

Pusa Pasand – First high yielding heat tolerant summer squash

THE summer squash (*Cucurbita pepo* L.), known as *Chappan Kaddu* in Hindi is a very popular and important vegetable grown in hills and plains of India. It is an easy-to-grow, short-season crop best adapted to temperate and subtropical regions. Fruits are generally consumed immature as vegetable. Its tender fruits can be served fresh in salad and cooked (stuffed with meat, fried squash, baked squash). Growing tips and flowers are also consumed. It fits well in multiple cropping systems. No improved and heat tolerant round fruited variety of summer squash for spring summer season is available so far for North Indian plains.

The available variety/ hybrid Australian Green and Pusa Alankar developed by IARI are long cylindrical in shape. The only local oblong round variety available is very shy bearer and is less preferred by the consumers. The consumer preference in North Indian plains is of flattish round and medium size (70-80 g) fruits. Keeping in view the above facts, an early, heat tolerant, high yielding flattish round shaped variety Pusa Pasand

has been released, notified and recommended for commercial cultivation during spring summer season for NCR Delhi. It is also suitable for growing during off season in winter under naturally ventilated polyhouse (Mid October - Mid February) and under plastic low tunnel (November end - Mid April) in North Indian Plains.

Pusa Pasand (DS-8)

It is developed from highly heterozygous local material collected from Malerkotla, Dist: Sangrur in Punjab. Selfing and individual plant selections were carried out to purify the material and develop the variety.

Plants are annual, bushy, monoecious, and pubescent with an upright and open habit, hence assuring multiple harvest, easy picking and shelters the fruits from the sunburn. Leaves are ovate-cordate without white spots and with serrate denticulate margins. Young fruits are attractive light green, shiny, uniform, flattish round in shape, 70-80 g with tender flesh. Fruits are easy to pick with minimal breakage. It has continuous and concentrated fruit setting. It is ready for first harvesting in 45-50 days after sowing during spring summer season. It has good heat tolerance and can produce seeds from April to May under

open condition in North Indian plains. Average yield is 16.0 t/ha under open field condition, 24.5 t/ha under naturally ventilated polyhouse and 22.8 t/ha under plastic low tunnel.



Fruits of 'Pusa Pasand'

Performance of Pusa Pasand

Pusa Pasand has been tested in yield trial under open field condition at IARI, New Delhi from 2010 to 2014 during spring summer season along with round fruited local check (Table 1). The results indicated that Pusa Pasand yielded 16.01 t/ha which

was 40.93% higher than the local check.

At Centre for Protected Cultivation (CPCT), IARI, New Delhi it showed 62.15% higher yield over local check under naturally ventilated polyhouse during off-season i.e. winter season (mid October to mid February) from 2011 to 2013 (Table 2). Pusa Pasand yielded 22.8 t/ha with 64.38% higher yield than the local check under plastic low tunnel during off-season i.e. winter season (November end - Mid April) from 2011 to 2013 (Table 3). At multilocation testing from 2012 to 2014, it showed 36.97% higher yield over local check under open field condition during spring summer season at IARI Regional Station, Karnal (Table 4).

- If maggots bore into the bulb, it causes growth deformation.
- Plants show yellowing, wilting and hollowing out of the older plants.
- Feeding by third generation maggots results in loss of shape, making it unsuitable for marketing.
- The infested maggots cause secondary storage rots in the storage.

Management practices

- Avoid successive planting of onion in the same field and follow crop rotation.
- Use well decomposed cow manure.
- Field sanitization, removal of weeds, destruction of damaged onions to reduce population build up.
- Soils that are rich in un-decomposed matter should

be avoided.

- Close planting of onions should be avoided to reduce movement of maggots in the nearby areas.
- Drenching of the chlorpyrifos with irrigation at 1.6-2 litre/ acre should be done before transplanting or when infestation starts to appear. This will effectively control maggot infestation up to 8 weeks.
- After hand weeding, fipronil 80% WG should be applied in the soil at 1 kg/ acre followed by irrigation.

For further interaction, please write to:

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Cultivation

Summer squash requires mild climate for its growth, flowering and fruit-set. The optimum temperature requirement for successful growing of summer squash is 24-27°C. It is sensitive to frost and low temperature and its cultivation is difficult in northern plains from December to February because of the prevailing low temperature during this period. However, Pusa Pasand being heat tolerant can be successfully grown during spring summer season under open condition. It can be grown successfully on all type of soils but prefers well-drained loam and sandy loam soils rich in organic matter.

Growing under lowcost polyhouse and low plastic tunnel under North Indian plains

For direct sowing, seeds are sown on raised beds diagonally with a spacing of 90 × 60 cm. Sowing is done under low-cost polyhouse from 3rd week of October to 1st week of November when temperature is mild and

Pusa Pasand – First high...

conducive for summer squash. The seed rate is 3.0-5.0 kg per hectare. The seeds are treated with captaf @ 2 g/kg of seed. Generally, 2-3 seeds are sown on pit prepared diagonally on the side of the raised bed and when the seedlings are established, thinning is done to keep only one plant per pit. It can also be transplanted by raising seedlings in plug tray (1.5 inch cell size) with soilless medium consisting of cocopit, vermiculite and perlite in a 3:1:1 ratio. Single seed should be sown per cell. The 28 days old seedlings (two-leaves stage) should be transplanted @ 1 seedling/hill over raised bed. Earthing up is very essential which should be done at regular interval, whenever required to provide support to the plants. Drenching of seedlings with captaf 2 g/ litre of water should be done to prevent the seedlings from damping off.

A fertilizer dose of 250 kg FYM, 1.2 kg N, 800 g P and 600 g K was found to be optimum for 100 m² (20 × 5 m) polyhouse. A basal dose of 250 kg FYM, 600 g

Table 1. Mean performance of Pusa Pasand (DS-8) and local check under open field condition at IARI, New Delhi during spring summer season from 2010 to 2014

Selection	Yield (t/ha)					Average yield (t/ha)	Percentage increase over check	No. of days to first harvest
	2010	2011	2012	2013	2014			
DS-8	17.60	16.53	15.84	15.14	14.94	16.01	40.93	45-50
DS-13	14.07	14.20	14.33	12.60	11.55	13.35		50-55
DS-18	13.07	13.47	12.40	12.77	10.96	12.53		50-55
Local Check	12.25	10.86	11.42	11.52	10.76	11.36		55-60

Table 2. Mean performance of summer squash Pusa Pasand (DS-8) under naturally ventilated polyhouse during winter season (Mid October - Mid February) at CPCT, IARI, New Delhi from 2011 to 2013

Selection	Yield (t/ha)			Average yield (t/ha)	Percentage increase over check	No. of days to first harvest
	2011	2012	2013			
DS-8	22.40	25.78	25.48	24.55	62.15	40-42
Local check	13.58	16.69	15.14	15.14		47-50

Table 3. Mean performance of summer squash Pusa Pasand (DS-8) under plastic low tunnel during winter season (November end – Mid April) at CPCT, IARI, New Delhi from 2011 to 2013

Selection	Yield (t/ha)			Average yield (t/ha)	Percentage increase over check	No. of days to first harvest
	2011	2012	2013			
DS-8	21.80	24.00	22.60	22.80	64.38	50-55
Local check	13.40	14.80	13.40	13.87		60-62

Table 4. Performance of Pusa Pasand (DS-8) under open field condition during spring summer season from 2012 to 2014 at IARI Regional Station, Karnal

Selection	Fruit yield (t/ha)			Average yield (t/ha)	Percentage increase over check
	2012	2013	2014		
DS-8	15.96	14.83	15.57	15.45	36.97
Local check	11.60	10.60	11.65	11.28	

N, 800 g P and 600 g K should be applied at the time of preparation of beds and rest of the N should be applied in two split doses, 300 g one month after sowing and another 300 g just before the initiation of flower. Summer squash is bushy in nature; hence, it does not require any trailing and pruning but earthing up is essential to cover the roots properly. The raised beds should be covered through black plastic as mulch. Otherwise one or two hand-weeding are required. It requires 2-3 hoeing and weeding. Frequent irrigation at shorter interval is required. The older leaves should be removed at regular interval to prevent the plant from various diseases and pests and to provide the plant proper aeration and light. The application of one spoon Carbofuran per hill at the time of sowing/ transplanting of seedling can provide an effective control against cut worm. For control of white flies, aphids and viral diseases, spraying of Imidachlorprid @ 0.3 ml/l is recommended. Mites are sometimes cause serious problem during spring summer season and can be controlled by spraying Spiromesifen (Oberon) @ 1.5 ml/l. The preventive spray of Karathane and Ridomil 2 g/litre of water at 8-10 days interval control powdery mildew and downy mildew, respectively. No synthetic plant protection chemical should be used fifteen days prior to harvesting.

Hand pollination is needed in summer squash. Pollination is comparatively easy in summer squash since flowers are large and solitary. Freshly open flowers are hand pollinated from 8-10 a.m. in the morning to enable fruit-set and fruit development.

For low plastic tunnel, seeds are sown on raised beds diagonally with a spacing of 90 × 60 cm during last week of December to first week of January. The sowing, planting, intercultural operation, fertilization and plant protection measures are same as mentioned above should be followed. During second fortnight of February when chance of frost is over, the polythene should be removed for open pollination by honeybees and other beneficial insects.

Growing under open field condition

Summer squash requires mild climate for its growth, flowering and fruit-set. However, Pusa Pasand being heat

tolerant can be successfully grown under open condition during spring summer season under North Indian plains. The seeds are sown on raised beds diagonally with a spacing of 90 × 60 cm during third week of February to first week of March. Apply 15-20 tonnes of well-rotten organic manure per hectare before field preparation and 100 kg urea, 200 kg single super phosphate and 80 kg muriate of potash at the time of last ploughing. Another dose of 50 kg urea should be top-dressed at 20 days after planting. The intercultural operation, fertilization and plant protection measures are same as mentioned above should be followed.

Harvesting and yield

The fruits should be harvested at tender stage and graded according to size. The harvested fruits should be kept in plastic crates with fillers instead of gunny bags to avoid bruises and injury. The average fruit yield is 16.0, 24.5 and 22.8 t/ha during spring summer season under open field condition; naturally ventilated polyhouse and plastic low tunnel during winter season, respectively.

SUMMARY

Pusa Pasand is the first early improved flattish round heat tolerant variety of summer squash for spring summer season cultivation under open and protected cultivation during winter (offseason) developed by IARI for North Indian plains. It can set fruit and produce seed under high temperature condition. Apart from superior quality characters, it has an average fruit yield of 16.0, 24.5 and 22.8 t/ha which is 40.9, 62.1 and 64.4% superior over local check, during spring summer season under open field condition; naturally ventilated polyhouse and plastic low tunnel during winter season, respectively. Its continuous and concentrated fruit setting will be highly acceptable to the growers.

For further interaction, please write to:

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