

# SIL standard index weightings – August 2008

---

## SIL Technical Note

---

Relates to: Standard SIL indexes – breeding value traits and their economic weightings

Written by: Georgie Walker & Mark Young

Date: August 2008

---

### Summary

- SIL has a number of standard SIL indexes customised to specific production systems, combining information on selected Goal Trait Groups (sub-indexes)
- Our Dual Purpose Overall index can focus on Growth, Meat, Reproduction, Survival, Wool & Health goal trait groups
- The Terminal Sire Overall index can focus on Growth, Meat, Survival, and Health
- A number of specialized Wool indexes have been developed that have a mixture of sub indexes with a focus on wool and wool quality.
- Some Goal trait Groups can be further sub-divided into related trait groups
- The sub indexes in each overall index can vary due to what traits are important to a production system and what traits have been evaluated.

### Background

The amount of emphasis placed on key economic traits affecting prime lamb and wool production in New Zealand's national sheep flock was reviewed by SIL in 2004. New traits have been added to the SIL Index system several times since then. This document summarises details for the current indexes.

Some goal trait groups do not currently have estimates of economic value so they cannot be included in overall indexes. However, selection decisions can be made with reference to component trait breeding values.

### Latest additions to Standard SIL indexes – August 2008

SIL has made two changes to the standard SIL indexes, a new Goal Trait Group in the Health area – Resilience to Internal Parasites and a new sub-index Hogget Lambing (was previously a goal trait group with breeding values and no relative economic values).

#### *Resilience to Internal Parasites goal trait group*

The Resilience goal trait has been added to the “*Health*” trait range. It estimates genetic merit for sheep's resilience to internal parasite challenges. In the face of a challenge from internal parasites (worms) resilience is measured as no noticeable reduction in performance. Parasite loads are not relevant, and some resilient sheep may carry large worm burdens. Resilience is similar to but different to another SIL goal trait group focused on internal parasites – Resistance, where sheep “fight” the worm infection and have a reduced worm egg count in the face of challenge. At present there is no sub-index for Resilience because we do not have good estimates of the economic benefits of these traits.

#### *Hogget Lambing sub index*

Two hogget lambing breeding values – Hogget Fertility (HFER) and Hogget Litter Size (HNLB) have been available since July 2007. SIL now has index weights for these hogget

lambing traits allowing Hogget Lambing to be included in the Dual Purpose Overall Index alongside other Reproduction traits.

SIL has technical notes on these goal trait groups on the SIL website [www.sil.co.nz](http://www.sil.co.nz).

### SIL Overall Indexes

These are used by many sheep breeders as an estimate of overall genetic merit for each animal, taking into consideration information from all recorded traits and from relatives. These indexes are important because a number of different traits are measured and selected for by sheep breeders. For example, a ram may be superior to other rams based on a single trait such as bodyweight, but his daughters may have below average performance for other traits, such as fleece weight and number of lambs born.

An overall index allows superiority in one trait to compensate for inferiority in other traits. Effectively **the index weights different traits depending on the income they generate, when you get this income and the proportion of animals that generate this sort of income**. This is why they are called “economic indexes”. Selection based on these will lead to economically optimal genetic progress being made across the range of genetic traits assessed.

Estimates of income are based on projections of key product prices for lamb and wool by the Economic Service of Meat & Wool New Zealand. Many other economic and production parameters are incorporated into the index derivation. Predicted animal feed energy requirements, the current national lambing percentage, and typical commercial flock age structure are examples of these parameters.

### SIL Terminal Sire Overall Index

The Terminal Sire Overall Index has a focus on lamb production where the emphasis is on fast early growth for lambs. Lamb survival to weaning, fast early growth, carcass merit and some disease resistance traits (dag score & internal parasite resistance) for lambs are considered the key focus for selection with the SIL Terminal Sire index.

### SIL Dual Purpose Overall Index

SIL’s Dual Purpose Overall Index has a combined focus on both lamb and ewe replacement production. Therefore reproduction as well as growth, meat, survival, wool and health traits are all important to dual purpose farming systems.

#### *Health traits*

SIL has four health traits. There are sub-indexes for internal parasite resistance (WormFEC), dag score, facial eczema and a goal trait group for internal parasite resilience. There are currently no relative economic values for resilience. Not all sub-indexes are included in the overall indexes (see separate overall index tables) however “*health*” breeding values can be produced in any genetic evaluation where there is predictor trait information available.

SIL “Overall” and SIL “Production” indexes differ by the former including sub-indexes for production and health traits in the evaluation while the Production indexes include only production traits. For example, a DPO index might include Growth, Reproduction, Survival, Facial Eczema & WormFEC but the associated DPP would only contain Growth, Reproduction & Survival.

### *Other differences*

Sub-indexes for apparently similar traits can differ between Dual Purpose indexes and Terminal Sire indexes. For example, while sub-indexes for Dual Purpose sheep include traits for older sheep, those for Terminal Sire sheep focus only on lambs so the Dual Purpose Growth sub-index includes adult live weight & maternal weaning weight (milking ability) but the Terminal Sire Growth sub-index does not.

In addition, economic weights for index traits can differ due to the relative importance of the trait, e.g. when all lambs go for meat production compared to a situation where some are kept as replacements for the ewe flock.

### SIL Wool Production System Overall Indexes

Wool Production System indexes make up the third main category of standard SIL indexes, after Dual Purpose and Terminal Sire indexes. Four sets of wool indexes are available for ram breeders: Mid-micron Overall (MMO), “Medium-fine” Fine Wool (FWm), “Fine” Fine Wool (FWf) and the “Super-fine” Fine Wool (FWs) index. While these indexes focus more on wool quality than does the Dual Purpose Index they still include other production sub-indexes similar to the Dual Purpose sub-indexes.

### SIL Standard Indexes

SIL standard indexes give near optimal genetic gains for most farming conditions. They have been derived using technical and economic information relevant to the average flock in New Zealand. SIL recognises that breeders targeting specific, commercial farming conditions can be justified in pursuing objectives different to the industry average. However one of the SIL standard indexes will suit most farming structures. SIL standard indexes are a very good yardstick for comparing genetic merit of animals by both ram buyers and ram breeders.

SIL bureaus have the means to generate custom indexes where this is relevant to do so.

### Technical Notes

More detailed information on the different goal trait groups (sub-indexes) SIL evaluates is available on the SIL website [www.sil.co.nz](http://www.sil.co.nz). Previous versions of SIL standard index weightings are also archived there.

### Need more information?

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

---

**Appendix** – SIL indexes. Tables on the following pages summarise the traits in SIL indexes and the economic weights used for each trait.

Tables are all in the same format. Where no economic weighting is given, that trait is not included in an index. This format has been used to highlight differences between indexes.

Table 1. Dual-Purpose Overall (DPO) index traits and weightings at August 2008

Sub-index	Sub-index short name	Goal trait breeding value full name	Breeding value short name	Economic weight (cents per ewe lambing)
Growth*	DPGm	Weaning weight – direct	WWT	116
		Weaning weight – maternal	WWTM	97
		Carcass weight	CW	140
		Ewe weight	EWT	-72
Meat	DPM	Lean weight	LEAN	293
		Fat weight	FAT	-183
Wool	DPW	Lamb fleece weight	LFW	416
		Hogget fleece weight	FW12	102
		Adult fleece weight	EFW	300
		Hogget fibre diameter	FDIAM	
		Adult fibre diameter	AFDIAM	
Wool Quality		CV of fibre diameter	FDIACV	
		Curvature	FCURV	
		Staple length	STAPLN	
		Brightness (Y)	COLY	
		Yellowness (Y-Z)	COLYZ	
Reproduction	DPR	Number of lambs born (litter size)	NLB	2430
Twinning Rate	DPT	Twinning rate adjusted for NLB	TWIN	3000
Hogget Lambing	DPH	Hogget fertility	HFER	880
		Hogget litter size	HNLB	302
Survival	DPS	Survival to weaning – direct	SUR	6329
		Survival to weaning – maternal	SURM	6371
WormFEC	DPF	FEC1%	FEC1	-2.9
		FEC2%	FEC2	-2.9
		Adult FEC%	AFEC	-2.5
Resilience	DPZ	Age when first drenched	DRAGE	<i>Not available</i>
		Live weight gain under parasite challenge	RGAIN	<i>Not available</i>
Dag Score	DPD	Lamb Dag Score	LDAG	-254
		Adult Dag Score	ADAG	-687
Facial Eczema	DPX	GGT21	GGT21	-903
*Growth if	DPG	Weaning weight – direct	WWT	134
Meat <u>NOT</u>		Weaning weight – maternal	WWTM	112
selected		Carcass weight	CW	199
		Ewe weight	EWT	-72

Table 2. Terminal Sire Overall (TSO) index traits and weightings at August 2008

Sub-index	Sub-index short name	Goal trait breeding value full name	Breeding value short name	Economic weight (cents per ewe lambing)
Growth*	TSGm	Weaning weight – direct	WWT	66
		Weaning weight – maternal	WWTM	
		Carcass weight	CW	70
		Ewe weight	EWT	
Meat	TSM	Lean weight	LEAN	320
		Fat weight	FAT	-200
Wool		Lamb fleece weight	LFW	
		Hogget fleece weight	FW12	
		Adult fleece weight	EFW	
		Hogget fibre diameter	FDIAM	
		Adult fibre diameter	AFDIAM	
Wool Quality		CV of fibre diameter	FDIACV	
		Curvature	FCURV	
		Staple length	STAPLN	
		Brightness (Y)	COLY	
		Yellowness (Y-Z)	COLYZ	
Reproduction		Number of lambs born (litter size)	NLB	
Twinning Rate		Twinning rate adjusted for NLB	TWIN	
Hogget Lambing		Hogget fertility	HFER	
		Hogget litter size	HNLB	
Survival	TSS	Survival to weaning – direct	SUR	4110
		Survival to weaning – maternal	SURM	
WormFEC	TSF	FEC1%	FEC1	-1.56
		FEC2%	FEC2	-1.56
		Adult FEC%	AFEC	
Resilience		Age when first drenched	DRAGE	<i>Not available</i>
		Live weight gain under parasite challenge	RGAIN	<i>Not available</i>
Dag Score	TSD	Lamb Dag Score	LDAG	-254
		Adult Dag Score	ADAG	
Facial Eczema		GGT21	GGT21	
<b>*Growth if Meat NOT selected</b>	TSG	<b>Weaning weight – direct</b>	<b>WWT</b>	<b>66</b>
		Weaning weight – maternal	WWTM	
		<b>Carcass weight</b>	<b>CW</b>	<b>158</b>
		Ewe weight	EWT	

Table 3. Mid-Micron Overall (MMO) index traits and weightings at August 2008

Sub-index	Sub-index short name	Goal trait breeding value full name	Breeding value short name	Economic weight (cents per ewe lambing)
Growth*	MMGm (=DPGm)	Weaning weight – direct	WWT	116
		Weaning weight – maternal	WWTM	97
		Carcass weight	CW	140
		Ewe weight	EWT	-72
Meat	MMM (=DPM)	Lean weight	LEAN	293
		Fat weight	FAT	-183
Wool	MMW	Lamb fleece weight	LFW	
		Hogget fleece weight	FW12	96
		Adult fleece weight	EFW	271
		Hogget fibre diameter	FDIAM	-21
		Adult fibre diameter	AFDIAM	-28
Wool Quality	MMQ	CV of fibre diameter	FDIACV	-8
		Curvature	FCURV	0
		Staple length	STAPLN	3
		Brightness (Y)	COLY	9
		Yellowness (Y-Z)	COLYZ	-6
Reproduction	MMR (=DPR)	Number of lambs born (litter size)	NLB	2430
Twinning Rate		Twinning rate adjusted for NLB	TWIN	<i>Not available</i>
Hogget Lambing		Hogget fertility	HFER	<i>Not available</i>
		Hogget litter size	HNLB	<i>Not available</i>
Survival	MMS (=DPS)	Survival to weaning – direct	SUR	6329
		Survival to weaning – maternal	SURM	6371
WormFEC	MMF (=DPF)	FEC1%	FEC1	-2.9
		FEC2%	FEC2	-2.9
		Adult FEC%	AFEC	-2.5
Resilience		Age when first drenched	DRAGE	
		Live weight gain under parasite challenge	RGAIN	
Dag Score	MMD (=DPD)	Lamb Dag Score	LDAG	-254
		Adult Dag Score	ADAG	-687
Facial Eczema		GGT21	GGT21	
*Growth if Meat <u>NOT</u> selected	MMG (=DPG)	Weaning weight – direct	WWT	134
		Weaning weight – maternal	WWTM	112
		Carcass weight	CW	199
		Ewe weight	EWT	-72

Table 4. “Medium-fine” Fine Wool (FWm) index traits and weightings at August 2008

Sub-index	Sub-index short name	Goal trait breeding value full name	Breeding value short name	Economic weight (cents per ewe lambing)
Growth*		Weaning weight – direct	WWT	
		Weaning weight – maternal	WWTM	
		Carcass weight	CW	
		Ewe weight	EWT	
Meat		Lean weight	LEAN	
		Fat weight	FAT	
Wool	FWmW	Lamb fleece weight	LFW	
		Hogget fleece weight	FW12	1219
		Adult fleece weight	EFW	931
		Hogget fibre diameter	FDIAM	-1378
		Adult fibre diameter	AFDIAM	-664
Wool Quality	FWmQ	CV of fibre diameter	FDIACV	-231
		Curvature	FCURV	-9
		Staple length	STAPLN	22
		Brightness (Y)	COLY	59
		Yellowness (Y-Z)	COLYZ	-59
Reproduction	FWR	Number of lambs born (litter size)	NLB	2618
Twinning Rate		Twinning rate adjusted for NLB	TWIN	
Hogget Lambing		Hogget fertility	HFER	<i>Not available</i>
		Hogget litter size	HNLB	<i>Not available</i>
Survival	FWS	Survival to weaning – direct	SUR	6412
		Survival to weaning – maternal	SURM	2630
WormFEC	FWmF	FEC1%	FEC1	-2.3
		FEC2%	FEC2	-2.3
		Adult FEC%	AFEC	-3.1
Resilience		Age when first drenched	DRAGE	
		Live weight gain under parasite challenge	RGAIN	
Dag Score		Lamb Dag Score	LDAG	<i>Not available</i>
		Adult Dag Score	ADAG	<i>Not available</i>
Facial Eczema		GGT21	GGT21	
*Growth if Meat <u>NOT</u> selected	FWG	Weaning weight – direct	WWT	111
		Weaning weight – maternal	WWTM	93
		Carcass weight	CW	58
		Ewe weight	EWT	-188

Table 5. “Fine” Fine Wool (FWf) index traits and weightings at August 2008

Sub-index	Sub-index short name	Goal trait breeding value full name	Breeding value short name	Economic weight (cents per ewe lambing)
Growth*		Weaning weight – direct	WWT	
		Weaning weight – maternal	WWTM	
		Carcass weight	CW	
		Ewe weight	EWT	
Meat		Lean weight	LEAN	
		Fat weight	FAT	
Wool	FWfW	Lamb fleece weight	LFW	
		Hogget fleece weight	FW12	2483
		Adult fleece weight	EFW	1883
		Hogget fibre diameter	FDIAM	-3095
		Adult fibre diameter	AFDIAM	-1255
Wool Quality	FWfQ	CV of fibre diameter	FDIACV	-437
		Curvature	FCURV	-40
		Staple length	STAPLN	71
		Brightness (Y)	COLY	45
		Yellowness (Y-Z)	COLYZ	-200
Reproduction	FWR	Number of lambs born (litter size)	NLB	2618
Twinning Rate		Twinning rate adjusted for NLB	TWIN	
Hogget Lambing		Hogget fertility	HFER	<i>Not available</i>
		Hogget litter size	HNLB	<i>Not available</i>
Survival	FWS	Survival to weaning – direct	SUR	6412
		Survival to weaning – maternal	SURM	2630
WormFEC	FWfF	FEC1%	FEC1	-4.8
		FEC2%	FEC2	-4.8
		Adult FEC%	AFEC	-6.3
Resilience		Age when first drenched	DRAGE	
		Live weight gain under parasite challenge	RGAIN	
Dag Score		Lamb Dag Score	LDAG	<i>Not available</i>
		Adult Dag Score	ADAG	<i>Not available</i>
Facial Eczema		GGT21	GGT21	
*Growth if Meat <u>NOT</u> selected	FWG	Weaning weight – direct	WWT	111
		Weaning weight – maternal	WWTM	93
		Carcass weight	CW	58
		Ewe weight	EWT	-188

Table 6. “Super-fine” Fine Wool (FWs) index traits and weightings at August 2008

Sub-index	Sub-index short name	Goal trait breeding value full name	Breeding value short name	Economic weight (cents per ewe lambing)
Growth*		Weaning weight – direct	WWT	
		Weaning weight – maternal	WWTM	
		Carcass weight	CW	
		Ewe weight	EWT	
Meat		Lean weight	LEAN	
		Fat weight	FAT	
Wool	FWsW	Lamb fleece weight	LFW	
		Hogget fleece weight	FW12	7171
		Adult fleece weight	EFW	3999
		Hogget fibre diameter	FDIAM	-10829
		Adult fibre diameter	AFDIAM	-7136
Wool Quality	FWsQ	CV of fibre diameter	FDIACV	-2484
		Curvature	FCURV	-40
		Staple length	STAPLN	71
		Brightness (Y)	COLY	45
		Yellowness (Y-Z)	COLYZ	-200
Reproduction	FWR	Number of lambs born (litter size)	NLB	2618
Twinning Rate		Twinning rate adjusted for NLB	TWIN	
Hogget Lambing		Hogget fertility	HFER	<i>Not available</i>
		Hogget litter size	HNLB	<i>Not available</i>
Survival	FWS	Survival to weaning – direct	SUR	6412
		Survival to weaning – maternal	SURM	2630
WormFEC	FWsF	FEC1%	FEC1	-14.0
		FEC2%	FEC2	-14.0
		Adult FEC%	AFEC	-18.5
Resilience		Age when first drenched	DRAGE	
		Live weight gain under parasite challenge	RGAIN	
Dag Score		Lamb Dag Score	LDAG	<i>Not available</i>
		Adult Dag Score	ADAG	<i>Not available</i>
Facial Eczema		GGT21	GGT21	
*Growth if Meat <u>NOT</u> selected	FWG	Weaning weight – direct	WWT	111
		Weaning weight – maternal	WWTM	93
		Carcass weight	CW	58
		Ewe weight	EWT	-188