12% of farmers' fields, scientists devoted 14% of their time to it, and 10% of the recently released varieties were suitable for upland conditions. For deep-water and floating rice, the mean percentages were: farmers' conditions, 5%; scientists' time, 4%; and latest varieties, 2%.

### Two promising IRYN cultures

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During September 1976, 29 medium-duration cultures of the International Rice Yield Nursery (IRYN) and check varieties IR8, IR26, and IR20 were received for tests at Aduthurai through the International Rice Testing Program. The materials were sown on 29 September and transplanted on 29 October.

**Performance of rices in the International Rice Yield Nursery, Aduthurai, India.**

| Variety | Parentage | yield (t/ha) | Yield compared with that of IR20 (%) | Days to flowering | Plant ht (cm) | Panicle (no./hill) | Panicle wt (g) |
|---|---|---|---|---|---|---|---|
| IET 4094 (CR 156-5021-207) | BU 1/CR 115 | 9.0 | 178.5 | 95 | 69 | 8.3 | 1.21 |
| P 881-19-22-12 IB-6-IB | IR22//IR930-147-8/Col. 1 | 8.7 | 173.0 | 103 | 73 | 4.0 | 1.77 |
| IR8 | Peta/DGWG | 3.8 | 74.6 | 104 | 79 | 5.4 | 2.00 |
| 1R26 | IR24/TKM 6 | 4.2 | 82.6 | 104 | 77 | 5.9 | 1.43 |
| IR20 | IR262/TKM 6 | 5.0 | 100.0 | 105 | 91 | 6.9 | 1.97 |
| CD (P=0.05) | – | 3.6 | 71.1 | – | – | – | – |

IET 4094 and P 881-19-22-12-IB-6-IB were superior to the checks, yielding 9.0 and 8.7 t/ha in 125 and 133 days, respectively. They are semidwarf cultures with long slender grain. IET 4094 was moderately resistant to stem borers and leaf folders, and susceptible to bacterial streak, helminthosporium, and bacterial blight diseases. P 881 was resistant to stem borers; moderately resistant to leaf folders, bacterial blight, and helminthosporium; and susceptible to bacterial streak.

GENETIC EVALUATION & UTILIZATION

# Disease resistance

### Experimental induction of rice tungro virus epiphytotic

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A field technique to screen rice against tungro virus has been developed at the Central Rice Research Institute, Cuttack, Orissa, India. The technique is based on the transitory virus transmission, rapid buildup, and quick movement of the vectors.

Plants were successfully infected under field conditions by manipulating the vector population, introducing a source of virus inoculum, and planting susceptible rices. Sowing and transplanting of rice were timed to coincide with the natural buildup of leafhoppers. To attract vectors to the experimental plots, planting was delayed from 4 to 6 weeks. Two rows of Taichung Native 1, which is highly susceptible to leafhoppers and tungro virus, were alternated with two test lines. A starter inoculum of as much as 1% of preinoculated seedlings of Jaya was evenly distributed. Within 30 to 40 days, 100% of the susceptible varieties were infected. Out of more than 10,000 varieties and hybrid lines screened over the past 5 years, more than 100 were identified as resistant.

### Rice tungro virus disease - resistance and control

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Tungro, one of the most devastating virus diseases of rice, occurs in epidemic form in India, the Philippines, Bangladesh, Thailand, Indonesia, and Malaysia. Losses in susceptible rices often exceed 60%. Almost 50 resistant cultivars were identified in an extensive screening program of about 5,000 tall indigenous varieties over a 4-year period at CRRI. The rices were not high yielders and were sensitive to lodging. The resistance genes are now being transferred from the donors to stiff-strawed semidwarf cultivars in an international breeding program. A few high yielding varieties, such as IR20, IR30, Pusa 2-21, Ratna, Annapurna, and Pankaj were found to be tolerant.

Tungro can also be controlled through control of its leafhopper vectors. In field and greenhouse experiments on 14 insecticides, carbofuran (Furadan 3G), at 2 kg a.i./ha at 15-day intervals, effectively controlled the disease and its vectors. Other insecticides effectively controlled the vectors, but failed to check the disease.