

NEW BREEDS OF SHEEP : EVALUATION PRE AND POST IMPORTATION

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SUMMARY

Selection of candidate breeds for importation is generally straightforward, being based on productive attributes. Assessment of individuals available prior to import is often more difficult due to few animals and limited objective information being available. Comprehensive evaluations involving many sire groups and large numbers of animals within quarantine are very expensive and are only possible if funding is forthcoming from non-commercial sources. Measurements of carcasses of surplus males and of wool criteria are more easily accommodated. Following the release of animals from quarantine, innovative producers will undertake their own evaluations, but there is still a need for inputs from R&D to assess selection responses for the development of predictive capability for breeding programmes.

INTRODUCTION

The importation of new breeds of sheep which have productive attributes not present in a country's existing sheep population is one of the simplest ways to catalyse a productive change within the industry. Many millions of dollars have been spent in comprehensive genetic research programmes, and now there is a major push to emphasise the possibilities that the new genetic technologies will provide for the animal industries. Within-flock selection, and in the last three decades large scale "open nucleus" programmes, have had considerable emphasis. The search for major genes in populations where a few uniquely productive animals may have their productive superiority simply inherited has also intensified.

The screening of very large numbers of animals is very expensive but must be strongly supported in the future. There is a danger that research funders will progressively view such approaches as "not very scientific" and will divert their funds to other areas of resolve which may be considered as "good science" but in comparison have only a fraction of the potential to contribute to increasing animal production and hopefully therefore to the national prosperity.

In situations where animals in other countries are clearly much more productive than those on which existing industries are based and which may have the potential to fit into existing or modified production systems then the case for funding for their introduction from Government or industry research funding sources is very strong. Very often it may be of much higher relevance than many research programmes which offer at best only marginal increases in production and then to only limited sectors of industry. Unfortunately such funding from research sources is usually not now forthcoming, and in addition the veterinary and political difficulties involved often seem to conspire to reduce enthusiasm for involvement in such activities. The importation of the Texel (TX), the Finnish Landrace (FL), the Awassi (AW) are good examples of existing recent importations which offer considerable opportunities to the New Zealand and Australian sheep industries. The East Friesian (EF) is the most productive milking breed in the world. Assuming that it is imported and becomes available, it will also be very valuable in both New Zealand and Australia, both as a component of a high fecundity meat dam but also as the basis of milking industries.

New Zealand and Australia have a very limited sample of the available sheep breeds in the world. The breeds that we do have are a result of the choices made by our European colonisers, their choices having been based on their own previous experience. The health requirements for the importation of sheep to both countries in the 1800's and in the early 1900's were non-existent or minimal at best. Consequently it is surprising that more diseases have not been inadvertently introduced in the past. As the Government veterinary service has built up in both countries, and the producer organisations have become better informed and also more politically active, it is now very much more difficult to gain the necessary health protocols and the industry support to allow introductions. With outbreaks of scrapie in New Zealand in 1952 and 1954, and suspected cases again in quarantine with imported sheep in 1976 and 1978, the subsequent health protocols which allow importation are logically very rigorous and conservative.

The experiences with the importations of sheep (and cattle) to New Zealand over the past 7-8 years, and experimentation on scrapie transmission carried out in the United States have however resulted in the attitudes of government and industry changing to one of rigorously managed, albeit minor, risk.

IMPORTATIONS

The importations undertaken in the last 15 years have been of animals with productive characteristics presently not available within the New Zealand flock, ie, body size and growth rate (Oxford Down, OD, Suffolk, S), fecundity (FL), milk production and fecundity (EF), leanness, body shape and muscling (TX), pelt quality (Gotland Pelt, GP), and fat-tailed (AW and Karakul, K). Some of these breeds have still not been cleared through their respective quarantine programmes, and there are still some breeds which would be very interesting from a productive point of view.

PRE-ENTRY EVALUATION

Animal Health

By far the most difficult part of any importation is the derivation of a protocol which requires the developmental inputs from the Ministry of Agriculture & Fisheries but also the negotiation of the protocol with various groups within the agricultural industry prior to approval. Considerations in this area have been covered in an earlier paper from Dr O'Hara.

Genetic spread

In the selection of animals for importation it is critical to sample as widely within the population as possible. Usually pedigree information is available and it is possible to obtain animals or genetic material from a number of families, which have been maintained as separate line, and also to obtain sheep from a number of breeders. Some importations have been of a very small number of animals and therefore the genetic spread has been limited. Factors which contribute to a limited sample of animals (or embryos or semen) may be:

- a) only a small sample of animals available from which to choose. This can be due to a small total population of animals in the source country, or only a small number of animals meeting the "flock of origin" criteria required in a health protocol.
- b) the economics of the importation allow only a small number of animals to be imported, ie, there is simply not enough money available to allow the purchase, transport and ultimate quarantine of a larger number.

- c) the availability of effective multiplication techniques such as embryo transfer, embryo splitting and artificial insemination may determine that only a small sample is required to achieve a goal of a much larger number of animals at the end of a three to five year quarantine programme.

Clearly in making decisions on the number of animals to be imported, the cost of the programme is a very easy criterion for administrators to assess. However the benefits of importing twice or three times as many animals or embryos to obtain a wider sample are more difficult to convincingly quantify.

Productive characteristics

As the reason for the introduction of new breeds is to increase production within a new industry, or to initiate a new one, clearly the most productive animals should be sought. Importers will be constrained by the number of animals offered for sale and in most cases the vendor will not offer what are perceived to be the best animals. The experience of many importers has shown that often there are only poor production records available on which to make the selections. With the New Zealand imports of sheep from Scandinavia there were usually fecundity records available, but any information on the growth rates or weaning weights was not summarised in such a way that any breeding values could be assessed for individual ewes. As in many countries, sheep in Scandinavia are lambed indoors and are given variable degrees of care before and after lambing it is difficult also to assess mothering ability. In Scandinavia central performance test information on growth rate (and in some cases feed conversion efficiency) was available for ram lambs and some of the rams.

Records of wool production will usually not be available and it is necessary to make selections based on subjective criteria. Where animals are in full wool it is possible to make selections on wool bulk, and to select on the basis of evenness of the fleece. In the countries of origin of the breeds of most interest to New Zealand and Australia, wool is not a very valuable commodity and therefore no information exists about the amount produced or the quality. If milking breeds are being considered then usually some information will be available on the daily milk yields and the total lactation yield, but generally none will be available on milk composition.

Clearly there are difficulties in making satisfactory selections on the productive characteristics of most interest, and a best guess philosophy often has to be adopted. Assessment of the productivity of the animals, and their purebred and crossbred progeny within the importing country is therefore much more important.

Structural soundness

Attention must also be paid to structural faults, particularly leg and feet faults and also to jaws (ie, undershot or overshot jaws should be rejected). Jaw faults were not considered important by the breeders in Denmark or in Finland. These criteria are very important in New Zealand and Australia due to the fact that farmers will be very quick to reject new animals on the basis of any perceived faults, which they will quickly assess to the exclusion of other desirable productive characteristics.

EVALUATIONS OF SHEEP IN QUARANTINE

Importations of sheep require very long periods of quarantine to fulfil Scrapie Freedom Assurance Programmes (SFAP) although the recent adoption of bioassay procedures using goats has reduced the required time by two years. The evaluations invariably include the crossing of the introduced breed with "local" breed ewes and the evaluation of the progeny, in comparison with contemporary crosses generated from similar ewes mated with the most commonly used sire breeds within the existing industry. The

detailed carcass evaluation of the TX, OD and FL crosses compared with Border Leicester and Suffolk crosses reported by Clarke *et al* (1988) is a good example of the type of information required to assess breeds within their new environment.

The detailed assessment of reproductive rates of the purebreds and their crosses and of wool production and quality are also important and there are many examples of such evaluations in the literature. During the quarantine period, the involvement of industry groups (ie, meat processors, wool brokers and stock and station companies) as well as farmer groups is desirable. This strategy may also bring in additional funds to allow evaluations to be undertaken and also to speed up the infusion of the new genetic material into existing local breeds through upgrading.

The biggest problem with the evaluation of new breeds in quarantine is the cost of carrying out this work. In the past there has been concentration within the quarantine facilities on programmes of multiplication to ensure that more animals are available for sale at the release date. For this reason it has been extremely difficult to obtain realistic and "unimpeded" evaluations of purebred females, and with pressure on quarantine space it has not always been possible to undertake rigorous comparisons. Measurements of growth rates, wool production and reproductive traits of young stock can usually be accommodated. Only where the evaluation work is funded by research grants is it possible for comprehensive evaluations to be undertaken within quarantine.

EVALUATION OF SHEEP POST QUARANTINE

Following the release of sheep at the end of the quarantine period, most will be spread throughout the industry and semen will also be available. Some animals also will be available for evaluations on research stations. In this situation, farmer evaluations will test the animals' place within industry, with these observations being complementary to more detailed assessments made on research stations. In this phase the close co-operation of the research and advisory staff of government agencies is essential. In the post quarantine phase it will be more affordable to sample many more sires for comparisons with local breeds and to assess productive benefits that may be derived. Very recent experience in New Zealand with the enthusiasm of farmers for the use of the TX and the OD breeds and the involvement of the more progressive meat companies in the detailed carcass evaluation of the crosses is a good example of the rapid industry uptake of breeds which clearly have productive advantages.

However the research and extension effort is still critical because after the release of new breeds from quarantine, industry is still dealing with a relatively unselected population. Within the multiplication programmes in quarantine, selection pressure on males will have been considerable, but there will have usually been little selection on the female side. Even so, the accuracy of such assessments may not have been satisfactory. An example is eye muscle area and leanness in the TX, which are now receiving considerable emphasis in New Zealand programmes with the TX breed. Additional work is needed to assess selection responses and to develop more accurate predictive capability for the future.

NEW BREEDS AND THEIR CONTRIBUTION TO SHEEP PRODUCTION

Within New Zealand and Australia there are still major opportunities for diversification towards the production of fat-tailed sheep for live markets in the Middle East and for the development of sheep milking as a significant industry. The Awassi sheep presently in quarantine will be useful for the development of both industries. Assessments of the inheritance of wool colour in the crosses and the definition of strategies for the elimination of, or minimisation of the incidence of coloured fibres, will be critical for the adoption of the breed and its crosses.

The EF, the world's most productive milking breed also has a lamb drop of about 220%, and reasonable fleeceweights of white wool. It is also extremely lean and therefore could be particularly useful within both traditional lamb producing systems, and as a catalyst of the initiation of sheep milking as a new industry. For the lamb producing industry in both New Zealand and Australia it is also desirable that a much bigger sample of American Suffolks is obtained. There is also interest in the other breeds from the USA, but future importations will be required to be via embryo and will involve bioassays in a SFAP. However the political possibility of such importations will require more information from the scrapie transmission studies being undertaken in the UK at the present time.

REFERENCE

CLARKE, J.N., PARRATT, A.C., MALTHUS, N.C., AYMES, A.E., ULJEE, A.E. and WOODS, E.G. (1988) *Proc. NZ Soc. Anim. Prod.* 48 : 53