brinjal hybrids and genotype

Treatment	Treatment details	Plant height (cm)	Number of branches per plants
T ₁	RBH-1	112.96	7.62
T ₂	RBH-2	105.10	5.45
T ₃	RBH-3	102.71	5.26
T ₄	RBH-4	96.96	5.07
T ₅	RBH-5	92.40	4.91
T ₆	RBH-6	86.33	3.92
T ₇	RBH-7	107.22	6.42
T ₈	Phule Harit (c)*	103.56	5.66
T ₉	Gallon(cc)**	100.83	4.48
T ₁₀	Bartok(cc)**	98.95	4.01
	S.E. (m)±	2.09	0.431
	CD at 5%	6.20	1.282

Table 2: Phenological parameters of roasting type brinjal hybrids and genotype

Treatment	Treatment Details	Days to first flowering	Days to 50% flowering	Number of fruits per cluster	Number of days to first picking	Fruiting period (days)
T ₁	RBH-1	52.20	64.97	1.0	86.32	94.24
T ₂	RBH-2	55.06	70.87	1.0	92.35	91.30
T ₃	RBH-3	56.88	73.34	1.0	94.21	90.68
T ₄	RBH-4	58.58	74.52	1.0	95.51	90.51
T ₅	RBH-5	59.25	75.58	1.0	98.23	85.91
T ₆	RBH-6	60.06	77.10	1.0	101.98	82.76
T ₇	RBH-7	53.30	66.27	1.0	89.16	95.92
T ₈	Phule Harit (c)*	54.84	68.29	1.0	91.98	89.49
T ₉	Gallon (cc) **	56.72	71.64	1.0	93.65	87.72
T ₁₀	Bartok (cc) **	57.94	73.28	1.0	94.32	86.19
	S.E. (m)±	0.89	1.26	0.00	1.37	0.71
	CD at 5%	2.667	3.74	0.00	4.08	2.11

Table 3: Yield parameters of roasting type brinjal hybrids and genotype

Treatment	Treatment details	Number of fruits per plants	Fruit length (cm)	Fruit diameter (cm)	Fruit weight (g)	Pericarp thickness (cm)
T ₁	RBH-1	18.83	17.02	8.32	228.09	0.79
T ₂	RBH-2	16.87	15.94	7.91	221.34	0.72
T ₃	RBH-3	15.80	14.36	6.55	218.47	0.65
T ₄	RBH-4	14.81	12.89	6.27	214.35	0.63
T ₅	RBH-5	14.56	12.03	6.14	199.59	0.59
T ₆	RBH-6	13.96	11.89	5.96	166.62	0.54
T ₇	RBH-7	17.82	15.96	8.27	223.96	0.75
T ₈	Phule Harit (c)*	17.53	15.26	8.21	212.24	0.73
T ₉	Gallon (cc) **	16.77	14.93	7.97	211.51	0.72
T ₁₀	Bartok (cc) **	16.10	14.77	6.36	210.93	0.66
	S.E. (m)±	0.80	0.53	0.33	1.40	0.01
	CD at 5%	2.37	1.56	0.97	4.17	0.04

Table 4: Yield parameters of roasting type brinjal hybrids and genotype

Treatment	Treatments Details	Yield per plant (kg)	Yield per plot (kg)	Yield per ha (q)
T ₁	RBH-1	4.30	103.16	520.99
T ₂	RBH-2	3.74	89.64	452.75
T ₃	RBH-3	3.45	82.83	418.33
T ₄	RBH-4	3.17	76.16	384.67
T ₅	RBH-5	2.91	69.83	352.68
T ₆	RBH-6	2.33	55.80	281.82
T ₇	RBH-7	3.99	95.79	483.78
T ₈	Phule Harit (c)*	3.72	89.23	450.65
T ₉	Gallon (cc) **	3.55	85.11	429.87
T ₁₀	Bartok (cc) **	3.39	81.46	411.43
	S.E. (m)±	0.18	4.36	22.01
	CD at 5%	0.54	12.95	65.39

Result and Discussion

1. Morphological Parameter

The result of the present investigation for morphological characters are depicted in Table 1. The result showed that maximum plant height at last picking was observed in RBH-1 (T₁) (112.96 cm) which was found to be statistically at par with RBH-7 (T₇) (107.22 cm) and significantly superior over the other hybrids and check Phule Harit, Gallon and Bartok as commercial check. The minimum plant height (86.33 cm) was recorded in hybrid RBH-6 (T₆). The above results are in conformity with results reported by Jayalakshmi and Praneetha (2018)^[7], Syed *et al.* (2018)^[15].

Maximum number of branches (7.62) was recorded by hybrid RBH-1 (T₁) which was found at par with hybrid RBH-7 (T₇) (6.42) and significantly superior over the remaining hybrids and check Phule Harit, Gallon and Bartok as commercial check. Similar results were reported by Thangamani (2003)^[16], Jayalakshmi and Praneetha (2018)^[7].

2. Phenological Parameters

The mean performance of phenological parameters is presented in Table 2. Days to first flowering appears are ranged from 52.20 to 60.06 days. Significantly least minimum days taken for appearing the first flower was observed in the hybrid RBH-1 (T₁) (52.20 days) which was found at par with hybrid RBH-7 (T₇) (53.30 days) and check Phule Harit (T₈) (54.84 days) and significantly superior over the Gallon and Bartok as commercial check. Significantly maximum number of days for first flowering was recorded in hybrid RBH-6 (60.06 days). Similar results were also reported by Das *et al.* (2017), Kekana (2018)^[8].

The days required for 50% flowering of different hybrids ranged from 64.97 days to 77.10 days. It was found that hybrid RBH-6 (T₆) required maximum days (77.10) for 50% flowering which was at par with RBH-5 (T₅) (75.58 days) and RBH-4 (T₄) (74.52 days). On the other hand, minimum days (64.97) for 50% flowering was required by hybrid RBH-1 (T₁) which was at par with RBH-7 (T₇) (66.27), check Phule Harit (T₈) (68.29). Two hybrids exhibited significant earliness in 50% flowering as compared to Gallon and Bartok as commercial check.

Above findings regarding the variation in 50% flowering in different brinjal hybrids are in accordance with Vidhya and Kumar (2015)^[18].

Solitary fruit bearing habit was observed in all brinjal hybrids along with check and commercial checks. This result was agreement with Tripathy *et al.* (2017)^[17].

Days required for first picking of fruit ranged from 86.32 days to 101.98 days. Significantly minimum days for first fruit picking was recorded in RBH-1(T₁) (86.32 days), which was

at par with, RBH-7 (T₇) (89.16 days) and significantly superior over the check Phule Harit, Gallon and Bartok as commercial check. However, significantly maximum days for first fruit picking was recorded in RBH-6 (T₆) (101.98 days) which was at par with RBH-5 (T₅) (98.23 days). The similar results were also reported by Dhaka and Soni (2012)^[4], Kekana (2018)^[8].

The maximum fruiting period (days) recorded in RBH-7 (T₇) (95.92 days) which was at par with RBH-1 (T₁) (94.24 days). However, the minimum fruiting period (days) noticed in RBH-6 (T₆) (82.76 days). Similar findings were reported by Syed *et al.* (2018)^[15] and Haldavanekar *et al.* (2019)^[6].

3. Yield Parameters

The results of the present investigation for yield parameters are depicted in Table 3. The highest number of fruits per plant was noticed in the treatment RBH-1 (T₁) (18.83). Which is at par with treatment RBH-7 (T₇) (17.82) and treatment check Phule Harit (T₈) (17.53) and was superior over rest of the hybrids, Gallon and Bartok as commercial check. The lowest number of fruits per plant was noticed in treatment RBH-6 (T₆) (13.96). Which is at par with RBH-5 (T₅) (14.56), RBH-4 (T₄) (14.81), RBH-3 (T₃) (15.80) and Bartok (T₁₀) (16.10).

The variation in number of fruits per plants was also noticed in Syed *et al.* (2018)^[15], Chaturvedi *et al.* (2016)^[1] and Dhaka and Soni (2012)^[4].

The significantly longer fruits were recorded in RBH-1 (T₁) (17.02 cm). Which is at par with hybrid RBH-7 (T₇) (15.96 cm), RBH-2 (T₂) (15.94 cm), check Phule Harit (T₈) (15.26 cm), Gallon (T₉) (14.93 cm) and Bartok (T₁₀) (14.77cm) as commercial check. Shortest fruit length recorded in treatment RBH-6 (T₆) (11.89 cm). Which is at par with hybrids RBH-5 (T₅) (12.03 cm), RBH-4 (T₄) (12.89 cm).

Small and medium fruits are more popular in the kitchen, whereas large fruits are useful for making bharta (roasting purpose). The above result is in accordance with Singh *et al.* (1999), Gayatri and Patil (2003)^[5], Tripathy *et al.* (2017)^[17].

Fruit diameter along with the fruit length decides the size and weight of fruit and ultimately contributes to the yield. Similarly, the fruit diameter of brinjal hybrids was also varied significantly and it was in the range of 5.96 to 8.32 cm. The highest fruit diameter was noticed in the hybrid RBH-1 (T₁) (8.32 cm) was at par with RBH-7 (T₇) (8.27 cm), check Phule Harit (T₈) (8.21 cm), and commercial check Gallon (T₉) (7.97 cm) RBH-2 (T₂) (7.91 cm) and the lowest fruit diameter was observed in hybrid RBH-6 (T₆) (5.96 cm). Such type of variation in fruit diameter was also noticed in Khapte *et al.* (2012)^[10], Gayatri and Patil (2003)^[5], Kekana (2018)^[8].

The fruit weight of brinjal hybrids was in range of 166.62 to

228.09 g. The highest fruit weight was observed in hybrid RBH-1 (T₁) (228.09 g) and was superior over all the hybrids and checks under study which was at par with RBH-7 (T₇) (223.96 g). The lowest fruit weight was noticed in hybrid RBH-6 (T₆) (166.62 g). Maximum fruit weight is associated with maximum pulp yield for roasting purpose. The variation in weight of the brinjal fruits was also recorded by many scientists working on *viz.*, Chaturvedi *et al.* (2016)^[1], Tripathy *et al.* (2017)^[17].

Brinjal pericarp thickness is a good quality characteristic for extending shelf life. Fruit with a thick pericarp is more suited to long-distance transit and has less post-harvest losses.

Significantly maximum pericarp thickness was recorded by RBH-1 (T₁) (0.79 cm) which was at par with RBH-7 (T₇) (0.75 cm), followed by check Phule Harit (T₈) (0.73 cm), hybrid RBH-2 (T₂) (0.72 cm), Gallon (T₉) (0.72 cm) and Bartok (T₁₀) (0.66 cm) as commercial check. Significantly lower pericarp thickness observed in RBH-6 (T₆) (0.54 cm) followed by RBH-5 (T₅) (0.59 cm), RBH-4 (T₄) (0.63 cm), RBH-3 (T₃) (0.65 cm). The findings are in accordance with those reported by Gayatri and Patil (2003)^[5], Tripathy *et al.* (2017)^[17] and Chinthagunti *et al.* (2018a)^[2].

The result of the present investigation of yield parameters for fruit yield per plant, Total yield per hectare are depicted in Table 4.

The significantly higher fruit yield per plant was recorded in the hybrid RBH-1 (T₁) (4.30 kg) which was at par with RBH-7 (T₇) (3.99 kg), RBH-2 (T₂) (3.74 kg), check Phule Harit (T₈) (3.72 kg). RBH-6 (T₆) recorded lowest yield per plant (2.33 kg). The result is in concordance with those of Nirmala *et al.* (2013)^[13], Chaturvedi *et al.* (2016)^[1].

The yield per plot ranges from 55.80 kg to 103.16 kg. The significantly higher fruit yield per plot was recorded in the hybrid RBH-1 (T₁) (103.16 kg) which was at par with RBH-7 (T₇) (95.79 kg) followed by RBH-2 (T₂) (89.64 kg), check Phule Harit (T₈) (89.23 kg), Gallon as commercial check (T₉) (85.11 kg), RBH-3 (T₃) (82.83 kg). Hybrid RBH-6 (T₆) recorded lowest yield per plot (55.80 kg). These results are in line with the result of Nirmala *et al.* (2013)^[13], Chaturvedi *et al.* (2016)^[1], Tripathy *et al.* (2017)^[17].

Total yield per hectare ranged from 281.82 to 520.99 q/ha. The maximum yield per hectare was observed in hybrid RBH-1 (T₁) (520.99 q/ha) which was at par with hybrid RBH-7 (T₇) (483.78 q/ha) followed by RBH-2 (T₂) (452.75 q/ha), check Phule Harit (T₈) (450.65 q/ha), Gallon (T₉) (429.87 q/ha) and Bartok as commercial check (T₁₀) (411.43 q/ha). Minimum yield per hectare was noticed in hybrid RBH-6 (T₆) (281.82 q/ha). These results are in line with the result of Kadam *et al.* (2007), Chinthagunti *et al.* (2018a)^[2] and Tripathy *et al.* (2017)^[17].

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