Table 2. Effect of LFA and added P on grain and straw yields of IR20 in lateritic sandy clay loam soil. 1988.

Treatment LFA (g/pot)	Yield			
	Grain (g/pot)	% increase	Straw (g/pot)	% increase
		P (0 ppm)		
No added LFA	16.29		20.47	
2.5	17.48	7.3	22.68	10.8
5.0	23.07	41.6	27.72	35.4
7.5	16.81	3.2	17.64	-13 .8
Mean	18.81		22.12	
		P (13 ppm)		
No added LFA	17.25		25.08	
2.5	19.31	11.9	24.23	-3.4
5.0	23.62	36.9	33.40	33.2
7.5	16.07	-6.8	17.18	-31.5
Mean	19.06		24.97	
LSD (P = 0.05)				

diammonium phosphate at 13 ppm, and K as sulfate potash at 11 ppm.

Twenty-day-old rice seedlings raised in the experimental soil were transplanted at two seedlings per hill, three hills per pot, and allowed to grow for 50 d under flooded condition.

LFA combined with NPK resulted in the highest DMP (22.7 g/pot), which was about 42% more than that of NPK alone (Table 1). P content was consistently higher when LFA was added. LFA with N, P, K, and their combinations did not influence SiO_2 content in rice plants.

Another pot culture trial in Dec 1987-Apr 1988 incorporated 0, 2.5, 5.0, and 7.5 g LFA/pot (0, 0.5, 1.0, and 1.5 t/ha) with 13 ppm P and no P. The experiment was conducted using a completely randomized design with three replications. N at 40 ppm and K at 11 ppm were applied to all pots.

Regardless of P treatment, LFA at 5 g/pot gave the highest grain yield, followed by LFA at 2.5 g/pot (Table 2). Applying P with LFA at 2.5 g/pot increased grain yield, but at 7.5 g LFA/pot, yields were reduced by 6.8% compared with no LFA.

Straw yield was markedly increased with 5 g LFA/pot with or without P. LFA at 7.5 g/pot adversely affected straw yield.

Silicicolous plants, such as rice, can benefit from up to 1 t LFA/ha, particularly in lateritic acid soils. ■

Fertilizer management—organic sources

Using desiccation to preserve blue-green algae (BGA)

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We wanted to find a suitable method to preserve BGA in the dry state as an alternative to frequent subculturing of fresh cultures. We produced soil-based cultures, cultures deposited on paper strips, and mass cultures and tested their viabilities after long storage.

Soil-based cultures were produced in 250-ml erlenmeyer flasks or on petri plates (14 cm diam). A loopful of culture was inoculated into a previously autoclaved mixture of 100 ml BG-11_0 medium and 20 g soil. Cultures were incubated under continuous illumination for 4 wk and then dried slowly. Cultures were ground and kept in plastic bottles at room temperature.

To preserve strains on paper, 6- to 12-wk-old liquid cultures were deposited aseptically on to sterile strips (2 × 7.8 cm) of Whatman chromatography paper no. 3 and dried in a convection flow clean bench. Paper strips were stored in plastic bags at room temperature.

Mass cultures were produced in 12 liters of medium exposed to continuous illumination, stirring, and bubbling of an air-CO_2 mixture. Cultures were decanted and centrifuged after 4-6 wk of growth. They were dried slowly under fluorescent lamps and later ground and stored in plastic bottles.

Viabilities of the dried cultures were tested by incubating aliquot parts of the soil-based and mass cultures in 25-ml erlenmeyer flasks containing 5 ml of medium. For cultures on paper strips, 0.5-cm portions were cut and incubated like the other cultures.

Of the 65 soil-based cultures, 58 remained viable after 6 yr of storage. A disadvantage of using soil as a base is the presence of contaminants. About 40% of the cultures were contaminated with either diatoms, BGA (notably *Nostoc* sp.), or both. Soil must be sterilized completely to remove indigenous flora when using this preservation method.

Fifteen of the 136 strains dried on paper strips lost viability after at least 5 mo of storage. The number increased to 30 after another 6 mo, and none of the strains were viable after 4 yr. The paper strip method should only be used for short-term preservation.

Powdered mass cultures remained viable after 9 yr of storage. As with the soil-based cultures, the populations decreased tremendously over time; higher aliquot parts and longer incubation periods were required to obtain growth. The best method for preserving BGA in the dry state is the powdered mass culture, which has the advantages of unialgality and retention of viability for up to 9 yr. ■

Effects of *Sesbania aculeata* (dhaincha) on rice yield

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We studied how rice yields were affected by green manuring with dhaincha and by incorporating green manure (GM) with graded doses of N, P, K, and Zn (see table).