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Guide to the Classical and Other Long-term Experiments, Datasets and Sample Archive



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Saxmundham, Rotations I & II

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root crop, especially on the NPKNaMg plots as a result of increasing soil acidity. By 1948 the produce was too small to weigh, and the four-course rotation ceased in 1951. Soil acidity was corrected and the plots were then used to evaluate the P and K reserves accumulated up to 1951. During this period the original six plots were halved and two levels of soil organic matter were established by growing leys on one half (Johnston & Penny, 1972). Subsequently, the plots were further sub-divided to build up different amounts of P and K in the soil. Crop yields were then related to the reserves of P and K in the soil and the effect of adding fresh P and K. The experiment ended in 1990 but data relating yield to plant-available P is still useful and has been used recently in several papers (Johnston *et al.*, 2013).

The Woburn Intensive Cereals Experiments

The Intensive Cereals experiments (winter wheat and spring barley grown continuously to mirror those at Rothamsted) started in 1876. Unlike most of the arable soils at Rothamsted, those at Woburn contain little or no free calcium carbonate and the soil pH at the start of the experiment was probably *c.* 6. Consequently, within 20 years, the experiments ran into problems with soil acidification where ammonium sulphate was applied, and yields declined markedly. Tests of liming on these experiments, started in 1897, were the first in the UK, but yields did not recover to their former level. Conceivably, yields were also affected by cereal cyst nematodes which can be a problem with continuous cereals on these lighter textured soils. For many years the yields remained poor and the site was used for a number of other experiments. One tested the effects of growing grass-clover leys for one

to six years on the yield of subsequent arable crops. Yields of up to 9.0 t ha⁻¹ of wheat grain and 75 t ha⁻¹ of potato tubers were achieved following the longer leys (Johnston *et al.*, 1994).

Saxmundham Rotations I & II

The soil at Saxmundham is a heavy sandy clay loam, which can be difficult to cultivate; it provides a further contrast to the soils at Rothamsted and Woburn. Two long-term experiments were started at Saxmundham in 1899 by the East Suffolk County Council. Each consisted of four blocks so that a typical Norfolk four-course rotation could be grown, with each crop present in each year. On the Rotation I experiment, there was a factorial test of N, P and K plus bone-meal and FYM treatments (Williams & Cooke, 1971). Rotation II sought to determine how limited amounts of FYM, sodium nitrate and superphosphate could best be used over the four-course rotation. When Rothamsted assumed responsibility for the site in 1965 the experiments were reviewed and modified. Data from the Rotation II experiment have been used extensively to look at the responses by various crops to fresh and residual P (Johnston *et al.*, 2013), and the decline in plant-available P when fertiliser P is withheld (Johnston *et al.*, 2016). The critical level, above which there is no further response to fresh P, is higher and more variable on this heavier soil than on the better soil at Rothamsted (see Exhaustion Land above). The Rotation I experiment has been used to look at crop responses to both P and K and their interactions with N, particularly where much fertiliser N was applied in recent years to high yielding cultivars of wheat with the aim of achieving bread-making quality. Rothamsted relinquished the site in 2010.