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Abstracts of Ph. D. Thesis

Assessment of Available Copper and Moly bdenum Status of Soils of North Gaujarat and Response Studies with Respect to alfalfa.

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With the increasing use of fertilizers, greater stress on intensive farming and the cultivation of high-yielding varieties of crops more responsive to fertilizers, it is likely that phsiological nutrient imbalance may arise and crop yields may suffer.

In order to assess the availability status of copper and molybedenum in soils of North Gujarat a three-pronged approach involving soil analysis, pot study and a field experiment with alfalfa was followed.

One hundred and twenty three representative surface soil samples from different villages of Ahmedabad, Gandhinagar, Banaskantha, Sabarkantha and Mehsana districts of North Gujarat were collected and analysed for (i) available copper, (ii) available molybdenum, (iii) pH, (iv) organic matter (v) calcium carbonate and (vi) silt + clay contents.

Soil analysis indicated that available Cu content of soils varied from 0.04 to 0.32 ppm. Overall 20% of the soils were found deficient in available Cu. Between available Cu and organic matter of soils a highly significant positive correlation was observed.

Available Mo content of soils varied from 0.02 to 0.61 ppm. About 20 per cent of soils were found deficient in available Mo. The correlations of available Mo with pH, lime and silt + clay contents were non-significant.

To verify the results of soil analysis and to measure the response to Cu and Mo applications a pot-culture experiment with soybean grown in soils (i) deficient in available Cu and Mo (ii) sufficient in both, (iii) deficient in Cu and sufficient in Mo and (iv) deficient in Mo and sufficient in Cu was carried out. Although the effects of Cu and Mo applied alone or in combination were non-significant, there was a tendency for increase in dry-matter of soybean in case of soils deficient in both, by the application of Cu and Mo. Application of Mo increased several-fold the Mo content of soybean.

A field experiment with alfalfa on *Lihoda* soil having 0.11 ppm (marginal) available Cu, 0.02 ppm (deficient) of Mo and 0.44 mg P_2O_5/100 g soil was carried out by applying 5 ppm Cu and 0.5 ppm Mo with 0, 100 and 200 kg P_2O_5/ha.

The effect of application of P at the rate of 100 and 200 kg P_2O_5/ha increased the forage yields by 48 and 56 per cent respectively over no phosphorus. Application of Mo had no effect on dry matter yield in the first cutting, but there was a small beneficial effect in the second and third cuttings. The effect of P and Mo when applied together was additive. This was particularly the case in absence of copper. The overall effect of Cu on yield was not significant. Application of P brought about a small reduction in the Cu content,

still the content was well above the threshold value for normal growth of alfalfa.

Application of 0.5 ppm Mo was reflected in large increases in the Mo content of alfalfa. Phosphate application decreased the Mo content of applied Mo. Effect of Cu application was statistically significant in reducing the Mo content particularly when Mo was applied. Effects of Cu, Mo and P alone or in combination on the N content were nonsignificant.

In North Gujarat, 20% of the soils were deficient in Cu (<0.1 ppm) and Mo (<0.05 ppm).

Application of P at the rates of 100 and 200 kg P_2O_5/ha increased the forage yield of alfalfa to the tune of 48 and 56 per cent respectively. However, Cu or Mo alone did not improve the yield significantly. Molybdenum application had additive effect with P.