Copper Supplementation Trials with Cattle in Queensland

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OBSERVATIONS have been made at two experimental sites on the efficacy of top-dressing and of intramuscular injection for correcting copper deficiency in cattle.

At Mooloolah, 70 miles north of Brisbane, 20 acres of alluvial river frontage was divided into four 5-acre plots, which were top-dressed in March, 1951, as follows:-

Paddock 1 — copper sulphate 10 lb. per acre; lime 1 ton per acre; superphosphate 187 lb. per acre.

Paddock 2 — copper sulphate and super as for Paddock 1.

Paddock 3 — copper sulphate as for Paddocks 1 and 2.

Paddock 4 — no treatment.

The top-dressing had little influence on botanical composition; narrow-leafed carpet grass (Axonopus affinus) remained dominant; paspalum comprised only 1 to 5 per cent., and in Paddock 1 white clover increased slightly to 9 per cent. of the pasture.

From April, 1952, until August, 1953, 4 Hereford yearling heifers grazed each paddock. The liver copper concentrations of heifers grazing the top-dressed paddocks were not significantly raised, and their liveweight gains were no better than the heifers grazing the untreated pastures.

A second trial was commenced in September, 1953, on the same four paddocks with 16 selected Hereford heifers 6 months of age. The paddocks were top-dressed as follows:—

Paddock 1 — no further lime; super 187 lb. per acre plus copper sulphate 28 lb. per acre per annum in two applications (Sept., 1953, and March, 1954).

Paddock 2 — super and copper as for Paddock 1.

Paddock 3 — copper sulphate as for Paddocks 1 and 2.

Paddock 4 — no treatment.

Pasture samples analysed once a month showed:

(a) In the untreated paddock, copper concentration of carpet grass ranged from 2.5 to 5.5 p.p.m. Cu and paspalum from 5 to 8 p.p.m. Cu, dry matter basis.

(b) In top-dressed paddocks, a quick rise up to 30 p.p.m Cu in carpet grass and a quick fall to a marginal to low level 3 months after top-dressing.

(c) In top-dressed paspalum and white clover, similar but less marked rises in Cu, but the increase persisted longer.

Liver copper concentrations of heifers grazing the untreated paddock declined and then remained low throughout the trial, whilst liver copper concentrations on the three top-dressed paddocks were raised to normal but were falling again at 6 months after each top-dressing.

All the heifers gained weight from September to April and then lost weight until August. No differences were detected between groups. Blood inorganic phosphate levels were marginal to low in March, June and September in all groups. Thus, deficiency of phosphorus as well as copper exists. It is suggested, too, that failure to consume available pasture also contributes to weight losses during the winter months.

The effect of intramuscular injection of copper sulphate on copper deficient cattle was examined in a trial at Rocklea near Brisbane, on a good paspalum pasture, rather low lying and containing a lot of white clover.

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Twenty Hereford cows, 12 Hereford weaner steers and 5 sets of identical twins were used. One member of each pair of Herefords and one of each set of twins was injected with copper sulphate solution each 2 to 3 months, and all the cattle grazed together. This trial ran from December, 1953, to March, 1955.

The untreated cattle showed very low liver copper concentrations and the injected groups were normal for the 15 months of the trial, but there were nevertheless no differences between the groups in either summer-autumn weight gains or winter weight losses. As in the Mooloolah trial, it was found that marginal blood inorganic phosphate during autumn, winter and spring, and failure to consume available pasture during the very good winter of 1954 were important factors contributing to poor weight gains during this period.

Since the copper and the phosphorus contents of the dominant pasture species, paspalum, were adequate, there is apparently interference with the metabolism of these two elements on this pasture.

Observations are being continued at both experimental sites with special reference to copper, phosphorus, cobalt, pasture yields and feed intake in relation to weight gains.