

Genetic merit for hogget lambing

SIL Technical Note

Relates to: Increasing hogget lambing percentages

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Summary

- Hogget lambing is related to, but not the same as, adult lambing
- SIL produces a sub-index for Hogget Lambing (DPH) accounting for hogget ewe fertility (HFER) and hogget ewe fecundity (HNLB)
- Selection for hogget lambing will benefit adult NLB due to positive relationships between the traits
- Hogget Lambing data allow a sire's genetic merit for adult ewe litter size (NLB) to be predicted earlier and more accurately using hogget lambing records of his daughters.
- Accuracy in data recording is important for assessing genetic merit in hogget lambing traits

Background

Hogget lambing is a commonly debated topic. Some of the pros for it include additional lambs, the opportunity to utilize surplus feed, and the ability to increase rates of genetic gain based on selection using hogget lambing performance and a reduced generation interval. Some of the cons argued include the risk of adversely affecting future performance and higher requirements for labour and other resources.

Around 40% of farms in New Zealand lamb hoggets. Some farms have a policy of reviewing each year whether they mate ewe hoggets, usually on the basis of how well grown they are and the projected feed supply.

SIL has the option to use hogget lambing measurements in evaluating Reproduction. This is a prediction of ewe fecundity across all ages (NLB BV). In addition, SIL can now assess genetic merit for a ewe's ability to produce lambs as a hogget.

Biology and genetics of hogget lambing

Genotype and environmental effects influence hogget reproductive performance. A ewe needs to be cycling to get in lamb while the number of eggs produced per cycle (ovulation rate) set the limit for the number of lambs she will have. Embryonic & foetal survival act on this to determine the number of lambs born.

Some ewe hoggets reach puberty by mating time and some do not. Like other reproduction traits, hogget fertility and hogget fecundity are lowly heritable (c.10%). However it is possible to increase hogget lambing performance by selecting animals with high genetic merit for fertility and fecundity.

Live weight at mating and growth rate leading up to mating can influence hogget lambing performance. There is a positive relationship between autumn live weight and performance at hogget lambing. This relationship is affected by genotype and feeding conditions.

There is a positive correlation between hogget lambing traits and adult fecundity or litter size (number of lambs born, NLB). This means that, other things being equal, hoggets producing lambs, and those producing more lambs, will have a higher litter size as adult ewes than ewes that do not.

A key advantage to sheep breeders is that a sire's genetic potential for reproduction can be predicted more accurately and earlier if his daughters first lamb at one year old rather than at two years old. With sires genetically "proven" earlier, generation interval can be reduced which will increase rate of genetic gain in this trait. Hogget Lambing information can be very beneficial when estimating "adult" NLB breeding value.

Measuring hogget lambing

Hogget lambing is recorded the same way as adult lambing and shouldn't require any additional measurements than are currently collected. However accurate and complete recording is essential to ensure accurate predictions of genetic merit.

It is important to record barren ewe hoggets that have been exposed to rams as well as the ewe hoggets that do get in lamb. We need to distinguish between hoggets that do not lamb because they were not exposed to the ram (unknown fertility) from those that do not lamb but were exposed to the ram (not fertile). Hogget fertility is the ability of the hogget to ovulate and get in lamb. If barren ewe hoggets are not identified, fertility calculations will be compromised. All ewe hoggets that are exposed to a ram should be recorded as such.

Hogget fecundity is the number of lambs a ewe hogget has and can be recorded based on the actual lambs born, pregnancy scanning results or by submitting a number of lambs born for each hogget ewe. Even if a lamb is born dead it is best practice to record it against the ewe so the ewe and family can be credited with producing that size of litter (death of the lamb will be reflected in merit for survival). In across-flock analyses there can be differences in recording practices, i.e. one flock may be using pregnancy scanning results to assess litter size and another by tagging all lambs near birth. This should not cause problems with the SIL evaluation.

Autumn live weight is an optional predictor for hogget and adult reproduction breeding values. SIL recommends recording an autumn live weight for all ewe hoggets including those not mated and using this to predict breeding values in most situations. This takes account of the fact that there is a weak but positive relationship between body size and litter size.

Animals can have hogget lambing breeding values even when close relatives have not been exposed to rams as hoggets. The breeding values are predicted using information from any relatives that lambed as hoggets, from adult litter size (NLB) and from autumn live weight measurements. However, to ensure acceptable accuracy, SIL recommends that the Hogget Lambing option be included in a genetic evaluation ONLY when hogget lambing is practiced most years, for most of the ewe hoggets.

Pedigree information is important for predicting genetic merit in hogget lambing. Correct recording of sires and dams allows genetic merit to be credited to families appropriately. It is also important to include accurate birth dates and contemporary management groups (mobs) so these can be adjusted for.

To remove bias due to ewe age, you need to make sure at least one sire is mated to ewes of different ages each year. Otherwise SIL cannot separate sire effects (genetic) from ewe age effects (non-genetic). This is very important.

Accuracy in data collection is critical. Tables produced by the SIL Data Auditing Tools for Reproduction & Survival provide a good summary for assessing recording practices and checking that all available data have been submitted to SIL (see separate SIL Technical Note for further information).

Genetic evaluation

Previously SIL used hogget fecundity (number of lambs born) as an optional predictor for the NLB breeding value. This option is still available in the **Reproduction** Goal Trait Group (sub-index). The NLB breeding value in the Reproduction evaluation is effectively genetic merit for “adult ewe” litter size.

There is now a separate Goal Trait Group (or sub-index) called **Hogget Lambing**. Hogget Lambing produces two breeding values - Hogget Fertility (HFER) and Hogget Fecundity (HNLB). Hogget Fertility is whether the hogget ewe is cycling and produces a lamb(s). Hogget Fecundity is how many lambs the hogget ewe carries in her pregnancy. A hogget ewe is credited with “Yes”, “No” or “Not mated” for hogget fertility and a non zero value (e.g. 1, 2, 3, 4) for hogget fecundity.

SIL has another Reproduction option called Twinning Rate that produces a Twinning Rate breeding value (TWIN BV) for adult ewes. The objective of the TWIN breeding value is to identify ewes that have a higher twinning rate at the same lambing percentage. Selecting for twinning can be used to reduce the percentage of triplets while still selecting for overall fertility in the flock. Hogget lambing measurements are not used in the Twinning Rate evaluation (see separate SIL Technical Note for further information).

Both Hogget Lambing and Twinning Rate are options of the Reproduction evaluation. You can run both Hogget Lambing and Twinning Rate with Reproduction. When Hogget Lambing is run, the NLB breeding value will incorporate hogget lambing data.

Various options available for the different reproduction combinations are given in a table in the appendix at the end of this document.

Hogget lambing versus number of lambs born

There is a positive relationship between hogget lambing and adult lambing. Selecting sires with high Hogget Lambing breeding values will help to identify sires that have daughters with higher adult NLB breeding values. You will see a strong relationship between HNLB and NLB breeding values.

Hogget lambing versus other traits

There is evidence that ewes lambing as hoggets may be adversely affected in terms of future productivity. Management policies on farm can help to reduce the size of these effects.

SIL takes account of these effects in its genetic evaluation by treating hoggets that have lambed differently to those that did not, for traits measured later (e.g. LW18).

Lambs born to hogget ewes do not grow as well as those from older ewes. They are born lighter and the ewe produces less milk. SIL takes account of this effect in its genetic evaluations by accounting for age of dam. So a lamb from a hogget ewe is able to be fairly compared to a lamb from an older ewe for predicted genetic merit.

SIL reports

A sub-index for Dual Purpose Hogget Lambing can be included on reports and /or combined in the Dual Purpose overall index figures. It is symbolized as DPH (Dual Purpose Hogget Lambing) and is combination of both the hogget fertility (HFER) and hogget number of lambs born (HNLB) breeding values multiplied by their respective economic weights. For other breeding systems, i.e., Terminal Sire systems the hogget lambing breeding values can be included in reports but are not in the Terminal indexes.

Like all indexes the higher the DPH value the better and for the breeding values the higher the better. The DPH makes things easier for both breeders and buyers when analyzing hogget lambing by being reported as cents per ewe lambing unit thus enabling it to be compared to other sub indexes as necessary.

Other relevant technical notes

SIL technical information relating to hogget lambing and other topics can be found on the SIL website, www.sil.co.nz, under Technical Notes.

Need more information?

Contact your SIL bureau, send an email to silhelp@sheepimprovement.co.nz or telephone 0800-745-435 (**0800-SIL-HELP**).

Other reading

- M&WNZ R&D Brief Number 128: Managing hoggets from pre-mating through to two-teeth, 2007. Available from M&WNZ, www.meatandwoolnz.com or M&WNZ Regional Managers.
- “100 More” A guide to Hogget Mating, edited by Richard Gavigan & Richard Rattray. Available from M&WNZ, www.meatandwoolnz.com or M&WNZ Regional Managers
- “200 by 200” A guide to improved Lambing Percentage, edited by Richard Gavigan & Peter Rattray, 1997. Available from M&WNZ, www.meatandwoolnz.com or from M&WNZ Regional Managers

Goal Trait Group (sub-index)	Breeding values				Data used in evaluation				Notes
	NLB	TWIN	HFER	HNLB	Lambing data for 2-year old & older ewes	Hogget lambing data	Pregnancy scan data	Autumn LW as predictor	
Reproduction	✓				Used to predict NLB	Default is NOT used Option to also use this to predict NLB WILL be used if Hogget Lambing selected	Default is NOT used Can be used	Default is to use Can be switched off	Can be run on its own OR with one or both of Twinning Rate and Hogget Lambing
Twinning Rate		✓			<u>Only 3-year old and older</u> ewe lambing data used to predict TWIN	Not used	Default is NOT used Can be used	Not used	Reproduction MUST also be selected.
Hogget Lambing			✓	✓	Used to predict HFER & HNLB	Used to predict HFER, HNLB	Default is NOT used Can be used	Default is to use Can be switched off	Reproduction MUST also be selected.

Table 1. These three Goal Traits Groups are used by SIL to provide a focus on female reproduction traits. Reproduction must be chosen for evaluation before either Twinning Rate or Hogget Lambing can be chosen. Reproduction can be run on its own.