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Fertiliser trials with potatoes, Manjimup: 1958-1959

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THIS experiment was the third of this type carried out in karri loam soils. Significant yield responses were obtained from increasing rates of fertiliser applications. The results appear to be generally consistent with those obtained previously in the area.

In two previous experiments carried out in 1956-57 and 1957-58 complete fertiliser mixtures were tested. The mixtures consisted of ammonium sulphate at rates varying from 1½ to 9 cwts. per acre, superphosphate at rates varying from 3 to 32 cwts. per acre and muriate of potash with rates varying between 1 and 4 cwts. per acre. In both experiments 6 cwts. of ammonium sulphate per acre gave the highest total and first grade yields, while higher rates had no further effect. Concerning the rate of superphosphate, in both experiments the rate resulting in highest yields was about 24 cwts. per acre. The need for potash was not conclusively demonstrated in either of the experiments. Both experimental crops were sprinkler irrigated and no topdressing was applied.

In the present experiment the rates of fertiliser components were as follows:

- Ammonium sulphate: 4, 6 cwts. per acre.
- Superphosphate: 15, 20, 25 cwts. per acre.
- Muriate of potash: 0, 1, 2 cwts. per acre.

In addition to the above fertiliser rates the trace elements copper and zinc were added to all plots in the experiment at the rates of 60 lb. of crude copper ore and 5 lb. of zinc oxide per acre.

A further aspect of fertiliser application was introduced into this experiment; while the whole amount of superphosphate was applied at planting time, only one half of the nitrogen and potash fertilisers was used at the time of planting and the other half in the form of side-dressing at a later stage.

The different rates of fertiliser components together with the two methods of application when combined in all possible ways gave a total of 36 treatments. The plots contained three rows of 46 plants each and covered an area of approximately 1/125 acre. Each treatment was replicated four times and the total area of the experiment was nearly 1½ acres.

Planting of the experiment was carried out between the 18th and 22nd of August, 1958, on the property of Rice Brothers at Eastbrook. The area was in the vicinity of the one used for a similar experiment in the previous year and had the same
aspect. It had been newly cleared and ploughed once shortly before the experiment was commenced.

Cut setts of the average size of 2 oz. were used for planting. The setts were dipped in a suspension of zinc oxide before planting, and then planted about 6-8 inches deep in rows 2 ft. 6 in. apart and spaced 12 in. apart in the rows. A three furrow ridger was used to open up the furrows as well as cover the planted rows. The fertiliser mixtures were placed on the side of the furrows, to the side and slightly below the level of the seed pieces, and as far as possible out of direct contact with them.

Those plots which received the split applications of fertilisers were side-dressed on the 20th October when the plants were about 6-8 in. high.

As in previous experiments, sprinkler irrigation was again applied, and this together with the natural rainfall received during the growing period of the crop amounted to about 17 inches of water.

The experiment was harvested between the 15th and 20th of December, and total as well as first grade yields were recorded for each treatment plot. For the purposes of the experiment tubers damaged during digging operations or otherwise accidently injured were considered first grade, and their weights were added to the first grade yields.

First grade yields from the different plots calculated to an acre ranged from about 7 1/2 to 13 1/2 tons. The responses to the three individual fertiliser components were as follows:

1. **Nitrogen.**—Ammonium sulphate at the rate of 6 cwts. per acre resulted in significantly higher yields than at 4 cwts. per acre.

2. **Phosphate.**—Yields from the application of 25 cwts. of superphosphate per acre were significantly higher than those from the application of 20 cwts. per acre, and this latter rate, in turn, gave significantly higher yields than the application of 15 cwts. per acre.

3. **Potash.**—The three levels of potash were significantly different in their effects on the yields; 1 cwt. of muriate of potash gave a significantly higher yield than when no potash was applied, and there was a further significant yield increase when the rate of muriate of potash was increased to 2 cwts. per acre.

Concerning the split application of ammonium sulphate and muriate of potash as compared with that part of the experiment in which all fertilisers were used at
the time of planting it was found that the latter method resulted in significantly higher yields in every case.

The differences in first grade yields appeared to be high enough in every case to more than repay the extra costs associated with the increased rates of fertilisers.

The results are tabulated above, and are also illustrated diagrammatically, showing the overall effects of the three individual fertiliser components. As split applications of fertilisers resulted in greatly reduced yields in every case, only that part of the experiment in which all fertilisers were applied at planting time has been considered.

**ACKNOWLEDGMENTS**

Grateful acknowledgment is made to Messrs. Rice Brothers of Eastbrook, who for the second year in succession made the area and equipment available for the experiment as well as extended their cooperation in all phases of the experiment.

Acknowledgment is also made to officers of the Horticultural Division of the Department of Agriculture who assisted with the field work, and particularly to Mr. G. de Haan, Vegetable Instructor of Manjimup whose assistance, as in previous years, very greatly contributed to the successful completion of the work.

The statistical analysis of the experimental results was carried out by the Biometrics section of the Plant Research Division.

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