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Living with the Inverdale gene (FecX) in a Romney flock

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ABSTRACT

This paper discusses a Romney flock where the Inverdale gene was identified in 1993, but it almost certainly traces back to a 1968-born ewe that had triplets in four successive lambings. It appears that the first Inverdale ram used in the flock was a triplet son of this ewe, born in 1970, because several ewes born in 1972 produced triplets or quadruplets.

The breeding programme has been based on all ewes being given the same treatment, and thus multiple rearing ewes had to perform well if their progeny were to be selected. Carrier ewes have the range of qualities present in the larger population and the same management practices, production objectives and procedures can be applied to them as to non-carrier sheep. The only difference is the enhanced prolificacy and the management requirements that may impose. Records show that they maintain condition well and have a long life expectancy.

Keywords: sheep; prolificacy; Inverdale gene.

Origin of the gene

In 1965, when I bought my present farm near Tokoroa, the sheep that were on it were a legacy from the previous owner who had a policy of selling all lambs and buying in two-tooths in the January sales. The sheep were of diverse ancestry, making them wonderful base material for a dedicated selection programme.

For the next three years the policy of buying in two-tooths at the summer sales was continued, but in decreasing numbers, to maintain flock size in the face of a ruthless culling programme against poor performance. The last new genetic material brought in by female sheep was in January 1968.

It is important to distinguish between females and males as sources of outside genetic material because in this flock the gene could not have been introduced by an outside ram. It either came from the original ewes, or two-tooth ewes purchased in 1966-1968, or from a spontaneous mutation. It is unlikely that the gene was already in the flock in 1965 as there was no evidence of its presence in the following four years. At this time there was no sign of any unusual prolificacy in the Romney flock. However, there was heavy selection pressure from the start towards higher prolificacy, and from 1967 onwards, ewe hoggets were exposed to the ram for one cycle and those that lambed were identified. This group was closely watched the following lambing and twin-bearers retained as elite performers. Initially there were very few ewes lambing as hoggets and subsequently having twins as two-tooths.

The most likely source of the gene is the two-tooth ewes bought after farm purchase; all of them from the Hawkes Bay region. In 1970, a 1968-born ewe that had lambed as a hogget had triplets as a two-tooth, and these were the first recorded to a ewe of any age on the farm. She had triplets for the next three years. The records of what happened next have mostly been discarded, but I was certainly delighted at how easy it seemed, contrary to popular belief, to raise the lambing percentage in Romneys. I didn't realise I had a woolly tiger by the tail.

I believe that one of the triplets born in 1970 was used as a two-tooth ram for the 1972 mating, because several ewes that were born that year produced triplets and one had quadruplets several times in the course of a breeding life that started as a hogget, and went on for eight years. She had an even more prolific daughter born in 1976, that managed to produce quintuplets in 1979, and triplets and quadruplets in other years. She went to Woodlands to join the high prolificacy flock in the early 1980s, and had two sets of twins before going out to sea in one of Southland's recent 100 year floods.

It is interesting to note that, despite a single gene being involved, the increased prolificacy seemed to take a couple of generations to get into its stride. The 1968-born ewe that had triplets as a two-tooth in 1970 is undoubtedly the progenitor of the Inverdale-carrying population. But her performance of four sets of triplets has been well exceeded by some of her descendants. Possible environmental effects are difficult to argue, as the 1960s were favourable for pasture growth while the 1970s, when prolificacy levels increased markedly, were drought prone. Reducing feed levels at mating coincided with increased prolificacy in these ewes. Normal ewes behaved normally, and lambing percentage generally dropped.

No special treatment

Prolificacy was a major element in the breeding programme, but objective measurements with common treatment for all, was a basic tenet. The net result was to encourage the multiple bearing ewes to do their thing, and then decline them any help on grounds of necessity for a level playing field. This sounds like a government policy statement.

With the benefit of hindsight, my reaction to the advent of this increased prolificacy was quite inappropriate. Not only were these ewes left on equal terms with ewes bearing/rearing singles and twins, but the weaned multiple-born lambs had to compete with lambs that were born larger, fed better on the dam and were consequently considerably heavier

at weaning. Most of the multiple-born lambs were culled out because of their small size at the autumn selection.

However, despite this, I used several quadruplet-born rams in the mid to late 1970s and the result was numerous multiple births. At this point I was somewhat bewildered by what was going on, and certainly lost for an intelligent response. Evidently, some females did make it into the flock on their own merits, or the gene would have disappeared by now.

Preferential management

My problem was how to accommodate these multiparous ewes in a programme that demanded that all sheep be treated the same. I believed that the variation from singles to quintuplets was continuous, and that there was no cut-off point at which it could be said these sheep are different to those, and can therefore be given some elementary help as required.

In 1993, the observation of streak ovaries in some progeny of matings between six of my prolific ewes and a ram known to carry the Inverdale gene at the Invermay Agricultural Centre confirmed that the Inverdale gene was present in my flock. Knowledge of the single gene causing the wide variation in prolificacy has changed my approach to evaluating these ewes. Carrier ewes are a subset of the total population, and as such can be handled differently without compromising the integrity of the selection process in the non-Inverdale ewes. However, this assumes that one has a means to distinguish Inverdale carrier ewes from non-carriers.

The flock was first scanned for pregnancy in autumn 1994, in part in an attempt to identify possible Inverdale carriers before lambing. Ewes carrying three or more, whether of flock or elite origin, were marked. Examination of the records of the elite ewes drafted off, showed a number with performance records complete enough to be confidently classed as carriers. All triplet bearing ewes were put onto *ad lib* feeding about three weeks before lambing. They had to be shepherded daily to check for cast ewes. More importantly for the retention of the gene in the flock, two 1990-born rams, bred from known carrier ewes, were both proved to be carriers following the pregnancy scanning of their two-tooth ewe progeny. As one of these rams had also been used for the previous two matings, a resurgence of multiple births over the next few years is expected.

Advantages of the Inverdale gene

It is easy to be negative about the size of the increase in prolificacy, and wish for a smaller increase spread over a larger sample. An extreme example was a triplet-born lamb

culled from my flock, that subsequently produced triplets as a hogget. However, there are advantages to increasing prolificacy through a single gene. Selection for other traits is not compromised. Carrier ewes have the range of qualities present in the larger population, and therefore the same management practices, production objectives and procedures, can be applied to them as to the non-carrier sheep. The exception is the enhanced prolificacy, and the specific management requirements that imposes.

This implies that the Inverdale gene affects nothing more than the ovulation rate. It is important to consider other traits related to high prolificacy, including ease of lambing, milk production, mothering ability, body weight and life expectancy. Lambing Inverdales is no different to lambing other prolific sheep. I have no information about milk yield, but from my observation, carrier ewes have a larger udder at birth, which is probably a response to the increased number of foetuses. I am convinced that carrier ewes are good mothers and their lambs stay close together. I am also sure that they maintain condition as well as non-carrier ewes and have a long life expectancy, with no sign of early burn-out. The 1994 lambing confirmed the view that the development of a high prolificacy flock in a controlled environment is very dependent on an effective technique for identifying female carriers of the Inverdale gene.

Potential for the Inverdale gene

There can be no doubt that carrier ewes are inherently prolific sheep, although occasionally ewes will produce singles. There is no need to flush ewes at mating time, but consistently high levels of feeding are important for ewes carrying the Inverdale gene, as for any prolific sheep. To convert this extra prolificacy to profit will likely require some human assistance and preferential treatment at birth. Preferential feeding of lambs and hoggets is also recommended. The problem of identifying carriers remains, but research into genetic markers is currently in progress.

When the gene is introduced to a flock by a carrier ram, there is a sudden increase in prolificacy two years later. In contrast, when the gene is introduced by a ewe, there is a slow appearance of increased prolificacy which is sustained only if the flock manager chooses to encourage it. For sheep farmers who enjoy the fruits of good shepherding, these are rewarding sheep to manage. The number of gene carriers in a particular flock will be limited by the resources of the enthusiast who tackles the job. There are people who would welcome the challenge, and it is mainly for them that I have shared my experiences.