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## Report for 1929

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## Winter and Home-grown Food for Stock

### Rothamsted Research

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was, indeed, somewhat below the average for the 74 years preceding the fallow, excepting on Plot 10 (sulphate of ammonia only) and Plot 19 (rape cake), where it was above: on most plots, however, the yields are above those on the same ground for 1925. In part, the fall is due to the return of the weeds: *Alopecurus* (black bent) was bad on Plots 10, 11 and 12, and *Alopecurus* and *Stellaria* (chick weed) on Plots 2, 7, 8 and 16. There were few signs of the former serious weeds, *Papaver* (poppy), *Tussilago farfara* (coltsfoot), *Sonchus arvensis* (sow thistle), *Equisetum arvense* (horsetail) and *Cirsium arvense* (thistle). Already, however, they are appearing, and it is more difficult than formerly to cope with them, as we can no longer count on hand-hoeing in spring, owing to shortage of labour.

Typical yields were as follows:—

	Plot No.	Yield before fallow.		Yield after fallow.	
		Average 74 Years 1852-1925.	1925.	1st Year 1928.	2nd Year 1929.
Farmyard manure .. ..	2B	33.5	15.1	48.4	30.0
<i>Artificials.</i>					
Complete (Nitrate of Soda) ..	9	18.8†	16.3	56.1	21.6
„ (Sulphate of Ammonia)	6	21.7	10.1	47.3	17.7
Complete Double Nitrogen:					
(Nitrate of Soda) ..	16	29.9†	21.2	56.1	26.3
(Sulphate of Ammonia)	7	30.4	18.6	67.4*	20.9
No Nitrogen .. ..	5	13.5	6.8	35.2	9.1
No Manure .. ..	3	11.7	6.7	27.9	9.1

† 41 years only, 1885-1925.

\* Estimated from half plot.

The value of the fallow has soon gone, but the fault does not seem to be with the weeds. We are not yet able to give a satisfactory explanation.

#### WINTER FOOD FOR ANIMALS: HOME GROWN FEEDING STUFFS.

The increased number of livestock now kept on the farm enables us to investigate one of the most important of present-day agricultural problems: the provision of cheaper winter food for livestock. The present position is that “starch equivalent” can be purchased for 1d. per lb., while “protein equivalent” costs 1½d. per lb. On the other hand, fertilisers are cheap and are readily converted into foods. At what expenditure on fertilisers can a farmer produce these food substances on his own farm?

The results of the last 10 years' field experiments have shown the kind of increased crop that can reasonably be expected from a dressing of 1cwt. per acre sulphate of ammonia on land where sufficient phosphate and potash is given during the rotation. The composition of the increase is also known. The yields in terms of food units are as follows:—

*Increases expected from 1 cwt. sulphate of ammonia per acre, in presence of sufficient phosphate and potash.*

	Usual increase per 1 cwt. Sulphate of Ammonia.	Protein equivalent per cent.	Starch equivalent per cent.	Produced by 1 cwt. Sulphate of Ammonia.	
				Protein equivalent lb.	Starch equivalent lb.
Potatoes ..	20 cwt.	.6	18	13	405
Mangolds ..	32 „	.4	7	14	250
Swedes ..	20 „	.7	7	16	157
Barley : Grain	6½ bu.	8.5	71	31	258 } 420
Straw	6½ cwt.	.7	23	5	
Oat : Grain	7 bu.	7.6	60	22	176 } 310
Straw	6 cwt.	.9	20	6	
Wheat : Grain	4½ bu.	9.6	72	26	194 } 267
Straw	5 cwt.	.1	13	6	
Meadow Hay ..	9 „	4.6	37	46	374
			Mean	26	312

Barley stands out as one of the most efficient transformers of cheap fertilisers into food: meadow hay runs it closely when 9cwt. additional crop can be obtained without loss of quality by the use of 1cwt. sulphate of ammonia or nitrate of soda: this does not always happen on permanent grass land: the other figures however are usually reached. The average result is that for an expenditure on fertilisers of between 10/- and 20/- it is reasonable to expect a return of

26 lb. protein equivalent, worth about ... 3/2; and  
 312 lb. starch equivalent, worth about ... 26/6.  
 In all, food substance worth about ... 29/8.

During the present season, 1930, we have started experiments on fodder mixtures with the view of finding, if possible, even more efficient transformers of fertilisers into food. Four fodder mixtures are tested, containing beans, peas or vetch, barley or oats: they are:—

1	2	3	4	Seeding per Acre.
Beans.	Beans.	Beans.	Beans.	1 bushel.
Peas.	Peas.	Vetches.	Vetches.	2 bushels.
Barley.	Oats.	Barley.	Oats.	2 bushels.

There are 36 plots of each mixture, devoted to 12 fertiliser treatments, these being combinations of

- 0, 1, 2cwt. per acre sulphate of ammonia.
- 0, 3cwt. per acre superphosphate.
- 0, 1cwt. per acre muriate of potash.

Each treatment is triplicated.