

# Central Soil Salinity Research Institute (CSSRI)

## Karnal

Central Soil Salinity Research Institute (CSSRI) is a premier research institute dedicated to pursue interdisciplinary research on salinity/ alkalinity management and use of poor quality irrigation waters in different agro-ecological zones of the country. The Govt. of India constituted an Indo-American Team to assist the Indian Council of Agricultural Research to develop a comprehensive water management programme for the country. As a follow up of these recommendations, it was decided to establish the Central Soil Salinity Research

Institute under Fourth Plan period. The Institute started functioning at Hisar (Haryana) on 1st March, 1969. Later on, it was decided to shift this Institute to Karnal



during October, 1969. In February 1970, the Central Rice Research Station, Canning Town, West Bengal was transferred to CSSRI, Karnal to conduct research on problems of coastal salinity. Another Regional Research Station for carrying out research on problems of inland salinity prevailing in the black soil region of western parts of the country started functioning at Anand (Gujarat) from February, 1989. As per recommendation of the QRT, the station was shifted from Anand

to Bharuch in April 2003. Keeping in view the need of undertaking research for situations under surface drainage congestion, high water table conditions, relatively heavy textured soils, and indurated pan for managing alkali soils of Central and Eastern Gangetic Plains, another Regional Station was established during October, 1999 at Lucknow. The Coordinating Unit of AICRP on Management of Salt Affected Soils and Use of Saline Water in Agriculture is located at the Institute with a network of eight research centres located in different agroecological regions of the country (Agra, Bapatla, Bikaner, Gangawati, Hisar, Indore, Kanpur and Tiruchirapalli). The Coordinating Unit of AICRP on Water Management functioned at the Institute from early seventies till it was shifted to Rahuri (Maharashtra) in 1990.

## Crop Improvement

Breeding efforts in rice got impetus with the identification, selection and introgression of salt tolerance from land races like Damodar (CSR1), Dasal (CSR2) and Getu (CSR3) which were native to the coastal Sunderban areas in West Bengal. These are the traditional, tall and photo-sensitive selections which served as donors for salt tolerance for developing high yielding salt tolerant, semi-dwarf and early maturing varieties with better grain quality. Many elite genotypes were developed using mutation bulk and pedigree breeding method. Similarly, for developing the first salt tolerant basmati variety CSR Basmati 30 (Yamini) derived from the cross BR4-10/Pakistan Bas.1, the donor BR4-10 from coastal saline areas of Maharashtra was used. Many eminent rice breeders contributed significantly in developing salt tolerant varieties and other breeding lines at CSSRI, Karnal.

The efforts were initiated and continued to evaluate the available germplasm of rice for their salt tolerance. Physiological traits related to salt tolerance behaviour of sensitive and tolerant genotypes were also identified. Based on these findings, the tolerant genotypes were crossed amongst themselves as well as with high yielding genotypes to develop and screen the germplasm lines best adapted to the target soils in terms of higher yield and salt tolerance potential. Sustained efforts were made to broaden the base by acquiring more lines from NBPGR New Delhi, DRR Hyderabad and CRRI Cuttack, international agencies like IRRI Philippines as well as the target areas having saline and sodic soils. The improved germplasm was further evaluated at CSSRI and its centres and under the respective All India Coordinated programmes.



## Varieties developed/ released

CSSRI has developed seven salt tolerant rice varieties for salt affected soils (Table 1). CSSRI, Karnal also led the country wide program on rice improvement for salt affected soils encompassing different salinity centres which resulted in the development of other genetic stock with salt tolerant rice varieties.

### CSR13

Parentage	CSR1 / Bas.370 // CSR5
IET No.	10348
Year of release	1998
Plant height(cm)	115
Maturity days	145
<b>Tolerance limits</b>	
• <b>Salinity</b>	
• (ECe:dS/m)	< 9.0
Sodicity (pH <sub>2</sub> )	<10.0
Yield ( t/ha)	
Non stress	>6.0
Salt stress	>3.0
Grain type	Long slender
Recommended ecology	Sodic and inland saline soils of UP, Haryana, Gujarat and Maharastra.



### CSR23

<i>Parentage</i>	IR64 // IR4630-22-2-5-1-3/ IR 964-45-2-2
IET No.	13769
Year of release	2004
Plant height(cm)	115
Maturity days	130
<b>Tolerance limits</b>	
• <b>Salinity</b>	
• (ECe:dS/m)	<10.0
Sodicity (pH <sub>2</sub> )	<9.9
Yield ( t/ha)	
Non stress	>6.5
Salt stress	>4.0
Grain type	Long slender
Recommended ecology	Sodic soils of Haryana, UP and coastal saline areas of Maharastra. Gujarat, Tamil Nadu, Kerala and West Bengal.



## CSR27

<i>Parentage</i>	NONA BOKRA / IR565-33-2
IET No.	13765
Year of release	1998
Plant height(cm)	115
Maturity days	125
<b>Tolerance limits</b>	
• <b>Salinity</b>	
• (ECe:dS/m)	<10.0
Sodicity (pH <sub>2</sub> )	< 9.9
Yield ( t/ha)	
Non stress	>6.5
Salt stress	>4.0
Grain type	Long slender
Recommended ecology	Sodic and Coastal saline soils of India



## CSR30

<i>Parentage</i>	BR4-10 / Pak. Basmati
IET No.	14720
Year of release	2001
Plant height(cm)	155
Maturity days	155
<b>Tolerance limits</b>	
• <b>Salinity</b>	
• (ECe:dS/m)	<7.0
Sodicity (pH <sub>2</sub> )	<9.5
Yield ( t/ha)	
Non stress	>3.0
Salt stress	>2.0
Grain type	Basmati
Recommended ecology	Sodic areas of UP, Haryana and Punjab.



### CSR36

*Parentage* CSR13/Panvel 2//IR36

IET No. 17340

Year of release 2005

Plant height(cm) 110

Maturity days 140

#### **Tolerance limits**

- **Salinity**

- (ECe:dS/m) <11.0

Sodicity (pH<sub>2</sub>) <10.0

Yield ( t/ha)

Non stress >6.5

Salt stress >4.0

Grain type Long slender

Recommended ecology Sodic soils of Haryana, U.P. and Pondicherry



### CSR 43

*Parentage* KDML 105 / IR 4630-22-2-5-1-3/ / IR 20925- 33-3-1-28

IET No. 18259

Year of release 2011

Plant height(cm) 100

Maturity days 110

#### **Tolerance limits**

- **Salinity**

- (ECe:dS/m) <9.0

Sodicity (pH<sub>2</sub>) <10.0

Yield ( t/ha)

Non stress >6.5

Salt stress >3.5

Grain type Long slender

Recommended ecology Sodic soils of U.P

