ROTHAMSTED RESEARCH

Rothamsted Experimental Station Guide

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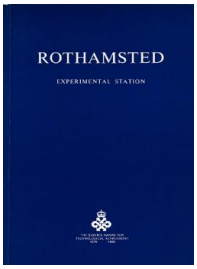

Woburn

Rothamsted Research

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drought, nutrient deficiencies) is eliminated. The factorial nature of these experiments gives measures of the loss of yield caused by omitting one or more of the inputs, some of which are admittedly uneconomic.

WOBURN

Experiments began on the farm at Woburn in Bedfordshire in 1876, under the auspices of the Royal Agricultural Society of England, and Rothamsted assumed responsibility in 1926. The farm is not owned by the Lawes Trust but is rented from the Bedford Estates. Over most of the farm the soil is a sandy loam, derived from the Lower Greensand, differing greatly from the Clay-with-flints at Rothamsted, and many of the problems in arable agriculture differ at least in degree from those on the heavier soil. Woburn still fulfils an original purpose, to duplicate experiments done at Rothamsted on a different soil type, but for many years work has also been done on problems especially important in light-land farming, such as acidity, nitrogen deficiency, poor soil structure, and small water-holding capacity. Experiments on green manuring, ley farming and organic manuring have for long been major parts of Woburn's programme; work with irrigation began there in 1951. Since 1974 substantial increases in yield of wheat, barley and sugar beet have been obtained from subsoiling alone and of potatoes, barley and sugar beet from incorporating PK fertilisers in the subsoil. Reasons for these increases are being sought.

The light soil of most of the Woburn farm is favourable to nematodes, both the free-living and cyst-forming types. Experiments, mostly long-term, are being done on potato cyst-nematode, both species of which (*Globodera* (formerly *Heterodera*) *rostochiensis* and *G. pallida*) occur at Woburn. The complex relations between the species, and how this is affected by nematicides and different varieties of potatoes, some with a degree of resistance, are being studied in long-term experiments. Other experiments deal with population dynamics and seek economic means of control by chemicals. There is evidence that potatoes at Woburn occasionally suffer appreciably from other nematodes that do not form cysts. Growth and yield experiments on winter wheat at Woburn provide a useful comparison with similar, more detailed work at Rothamsted.

Cereal cyst nematode (*H. avenae*) is also studied. Other pathogens which are more prevalent in the Woburn soil than at Rothamsted are the fungi *Verticillium* (which attacks potatoes in conjunction with cyst nematode) and *Streptomyces scabies* (common scab of potatoes) and experiments test methods of control of both.

Some fields have a heavier soil derived partly from Oxford Clay, and about half is devoted to a long-term rotation experiment on cultivation and the effect of deeply incorporated PK.

Cropping and organisation

The farm totals 76 ha, the main arable crops being barley (18 ha), wheat (20 ha) and potatoes (8 ha). It is not easy to grow suitable break crops; beans and leys suffer from drought and sugar beet clashes with potato harvest. Some beans are grown on the heavy land and more recently winter oats have been introduced. Because of potato cyst-nematode part of the area of potatoes is planted with Maris Piper or more recently Cara which is

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resistant to *Globodera rostochiensis* but not to *G. pallida*, and stem-eelworm resistant varieties of oats are grown. Of 15 ha of grassland, about 8 ha are temporary grass, most being 1- or 2-year breaks in the rotation, and the rest is permanent grass.

The farm is staffed by a bailiff responsible for day-to-day organisation, and three tractor drivers, with two recorders responsible for marking out and applying treatments and recording yields from experimental plots.

Large experimental plots total about 1500 and the methods used are similar to those at Rothamsted. In addition about 1000 plots are used for microplot experiments.

The farm is well equipped with buildings. There is adequate storage for hay, straw and machinery, and there is an insulated potato store with a capacity of 200 tonnes.

Grain is dried in radially ventilated silos before being transferred to steel silos for storage. These are fitted with low-volume ventilation to allow cooling in suitable conditions, and permit storage at a higher moisture content than in unventilated bins. Total storage capacity is 180 tonnes.

About 40 cattle are yarded each winter. They are usually fattened off grass in the following summer but if grass is short in dry summers they may be transferred to Rothamsted.

SAXMUNDHAM

The East Suffolk County Council began experiments on permanent sites at Saxmundham in 1899. The work was continued by the National Agricultural Advisory Service from 1947 to 1964, when the Experimental Station, now only 3 ha, was placed under Rothamsted's control. The sandy-clay soil at Saxmundham contains about the same amount of clay as the Rothamsted soil, but is much more difficult to work and this difference in soil structure is being investigated.

The Station originally possessed two Arable Rotation experiments (I and II) started in 1899. The site of Rotation I is used to measure (i) the rate of removal of potassium by arable crops and grass and (ii) to measure benefits from part of the experiment where lucerne was grown between 1970 and 1976. The experiment also provides a site with a known history of manuring for an experiment on subsoiling and deep incorporation of PK fertilisers. Part of Rotation II has been used since 1965 for experiments on factors affecting the growth of winter wheat on poorly-structured soil. Between 1971 and 1976 yields of wheat grown continuously were as large at Saxmundham as at Rothamsted; poorer yields obtained before this may have been due to late sowing. The remainder of Rotation II has been used to establish a range of soils containing different amounts of soil phosphorus (ADAS Index 0 to 4). Yields and responses to fresh superphosphate have been measured for cereals and root crops grown at each soil P index. The site is now being used to measure the rate at which available P residues decay in this soil.

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