Revised Meat Module DRAFT

SIL Technical Note

Subject:	**Meat Traits**
Relates to:	Meat merit, Lean yield, Fat yield carcass weight and carcass weight yield
Date:	Revised March 2019

Summary

- The revised meat yield module is based on updated genetic parameters (heritabilities and correlations), and can use a range of meat data - ultrasound, VIAscan, CT and processor information. It reflects current processing weights, carcass composition and breeds
- The carcass weight BV (CW BV) is calculated in the Meat Yield module based predominantly on liveweight information and reported in the Growth sub-index
- Carcass weight yield BV (CWY BV) reflects additional information for CW based on all available meat data and is reported in the Meat sub-index.
- The Meat Yield sub-index rewards individuals with above average yield of lean tissue and is adjusted for carcass weight
- The Maternal Meat Yield sub-index only uses the Lean Yield components
- The Terminal Meat Yield sub-index uses Lean and Fat Yield components. The penalty on fat is designed to slow the deposition of fat relative to increasing lean (muscle) deposition.

The revised Meat Yield module results in more accurate predictions of merit for fat and lean yield and reflects modern carcass composition and breeds.

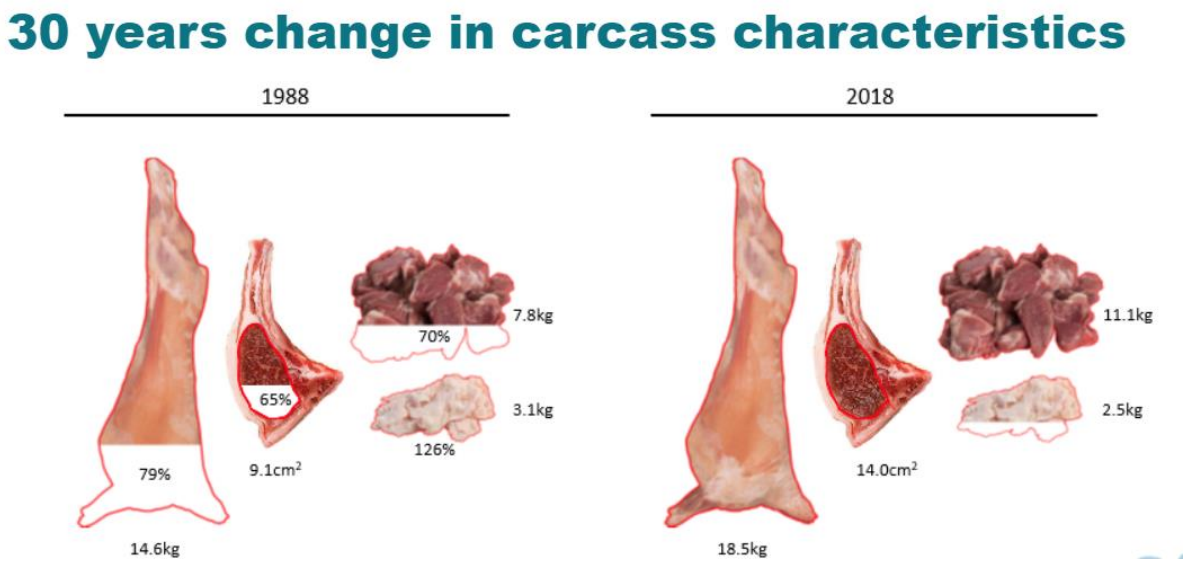
Background

The previous meat module was based on experiments in the late 1980's using 14.6 kg carcass weight lambs of Romney breed. The parameters had been scaled over time to reflect the heavier average carcass weights that are now typical and to include additional measures of carcass information such as VIAscan and CT (Computer tomography).

Over 5 years, a comprehensive study of the progeny of current industry sires - reflecting the current mix of breed types, carcass weight and composition typical of the current industry has been completed. Progeny have been assessed across multiple measurement systems, using spiral CT as the gold standard to calibrate the other systems.

There has been considerable change in carcass composition in 30 years, Current carcasses (18.5kg) have about 60% of carcass weight as lean muscle and 13.5% fat, compared to 53% lean and 21% fat for the smaller 14.6 kg carcass. See Fig 1.

Fig 1. Change in carcass characteristics over 30 years



Carcasses are now heavier, with proportionally more lean tissue and less fat than in 1988.

SIL Meat Yield sub-index

SIL characterizes carcass merit overall as the SIL Meat Yield sub-index. This uses the breeding values for carcass weight yield and the lean yields across the carcass regions (Shoulder, Loin and Hindquarter) and fat yield (Terminal only). Lean yields are a more accurate indicator of merit than eye muscle area BV. The units for yield are kilogram lean (muscle) or fat per kilogram of carcass. Yields are adjusted for carcass weight to identify animals above or below average at a given carcass weight.

The Terminal Sire Meat Yield sub-index consists of both lean and fat yield components. A negative weighting on fat yield is designed to reduce the rate of fat gain with associated with increasing lean tissue gain.

In Dual Purpose breeds, over-fatness is not seen as an issue currently and a degree of fatness is seen as an important buffer for ewes, smoothing feed and demand requirements. The Dual Purpose Meat Yield sub-index consists only of the lean (muscle) yield components– there is no fat yield component in the DPM sub-index.

If dual purpose sheep breeders are concerned about low fat levels, they can muscle scan young animals and body condition score (BCS) ewes. The Body Condition Score sub-index uses the muscle scan information as an early predictor of body condition score, as well as using adult ewe body condition scores and should report the body condition score sub-index (DPBC)

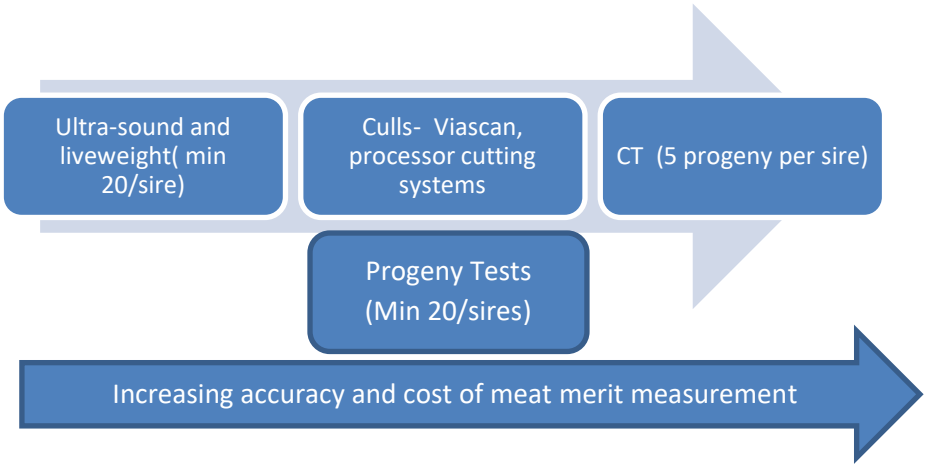
Recording Meat Yield Information

Ultra-sound scanning is the most cost-effective way of capturing yield information on the largest numbers of animals. It is recommended that a live weight of all lambs is taken at ultra-sound scanning. If 20-25 or more male progeny numbers per sire are available, it may be

sufficient to only scan ram lambs. In small flocks or flocks with small progeny numbers per sires, SIL recommends measuring both ewe and ram lambs to increase the accuracy of the meat yield prediction. Ultra-sound information on young animals is also used to inform body condition score if recorded (maternal flocks).

Complete weaning weight data is important as it takes into account that not all animals have later measurements. This is important because it removes bias in estimates of genetic merit caused by earlier culling of smaller animals.

Fig 2. Increasing accuracy and cost of Meat Yield measurements



Additional information from VIAscan and processor cutting systems (calibrated within SIL) can provide additional information on culls or in progeny test situations where all lambs are processed. More processor cutting or measurement systems e.g. Dexa can be added in time as they become calibrated.

To make efficient use of CT scanning, animals should be pre-screened with ultrasound and selections made for CT scanning based on the genetic evaluation of ultrasound scan data. The optimum response to CT scanning comes from scanning the top 10-15% of ram lambs, but this comes at significant cost. Breeders should scan a minimum of five progeny per sire to ensure a good response to CT scanning.

Genetic evaluation

Heritabilities for carcass traits are moderate (c.30%). There is a positive genetic correlation between fat and lean weights – which means animals that genetically have more lean (muscle), will generally have more fat. There is more variation in the amount of fat than lean in carcasses.

The Maternal Meat Yield sub-index has no penalty on fat. The Terminal Meat Yield index has a penalty on fat designed to slow the accumulation of fat with increasing lean.

Reporting meat yield breeding values and sub-indexes

Breeding values	Abbreviation	Comment	Units
Carcass weight	CW BV	Predominantly based on live weights, reported in the Growth sub-index. A higher value = greater carcass weight	Kg
Carcass Weight Yield	CWY BV	Adjustment in carcass weight reflecting meat data, reported in the Meat sub-index. A higher value = greater carcass weight yield	Kg/kg carcass weight
Lean Yield	LEANY BV	Overall score of meat yield merit. Recommend reporting this this BV rather than SHLY, LNLY & HQLY if not doing Viascan or CT. A higher value = greater carcass lean (muscle)	Kg/kg carcass weight
Shoulder Lean Yield	SHLY BV	These can be useful to report if you have higher level CT data which informs on how the lean tissue is distributed across the 3 regions otherwise a standardised breakdown is used. A higher value= greater carcass lean (muscle) in the shoulder	Kg/kg carcass weight
Loin Lean Yield	LNLY BV	As for SHLY – a higher value = greater lean(muscle) in the loin	Kg/kg carcass weight
Hindquarter Lean Yield	HQLY BV	As for SHLY – a higher value = greater lean(muscle) in the hindquarter	Kg/kg carcass weight
Fat Yield	FATY BV	A higher value indicates more fat and a lower value indicates less fat as a proportion of the carcass	Kg/kg carcass weight
Eye Muscle Area	EMAc BV	Th index does not use this BV – it is more accurate to use the Lean Yield BV but some breeders report it as commercial buyers can envision the trait. A higher value indicates a greater eye muscle area corrected for size	Cm^2
Indexes	**Abbreviation**	**Comment**	**Units**
Dual Purpose Meat Yield	DPM	DPM = rev* x CWY BV+ rev x SHLY BV +rev x LNLY BV+ rev x HQLY BV	Cents per ewe mated
Terminal Sire Meat Yield	TSM	TSM = rev x CWY BV+ rev x SHLY BV + rev x LNLY BV+ rev x HQLY BV -rev x FATY BV	Cents per lamb born
Terminal Sire Lean Yield	TSLY	TSLY =rev x CWY BV+ rev x SHLY BV + rev x LNLY BV+ rev x HQLY BV	Cents per lamb born
Terminal Sire Fat Yield	TSFY	TSFY = -rev x FATY BV Negative weighting on fat	Cents per lamb born

*rev = relative economic value/weight.

Using the SIL Meat Yield sub-index in selection

SIL recommends using the Meat Yield sub-index to improve carcass merit, in combination with using the Growth sub-index to increase growth. This will allow the breeder to identify genetically fast-growing animals with above average saleable meat yield.

The terminal meat yield index combines merit for lean (muscle) yield and fat yield. To distinguish merit for the lean and fat components of the Terminal Sire Meat Yield these can reported separately as TS Lean Yield and TS Fat Yield

TSM = TSLY + TSFY

Individual can have similar merit for TSM but achieve this is different ways.

For example;
A TSM = 500c TSM = 400c (TSLY) + 100c (TSFY)
B TSM = 500c TSM = 200c (TSLY) + 300c (TSFY)

A has more lean (muscle) and more fat than B.
B has less lean (muscle) and less fat than A – more reward for being lower in fat

With indexes, a higher number indicates greater reward for that trait – for fat that means less fat.
In Dual Purpose Breeds there is no penalty on Fat

SIL does not recommend reporting actual measurements such as eye muscle area, as they have not been adjusted for non-genetic effects such as age, live weight or the performance of relatives.

Relative economic weights

The relative economic weights/values in terminal and dual-purpose indexes are different.

Terminal Indexes are expressed as cents per lamb born and take into account that there is no on-going accumulation of merit for terminal genetics within the commercial ewe breeding flock.

Dual purpose indexes are expressed as cents per ewe mated. On average ewes have more than one lamb and also reflect there is potential for an accumulation of merit in the commercial ewe breeding flock -this increases the value of an improvement in a particular trait to a production system.

For up to date REV values see Technical Notes on the SIL website.

Need more information?

- Contact your SIL bureau, local SIL adviser or call 0800-745-435 (0800-SIL-HELP).