

Piedmontese Genetic Trends.

Cross Breeding: comparing the Old and the New

Many North American Piedmontese breeders have been dedicated to improving breed performance over the years, but selection towards commercially critical traits such as calving ease and growth can take generations to become apparent in overall “breed averages”. This article gives a basic over-view of crossbred calving and growth from Piedmontese sires used 20+ years ago compared to some in use today.

First, it is important to understand how selection toward one trait may affect another trait. Selection pressure towards growth will result in increased birth weight, for example (although not necessarily causing increased calving difficulty). The term used to describe this situation is correlation. Correlation is defined as: A measure of how two traits vary together.

A correlation of + 1.00 (100%) means that as one trait increases the other also increases – a perfect positive relationship.

A correlation of –1.00 (100%) means that as one trait increases the other decreases –a perfect negative or inverse relationship.

A correlation of 0.00 means that no relationship exists between traits. Correlation coefficients may vary between +1.00 and –1.00.

Birth weight and weaning / yearling weight are correlated positives. This means that as one will increase so will the other. The level of the correlation between birth weight and yearling wt is +. 4 to +. 7. The average is about +. 55. Note that the relationship is not perfect (+ 1.00) meaning all animals do not fit the correlation. As a producer you can find both sires and dams that will produce calves with low birth weight and high yearling weights.

In order to gain insight into potential genetic changes in the Piedmontese as a result of these first years of breed improvement strategies, we can review cross-breeding data from early Piedmontese sires as compared to some current Piedmontese sires.

Crossbred data is available from the USDA MARC GermPlasm Evaluations conducted from 1986 to 1990, where 2-copy sires were used over British-cross females (primarily Angus X Hereford), raised at Clay Center, Nebraska.

Current data recorded from 2010 through 2012 is available courtesy of Lone Creek Cattle Company, where 2-copy sires were used over British-cross females (primarily Angus cross) raised in the ‘Sand Hills’ at their Red Deer Ranch near Valentine, Nebraska and also at their Pullmann Ranch facility near Whitman, Nebraska.

Strong similarities in breed-of-dam and environment make these three data sets well suited for a general comparison. (Please do keep in mind, however, that it is only a general comparison and uses only crossbred progeny. More exact tracking of genetic change in the Piedmontese seedstock population will be possible after the revisions to the EPD database which are now underway.)

Some modern crossbred data comes from Lone Creek Cattle Company’s Red Deer Ranch located in the Sand Hills region of Cherry County near Valentine, NE. The Red Deer Ranch runs some 2000 Angus-cross cows, producing crossbred Piedmontese for the Certified Piedmontese Brand of Great Plains Beef. From 2010 through 2012, data was compiled there on some 3000 Piedmontese-sired calves alongside nearly 1000 Angus-sired calves.

In addition to the larger Red Deer Ranch crossbred data set, Lone Creek Cattle Company also conducted a trial on five current Piedmontese AI sires in comparison to Piedmontese ‘clean up’ bulls at their Pullmann Ranch facility near Whitman, NE.



A group of 318 first calf heifers were also bred to Piedmontese herd bulls as part of the calving trial.

Again, these Piedmontese sires were used over Angus-cross females so all offspring were 1-copy for the inactive myo statin gene.

See Table 1 on the following page.

The Italian Piedmontese Association has studied deeply the breed’s genetic correlation parameters for years. Values higher than +0.2 or lower than –0.2 indicate traits with significant positive or negative correlation, respectively. In the positive case, the improvement of the first trait also improves the other one: this is the correlation between growth potential and daughter’s calving ease (a +0.25 correlation). In the negative case, the selection on the first trait worsens the other one: this is the situation between growth and direct calving ease (birth ease) which has a -0.46 correlation; and also between direct calving ease (birth ease) and daughter’s calving ease which has a -0.36 correlation. For example, the Italian AI Sire List, Buta Bin, always gives recommendation of the current “best bulls for use on heifers”. The explanation of this selection is given as: “These bulls have shown a very good birth ease of their progeny when used on heifers, which experience more calving problems than adult cows. Bulls for heifers are very good for birth ease but, due to genetic correlations, usually are poor for calving ease of their daughters. As a consequence, these bulls should be used on heifers only in order to let them calve easily for the first time. The use of their progeny for breeding purposes is not recommended.” Complete ANABORAPI report: http://lg.anaborapi.it/pdf/bb_intro_en.pdf

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TABLE 1:

Sire Group	Research Location	Number of Calves	Birth Weight Pounds	Unassisted Births	Calving Ease Score	Gestation Length Days	Weaning Weight 205-Days
1980s Piedmontese AI sires over AngusX *	USDA Clay Center, NE	200	80.2	92.5 %		287.2	463 **
1980's Angus and Hereford AI sires	USDA Clay Center, NE	102	80.4	92.7 %		283.1	469 ***
Current Piedmontese Herd Bulls over AngusX	Red Deer Ranch, Valentine, NE	3075	85.8		1.019		482.8
Current Angus (maternal lines) over AngusX	Red Deer Ranch, Valentine, NE	998	81.7		1.017		467.7
Current Piedmontese AI sires over AngusX ****	Pullmann Ranch, Whitman, NE	342	85.6	98.25 %	1.056 *****	284.8	570.8
Current Piedmontese Clean Up Bulls over AngusX	Pullmann Ranch, Whitman, NE	136	80.6		1.00		553.9
Current Piedmontese Herd Bulls over AngusX First Calf Heifers	Pullmann Ranch, Whitman, NE	318	79.1	98.75 %	1.03		511.5

* Some 17 different early Fullblood Piedmontese sires were utilized via AI by the USDA MARC; these sires had not been performance evaluated and represented a very small population of Piedmontese available at the time.

** USDA MARC reports 200-day weaning weight of 452 lbs, adjusted here to a 205-day weight of 463 lbs.

*** USDA MARC reports 200-day weaning weight of 458 lbs, adjusted here to a 205-day weight of 469 lbs.

**** Current Piedmontese AI Sires have been performance evaluated and are selected towards improved growth, which correlates to increased birth weight. Simultaneous selection towards Calving Ease can maintain good calving even with increased birth weight.

***** Current Piedmontese AI Sires calving scores may be skewed due to 4 abnormal presentation births in the total of 6 assisted births.

From this data above it appears that average birth weight has increased 5.4 pounds but unassisted births also improved 5.75% and 205-day weaning weights have risen by more than 100 pounds, when comparing old and new Piedmontese AI sires. It is interesting to note that gestation length has been reduced by almost 3 days on average between the old and the new AI sires.

In this small sampling of Piedmontese AI sires, we can see a genetic trend towards increased birth weight, but improved calving ease - and definitely an improvement in growth to weaning in cross-bred calves.

At the Red Deer Ranch, Piedmontese herd bulls produced calves 4 pounds heavier at birth than the Angus bulls, but 15 pounds heavier at weaning than the Angus bulls, with no significant difference in calving ease score.

Averages cannot tell us the peaks and the valleys, the highs and the lows. The overall average birth weight of 85.6 pounds from five AI sires in the Lone Creek data was derived from each sire's average birth weight.

There was a 9.1 pound spread from lowest (79.9 average) to highest (89 average) birth weight ranges between these five bulls. The record of assisted births is perhaps the most informative, however. Out of the 342 AI calves there were 4 abnormal presentation births, one hard pull and one easy pull, for a total of 6 assisted births.

That equals 98.25% un-assisted births.

Genetic progress is definitely being made in the Piedmontese breed, thanks to breeder's dedication to performance evaluation.

Thank you to Lone Creek Cattle Company for sharing this data.

Genetic Correlations and changes over the years in the Angus breed:

In review of the history and development of Angus, the first Angus arrived in the USA in 1873. Twelve hundred cattle were imported from Scotland, mostly to the Midwest, in a period of explosive growth between 1878 and 1883. On Nov. 21, 1873, the Association was formed with 60 members. Early involvement in the purebred industry relied on the showing for evaluation, and winning in the showing for a marketing strategy. But leadership in the Angus Association understood that income from cows was expected to make the farm payment - Profit being a matter of pounds and the inputs it takes to generate them. The Association was launching into the performance movement. Angus Herd Improvement Records were introduced in 1958. The Association issued its first performance pedigree in 1966 and calculated its first estimated breeding values (EBVs) for growth in 1972. In March 1974 the Association published its first Angus Sire Evaluation Report. At the time, the Angus business was floundering. Registrations had peaked in 1968 at 406,310, but the breed's small, compact frame was becoming more and more a detriment. The late 1960s push for growth and performance was starting to deter people from buying the smaller-framed, early-maturing cattle. Commercial breeders looked elsewhere, and when they couldn't find answers with the British breeds, they turned to Continental bloodlines from overseas. Through the use of EPDs, Angus breeders were able to increase the growth and performance of the breed while maintaining its position as the calving-ease leader. Registrations were on the rebound at the turn of the century, reaching 271,222 in fiscal year 2000.

The table right shows the average Angus birth weight and yearling weight by year. Alternate years /bull calves only have been selected. Weights are in pounds. The data was copied from the American Angus Assoc. Sire Evaluation report page 4.

A 15 pound increase in birth weight from 1973 to 1989 (about 1 lb/yr) increased yearling weight by 202 pounds (more than 12 lbs/yr).

Year	Birth Weight	Yearling Weight
1973	68	857
1975	69	866
1977	72	881
1979	73	901
1981	75	926
1983	78	938
1985	80	978
1987	81	1010
1989	83	1059
1991	83	1067
1993	82	1077
1995	82	1081
1997	82	1087
1999	82	1114
2001	82	1120
2003	81	1140