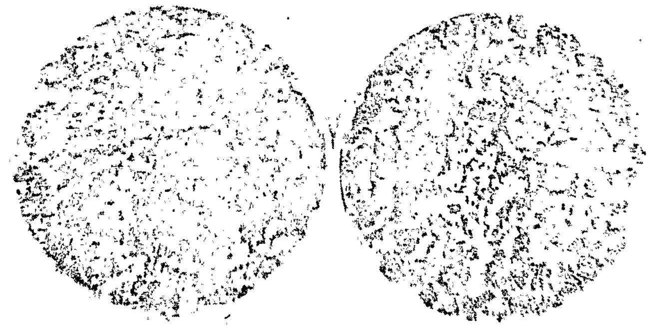


Azolla inoculated with *Rhizoctonia* sp. (left) and *S. rolfsii* (right) and their typical symptoms in petri dishes. Bangladesh Rice Research Institute.

was drying. A few days later, fungal growth was seen on the blighted and dried leaves. Isolation showed *Sclerotium rolfsii* to be associated with the growth.

In July–August, the symptoms were of the rotting type. They spread rapidly and covered the entire tank (46 x 91 cm) in 4–5 days. Samples were immediately collected and the causal agent was isolated and examined under a microscope. Mycelia were found branching at right angles over and within rotted leaves. On isolation from several such samples, the same fungus, which closely resembles *Rhizoctonia*, appeared on potato-dextrose agar. Specific identification has not yet been made. Their pathogenicity on azolla was proved by inoculation with these two fungi from the artificially produced symptoms and re-isolation (see photos). Further work on the problem is in progress. ■

Influence of moisture regimes on phosphorus uptake in acid soils

P. K. Bora, associate professor (soils), Assam Agricultural University, Jorhat 13, Assam; and N. N. Goswami, professor (soils), Indian Agricultural Research Institute, New Delhi 12, India

The rice crop's phosphorus uptake from fertilizer and natural soil sources was studied in a greenhouse experiment under continuously submerged (M1) and continuously moist (M2) conditions. Alluvial acid soils from Assam were collected at Sitabar (Soil 1), Dergaon (Soil 2), Golaghat (Soil 3), and Tengakhat (Soil 4) (see table). The uptake of fertilizer phosphorus was determined by radiochemical studies using Pusa 2-21 as test crop.

At the maximum tillering stage, the mean fertilizer phosphorus uptake in M1 was 300 times higher than in M2. At the grain ripening stage, a similar beneficial effect of M1 was recorded. M1 caused a significant increase (3 or 4 times more than M2) in soil phosphorus uptake at both stages. After the maximum tillering stage, the fertilizer phosphorus uptake was practically nil in M1 but was considerable in M2.

The results suggest that continuous submergence of rice is an effective management practice for increasing the efficiency of water-soluble phosphatic fertilizers for acid soils. They further indicate that natural soil phosphorus sources play a dominant role in rice production in Assam soils, which are rich in organic phosphorus fractions. ■

Fertilizer and soil phosphorus uptake by the rice crop in acid soils of Assam, India.[a]

Soil no.	Fertilizer phosphorus uptake (mg/pot)						Soil phosphorus uptake (mg/pot)					
	MTS			GRS			MTS			GRS		
	M1	M2	Mean	M1	M2	Mean	M1	M2	Mean	M1	M2	Mean
1	16.6	4.8	10.7	19.5	7.0	13.3	47.0	14.7	30.8	58.6	14.9	36.7
2	23.0	5.9	14.4	23.6	10.0	16.8	71.5	14.6	43.1	52.4	18.2	35.3
3	21.2	5.4	13.3	26.5	8.1	17.3	70.9	16.1	43.5	66.2	15.7	41.0
4	29.7	7.0	18.4	21.8	10.0	15.9	136.0	21.1	78.5	87.5	19.4	53.5
Mean	22.6	5.8	–	22.9	8.8	–	81.3	16.6	–	66.2	17.1	–
CD (5%)												
Soil			3.8**			2.9*			11.5**			6.8**
Moisture			2.7**			2.1**			8.1**			4.8**

[a]MTS = maximum tillering stage, GRS = grain ripening stage, M1 = continuously submerged, M2 = continuously moist.

Relationship between blue-green alga growth and the standing crop in wetland rice fields

S. A. Kulasooriya, senior lecturer, University of Peradeniya, Sri Lanka; P. A. Roger, soil microbiologist, Office de la Recherche Scientifique et Technique Outre-Mer, France; and I. Watanabe, soil microbiologist, International Rice Research Institute

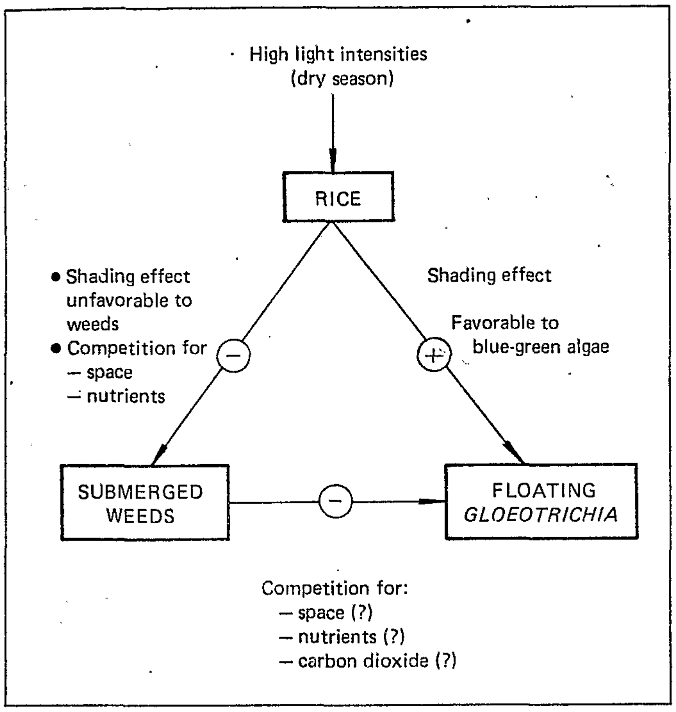
A 1979 dry-season experiment was conducted at IRRI to verify the observation that the presence of plants enhances the growth of *Gloeotrichia* sp., a nitrogen-fixing blue-green alga that forms floating masses in rice fields. A random block of 24 plots, 1.5 m^2 each, was used with 3 replications of 8 treatments: 1 treatment was unplanted, 1 was split bamboo (to simulate rice plants), 5 were planted with rice, and 1 was planted with *Cyperus iria.*

At harvest, data were collected on the fresh weight of *Gloeotrichia* sp., the fresh weight of submerged weeds (mostly *Najas* sp. associated with *Chara* sp.), and the acetylene-reducing activity (ARA) after 2 and 24 hours of *in situ* incubation under acetylene. As acetylene and ethylene diffuse slowly in and out of the water, the 1-hour activity was assumed to be caused by the floating algae and the 24-hour activity, by the total biotope activity.

ARA values ranged from 6 to 88 $\mu mol/m^2$ per ha for 1-hour measurements and from 94 to 4,166 $\mu mol/m^2$ per day for 24-hour measurements, with mean values of 32 $\mu mol/m^2$ per hour and 1,021 $\mu mol/m^2$ per day. A highly significant positive correlation between 1-hour ARA measurements and floating *Gloeotrichia* biomasses was found. This

Mean biomasses of *Gloeotrichia* sp. and submerged weeds in plots with and without rice. IRRI, 1979 dry season.

Biotype	Mean biomass (t/ha fresh wt)		
	With rice (15 plots)	Without rice (9 plots)	Significance of difference
Submerged weeds	2.9	7.5	0.01
Gloeotrichia	4.4	1.1	0.06



Possible interactions between rice, weeds, and algae.

correlation remained significant even for the 24-hour measurements, showing that *Gloeotrichia* floating masses were the principal nitrogen-fixing agents involved.

Although the unplanted plots had little floating algae, they had relatively high ARA. That was primarily because *Gloeotrichia* colonies epiphytic on *Chara* were relatively abundant in the plots. Closer observation showed that *Gloeotrichia* epiphytism was predominant on *Chara* and rare on *Najas*.

The weights of floating *Gloeotrichia* biomasses ranged from 0 to 14 t/ha (mean, 3.3 t/ha). The distribution was log-normal (L-shaped histogram and a mean close to the square root of the variance).

The fresh weights of submerged weed biomasses ranged from 0.2 to 11.8 t/ha (mean, 4.8 t/ha).

The presence of rice increases *Gloeotrichia* growth and decreases the growth of submerged weeds (see table).

Possible relationships between weeds and floating algae were tested by studying correlations between weed and *Gloeotrichia* biomasses and between weed biomasses and 1-hour ARA. Both correlations were significant and negative; the respective r values were 0.60 and 0.73 (r 0.05 = 0.67).

Although the results do not fully explain the relationships among the three biotypes, the figure shows some possible interactions.

The results confirm the observation that rice positively affects *Gloeotrichia* growth, either directly by protecting algae against high light intensity, which inhibits their growth or indirectly by limiting the growth of submerged weeds, which seem to compete with floating *Gloeotrichia*. ■

Soil fertility trials in farmers' fields in Sierra Leone

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Soil is tested to provide farmers information that enables them to apply adequate – but not excessive – fertilizer to supplement available nutrients. The All Sierra Leone Coordinated Agronomic Trials conducted in farmers' fields in 1978 provided much data on soil fertility evaluation. The multilocational trials sought to determine if soil testing could help predict rice response to added fertilizer. We defined the "critical level" of a nutrient in a soil as the level below

Table 1. Critical levels of organic carbon, available phosphorus, and exchangeable potassium for dryland rice in Sierra Leone.

Nutrient	Critical level	Rice response (kg/ha)	
		Above critical level	Below critical level
Organic carbon	2.4 (%)	540	590
Av phosphorus	10.0 (ppm)	180	410
Exchangeable potassium	0.07 (meq/100 g)	255	605

Table 2. Critical levels of organic carbon, available phosphorus, and exchangeable potassium for rice in inland valley swamps in Sierra Leone.

Nutrient	Critical level	Rice response (kg/ha)	
		Above critical level	Below critical level
Organic carbon	3.6 (%)	600	655
Av phosphorus	5.8 (ppm)	690	875
Exchangeable potassium	0.05 (meq/100 g)	255	520

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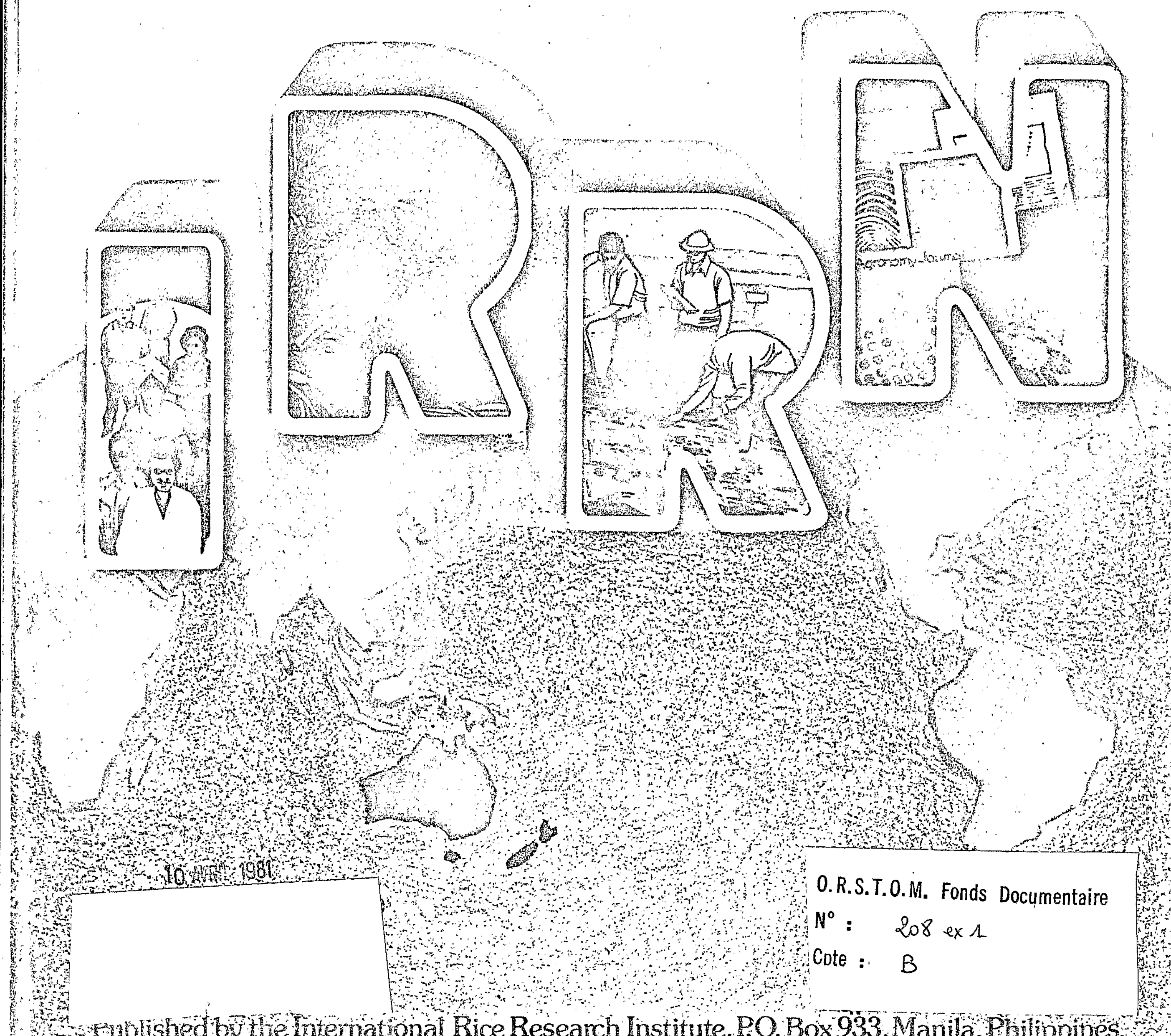

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