166 B

Effect of straw and Inorganic fertilizer on root density and grain yield of rice (var. Bg 94-1) in the Low Country Intermediate Zone of Sri Lanka

Effects of rice straw and inorganic fertilizer combinations on root density and grain yield of the direct seeded rice variety Bg 94-1 in the Low Country Intermediate Zone was investigated. Makandura, Walpita and Wariyapola were the three locations where the field experiment was conducted during Yala 1999 and Maha 1999/ 2000 for root density study. Six treatments were: 1) [2S+Fa] straw 2 t ha-1 with chemical fertilizer mixture 'a'{=basal-N-15, P2O5-30, K2O-10; 3 weeks after sowing (WAS)-N 25 and 6 WAS-N 60] kg ha-1}, 2) [3S+Fb] straw 3 t ha-1 with chemical fertilizer mixture 'b' {=(basal-N-15, P2O5-30, K2O-0; 3 WAS-N 25 and 6 WAS-N 35) kg ha-1}, 3) [2S-F] straw 2 t ha-1 without chemical fertilizer, 4) [3S-F] straw 3t ha-1 without chemical fertilizer, 5) [0S+Fc] chemical fertilizer mixture 'c'{=(basal-N-15,P2O5-30, K2O-20; 3 WAS-N 25 and 6 WAS-N 60) kg ha-1}, without straw, and 6) [0S-F] no fertilizer & no straw, a control. A nested treatment arrangement was used in a randomized complete block design with two replicates at each location (total of 6 replicates). The plot size was 3 m x 6 m. Representative soil samples were collected at harvesting stage, using a 5 cm long PVC cylinder (Volume 80 cm3). All above treatments were continuation of a long term organic matter study.

Treatment 3S+Fb showed significantly higher root density than all other treatments in Yala 1999. The increase of root density of 3S+Fb treatment was by 49, 77, 66, 77 and 219%over 2S+Fa, 2S+Fa, 2S-F, 3S-F, 0S+Fc and 0S-F respectively. In Maha 1999/ 2000 the highest root density (3.94 cm-2) was observed in 3S+Fa. But it was significantly different from that of 2S-F and 3S-F. The increase of root density of 3S+Fb was by 29, 49, 58, 10 and 46.50% over 2S+Fa, 2S-F, 3S-F, 0S+Fc, and 0S-F respectively. The root density was significantly different between locations in both seasons. The treatment 3S+Fa gave significantly a higher yield (1.76 t ha-1) than all other treatments in Yala 1999. However in Maha, the treatments 2S+Fa, 3S+Fb and 0S+Fc gave significantly higher yields of 2.45, 2.95 and 3.09 respectively over all other treatments. Straw at 3 t ha-1 with chemical fertilizer (3S+Fb) was superior to others in increasing root density in both seasons. The root density was positively correlated with yield in both seasons indicating the root development due to organic matter addition was contributory for the yield increase.