MASODHA (FAIZABAD)

Crop Research Station

Narendra Dev University of Agriculture & Technology, Kumarganj, Faizabad Uttar Pradesh

The Crop Research Station, Masodha, Faizabad formerly known as Rice Research Station, was established in the year 1951 with the mandate to conduct rice research on different ecosystems viz., drought prone rainfed upland, rainfed shallow lowland and semi deep ecology, irrigated etc. This station is a satellite centre of Narendra Dev University of Agriculture & Technology (NDUAT), Faizabad.

Major contributions to AICRIP

Crop Improvement

Plant Breeding

High yielding varieties developed at this center have contributed a lot in enhancing the productivity of irrigated areas not only of Uttar Pradesh but many other states too.

Sl. No	Variety	Parentage/ Designation	Year of release	Maturity (days)	Yield (q/ha)	Grain type
A. Upland drought prone very early						
1	Narendra-1	Belle Patna/IR8	1981	105	35-40	MB
2	Narendra-118	IR 36/Hansraj A	1987	85	35-40	MS
3	Narendra-97	Nagina-22/Ratna	1992	90	35-40	LS
4	Barani Deep	C1064-5/IR 9129-320-3-3-3//IR 54	2001	100	35-40	LS
5	Shushk Samrat	C 1064-5 / Kalkari// IR 54	2007	105	35-40	LS
B- Irrigated						
Early (100-115d)						
6	Narendra-2	IR 8/Tadukan / (TKM6 /TNI)/ /IR8/IR24	1982	115	40-45	LS
7	Narendra-80	Nagina-22/IR 36	1986	115	40-45	MS

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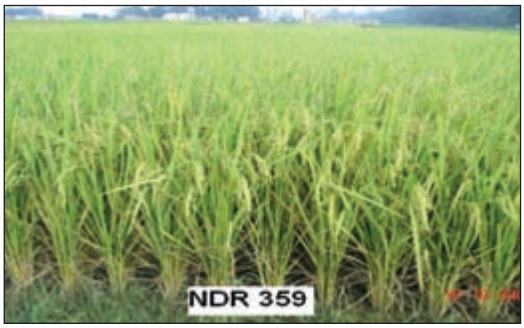
8	NDR 2026	SIPI 632-63 / CHAINUNG SEN YU 47/ TAICHUNG SEN 12	2005	115	40-45	MS
9	NDR 2064	Pant Dhan 4/Saket4 // NDR 2017	2007	115	50-55	MS
10	NDR 2065	Pant Dhan 4/Saket 4// NDR 2018	2011	120-125	50-55	LB
11	NDR 2101 (Shivraj)	Pant Dhan 4/NDR 2018	2013	120-125	50-55	LB
Medium Duration (120-130d)						
12	Sarjoo-52	TN 1/Kashi	1980	130	60-65	LB
13	Narendra-359	BG90-2-4/OB677	1993	130	60-65	LS
14	Naredndra 3112-1 (Prakhar)	NDR 313-1/NDR 359	2009	125-130	50-55	LB
15	NDR 370133 (Narendra Sona)	NDR 359/NDR 3026	2013	130	55-60	LB
16	Narendra Laher	IR 68068-99-1-3-3-3/ Janak//IRRI 105	2014	130	55-60	LS
Hybrid Rice						
17	Narendra Shankar Dhan-2	IR58025A/NDR3026-3-1	1998	130	65-70	LS
Rainfed Lowland Shallow Deep (30-50cm)						
18	NDR 8002	IR 67493-M – 2	2004	140	40-45	LS
19	Jal Lahri	Pankaj/Mahsuri// TKM6	1993	145	40-50	MS
D. Usar/Problem Soil						
20	Narendra Usar Dhan - 2	IR1814/IR1366- 120 -3-1//IR1539- 37-3-1	1995	125	30-40	LS
21	Narendra Usar Dhan -3	LEUNGYAI 148/IR 9129-209-2-2-1 //IR 18272-27-3-1	1999	130	45-50	LS
22	NDURH-3	IR58025A/NDRK5026 -1 R	2005	130	50-55	LS

Sl. No	Variety	Parentage/ Designation	Year of release	Maturity (days)	Yield (q/ha)	Grain type
23	Narendra Usar Dhan 2008 (NDRK 5088)	TCCP 266-249-B-B-3/IR 262-43-8-1	2009	120-125	45-50	LB
24	Narendra Usar Dhan 2009 (NDRK 50002)	NDRK 5024/NDR 423	2012	120-125	45-50	MB
E. Aromatic Rice						
25	Lalmati	Land Race	2007	110	30-35	SS
26	NDR 6093	NDR 637/Type-3	2012	128	40	LS
27	NDR 6244	IET 13549/Taroari Basmati	2013	130-35	40	LS
28	Narendra Parag	Selection from Vishnu Parag	2014	130-35	40	SB



Narendra Shankar Dhan 2

- Breeding material nominated – Every year 250-300 crosses were made and 1500-2500 segregating populations were screened for various traits covering all the ecologies. Of these, 19-37 entries were nominated to AICRIP.
- Altogether 1078 exotic and indigenous germplasm have been maintained.

Crop Production

Agronomy

- Rice based cropping systems: Out of six rice based cropping systems tested, rice-wheat system found to be quite feasible and economically sound. Rice-potato + mustard - black Gram crop sequences proved to be the most remunerative followed by rice- wheat-green manure crop sequence. With adoption of dhaincha (Sesbania) for green manure in summer season, the grain yield of rice and wheat may be enhanced by 5-6q/ha compared to fallow with saving of 40 kg N/ha.

- Nutrient management: For fertilizer economy, 25% of recommended fertilizer dose (120 kg N+60 kg P20s + 60 kg K2O/ha) may be applied through FYM and rest 75% through inorganic fertilizers. Half dose of nitrogen along with full dose of phosphorus and potash should be applied as basal, half N as top dressing at the active tillering and PI stages of crop growth.
- Cultural practices: Transplanting of medium duration rice varieties should be done at the end of June or early July, short duration by mid July while traditional photo period sensitive varieties by the end of July with 50 hills per square meter. The sowing in line under puddled condition by DRR 7 rows drum seeder using 100 kg sprouted seed was at par to transplanting and better than farmers' practices as well as broadcasting of sprouted seed in puddled conditions.
- Weed Management: Hand weeding twice, at 20 and 40 days after sowing/ transplanting has been found effective. Use of Butachlor @ 1.5 kg ai/ha or Anilophos 30 EC @ 0.6 kg a.i./ha applied within 3-4 days after sowing/ transplanting was most effective.
- Scented rice: For better yield, transplanting of scented dwarf rice varieties must be completed before 3rd week of July. These varieties responded to N linearly up to l20 kg N/ha while tall traditional varieties up to 90 kg N/ha.

Soil Science

Long term effect of continuous cropping and manuring:

- Twenty years results showed that there is need of P application in both the crops i.e. rice-wheat. In long run, nitrogen responds only in presence of phosphatic fertilizers.
- The loss of applied N due to prilled urea application through leaching and ammonia volatilization could be reduced by the application of the neem cake coated urea, urea super granules and large size granulated urea.
- Nitrogen application, irrespective of sources increased $NH4^{+}$, N concentration 86.6% in the soil. The application of urea in three splits recorded highest grain yield as well as nitrogen use efficiency.
- Maximum uptake response and recovery of applied nitrogen was observed with prilled urea followed by 50% organic +50% inorganic fertilizer.
- Maximum paddy yield was recorded in the treatment 120 kg N, 60 kg P_20_5& 60 kg K_2O, 25 kg $ZnSO_4$, 10 kg S + FYM @ 5t/ha as compared to other combinations of inorganic and organic manure treatments.
- Application of 5.0 ppm of Zn recorded maximum paddy yield, where as application of Zn beyond 5.0 ppm decreased the yield.
- Fe & Zn lines - Rice germplasm for higher Iron and Zinc content in grain was screened and promising genotypes were identified.

Physiology

- For drought prone rainfed conditions, findings emphasized the need for evolving rice cultivars possessing greater sink potential (product of grain number and grain size) and increased drought resistance particularly plant sustenance with maturity duration around 90 days which is actually the maximum span of the rainy season in eastern Uttar Pradesh.
- For rainfed upland situations compact and awned panicles have been found to lose less water, hence beneficial under limited water supply conditions. Panicle water relations and genotypic variation therein provide opportunity for identifying adaptive mechanisms of great practical significance.
- "Tri-nodal rooting"- a unique rooting system in rice seedlings has been identified and found to increase drought resistance through maintaining higher leaf water status and increased seedling vigor.
- Root-box studies have shown that the root length densities of deeper soil zone were beneficial than root length densities of upper soil zones in maintaining water status of plant under depleting soil moisture conditions.
- Enhanced capacity of dry matter accumulation during vegetative stage and subsequent translocation of stored assimilates for grain filling during stress period have been found desirable characteristics for increased production and productivity under stress situations.
- The exogenous application of ABA may be of value for plant survival under depleting soil moisture conditions and regrowth upon rewatering.
- Pre-sowing drought hardening prevented turgor loss, increased net chlorophyll content and enhanced both proline and sugar accumulation in the leaves during drought.

Crop Protection

Entomology

Cultural practices

- Transplanting before 15th July helps to avoid high infestation of rice whorl maggot. Alleys formation after every ten rows hinders the development of BPH.
- Rain supported with dry spell in the month of October encourages the development of ear cutting caterpillar. Flooding the field is recommended to check their multiplication.

Chemicals identified

- Chlorpyriphos was effective against rice ear cutting caterpillar. Spray

formulation gave better result than the dust. Chlorpyriphos 10G, Carbofuron 3G and Monocrotophos 40 EC were found' effective for controlling the whorl maggot after 10 DAT.

- Carbofuran 3G and Phorate 10G @ 1 kg a i./ ha are very effective against rice stem borer at 30 and 50 DAT.
- Mixture of BPMC+DDVP (l: 1) @ 1 litre/ha and Monocrotophos one litre/ha spraying was most effective for controlling BPH and WBPH.
- Dipping of uprooted nursery in 0.02% Chloropyriphos 20 EC for 12 hours was very effective to control whorl maggot, gall midge and leaf hoppers.
- Synthetic pyrethroids, Quinalphos and Methyl parathion should not be sprayed as they cause resurgence of BPH.

Plant Pathology

Disease management - Following chemicals were found effective:

- Sheath rot (SR): Bavistin 50 WP @ 0.1 %; Brown Spot (BS) and Grain discoloration: Indofil M -45 @ 0.2-0.25 %; Sheath Blight (ShB): Bavistin 50 WP @ 0.1 % & Hexaconazole 5SC @ 0.2%; False Smut (FS): Propiconazole @ 500 ml/ha
- New chemicals- Foliar Spray: Sheath blight- Sheathmar @ 2.5 l/ha, Nativo 75 WG @ 200 g/ha, Thiafluzamide 24 SC @ 200g/ha, Propiconazole @ 500ml/ ha, Opus @ 2.0 l/ha, Swing @ 2.0 l/ha, Folicur @ 0.6 l/ha, Armure @ 0.7 l/ha RILFOO4 @ 2 kg/ha Sheath rot- Swing @ 2.0 l/ha.
- Sheath Blight - Bavistin 50 WP @ 0.2% followed by seedling treatment before transplanting by dipping the seedlings in 0.05% Bavistin solution for 10 minutes

Cultural Management

- Nitrogen management - Significant differences in reduction of BLB and ShB infection and higher yields were obtained by stopping the nitrogen application at disease initiation. Draining out the standing water is also recommended to check the diseases.
- Early and medium duration varieties escaped sheath rot disease when nursery was planted within first week of June. Irrespective of date of nursery planting, late varieties were very little affected by the disease.
- Timely sown short duration rice varieties escaped false smut disease.

Basic studies

- Root dip in Bavistin 50 WP (0.05%) before transplanting for 10 minutes followed by foliar spray of Bavistin 50 WP @ 0.1 % at 12 to 15 days interval with initiation of sheath rot disease effectively managed the disease.
- Bio-control of Sheath blight -Pseudomonas fluorescence controlled ShB with significantly higher yields when prophylactic sprays were given but the treatment was not at par with chemical control.