THE MANAGEMENT AND UTILIZATION OF PASTURE BY PIGS

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The New Zealand farmer who breeds pigs tends to place either too much emphasis upon the value of pasture, with rather dire effects, or too little, with the result that he deprives himself of a valuable addition to his basic feed supply. In this paper an attempt will be made to assess the value of pasture in the New Zealand pig keeping economy over the whole production cycle from the mating of the sow to the marketing of the finished product.

The feed costs of producing a pork or bacon carcase commence when the sow is mated. The feed eaten by the sow during pregnancy and during lactation plus that eaten by the litter while suckling is refered to as sow overhead. This feed cost must be debited to the litter. After weaning, each pig has a personal feed requirement or fattening cost.

There are thus two distinct phases in the production of a marketable carcase-the feed required to produce a weaner, which is the sow overhead cost, and that required to raise the weaner to pork or bacon—the fattening cost.

In the first part of this paper an attempt will be made to evaluate the part pasture can play in reducing the amount of dairy by-products and meal needed:

(1) To produce a weaner pig, and

(2) To raise a weaner to market weight.

THE EFFECT OF PASTURE ON SOW OVERHEAD

Under American dry-lot conditions, where sows are kept on bare paddocks or upon concrete, it is estimated that 2901b. of meal are required to produce- a weaner pig (litters of six pigs). Under New Zealand conditions, where sows are allowed access to pasture during pregnancy and lactation, this cost is reduced to 160 feed units.

The recommended method of feeding a pregnant

sow in this country when good pasture is available is as follows :

1st four weeks	6	units per day	168
2nd four weeks	3	„ „ „	84
8-14 weeks	2	„ „ „	84
14-16 weeks	4	„ „ „	56
			392 units

During lactation it is recommended that a sow with six pigs should receive eight units per day for 56 days and that the piglets will eat 20 units each from the creep--an additional 568 units. The grand total of 960 units for a litter of six pigs represents a sow overhead of 160 units per pig weaned.

It is possible, however, to reduce this overhead quite substantially when sows wean in relatively good condition by feeding solely upon pasture for periods up to a month in the middle of pregnancy, before rapid growth of the litter "in utero" commences. We have many records of sows at Ruakura which have eaten less than 290 units during pregnancy and weaned first-class litters subsequently.

On the other hand many New. Zealand farmers rely far too much on pasture as a sow feed during pregnancy and put weaned sows straight out to grass with the boar. Ballinger's work (1) has shown the folly of this system-sows failing to come in season, or failing to hold to the boar, or in the last resort, aborting about one month before due farrowing date. A recent survey of above average farms, in the course of which data were collected on, the reproductive efficiency of sows, showed that:

(1) On the average, sows produced, only 1.5 to 1.8 litters per year instead of the possible two.
(2) Farrowings were spread evenly throughout the year despite the fact that the farmers concerned expressed a preference for compact late winter and early summer farrowings.

There appears no doubt that in abusing sows by allowing them no feed but pasture, especially during the early post-weaning period, the reproductive efficiency of a sow herd is materially reduced. The net result on the farm is too few pigs on hand to drink milk throughout the season, leading to the wastage of feed and over-fat, overheavy bacon.

During lactation it is recommended that sows be allowed access to pasture for a period of an hour in the morning and an hour in the afternoon. It is probable that the grass eaten at this time is of small value as

a source of nutrients, but of great value as a source of vitamins. American workers (2) have found that the Vitamin A content of the milk of sows on pasture is 50 per cent. higher than the milk of sows kept in dry-lot. The litter, on the other hand, spends most of its time playing or eating soil.

THE USE OF PASTURE OVER THE. FATTENING PERIOD

Numerous experiments have been conducted **overseas** and in New Zealand (3), (4), (5), but the results have not shown any substantial food savings by allowing fattening pigs access to pasture. An experiment carried out at Ruakura in 1953 is fairly representative of the type of results obtained elsewhere on this phase of pasture utilisation,

Group	Weight Range (lb.)	Treatment: Grazed A — Units Per lb. Gain	Treatment: No Grazing B — Units Per lb. Gain
1	40-100		2.6
	101-160	3.33	3.24
	40-160	3.08	3.03
2	40-100	2.47	2.56
	101-160	3.35	3.32
	40-160	3.07	3.02

The conditions under which this experiment was run were not ideal. The grass growth was reasonably good in October, but dry weather over the last two months while the pigs were growing from 110 to 160 lb. led to poor pasture production over this period of the experiment. However, there appears to **be some** hope of achieving a small saving of milk during the period of the year when pasture growth is good. It is intended to continue this investigation when the programme of work at present under way is completed.

There is evidence that the general health of fattening pigs can be improved by allowing occasional access to pasture after weaning. At Ruakura we have found that litters which scour persistently during fattening can be helped considerably by being grazed twice each week.. There is every reason to **believe that pigs** being taken to bacon weights can benefit by hav-

ing -access to pasture. Separated milk, which on many farms is the sole ration for fattening pigs, has had. all the Vitamins A and D removed in the butterfat. The fattening pig is, therefore, entirely dependent upon the vitamins stored in its liver-vitamins ingested while on the sow. Should the fattening period be extended much beyond four months, there is a distinct chance. that the vitamin storage will, be exhausted and that resistance to various bacterial infections will be reduced to such an extent that losses through disease will occur. This situation exists on many farms where bare dirt pens pass for grass paddocks and no green feed is available within the piggery fence.

To summarise the information we have on the part pasture can play in reducing feed costs: the pregnant sow can obtain a substantial proportion of her feed requirements from grass but should be well fed after weaning, at least until proven in pig. By weaning sows on to a ration of grass alone the reproductive efficiency of a herd can be greatly reduced. The lactating sow probably obtains very little direct nutrients from grass since she is full fed a production ration of milk or meal. Grass does, however, have an effect upon the vitamin content of her milk.

The fattening pig can, even under favourable conditions, make only limited use of pasture as a source of nutrients especially when fed on separated milk which is so bulky as to reduce the appetite for grass to a minimum. There is evidence, however, that an occasional run out to pasture will help to keep a fattening pig healthy.

'THE FULL EXPLOITATION OF THE VALUE OF PASTURE

The second part of this paper is concerned with the fuller exploitation of grass. At Ruakura we consider that pasture can play a much more important part' in pig-keeping' economy. than it has in the past. We realise that a tremendous amount of systematic work needs to be done to objectively establish the true potential of this factor in pig production. However; some progress has been made.

'First, it must be realised that much of the feed requirement of the pregnant sow is expended in'en-, abling her to regain the condition she has lost during the previous lactation. Lactating sows fed on separated milk will lose up to 120 lb. of bodyweight while suckling large litters. This condition must be rebuilt if reproductive efficiency is to be maintained; If 'a

system of production can be devised whereby the sow loses little, if any, weight during lactation; the' overhead feed costs of the subsequent pregnancy could be considerably reduced and pasture exploited more 'fully. Such a system is now- available in the early weaning technique developed overseas, principally in America and recently adapted to local conditions at Ruakura.

By this method the litter is removed from the sow at one week of age and hand fed from this age to market weight. By removing the piglets at seven days of age, the sow is relieved of the burden of lactation and, in consequence, loses little, if any, real body weight following farrowing. When weaned, such a sow can be fed as follows:

First week	2 units per day	*14 units*
1-3 weeks	4 „ „ „	'56 „
3-6 weeks	2 - „ „	„42 „
6-16 weeks	Grass	
16-18 weeks	„ 4 units per day	56 „
		168 units

The total feed requirement during gestation can, therefore, be reduced from 390 to 168 feed units and pasture feeding exploited more fully. Incidental to this system is the more efficient use the piglets make of food fed directly to them rather than through the sow. The total gain in efficiency of feed usage by adopting the early weaning system is in the vicinity of 23 per cent.

The question inevitably arises "What are the relative economics of allowing pigs to eat grass that would otherwise be available to cows?" Ballinger's work (6) 'indicated that a sow will eat about 25 lb. of green matter per day. With better pastures the intake is probably higher than this. A cow will eat up to 130 lb. of green matter per day so it can be claimed that 4 to 4½ sows could be run in place of one cow. By feeding sows on pasture approximately 130 feed units are saved per pig weaned; Ruakura figures indicate that the feed cost of producing a pound of pork is 4.2 units, taking both sow overhead and fattening costs into consideration. Each 130 units saved, therefore, represents an additional 30lb of pork. For four sows producing six pigs each, twice in the year, the total extra pork production is 1,440lb., which at 1/6 per lb. represents an extra return of £108. This, return is rather better than could be expected from the average cow *in* twelve months. The questions that really concern

us, however, are how to establish, maintain and control suitable pig pasture and how to utilise it to the fullest possible extent.

THE TYPE OF PASTURE FOR THE PIGGERY

At Ruakura we are using pastures of perennial ryegrass, red and white clovers, perennial ryegrass and H.l. plus clovers and, more recently, a pure stand of H.l. and clover. Our observations are that H.l. is much more palatable than perennial and the growth habit fits the piggery needs more closely than that of perennial. We consider that in August, September and October, when grass is growing rapidly, grass plus clover is an ideal feed for sows. Once grass growth slows down clover alone is the ideal feed since at this time of the year sows will chew ryegrass, extract the juice and spit out the fibre in large shredded chunks.

Our aim, therefore, is to use a grass which will produce heavily in the winter and early spring and then cease to compete with the clover. In order to. obtain a clover dominant sward from November on the ratio of clover to grass must be high at all times of the year.

It is a generally held belief that clover will not thrive in pig paddocks, and that after a very few years clover will disappear altogether. There are several steps leading to the absence of clover on the general run of pig pens. If pigs are allowed out on pasture in all weathers the clover will be weakened by continual. tramping. For a while the ryegrass will thrive under this treatment, but eventually becomes soiled, clumpy and unpalatable and then shades whatever clover remains. The pigs finding the ryegrass unpalatable will then select the remaining clover and even dig out the rhizomes and so finally destroy it. If this process is allowed to continue to 'its logical conclusion the pen will finish up as a mud-lot which, if spelled for any length of time, will provide a pleasant looking, but generally useless, growth of annuals, such as *Poa* annua or barley grass. However, it is possible to develop high yielding mixed swards under proper management. At Ruakura, individual pens are provided for lactating sows and access to them is allowed twice each day, an hour in the morning and an hour in the afternoon. A lactating sow is already fairly fully fed on a productive ration of milk or milk and meal and. her appetite for grass is small. Our observations. indicate that she will graze effectively for about two hours per day whereas a pregnant sow will graze for six to eight

hours. If allowed to remain in the pen for periods above an hour she loses interest in grazing and seeks to dig holes, ably supported by her litter. Once a hole is dug, an operation which takes an undisturbed sow about an hour, it takes six months to satisfactorily regrass the area.

Further, if the sow is allowed to lie about in the paddock, the litter will suckle her there. To obtain maximum litter weight at weaning the litter should visit the creep after each suckling. If they suckle in the paddock they will not bother to return to the house in order to eat supplementary food. The lactating sow, therefore, if allowed ad lib access to a grass pen, will soon destroy the grass cover and the litter will be discouraged from taking their full quota of supplementary feed.

From experience gained over the last three years we suggest that five farrowing houses be placed. in a paddock of about ¼ acre and that the lactating sows be grazed with the electric fence as a group, one litter being allowed out each day. By this method much better pasture control can be obtained.

The management of pregnant sows is much simpler than that of lactating sows. These sows may be dealt with as a herd in much the same way as cows, and their grazing controlled with the electric fence. It is perhaps appropriate at this stage to discuss the advisability of using strip grazing as against paddock grazing for pigs. There are several points to be considered. With small paddocks and rapid changes on firm ground paddock grazipg is satisfactory., Small paddocks do, however, have disadvantage%. In the spring it is not possible to fully control growth- on the area which is needed in the summer and autumn. The logical thing to do is to use larger paddocks and make silage from the excess growth in the spring. In this *way,* some of the fertility which is being transferred from the rest of the farm to the piggery 'area in the form of separated milk can be taken back. If paddocks are large, the grass tends to become soiled by being subjected to grazing over a lengthy period, and when the soil is soft, pugging over this period can depress clover growth. By reducing the area; that is, by break grazing, any tendency for selective grazing is reduced. Selection by a pig does not merely involve biting off the selected species, in this case clover, but in its eventual uprooting and destruction.

To give some idea of the possibilities of pasture utilisation by dry sows the present' carrying capacity

at -the Ruakura piggery may be quoted. At the present time we, are running 56 sows on an area of 2.8 acres. These sows are in varying stages of mating or pregnancy. Thirty-seven of them are receiving no feed but grass. On present indications approximately one acre of this area will have to be cut for silage once farrowing starts in the. middle of October. We consider that by the. introduction of more H.l. and a better balance of ryegrass and clover this production cgn be improved.

For the winter the use of autumn-saved pasture is just as. essential. as on the dairy farm proper. In addition; grass silage can play an important part in providing a part of the maintenance of a pregnant sow; Up to 14 lb. of silage can be eaten per day by a sow, representing approximately one meal unit. This, plus crops which may also be break fed, thus reducing harvesting costs, can help to reduce the milk and meal requirements of sows during pregnancy in the winter';

SUMMARY

1. By the proper utilisation of pasture the milk and meal required to produce a weaner pig can be substantially reduced below that required in overseas countries under dry-lot conditions.
2. It is estimated that the feed saved per pig weaned by feeding pregnant and lactating sows on pasture is in the vicinity of 130 feed units.
3. The weight lost during the'previous lactation must be rebuilt in the early stages of mating and pregnancy if the reproductive efficiency of a sow herd is to be maintained. Grass is, therefore, not suitable as the sole ration of pregnant sows.
4. The lactating sow probably obtains little- useful nutrient from pasture, but does obtain. vitamins through grazing. These vitamins are important in the maintenance of the health of the litter after weaning.
5. A small reduction in the milk and -meal requirement of fattening pigs can be achieved under- favourable conditions of pasture growth. Here again. grass is important as a source of vitamins.
6. Methods of grass utilisation are discussed.

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DISCUSSION

Q. (Lynch) : Could pigs be grazed over the farm as a whole ?
A. Fencing is one difficulty. Leptospirosis may be spread to cows by pigs. Also the management of the pigs would deteriorate. They should be under the farmer's eye.
Q. What is a litter fed on after early weaning?
A. A milk substitute.
Q. (Dr Mitchell) : What should be the relationship of numbers of cows to pigs ?
To make full use of skim milk, 1 sow to 8 cows.
; : What is the mortality rate of early weaned pigs ?
No greater than later weaned, but they haven't got the same bloom.
Q. What is an economic amount of land to devote to pig grazing ?
A. On a 60-acre dairy farm have 2 acres in 4 fields for pig grazing. This area can be run efficiently with minimum labour. In my slides you may have noticed the electric fence we use at Ruakura. It can be shifted in 5 minutes, and gives perfect control of pigs.
Q. What pasture species should be used?
A. We are now using a mixture of H.1., red and white clovers, which I consider to be ideal. H.l is much more palatable in spring and fades in the summer when clovers are the desirable plants.