

Pusa Jawahar Hybrid Maize-1

A potential hybrid adapted to Madhya Pradesh

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Pusa Jawahar Hybrid Maize-1 (PJHM-1) is a medium maturing (90-95 days), medium tall (195 cm) hybrid, having dark foliage, semi-erect leaves with stay green character. Seeds of this hybrid are semi-dent, bold and orange/amber in color. PJHM-1 has very good field tolerance to Fusarium Stalk Rot (2.8) and Rajasthan Downey Mildew (0.0) and appears to be tolerant to drought and water logging at early growth stages. It has the yield potentiality up to 10,294 kg/ha with the average yield of 6,474 kg/ha. It is highly responsive to nitrogen fertilizer and positive response is evident up to 200 Kg nitrogen/ha during Kharif with appropriate P and K combination.

Keywords: Hybrid maize-1, Madhya Pradesh, Pusa Jawahar, Seed

Introduction

Madhya Pradesh is one of the traditional maize growing states in India with 12.67 lakh ha under maize cultivation. It ranks first in the area and 8th in productivity among the top 10 maize growing States in India. Maize is grown only during *kharif* season in MP and it stands first in the *kharif* maize productivity with 3261 kg/ha, surpassing the national average (3032 kg/ha)

In early 1990s, commercial cultivation of early and extra early maize hybrids was recommended and hence the productivity was low. Off late, due to favourable rainfall pattern and shift in the cropping pattern, farmers of the state are demanding medium maturing field corn hybrids. As the maturity duration of maize hybrids is positively correlated with its yielding ability, the medium duration maize hybrids will be boon for increasing maize productivity and farmers' income in Madhya Pradesh. Considering this, the field corn hybrid, Pusa Jawahar Hybrid Maize-

1 (PJHM-1), developed at ICAR-Indian Agricultural Research Institute, New Delhi was evaluated for its adaptability in MP in collaborations with J.N.K.V.V., Jabalpur, Madhya Pradesh. After confirming its promising performance against high yielding checks, it was released and notified for commercial cultivation in Madhya Pradesh during *kharif* season (S. No. CP-4/cotton/SSPC/2018/ 257/ Dated 22/05/2018 and Corrigendum; and notification G.No. 1326. S.O. 1498(E) (60).

There will be always a disparity between potential yield of hybrid and realization of yield at farmers' field. To minimize this gap following scientific cultivation practices should be followed.

Practices to be followed for realizing expected yield of PJHM-1

Climate

The PJHM-1 is well adapted to sub-tropical climate of central India, mainly Madhya Pradesh. Therefore, it

was released for the cultivation during *kharif* season in Madhya Pradesh.

Soil

PJHM-1 requires a well-drained alluvial to sandy loam soil with good amount of organic matter for its healthy growth. It thrives well in soil with pH range of 5.50 to 8.00.

Sowing

The seed rate for this hybrid is 20 kg/ha. Seed treatment with Imidacloprid @ 2ml/ kg and Carbendazim (Bavistin 50WP) @ 1gm/kg of seeds before sowing will improve germination and seedling establishment. Sowing of hybrid can be taken on the last fortnight of June to the first fortnight of July and the depth of sowing should be 2.5-3.0 cm. Raised bed sowing is more preferred to avoid the losses due to prolonged water logging. Plant population of 66,666 plants/ha (Spacing: 75 × 20 cm) or 83,333 plants /ha (Spacing: 60 × 20 cm)

will be ideal. Sowing of 2 seeds per hill with proper pest management practices would ensure the recommended plant stand at harvest and help realize expected yield levels.

Land Preparation and Fertilizer Application

Land should be ploughed 4-5 times to ensure fine tillage and prepare ridges and furrows with designated row spacing. FYM or chemical fertilizer: Incorporate 10-15 tonnes / ha of FYM and chemical fertilizer at the rate of 150-180: 90: 60 kg N:P: K along with 25-40 of ZnSO₄ for one-hectare area. Nitrogen should be applied in 5-splits as detailed below for higher productivity and use efficiency.

Entire dose of phosphorus, potash and zinc with 20 % nitrogen should be applied at the time of field preparation (Basal Dose). Application of ZnSO₄ recommended as maize is susceptible to Zn deficiency.

Crop Stage	Nitrogen rate (%)
Sowing (basal dose)	20%
V4 (four leaf stage)	20%
V8 (eight leaf stage)	30%
VT (tasseling stage)	20%
GF (grain filling stage)	10%

Irrigation

Apply first irrigation very carefully. Water should not overflow on the ridges. Irrigation should be applied in furrows up to 2/3rd height of ridges. The following are the critical stages for life saving irrigation to avoid failure of the crop.

Critical stages for irrigation

- Young seedlings – 15 to 20 days after sowing
- Knee height stage
- Flowering
- Grain filling
- 10 days after grain filling

Weed control

Pre-emergence application of Atrazine @ 2 kg/ha along with

Pendamehalin @ 1.5 liter/ha within 2 days after sowing is recommended for weed control. The post emergence spray of Laudis 630 SC (Tembotrane 420 g/L + Isoxadifen-ethyl 210 g/L) @ 250ml/ ha after 25 days of sowing will effectively control the weeds

Intercultural operation

Thinning should be done after 10 days of germination, keeping one plant per hill. At knee high stage (about 30 days after sowing) earthing up followed by hand weeding with khurpi should be ensured. The second earthing up should be done at around 45 days after sowing to provide proper support to the plant, which will also help retain moisture longer period of time.

Plant Protection

There are few common insect pests of maize which may attack PJHM-1 hybrid also at different growth stages. Understanding the nature of damage and their management is very much essential to realize expected yield.

Important insect pests and their nature of damage

- Termites, *Isoptera* sp: Termites are generally harmless to non-woody plants, but many plants with harder bodies are damaged by termites. Some termites they eat into the roots of young plants immediately below the soil surface, destroying the central root portions, and fill the resulting cavities with soil. Damaged plants wilt and may die within few days, particularly under drought conditions.
- Spotted stem borer, *Chilo partellus*: The first indication of stem borer infestation is the appearance of small-elongated windows or round holes on the young maize leaves in 2 to 3 weeks old crop due to feeding by the young stem borer larvae. The third-instar larvae migrate to the base of the plant, bore into the

shoot, and damage the growing point resulting in the production of deadheart.

- Pink Borer, *Sesamia inferens*: The moth of the *Sesamia* is nocturnal and lays eggs on lower leaf sheath. Newly hatched larvae remain behind the leaf sheath and begin chewing on the stem and inner side of the sheath. If larvae invade the whorl, unfolding leaves are chewed resulting in topping of the central whorl. If the larvae of *Sesamia* enter the plant near the base causes dead-heart symptom. Pink borer occurs during winter season particularly in peninsular India.
- Corn leaf aphid, *Rhopalosiphum maidis*: Piercing of the leaves and sucking of plant fluids by aphids causes some yellowish mottling. Sugary droplets excreted by the aphids favor the development of black molds and make the plants sticky. The aphid colonies may completely cover emerging tassels and the surrounding leaves, preventing pollen release. The role of this insect as a vector of the sugarcane mosaic virus, maize dwarf mosaic virus, and maize leaf-fleck virus which makes it a pest of considerable economic importance.
- The fall armyworm (FAW), *Spodoptera frugiperda*: The FAW is a polyphagous pest and has a very wide host range, with over 353 plants recorded, but clearly prefers grasses. First instar larva is green-ish in colour with black head while the final instars are with dark grey head and dull grey body with white subdorsal and lateral white lines. The mature larva is with a white inverted "Y" on the head and with distinct black spots on the body. Larvae also have a distinct pattern of four "dots" on the eighth abdominal segment.

Management of insect pests

- Application of fipronil granules @ 20 kg ha⁻¹ followed by light

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- irrigation or use of imidacloprid or thiamethoxam drop-by-drop in the water channel while irrigating the field is useful for termite control.
- Treat seeds with thiamethoxam (9 ml/kg seed), or imidacloprid (0.165 mg/kg seed) to improve plant stand, seedling vigor, and reduce the damage by stem borer and corn leaf aphid.
 - Spray the maize crop with Deltamethrin 2.8 EC @ 175 ml/ha (0.7 ml/lit water) at 15 days after germination are effective for stem borer control.
 - The spotted stem borer can also be managed by use of egg parasitoid, *Trichogramma chilonis* @ 8 Trichocards/ha at 10 days after germination. Egg parasitoids such as *Trichogramma* sp. and *Telemonus remus* can be released for destroying the eggs of FAW.

- Entomopathogenic fungi such as *Nomuraea releyi*, *Metarhizium anisopliae* @ 2 g/ L are effective for the management of FAW.
- Seed treatment with Fortenza Duo @ 6ml/kg of seeds provides sufficient protection to the seedlings for FAW up to 20 days after germination.
- Use the insecticides viz., thiamethoxam 12.6% + lambda cyhalothrin 9.5% ZC, emamectin benzoate 5G @ 0.5 g/L, spinetoram (Delegate/Largo) 11.7 sc @ 0.4 ml/L, or chlorantraniliprole (Coragen) 18.5% sc for controlling FAW.

Harvesting and Threshing

The hybrid, PJHM-1 will be ready to harvest after 95 days of sowing and its stay green nature enables harvesting green fodder after the

harvesting of cobs and hence it can be a dual purpose hybrid. The maize ears should preferably be dried for 3-4 days after harvesting to improve grain recoveries and reduce breakage losses during shelling. Shell the cobs when the moisture content ranges between 15-20%. Conventional harvester/combiners can be used for threshing maize cobs along with husk to save labour required for dehusking.

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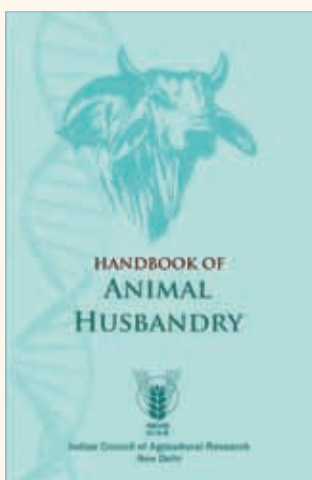
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TECHNICAL SPECIFICATIONS

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