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Livestock Judging

A 4-H Animal Science Project

Activity 7, How Do I Rate?

Reviewed: 10/2021

CREDITS AND ACKNOWLEDGMENTS

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Activity 7

HOW DO I RATE?

BACKGROUND BASICS..

OBJECTIVES:

For youth to:

- Select animals based on performance potential.
- Interpret performance data.
- Relate data to visual appraisal.
-

LIFE SKILLS:

- Acquiring, analyzing, and using information.
- Problem solving and decision making.

MATERIALS:

PICK YOUR BULL Data sheet

Pens/Pencils

TIME:

1 Hour

ADVANCE PREPARATION:

Make an overhead of the PICK YOUR BULL Data sheet.

SETTING: Comfortable room

There are primarily three types of performance data. Adjusted performance records (1) are used to make within-herd/flock ratios (2). Expected Progeny Differences (EPDs) (3)are only calculated for purebred herds. The ratios and pedigree information from different herds within a breed are submitted to respective breed registries for EPD calculation

1) Adjusted Performance

This is initial data collected and consists of an animal's actual performance record. Often times, the numbers reflect the adjusted weight of an animal. This means that instead of the animals being weighed at a common day of age, they are weighed on a common day. The weights are then adjusted for age. The following are examples of the most common data given in cattle, swine and sheep. A (+) or (-) follows each trait and indicates whether you generally want the trait's number to be high (+) or low (-). However, in some cases the opposite sign may be acceptable or desirable, depending on the management scenario.

2) Ratios

Ratios provide a method of comparing animal performance to a base number. They do not account for differences in environment or management. Ratios rank an individual animal's deviation of performance to the herd average in a certain trait. The herd average is represented by a ratio of 100. For example, if a bull had a weaning weight ratio of 110, then his weaning weight was 10 percent higher than the herd average. If a heifer has a yearling weight of 92, then she performed 8 percent below the herd average.

3) Expected Progeny Differences (EPDs) and Indexes

EPDs are a prediction of how offspring of each animal are expected to perform relative to the offspring of other animals within the breed's database. The numerical estimate of an animal's EPD excludes the effect of environment , and only considers an animal's genetic ability for that trait, making it a better genetic tool than actual or adjusted data or within herd ratios.

EPDs are computed in the units of measure for the trait, plus or minus (i.e. a bull with a +30 weaning weight EPD would be expected to sire calves that wean 20 pounds heavier than a bull with a +10 weaning weight EPD). However, for other traits, larger values are not always preferred. An index (uses EPDs to develop an index which is formatted in dollars, so a larger value is always preferred.

EPDs are accompanied with an accuracy value between 0 and 1. This represents the accuracy and reliability of the prediction. Older parent animals have a higher accuracy value because of the fact that they have proven results and performance through their progeny, whereas a younger animal doesn't. The larger the accuracy, the more reliable the estimate of genetic potential (EPD). For instance, a young non-parent Angus bull with a birth weight EPD of 2.0 with an accuracy of 0.20 would have a range of "true" EPD values from -0.1 to +4.1, and an aged Angus bull offered within an bull semen catalog with the same EPD of 2.0 and hundreds of progeny resulting in an accuracy of 0.95 would have a range of "true" EPD values from - +1.9 to +2.1.

Accuracy values of young non-parent stock are quite low, generally less than 0.20 and often very similar, therefore accuracies of animals used in judging contests are seldom shown.

INTRODUCING PERFORMANCE DATA

What do the letters and numbers mean?

In a judging contest, students can use the performance information to compare traits between animals , but also to the current breed averages for that trait. Review the codes for performance data on page 100 with the youth then provide a the sample chart below for discussion.

Consider the following two Angus bulls—if both bulls were mated to comparable cows, over time, what would be expected, assuming comparable increases in accuracy?

	BW	WW	YW	Milk	Scrotal	REA	MARB	FAT	$B
Bull A	8.2	37	73	12	+.95	+.25	+.`10	+0.03	35.15
Bull B	1.2	54	91	23	+.45	+.65	+.45	-0.04	50.25
2011 Average	2.0	46	83	22	+.42	+.19	+.41	+0.01	45.95

For growth traits, Bull A's calves should be 8 lbs heavier at birth (BW), 17 lbs lighter at 205 days (WW), and 18 lbs lighter at 365 days (YW), than Bull B's calves. For maternal performance, Bull A's daughters should wean calves 11 lbs lighter than Bull B's, due solely to maternal performance (Milk). Bull A's sons should have 0.5 cm greater scrotal circumference than Bull B's sons (Scrotal). Bulls with stronger scrotal circumference EPDs will tend to have improved seminal quality and their daughters will be

quicker to reach sexual maturity. For carcass traits, Bull A's progeny will have a 0.40 in^2 smaller ribeye (REA), 0.35% less intramuscular fat or marbling within the ribeye (MARB), and have 0.07 in greater fat thickness opposite the ribeye (FAT). The $Beef ($B) index suggests Bull A's progeny should be worth $15.10 less than Bull B's progeny due to their YW, REA, FAT, carcass weight, and MARB EPDs.

Now, consider these two Yorkshire gilts—what do these numbers mean?

Consider the two Yorkshire gilts—if both gilts were bred by comparable boars, over time, the following would be expected.

	DAYS	BF	NBA	LWT	TSI	SPI	MLI
Gilt A	-4.6	-0.06	+0.20	+2.55	112	106	112
Gilt B	+0.6	-0.02	+0.65	+6.55	104	115	112
2011 Average	-0.75	-0.01	+0.24	+2.80	106.1	109.7	112.3

For terminal traits, Gilt A 's progeny should reach 250 lbs in 5 fewer days (DAYS) and have 0.04 in less fat thickness opposite the loineye (BF) , than Gilt B's progeny. For maternal performance, Gilt A's daughters should have 0.45 fewer pigs born alive per parity (NBA) and have and have 4 lbs lighter 21 day litter weights (LWT) at weaning . The Terminal Sire Index (TSI) is developed from the DAYS and BF EPDs, the Sow Productivity Index (SPI) is developed from the NBA and LWT EPDs, and the Maternal Line Index (MLI) is developed from all four listed EPDs, but puts 75% of the emphasis on the two maternal traits.

How should these data be interpreted and used in judging contests?

Students should be instructed how to identify "red flags" within the data set.

For instance, Bull A was substantially above breed average for birth weight, substantially below breed average for milk and $Beef, and was in the wrong genetic direction for both marbling and fat. All of those would serve as a red flag. Bull B was in the correct genetic direction for all reported traits. Bull B's data would be preferred, for most scenarios.

Gilt A was below breed average for NBA , LWT and accordingly SPI. Gilt B was in the wrong genetic direction for DAYS, but posted a very strong SPI. Even though both gilts had the same MLI, Gilt B's data would be preferred for most scenarios.

INTRODUCTION

Scenarios are often given to contest participants. These describe the situation in which the animals are going to be used. Scenarios usually tell the intended use of the animal, the intended use of their progeny, feed and labor resources available, and how progeny will be marketed.

Performance data can be confusing when you don't understand its purpose and use in placing a class. However, once you are shown a way to analyze and simplify the information, classes with performance data often become your favorites. EPDs and indexes are genetic tools that when used in combination with phenotypic evaluation, improve the efficacy of livestock selection.

DO

How Do I Rate?

- Review the how to read and interpret the data charts and situations. Use the INTRODUCING PERFORMANCE DATA to orient youth to analysis process.
- Divide the youth into pairs.
- Distribute paper and pens/pencils to each group.
- Display the PICK YOUR BULLS chart.
- Assign youth a column to defend. They should be prepared to tell why the data in that column is important, what priority it should be given and which column is the most profitable trait and why.
- Distribute one scenario per pair and allow them time to evaluate and select which bull they would choose to best fit the scenario.
- Have each pair read their scenario to the entire group and discuss and defend their decision.

Performance Data Codes

Common Beef Cattle EPD's and Indexes

Growth

BW= Birth Weight

WW= Weaning Weight

YW= Yearling Weight

Maternal

MM= Maternal Milk,

TM= Total Maternal,

SC= Scrotal Circumference

Carcass

REA=Ribeye Area,

%IMF=Intramuscular fat

BF=Backfat

American Angus Assoc. Indexes

$F= Feedlot,

$G= Grid,

$B= Beef

Common Swine EPD's and Indexes

Growth

DAYS= Days to 250

Carcass

BF= Backfat

Maternal

NBA= Number Born Alive

LWT=21 day litter weight

Indexes

SPI= Sow Productivity Index,

MLI= Maternal Line Index,

REFLECT

- Which traits are especially important if you are breeding a bull to a group of yearling heifers?

  A low birth weight record and desirable calving ease score are crucial in this situation, because heifers usually have a difficult time delivering large calves and the calves and/or heifers could die as a result of calving problems (called dystocia).

- Assuming the producer has no calving, milking or feed problems, if the producer's ultimate goal is to sell all calves at weaning age, which trait is the most important?

  High weaning weight data indicates the producer will get the calves to a sellable weight in less time, which provides cash in the bank for the producer.

- Did you find it difficult to determine which columns represented the most important information based on the scenario?

  Remember to look for the items in the scenario which will have a significant impact on the producer's profit margin. For example, if the producer is retaining heifers, low milk EPDs could indicate a lack of maternal performance; if the producer sells cull heifers and steers as yearlings, the yearling weight data would be far more important than the weaning weight data. To help you develop a system of analyzing the data, try marking a large $ sign on the money making data and a small $ sign on the data that is important but in a lesser way.

APPLY

- Go to a farm or ranch and work performance classes.

  (Youth will need performance data in order to do this.)

- Find calculated breed averages for breeds of beef cattle, hogs, and sheep, available at their breed websites.

Scenario Answer Key

In Scenario 1, the producer needs a calving ease sire, to produce daughters with strong maternal performance. Also, it would be desired to have strong records for yearling growth, because that is when steer and cull heifers are marketed. Bull 2 was the only bull below breed average for birth weight, and was above breed average for milk, scrotal circumference and yearling growth, thus would have the most scenario adaptable data set.

In Scenario 2, the producer needs excellence in weaning growth with little concern for calving ease due to mating with mature cows. Bulls 2, 3, 4, and 5 are all above breed average for weaning weight, with Bull 4 having the strongest data for weaning growth . Bull 4 has below average carcass EPDs, but the producer plans to have already marketed the calves, thus Bull 4 would be the most scenario adaptable.

Scenario 3, is another terminal scenario with the producer retaining ownership of all calves through feeding and marketing calves at slaughter on a traditional carcass merit grid. Bulls 2, 3, 4, and 5 are all above breed average for yearling weight, with Bull 4 having the strongest data for post-weaning growth . However, Bull 4 has below average EPDs for ribeye area and marbling. Bull 3 has the second strongest yearling weight EPD and the strongest set of carcass EPDs, thus Bull 3 would be the most scenario adaptable.

Scenario 4 describes a limited forage scenario where all the emphasis is upon producing reproductively efficient daughters. Heavier milking cows have greater nutritional needs, thus this bulls daughters need to be marginal for milk production. Only Bulls 1 and 3 were below breed average for milk, and only one of those, Bull 1, was above breed average for scrotal circumference, which is a predictor of sexual maturity. Bull 1 is the most scenario adaptable.

Scenario 5 is for a purebred producer who needs an excellent and balanced genetic profile. Both Bulls 2 and 5 have a strong genetic profile, with Bull 5 having the strongest data and would be deemed the most scenario adaptable.

PICK YOUR BULL

	BW	WW	YW	MAT	TMAT	Scrotal	REA	FAT	MARB
1	1.0	21	33	-4	6.5	1.5	0.00	-0.004	0.00
2	-6.0	26	45	9	22	1.9	0.25	-0.01	0.05
3	2.2	39	62	0	19.5	0.0	0.95	-0.03	0.40
4	5.5	50	80	18	43	-0.2	-0.12	-0.015	-0.18
5	1.0	35	55	10	27.5	2.1	0.66	-0.03	0.25
2011 Average	0.6	24	42.1	6.5	18.5	0.6	0.20	0.000	0.03

The EPD's for Charolais bulls are shown above. The following scenarios will illustrate the use of EPD's to meet specific herd needs of beef cattle producers.

BW - Birth weight

WW - Weaning weight

YW - Yearling weight

MAT - Maternal Milk

TMAT - Total maternal

Scrotal—Scrotal circumference

REA—Ribeye area

FAT— Fat thickness

MARB— Marbling

PICK YOUR BULL SCENARIOS

Scenario 1:

Select a bull to be mated to mature black-baldie cows and heifers on a commercial cow-calf operation in central Florida. The top fifty percent of the heifer calves will be kept as replacements and the remaining heifers are marketed through elite commercial replacement heifer sales. The producer retains ownership of the steer calves and sells them at the conclusion of the stockering phase.

Scenario 2:

Select a bull to be utilized as a terminal sire on mature commercial cows in central Florida. After a 45 day preconditioning period, all calves will be marketed through graded feeder calf sales in large commingled groups.

Scenario 3:

Select a bull to be mated to mature Brahman-influenced cows on a commercial cow-calf operation in central Florida. The producer retains ownership of the steer calves and heifers through finishing in a commercial feedyard and markets them to a fed beef slaughter operation whose pricing schedule for fed cattle is based on a low Choice yield grade 3 carcass as the base value.

Scenario 4:

Select a bull to be mated to Brahman-influenced cows on a large commercial cow-calf operation in the arid American southwest. This operation has made the financial decision not to fertilize any native range or improved pastures for the past three years, thus forage is limited and of marginal quality. Ranch management wants to increase the number of brood cows within the operation, so they plan to keep all heifer progeny of acceptable quality.

Scenario 5:

Select a bull to be purchased as a clean up bull on mature cows for a small, but high quality, purebred Charolais operation . This bull must have the genetic flexibility to produce sons that can be sold through an invitational bull sale, which is the primary source of income, as well as competitive females as junior show prospects.

PERFORMANCE CLASS PHRASES—FOR REASONS

CATTLE:

-Calving ease scenario–should cause less dystocia (or calving difficulty)—↓er BW EPD

-Replacement female scenario–should have heavier milking daughters— ↑er MILK EPD

-Replacement female scenario–whose daughters should be younger at their first estrus—-↑er Scrotal EPD

-Retained ownership sell as yearlings should have faster growing yearling progeny—↑er YW EPD

-Retained ownership sell on carcass merit–should have more valuable terminal progeny—↑er YW EPD and stronger more balanced carcass EPDs

-Limited forage scenario–should produce easier keeping, lower maintenance daughters—↓er MILK EPD

HOGS

-Maternal scenario–should have heavier milking, more prolific daughters—↑er NBA and LWT EPDs

-Terminal scenario–should have the leaner, faster growing terminal progeny—↓er BF and DAYS EPDs

_____

Name

_____

Address

_____

Name of Club/School

_____

Leader/Teacher's Name

4-H Club Motto

"To make the best better"

4-H Pledge

I Pledge:

My head to clearer thinking
My heart to greater loyalty
My hands to larger service, and
My health to better living
for my club, my community,
my country, and my world.

4-H Colors

Green and White

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