

## Short Communication

# **GH-22: A new bottle gourd variety**

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Bottle gourd [*Lagenaria siceraria* (Mol.) Standl.] belonging to the family cucurbitaceae is cultivated in tropical and subtropical regions of the world though its centre of origin is tropical Africa and Asia. In India, it is cultivated in all parts of the country mainly during spring-summer and rainy season. It supplies carbohydrates, protein, minerals and vitamins in adequate amount. Bottle gourd varieties may be long, round, or oval-oblong fruited. It is grown for its tender fruits, which are consumed either in cooked form or used for making sweets. Its pulp, tender stem and tender leaves are known to have cooling effect and prevent constipation. The green fruits are easily digestible and its juice is considered good for arresting heart problems. Inbreeding in landraces followed by individual plant selection is an effective method of breeding to develop pure line cultivars for cultivation in different agro-ecological zones. Bottle gourd being a cross-pollinated crop does not suffer from inbreeding depression. The goal of bottle gourd breeding is to develop high yielding early variety with more number of fruits, medium fruit weight, high female to male flower ratio, cylindrical green fruits, presence of pubescence sparsely on skin, non-fibrous flesh at edible stage, bitterness free and resistance against insect-pests and diseases. Before sowing, the seed was wrapped overnight in a moist gunny bag, which was sterilized by dipping in 0.2% solution of captan 70% WP. Thereafter, the seed was dried in shade for half an hour. The channels of 45 cm width and 30-40 cm deep were opened in east west direction at a distance of 2.5 to 3 meter for providing uniform sunlight throughout the day to the plants. About one kg mixture of chemical fertilizers and farmyard manure was applied and mixed thoroughly in soil where the seeds were to be sown. Then, two to three seeds

were sown on northern side slope of channels where the mixture of fertilizers and farmyard manure was mixed; and retained only one healthy/vigorous seedling per hill, when they became large enough to handle.

**Salient characteristics:** GH-22 variety has medium long vine (6.6 m) with green leaves, oblong to bottled shaped attractive green fruits, medium size of 28.2 cm length and 7.6 cm diameter, non-fibrous white flesh, medium fruit weight 750-800 g and longer shelf life because of lesser physiological loss in weight (7.43, 3.04 and 2.76%) as compared to Pusa Naveen (11.47, 3.29 and 2.84%) after 8 days of storage in cardboard boxes, polythene bag and cling film packing, respectively (Table-3). The fruits are very good in taste and take lesser time in cooking. It is very early in maturity and fruits become ready for first picking in 55-60 days after sowing in spring-summer and 50-55 days after sowing in *Kharif* season. The average fruit yield is 280 q/ha in a duration of 125-130 days.

**Agronomics characters:** The variety GH-22 gives more fruits per vine (6.4 and 7.7) than that of Pusa Summer Prolific Long (5.5 and 5.5) and Pusa Naveen (5.7 and 6.3) in spring-summer and rainy season, respectively (Table-1). The average fruit weight is 796 g at edible stage, which is lesser than the average fruit weight of check variety Pusa Summer Prolific Long (1100 g) and Pusa Naveen (950 g). The length and diameter of fruit were recorded 28.2 and 7.6 cm, respectively, which were almost equal to Pusa Naveen but 20% lesser in the fruit length and 10% higher in diameter of Pusa Summer Prolific Long (33.8, 8.5 cm), respectively. The vine length of GH-22 was 659 cm, which was lesser than the check variety Pusa Summer Prolific Long and Pusa Naveen. In agronomical trial, it was revealed (Table 2) that the bottle gourd variety GH-22 gave fruit yield of 297.5 q/ha when sown at 2.50 m x 60 cm spacing and supplied with nitrogen 87.5 kg/ha. Also the crop sown in last week of February with the irrigation frequency of 50 mm CPE recorded maximum fruit yield

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of 341.4 q/ha as compared to other treatments. However, as per the package of practices adopted in Haryana, bottle gourd gives maximum yield when sown in the month of February-March in flat beds or in June-July on raised beds and supplied with farmyard manure 15 tonnes, nitrogen 50 kg, phosphorus 25 kg and potash 25 kg/ha. Farmyard manure is applied at the time of land preparation and one third dose of nitrogen along with full dose of phosphorus and potash is applied at the time of last shallow ploughing. Rest of the nitrogen is applied in two splits, once at the time of vine growth and another at fruiting. A light irrigation is given just after sowing and subsequent irrigations are applied at 4 to 6 days interval depending on season and stages of crop growth and in rainy season as and when required. Irrigation should be applied only up to two third of the channel depth. Applying flood irrigation in summer increases the bottle gourd yield since it keeps the field temperature comparatively low, which promotes femaleness. In initial stages, the field is kept weed free by hoeing and weeding twice or thrice. In summer, the tall weeds are not removed from the field as they will protect the fruits from high light intensity, which may cause injury to the fruits.

**Yield and Quality traits:** The fruit yield of the bottle gourd variety GH-22 and check varieties are given in Table 1. The fruit yield of GH-22 was 240.7 and 322.3 q/ha under Hisar (Haryana) conditions in spring-summer and rainy season, which was 26.8 and 30.6 percent higher than the check variety Pusa Naveen and 39.7 and 42.0 percent higher than Pusa Summer Prolific Long,

respectively (Table-1). In multi-location farmer field trials conducted by various KVK in nine districts of Haryana, the yield was 316.4 q/ha, which was 38.3 percent higher than the check variety Pusa Summer Prolific Long. The results of multilocation trials held by All India Coordinated Varietal Trials revealed that variety GH-22 recorded 256.1 q/ha fruit yield on the average of 20 trial centers conducted over 3 years (2010-11 to 2012-13) and showed 11.1. During these 3 years of testing, GH-22 remained 10 times on top position in IET and AVT-II stages out of 20 trials, indicating the consistency in performance of the variety over locations and years. The ascorbic acid and total soluble solids (Table 3) in fruits of GH-22 (4.0 and 3.37) were more as compared to check variety Pusa Summer Prolific Long (3.2 and 2.03), respectively. It takes less time in cooking than the check variety. The fruits of GH-22 were better in quality traits such as length (medium), colour (green), pubescence (present), taste (good) and flesh texture (medium). The fruits had comparatively longer shelf life.

**Disease reaction:** The disease reaction is given in Table-4. Based on screening studies of three years trials under natural field conditions, the variety GH-22 showed less severity of *Cercospora* and *Anthracnose* disease (4.0 & 8.0 and 8.7 & 9.8 %) as compared to disease severity on plants of check variety Pusa Naveen (8.9 & 13.4 and 13.0 & 15.0 %) and PSPL (10.9 & 20.9 and 16.5 & 22.9%) in summer and rainy season, respectively. No major incidence of pests was seen in the crop, however, the red pumpkin beetles attacked the crop at

Table 1: Performance of bottle gourd variety GH-22 for fruit yield in station, farmer's field and multi-location research trials

Variety	Number of fruits per vine		Average fruit yield q/ha		Station trials (Av. of four year)	Farmer's field (Av. of two year)	Multi-location (Three years)
	Summer	Rainy	Summer	Rainy	GH-22	Rainy	Summer
GH-22	6.4	7.7	240.7	322.3	281.5	316.4	256.1
Pusa Naveen (NC)	5.7	6.3	184.3	254.2	219.2	-	230.5
PSPL (local check)	5.5	5.5	169.5	230.7	200.1	228.8	-
Percent Increase over checks	-	-	+30.6	+26.8	+28.8	+38.3	+11.1
			+42.0	+39.7	+40.7		

Table 2: Effect of different nitrogen levels on plant spacing along-with varied date of sowing and irrigation level on fruit yield of bottle gourd variety GH-22

Nitrogen levels (kg/ha)	Plant spacing		Mean	Irrigation level at CPE	Date of Sowing			Mean
	2.5 m x 60 cm	2.5 m x 75 cm			Last week of February	Second week of March	Last week of March	
50.0	246.0	148.0	197.0	50 mm	341.4	335.4	282.8	319.9
62.5	262.0	162.3	212.1	75 mm	329.7	322.9	261.7	304.6
75.0	272.0	173.5	222.8	100 mm	300.0	305.5	243.7	283.0
87.5	297.5	192.5	245.0	Mean	323.7	321.2	262.7	302.5
Mean	269.4	250.6	260.3	CD at 5% level of significance	Date of sowing= 4.2; Irrigation= 4.5; Date of sowing x irrigation= 5.22			
CD at 5% level of significance	Spacing = 6.5; Nitrogen = 14.0; Spacing x nitrogen= 4.8							

Table 3: Physiological loss in weight, decay loss during storage in bottle gourd variety GH 22 at ambient temperature in Hisar

PLW (%) in storage at different (days) interval	Card board box packing			Polythene bag packing			Cling film packing			C.D. at 5%
	GH-22	PSPL (LC)	Pusa Naveen (C)	GH-22	PSPL (LC)	Pusa Naveen (C)	GH-22	PSPL (LC)	Pusa Naveen (C)	
2	3.33	4.14	5.75	0.68	1.03	0.57	0.10	0.60	0.10	0.19
4	5.38	6.38	8.50	1.20	1.67	1.15	0.15	1.08	0.23	0.25
6	6.59	7.61	10.19	2.46	3.22	2.77	1.08	2.77	0.88	0.25
8	7.43	9.07	11.47	3.04	4.75	3.29	2.76	3.26	2.84	0.24
Quality parameters										
Variety	Cooking time (minutes)		Juice (%)	TSS (%)			Acidity (%)		Ascorbic acid (mg/100 g)	
GH-22	7.3±0.6		69.67±1.53	3.37±0.32			0.075±0.01		4.0±0.35	
PSPL (LC)	10.3±0.6		71.33±2.08	2.03±0.12			0.107±0.02		3.2±0.35	

Table 4: Performance of bottle gourd variety GH-22 for diseases during rainy seasons at Hisar

Variety	Mosaic (disease reaction)			Cercospora leaf spot (%)			Anthracnose (%)		
	2012-13	2013-14	2014-15	2012-13	2013-14	2014-15	2012-13	2013-14	2014-15
GH-22	Mild	Mild	Mild	14.2	7.4	7.9	8.8	7.1	8.1
Pusa Naveen (C)	Mild	Mild	Mild	16.8	13.9	14.4	11.5	13.2	15.5
PSPL (LC)	Mild	Mild	Mild	28.3	18.1	22.4	18.4	17.6	16.7

two to four leaf stage, which was controlled by spraying cypermethrin 25EC 60 ml dissolved in 250 litre of water per acre and applying one litre of chlorpyrephos 20EC through irrigation in starting of crop growth.

**Storage studies:** After 8 days of storage under ambient room temperature conditions, the physiological loss in weight of GH-22 fruits packed in cardboard boxes, polythene bag and cling film was less (7.43, 3.04 and 2.76%) as compared to the physiological loss in weight of check variety Pusa Naveen (11.47, 3.29 and 2.84%) and Pusa Summer Prolific Long (9.07, 4.75 and 3.26%) fruits, respectively (Table 3). Thus, the GH-22 have better in shelf life than both the check varieties.

Overall, GH-22 variety has medium long vine (6.6 m) with green leaves, oblong to bottled shaped attractive green fruits, medium size of 28.2 cm length and 7.6 cm diameter, non-fibrous white flesh, medium fruit weight 750-800 g and longer shelf life because of lesser physiological loss in weight (7.43, 3.04 and 2.76%) as compared to Pusa Naveen (11.47, 3.29 and 2.84%) after 8 days of storage in cardboard boxes, polythene bag

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