GROWTH, YIELD AND NUTRIENT CONCENTRATION OF TWO RICE VARIETIES TREATED WITH FOUR LEVELS OF SALT AND NITROGEN

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ABSTRACT

PATRICIO, HOPE GAYLAN, University of the Philippines at Los Baños, January 1984. Growth, Yield, and Nutrient Concentration of Two Rice Varieties Treated with Four Levels of Salt and Nitrogen.

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The effect of NaCl and nitrogen on the soil solution EC and pH; and on the growth, yield, and nutrient concentration of IR52 and IR26 rice varieties were studied in a pot experiment in the screenhouse of the Department of Soil Science, UPLB, College, Laguna, from December 17, 1982 to April 23, 1983.

The results show that the soil solution EC increased, whereas pH decreased with increasing salinity. The different salt levels also significantly delayed flowering and harvesting, depressed growth and yields, and generally increased the concentrations of nitrogen, phosphorus, sodium and chlorine, but decreased potassium concentration in the straw of both varieties.

Varietal response to applied nitrogen, however, differed. In terms of their straw yield, IR52 responded more to the application of 90 kg N/ha whereas IR26, to 135 kg N/ha application. Furthermore, fertilization with 90 and 135 kg N/ha increased

the concentrations of nitrogen in the root and of potassium and sodium in the straw of IR52. The same nitrogen levels increased the concentrations of phosphorus in the grain and of potassium in the straw of IR26. The highest nitrogen rate (135 kg N/ha) increased chlorine concentration in the grain of IR52, but decreased that of IR26.

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INTRODUCTION

Saline soils are recognized to be the most common and extensive among the problem soils in Southeast Asia. Roughly 150 million hectares of current and potential rice land in the tropics and subtropics may be affected by salinity (Massoud, 1974), and over 60 million hectares of rice land in South and Southeast Asia contain toxic amounts of salt (Ponnamperuma and Ikehashi, 1979).

Excessive salt is the main obstacle to the normal growth of plants in saline soils. However, poor plant growth in saline soils, is also a function of specific ion toxicities, harmful osmotic effects, nutritional imbalances and deficiencies induced by high salt concentration (IRRI, 1972; Mahrous, et al., 1982; Rana, 1977). The direct effects of salinity include stunted plant growth, an intensification of green color and sometimes necrosis and defoliation (Mahrous, et al., 1982; Rana, 1977).

Rice (O. sativa L.) has been generally recommended as the crop best suited to saline soils (Bhumbla and Abrol, 1978; Ponnamperuma, 1979). It is tolerant partly because it grows in submerged fields, thus the standing water dilutes the salts in the soil. Morever, the development of salt tolerant, disease and insect pest resistant varieties can make possible, the cultivation of salt-effected areas without costly reclamation especially the coastal saline soils which are found to be climatically, physiographically, and hydrologically