POTENTIAL AND PROBLEMS FOR RABBIT PRODUCTION IN AUSTRALIA

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SUMMARY

Rabbits have enormous reproductive and growth potentials which have yet to be harnessed in developed countries in the form of a profitable rabbit meat industry. Nevertheless, since rabbits do not compete for feedstuffs used for traditional livestock, there is an opportunity to develop a rabbit meat enterprise. The potential for a rabbit industry in Australia is discussed in relation to experience overseas and production problems such as disease, particularly myxomatosis.

INTRODUCTION

Commercial rabbit farming in most states in Australia is banned. In Victoria a producer can maintain 9 rabbits without a licence and 30 rabbits with a licence. In 1977 the New South Wales Government issued a permit under the Pastures Protection Act to establish a rabbit farm at Broken Hill to produce initially 500,000 animals at any one time. One condition of this licence was that rabbits would not be immunised against myxomatosis with fibroma or some other agent. Mr. Charles Blunt, the then Livestock Secretary of the N.S.W. Graziers' Association issued a statement opposing the licence on the basis that these rabbits would erode the effectiveness of control measures already implemented. The opposition to rabbit farming by the grazing community is understandable but the real reasons are uncertain. The introduction of an alternative meat source is a challenge, and perhaps a threat, to the traditional domestic meat species. From the point of view of the Australian consumer, such competition can only be applauded.

Rabbit farming in many parts of the world is becoming an important industry. In Spain for example, production of meat from rabbits (110 million kg) in 1978 was similar to that from sheep (De Blas *et al.* 1981). In France per capita consumption in 1974 exceeded 6 kg (Parkin 1974). The object of this paper is not to review all aspects of rabbit production but to highlight some important aspects in relation to its potential in Australia.

POTENTIAL AND SOME GENERAL OBSERVATIONS

Of all the species of livestock domesticated by man, the farmed rabbit may have the greatest potential for meat production. Since the gestation period is 31 d and the young are often weaned at 28 d of age, in theory one doe can produce ten litters (6-10 kits) each year. It is possible for the litter to be weaned 3 d before the doe kindles and is immediately mated (post-partum mating). Although this system is not yet used in commercial practice, it demonstrates the enormous potential for the production of rabbit meat. Under such a system a doe (3-4 kg) could produce 80 kg of dressed rabbit per year. A particularly attractive aspect of rabbit production is that it need not compete with man nor directly with traditional species used in the intensive animal industry for feed sources.

The two most common commercial breeds are the New Zealand White and the Californian; these may be crossed to produce the White Pearl (Californian buck x New Zealand doe). Growth rate of fryer rabbits may reach 40 g/d during the 4-8 week growth period. Other breeds and their crosses are currently being studied (Lukefahr *et al.* 1980, 1981), particularly in relation to the use of bucks from giant breeds crossed with does from smaller breeds. Litter size is about 8 to 10

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kits but there is often high mortality (25%) and average weaning numbers are 5 or 6. Weaning occurs between three and five weeks of age. The doe is usually mated 10-15 days after kindling, and there is usually one buck per 10 breeding does.

The chemical composition of rabbit meat shows that the fat content is 75 g/kg and largely unsaturated with a cholesterol content of 1.39 g/kg. Sodium content is only 393 mg/kg (Rao et al. 1979). Of all the commonly used meats, rabbit meat is probably the most suitable for human consumption. Carcass yield of fryers ranges from 50-56% of liveweight (Lukefahr et al. 1981).

DIGESTION

The rabbit is a hind gut fermenting herbivore. The fermentation is confined largely to the caecum which constitutes about 50% of the total capacity of the alimentary tract (Portsmouth 1977). At about 3 weeks of age the rabbit starts to ingest a soft faeces direct from its annus (coprophagy) without mastication. These soft faeces consist of a bacterial concentrate within a mucus envelope (Hörnicke 1977). It was found that a 1 kg weanling rabbit produced 28 g of soft faeces containing 1.3 g of true protein (Spreadbury 1978). However the diet contained only 8% crude fibre and thus the estimate of protein in soft faeces is probably low. Despite its large caecum, the rabbit's ability to digest dietary fibre in lucerne meal is only 16% (Slade and Hintz 1969). On the other hand, Parker (1976) estimated that volatile fatty acids from microbial fermentation in the caecum of the rabbit contributed 30% to the rabbit's maintenance energy requirement.

NUTRITIONAL REQUIREMENTS

Dietary fibre

Although the rabbit is unable to digest fibre to the same extent as some other hindgut fermentors, fibre is a dietetic requirement for its general well-being, particularly in reducing enteritis (Cheeke and Patton 1980). On the other hand, recent observations suggest that high levels of crude fibre (22%) may also cause mucoid enteritis (Patton and Cheeke 1981). Although lucerne hay or meal is a major source of roughage in rabbit diets and rabbits can grow at 36 g/day on a diet of 90% lucerne meal, there are several other useful forage sources (Cheeke 1981).

Growth

The nutrient requirements of the rabbit have been published by the NRC (1977) and more recently by Lebas (cited by Cheeke and Patton 1981). These requirements are closely related to digestible energy (DE) concentration. Both Lebas (cited by Cheeke and Patton 1981) and Spreadbury (1978) recommend a similar dietary crude protein of 150 g/kg for growth, but lysine and sulphur amino acid allowances differ. Spreadbury (1978) found that lysine and sulphur amino acids were 9.4 and 6.2 g/kg diet while Lebas recommended 6 and 5 g respectively. Spreadbury's diet contained 13 MJ DE/kg and Lebas's only 10.5. The requirement by the growing rabbit for arginine is only 6 g/kg diet (Lang 1981a). Clearly protein and amino acid allowances are related to the amount of soft faeces recycled which is in turn probably related to dietary fibre content.

Rabbits appear to be able to adjust their food intake to achieve a fairly constant DE intake (Cheeke 1981). Evans (1981) compared levels of both energy and crude fibre in diets; although rabbits grown from 4 to 10 weeks of age grew faster on a high energy (15 MJ DE/kg) than on a low energy (13.8 MJ DE/kg) diet, diets high (128 g/kg) in crude fibre supported better growth than those low in crude fibre (103 g/kg). Feed efficiencies ranged from 2.0 to 2.3. De Blas et al. (1981) suggested that the optimum DE to crude protein (g) ratio was 98 kJ for growing rabbits which is slightly higher than 83 kJ found by Spreadbury (1978). Because of caecal synthesis and coprophagy the rabbit's dietary requirements for B vitamins are low.

Lactation

The young are suckled once per d for only about 5 min. The doe can produce about 280 g of milk containing about 3 MJ of gross energy. Lukefahr et al. (1981) reported average production of 180 g/d for New Zealand White does during the first three weeks of lactation, with a peak yield of 228 g/d. It can be calculated that the doe will need about 32 g/d of additional protein of high biological value to meet the needs of peak lactation. Lebas (cited by Cheeke and Patton 1981) suggested that the diet contain per kg: 180 g crude protein, 7.5 g lysine, and 11.3 MJ of DE. This would represent an intake of about 400 g/d during the first three weeks of lactation. A typical all-purpose rabbit diet is shown in Table 1.

TABLE 1 A typical rabbit diet (OSU No. 1) suitable for does and for weaned rabbits recommended by Oregon State University Rabbit Research Centre

	g/kg
Suncured lucerne	540
Soybean meal	210
Wheat mill run	200
Molasses	30
Tallow	12.5
Trace mineralized salt	5
Dicalcium phosphate	2.5
Bentonite (pellet binder)	18

Composition (g/kg): crude protein 216 g; crude fibre 154 g; calcium 8.4 g; phosphorous 5.2 g; digestible energy 10.8 MJ/kg.

DISEASE

Mortality in farmed rabbits can be high. Estimates of between 15 and 40% have been suggested for rabbits between birth and weaning (Lang 1981b). In commercial units about 20% of mortality is considered to be average for all fryers born (Cheeke and Patton 1981). The three most common diseases in rabbit production are enteritis, pasteurellosis and a "young doe syndrome" (Patton and Cheeke 1980). In Australia potentially the greatest disease problem is myxomatosis.

Sobey (1981) reviewed the problem of protecting the domestic rabbit against myxomatosis, particularly with Shope's fibroma virus. Following a visit to Australia in 1962, Dr. R.E. Shope stated that in his opinion fibroma virus as presently used to protect domestic rabbits in commercial rabbitries against myxomatosis constituted a hazard of unknown magnitude. Despite this, fibroma was used on a large scale to vaccinate domestic rabbits in France without any noticeable protection to the wild rabbit population. Sobey (1981) concluded that "It is my personal opinion that one would not be able to successfully establish fibroma in a field population of wild rabbits even with considerable effort". It appears the fear of unimmunised rabbits transmitting the live virus to wild rabbits and thereby affording protection against myxomatosis is without scientific documentation. Sobey (1981) also suggested that a highly attenuated variant of the North American Californian type myxomer virus, which is regarded not to be transmissable from rabbit to rabbit, could be used to protect farmed rabbit against myxomatosis.

CONCLUDING REMARKS

The rabbit industry has not been particularly viable in developed countries. In the United States the industry appears to lack profit potential (Enos et al. 1979). In Britain it is known as the "18 months industry" (Parkin 1974) because of lack of profit. Compared with the poultry industry, the rabbit industry is in its infancy and there is opportunity for real progress to be made in all areas of production, management, disease, breeding and nutrition (Enos et al. 1979).

It would seem logical that in Australia rabbit production must commence as a small farm enterprise. Present technology does not allow viable large production units; it is not surprising that the licence granted to farm rabbits cn a large scale at Broken Hill was not taken up. Existing buildings could be easily converted to house rabbits and because rabbit farming is still labour intensive it would be undertaken as a side line to a major enterprise. Moreover a stable and predictable demand must be created before a rabbit industry can be established on a firm basis. Since feed costs are at least 70% of the total cost of production it is essential that low-cost diets are designed incorporating ingredients that do not generally compete with the intensive animal industry. These diets would probably be high in herbage or conserved forage since it has been shown that rabbits can utilize such material efficiently, particularly the protein fraction. The need is to identify and test low-cost ingredients and feed by-products that may be used successfully in rabbit diets. Finally, the immediate need is to demonstrate unequivocally that the domestic rabbit does not pose a threat to the grazing community. It is unlikely to survive, let alone to reproduce in the wild. The vexed question of the use of a live virus to immunise farmed rabbits against myxomatosis must be resolved. It seems that opposition to both of these questions is without scientific support.

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