ROTHAMSTED RESEARCH

Report for 1935

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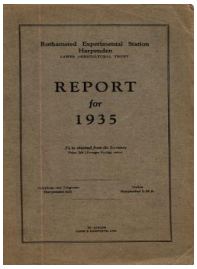

Crop Estimation and Forecasting : Sampling Observations on Wheat Growth

Rothamsted Research

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26. TARR, H. L. A. (1935). "The Brood Diseases of Bees." In Report of the lectures given at the fifteenth Midland and South Western Counties Convention of Beekeepers. Worcester, p.21.
27. TARR, H. L. A., 1935. "Studies on European foul brood of bees, I." A description of strains of *Bacillus alvei* obtained from different sources, and of another species occurring in larvae affected with this disease. Ann. App. Biol. 22, pp. 709.
28. TARR, H. L. A. (1935). "A note concerning the brood disease investigation at Rothamsted Experimental Station." In "Year Book of the South Eastern Federation of Bee Keepers' Associations," p.5.
29. TARR, H. L. A. (1936). "Abridged Report of the foul brood investigation for September 30th, 1934, to September 30th, 1935. Bee World, No. 1. (Also in Bee Craft and British Bee Journal and Archiv. f. Bienenkunde 17, 92).
30. TARR, H. L. A. (1935-6). "Brood diseases of bees." Beekeeping 1, No. 7. Vol. 2, Nos. 1 and 2.
31. TARR, H. L. A. (1936). "The organism of European foul brood of bees." Nature, 137, p. 151.
32. TARR, H. L. A. (1936). "Streptococcus apis Maassen." Bee Craft, No. 2. (Also in British Bee Journ. and Bee World).
33. TARR, H. L. A. (1936). "Bacillus alvei and Bacillus paraalvei," Bee World, No. 4. (Also in British Bee Journ. and Bee Craft.)
34. TARR, H. L. A. (1936). "The diseases of bee larvae." In Bee World, Bee Craft, and British Bee Journ.
35. TARR, H. L. A. (1936). "Studies on European foul brood of bees, II." The production of the disease experimentally. Ann. Appl. Biol. 23. (In the Press.)
36. TARR, H. L. A. (1934). "The present position of the Scientific Investigation of foul brood diseases of bees." Rothamsted Conference XVIII.,
37. (1934). Rothamsted Conferences 18: "Brood diseases of bees," 46 pp.
38. (1935). Rothamsted Conferences 20: "Cause and control of swarming," 31 pp.

CROP ESTIMATION AND FORECASTING

SAMPLING OBSERVATIONS ON THE GROWTH OF WHEAT

In 1924 the Agricultural Meteorological Committee was formed by the Ministry of Agriculture and Fisheries, the Department of Agriculture for Scotland, the Meteorological Office and the Forestry Commission, to investigate the effects of the weather on agricultural and horticultural crops. The programme includes sampling observations on the growth of wheat on a plan developed by the Statistical and Plant Physiological Departments at Rothamsted. Ten stations collaborate; at nine of them full meteorological observations are taken. The work is supervised by the Statistical Department, and 1935 was the third year of the full scheme.

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The observations consist of counts of plant number and shoot number per unit area, and measurements of shoot height and ear height. At each station two standard varieties are observed at intervals varying from three weeks to a day, according to the state of the crop.

In surveying the results of the first three years Miss M. M. Barnard found a close connection between the height of the shoots at ear emergence and the final yield of grain. Plant number at tillering was negatively correlated with the yield of grain. No other measurement was closely associated with yield. The results are too few to show the effects of variation in meteorological conditions on yield, but at certain stages the effect of the temperature on growth was clearly marked. The wheat crop, in fact, appears to be growing at or near the optimum meteorological conditions, so that the influences of variation of weather are likely to be small and complex, differing with different soil types.

Observed and Predicted Yields (cwt. per acre)

Station	1932-33		1933-34		1934-35		Mean	
	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted
Seale Hayne ..	19.0	25.5	32.4	30.0	26.2	26.2	25.9	27.3
Rothamsted ..	22.2	26.2	32.2	32.4	34.7	32.5	29.7	30.4
Newport ..	35.3	38.8	43.7	43.3	40.0	37.6	39.7	39.9
Boghall	32.8	35.3	35.7	37.8	29.6	26.4	32.7	33.2
Sprowston ..	25.3	30.6	28.3	29.5	20.6	23.3	24.7	27.8
Plumpton ..	—	—	35.2	28.2	47.2	39.4	39.4[3]	33.6[3]
Wye	10.8[4]	—	47.8	41.5	15.2[5]	24.2	—	—
Long Sutton ..	27.6	29.3	—	—	10.8	—	—	—
Mean[1]	28.4[2]	31.6[2]	34.6	33.5	33.0	30.9	—	—

(1) Excluding Wye and Long Sutton.
(2) Adjusted to be comparable (over the same group of places) with the means of the other years, which include Plumpton.
(3) Adjusted to be comparable (over the same set of years) with the means of the other stations.
(4) Serious damage by birds.
(5) Damaged by Take-all (*Ophiobolus graminis* Sacc).

The association between shoot-height at ear emergence, plant number at tillering and yield of grain, enables a formula for the prediction of yield to be calculated. Working with the mean of the two standard varieties, and the first six stations of the accompanying table, it was found that for every increase of an inch in height (measured to the top of the sheath of the youngest leaf) an increase in yield of 1.32 cwt. per acre is to be expected, and that for every increase in plant number of 1 per foot-length of row, there is a decrease in yield of 0.62 cwt. With a height of 30 inches and a plant number of 10 per foot, the expected yield is 34.3 cwt. The values of the yields calculated from the formula are shown in the table for comparison with the actual yields.

These results are not sufficiently extensive to determine the accuracy of forecasts based on height measurements, but they suggest that simple measurements of this type may enable good forecasts to be made for any particular field.

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Such forecasts, however, would be of little use in predicting the average yield of a district unless one knows how closely the yield on the observation plot is related to that of other fields in the same district.

The degree of association between fields in a district was estimated from samples taken by the crop weather observers in 1934 and 1935 from fields on different farms: the variability from field to field was remarkably high. In consequence both estimates and forecasts of the average yield of a district need to be based on observations of commercial crops.

The observations on wheat will be extended to study the possibilities of crop estimation at and prior to harvest. Suitable methods for sampling sugar beet and potatoes are being sought; the Harper Adams College is co-operating in the sugar beet work.

DEPOSITS FROM THE ATMOSPHERE

Since 1915 Rothamsted has co-operated in the investigation of Atmospheric Pollution organized by the Department of Scientific and Industrial Research. Certain analyses of the rain and of the dust deposits are regularly made, and some of the results have now been summarised. (1) For the second year in succession our deposition gauge collected the smallest total solids out of the 98 gauges in use throughout the country. The total for the period April 1st, 1934, to March 31st, 1935, was made up as follows:

		Kg. per hectare	Cwt. per acre
Insoluble Matter	Loss on Ignition	59.4	0.473
	Ash	88.1	0.702
Soluble Matter	Loss on Ignition	93.9	0.748
	Ash	91.1	0.725
Total		332.5	2.648

The total deposit for the present year is the lowest since 1925-26 when a total of 307.5 kg per hectare (2.45 cwt. per acre) was collected. The average total for the last ten years is 401.1 kg per hectare (3.20 cwt. per acre) and the highest, recorded in 1929-30, was 507.4 kg. per hectare (4.04 cwt. per acre). The well-known positive correlation between rainfall and deposition of soluble matter is clearly apparent, and in consequence of this no secular change either for better or worse is detectable with certainty over this period.

The average monthly deposit was greater during the summer than the winter. This is a regular feature of our records, but it is particularly interesting this year, because rainfall had the opposite distribution.

	April to Sept.	Oct. to March
Average Monthly Rainfall, mm.	43	51
Average Monthly Deposition, Kg/hectare	31.8	23.6

(1) B. H. Wilsdon.—"Results of a statistical examination of records of deposit gauges." Appendix to Dept. Sci. Ind. Res., Twenty-first Report on Observations in the Year ended 31st March, 1935.

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