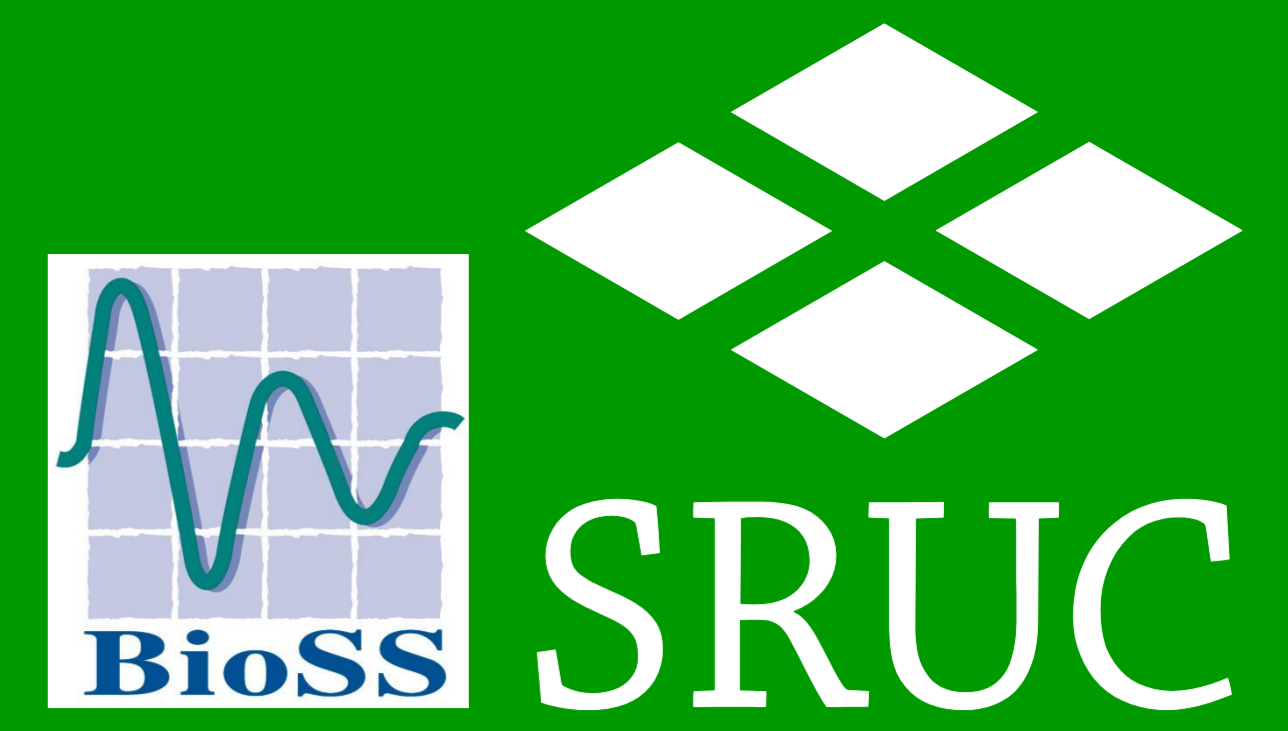


# CT scanning Increases EBV Accuracies



**Kirsty Moore (EGENES, SRUC) Kirsty McLean (CT Unit, SRUC), John Gordon (CT Unit, SRUC), Nicola Lambe (SRUC), Lutz Bunger (SRUC)**  
 Scotland's Rural College  
 West Mains Road  
 Edinburgh, EH9 3JG, Scotland  
 Email: ctunit@sruc.ac.uk

**SRUC's CT scanning service** provides the opportunity to CT scan elite pedigree male lambs:

- measures carcass composition: tissue weights, killing out %, linear dimensions, muscularity and much more
- provides highly accurate and repeatable results
- results are included in the Sheepbreeder database (Signet)
- Estimated Breeding Values (EBVs) are produced
- **accuracies of EBVs** - based on performance data for an animal and its relatives, the heritability of the trait and its genetic relationship with other recorded traits - **can be up to 10% greater in CT scanned lambs**
- Higher heritability of a trait means higher accuracies of EBVs e.g. 10% higher heritability gives 10% higher selection response

## Example 1: Comparison of 2 lambs – full brothers

This can be demonstrated by 2 full brothers born as triplets (3<sup>rd</sup> lamb fostered) and reared together, so directly comparable. Lamb A: ultrasound + CT scans. Lamb B: ultrasound scan only (see table below). Difference in EBV accuracies due only to inclusion of CT records (N.B. Lamb B's figures also benefit from being related to Lamb A).

EBV	Lamb A	Lamb B	
	% accuracy of EBV	% accuracy of EBV	difference in % accuracy
<b>Lean</b>	86	75	11
<b>Fat</b>	82	69	13
<b>Muscularity</b>	81	65	16

## Example 2: Flocks new to CT– what are the effects on EBV accuracy

The addition of the CT data affects the accuracy of EBVs (see table below – pink = CT data included; blue = no CT data):

- Average EBV accuracies do not vary greatly
- Maximum EBV accuracies are always larger (7-12% for lean and fat, 32% for muscularity).
- EBV accuracies for previous years are also improved

This is directly due to CT scanning and if these lambs had not been CT scanned their accuracies, and to a lesser extent those of their relatives, would not have increased.

		Flock 1 recording since 2004 - first CT scanned in 2012					Flock 2 recording since 2010 - first CT scanned in 2012				
		2011 analysis		2012 analysis			2011 analysis		2012 analysis		
		2010	2011	2010	2011	2012	2010	2011	2010	2011	2012
<b>Lean</b>	Average	60	61	60	63	56	53	59	59	62	61
	Min	40	43	42	44	40	46	34	51	46	48
	Max	70	67	71	78	77	61	69	87	69	76
<b>Fat</b>	Average	54	54	54	56	53	50	52	56	56	56
	Min	37	40	39	40	37	43	32	49	42	44
	Max	64	60	65	73	72	59	60	82	62	71
<b>Muscularity</b>	Average	40	38	42	41	42	44	38	49	42	46
	Min	26	29	30	31	28	32	24	35	33	36
	Max	55	45	55	49	77	52	44	73	49	76

## Benefits of continued use of CT Scanning

- Continued use of CT will maintain the initial accuracy increases (although with no further significant increase in the EBV accuracies in subsequent years)
- Higher accuracies will be lost over time if CT stops
- CT scanning produces breeding animals who's progeny have EBV values with accuracies that would otherwise take one crop of performance recorded (ultrasound and weights) progeny to achieve.
- The use of CT scanning results in improved genetic progress if selection decisions are based on EBVs

**Please contact us to discuss your requirements: SRUC-BioSS CT Unit, Tel: 0131-535-3250 Email: ctunit@sruc.ac.uk**