Understanding and Using ASA's

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The first Simmental EPDs were published in the mid eighties. I remember it vividly, as they created quite a stir. Many breeders (myself included) were resistant to using them. Since then, EPDs have become the industry's most heavily used tool for genetic improvement and I've certainly changed my tune. Though we've had the benefit of EPDs in our tool chest for over twenty years, having EPDs without economic selection indexes is a bit like having superhighways without maps—you can drive fast but can't be sure you're traveling in the right direction. Indexes provide the maps.

Our first indexes, the Terminal (TI) and All-Purpose (API), were published in the Spring '05 Sire Summary. They are also available online for all animals that have EPDs on the traits the index is composed. These indexes provide the most powerful tools for genetic improvement our breed has ever seen. Their power lies in the fact that they use economic data to objectively weight EPDs in a manner that results in a map to the maximum overall genetic improvement possible.

In developing the indexes, we used price and cost data averaged over the last 5 years as reported by Cattle Fax. Everything, from the cost of hay and corn to price grids on quality grade, yield grade and carcass weight is taken into consideration in our indexes. As with any power tool, it helps to develop a basic understanding about how they work before using them. A short synopsis of the two indexes and how to use them follows.

API. The API evaluates sires being used on the entire cowherd (bred to both Angus first-calf heifers and mature cows) with a portion of their daughters being retained for breeding and the steers and remaining heifers being put on feed and sold grade and yield. All EPDs, with the exception of tenderness, are taken into consideration in this index.

To provide a barometer on how the API weights traits, I've calculated the average EPDs of our top 25 active sires for API.

Average EPDs for the top 25 API sires:

CE	WW	YW	MCE	MLK	STAY	CW	YG	MRB	API	TI
12 (5)	21(95)	40(90)	8(10)	7(40)	17(5)	-8(70)	.0(50)	.12(30)	27(1)	17(50)

Percentile rank among actives sires is in parenthesis.

As you can see, the API puts heavy emphasis on bulls with good STAY (an estimate of the likelihood of a bull's daughters staying in the herd). This should come as no surprise; research has consistently shown that reproduction trumps all else in economic importance. STAY improves your bottom line by lessening the need for replacement females. Reducing your requirement for replacements allows you to market more young, high-value females, cuts your costs for heifer development and changes your herd's age structure so a larger portion of your females are in their most productive years (5 through 10).

Direct and maternal calving ease also get substantial weighting in the API. This is because they are strongly associated to calf survivability and, to a lesser degree, female longevity. Given that milk is essentially neutral in the index (the top 25 API bulls are only in the top 40% for milk), we can conclude that the benefits of increased weaning weight due to milk is negated by the additional cost associated with increased milk production.

It may be difficult for breeders to accept that the API places downward selection pressure on growth, as it is counter to the direction taken in most breeding programs. Though increasing growth is invariably a good thing in terminal sires, its strong association with mature size makes it less desirable in replacement female sires, as increasing mature size increases cowherd maintenance requirements. Keep in mind that the positive benefits of increased growth in sires' steers and cull females are accounted for in the API. Nevertheless, the index is telling us that the extra cost of maintaining larger cows outweighs the benefit of increased growth in other areas of the system. Even so, the API is evidently finding sires with more carcass weight than would be expected given their growth potential. (The top 25 average in the 95 and 90th percentiles for weaning and yearling weight, while reaching the 70th percentile for carcass weight.)

From the top 25, it is evident that more weight is placed on marbling than yield grade. This is likely because there is no financial incentive to improving yield grade unless there is a problem (i.e. yield grades reach 4); for the most part, due to Simmentals superior yielding ability, SimAngus half-bloods see few discounts for yield grade.

TI. The TI is designed for evaluating sires' economic merit in situations where they are bred to mature Angus cows and all offspring are placed in the feedlot and sold grade and yield. Consequently, maternal traits such as milk, stayability and maternal calving ease are not considered in the index.

New Economic Selection Indexes

Average EPDs for the top 25 TI sires:

CE	WW	YW	MCE	MLK	STAY	CW	YG	MRB	API	TI
11(10)	49(5)	86(3)	4(35)	3(70)	7(60)	6(25)	.00(50)	.22(10)	-4(70)	33(1)

Percentile rank among actives sires is in parenthesis.

Unlike the top 25 API sires, these are "king of the hill" growth sires. What we can conclude from this is that, even when the increased feed consumption associated with higher levels of growth is taken into consideration (which the index does), heavy selection on growth is warranted in terminal sires—certainly not much of a revelation.

The top TI sires are higher marbling and carcass-weight sires than the API sires. Though the same price grids were used for carcass traits in the API and TI, having fewer traits to select for in the TI allows more weight to be put on these traits. As with the API, the TI puts little emphasis on yield, apparently a function of SimAngus half-bloods not having a yield grade problem.

TOP 25 ALL PURPOSE INDEX SIRES

ASA NUM	NAME	CE	WW	YW	MCE	MM	STAY	CW	YG	MB	$API	$TI
1425514	BLACK IRISH KANSAS	12	30	61	12	2	25	-4	-0.06	0.01	$35	$20
1958408	GW MR. MATERNAL 134G	14	6	21	8	11	18	-9	-0.03	0.04	$34	$12
2037400	GSR BK IRISH J65	3	-7	6	8	12	14	-3	-0.01	0.02	$32	$6
2122242	FOSS L126	13	12	33	7	7	18	-4	-0.04	0.05	$30	$15
1751384	RAINS BLACK 271D	13	16	24	10	0	15	-10	-0.04	0.08	$29	$16
1773718	SHOESTRING BLACK DNA175C	16	12	27	6	7	15	-8	-0.02	0.02	$29	$16
2133090	KAPPES DURAMAX L172	16	24	46	7	10	15	6	-0.06	0.46	$28	$26
1929796	SCF-SSS BLACK EVOLUTION	7	11	28	13	12	18	-30	-0.08	-0.01	$28	$7
1757255	PPSR BLACK AVENGER 108D	13	29	45	12	12	19	3	-0.07	-0.07	$27	$20
2095237	SHOESTRING 2U J110	13	32	47	3	1	18	-7	-0.02	0.14	$27	$23
1884316	NICHOLS SHANNIGAN F5	17	27	62	15	-9	19	-16	-0.15	-0.20	$27	$20
2146802	3C LIFETIME L342-B	13	25	36	2	3	16	-1	0.11	0.15	$26	$20
2094098	PPSR MONTANA STYLE 37K	13	29	55	6	6	19	4	0.02	0.14	$26	$22
1600900	ER BIG SKY 545B	11	21	29	3	13	15	-18	0.01	0.36	$26	$19
2102934	NUWAY L MISSISSIPPI	9	23	47	9	3	19	-4	-0.06	0.02	$26	$15
1309365	BLACK MICK	8	24	46	12	13	19	3	0.00	0.07	$26	$16
2008405	WESTFALL ORION	9	20	37	3	10	20	-30	-0.17	0.05	$26	$13
1941528	HART EXTRA EFFORT G289	10	13	25	3	5	16	-9	0.00	-0.03	$26	$11
2023000	SHOESTRING BLACK ii's	16	19	49	5	7	16	-13	-0.10	0.13	$25	$20
2002262	MSR 837H OF 300F CHARLY	13	12	13	4	2	13	-35	-0.04	0.01	$25	$12
2144695	WCM KENWORTH 14L	10	28	48	6	9	19	-16	0.00	0.14	$25	$19
2045172	PLAINVIEW MIDNIGHT 208	12	25	48	8	6	18	-5	-0.03	0.06	$25	$19
2081939	HOOK'S SHEAR FORCE 38K	17	21	37	7	15	12	-14	-0.07	0.47	$25	$25
1757254	PPSR MONTANA IRISH 107D	8	34	64	9	1	19	8	0.04	0.19	$25	$22
2037259	RING J923	10	16	36	5	9	16	-4	0.00	0.12	$25	$14

TOP 25 TERMINAL INDEX SIRES

ASA NUM	NAME	CE	WW	YW	MCE	MM	STAY	CW	YG	MB	API	TI
1268334	FS BLACK JACK XPPQ	8	96	136	4	-9	-3	-4	0.00	0.07	-$39	$44
2068996	DAUME LUCKY NUMBERS J955	17	45	82	4	7	9	20	-0.09	0.42	$7	$36
2107286	CCR ECCO PERFECTOR Z17K	10	53	87	1	12	6	5	0.09	0.51	-$4	$34
2022999	SHOESTRING JW TAYLORH206	16	49	89	5	-3	19	-4	-0.06	0.33	$21	$34
2075439	OMF SEVENDUST K13	16	50	78	3	11	8	5	-0.02	0.24	$3	$34
2063935	GFI REMINGTON K43	15	51	84	2	7	6	-5	0.04	0.23	-$3	$33
2123626	MEYERS BONUS	10	55	94	-1	5		18	0.06	0.25	NA	$33
2101834	LEARN'S CUSTER	9	66	101	4	0	1	-1	0.03	0.04	-$23	$33
2124325	NICHOLS SHANNIGAN L196	12	50	92	6	-8	11	3	0.11	0.41	$8	$33
2169604	NICHOLS SHANNIGAN M35	12	51	92	7	-3	11	18	0.16	0.25	$7	$33
2144283	WHW FULL FIGURES 855L	11	53	83	3	3	8	-4	-0.02	0.31	-$1	$32
1892577	BS & JF MR STOCKMAN 021F	11	61	83	4	-13	6	-6	-0.04	0.05	-$7	$32
2144511	TNT BLACK ICON L123	12	50	80	9	0	9	21	0.14	0.21	$5	$32
2036903	NICHOLS SHANNIGAN J22	16	48	85	10	-8	11	4	0.05	0.11	$9	$32
1975187	WLE OVERLOAD	5	53	116	-3	-5	7	26	0.11	0.41	-$11	$32
1998886	DS SIX SHOOTER 3H	20	38	81	9	14	9	10	-0.10	0.11	$7	$32
2107959	RCC/TCF TOTALLY DIFFEREN	14	52	86	4	8	5	5	0.12	0.10	-$6	$31
2110116	BROOKS ABOVE PAR	13	52	87	2	7	8	4	0.06	0.17	-$2	$31
2124366	NICHOLS JETTOP L64	5	67	113	2	-3	12	11	-0.06	0.03	-$10	$31
2036909	NICHOLS LANDROVER J38	6	56	97	3	-15	8	23	0.00	0.25	-$5	$31
1979776	PSF SHOCKWAVE H7	2	75	106	5	-12	4	-4	-0.02	0.04	-$23	$31
2121276	NLC LINUS L358L	7	60	101	4	3	5	1	0.04	0.20	-$13	$31
2066025	RJM FULLY LOADED K144	8	54	99	0	0	7	8	0.06	0.28	-$8	$31
2161700	SAS SMOKIN JOE	8	62	93	5	5	6	4	0.06	0.02	-$13	$31
2003767	TNT IMPACT H21	10	51	83	6	-1	7	-4	0.05	0.32	$0	$31

Understanding and Using ASA's New Economic Selection Indexes

Given their extreme growth rates, it seems surprising that the top TI sires have as much calving ease as the API sires. Again, this is likely a function of there being fewer traits to select for in the TI. It may also come as a surprise that the top TI sires are different than average for traits not considered in the index (MCE, MLK, STAY); after all, we're not selecting for those traits. This is a good illustration of correlated response—altering traits due to selection on related (correlated) traits.

Using Indexes. The indexes calculate the estimated differences between bulls in net dollars returned per cow exposed. For example, a bull with a +23 and +1 for TI and API would be expected to return $23 and $1 more per cow exposed than a bull with a 0 for both indexes. Besides being a tool to improve seedstock, commercial producers can use these indexes to determine how much a bull is worth. Or, put another way, how much they can pay for one bull compared to another. For example, when buying a terminal sire, a producer can quickly figure a bull scoring +30 for TI is worth an extra $3,600 over a $0 bull if both are exposed to 30 cows over 4 years ($30 x 30 hd x 4 yr = $3,600).

An important point is that our index values, like our EPDs, are for comparison purposes only; they can't tell us how much actual profit to expect. For example, though you may net $30 more per cow exposed using one bull over another, the matings could still be unprofitable. Furthermore, do not compare ASA's index values with those of another breed; they are only designed to compare Simmental bulls within our genetic evaluation.

From the top 25 lists, it is obvious that terminal sires are different than all-purpose sires. Though there are a few sires that rank well in both areas, the average of the elite group in one index is only run of the mill in the other. This points out the importance of determining how customers use your bulls; matching sire selection to their needs will certainly enhance their bottom line. Ultimately, developing separate terminal and all-purpose lines may be necessary to meet all of your customers' requirements.

Another thing to keep in mind is that these are broad-based, one-size-fits-all indexes. It is unlikely that all of your customers' programs fit neatly into the TI or API scenarios. For example, your customers may sell to a niche market that heavily rewards prime beef or have Brahman-based cows. This may necessitate the use of more scenario specific indexes. Even so, our indexes will tend to rank sires well under most real-world scenarios.

Unlike EPDs, indexes don't have associated accuracy values. That's not to say that accuracy shouldn't be considered when using them. Indexes are a function of EPDs. If an index is heavily influenced by one of its component traits, STAY in our API for example, a change in that trait can substantially alter an animal's index value. If an animal has high-accuracy EPDs for the influential traits in an index, you have little to worry about (though a dramatic change in economics could still upset the apple cart). If the influential traits are of low accuracy, however, it would be wisest to "hedge your bets" by using a sampling of low-accuracy sires with similar index values. Though these low-accuracy sires are sure to move up and down, the average of their index values will settle around what you expected. ◆