

ECONOMIC COMPARISON OF OPEN AND CLOSED NUCLEUS
BREEDING SCHEMES FOR WOOL PRODUCTION

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James (1977) has shown that an open nucleus breeding scheme could give 10-15% faster improvement than a closed system. An open scheme will involve higher costs as it requires measuring all ewes in the population.

Thatcher and Napier (1976) examined the economic benefits of a producer breeding his own rams. If a stud (nucleus) producer provides surplus rams to base flocks the returns are likely to increase when genetic gain in these flocks are included.

In evaluating the schemes we have examined one year's work and summed discounted benefits over the next 30 years according to the method of Hill (1974). Costs of measurement are borne at the start of the programme and are not discounted; they might be of the order of 25 and 13 cents per ewe for open and closed nuclei respectively. Extra costs of transport, disease control, administration etc. may be incurred in an open system that would not apply to a closed nucleus.

One-tenth of the ewes are in the nucleus and for the open nucleus 50% of replacement ewes are from the base flocks.

TABLE 1: The present value of gross extra returns (cents/ewe)
resulting from one year of selection?

| Interest rate (%) | Open nucleus | Closed nucleus | Difference |
|-------------------|--------------|----------------|------------|
| 10 | 309 | 252 | 57 |
| 20 | 144 | 115 | 29 |
| 30 | 85 | 68 | 17 |
| 40 | 59 | 47 | 12 |

⁺Parameters: wool price 200 c/kg greasy, heritability 0.4, standard deviation 0.5 kg, survival rate .90 for rams and 0.95 for ewes, 2 and 4 age groups of rams and ewes respectively, lambs weaned 80% for maidens, 90% for older ewes.

Both schemes would be profitable even at an interest rate of 40%, but the return on the extra investment in an open nucleus would not be profitable at this interest rate.

HILL, W.G. (1974). *Animal Production*. 18: 117.

JAMES, J.W. (1977). *Animal Production*. 24: 287.

THATCHER, L.P. and NAPIER, K.M. (1976). *Animal Production*. 22: 261.

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