

# CROP PRODUCTION

## PACKAGE OF PRACTICES FOR CULTIVATION OF HYBRID RICE

The first two hybrid varieties of rice were released by the State Variety Release Committee of Andhra Pradesh in 1993. By the end of 2002, 17 hybrids (13 from public sector and four from private sector), have been released for commercial cultivation, the list of which is given below:

| Hybrid                 | Crop duration (Days) | % Yield advantage over local check | States for which recommended for cultivation  |
|------------------------|----------------------|------------------------------------|---|
| APHR-1                 | 130-135              | 35.4                               | Telangana, Rayalaseema and uplands of coastal Andhra Pradesh  |
| DRRH-1                 | 125-130              | 32.7                               |   |
| APHR-2                 | 120-125              | 44.2                               |   |
| MGR-1                  | 110-115              | 16.2                               | Tamil Nadu (for May-June and September-October) planting  |
| CORH-2                 | 120-125              | 20.2                               | Tamil Nadu (July-Sept.)   |
| ADTRH-1                | 115-120              | 44.9                               | Tamil Nadu (April-July)   |
| KRH-1                  | 120-125              | 31.4                               | Irrigated areas of Karnataka  |
| KRH-2                  | 130-135              | 21.3                               |   |
| CNRH-3                 | 125-130              | 37.4                               | West Bengal (Boro season)   |
| Pant Sankar Dhan-1     | 115-120              | 9.7                                | Plains of western Uttar Pradesh   |
| Sahyadri               | 125-130              | 35.8                               | Konkan region of Maharashtra  |
| Narendra Sankar Dhan-2 | 125-130              | 24.5                               | Eastern Uttar Pradesh   |
| PHB-71                 | 130-135              | 28.0                               | Tamil Nadu, Haryana, Maharashtra and Uttar Pradesh  |
| PA 6201 (2000)         | 125-130              | 22.9                               | Eastern and some parts of Southern India  |
| HRI-120 (2001)         | 135-140              | 24.4                               | Telangana region of Andhra Pradesh, Karnataka, Konkan region of Maharashtra, Plains of Uttaranchal, Eastern Uttar Pradesh, Orissa and Tripura |
| Pusa RH-10 (2001)      | 120-125              | 39.9                               | Haryana, Punjab, Western Uttar Pradesh, Delhi   |



High yielding hybrid rice variety KRH-2



High yielding hybrid rice variety PHB-71

On-farm multi-locational evaluation of hybrids released till 2000, showed that hybrid KRH-2 was the highest yielder and most adaptable one, followed by hybrids PHB-71, PA-6201, Sahyadri, Narendra Sankar Dhan-2 and DRRH-1.

## PACKAGE OF PRACTICES

The Directorate of Rice Research (DRR), Hyderabad has developed package of practices for hybrid rice cultivation, which can be locally tailored depending upon the variation in soil, climate and other associated factors.

### Sowing

Adjust sowing in a way that the crop is not exposed to extreme high or low temperatures particularly at panicle initiation and flowering stages.

| Season        | Sowing period*        | Planting period*      |
|---------------|-----------------------|-----------------------|
| <i>Kharif</i> | June 1st–3rd week     | July 1st–3 rd week    |
| <i>Rabi</i>   | November 2nd–4th week | December 2nd–4th week |

\*Sowing and transplanting time may vary slightly depending on locations/seasons.

### Seed Rate

15–20 kg/ha. Seed is to be procured afresh every season.

### Nursery Management

Since the cost of hybrid seed is higher, proper nursery management is very important. Sparse sowing of hybrid seed @ 20–30 g/m<sup>2</sup> should be adopted to obtain strong, healthy and multi-tiller seedlings in 20–25 days for planting.

Prepare wet beds of 1 meter width and of convenient length with good drainage facility. Total nursery area required for sowing 15–20 kg of seed is 750 to 1,000 m<sup>2</sup>. Apply 250 kgs of farmyard manure, 1 kg Nitrogen, 0.4 kg Phosphorus and 0.5 kg Potash per 100 m<sup>2</sup> nursery area. Before sowing soak the seeds for 12–15 hours. Treat the pre-soaked seeds with Carbendazim (50% WP) @ 4 g per kg of seed. Incubate the seeds in gunny bags for 1 to 2 days for better sprouting. Sow the sprouted seeds sparsely and uniformly on well prepared seed beds. Maintain thin film of water without allowing the beds to dry at anytime. Top dress the nursery beds after 15 days of sowing with 0.6–0.8 kg of Nitrogen per 100 m<sup>2</sup> area. Appropriate plant protection measures may be taken, if necessary.

## Main Field Management

### Transplanting

Prepare main fields thoroughly by repeated ploughing followed by puddling and apply the recommended dose of farmyard manure two weeks before transplanting. After thorough leveling of the fields, apply 50% of Nitrogen and 75% of Potash, and complete dose of Phosphorous, a day before transplanting. Transplant 25–30 days-old seedlings, 1 to 2 seedlings per hill at 2–3 cm depth. The spacing of 20 × 10 cm or 15 × 15 cm is essential to ensure a plant population of 45–50 hills/m<sup>2</sup> meter area.

### Weed Management

Mix 2.5–3.0 kg of Butachlor in 50–70 kg of sand and apply in one hectare area after 5–6 days of transplanting of rice. Thereafter ensure uniform 2 cm of standing water in the field for 3–4 days. If needed, undertake hand weeding to ensure healthy crop.

### Manures and Fertilizers

Balanced use of organic and inorganic fertilizers is also very important to realize full potential of these rice hybrids.

#### Recommended dose (per ha)

|  |   |
|--|---|
| Green manure or Farm Yard Manure (tonne) | 10–15                                   |
| Chemical fertilizers* (kg)               |   |
| Nitrogen (N)                             | 120–150                                 |
| Phosphorus (P)                           | 40–60                                   |
| Potash (K)                               | 40–60                                   |
| Zinc (Zn) need based                     | 50–60 ZnSO <sub>4</sub> once in 3 years |

\*Fertilizer recommendations may vary slightly depending on location. Need based application of zinc and iron is also recommended for higher yields.

Apply 25% of the recommended dose of nitrogen in the form of Urea at 30–35 days after planting and the remaining 25% nitrogen and 25% of Potash at panicle initiation stage (70–75 days after transplanting).

### Water Management

Maintain a thin film of water for initial 30 days and when the crop reaches maximum tillering stage, increase the water level to 4–5 cm.

Drain out water for 4 to 5 days after maximum tillering stage so that emergence of late tillers can be suppressed. Ten days before harvest drain out applied irrigation water completely from the field.

### Disease and Insect Pest Management

Like other rice varieties, hybrids also are damaged by insect pests and diseases. Control measures for some of the common insect pests and diseases are given below. Plant Protection Experts from the concerned Agricultural University and/or State Department of Agriculture may be contacted for location specific requirements.

| Recommended control measures |   |
|------------------------------|---|
| <b>Diseases</b>              |   |
| Blast                        | <ul style="list-style-type: none"> <li>• Tricyclozole 75 WP                             <ul style="list-style-type: none"> <li>– Seed treatment (2 g/kg of seed)</li> <li>– Spraying (0.6 g/litre)</li> </ul> </li> </ul> |
| Sheath Blight                | <ul style="list-style-type: none"> <li>• Validamycin 3L spray (2.5 ml per litre) or</li> <li>• Hexaconazole 5 EC spray (2 ml per litre) or</li> <li>• Propiconazole 25 EC (1 ml per litre)</li> </ul>                     |
| False smut                   | <ul style="list-style-type: none"> <li>• Chlorothalonil 75 WP spray (2 g per litre)</li> <li>• Propiconazole 25 EC spray (1 ml per litre)</li> <li>• Mancozeb 75 WP spray (3 g per litre)</li> </ul>                      |
| Sheath Rot                   | <ul style="list-style-type: none"> <li>• Carbendazim 50 WP spray (1 g per litre)</li> <li>• Propiconazole 25 EC spray (1 ml per litre)</li> </ul>   |
| <b>Insect Pests</b>          |   |
| Stem borer                   | <ul style="list-style-type: none"> <li>• Cartap spray 50 WP (0.3 kg a.i./ha) or</li> <li>• Monocrotophos spray 36 WSC (0.5 kg a.i./ ha) or</li> <li>• Chloropyrifos spray 20 EC (0.5 kg a.i./ha)</li> </ul>               |
| Brown plant hopper           | <ul style="list-style-type: none"> <li>• Imidachloprid spray 200 SL (25 g a.i./ha) or</li> <li>• Thimathoxan spray 25 WG (25 g a.i./ha) or</li> <li>• Ethofenprox spray 10 EC (75 g a.i./ha)</li> </ul>                   |
| Leaf folder                  | <ul style="list-style-type: none"> <li>• Cartap granules 4 g (0.6 kg a.i./ha) or</li> <li>• Cartap spray 50 SP (0.3 kg a.i./ha)</li> </ul>  |
| Gall midge                   | <ul style="list-style-type: none"> <li>• Carbofuran or Phorate granules 3 g (1.00–1.25 kg a.i./ha or</li> <li>• Chloropyrifos granules 10 g (1.0 kg a.i./ha)</li> </ul>   |

### Harvesting and Threshing

- When grains in the lowest portion of the panicle are in the dough stage (about 20 days from 50% flowering), drain out water from fields.
- Allow the grains to harden.

- Harvest 30–35 days after flowering when stalks still remain green to avoid grain shedding. Moisture content of paddy should be 20 to 24% at harvest.
- Thresh as early as possible, preferably a day after harvest.
- Dry gradually under shade until the moisture content is brought down to 12–14%, to ensure better milling quality and storage. Under good management conditions the hybrids can give 1.0 to 1.5 tonnes/ha more than the best high yielding varieties.

## GRAIN STORAGE

Depending upon the quantity of grain to be stored, a suitable storage structure (metallic/non-metallic) which is fairly air tight is needed. Disinfest the storage structure with malathion 50 EC (1: 100 dilution) @ 3 litres of spray emulsion per 100 m<sup>2</sup>. before filling in with grains. Store rice as unmilled paddy. Bring down the grain moisture level to 12–14% before storage by open drying.

If old gunny bags are to be reused, treat such bags with malathion or immerse in boiling water for 15 to 20 minutes and dry. Stack the bags in systematic way on proper planks either on wooden crates or on a foot high thick layer of husk or straw, away from the walls.

## ECONOMICS

With complete adoption of the recommended practices along with good field management, it is possible to obtain 1.0–1.5 tonnes/ha higher yields from hybrids as compared to the recommended high yielding varieties under similar growing conditions. Hybrid seed cost is the only additional expenditure incurred in cultivation.

*For more details contact:*

Director  
Directorate of Rice Research  
(ICAR) Rajendranagar  
Hyderabad 500 030