

Pusa Purvi: New variety of small fruited bitter gourd

Pusa Purvi has been released and notified by the Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Horticultural Crops for cultivation in National Capital Region of Delhi and its adjoining areas. The growers will be benefitted by this variety because of its prolific bearing, better nutritional quality and organoleptic taste.

PUSA Purvi, the small fruited bitter gourd variety (*Momordica charantia* var *muricata*) is mainly grown in eastern and north-eastern states (*uchhe*) of the country. Special traits like unique flavour, taste, health benefits and fruit fly tolerance have enabled the perpetuation of these small fruited varieties and are suitable for making stuffed cuisines (*Bharua*).

The vine length is only 1.5-2.0 m which is well-suited for high density planting. The leaves are small, green with deeply lobed margin. The plant is monoecious; female flower solitary on long peduncle, yellow in colour; male flowers are also solitary. Fruits are attractive dark green and small in size, (4-5 cm long and 3-4 cm diameter) with pointed tubercles, prickled, and crispy flesh. Fruits are ready for first harvesting in 50-55 days after sowing. The fruits of Pusa Purvi contains Vitamin C (124.34 mg/100 g FW), antioxidant activity CUPRAC value (5.19 μ mol Trolox/g FW) and FRAP value (1.95 μ mol Trolox/g FW). The fruits also contain more minerals like calcium (43.03 mg/100 g), manganese (3.49 mg/100 g), Zn (4.99 mg/100 g) and Fe (3.2 mg/100 g) compared to other long fruit varieties.

Production technology

Bitter gourd is a sub-tropical vegetable and requires hot and dry climatic conditions for its successful cultivation. It can be grown on many types of soils but sandy loam and loamy soils are the best for its production. The required seed rate is 6-7 kg/ha. Before sowing, the seeds should be soaked in Captaf @ 2g/L water solution for about 24-30 hours. The channels of 45 cm wide and 30-40 cm deep

are made from east to west in the prepared field. Distance between one channel to another channel is kept 2.0 m but it can be reduced to 1.5 for high density planting. The seeds are sown in prepared hills 50 cm apart on the northern slopes of the channels.

About 15-20 tonnes FYM, 100 kg calcium ammonium nitrate or 50 kg urea, 200 kg single super phosphate and 75 kg muriate of potash per ha need to be applied at the time of soil preparation. Another dose of 50 kg urea should be top dressed in 2 split doses at the time of vining and initial fruit setting in the crop. Light irrigation is given at 4-6 days interval during summer season and once in a week in *kharif* season if there is no rain. Two to three weeding should be done when needed to keep down the weeds under complete control till the plants start trailing. Fruits should be harvested when they are still tender and their seeds are immature.



Plant protection

Fruit fly pheromone traps (10 traps/ha) may be placed along with baits of malathion for control of fruit fly during flowering and fruiting phase. For fruit fly control, add 100 g Jaggery and 10 ml Malathion in 1 L of water and keep in the plot (4-6 places/acre). Foliar application of Imidacloprid (0.03%) after transplanting at 10-15 days interval for 60 days is effective to control major insects in bitter gourd. Spraying of insecticide must not be done at the flowering stage early in the morning hour when honeybees are active in pollination.

Powdery mildew symptoms first appear as round white spots on the under surface of the older leaves and later



spreads on the upper surface of the leaves. Spraying with Karathane or Bavistin @ 2 g/litre of water is effective to control this disease. Sulphur dust or spray should not be done to control any fungal disease in bitter gourd as it is very sensitive to sulphur. Downy mildew symptoms appear as irregularly shape yellow to brown angular spots appear on upper sides of the leaves. Under moist condition, a purplish mildew typically develops on the underside of the leaf spots. Spraying of Redomil MZ @ 2.5 g/L of water at 10-15 days interval can control this disease. Bitter gourd is a host of watermelon potyvirus, cucumber green mottle virus (both transmitted by white fly), and bitter gourd mosaic virus (transmitted by aphid). Uprooting and destruction of affected plants and collateral hosts is a common means of control. The whitefly can be controlled by spraying Carbaryl 50WP @ 2 ml/L of water or Spinosid @1 ml/4 L of water.

Table 1. Performance of Pusa Purvi variety (DBGS 34) at spacing of 2.0 × 0.5 m (Pooled data of 3 years)

Variety	Node bearing 1 st female flower	Days to 1 st harvesting	Number of fruits/plant	Individual fruit weight (g)	Yield (t/ha)
Pusa Purvi	24.97	56.62	44.13	21.37	9.42
DBGS – 35	16.67	59.59	38.81	19.89	7.85
DBGS – 48	22.60	60.49	45.77	20.02	8.27
DBGS – 49	25.74	61.95	25.55	18.86	5.12
Pusa Do Mausami*	15.99	59.93	20.83	73.85	15.74
Pusa Vishesh*	16.29	64.60	19.40	73.23	15.75
CD at 5%	4.03	12.74	8.13	8.79	2.67
CV (%)	10.85	11.57	13.82	12.78	14.13
At close spacing of 1.5 x 0.5 m					
Pusa Purvi	21.08	55.55	49.76	20.26	11.92
DBGS – 35	19.15	60.75	46.11	19.71	10.10
DBGS – 48	19.31	60.00	42.70	19.50	8.84
DBGS – 49	24.69	59.23	23.90	19.05	6.01
Pusa Do Mausami*	17.61	61.14	22.70	73.60	17.57
Pusa vishesh*	18.63	58.82	21.34	74.94	18.33
CD at 5%	4.72	12.71	8.78	9.14	4.44
CV (%)	12.95	11.79	13.83	13.22	16.82

*Long Fruited type (*M. charantia* var. *charantia*).

Table 2. Comparative analysis of mineral contents of bitter gourd variety Pusa Purvi (DBGS 34)

Genotype	Moisture (%)	Calcium (mg/100 g)	Manganese (mg/100 g)	Zinc (mg/100 g)	Iron (mg/100 g)
Pusa Purvi	82.3	43.03	3.49	4.99	3.2
DBGS-35	84.4	35.70	2.48	3.72	2.8
DBGS-48	83.8	31.40	1.92	2.76	2.3
DBGS-49	82.1	36.00	2.47	3.60	3.0
Pusa Do Mausami	90.4	14.20	2.96	3.62	2.0
Pusa Vishesh	92.3	23.27	2.00	2.91	1.3
VNR-22	91.5	31.10	2.70	4.00	2.4
Arka Harit	90.3	29.23	2.90	4.70	1.7
Pusa Hybrid-2	90.2	32.93	2.40	4.44	1.5
CD (P=0.05)	2.33	4.32	0.68	0.32	0.48

Table 3. Comparative estimates of antioxidant values of bitter gourd variety Pusa Purvi (DBGS 34)

Genotype	Vitamin C (mg/100 g FW)	CUPRAC (μ mol Trolox/ g FW)	FRAP (μ mol Trolox/ g FW)
Pusa Purvi	124.34	5.19	1.95
DBGS-35	92.93	5.41	1.90
DBGS-48	102.02	4.92	1.12
DBGS-49	92.79	3.72	1.62
Pusa Do Mausami	84.49	2.73	1.42
Pusa Vishesh	97.21	4.12	1.16
CD (P=0.05)	6.70	1.65	0.08

Seed production

Flowering in gourds normally starts in about 40-45 days after sowing depending upon the weather condition. The anthesis occurs in majority of gourds in morning. Pollination generally takes place between 6 AM to 8 AM. It is cross pollinated by nature and extent of cross pollination ranges from 60 to 80% depending upon the environment and visit of the insect. It is evident that insect do not distinguish flowers from the same or different plants at the time of voluntary pollination. The major insect that acts as pollinator is mostly bees (*Apis florae* and *A. dorsata*). The beetles like *Conpophilous* sp., moths like *Plasmodia* sp., etc. also help in pollination. For getting maximum fruit set and seed yield, one bee colony per acre is beneficial. The isolation distance of 700 m for certified seeds and 1000 m

for foundation seed. The change in colour of fruit is used as criteria of maturity index and fruit turns to bright yellow upon ripening.

Yield

Average yield is 9.50 t/ha at a spacing of 2.0 m $\times$ 0.5 m and it can be increased to 12.00 t/ha at a closer spacing of 1.5 m $\times$ 0.5 m.

For further interaction, please write to:

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Integrated pest management (IPM) module in bitter gourd

IPM comprised seed treatment with imidacloprid, installation of yellow sticky traps, border crop with maize, spraying of Azadirachtin, thiamethoxam, imidacloprid, cyantraniliprole, Neem oil + *Lecanicillium lecanii* and neem oil + *Beauveria bassiana* from 20 DAS onwards to till 70 DAS at 10 days intervals each harboured lowest whiteflies population with maximum of 70.14% reduction over control (PROC). The number of predatory ladybird beetles and polyphagous spiders were also higher in this module. Furthermore, the highest healthy fruit yields were recorded from the integrated pest management module accompanied with maximum highest cost benefit ratio of 1:5.

Under AICRP (VC), treatment comprising of mulching, sequential spray of pyriproxyfen (5% EC) + fenpropathrin (15% EC), spiromesifen (22.9% SC), buprofezin (25% SC) and neem oil @ 10 days interval, recorded least average percent disease incidence (24.44%) against control (71.85%). Additionally, the same treatment recorded the highest average yield of 155.41 q/ha over control (77.91 q/ha). Also, the same treatment showed the highest C:B ratio of 1:1.95. Hence it can be recommended for the management of viral diseases in okra (Kashi Pragati) under Varanasi region.

Source: ICAR Annual Report 2022-23

Cucumber

Hybrid- Kashi Nutan has been identified for cultivation in zone-IV (Uttar Pradesh, Bihar, Punjab, Jharkhand) in 2021. The fruits are light green, tolerant to cucumber mosaic virus and downy mildew and has crispy flesh free from carpel separation. Average fruit weight 200-225g with good market acceptability. Productivity is 165-180 q/ha.



Source: ICAR Annual Report 2022-23