

Technical Bulletin

MASTERING THE MAZE OF EPD ACCURACIES & CORRELATIONS

Accuracy (Acc) is an expression of reliability of the EPD. Accuracy may range from 0.0 to 1.0. As accuracy approaches 1.0, the EPD is more reliable and can be expected to change less in the future as more progeny data are accumulated.

Accuracy may be categorized into low, medium and high reliability as follows: Low 0.0 to .59; Medium .60 to .79; High .80 to 1.0. EPDs should be used to decide which bulls are selected while accuracy values suggest how extensively the bulls should be used. Bulls with favorable EPD values and high accuracy values can be used with confidence that they will contribute favorably to genetic improvement of the herd.

Accuracy is an abbreviated method of expressing the reliability of an EPD. Another more specific indicator is the standard error of prediction (possible change). Changes in EPD can be expected to fall within the possible change range 67 percent of the time. To the right **Table 1** shows the possible change at different levels of accuracy for each trait.

As accuracy increases, the possible change decreases. For example, if the accuracy of a bull's yearling EPD is .20, the expected possible change in EPD is ± 22 lb. (potential range in EPD = +38 to +82 lb. for a bull with a yearling weight EPD of +60 lb.).

If the yearling weight EPD accuracy is .80, the possible change in EPD decreases to ± 7 lb. (possible range in EPD = +53 to +67 lb. for a bull with a yearling weight EPD of +60 lb.).

Heritability Estimates and Trait Correlations

Heritability may be defined as the portion of the differences among sire progeny groups that is due to genetic variation. For a trait that is 40 percent heritable, 40 percent of the variation in the contemporary group is due to genetics and 60 percent is due to environment. The higher the heritability, the easier it is to make a genetic change in one specific trait. Since heritability is already considered in their calculation, EPDs reflect actual genetic differences.

The heritability estimates given in **Table 2** are those calculated by the University of Georgia for Gelbvieh used in the NCE analysis.

EPD correlations indicate how closely traits are genetically related by reflecting the effect that selection for one trait can have on other traits. Correlations may range from -1.0 to +1.0. The closer the correlation is to 1.0, the higher the relationship. A negative correlation indicates that as you select for a trait in one direction the other trait will move in the opposite direction. Positive

correlations indicate traits will move in the same direction. Highly correlated traits (stronger genetic relationships) can be interpreted such that these traits will move according to the genetic relationship and it will be somewhat rare to find animals that do not follow those trends.

For example, note in **Table 3** on page 57, that the correlation between weaning weight and yearling weight is High (H). This means that increases in weaning weight will be accompanied by an increase in yearling weight. This would be considered a beneficial correlation since selection for one trait has a positive effect on another trait.

Conversely, an increase in yearling weight may be expected to be followed by a decline in calving ease since the correlation between the two traits is -Low (-L). This would be considered a genetic antagonism. However, the low correlation suggests that exceptions exist and it is possible to identify and use bulls that excel genetically for both growth and calving ease. By using the information, it is definitely

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Table 1. Possible Change Values

ACC	Calving Ease Direct	Birth Weight	Weaning Weight	Yearling Weight	Milk	Gestation Length	Daughters' Calving Ease	Scrotal Circumference
0	11	3.8	18	27	12	2.7	11	0.85
.1	10	3.6	16	25	11	2.4	10	0.78
.2	9	3.2	14	22	10	2.1	9	0.71
.3	8	2.7	13	19	8	1.9	8	0.63
.4	7	2.5	11	17	7	1.6	7	0.55
.5	6	2.1	9	14	6	1.3	6	0.47
.6	4	1.7	7	12	5	1.1	5	0.40
.7	3	1.3	6	9	3	0.8	3	0.32
.8	2	0.9	4	7	2	0.6	2	0.21
.9	1	0.4	2	3	1	0.3	1	0.11
1.0	0	0.0	0	0	0	0.0	0	0.00

EPD ACCURACIES & CORRELATIONS

possible to select against antagonisms. Knowledge of correlations demonstrates the need to use EPDs for identifying genetics to match specific needs.


For purposes of this general discussion the correlations reported as either low (L), medium (M) or high (H) and presented in **Table 3**. Actual numeric values for the correlations between the traits will be reported with the updated Sire Summary. 

Table 2. Heritability Estimates for Gelbvieh

Trait	Heritability	Trait	Heritability
Calving Ease – Direct	.18	Daughters Calving Ease	.12
Birth Weight	.42	Scrotal Circumference	.37
Weaning Weight	.24	Milk	.08
Yearling Weight	.19	Gestation Length	.42

Table 3. Relative Correlations of Sire EPDs

	CE	BW	WW	YW	M	TM	GL	CED	SC	CW	REA	MB	FT
CE Direct	1.00	-	-	-	-	-	-	-	-	-	-	-	-
Birth Wt.	-H	1.00	-	-	-	-	-	-	-	-	-	-	-
Weaning Wt.	-M	M	1.00	-	-	-	-	-	-	-	-	-	-
Yearling Wt.	-L	M	H	1.00	-	-	-	-	-	-	-	-	-
Milk	L	-L	-L	-L	1.00	-	-	-	-	-	-	-	-
Total Mat.	-L	L	H	H	H	1.00	-	-	-	-	-	-	-
Gest. Length	-M	M	L	L	-L	L	1.00	-	-	-	-	-	-
CE Daughters	H	-M	-L	-L	L	L	-L	1.00	-	-	-	-	-
Scrotal Circ.	L	L	M	M	L	M	-L	L	1.00	-	-	-	-
Carcass Wt.	-L	L	M	M	L	M	L	-L	L	1.00	-	-	-
Ribeye Area	-L	L	L	L	L	L	L	-L	-L	M	1.00	-	-
Marbling	L	-L	-L	-L	L	-L	-L	-L	L	-L	-M	1.00	-
Fat Thickness	L	-L	-L	-L	L	-L	-L	-L	L	-L	-M	M	1.00

¹.25 or less = Low (L); .26 to .50 = Moderate (M); greater than .50 = High (H)