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COTTON RESEARCH AND DEVELOPMENT CORPORATION
FINAL REPORT ON PROJECT DAQ 67

The 12th International Plant Nutrition Colloquium was held at The University of Western Australia between the 21st and 26th of September 1993. Some 380 delegates attended, representing most nations of the world. The majority of these delegates also took part in the International Symposium on Zinc in Soils and Plants at the same venue on the 27th and 28th. Between these two dates there were field trips into various regions of South-West Western Australia to demonstrate local agronomic conditions and research.

The lecture and discussion sessions of the colloquium covered several subjects of particular interest including; general nutrient uptake, mycorrhizas and P nutrition, minimum tillage and N usage, etc.. One entire session was devoted to potassium and calcium, where some principles discussed were of direct relevance to my current cotton research.

During lunch sessions there were informal meetings between members of the potassium working group, Graeme Blaire (UNE), Phil Wright (NSW Ag), Chris Dowling (INCITEC) along with Ken Cassman (currently IRRI in the Philippines) who shared with us his findings and those of his graduate students on potassium research in California. Plans were discussed for the upcoming 1993 season. I also discussed these plans with Drs Colin Asher and Jane O'Sullivan of Queensland University, who had been reviewing copies of my field experiment notes since July.

The field trip I attended toured the Eastern `wheat and sheep' belt as far inland as Merredin, where average rainfall is ca. 300mm per annum. Research emphasis in this region is placed on water and nitrogen efficiency, micronutrient deficiency correction and problems of soil acidity.

The Zinc Symposium covered most aspects of zinc chemistry including; usage, uptake, deficiency, fertiliser formulations etc.. As some of the current and potential cotton growing soils of Central Queensland have marginal levels of zinc supply, general knowledge in this area is potentially useful. The association between mycorrhizal infection and zinc nutrition was discussed, and the relevant papers will be passed on to Peter McGee at Sydney University and David Nehl at UNE who do cotton research in that area.

Aims:

1. To determine the rates, form and placement of fertiliser appropriate to alleviate potassium deficiency and premature senescence.

2. To further research the role of potassium in the resistance of cotton to Alternaria leaf spot.

Fertiliser rate and placement trials continued in the 1993/94 season. Seven rates of banded potassium muriate where examined (0-500 kg K/ha) at two sites in replicated trials. These sites included treatments designed by Phil Wright for estimating plant usage of potassium. Comparison was also made between application methods at the same sites. Fertiliser was banded under the bed, water run and foliar sprayed. The placement trial was repeated with the cooperation of INCITEC at several sites in NSW. In all experiments, nutrition was continually assessed by tissue analysis, and plant maps. Disease symptoms, yield and grade data were collected. Soil samples were also taken to determine plant uptake efficiency and residue after crop cut-out.

Field experiments concerning dosage rates and placement of potassium fertiliser at Emerald are now complete. Collation and analysis of 1993/94 field data is in progress. Results of the application method trials suggest that bed banding is more efficient than water run potassium and that some yield benefit may be gained from foliar K fertiliser (0.25 bales/ha on two sites) even after soil levels are adequate.

Details from both these experiments and others are included in a paper submitted for the ACGRA conference at Broadbeach and those of the application method trial are reported in articles to be submitted to the Central Queensland News, Country Life and The Australian Cottongrower.

Final collation was made of the INCITEC soil survey from 1993, cataloguing results of comprehensive analyses on 120 sites in and around the Emerald Irrigation Area. This data will be shared with Ivor McLeod at UNE.

The use of systemic fungicide to control *Alternaria* leaf spot was again attempted on two sites where infestation was noticeable prior to boll filling. This did not produced a yield response whereas replicated potassium addition increased yield and greatly reduced *Alternaria* infection.