Calculation of the Economic Value of Foot rot in the Irish Sheep Industry

T. J. Byrne[1], P. R. Amer[1], M. P. McHugh[2], A. R. Cromie[3], T. Pabiou[3], P. J. Donnellan[3], B.W. Wickham[3]

Background and Aim

Improving genetic resistance to infectious diseases is important for the sustainability of lamb production systems. As such, Irish sheep improvement programs are putting more emphasis on breeding for disease resistance.

Foot-related diseases include abscesses, scald (Figure 1), and foot rot (Figure 2). The diseases negatively effect production traits and their treatment and prevention is costly. These diseases also represent a major welfare problem for the Irish industry.

In this study, we aim to develop a framework for computing an economic value for foot rot for sheep in Ireland.

Figure 1. Foot infected with scald

Figure 2. Foot infected with foot rot

Control practices for prevention and treatment of foot-related diseases include:

- Foot paring
- Vaccination
- Grazing management
- Segregation
- Topical spray treatment
- Antibiotic treatment
- Foot bathing
- Selective culling

Materials and Methods

Trait definition

- Foot rot was treated as a binomial trait
- Economic values were calculated for two separate traits; ewe foot rot and lamb foot rot
- The units of the economic value give the farm profit impact per unit change in the foot rot incidence trait per ewe or per lamb per year

Rationale for computing economic values

- Modelling the economic value of genetic improvement in resistance used two hypothetical farms of differing levels of prevalence; a' low' prevalence and a 'high' prevalence farm
- It was assumed that the 'low' prevalence farm has 5% of ewes/lambs with any foot score >0, while the 'high' prevalence farm has 25% of ewes/lamb with any foot score >0
- Significant assumptions were required regarding the level of genetic difference between the hypothetical farms, and the associated levels of treatment required

Farm data

- Data from the Teagasc Knockbeg Sheep Unit reported on the prevalence levels and prevention and treatment practices on 17 sheep farms in Ireland
- The 3 farms with the lowest average number of treatments (foot paring, foot bathing, and topical and antibiotic treatment) were modelled as the 'low' prevalence farm, and the 3 farms with the highest average number of treatments were modelled as the 'high' prevalence farm
- The variation in control strategies undertaken by these groups of farms was assumed to occur as a direct result of the requirement to manage the condition and therefore directly linked to underlying genetic merit between our high and low farms

[1]AbacusBio Limted, P O Box 5585, Dunedin, New Zealand
[2]Teagasc, Ballyhaise, Co. Cavan, Ireland
[3]Irish Cattle Breeding Federation Society Limited, Highfield House, Shinagh, Bandon, Co. Cork, Ireland

Results and Discussion

The levels of prevalence (% score >0) allocated to the 'low' and 'high' farms were based on intuition (Table below), because very little data are available on prevalence differences, and the associated costs of treating flocks, with differing genetic performance for resistance to foot rot.

Table. Prevalence and estimated associated costs of foot rot

	Percent prevalence (score >0)	Total annual cost per flock ewe	Total annual cost per flock lamb
Low prevalence	5%	€ 0.55	€ 0.142
High prevalence	25%	€ 4.96	€ 0.401

The model we developed predicted a change in annual per ewe costs of €0.221 per percent increase in ewes with a foot score >0. A 1% increase in lambs with a foot score >0 resulted in a change in annual per lamb costs of €0.013 (Figures 3). Therefore, the majority of benefits from reducing foot rot will come from savings in ewe, rather than lamb, prevention and treatment.

The feasibility of genetic improvement for disease traits is high with the heritability of a range disease traits being similar to that of a number of production traits. However modelling the economic implications of differences in the true genetic performance of flocks for disease traits and selecting for resistance to disease traits, such as foot rot, remains difficult.

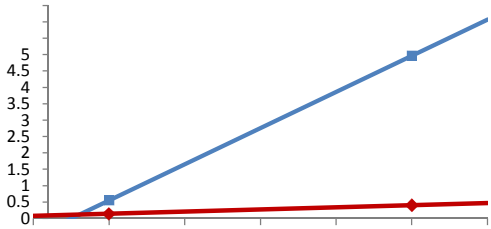

Figure 3. Cost per flock ewe and per flock lamb with an increase in the proportion of ewes or lambs with a foot rot score >0

Conclusions

An economic value has been developed for foot rot for sheep in Ireland. Data were available on the costs of treatment and prevention practices, however significant assumptions were required regarding the level of prevalence (and therefore genetic merit for resistance) associated with a prescribed level of treatment.

The work reported here provides a basis for inclusion of disease traits in breeding objectives for sheep in Ireland.