

Field isolation: Sweet corn crop needs isolation of at least 250 m from normal maize/popcorn as pollination deteriorates its quality.

Sowing time: The ideal planting time is June-July in *kharif* (rainy) and September-October in *rabi* (winter) season.

| Seed rate | Spacing | Plant population |
|-----------|------------------|-----------------------|
| 3 kg/acre | 75 cm × 25-30 cm | 18,000 to 21,000/acre |

Nutrient management

| Crop stage | Schedule | Fertilizer (kg/acre) | | | |
|----------------|-----------------------|----------------------|-----|-----|-------------------|
| | | Urea | DAP | MOP | ZnSO ₄ |
| Sowing | Basal | 45 | 45 | 30 | 10 |
| 25 DAS | 1 st split | 35 | - | - | - |
| Pre-tasselling | 2 nd split | 20 | - | - | - |

Irrigation management: Sweet corn crop typically requires 4-5 irrigations during *kharif* and 6-7 irrigations in *rabi* season. Avoid moisture stress during the tasseling-silking, as water stress can lead to reduced seed set and may develop barren ears.

Harvesting: Green cobs are harvested after 18-20 days of pollination during *kharif*. Picking should be done in evening. At the harvest time the moisture is generally 70 % in the grain and sugar content varies from 11 to more than 20 %. Green cobs should be immediately transported to the cold storage in refrigerated trucks to avoid the conversion of sugar to starch.

POPCORN

Popcorn is one of the common snack items in many parts of the world, particularly in cities and is liked because of its light, porous and crunchy texture. It's also used in various snack products, such as popcorn balls and popcorn-based cereals. Furthermore, the popcorn flour can also be used for preparing many traditional dishes. Popcorn is a good source of dietary fiber and contains vitamins, minerals, and antioxidants.



Production technology

The production technology of pop corn is very similar to dent corn/QPM.

Varieties

| NHZ | NWPZ | NEPZ | PZ | CWZ |
|--|---|--|--|---|
| Pant Popcorn-1, Shalimar Pop Corn-1, BPCH-6, VL Amber Pop Corn | GAPCH-21 Maha Shweta, DMRHP 1402, Shalimar Pop Corn-1, BPCH-6 | GAPCH-21 Maha Shweta, Shalimar Pop Corn-1, BPCH-6, Ladhawal Popcorn Hybrid 3 | Pant Popcorn-1, GAPCH-21 Maha Shweta, BPCH-6, Ladhawal Popcorn Hybrid 3, DMRHP 1402, Shalimar Pop Corn-1 | Pant Popcorn-1, GAPCH-21 Maha Shweta, DMRHP 1402, Shalimar Pop Corn-1, BPCH-6, Ladhawal Popcorn Hybrid 2, Ladhawal Popcorn Hybrid 3 |

Sowing time: *Kharif* popcorn can be planted from the last week of May to the first fortnight of July. *Rabi* sowing need to be completed in between October end to middle of November.

Seed and sowing

| Seed rate | Spacing | Plant population |
|-----------|---------------|------------------|
| 5 kg/acre | 60 cm × 20 cm | 33,000 / acre |

Nutrient management: Fertility requirements for popcorn are similar to dent corn/QPM. High nitrogen rates can cause lodging, especially when using less than the recommended rate of potash. Popcorn seedlings grow slower than dent corn, therefore a basal fertilizer application is very important for the crop.

Harvesting: Pop corn matures in 85-90 days in rainy season (*kharif*) and 95-100 days in winter season (*rabi*). Harvesting should be done when the moisture content of the kernels falls within the range of 16-20 percent.

FODDER MAIZE

Maize is a popular fodder crop due to its rapid growth, abundant biomass yield, and excellent palatability. It contains ample quantities of protein and minerals, and bear superior digestibility compared to other non-legume fodders. In contrast to sorghum and pearl millet, maize does not contain any undesirable anti-quality components, making it the preferred choice for livestock feeding.

Production technology

Varieties: The tall, leafy and longer duration cultivars are most preferred for maize fodder cultivation. African Tall, J 1006, Pratap Makka Chari-6, J 1007, TSFM-15-5 and DFH-2 are some popular cultivars for fodder purpose.

Sowing time: The cultivation of maize for fodder can be done round the year.

Seed and sowing

| Seed rate | Spacing | Plant population |
|------------|---------------|------------------|
| 20 kg/acre | 30 cm × 10 cm | 90,000/acre |

Nutrient management

| Crop stage | Schedule | Fertilizer (kg/acre) | | |
|------------|-----------------------|----------------------|-----|-----|
| | | Urea | DAP | MOP |
| Sowing | Basal | 55 | 55 | 30 |
| 25-30 DAS | 1 st split | 55 | - | - |

Weed management: Atrazine @ 400 g ai/acre may be applied immediately after maize planting to control early flushes of weed. Weed management during later growth stages is not required because the dense planting suppress weed growth.

Harvesting: Harvesting should be done just after anthesis (at 65-75 DAS).

MAIZE FOR SILAGE

Silage is a product of anaerobic fermentative process, which converts soluble plant carbohydrates into organic acids by microbial activity. Maize is one of the most desirable crops for silage making. The high starch, energy, and water-soluble contents and buffering capacity of maize silage, coupled with its high dry matter yield potential, make it an excellent feed for cattle and sheep.



Production technology

Varieties: Long duration, leafy cultivar with broad leaf and thin stem, high vegetative growth, more dry matter yield, high protein and less lignin content are most suitable for silage making.

Sowing time: The silage maize can be cultivated round the year.

Seed and sowing

| Seed rate | Spacing | Plant population |
|----------------|---------------|------------------|
| 8-10 kg / acre | 60 cm × 20 cm | 33,000 / acre |

Nutrient management: Apply 50-60 kg N, 20-25 kg P and 12-16 kg K per acre for good crop harvest. Nitrogen should be applied in three splits at sowing, 30 and 45 days after sowing.

Harvesting: Silage maize should be harvested when the dry matter content of the whole crop is between 28-35 per cent.



Specialty Maize Cultivation Practices for Livelihood Security



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Maize is the leading cereal crop in the world with more than one billion tonne production. Other than grain, maize is also cultivated for various purposes like quality protein maize (QPM), baby corn, sweet corn, pop corn, forage and silage corn etc. Baby corn and sweet corn with short to medium duration cropping period can play important role in diversification in peri-urban agricultural systems and nutritional garden. The demand for specialty corn in India is growing due to changing consumer preferences, increased health awareness, and the demand for diverse and premium food products. To meet the growing demand, there is a need to enhance specialty corn productivity through adoption of the best production practices. The brief summary of different type of specialty maize is as follows:

QUALITY PROTEIN MAIZE (QPM)

Maize grain presents significant shortcomings as a dietary staple, lacking key amino acids lysine and tryptophan. QPM developed from a mutant maize has nearly twice the amount of lysine and tryptophan. QPM offers added nutritional benefits, including increased niacin (vitamin B₃) content and enhanced absorption of potassium and carotene. Moreover, it maintains comparable or superior yield potential to traditional maize varieties. QPM is an important feed for monogastric animals like rats, chickens, and swine. It offers advantages such as substituting costly high-protein supplements like soybean or fish meal in livestock feed.



Production technology

Varieties

| NHZ | NWPZ | NEPZ | PZ | CWZ |
|--|--|--|--|--|
| Pusa HQPM-1 Improved, Pusa HQPM-5 Improved, Pusa Vivek QPM-9 Improved, Pusa Biofortified Maize Hybrid-1, Ladhawal Quality Maize Hybrid 1 | PMH1-LP, VLQPM Hybrid 45, Pusa HQPM-1 Improved, Pusa Biofortified Maize Hybrid-1, Malaviya Swarn Makka-1, IQMH 202, Pusa HQPM-5 Improved, Pusa HM-4 Improved, Pusa Biofortified Maize HYBRID 2, Pusa Biofortified Maize HYBRID 3 | VLQPM Hybrid 45, Pusa HQPM-1 Improved, Pusa Biofortified Maize Hybrid-1, Pusa HQPM-5 Improved, Pusa Vivek Hybrid -27 Improved, Shaktiman-5, Pusa HM-9 Improved, Pusa Biofortified Maize HYBRID 2, Pusa Biofortified Maize HYBRID 3 | Pusa HQPM-1 Improved, Pusa HQPM-5 Improved, Pusa HQPM-7 Improved, Pusa HM-8 Improved, Pusa HM-4 Improved, Pusa Biofortified Maize HYBRID 3 | Pusa HQPM-1 Improved, IQMH 203, Pusa HQPM-5 Improved, Pusa HQPM-7 Improved, Pusa Vivek QPM-9 Improved, Pratap QPM Hybrid-1 |

Sowing time

| Season | Ideal sowing time |
|---------|---|
| Khariif | June 20 to end of July |
| Rabi | Last week of October to first fortnight of November |
| Spring | First week of February |

Seed and sowing

| Seed rate | Spacing | Plant population | Planting method | Sowing depth |
|-----------|---------------|------------------|---------------------|--------------|
| 8 kg/acre | 60 cm x 20 cm | 33,000/acre | Raised bed planting | 3.5-5.0 cm |

Fertilizer management

| Crop stage | Schedule | Fertilizer (kg/acre) | | | |
|---------------|-----------------------|----------------------|-----|-----|-------------------|
| | | Urea | DAP | MOP | ZnSO ₄ |
| Sowing | Basal | 23 | 52 | 27 | 10 |
| Knee-high | 1 st split | 44 | - | - | - |
| Pre-tasseling | 2 nd split | 44 | - | - | - |

Water management: Adequate moisture at germination, pre-tasseling, silking and grain-filling stages should be ensured through irrigation. Maize is very sensitive to water stagnation hence drain out excessive water after heavy rainfall.

Weed management

| Herbicides | Dose/ha | | Dilution in water (L/ha) | Time of application (DAS) |
|--|---|---|--------------------------|---------------------------|
| | a.i | Formulation | | |
| Atrazine 50% WP | 0.5-1 kg | 1-2 kg | 500-700 | 0-2 |
| 2,4-D Dimethyl Amine salt 58% SL | 0.5 kg | 0.86 ml | 400-500 | 25-30 |
| 2,4-D Ethyl Ester 38 % EC (having 2,4-D acid 34 % w/w) | 0.9 kg | 2.65 L | 400-450 | 25-30 |
| Halosulfuron Methyl 75% WG | 67.5 ml | 90 ml | 375 | 25-30 |
| Pyroxasulfone 85% w/w WG | 127.5 g | 150 ml | 500 | 0-2 |
| Tembotrione 34.4% SC | 120 g | 286 ml | 500 | 25-30 |
| Topramezone 336 g/L w/v SC | 25.2 to 33.6 g a.i./ha + MSO adjuvant @ 2 ml/l of water | 75 to 100 ml + MSO adjuvant @ 2 ml/l of Water | 375 | 25-30 |
| Mesotrione 2.27% w/w + Atrazine 22.7% w/w SC | 875 g | 3500 ml | 500 | 25-30 |

Disease management

| Disease | Recommended fungicide/bactericide |
|---|---|
| Maydis leaf blight, Turicum leaf blight & Banded leaf and sheath blight | Spray Azoxystrobin 18.2% + Difconazole 11.4% w/w SC (Amistar Top) @ 1ml/L water |
| Charcoal rot | Seed treatment with 5 ml Thiram Flo 40 FS per kg seeds before sowing. |
| Bacterial leaf and sheath blight | Spray of Sheethmar (Validamycin) @ 2.7 ml/L water. |
| Bacterial stalk rot | Drenching with bleaching powder Ca (ClO) ₂ @ 1.5g/15L of water |
| Rajasthan downy mildew | Foliar spray of Metalaxyl + Mancozeb (0.1%) |
| Curvularia leaf spot | Spray Carbendazim 12% + Mencozeb 62.7% @ 2 g/L water 35 and 55 DAS. |
| Common rust | Spray Dithane M-45 @ 2.4-4 g/L water and repeat the spray at 15 days interval. |

Pest management

| Pest | Recommended pesticide |
|--------------------------------------|--|
| Maize stem borer and pink stem borer | Chlorantraniliprole 18.5% SC at a rate of 60 ml per acre between 15-18 days after sowing |
| Shoot fly | Seed treatment with Imidacloprid 600 FS @ 6 ml/kg seed |
| Fallarmy worm | Spray (a) Chlorantraniliprole 18.5% SC (80 ml/acre) @ 0.4 ml/L, or (b) Spinetoram 11.7 % SC (100 ml/acre) @ 0.5 ml/L, or (c) Emamectin benzoate 5% SG (80 g/acre) @ 0.4g/L |

Harvesting: The crop is harvested when the cob husk has dried and turned brown and kernels have reached the desired moisture content (20-30%).

BABY CORN

Baby corn is young finger like unfertilized cobs with one-to-three-centimeter emerged silk preferably harvested within 1-3 days of silk emergence depending upon the growing season. It can be eaten raw as salad and in preparation of different recipes such as chutney, pakora, mix vegetables, pickles, candy, murabba, kheer, halwa, raita, Chinese preparations, etc. It is rich source of proteins, vitamins (A, B, C, and E, folate, thiamine, and pantothenic acid) iron and phosphorus. Cost of cultivation of baby corn in India is lowest in the world therefore; India can become one of the major baby corn producing country. It has great potential both for internal consumption and export.



Production technology

Varieties

| NHZ | NWPZ | NEPZ | PZ | CWZ |
|--|---|---|---|--|
| Ladhawal Baby Corn Hybrid 3, IMHB 1539, Vivek Hybrid 27, Central Maize VL Sweet Corn 1, HM-4, VL Baby Corn-1, COBC-1, Central Maize VL Baby Corn 2, Pusa HM4 Male Sterile Baby Corn (Shishu) | IMHB 1532, Vivek Hybrid 27, Central Maize VL Sweet Corn 1, HM-4, VL Baby Corn-1, COBC-1, Pusa HM-4 male sterile baby corn, Pusa HM4 Male Sterile Baby Corn (Shishu) | Vivek Hybrid 27, HM-4, VL Baby Corn-1, COBC-1, Central Maize VL Baby Corn 2, Pusa HM4 Male Sterile Baby Corn (Shishu) | Baby corn GAYMH-1, Vivek Hybrid 27, Central Maize VL Sweet Corn 1, HM-4, VL Baby Corn-1, COBC-1, Central Maize VL Baby Corn 2, Pusa HM4 Male Sterile Baby Corn (Shishu) | Baby corn GAYMH-1, IMHB 1532, Vivek Hybrid 27, Central Maize VL Sweet Corn 1, HM-4, VL Baby Corn-1, COBC-1, Central Maize VL Baby Corn 2, Pusa HM4 Male Sterile Baby Corn (Shishu) |

Sowing time: Baby corn can be cultivated throughout the year provided the temperature remains above 20-28°C. Staggered sowing of baby corn is advised to ensure a continuous and extended harvest.

Seed and sowing

| Seed rate | Spacing | Plant population | Sowing method |
|--------------|-------------------|------------------------|----------------------------|
| 9-10 kg/acre | 60 cm x 15 -20 cm | 33,000 - 45,000 / acre | Dibbling on side of ridges |

Nutrient management

| Crop stage | Schedule | Fertilizer (kg/acre) | | |
|-------------------------------|-----------------------|----------------------|-----|-----|
| | | Urea | DAP | MOP |
| Sowing | Basal | 10 | 50 | 40 |
| 4 leaf stage | 1 st split | 26 | - | - |
| 8 leaf stage | 2 nd split | 40 | - | - |
| Before detasseling | 3 rd split | 32 | - | - |
| After 1 st picking | 4 th split | 20 | - | - |

Detasseling: Fertilization hampers baby corn quality therefore remove the tassels as soon as they emerge from the flag leaf. Detasseling should be practiced row-wise. Leaf should not be removed during detasseling otherwise it hamper baby corn yield. Detasseling is not required in male-sterile varieties like Shishu.

Harvesting: Unfertilized small cobs are harvested 1-3 days after the silk emerges. Pickings should be done daily during *khariif* and on alternate day during *rabi* season. Picking during morning or evening hours are advised to ensure better quality baby corn.

SWEET CORN

Sweet corn is one of the most popular vegetables in the USA, Europe and other developed countries of the world. Sweet corn is a very delicious and rich source of energy, vitamin C and A. It is eaten as raw, boiled or steamed green cobs/ grain. It is also used in preparation of soup, salad and other recipes. It is becoming very popular in urban areas of country therefore; its cultivation is remunerative for peri-urban farmers. Besides green cobs, the green fodder is also available to the farmers for their cattle.



Production technology

Varieties

| NHZ | NWPZ | NEPZ | PZ | CWZ |
|--|----------|-------------------------|--|--|
| NUZI 260, Pusa Super Sweet Corn 2, VL Sweet Corn Hybrid-2, Pusa Super Sweet Corn 1, HSC 1, Win Orange Sweet Corn | NUZI 260 | Pusa Super Sweet Corn 1 | NUZI 260, Pusa Super Sweet Corn 2, Pusa Super Sweet Corn 1 | Pusa Super Sweet Corn 2, Pusa Super Sweet Corn 1 |