

Integrated germplasm improvement — irrigated

ASD20: a new short-duration rice variety for Tamil Nadu, India

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IR44595-70-2-3-3, a cross-derivative of IR64/IR25863-61-3-2//IR58, was received through the International Rice Testing Program in 1988 and subjected to further selection at RRS. It was designated as AS89044 and released as ASD20 in Jan 1997 for general cultivation in Tamil Nadu.

ASD20 is a semidwarf hybrid (89 cm) and matures in 110 d. At this station, it produced a mean yield of 6.7 and 5.6 t ha⁻¹ in dry (June to September) and wet seasons (October to January), respectively. The performance in multi-location, adaptive, minikit, and national trials was good; it registered a mean yield of 5.7 t ha⁻¹ in 320 trials with a 5.6, 9.6, and 9.6% increased yields over ADT36, ASD18, and IR50, respectively (see table). The biological yield of ASD20 is 18.5 t ha⁻¹ (6.7 t ha⁻¹ grain, 11.8 t ha⁻¹ straw) and its potential grain yield is 9.7 t ha⁻¹.

Mean yield performance of ASD20 in different trials. Tamil Nadu, India. 1988-96.

| Trial/year | Mean grain yield (t ha ⁻¹) | | | | | | |
|--|--|-------|--|------|-------|--------|--------|
| | Trials (no.) | ASD20 | ADT36 | IR50 | ASD18 | Annada | Tulasi |
| Station trial | | | | | | | |
| Dry season (1988-96) | 11 | 6.7 | 6.2 | 5.5 | 5.7 | - | - |
| % increase over checks | | | 8.1 | 21.2 | 17.9 | - | - |
| Wet season (1990-91 to 1995-96) | 6 | 5.6 | 4.5 | 4.7 | 4.7 | - | - |
| % increase over check | | | 25.4 | 19.5 | 20.4 | - | - |
| Multilocation trial (1991-92) | 19 | 4.8 | - | 4.5 | 4.4 | - | - |
| % increase over check | | | | 8.2 | 8.9 | | |
| Adaptive research trial (1992, 1993, and 1996) | 197 | 5.5 | 5.4 | 5.3 | 5.3 | - | - |
| % increase over check | | | 3.1 | 4.5 | 5.3 | | |
| National trial (1992-94) | 25 | 5.3 | - | - | - | 4.5 | 4.6 |
| % increase over check | | | | | | 17.7 | 15.5 |
| Minikit trial | 65 | 6.3 | (min range: 3.9-6.1 t ha ⁻¹ ; max range: 6.1-9.1 t ha ⁻¹) | | | | |
| Overall mean performance | 320 | 5.7 | 5.4 | 5.2 | 5.2 | 4.5 | 4.6 |
| % increase over check | | | 5.6 | 9.6 | 9.6 | 26.7 | 23.9 |

ASD20 is resistant to stem borer, leafhopper, and sheath rot and moderately resistant to blast and rice tungro virus. The rice is long, slender, and white with good cooking quality. Protein content (8.0%) is higher than that of IR50 (7.6%). Its milling recovery is

68.5% (IR50 has 66.9%); 1000-grain weight is 22.1 g.

ASD20 is a best alternative to IR50 and suitable for April to July, October to November, and December to January sowings throughout Tamil Nadu, India. ■

Integrated germplasm improvement — flood-prone

Padmanath: an improved deepwater rice in Assam, India

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Deepwater rice varieties in Assam (51-100 cm) are mostly indigenous to the state, require 5-8 mo to mature, encounter occasional droughts and floods up to 3-4 m, and possess genes for stem

elongation and/or submergence tolerance. The average yielding ability of these indigenous types is very low (1.1 t ha⁻¹).

We developed a new deepwater variety, Padmanath, by the bulk pedigree selection method after hybridization among Pankaj/Jagannath//Negheribao. Pankaj and Jagannath are improved high-yielding varieties adapted to waterlogged situations, and Negheribao is a local deepwater rice variety with stem elongation capacity in response to rising water level, tolerating flood up to 3-4 m.

The yield records of Padmanath are presented in the table. The average grain yield was 2.7 t ha⁻¹ over years and locations in the state. Padmanath showed 17% superiority over the check variety Amonabao and 49% over its deepwater rice parent Negheribao. Padmanath was also evaluated in the National Deepwater Rice Yield Trials (PVT 6) during 1989 under the name IET11876, and had 85% submergence survival rate, stem elongation score 3, and yield of 2.6 t ha⁻¹ over Pusa, Chinsurah, Ghagharaghat, and North Lakhimpur as compared with the

Mean yield performances of Padmanath. Assam, India, 1985-95.

| Year | Location | Yield (t ha ⁻¹) | | |
|------------------------------------|-------------|-----------------------------|------------|----------|
| | | Padmanath | Negheribao | Amonabao |
| 1985 | Garumnuria | 3.2 | 2.7 | 2.8 |
| 1986 | Garumuria | 3.0 | - | 2.7 |
| | Korson | 3.0 | 2.1 | 2.7 |
| | Dhalpur | 3.3 | 2.5 | 3.1 |
| | Majuli | 3.2 | 2.3 | 2.8 |
| 1987 | Garumnuria | 3.2 | 2.2 | 3.0 |
| | Korson | 3.1 | 2.1 | 2.6 |
| | Dhalpur | 3.3 | 2.4 | 2.9 |
| | Jorhat | 3.4 | 2.0 | 2.8 |
| 1988 | Garumnuria | 2.9 | 2.1 | 2.3 |
| | Kalabari | 3.1 | - | - |
| | Dhalpur | 2.5 | 1.6 | 1.1 |
| | Dhemaji | 3.2 | - | - |
| | Dhakuakhana | 3.4 | - | - |
| | Jorhat | 1.7 | 1.7 | 1.9 |
| 1989 | Garumuria | 3.1 | 1.8 | 2.2 |
| | Dhemaji | 3.0 | - | - |
| | Dhakuakhana | 3.2 | - | - |
| 1991 | Garumuria | 1.1 | 0.6 | - |
| | Korson | 3.1 | 1.4 | 1.7 |
| 1992 | Garumuria | 1.3 | - | 1.1 |
| | Mahaijan | 1.6 | - | 1.2 |
| 1994 | Garumuria | 3.7 | - | 2.7 |
| 1995 | Garumuria | 1.2 | 0.9 | - |
| | Dolpota | 2.0 | 1.8 | - |
| | Dhakuakhana | 2.1 | 1.2 | - |
| | Ghilamora | 3.0 | 1.5 | - |
| Pooled av over years and locations | | 2.7 | 1.8 | 2.3 |

national check Jalamagna with 100% survival, stem elongation score 1, and yield of 2.1 t ha⁻¹, respectively. Padmanath is photoperiod-sensitive and flowers in late October. It is recommended for cultivation in flood-prone lowlands and deeply flooded regions of up to 2 m water in Assam. Padmanath exhibited moderate field tolerance for the major diseases and pests of deepwater rice. Good stem elongation up to 24.8 cm d⁻¹ was also recorded in rising floods. The variety also possesses excellent kneeing ability (38° average for all tillers).

Padmanath has medium-bold awned grains of the dimensions 7.4 × 3.1 mm and a test weight of 26.4 g for 1000 grains. The kernels are white and nonglutinous with a length-breadth ratio of 2.8. It is gaining popularity among the deepwater rice farmers of the state. ■

Panindra: a new deepwater rice for Assam, India

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Besides Padmanath, a new deepwater rice variety, we bred Panindra by the bulk pedigree method after hybridization between Pankaj and Negheribao. Pankaj is an improved high-yielding rice variety adapted to waterlogged situations and Negheribao is a local deepwater rice variety with excellent stem elongation capacity under rising floods up to 3-4 m.

The yield data of Panindra from 1988 to 1995 over 13 locations of the state are presented in the table. Panindra had a mean grain yield of 2.5 t ha⁻¹ over years and locations, exhibiting 33% superiority in yield than the local check variety Amonabao. Panindra was also found superior in grain yield by 50% than its deepwater parent Negheribao. Panindra is tall, elongating with medium slender grains, and suitable to grow in 1-2 m floods in Assam. The variety was also tested in the National Deepwater Rice Yield Trials (PVT6) under the name IET11875 from 1989 to 1993. During 1989, Panindra had a mean yield of 2.0 t ha⁻¹ as compared with the national check variety Jalamagna, which had the mean yield of 2.2 t ha⁻¹ across locations over India in PVT6.

Ranjini (MO 12): a high-yielding rice variety with blast and brown planthopper resistance

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Mean paddy yield of Panindra. Assam, India, 1988-95.

| Year | Location | Yield (t ha ⁻¹) | | |
|-----------|-------------|-----------------------------|------------|----------|
| | | Panindra | Negheribao | Amonabao |
| 1988 | Garumuria | 4.2 | 2.1 | 2.3 |
| 1990 | Korson | 4.1 | 2.9 | - |
| 1991 | Garumuria | 1.7 | 0.6 | - |
| 1992 | Garumuria | 1.9 | - | 1.1 |
| | Mohaijan | 2.9 | - | 1.2 |
| 1993 | Garumuria | 2.3 | 2.0 | 1.9 |
| 1994 | Garumuria | 3.1 | - | 2.7 |
| | Dolpota | 3.0 | - | 2.3 |
| 1995 | Garumuria | 1.1 | 0.9 | - |
| | Dolpota | 1.1 | 1.8 | - |
| | Dhakuakhana | 2.6 | 1.2 | - |
| | Ghilamora | 2.4 | 1.5 | - |
| | Dhemaji | 2.5 | 2.2 | - |
| Pooled av | | 2.5 | 1.7 | 1.9 |

During 1990, Panindra had exhibited a mean yield of 2 t ha⁻¹ over India under IVT-DW; during 1992 it ranked second to Ghaghraghat (3.3 t ha⁻¹) and was superior to Jalamagna (1.8 t ha⁻¹).

Panindra is a photoperiod-sensitive variety, flowering by the last week of October in Assam. It is moderately tolerant of major diseases and pests but moderately susceptible to rice stem nematode, *Ditylenchus angustus*. It has outyielded the local deepwater rice varieties of Assam in plant and grain characters. Fair stem elongation rate (21 cm d⁻¹) was also observed for Panindra. Excellent kneeing ability (41°) of the tillers after the flood was also an added advantage to this variety.

Awnless grain of Panindra has a dimension of 7.8 × 2.6 mm with a test weight of 24.3 g for 1000 grains. The nonglutinous white kernel has a length-breadth ratio of 3.0. ■

Rice blast is one of the most serious diseases prevalent in Kuttanadu, the rice bowl of Kerala, a unique deltaic area, 0.5-2.0 m below MSL. Many popular high-yielding varieties of this locality lack blast resistance. A hybridization program was started at RRS, Moncompu, using locally accepted, high-yielding varieties, such as MO 5 and blast-resistant varieties such as