D. Munshi, T. K. Behera, Amish K. Sureja*, Awani K. Singh, Balraj Singh, B. S. Tomar and J. Singh

Pusa Parthenocarpic Cucumber-6: A high-yielding early bloomer for protected cultivation

Pusa Parthenocarpic Cucumber-6 is the first extra early (40-45 days for first fruit harvest) improved variety of parthenocarpic gynoecious cucumber suitable for cultivation in protected condition developed by ICAR-IARI for north Indian plains. Apart from superior quality characters, it showed 31.58%, 28.47%, and 21.36% higher yield over the checks (Pant Parthenocarpic Cucumber-2, Aviva and Asma) during winter season (off-season, November-March) under low cost polyhouse.

THE cucumber (*Cucumis sativus*), known as *khira* in Hindi is an important cucurbitaceous crop grown extensively throughout the India mainly for salad purpose. It is highly thermo-sensitive in nature and its cultivation in north Indian plains during winter season is hampered because of extremely low temperature prevailing in this part. Parthenocarpic gynoecious cucumber varieties are suitable for polyhouse cultivation as these varieties develop fruits automatically without any pollination and can be successfully cultivated under polyhouse during winter season. Nowadays, many of the private seed companies are selling F_1 hybrid of parthenocarpic cucumber at a very high price as their seeds are being sold on per seed basis. Keeping in view these facts, a gynoecious parthenocarpic cucumber variety Pusa Parthenocarpic Cucumber-6 was developed by Division of Vegetable Science, ICAR-Indian Agricultural Research Institute (IARI), New Delhi for cultivation in protected condition in north Indian plains. The variety was notified by Central Sub-committee on Crop Standards, Notification and Release of Varieties of Horticultural Crops.

Pusa Parthenocarpic Cucumber-6 (DPaC-6)

It is the first extra early (40-45 days for first fruit harvest), improved variety of parthenocarpic gynoecious cucumber suitable for cultivation in protected condition developed by ICAR-IARI for north Indian plains. It has distinct advantage in yield and quality characters over Pant Parthenocarpic Cucumber-2 and commercial private sector hybrids, viz. Aviva and Asma. The average fruit yield is 125.0 t/ha (1250 kg/100 m^2) during winter season (off-season, November-March) under low cost polyhouse which is 31.58%, 28.47%, and 21.36% superior over Pant Parthenocarpic Cucumber-2, Aviva and Asma, respectively. Fruits become ready for first harvesting in 40-45 days after sowing during winter season (off-season, November-March) under low cost polyhouse. Fruits have desirable marketable attributes and are attractive, uniform, dark green, glossy, cylindrical, straight, slightly ribbed, non-hairy, non-warty, slightly striped at blossom end and has tender skin and crispy flesh. The shape of peduncle end and blossom end of fruit is obtuse. The fruit has average length of 14.24 cm and width 3.45 cm, while the average fruit weight is 105 g.

Performance of Pusa Parthenocarpic Cucumber-6

Pusa Parthenocarpic Cucumber-6 (DPaC-6) has been tested in yield trial at IARI, New Delhi during winter season (off-season, November-March) under low cost polyhouse from 2021-22 to 2023-24 along with checks (Pant Parthenocarpic Cucumber-2, Aviva and Asma). Pusa Parthenocarpic Cucumber-6 yielded 125.0 t/ha which was 31.58%, 28.47%, and 21.36% higher than checks Pant Parthenocarpic Cucumber-2, Aviva and Asma, respectively (Table 1).

At Centre for Protected Cultivation (CPCT), IARI, New Delhi, it yielded 97.9 t/ha during winter season

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Parthenocarpic Cucumber harvest

Parthenocarpic Cucumber crop

(off-season, November-March) under polyhouse which is 42.92%, 30.53%, and 23.45% higher yield over checks Pant Parthenocarpic cucumber-2, Aviva and Asma, respectively (Table 2). Under insect-proof net house, Pusa Parthenocarpic Cucumber-6 (DPaC-6) gave a yield of 84.94 t/ha which is 29.52, 22.11, and 20.06% higher yield over checks Pant Parthenocarpic Cucumber-2, Aviva and Asma, respectively (Table 3).

In multilocation testing at IARI Regional Station, Karnal during winter season (off-season, November-March) under low cost polyhouse, Pusa Parthenocarpic Cucumber-6 (DPaC-6) gave a yield of 104.91 t/ha which is 69.95, 62.27 and 29.75% higher yield over checks Pant Parthenocarpic Cucumber-2, Aviva and Asma, respectively (Table 4).

Cultivation

It can be grown successfully on well-drained loam and sandy loam soils. Soil should be thoroughly ploughed, well prepared and basal dose of 200-250 kg FYM; 70-80 g N, 80-90 g P_2O_5 and 70-80 g K_2O per hundred 100 m^2 should be applied at the time of bed preparation under polyhouse. A spacing of 60 × 30 cm is recommended. Recommended seed rate is 15 to 20 g per 100 m^2 of polyhouse.

For getting successful crop of cucumber in polyhouse during off season (winter season), direct sowing is done in the third week of October to first week of November when the temperature is mild and conducive for the growth of cucumber. The seeds are treated with Captaf @ 2 g/kg of seed. Generally, 1-2 seeds are sown per pit and after germination when seedlings are established, thinning is done to keep one plant per pit. To save time, the seeds are sown in polythene bags filled with mixture of soil (2 part), FYM (1 part) and sand (1 part) during first week of October and 3-4 week old seedlings are transplanted in the last week of October or first week of November.

Nowadays, pro-trays or plug trays are recommended to raise seedlings. Generally, medium cells (5-6 cm in diameter) are required for optimum growth of cucumber seedlings. These trays help proper germination, provide independent area for each seed to germinate, reduce the mortality rate, maintain uniform and healthy growth of seedlings, provide ease of handling, storing and transportation. Mostly artificial soil-less media is used for raising healthy and vigorous seedlings of cucumber in plastic pro-trays. Mainly three ingredients, viz. coco peat, vermiculite and perlite are used as root medium for raising the nursery. These ingredients are mixed in 3:1:1 ratio before filling in the required plug trays and plastic pro-trays.

Hand weeding and hoeing are done at regular interval of time to keep the cultivated area clean. A fertigation schedule with soluble fertilizers N:P:K 19:19:19 @ 8-10 g/litre is followed when seedlings are 3 weeks old. Supplementary doses of liquid fertilizers are sprayed

Table 1. Mean performance of Pusa Parthenocarpic Cucumber-6 (DPaC-6) at I.A.R.I., New Delhi during winter season (off-season, November-March) under low cost polyhouse from 2021-22 to 2023-24

Variety	Yield (t/ha)			Average yield (t/ha)	Percentage increase over checks (PPC-2, Aviva, Asma)	No. of days to first harvest
	2021-22	2022-23	2023-24			
DPaC-6	118.2	131.1	125.7	125.0	31.58, 28.47, 21.36	40-45
DPaC-9	107.6	115.5	121.9	115.0		45-50
Pant Parthenocarpic Cucumber-2 (Check)	93.8	88.5	102.6	95.0		50-55
Aviva (F_1) (Check)	89.3	107.5	95	97.3		45-50
Asma (F_1) (Check)	95.6	100.8	112.5	103.0		45-50

Table 2. Performance of Pusa Parthenocarpic Cucumber-6 (DPaC-6) during 2022-23 in polyhouse at CPCT, I.A.R.I., New Delhi

Name of the line/variety	No. of fruits/plant	Avg. fruit wt. (g)	Yield per plant (kg)	Average yield (t/ha)	Percentage increase over checks (PPC-2, Aviva, Asma)
DPaC-6	25.0	108.8	2.72	97.9	42.92; 30.53; 23.45
DPaC-9	23.0	101.7	2.34	84.2	
Pant Parthenocarpic Cucumber-2 (Check)	18.4	103.4	1.90	68.5	
Aviva (F_1) (Check)	20.0	104.2	2.08	75.0	
Asma (F_1) (Check)	21.5	102.5	2.20	79.3	

Table 3. Performance of Pusa Parthenocarpic Cucumber-6 (DPaC-6) during 2022-23 in insect-proof nethouse at CPCT, I.A.R.I., New Delhi

Name of the line/variety	No. of fruits/plant	Avg. fruit wt. (g)	Yield per plant (kg)	Average yield (t/ha)	Percentage increase over checks (PPC-2, Aviva, Asma)
DPaC-6	23.2	101.7	2.36	84.94	34.50; 19.17; 16.16
DPaC-9	21.8	103.8	2.26	81.46	29.52; 22.11; 20.06
Pant Parthenocarpic Cucumber-2 (Check)	17.5	104.1	1.82	65.58	
Aviva (F_1) (Check)	19	101.7	1.93	69.56	
Asma (F_1) (Check)	19.4	101.3	1.97	70.75	

Table 4. Performance of Pusa Parthenocarpic Cucumber-6 (DPaC-6) during winter season (off-season, November-March) under low cost polyhouse in 2022-23 at I.A.R.I. Regional Station, Karnal

Name of the line/variety	No. of fruits/ plant	Avg. fruit wt. (g)	Yield per plant (kg)	Average yield (t/ha)	Percentage increase over checks (PPC-2, Aviva, Asma)
DPaC-6	26.3	110.8	2.91	104.91	69.95; 62.27; 29.75
DPaC-9	24.1	105.3	2.54	91.36	
Pant Parthenocarpic Cucumber-2 (Check)	16.9	101.5	1.71	61.73	
Aviva (F_1) (Check)	18.0	100.1	1.80	64.65	
Asma (F_1) (Check)	20.9	107.7	2.25	80.85	

after transplanting in 3 split doses @ 12-15 g/litre at 10 days interval till flower initiation. The plants are trained vertically with the help of nylon thread and lateral branches if any are pinched off at regular interval and fruits are allowed to set only on the main branches.

Harvesting of fruits can be started from last week of December to first week of January and continue up to first week of April. Deformed fruits and old leaves should be removed at regular intervals in order to improve aeration.

Drenching with Ridomil @ 2 g/litre and Blitox @ 3 g/litre of water is necessary to prevent the seedlings from damping off and protect the seedlings from other root borne diseases. Downy mildew and virus are the major problems during *kharif* season. A need based spray of Imidachlorpid @ 0.3 mL/L or Acetamiprid @ 0.3 g/litre of water followed by Dimecron @ 2 mL/litre of water at two to three weeks interval should be applied judiciously to prevent the crop from important sucking pests like aphid and whitefly.

For further interaction, please write to:
Dr Amish K. Sureja (Scientist), Division of Vegetable Science, Indian Agricultural Research Institute, New Delhi 110 012. *Corresponding author email: aksureja@gmail.com

Tomato Hybrid Kashi Adbhut (VRNTH-18283) for high temperature: Suitable for high day temperature of 38±2°C and night temperature of 32±2° C. Semi-indeterminate plants, fruit weight 60-30 g with yield potential of 520 q/ha, having TSS 3.7⁰ Brix and acidity 0.25%. Crop duration February to June under north Indian plains. Availability of fruits up to 2nd week of June. Identified by Institute Technology Identification Committee. Proposal for release and notification submitted to U.P. State Government in April 2022.

Tomato Hybrid Kashi Tapas (VRNTH-19095) for high temperature: Suitable for very high day temperature of 38±2°C and night temperature of 32± 2°C. Semi-indeterminate plants. TSS 5.4° Brix & acidity 0.38%. Yield potential is 448 q/ha. Fruit weight is 45-40 g. Crop duration February to June under north Indian plains. Availability of fruits up to 1st week of June. Identified by Institute Technology Identification Committee. Proposal for release and notification submitted to U.P. State Government in April 2022.

Source: ICAR-Annual Report 2022-23