### *Meloidogyne oryzae,* a pest of irrigated rice in Surinam

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We studied rice root-knot nematode *M. oryzae* populations in Nickerie, the main rice cultivating area of Surinam. Rice cultivation on heavy clay soils in the coastal plain is completely mechanized. Root-knot nematode infestation was mainly on higher land within flooded fields. Thorough flooding reduced infestation and plants recovered slightly. Heavily infested rice plants were stunted, with galled roots and yellow-brown leaves. In nematode-infested fields, crop growth often was limited by P deficiency, weed competition, or acid soil.

Adult females and egg masses were embedded in the roots. *M. oryzae* life cycle took about 4 wk at a mean 27°C. Infestation was concentrated in areas where rice had been planted for at least 30 yr — the last 10 with 2 crops annually.

Greenhouse trials determined if *M. oryzae* reduced growth and yield of rice. Three plants per pot were sown in a 10- × 30-cm polyvinyl chloride containers filled with heavy clay soil (pH = 5.5). Ten thousand *M. oryzae* eggs were added to 30 pots and 30 were left uninoculated. Fifteen pots of each group were flooded to $\leq$ 5 cm and 15 pots were kept without standing water. Although no differences in plant growth were apparent at 45 d after sowing, rice yield was 15% lower in flooded inoculated soil and 9% less in inoculated soil without standing water than in nematode-free pots. Yield was negatively correlated with the number of galls, eggs, and second-stage larvae in the roots ($r = -0.74$; $r = -0.59$ $p<0.01$) in the flooded pots.

Five rice varieties (Diwani, Camponi, Pisari, SKK, and Holland) were good *M. oryzae* hosts, as were weeds *Fimbristylis miliacea, Echinochloa crus-pavonis, E. colonum, Hymenachne amplexicaulis,* and *Eleocharis* sp. The nematode also reproduced on wheat, potato, tomato, sorghum, and plantain, but not on maize, cotton, peanut, sweet pepper, sweet potato, watermelon, or tobacco.

Deep flooding seems to control *M. oryzae* in irrigated rice fields. Because irrigation water is not always available, we tested different seed treatments for nematode control.

In greenhouse trials, carbofuran at 2.4, 4.8, and 7.2 g ai/kg seed reduced galls by 57, 79, and 80%. Oxamyl was ineffective. □

# Irrigation Water Management

### Water harvesting for rainfed rice cultivation

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Eight percent of 4.7 million ha of rice in central India is rainfed. Drought is a major cause of unstable yields. We developed a water harvesting technique to stabilize yields.

A series of 8 high and low beds (560 $m^2$ each) were constructed. Soybean was grown on raised beds and rice in the sunken beds. We estimated the percentage of runoff from high to low beds based on rainfall intensity, infiltration rate, and water balance computations with effective rainfall and Penman's potential evapotranspiration (see table).

About 46% of total rainfall can be harvested as induced runoff. Soybean, which has low water requirement, grows well on the raised beds which feed water onto lower beds where rice is planted. Using this system over 3 yr, soybean and rice yielded an average 2.3 and 2.6 t/ha versus no-treatment fields with 1.5 t/ha. □

**Runoff and grain yield using water harvesting.**

| Year | Seasonal rainfall (mm) | Runoff [a] (mm) | Total water available (mm) | | Yield (t/ha) | |
|---|---|---|---|---|---|---|
| | | | Soybean | Rice | Soybean | Rice |
| 1981 | 1119 | 512.7 | 607 | 1632 | 2.2 | 2.8 |
| 1982 | 792 | 375.9 | 416 | 1168 | 2.2 | 2.2 |
| 1983 | 1263 | 568.4 | 695 | 1831 | 2.4 | 3.0 |

[a] Runoff was estimated by analyzing intensity of rainfall and infiltration rate as well as through water balance technique.

# Soil and Crop Management

### Summer storage of azolla in mud pots

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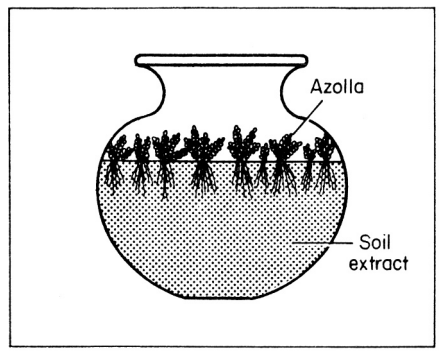
Maintaining azolla populations at high summer temperatures is a major constraint in azolla cultivation. In Apr 1983 we evaluated 2-, 3-, 5-, 8-, or 10-litre mud pots filled with 1, 2, 4, 6, or 8 litres of water or soil extract for azolla




Mud pot for growing azolla during summer, Tamil Nadu, India