

KAUL

Rice Research Station

Chaudhary Charan Singh Haryana Agricultural University Haryana

The rice research station was established in 1974 in the rice belt at Kaul in district Kaithal under Chaudhary Charan Singh Haryana Agricultural University with the mandate of development of high yielding non-scented varieties and export quality scented varieties possessing quality and resistance to major biotic and abiotic stresses.



Major contributions to AICRIP

Crop Improvement

Plant Breeding

Varieties developed & released

A) Medium Duration (135-150days)

HKR 126: Semi dwarf, high yielding, dark green leaf colour with long slender grain, suitable for timely transplanting. It can tolerate water stress up to 10 days without any yield loss. It is resistant to stem rot and WBPH and moderately resistant to bacterial blight.

HKR 127: Semi dwarf, high yielding variety with golden yellow coloured grains and high milling recovery. It matures in 139 days and was released and notified in 2009. It is tolerant to false smut and is suitable for timely planting.



HKR 128: Semi dwarf, high yielding variety with long flag leaf and long slender grain. It matures in 145 days and has already been tested at farmers' field under. It is likely to be released for general cultivation in the state.

B) Mid-early (120-135 days)

HKR 47: Released in 2005 and takes 135 days from seed to seed. It is semi dwarf, high yielding variety with golden coloured grains. It gives high milling rice recovery. It is tolerant to false smut and suitable for early and late planting.

IR 64: Introduced from IRRI through INGER programme and released after testing in station and coordinated trials. It is semi dwarf, high yielding, resistant to WBPH and moderately resistant to bacterial blight. It is suitable for early and late planting and performs well both in normal and salt affected soils.

C) Early Duration (100-120 days)

HKR 48: A semi dwarf, high yielding variety with sturdy stem and extra long grains. It is moderately resistant to bacterial blight. It matures in 118 days and is suitable for early and late planting.

D) Aromatic

HaryanaBasmati-1: Released in 1991 for general cultivation in Haryana. It is semi dwarf, high yielding, and photoperiod insensitive. Its grains are long slender and elongates twice after cooking. It is resistant to blast and tolerant to stem borer.

HaryanaBasmati-2: A semi dwarf, high yielding having extra long grain like Pusa Basmati 1121. Its grains elongate 2.17 times after cooking and give fragrance. It has also been tested at farmers' field and likely to be released for Haryana state.

E) Hybrid

Haryana ShankarDhan-1: A semi dwarf, high yielding indica rice hybrid maturing in 139 days, with stiff straw, broad, light green and erect leaves and long slender grains (super fine). It is tolerant to WBPH and stem rot and is suitable for timely planting.

Besides, CMS lines, maintainers and restorers were also identified for hybrid seed production as given below.

- 1 Developed two CMS lines HKR CMS1-1A (PMS3A/HB1) and HKRCMS2-1A (PMS3A/HKR239)
- 2 The CMS lines IR58025A, PMS1A, PMS2A, PMS3A and PMS10A have been used extensively in hybrid seed production

- 3 Identified IR50, HKR46, IR64, PR103, HKR124, BR827-35-K2, Pusa 44-33, IRON89-55, RP2151, IR72R,NDR118, IR54742, Indrasan, HKR49, IR54017, IR60913,HKR86-216,HKR93-3, IR54550, HKR86-3, IR52256, IR44962-7,HKR93-101, UPR1230-9-2, IR42266, IR8866, HKR91-108, IR1567,IR49461 PAU1126, IR60821-34, PAU1628 and PR109 as restorers
- 4 Identified HKR138, PUSA150,IR35546, HKR20, IR9828, HKR134, HKR239, HKR241, PR4141, HKR86-113, IR46823,HKR86-193, HB-1, IR-58110, Manhar, HKR112, HKR95-129, HKR95-128, HKR95-131, HKR95-138,HKR94-404, HKR95-55, HKR49492-2-2-2, PAU1973-121-1-2-1, Pusa150, IR41999-139-1-1-2-3, HKR96-90, IR46823-40-3-11, HKR98-18 HKR 94-105, HKR96-112 and HKR97-41 as maintainers.

Crop production

Agronomy

Chemical weed control in rice

- Oxyfluorfen, basalin, oxadiazon fentrazomide bensulfuron methyl and triasulfuron, pyrazosulfuron ethyl penoxsulam were found effective for weed control in transplanted rice causing greater reduction in weed growth and consequent increase in grain yield.
- Trials on economics of weed control showed that herbicides were economical than hand weeding in transplanted rice.
- Pendimethalin proved better than butachlor, benthiocarb and oxyfluorfen under direct seeded upland conditions
- combination of bispyribacsodium + metamifop (70 kg/ha) + wetter (100 ml/ha) was found most effective under direct seeded puddled conditions
- Studies on weed dynamics in rice-wheat system revealed that population of all types of weeds decreased every year with use of herbicides, but reverse was true for broadleaf weed Ipomoea aquatica.

Cultural management of rice

- • Medium duration hybrid PHB 71 had higher nutrient use efficiency and yielded higher than the medium duration variety HKR 126 under lower dose of fertilizer ($N_{120}P_{80}K_{60}$) while both were at par under the higher dose ($N_{150}P_{80}K_{60}$).
- • Use of various organic sources in Basmati rice (Basmati CSR 30) revealed that organic sources viz. green manuring (*Sesbania aculeata*) in situ at 5-10 t/ha coupled with application of FYM at 5-10 t/ha with or without blue green algae or azotobactor or phosphate solubilizing bacteria were found superior to

inorganic fertilizers.

- • Evaluation of different duration genotypes under alternate wetting and drying in puddled direct sown conditions revealed that hybrid HKR 1094; inbred HKR 47 and hybrid Haryana Shankar Dhan 1 were found most suitable.

Rice based cropping systems

- Management of rice residues in rice-wheat system revealed that the incorporation or retention of rice residues on the soil surface improved physico-chemical properties of the soil, particularly in the second year, resulting into increase in organic carbon content and decrease in bulk density of the surface soil (0-15 cm) over the in situ residue burning or removal practices.

Crop protection

Entomology

- Screening of rice genotypes against major insect pests: Based on field reaction from various trials viz. PHS, MRST, NSN-1, NSHN etc. from 1980 to 2014, several genotypes found promising against planthoppers, leaf folder and stem borer.
- Insecticide evaluation against major insect pests: Many insecticides formulations belonging to different groups were evaluated singly or in combination and recommended against planthoppers, leaf folder and stem borers.
- Several trials on Insecticides-induced resurgence of insect pests, monitoring species composition of stem borers and leaf folder, biological control, ecological engineering for planthopper management, Monitoring and management of yellow stem borer through pheromone trap, estimation of yield losses, Integrated Pest Management, population dynamics of insect pests through light trap were successfully conducted.

Plant Pathology

- Rice genotypes possessing single or two resistant genes were found susceptible to highly susceptible. Stable resistant sources against bacterial leaf blight have been identified for utilization in resistance breeding programme.
- Various fungi toxicants have been evaluated and effective molecules were identified.
- The genotypes HKR 95-128, HKR 95-131 and HKR 95-138, found resistant to bacterial blight in multi-environmental tests, have been maintained as genetic stocks by NBPGR, New Delhi.