SOILS AND PLANT NUTRITION

PRELIMINARY RESULTS ON THE AMELIORATION OF SALT EFFECTS BY NITROGEN MANAGEMENT IN TOMATOES

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Tissue culture-derived plantlets of tomato cultivars Apollo, Improved Pope and Del Monte were subjected to NaCl-salinity level of about EC = 15 dS m^{-1} from seedling establishment to maturity stage. The plants were fertilized with two forms of nitrogen ($NH4^+$ and $NO3^-$). The effect(s) of salinity x nitrogen treatments on yield and fruit quality were evaluated. Hardened plant materials were established for two weeks in clay pots containing 12 kg of soil:sand mixture (2:1) with 20 grams of N-P-K (14-14-14) as basal fertilizer. Salinity x nitrogen treatment combinations commenced 2 weeks after transplanting. Urea and technical grade potassium nitrate were used as sources of $N\text{-}NH_4^+$ and $N\text{-}NO_3^-$. The scheme of fertilization recommended by the IPB Vegetable Breeding Division was applied. Salinity caused growth reduction in tomato plants. However, the ill effects of salt was alleviated by appropriate N management. The forms of N absorbed by the plants appeared to show profound effect on the ability of the tomato plants to tolerate saline conditions. Plants fertilized with nitrate form on N were more robust in growth compared with those grown in ammonium form. Yield per pot was higher by 80% in $N\text{-}NO_3^-$ - grown tomatoes than that of $N\text{-}NH_4^+$ - grown. The difference in fruit yield was reflected on the number of fruits produced and the percentage of fruit set in nitrate-fed plants, i.e., 126% and 108% difference between the two N forms, respectively. But the average weight per fruit in nitrate-fed plants was 18% lower than the ammonium-fertilized tomatoes. Total soluble solids increased by about 16% in fruits produced from plants that received nitrate augmentation. On the other hand, total acidity decreased by about 13% in nitrate-fertilized plants.

EFFECT OF WATER MANAGEMENT ON METHANE EMISSIONS

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Wetland ricefields are probably the biggest agricultural source of methane. Methane produced at the reduced zone may either be transferred to the atmosphere and subsoil or oxidized. Water control is one of the most important factor controlling rice production and methane fluxes. This reports a study to determine the effect of water management practices on methane emissions and dissolved methane in soil solution. Water management treatments were: continuous flooding; drying 2 weeks before harvest; and drying at midtillering and 2 weeks before harvest. Methane emissions were measured continuously over the season using the automatic chamber system and soil solution samples were analyzed for dissolved methane weekly. Total emission and dissolved methane obtained from continuous flooding were 90 g CH_4 m^{-2} and 757 μ g ml^{-1} while drying at midtillering and 2 weeks before harvest were 14 g CH_4 m^{-1} and 87 μ
g ml^{-1}. Emission patterns, total emissions and dissolved methane are changed when the plots were dried at midtillering and at harvest. Drying at midtillering reduced seasonal emissions by 84% and dissolved methane by 88% and did not significantly reduce rice yields. Drying periods reduce methane emissions. Water management is a sound means of abating methane emissions from ricefields. But management practices that reduce methane emissions and increasing rice yields must be developed.

RAPID PLANT TEST TO INDICATE NITROGEN STATUS OF TOBACCO (*Nicotiana tabacum* L.)

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A rapid plant test for determining the fertilizer requirements of tobacco was developed and evaluated in laboratory, pot and field experiments. Sampling procedures for measuring the nitrate-N in petiole and stem saps were examined. In particular, the effects of time of sampling, duration of sample collection, plant age and fertilizer form were determined.

The utility of the rapid plant test for indicating the N fertilizer sidedressing requirement of tobacco was assessed in the field. Four different initial rates of potassium nitrate (0-66 kg N/ha) and two levels of sidedressing (nil and 22 kg N/ha) were the treatments. Prior to sidedressing the concentration of nitrate in the sap were strongly correlated to extractable nitrate and ammonium in the soil to depth of 30 cm. Cured leaf yield was significantly affected by the initial rates of N application but not the sidedressing treatments. Highest yield was obtained with the application of 66 kg N/ha. The critical nitrate concentration in petiole sap was found to be 1700 ppm.

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EVALUATION OF SALINE-SELECTED TOMATO SOMACLONES CV IMPROVED POPE UNDER DIFFERENT LEVELS OF SALINITY

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The study aims to evaluate the performance of saline-selected tomato somaclones derived from cv Improved Pope (IP) at 3 levels of salinity under greenhouse conditions. The experiment was laid out in a split-plot design with salinity level as main plot and variety as the subplot using four replications. Four-to five-leaf stage tomato seedlings of IP, somaclones S1T10, S2T44, S2T46 and a check variety Apollo (AP) were evaluated. Salinity was imposed by irrigating pots with NaCl solutions having EC values of <1, 8 and 15 dS m^{-1} about 2 1/2 weeks after transplanting. EC of soil extracts were monitored. Two seedlings per entry were transplanted in 11" - clay pots containing 12-kg sterilized soil (2 parts soil:1 part sand), fertilized with N, P, K and augmented with N-nitrate and calcium. Significant varietal differences were observed in yield per plant or yield per pot, fruit weight, number of fruits/plant, fruit set and total soluble solids (TSS). Under normal conditions, somaclones produced more fruits than IP and AP, 235% and 80% increases, respectively; higher yield by about 96% and 37%, respectively but gave lower weight per fruit than IP and AP by 17% and 24% respectively. At moderate salinity, no significant effects of salt on the measured parameters were observed except in S1T10. At high salinity however, significant yield reductions were observed, 40% over that of control. Fruit yields were not significantly different among the 5 varieties. Number of fruits was not affected by salinity. Fruit number was 73% higher in the somaclones than the check varieties. Salinity reduced fruit weight by about 18%. Fruit weight between the somaclones and the check varieties differed by 16%. Salt appeared to enhance fruit set in tomatoes; S2T44 had a significant increase in fruit set by 58% over the control. Across salinity levels, the somaclones were not significantly different from IP in fruit setting ability but were 44% better than that of AP. The presence of salt also improved the quality of fruits; TSS increased by 11% in the somaclones and 16% in the check varieties. Total acidity was not affected by salt except for Apollo which showed an increase of 47% over that of control. Salinity x variety interaction was not significant.