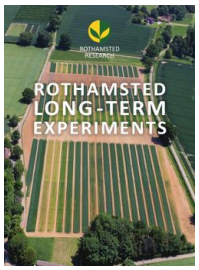
ROTHAMSTED RESEARCH

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



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Garden Clover

Garden Clover experiment, 2008

Garden Clover is the simplest of the Classical experiments, with (until 1956) only one, unmanured plot. Lawes and Gilbert were successful in growing wheat, barley and turnips each year on the same land but found that red clover, although a perennial, seldom survived through the winter when sown on farmland. Even when re-sown annually it soon failed to give an acceptable yield. To see whether red clover could be grown continuously on a "richer" soil Lawes and Gilbert laid down this small plot in the Manor's kitchen garden in 1854. Yields were very large for the first 10 years, averaging about 10 t dry matter ha^{-1}, probably because the soil was rich in nutrients and because soil-borne pests and diseases of clover were absent. Reasonable yields were obtained over the next 30 years but thereafter yields showed a marked decline and there were several complete failures.

Between 1956 and 1972 the plot was sub-divided and a sequence of tests made of K, molybdenum (Mo), formalin, N and Mg. N, K and Mg all increased yields, Mo and formalin did not. With N, P, K and Mg yields of about 6 t dry matter ha^{-1} were obtained in the year of sowing. The crop was usually severely damaged during the winter by clover rot (*Sclerotinia trifoliorum*) and was re-sown each spring. Since 1973 basal N, P, K, Mg and chalk have been applied.

Between 1976 and 1978 aldicarb was tested as a control for clover cyst nematode, *Heterodera trifolii*, which was known to be present, and the cultivar Hungaropoly, believed resistant to clover-rot, was compared with the standard susceptible cultivar S.123. The combination of aldicarb and Hungaropoly gave yields up to 8 t dry matter ha^{-1} but winter survival remained poor (McEwen *et al.*, 1984).

The plot was then sown with *cv.* Hungaropoly only, with basal aldicarb (until 1988), and tested the fungicide benomyl from 1980-90. Initially, there was a benefit from applying benomyl but averaged over the 11 years in which it was tested there was none. Between 1979 and 2018 the experiment was re-sown eight times. The mean yield of the cultivar Milvus for the period 2007-2012 was 11t ha^{-1}

Clover nodule bacteria and their bacteriophages are abundant. Nodule bacteria for *Vicia* spp. are sparse and those for *Lotus* and medicks absent. Other than Park Grass, with its mixed herbage, this is the only remaining Classical site where only a non-graminaceous crop has been grown. In terms of microbial diversity, its soil provides a potentially valuable contrast with that of Broadbalk and Hoosfield.

The rich kitchen garden soil on which the experiment was established had received much FYM. In 1857 the top soil (0-23cm) contained 10.8 t N ha^{-1}; by 2011 this had declined to 4.5 t N ha^{-1}.

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