



## Production Technology for Hybrid Rice- CR Dhan-703 (CRHR-103)

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RICE hybrids are impressive in yield and can produce 15-25% more yield over best HYVs of similar maturity duration. Till date, India has commercialized altogether 133 hybrids with duration of 110 to 145 days for cultivation in irrigated and shallow lowlands. The ICAR-National Rice Research Institute has developed a long duration rice hybrid, CR Dhan-703 for irrigated, shallow lowlands and *boro* ecosystem. This hybrid was released and notified during 2021 by SVRC, Odisha. The hybrid CR Dhan-703 (CRHR-103, IET-25278) was developed from a cross, CRMS 32A/CRL123R through heterosis breeding utilizing CGMS type of male sterility. This hybrid is based on an indigenous CMS line other than IR 58025A, which was widely used for the development of hybrids. The hybrid is medium tall (115 cm) with erect, non-lodging plant type and matures in 140-145 days. It has high spikelet fertility, non-shattering habit and possesses non-aromatic long slender grains with intermediate alkali value, intermediate amylose content and medium gel consistency with good cooking and eating qualities. It has good milling and hulling characteristics with moderate head rice recovery (HRR). It is moderately resistant to Blast, Sheath blight, False smut and GLH. The hybrid can be grown in both wet and dry seasons. The hybrid has a yield potential of 7.5-8.0 t/ha which is more than 1.0 t/ha over the comparable popular check variety, Swarna. The hybrid also has tolerance to excess stagnant water for a period of 7-10 days and can tolerate brief spells of submergence too. It was also found promising under lowlight conditions prevailing in Eastern India and will be suitable for favourable coastal shallow lowlands of the country. The

hybrid is recommended for irrigated and shallow lowland areas of Odisha and has also shown good performance in the states of Bihar, West Bengal and Gujarat. Seed production of the hybrid was found to be commercially feasible as the flowering synchronization of the two parental lines could be achieved easily in seed production plots.

Hybrids exerts it full potential under optimum agronomic management. This bulletin gives the information on production technologies to be followed for obtaining optimum grain yield in the hybrid, CR Dhan-703.

### **Suitable Hybrids for Odisha**

Rice hybrids are good input responsive, perform better during dry season than in wet season. Suitable hybrids should be chosen for different locations and ecosystems. To raise good crop, each time hybrid cultivation needs fresh seeds in each and every season which should be procured from only authorized seed agencies. For Odisha, the hybrids, Ajay, Rajalaxmi, Sahyadri, PAC835, BS6444G, 27P63, Arize Dhani, CR Dhan-701, CR Dhan-702 and CR Dhan-703 are found suitable.

### **Nursery Bed Preparation**

- About 600 m<sup>2</sup> nursery area is sufficient for transplanting of one-hectare field.
- Plough the nursery area when field is dry, then hold water in the field for 4-5 days.
- Drain excess water, puddle the field twice or thrice and finally level it by ladder.
- Prepare raised wet nursery beds of 0.15 m height and 1.0 m width with 30cm wide drains.
- Apply 100kg farmyard manure (FYM) and NPK @ 500: 500: 500 g/ 100 m<sup>2</sup> of nursery area before final preparation of the land.
- To ensure healthy seedling, sparse sowing is desirable, use 20-25 g of seeds per 1 m<sup>2</sup> of nursery area.

### **Selection of Seeds**

- Always use faithfully labelled seeds, it should be purchased from authorized suppliers.
- Generally, hybrid seeds are light in weight, so, never use brine solution (salt solution) to separate the half-filled seeds. As even half-filled hybrid seeds have good germination and vigour.

### **Seed Rate**

Per hectare cultivation of rice hybrid requires 12 to 15 kg seeds.

### **Seed Treatment**

- To avoid the diseases and pest in nursery, seed treatment with Carbendazim (Bavistin) @2 g/kg of dry seeds after soaking in water for 24 hours is desirable.
- Keep the treated seeds under shade and cover it with wet gunny bag or straw.
- Sprinkle water 2-3 times a day, seeds will sprout in one or two days.

### **Time and Method of Sowing**

- For wet season crop, right time of seed sowing is mid-June and for dry season, hybrid seed should be sown during 1<sup>st</sup> week of December. Delayed sowing during *Rabi* season cause erratic flowering, which should be avoided.
- Ensure sprouted seed sowing on levelled wet nursery beds with no standing water.

### **Nursery Management**

- After two to three days of sowing, light irrigation to maintain a thin film of water is desirable.

- Keep nursery bed free from weeds.
- Apply Carbofuran (Furadan 3G) @ 250 g/ 100 m<sup>2</sup> of nursery area after 15 days of sowing.

### Land Preparation

- Irrigated medium and banded shallow-lowland with good drainage facility are suitable for hybrid rice cultivation.
- Apply FYM @ 5 t/ha during the dry ploughing.
- Before seven to ten days of transplanting, saturate the field with sufficient water and puddle it thoroughly to incorporate the weeds.
- Level the puddled field by laddering prior to the transplanting.

### Transplanting

- Before uproot the seedling, a light irrigation is desirable.
- Uproot seedlings and dip it overnight in the solution of Chlorpyrifos @ 1 ml/litre of water.
- Transplant 25 to 30 days old seedlings at a shallow depth (2 to 3 cm) in well puddled and levelled land.
- Transplant @ one to two seedlings/hill with a spacing of 20 cm x 15 cm or 15 cm x 15 cm between the rows and plants.
- Planting rows should preferably be in the north-south direction.

### Fertilizer Application

- During wet season, application of NPK should be done @ 100: 50: 50 kg/ha and during dry season @ 120: 60: 60 kg/ha.
- Soil test based fertilizer application should be preferred especially for P and K.
- In basal dose, apply one fourth of total N, entire P and three fourths of K before final puddling. Top-dress the remaining N in three equal splits, each at three weeks after transplanting (active tillering), panicle initiation (80 days from the date of sowing) and panicle emergence stages. Also apply remaining one fourth of K at panicle initiation.

### Irrigation and cultural Practices

- After two days of transplanting, irrigate the field. Maintain 5-10cm water depth till grain filling stage.
- Gap filling should be done within 7-10 days of transplanting.
- Twice weeding, 1<sup>st</sup> after 21 days of transplanting (DAT) and 2<sup>nd</sup> after 42 DAT are desirable for healthy crop establishment.

### Plant Protection

Rice is prone to many insect pests, diseases and other nutritional disorders, which cause great loss in production and seed quality. Therefore, preventive measures before severe damage in field should be taken to stop/eradicate such problems. Some chemical methods which are given in Table 11 may be utilized in successful management of major rice problems.

### Harvesting, Drying and Storage

Drain out water from rice field before 15 days of harvesting. Harvest the crop when > 80% of the grains in panicles are ripened or attained golden color. Thresh dried paddy with paddle or power thresher. Winnow the threshed grains and dry the cleaned grain under shade to reduce moisture content to around 12-13% and store dried rice in storage bins.

**Table 12: Important plant protection measures**

Name of insect	Management practice
Gundhi bug	Spray chloropyrifos 20%+ cypermethrin 2% EC @ 1 L in 200L water. Apply Malathion 5 % dust @ 6-8 kg/acre at morning time.
Stem borer	Apply Cartap hydrochloride 50 SG/ Fipronil 5 SG @ 1kg/ha in 200 litres water at 15 days intervals.
Plant hopper	Spray the Imidacloprid 17.8% EC @ 1.2 L/ha
Rice hispa	Spray the Chlorpyrifos+Super methrin solution or quinalphos 25 EG @ 1.25 L in 200L water.
Name of diseases	Management practice
Bacterial leaf blight	Spray Streptocyclin/Agrimycin 60 or 80g+500g blitox or phytolon or fupravit in 500 litres of water 2-3 times at 10-15 days interval.
Blast and sheath blight	Early sowing and less nitrogen application may allow the crop to escape from blast and sheath blight. Spray fungicides like tricyclozol, hexaconozol or propiconozol @ 200ml/acre in 200 litres of water
False smut	Seed treatment with thiram+carbendazim (2:1 ratio) @ 3 g/kg seeds Spray Tricyclozol 75% WP @ 1.5 g/litre water
Khaira disease	Apply Zinc sulphate @ 20-30 kg/ ha.
Brown spot	Spray one of these: Carbendazim (0.1%), diathane M 45(0.25%), Tilt (0.1%), or hinosan (0.1%) 2-3 times at 10-12 days interval

**Points to remember**

- Never use hybrid harvest for raising the next crop. Use freshly procured seeds from an authorized agencies all the time.
- Apply N in four equal splits at basal, 21DAT, PI and panicle emergence.
- Apply K in two splits 3/4<sup>th</sup> in basal and 1/4<sup>th</sup> at PI.
- Nursery sowing should be very sparse (20-25 gm/sq.m.) to get healthy seedlings.
- Transplant only one or two seedlings /hill at the spacing of 15x15 cm or 15 x20 cm.

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