

Canterbury Chamber of Commerce

Agricultural Bulletin

RATIONS FOR STOCK

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BULLETIN

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Note.—This Bulletin is a continuation of No. 37, and the two should be read in conjunction.

In Bulletin No. 37 it was shown how stock feeds could be compared on a common basis, viz., their energy values or starch equivalents. Tables were given showing the relative starch equivalents of the commoner feeding stuffs, and it was explained how these starch equivalents could be used by farmers in deciding what feeds to buy. It was stated further that, even though two feeding stuffs supplied the same amount of starch equivalent, they were not always interchangeable unless the new rations supplied the correct amount of bulk and protein. In compounding a ration one must keep these requirements in mind. It is proposed, in this Bulletin, to state what these are for horses, cattle, and sheep, and to give in further detail mixtures that satisfy them. These mixtures are computed for the animals given as examples, and will necessarily vary with weight, age, and other circumstances.

If the animals are getting some feed off grass paddocks, or if they are doing less work, or are producing less than the stated quantities, amounts different from these usually are, and should be fed. Change in weight is a most important point to keep in mind; under New Zealand conditions it is more or less a common practice to allow animals to lose condition when feed becomes scarce. Fundamentally, it is unsound to do so, but it is often unavoidable.

In changing from a fat to a thin condition an animal may lose 25% of its weight, and since one pound of fat body weight is equivalent to three pounds of starch equivalent, a loss of thirty pounds in a fat sheep supplies sufficient energy for six weeks' feeding, and this explains how animals are able to exist on less than the full ration outlined.

It is not suggested that the starved animals would live six weeks, since the supply of vitamins, minerals and protein obtained from the body would be insufficient to maintain life; but, year after year, animals that are half-starved for three months do exist and produce from their body-substance, as indicated. The effects of underfeeding and mal-nutrition have been pointed out in previous bulletins, numbers 4,

9, and 22. If these facts are borne in mind, the feeder may now use the rations set out below in such quantities as to maintain his animals in the condition that he decides is most profitable. The condition in which it is desired to maintain the animal must be the only guide as to quantities fed.

Rations for Horses.

City cartage contractors use sufficiently large numbers of draught horses to supply dependable feed figures, which provide excellent information about rations. In general, these are in close agreement with the standards laid down by Kellner and other original workers and the following standard amounts for crude protein, starch equivalent and bulk are Kellner's adjusted in accordance with the above experience. The figures for crude protein are slightly lower than Kellner's. For the average draught horse (1400lb weight) the following daily quantities are required:—

	Crude Protein. lb.	Starch Equivalent. lb.	Dry Matter (Bulk). lb.
At light work ..	1.40	11.5	23 to 29
At medium work	1.60	14.5	26 to 33
At heavy work	2.00	18.8	29 to 35

According to these standards a horse getting 34lb of chaff per day will eat about 5½ tons per year.

It will be noted that a horse at medium work eats on an average about 29½lb of dry matter per day. This is equivalent to 34lb of oatsheaf chaff and at that rate a horse eats about 5½ tons per year.

The following alternative rations are based on the dry matter in this amount of feed, but they contain also the crude protein and starch equivalent required by a horse at medium work. The information set out in Table I. of Bulletin 37 is used in the following way. It is there shown that oatsheaf chaff contains 3.87 of crude protein and 36 per cent. of starch equivalent. Therefore 34lb of oatsheaf chaff contains 34 x 3.87 divided by 100lb of protein equal 1.29; and 34 x 36 divided by 100lb of starch equivalent equal 12.2. Throughout the Bulletin the amounts of protein and starch equivalent in every case are calculated in the same way. It is not possible to make satisfactory mixtures of some feed, and in most cases more than one

attempt will have to be made on paper before a satisfactory mixture is arrived at.

Ration.	Amount Fed.	Protein. lb.	Starch Equivalent. lb.
I.—			
34lb	oatsheaf chaff ..	1.29	12.2
II.—			
25lb	oatsheaf chaff ..	.95	9.0
9lb	oats ..	.72	5.2
III.—			
15lb	oatsheaf chaff ..	.57	5.4
6lb	wheat straw ..	.006	.72
12lb	oats ..	.96	7.8
1lb	linseed ..	.20	1.2
		1.736	15.12
IV.—			
15lb	oatsheaf chaff ..	.57	5.4
8lb	wheat straw ..	.008	.96
8lb	barley ..	.52	5.6
2½lb	linseed ..	.50	3.0
		1.60	15.0
V.—			
15lb	hay ..	.81	4.6
4lb	wheat straw ..	—	.5
12lb	oats ..	.96	7.2
2lb	wheat ..	.26	1.4
1lb	molasses ..	—	—
		2.03	14.7

Note—The oatsheaf ration No. 1 is low in both protein and starch equivalent, and increasing these by increasing the amount fed is unsound since more chaff means more bulk. The amount of straw or fibrous feed should not be more than 20lb and 34lb of oatsheaf chaff contains about this amount. For hard work straw should be reduced below 20lb. Each of the rations set out above is interchangeable pound for pound with every other one, but it is not suggested that horses now being fed on oatsheaf alone can be changed over abruptly to a ration of straw chaff and barley, without disturbance. If the change is made gradually, it is possible to substitute the new ration for the old over a period of, say, three weeks, and the substitution can always be arrested should the new ration prove unsatisfactory.

The question next arises whether it is worth while going to the trouble of making such a change. This is entirely a matter of circumstances. If it is necessary to buy oats and oatsheaf chaff at a cost in the feedroom of 3s 6d per bushel and £4 10s per ton, ration No. II. costs 1s 9d per horse per day. On the other hand, if some home-grown straw can be used at 2s per ton with barley bought at 3s per bushel and linseed bought at £8 per ton, and oat-

sheaf chaff as before, the cost of ration IV. is about 1s 4½d per horse per day. By feeding a team of six horses on No. IV. instead of No. II., a saving of 17s 6d per week could be effected. The matter is, however, one for every individual to consider, and for that reason the daily ration costs have not been worked out. It will be evident that in some circumstances oats and oatsheaf chaff are the cheapest ration, whereas in others some alternative rations will be cheaper. Much will depend on what the user has available on his farm.

Cow Rations.

Here again the condition in which it is desired to maintain the cows determines the amounts fed. Quantities are as follows for cows of a 1000lb live weight:

	Crude Protein. lb.	Starch Equiva- lent. lb.	Dry Matter. lb.
Dry cow main- tenance ..	.75	6.0	15 to 21
Cow giving one gallon ..	1.25	9.0	22 to 27
Cow giving two gallons ..	1.75	12.0	25 to 29
Cow giving three gallons ..	2.25	15.0	27 to 33

In-calf cows require a little more than maintenance, so the proportions, though not the quantities set out for horses are almost correct for cows. About one half of the horse ration, that is, 17lb of feed, will just keep cows improving. In addition to the half horse rations, the following supply sufficient bulk of protein and starch equivalent.

RATIONS FOR DRY IN-CALF COWS.

	Crude Protein. lb.	Starch Equivalent. lb.
VI.—		
40lb mangels ..	.28	2.4
12lb average hay ..	.64	3.7
	.92	6.1
VII.—		
60lb soft turnips ..	.36	2.64
12lb oat and tare hay ..	.78	3.60
	1.14	6.24
VIII.—		
40lb swedes ..	.44	2.92
10lb oat straw ..	.10	1.90
2lb barley ..	.13	1.42
	.67	6.24
IX.—		
10lb wheat straw ..	.01	1.2
6lb oats ..	.48	3.6
1lb linseed ..	.20	1.2
	.69	6.0
X.—		
12lb oat straw ..	.12	2.4
4lb barley ..	.26	2.8
1lb meat meal ..	.50	.95
	.88	6.1

Note: The protein in No. VII. is in excess but not to the extent of being harmful.

Mixing the correct rations for cows is more difficult when the cows are at pasture, since they get some feed off the grass. Cows will eat normally to satisfy their requirements of bulk, but if these amounts fail to satisfy the crude protein or starch equivalent requirements, the cows lose condition or continue to eat until excessive bulk has

been taken in. If this is done, waste must occur. With cows at grass it is safe to feed mixtures such as those detailed above, but in lesser quantities. If the grass is young and growing, it will be richer in protein and so the mixtures fed can afford to be poorer in protein. Thus, cows will winter satisfactorily and maintain their condition on straw and meat meal when there is some growing grass. If they get half a pound of meat meal per day, and eat 12 pounds of straw daily, the total ration would be as follows:—

	Crude Protein. lb.	Starch Equivalent. lb.
XI.—		
35lb green grass ..	.58	3.94
12lb wheat straw ..	.01	1.44
¾lb meat meal ..	.25	.47
	.84	5.85

On the other hand if the grass is long and stemmy the cows will not winter well on this ration, and some grain is necessary along with the meat meal.

Rations for Milking Cows.

As a rule milking cows are fed on grass, and when this is abundant it is usually unnecessary to use other foods, except, perhaps, a few pounds of hay in the early season. For winter milkers the following ration is suitable for cows giving three gallons of milk per day. For January and February in dry periods Ration XIV. will provide feed which will prevent the cows' milk yield declining; or a ration consisting of 80 to 100lb of turnips with hay if the grass is very short will suffice:—

	Cr. Protein. lb.	Starch equivalent. lb.
XII.—		
14lb swedes ..	.44	2.92
15lb hay ..	.81	4.70
5lb bran ..	.55	2.25
9lb oats ..	.72	5.4
	2.52	15.27
XIII.—		
80lb silage ..	1.60	10.4
15lb hay ..	.81	4.7
	2.41	15.1
XIV.—		
120lb silage ..	2.40	15.6

As with horses, excess of fibre is harmful with milking cows. A cow cannot take more than nine and a half pounds of indigestible material, and when she receives this amount her yield is limited to about one gallon per day, no matter how rich the remaining feed is. Twenty pounds of straw, 30lb of good hay, or 180lb of green grass contain about 9½lb of indigestible matter.

Rations for Hoggets.

The requirements for hoggets are perfectly satisfied by average pasture and green growing crops as regards protein and starch equivalent. But inadequate mineral supplies or absence of protein variety in crops such as green oats or red clover, when these crops are fed exclusively, cause them to be unsatisfactory. Mixtures of dry feeds that are suitable are as follows:—

XV.—			
Hay 15lb ..	.81		4.6
Peas 5lb ..	.39		1.4
	1.20		6.0
XVI.—			
Oatsheaf chaff 7lb ..	.27		2.5
Peas 5lb ..	.97		3.5
	1.24		6.0
XVII.—			
12lb good hay ..	1.14		6.0
XVIII.—			
Oat straw 8lb ..	.08		1.6
Bran 2lb ..	.22		0.9
Oats 2lb ..	.16		1.2
Wheat 2lb ..	.26		1.4
Meat meal 1lb ..	.50		0.9
	1.22		6.0

The amounts set out above are full feeds per head per week, but it is seldom necessary to feed more than ½lb per head per day of any mixture, and the amount actually fed will be decided by the amount of paddock feed. With hoggets on turnips a mixture richer even than these should be used. Where sheep get as much turnips as they will eat, meat meal alone is probably the best addition that could be made to their feed, since turnips supply only about two-thirds of the crude protein that is required.

Mixtures for in-Lamb Ewes.

These do not require to be so rich in crude protein as those for hoggets, and consequently a wider range of feeds may be used. Mixtures that supply the weekly requirements as follows:—

	Crude protein. lb.	Starch equivalent. lb.
XIX.—		
Oatsheaf chaff 16lb ..	.60	5.75
Peas 3lb ..	.58	2.07
Wheat 5lb ..	.51	3.60
	1.69	11.42
XX.—		
Oat straw chaff 15lb ..	.1	3.0
Bran 5lb ..	.65	2.2
Barley 5lb ..	.32	3.5
M.M. 1lb ..	.50	.9
Oats 2lb ..	.16	1.2
	1.73	10.8

As with every other class of stock, the amount fed will depend upon the amount of paddock feed. Where this is turnips it will not be necessary to vary the composition of the mixture with the length of time allowed per day on turnips.

No reference has been made to mineral requirements of animals throughout this bulletin, but the importance of minerals cannot be overlooked, especially in winter and when dry feeds are being used. They have been dealt with in Bulletin No. 6.

It is realised that the matter in the tables is a little difficult to understand unless one is accustomed to it, although in England and Denmark such tables form the basis of feeding practice. Any farmer who is in doubt about his calculations can have his figures checked up by applying to Canterbury Agricultural College.

Copies of this bulletin may be obtained from the Secretary, Canterbury Chamber of Commerce, P.O. Box 187, Christchurch.