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Report 1918-20 With the Supplement to the Guide to the Experimental Plots Containing the Yields per Acre Etc.



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Statistical Department VII

Rothamsted Research

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VI. O. N. PURVIS. "The Effect of Potassium Salts on the Anatomy of *Dactylis Glomerata*." *Journal of Agricultural Science*, 1919. Vol. IX. pp. 338-365.

Stems of *Dactylis glomerata* were collected from grass plots which had received different manurial treatment as regards potash.

The yield of hay from these plots during the period of the investigation was in close agreement with the average, showing that the season was not abnormal.

The thickness of the wall, the diameter of the lumina and the ratio of the lumen to the wall were measured both in sclerenchyma and metaxylem elements. In the early stages the sclerenchyma walls were thinner where potash had been supplied, but this effect was lost as the season progressed.

The lumina were larger in plants which had received potash when nitrogenous fertilisers had not been added, but in the presence of ammonium salts, this effect was reversed.

In the xylem the thickness of the walls was unaltered, whether potassic fertilisers were added or not. When no nitrogenous manures were added the diameter of the lumen was decreased in the presence of potash, but when ammonium salts had been applied, the diameter was increased by the application of potassic fertilisers.

The addition of potassium salts produced an increased ratio of lumen to wall, but this effect gradually passed off. Presumably, therefore, potassic fertilisers reduced the strength of mechanical cells in the early stages of growth. This conclusion, however, would not hold if potassium salts affected the composition of the wall.

From these results it is concluded that the rigidity of plants supplied with potassium salts is not the result of anatomical strengthening, but must be attributed to other causes, such as the influence of the salts on the physiological condition of the plant, or on its chemical composition.

VII. R. A. FISHER. "Studies in Crop Variation. An Examination of the Yields of Dressed Wheat from Broadbalk." *Journal of Agricultural Science*, 1921. Vol. XI.

A study of the variations in yield on Broadbalk where wheat has been grown continuously since 1843.

Three types of variation are found due respectively to (1) annual causes, primarily weather; (2) steady deterioration of the soil; (3) other slow changes, among which changes in weed flora are considered. The effect of weather is reserved for further consideration. The effects of soil deterioration and other slow changes are studied at length.

On the unmanured plot, the decrement in yield is of the order of 0.8%, or less than 1 bushel in 10 years. If this rate were maintained, the plot would still last out another 125 years. Where farmyard manure is applied there is practically no falling off in yield; this crop also shows the least variation due to weather. With complete artificials, however, there is a deterioration, but less with heavy than with light dressings of ammonium salts, which is not quite in accordance with the Law of Diminishing Returns. With incomplete artificials, however,