

SIL standard index weightings – May 2010

SIL Technical Note

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

- SIL has a number of standard SIL indexes customised to specific production systems, combining information on selected Goal Trait Groups (sub-indexes)
- Dual Purpose indexes can focus on Growth, Meat (Yield), Reproduction, Survival, Wool & Health
- Terminal Sire indexes can focus on Growth, Meat (Yield), Survival and Health
- A number of specialized Wool indexes have sub-indexes focusing on wool production and wool quality.
- The sub indexes and traits in each overall index vary depending on what is important to a production system and what traits have been evaluated.

Background

The 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 current indexes and replaces the previous version dated August 2008.

Latest changes to Standard SIL indexes – May 2010

SIL has made changes to the standard SIL indexes for Growth and Meat Yield (carcass quality) for Dual Purpose (DP) and Terminal Sire (TS) sheep. The changes made are;

- There is only ONE index variant of each type for Growth and Meat for each sheep type.
- Growth is now “Lamb” Growth. For DP sheep, genetic merit for Adult size (EWT BV) is now in its own index, DP Adult size (DPA). Growth is the only SIL Goal Trait Group that produces two sub-indexes (DPG & DPA).
- Genetic merit for growth rate is now entirely accounted for in the Growth index. This is reflected in an increased weighting on CW BV.
- The new Growth genetic evaluation makes use of mating LW information from 30 month (rising 3 year old) and older ewes to better predict EWT BV. Bureaus enter these measurements as LWMATE, a repeated measures trait. LWMATE(2) is now used instead of LW18.
- Meat is now “Meat Yield” and the BVs have fundamentally changed. Previous BVs, LEAN and FAT, were a measure of absolute size. The new BVs are adjusted to a constant carcass weight so they are tissue “yields” or proportions. These changes make Meat BVs independent of Growth BVs.
- Carcass lean yield is split into three regions – hindquarter lean yield (HQLY), loin lean yield (LNL) and shoulder lean yield (SHLY) to assess lean tissue distribution.
- The Meat index is the extra value above and beyond carcass size due to carcass tissue proportions (fat vs. lean) and lean tissue distribution.

A more detailed description of the changes made is contained in a SIL Web Note titled “2010 Changes to Growth and Meat indexes” available on the SIL website www.sil.co.nz.

SIL Overall or Production 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 should lead to economically optimal genetic progress 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 also used to derive index weights e.g. predicted animal feed requirements, the current national lambing percentage and typical commercial flock age structure.

Sheep types

Sub-indexes for apparently similar traits differ for Dual Purpose sheep from those for Terminal Sire sheep. 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 DP Growth sub-index includes maternal weaning weight (milking ability) but the TS Growth sub-index does not. DP sheep have a DPA index for Adult size but TS sheep do 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 “Overall” or “Production” indexes are made up of all relevant sub-indexes for Goal Trait Groups in the genetic evaluation. However, not all sub-indexes are included in the overall indexes for different sheep types (see following tables).

SIL Terminal Sire Overall Index

The Terminal Sire Overall Index has a focus on lamb production. Lamb survival to weaning, Lamb Growth, carcass merit (Meat) and some Health traits (dag score & internal parasite resistance) for lambs can be considered for selection with this index.

SIL Dual Purpose Overall Index

SIL’s Dual Purpose Overall Index aims to improve both lamb production and replacement ewe performance. Therefore reproduction as well as Growth, carcass merit (Meat), Lamb survival, Wool and Health traits can be considered for selection with this index.

Combined indexes – across Goal Trait Groups

SIL “Overall” and SIL “Production” indexes differ in regard to Health traits. Health traits are included in “Overall” indexes but not “Production” indexes e.g. if a DPO index includes

Growth, Reproduction, Survival, Facial Eczema & WormFEC, the associated DPP index would contain only Growth, Reproduction & Survival.

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 so it can not be part of an overall index. However “*health*” breeding values can be produced in any genetic evaluation where there is predictor trait information available.

SIL Wool Production System Overall Indexes

Wool Production System indexes make up the third main category of standard SIL 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.

Mid-Micron Overall is made up of DP sub-indexes for most traits but custom sub-indexes for Wool Production and Wool Quality. Previously there were separate Mid-Micron sub-indexes for all Goal Trait Groups but for most traits these were identical to their DP equivalents.

SIL Standard Indexes

SIL standard indexes give near optimal genetic gains for typical 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 index types 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 appropriate 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. 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, or telephone 0800-745-435 (0800-SIL-HELP). Please note that from 2010 forward the silhelp contact points are not monitored as frequently as they were previously.

Appendix – SIL indexes. Tables on the following pages summarise the traits in SIL indexes and the economic weights used for each trait. **Changes made in May 2010 are highlighted by a yellow background.**

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. Without index weightings, selection decisions can still be made with reference to component trait breeding values.

Table 1. Dual-Purpose Overall (DPO) index traits and weightings at May 2010

| Sub-index | Sub-index short name | Goal trait breeding value full name | Breeding value short name | Economic weight (cents per ewe lambing) |
|----------------|----------------------|---|---------------------------|---|
| Lamb Growth | DPG | Weaning weight – direct | WWT | 116 |
| | " | Weaning weight – maternal | WWTM | 97 |
| | " | Carcass weight | CW | 220 |
| Adult size | DPA | Ewe weight | EWT | -72 |
| Meat Yield | DPM | Hindquarter lean yield | HQLY | 402 |
| | | Loin lean yield | LPLY | 602 |
| | | Shoulder lean yield | SHLY | 201 |
| | | Fat yield | FATY ¹ | |
| 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 |

¹ Previous DPM indexes had a negative weighting on FAT. There is now no (zero) weighting on FATY

Table 2. Terminal Sire Overall (TSO) index traits and weightings at May 2010

| Sub-index | Sub-index short name | Goal trait breeding value full name | Breeding value short name | Economic weight (cents per ewe lambing) |
|----------------|----------------------|---|---------------------------|---|
| Lamb Growth | TSG | Weaning weight – direct | WWT | 66 |
| | " | Weaning weight – maternal | WWTM | |
| | | Carcass weight | CW | 158 |
| Adult size | | Ewe weight | EWT | |
| Meat Yield | TSM | Hindquarter lean yield | HQLY | 462 |
| | | Loin lean yield | LPLY | 693 |
| | | Shoulder lean yield | SHLY | 231 |
| | | Fat yield | FATY | -280 |
| 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 | |

Table 3. Mid-Micron Overall (MMO) index traits and weightings at May 2010

| Sub-index | Sub-index short name | Goal trait breeding value full name | Breeding value short name | Economic weight (cents per ewe lambing) |
|----------------|----------------------|---|---------------------------|---|
| Lamb Growth | DPG | Weaning weight – direct | WWT | 116 |
| | " | Weaning weight – maternal | WWTM | 97 |
| | " | Carcass weight | CW | 220 |
| Adult size | DPA | Ewe weight | EWT | -72 |
| Meat Yield | DPM | Hindquarter lean yield | HQLY | 402 |
| | | Loin lean yield | LPLY | 602 |
| | | Shoulder lean yield | SHLY | 201 |
| | | Fat yield | FATY ² | |
| 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 | 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 | 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 | | Age when first drenched | DRAGE | |
| | | Live weight gain under parasite challenge | RGAIN | |
| Dag Score | DPD | Lamb Dag Score | LDAG | -254 |
| | | Adult Dag Score | ADAG | -687 |
| Facial Eczema | | GGT21 | GGT21 | |

NB: Sub-index short names have changed. Where previously they had a MM prefix, they are now the DP equivalents where these were identical.

² Previous DPM indexes had a negative weighting on FAT. There is now no (zero) weighting on FATY

Table 4. “Medium-fine” Fine Wool (FWm) index traits and weightings at May 2010

| Sub-index | Sub-index short name | Goal trait breeding value full name | Breeding value short name | Economic weight (cents per ewe lambing) |
|----------------|----------------------|---|---------------------------|---|
| Lamb Growth | FWG | Weaning weight – direct | WWT | 111 |
| | " | Weaning weight – maternal | WWTM | 93 |
| | " | Carcass weight | CW | 58 |
| Adult size | " | Ewe weight | EWT | -188 |
| Meat Yield | | Hindquarter lean yield | HQLY | |
| | | Loin lean yield | LNLY | |
| | | Shoulder lean yield | SHLY | |
| | | Fat yield | FATY | |
| 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 | |

Table 5. “Fine” Fine Wool (FWf) index traits and weightings at May 2010

| Sub-index | Sub-index short name | Goal trait breeding value full name | Breeding value short name | Economic weight (cents per ewe lambing) |
|----------------|----------------------|---|---------------------------|---|
| Lamb Growth | FWG | Weaning weight – direct | WWT | 111 |
| | " | Weaning weight – maternal | WWTM | 93 |
| | " | Carcass weight | CW | 58 |
| Adult size | " | Ewe weight | EWT | -188 |
| Meat Yield | | Hindquarter lean yield | HQLY | |
| | | Loin lean yield | LNLY | |
| | | Shoulder lean yield | SHLY | |
| | | Fat yield | FATY | |
| 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 | | Twining 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 | |

Table 6. “Super-fine” Fine Wool (FWs) index traits and weightings at May 2010

| Sub-index | Sub-index short name | Goal trait breeding value full name | Breeding value short name | Economic weight (cents per ewe lambing) |
|----------------|----------------------|---|---------------------------|---|
| Lamb Growth | FWG | Weaning weight – direct | WWT | 111 |
| | " | Weaning weight – maternal | WWTM | 93 |
| | " | Carcass weight | CW | 58 |
| Adult size | " | Ewe weight | EWT | -188 |
| Meat Yield | | Hindquarter lean yield | HQLY | |
| | | Loin lean yield | LNLY | |
| | | Shoulder lean yield | SHLY | |
| | | Fat yield | FATY | |
| 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 | |