ROTHAMSTED RESEARCH

Rothamsted Report for 1932

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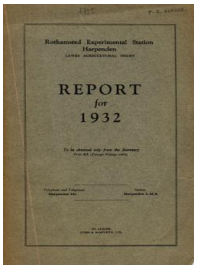

Fodder Crops

Rothamsted Research

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POTATOES

In the experiments at Rothamsted, Woburn and the outside centres up to the present good results have commonly been obtained with a mixture corresponding to 1 N : 1.5 P_2O_5 : 2.5 K_2O with increased phosphate where the soil is known to be deficient in this substance. In the 1932 experiments at the outside centres the most general response was, as usual, to nitrogen. The average increase in yield given by 1 cwt. sulphate of ammonia was 0.35 tons potatoes per acre, *i.e.* 1 ton of additional potatoes was obtained by an expenditure of 19/- on sulphate of ammonia. All the soils tested, even the fen soils, responded. Most of them responded also to potash ; indeed, on the sandy soil at Stanford nitrogen acted only when potash also was given. The response to phosphate was less general, but it was well marked on the fen soils when, indeed, responses were obtained up to 10 cwt. super per acre, and nitrogen was more effective when phosphate was applied as well. (Table II.)

FODDER CROPS

Fodder mixtures of oats and vetches. The results in 1932 confirm those of previous years that the nitrogenous manure favours the oats and depresses the vetches. The relations are shown in Fig. 1 ; the full details are given on pp. 148-149.

The total nitrogen content of the crop is not appreciably altered by the application of nitrogen. The total dry matter reaches a maximum with a seeding rate of 110 lb. oats and 90 lb. vetches per acre where no nitrogen is given, and with a mixture somewhat richer in oats when nitrogen is given. The total nitrogen content is a maximum with a mixture of 50 lb. oats and 150 lb. vetches per acre irrespective of whether nitrogen is given or not.

Kale. Our experience with kale is very promising. The crop is hardy, easy to grow, convenient in use and much liked by stock ; its leaves are rich in protein, and its yield is easily increased by nitrogenous manuring. On the light soil at Woburn we have been able to push the yields up to 28 tons per acre, and even higher yields may be possible (Fig. 2) ; indeed, kale appears to be one of the most suitable crops for converting cheap fertilisers into animal food.

Thinning and cultivating beyond what is necessary for keeping down weeds were not only unnecessary, but reduced the yield about 2 tons per acre. The results were :

	Unthinned	*Thinned*
Number of plants per acre, about	55,000	14,500
Yield, tons per acre :		
Ordinary cultivation .	27.65	25.18
Intensive cultivation .	25.51	23.63

Samples of the crop were taken each month from November to March : analysis showed that the content of nitrogen increased up to mid-January ; there was no gain in dry matter after mid-November, but also there was no loss. After February both dry matter and nitrogen fell off as the result of the withering of some of the leaves. (Table III.)

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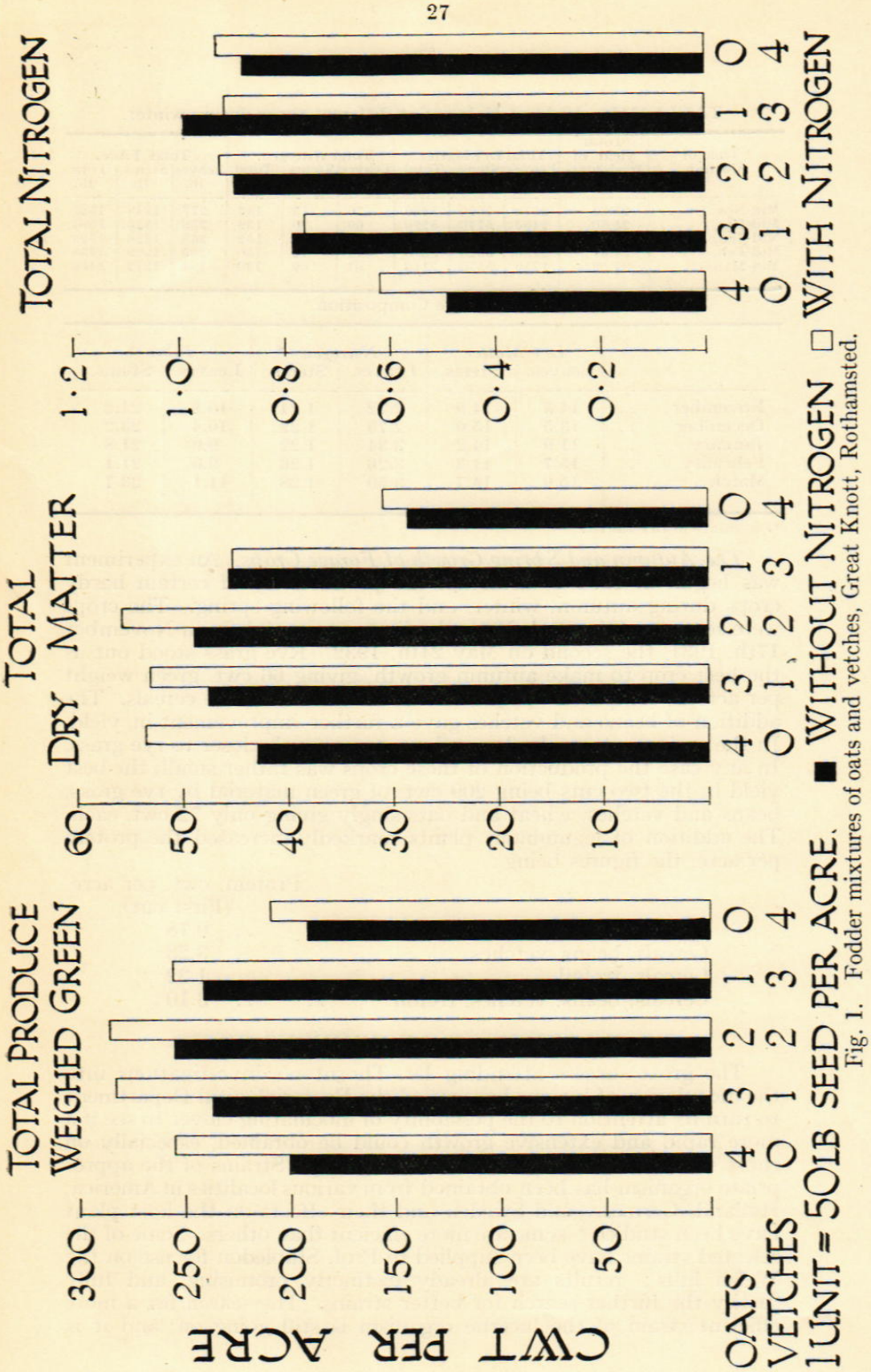

Fig. 1. Fodder mixtures of oats and vetches, Great Knott, Rothamsted.

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TABLE III.—Yield of Kale cut at different times during winter.

Time of Cutting.	Total yield of fresh material, tons	Total Dry Matter. Leaves lb.	Stems, lb.	Total, lb.	Total Nitrogen. Leaves lb.	Stems, lb.	Total, lb.	Total Fibre. Leaves lb.	Stems, lb.	Total, lb.
Mid-Nov. ..	25.68	2570	5890	8460	70	73	143	277	1248	1525
Mid-Dec. ..	25.30	2450	5770	8220	69	70	139	258	1336	1594
Mid-Jan. ..	27.50	2400	5890	8290	80	72	152	238	1286	1524
Mid-Feb. ..	24.37	2180	5820	8000	71	79	150	209	1229	1438
Mid-March ..	21.22	1740	5370	7110	61	69	130	194	1272	1466

Percentage Composition.

	Dry Matter Leaves.	Stems.	*Nitrogen* * Leaves.	Stems.	*Fibre* * Leaves.	Stems.
November ..	14.3	14.9	2.72	1.24	10.8	21.2
December ..	13.5	15.0	2.79	1.22	10.4	23.2
January ..	11.9	14.2	3.34	1.22	9.9	21.8
February ..	15.7	14.3	3.26	1.26	9.6	21.1
March ..	15.9	14.7	3.50	1.28	11.1	23.7

*Percentage in Dry Matter.

The Autumn and Spring Growth of Forage Crops. An experiment was begun in 1931 to ascertain the productivity of certain hardy crops during autumn, winter, and the following spring. The crops were sown on July 23rd, 1931, the first cut was taken on November 17th, 1931, the second on May 24th, 1932. Rye grass stood out as the best crop to make autumn growth, giving 66 cwt. green weight per acre as compared with 23 cwt. for the mean of the cereals. The addition of beans and vetches gave a further improvement in yield. In the spring cutting, barley and rye came much closer to rye grass. In any case the production of these crops was rather small, the best yield in the two cuts being 209 cwt. of green material by rye grass, beans and vetches, wheat and oats singly giving only 72 cwt. each. The addition of leguminous plants markedly increased the protein per acre, the figures being :

	Protein, cwt. per acre. (First cut)
Cereals alone	0.78
Cereals, beans, vetches	3.23
Cereals, trefoil	1.32
Cereals, beans, vetches, trefoil	3.10

INOCULATION OF LEGUMINOUS CROPS

The great success attending Dr. Thornton's investigations into the inoculation of lucerne has caused the Bacteriological Department to turn its attention to the possibility of inoculating clover to see if a more rapid and extensive growth could be obtained, especially on those soils where it does not thrive naturally. Strains of the appropriate organism has been obtained from various localities in America, Holland, Germany and Sweden and their effects on the host plant have been studied ; some are more efficient than others. Some of the selected strains have been supplied to Prof. Stapledon for use on the Welsh hills ; results are already distinctly promising, and fully justify the further search for better strains. The search for a more efficient strain of the lucerne organism is still going on, and it is

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