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Report for 1948

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Rothamsted Experimental Station
Harpenden

LAWES AGRICULTURAL TRUST

REPORT
for
1948

Crop Physiology Department

D. J. Watson

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CROP PHYSIOLOGY SECTION

By D. J. Watson

Investigations on Roots

Dr. Humphries has continued the work on the physiology of roots which he began in 1947. This has so far been mainly concerned with nutrient absorption. Experiments have been carried out to measure the uptake of N, P and K by excised roots from plants grown under conditions of controlled nutrient supply. The earlier experiments measured only the net gain or loss of ions over a 24-hour period and showed that roots deficient in a particular element would absorb that element when excised and placed in a complete nutrient solution in standard conditions of temperature and aeration. In later experiments the changes in mineral content of excised roots were followed at intervals of a few hours through a 24-hour period. It was hoped that these experiments would furnish data on which to base a standard procedure involving a less laborious routine for comparing the activity of root systems from plants grown in different conditions. It was found that the trend of the absorption curve depended on the magnitude of the initial deficit, and varied in different species, but the amount of an ion absorbed in a 24-hour period increased almost linearly with decrease in the concentration initially present in the roots. Further experiments to test a wider range of deficiency conditions are in progress.

The effect of carbohydrate content of the roots on nutrient uptake is being investigated by comparing roots from plants kept in the dark or in the light for a period before the roots are detached. In these experiments the respiration rate of the roots during the absorption period is being followed.

The experiments involve large numbers of estimations of nutrient content, and to speed up the analyses of a flame photometer is being constructed for the determination of potassium and other elements.

Dr. Watson was away until early June on a visit to Australia and America made possible by the grant of a travelling research fellowship by the Ministry of Agriculture. He spent about five months at the Waite Agricultural Research Institute In Adelaide, working in the Agronomy Department on zinc deficiency, and visited other research institutes in Western Australia, Victoria, New South Wales and New Zealand. Later he travelled for about three months in the United States and visited a number of the State Experiment Stations and Universities, mainly for the purpose of seeing recent developments in equipment and technique for research on botanical and plant physiological problems.

On 1st October 1948, the Crop Physiology Section was merged with the Botany Department.

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