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Dairy Update

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DETERMINING WHEN TO HARVEST STAY-GREEN CORN HYBRIDS

Adegbola Adesogan

Several Florida dairy producers have observed an increased incidence of digestive upsets, Variable Manure syndrome and Hemorrhagic Bowel syndrome in their cows in recent times. These problems have greatly affected the productivity of such herds, and many producers attribute the problem to feeding corn silage made from hybrids with high staygreen rankings. To address this problem, the University of Florida embarked on a series of studies aimed at understanding the influence of the staygreen ranking on the nutritive value of corn hybrids and milk production. This summary presents the results of the first of those experiments, which aimed to determine the effect of maturity at harvest on the nutritive value and aerobic stability of corn hybrids differing in staygreen ranking.

Southeast Milk, Inc.
Dairy Check-Off

One high staygreen corn hybrid and one average staygreen hybrid with similar relative maturity (118 d) were selected from Pioneer Hi-bred and Croplan genetics hybrids. The high staygreen hybrids were Croplan genetics 827 and Pioneer 31Y43, while average staygreen hybrids were Croplan genetics 799 and Pioneer 32D99. The four hybrids were grown on four replicate, 1 x 6 m plots. The hybrids were harvested at 26 (Cut 1), 34 (Cut 2), and 39 (Cut 3) % DM, yield was assessed and some selected plants were separated into ear and stalk fractions for chemical analysis. The rest of the forage from each plot was ensiled (15 kg) within plastic bags in mini-silos for 100 days and then analyzed.

In the freshly harvested plant, yield was similar at Cuts 1 and 2, and higher at Cut 3. High staygreen hybrids had greater stalk crude protein concentration, lower stalk DM and lower stalk sugar concentration than average staygreen hybrids. Whole plant digestibility was also lower in higher staygreen hybrids than average staygreen hybrids.

The staygreen ranking or source (seed company) of the hybrids did not affect silage fermentation, but high staygreen hybrids had greater crude protein and lower starch concentrations than average staygreen hybrids. High staygreen silages tended to be less digestible, than average staygreen hybrids. This suggests that processing is required to improve the digestibility of high staygreen hybrids.

Dry matter and starch content increased with maturity while residual (post fermentation) sugar and crude protein content decreased. Silage pH increased with maturity while ammonia-N, lactic acid and acetic acid concentrations decreased. Yeasts increased with maturity while molds decreased but aerobic stability was unaffected by maturity.

This study therefore indicates that staygreen corn hybrids should be harvested at the intermediate maturity stage (34% DM, Cut 2) to optimize nutritive value and yield. High staygreen hybrids seem more likely to have lower DM and sugar concentrations than low staygreen hybrids and such high staygreen hybrids should be processed to improve their digestibility and ensure proper starch release from the kernel. Staygreen ranking did not affect the normal fermentation indices. Further work on the effects of staygreen on milk production in cows is currently being done.

For more information, contact Dr. Adegbola Adesogan by email at adesogan@animal.ufl.edu, or (352) 392-7527.

MILK QUALITY

David R. Bray

The latest National DHI Somatic Cell Count (SCC) data is out and congratulations to the Florida dairymen for having the greatest reduction in SCC in the nation, dropping from 633,000 to 475,000 even with all the hurricanes that hit in 2004. Georgia also reduced their counts more than 60,000. It is important to keep our SCC on a downward trend to protect our market. We still have to contend with the PETA Puss heads and those who get paid to lower their counts and can't understand why we aren't as low as they are "up north".

Keeping SCC low in the Southeast is an expensive ordeal. We don't get paid for it, our hot, humid and wet conditions increase mastitis rates, which increase treatment costs and dumped milk. Florida dairymen have been almost free of contagious mastitis organisms for a few years, which means we have been able to milk cows well enough to do that. Increasing cow comfort will pay for itself with more milk production and better animal health due to less stress on our animals. I think that the future of dairy cow health in the Southeast will improve because more cows will be in barns due to environmental concerns. This will allow us to take better care of our cows, and we better take better care of the cows to pay for the barns.

Every dairyman's goal should have the lowest SCC as they can economically produce, and the state to have a SCC average below 400,000. We should also recognize that we still have many dairymen who do not have the facilities and or are at a point in their life that they don't want to spend huge amounts of money to upgrade their dairy. That will not help decrease our average, but if they produce milk within the legal limits and want to stay in the dairy business, that's their right.

Right and wrong ways to lower your SCC

There a variety of ways to have a low bulk tank SCC, some are economical, some are not.

1. You milk clean dry udders, post dip, dry treat all cows going dry, treat clinical mastitis as it appears, keep records so you can cull chronic cows (those that are treated more than five times in a lactation), keep cows clean, cool and comfortable, keep milking equipment in good repair. This method should be most economical and is sustainable.
2. You think you are doing # 1 above, but your help is not doing it. Once your SCC is high you try to find high animals and treat them, and treat them again and again, not knowing if they are new cases of mastitis or chronic cows. This is not an economical method and is expensive.
3. You don't know what is happening, same as above in # 2.
4. You have a low SCC because you over-treat. You treat every high cow on the monthly SCC list every month whether she needs it or not. This will give you a low SCC and a high pot herd and is very expensive.

Once the SCC elevates or the number of clinical mastitis cases increase you need to know why. If the cows are outside and it is wet and summer, that should not be a surprise. It is part of your plan: you are not paying for a barn but are paying the cost of not paying for a barn. The secret here is to keep lots as clean as possible and knowing that this will happen every year, you need to have your SCC at or below 500,000 before summer starts so you stay legal.

What size should my pot herd be?

Answer: as small as possible. There are a variety of goals or suggestions. I have data on 20+ large dairies in another state and the SCC of these herds ranges from 150,000 to 550,000 and a range of 1.0 % to 7.7% of the cows are in the mastitis herd per month. Some of low SCC herds had a high treatment rate and vice versa.

Treatment suggestions

1. Clean the teat ends with alcohol pads first, use only commercial tubes to put anything in the udder, NO EXCEPTIONS.
2. Follow directions on the box; if it says treat every 12 hours that means every 12 hours, if you can't treat every 12 hours, use a tube that is for 24 hours. You only make resistant bacteria by the wrong time of treatment.
3. If you are going to use extended treatments, check with your veterinarian for options and milk withholding times.
4. Keep records.
5. Cull chronic cows, five episodes of mastitis per lactation is the end of the productivity of that cow.
6. We suggest you have a bulk tank sample analyzed, large herds (1000+ cows) done every week, smaller herds once a month or more often if you purchase replacements. A lot of those "Yankee" cows and fresh heifers are rotten. This will inform you if you have any contagious pathogens that will pass from cow to cow, or environmental pathogens that don't pass from cow to cow.

Need help or got any questions?

If you have a mastitis problem and want some help, give me a call or e-mail: Dave Bray, (352) 392 5594, bray@animal.ufl.edu.

MANURE MANAGEMENT – SUSTAINABLE PRACTICES

Ann C. Wilkie

Check out the latest publications on the subject of manure management at http://dairy.ifas.ufl.edu/manure.html. These publications include papers by Dr. Ann C. Wilkie, describing the benefits of anaerobic digestion technology, design and process considerations for anaerobic digestion of dairy manure, and anaerobic digestion of flushed dairy manure using a fixed-film digester. There is also a report available from the National Dairy Environmental Stewardship Council, a collaboration between dairy producers, environmental organizations, U.S. Department of Agriculture, U.S. Environmental Protection Agency and academics which was formed by Sustainable Conservation and Environmental Defense. Art Darling and Ann Wilkie are council members. The report, entitled "Cost-effective and Environmentally Beneficial Dairy Manure Management Practices," outlines how innovative dairy producers are transforming manure into a valuable farm asset. The report provides detailed examples of cost-effective manure management strategies to assist producers in matching manure nutrients to crop needs and capturing nutrients in dairy manure. The report also includes implementation strategies and a list of funding resources available to assist dairy producers with sustainable manure management. Paper copies of the report are available from Dr. Wilkie.

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COMPARING THE ECONOMIC IMPORTANCE OF GENETIC IMPROVEMENTS IN MILK PRODUCTION, REPRODUCTION, AND PRODUCTIVE LIFE

Albert de Vries

Florida dairy producers have access to genetic evaluations for many traits that are economically important. These traits are combined in economic selection indexes to rank bulls and cows for total profitability. Currently, USDA-AIPL calculates the genetic merit of 11 economically important traits for bulls and cows 4 times per year and combines them into 3 lifetime merit indices: net merit (NM$), cheese merit (CM$), and fluid merit (FM$). A lifetime merit index is the expected total additional profit, in dollars, during a cow's lifetime as compared to the total profit of a breed average animal. Lifetime is considered to be 3 lactations. The true economic values of genetic improvement for individual farms depend considerably on the market prices of milk, fat, feed, heifers, cull cows, etc. This article discusses how USDA-AIPL arrives at its economic values for milk production, reproduction, and productive life and how these economic values may vary on Florida dairies.

Genetic merit of a trait in mature animals can be expressed as predicted transmitting ability (PTA). The PTA is half an animal's expected breeding value, equivalent to the genetic worth that is expected to be transmitted to its offspring. PTAs are expressed as differences from the breed base. The breed base is equivalent to the genetic merit of an average animal in the population and is occasionally recalculated by USDA-AIPL (once every 5 years).

The PTA for milk production is divided in PTAs for milk yield, fat, and protein. All are measured in total pounds per 305-day lactation in a mature cow. Thus, a PTA milk of 1 implies one pound more milk in 305-days compared to the breed base. The expected extra lifetime milk production is 3 lactations.

USDA-AIPL provides genetic evaluations for daughter pregnancy rate (DPR) as a measure of reproductive efficiency. DPR is defined as the percentage of nonpregnant cows that become pregnant during each 21-d period. Pregnancy rates on Florida dairy farms range from below 10% to over 20%. An increase in the PTA DRP of 1 implies a one percentage unit better pregnancy rate, say from 15% to 16%. Each increase of 1 in PTA DPR equals a decrease of 4 PTA days open per lactation.

Productive life (PL) refers to the time between first calving and removal from the herd by voluntary or involuntary culling, or death. The PTA PL is a measure for total added lifetime (not per lactation), expressed in months.

Table 1 shows the variation in PTAs for milk, fat, protein, DPR and PL in the August 2005 USDA-AIPL Holstein Sire Summaries (200 sires).

Table 1. Minima and maxima of PTAs for milk, fat, protein, daughter pregnancy rate (DPR), and productive life (PL) in the August 2005 USDA-AIPL Holstein Sire Summaries.

PTA	PTA Milk (305-d lbs)	PTA Fat (305-d lbs)	PTA Protein (305-d lbs)	PTA DPR (%)	PTA PL (months)
Min.	285	15	16	-2.1	-2.0
Max.	3110	102	81	2.7	5.0

Source: http://aipl.arsusda.gov/

The amount of genetic progress in the daughter does depend on the environment and management of the farm. Typically, well managed herds will see larger responses than herds where the environment and management is not as favorable for cows. But the genotype by environment interactions are not large enough to justify separate genetic evaluations for each production system (J. Dairy Sci. 87:501). In other words, the top bulls remain the top bulls regardless of the type of herd they are used in.

Each trait in the lifetime merit indices is assigned an economic value by USDA-AIPL (Table 2). This value allows dairy producers to compare the importance of improvements in say milk production with the values of improvements in DPR or PL. An economic value is the profit change when a given trait changes by one PTA unit, and all other traits in the index remain the same. The only difference between NM$, CM$ and FM$ is the way the milk is valued. The FM$ index is most appropriate in markets where milk is sold for fluid consumption such as Florida. For example, the expected value of a daughter of an average cow and a Holstein sire with +70 lbs for protein, +80 lbs for fat, +2000 lbs for milk, +2.5 months for PL, and +0.3 % for DPR under FM$ pricing is 70 x $1.33 + 80 x $2.54 + 2000 x $0.051 + 2.5 x $26 + 0.3 x $17 = $574 compared to a breed base average animal.

Table 3 lists the USDA-AIPL prices for protein, fat, and milk yield and the resulting economic values for these production traits. The economic values are calculated as (component price – feed cost) x 0.89 x 3 lactations (0.89 converts ME milk to actual milk). For example, 1 lbs of fat per lactation is worth $1.30 but the feed cost to produce it is $0.35. Therefore, profit per lactation is on average ($1.30 – $0.35) x 0.89 = $0.85 and for all 3 lactations (lifetime) it is $0.85 x 3 = $2.54.

Table 2. Economic values of the 11 traits in the net merit (NM$), fluid merit (FM$) and cheese merit (CM$) indices as calculated by USDA-AIPL in 2005.

Trait	PTA Units	Economic Value ($/PTA unit) NM$	CM$	FM$
Protein	Pounds	4.81	6.68	1.33
Fat	Pounds	2.54	2.54	2.54
Milk yield	Pounds	0	-0.056	0.104
Productive life	Months	26	26	26
Somatic cell score	Log	-166	-166	-166
Udder	Composite	33	33	33
Feet/legs	Composite	15	15	15
Body size	Composite	-12	-12	-12
Daughter pregnancy rate	Percent	17	17	17
Service sire calv. difficulty	Percent	-5	-5	-5
Daughter calv. difficulty	Percent	-5	-5	-5

Table 3. Milk component prices and economic values used by USDA-AIPL for NM$, CM$ and FM$.

Index	Milk yield ($/lbs)	Fat ($/lbs)	Protein ($/lbs)
NM$ price	0.012	1.30	2.30
CM$ price	-0.009	1.30	3.00
FM$ price	0.051	1.30	1.00
Feed cost	-0.012	-0.35	-0.50
Lifetime (# lactations)	3	3	3
Economic Values:			
NM$ (lifetime)	0.000	2.54	4.81
CM$ (lifetime)	-0.056	2.54	6.68
FM$ (lifetime)	0.104	2.54	1.34

One pound of milk with 3.5% fat and 3.0% protein is worth 1 x $0.051 + 0.035 x $1.30 + 0.03 x $1.00 = $0.1265. The feed cost to produce this pound of milk are 1 x $0.012 + 0.035 x $0.35 + 0.03 x $0.50 = $0.039. The economic value of a pound of actual milk with 3.5% fat and 3.0% protein in 1 lactation (305-days) in the FM$ index is therefore ($0.1265 - $0.039) x 0.89 = $0.078 or $0.233 lifetime (3 lactations). In other words, USDA-AIPL assumes that the economic value of marginal milk income over marginal feed cost is $0.078 per pound. The average feed cost on dairies in Florida ranges from $0.06 to $0.08 per pound of milk. At a $0.17 per lbs milk price, this means an income over feed cost in the range of $0.09 to $0.11. The marginal value of an extra pound of milk in Florida is therefore probably significantly higher than $0.078. If this value is say $0.10, then the lifetime value of milk (3.5% fat and 3.0% protein) is $0.330 instead of $0.233.

The PTA DPR is calculated from information on days open. USDA-AIPL assumes a day open costs $1.50. This does not include the increased cost for cow replacement due to reproductive failure because that is included in the cost of productive life. The lifetime value of 1 day open per lactation is 2.8 x $1.50 = $4.20. The factor 2.8 is based on the assumption that fewer breedings are attempted in the third lactation and includes an adjustment for heifer fertility. Because 4 days open is equal to 1% DPR, the economic value of 1 unit PTA DPR is 4 x $4.20 = $16.80, or rounded $17. This is the DPR value in Table 2.

Many studies have shown that the value of a 1 percentage unit increase in pregnancy rate increases when the average pregnancy rate in the herd is lower. Figure 1 shows some estimates of the change in lifetime profit per cow per percentage unit change in pregnancy rate for a simulated typical Florida herd. Pregnancy rate was varied from 10% to 34%. The economic value of a one percentage unit change in pregnancy rate ranged from $7 to $65 when the cost of increased cow replacement was included. However, if the cost of increased cow replacement was excluded, then the change in lifetime profit ranged from only $6 to $25. These latter values can be compared to the USDA-AIPL estimate of $17. The economic value of genetic improvement in DPR clearly depends on the average pregnancy rate in the herd and can be significantly higher or lower than $17.

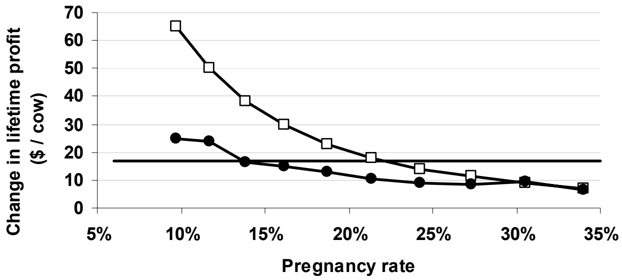

Figure 1. Change in lifetime profit per cow for a change of one percentage unit in pregnancy rate. The top curve (□) is change in lifetime profit including the cost of cow replacement. The bottom curve (●) is the change in lifetime profit per cow excluding cow replacement cost. The USDA-AIPL estimate (−) of $17 also excludes cow replacement cost. Lifetime is 3 lactations.

The USDA-AIPL estimate of the value of productive life accounts for the opportunity cost of delayed replacement because extending the productive life of one cow denies the opportunity to make a profit with a replacement animal in the same slot. The basic calculation is (heifer price – beef price) / lifetime. In 2000, USDA-AIPL assumed a heifer price of $1240 and a beef price of $525. The economic value of 1 month PTA PL could therefore simply be estimated as ($1240-$525) / 30 = $24, but USDA-AIPL used $28 per month in 2000. Currently, the economic value of 1 month PTA PL is set at $26 per month. This value can be considered the straight-line monthly depreciation of a dairy cow. Table 4 shows how the economic value of 1 month PTA PL varies from $16 to $59 for different heifer prices and annual cull rates. Lifetime (in months) is calculated as 1 / annual cull rate x 12.

Table 4. Estimates of the economic value of productive life for various heifer prices and herd lifetimes.

Beef price	Heifer price	25% 48.1	35% 34.3	45% 26.7	Annual cull rate Lifetime (months)
525	1300	$16	$23	$29	
525	1700	$24	$34	$44	
525	2100	$33	$46	$59	

Because the economic values in the lifetime merit indices in Table 2 are all expressed as lifetime benefits, we can easily compare the relative value of 1 unit change in milk production, DPR, and PL. Table 5A lists the economic values for these traits for USDA-AIPL and two hypothetical farms A and B. Farm A has a low cull rate, raises its own heifers and its pregnancy rate is high. Farm B has a higher cull rate and a lower pregnancy rate. The lifetime marginal value of 1 lbs milk in 305-days is assumed to be $0.33. Table 5B is a comparison of the relative values of a 1 unit increase in one trait compared to increases in other traits. For example, using the USDA-AIPL economic values, the value of 1 month extra PL is equivalent to 112 lbs more milk (3.5 % fat, 3.0% protein) per 305 days in lactation.

Table 5A. Economic values for productive life (PL), daughter pregnancy rate (DPR), and milk according to USDA-AIPL and for 2 hypothetical farms A and B.

	USDA-AIPL	Farm A	Farm B
1 month PL	$26	$16	$36
1 % DPR	$17	$10	$24
1 lbs milk in 305-days*	$0.233	$0.33	$0.33

* Milk with 3.5% fat and 3.0% protein

Table 5B. Relative value of improvements in 1 unit PTA productive life (PL), daughter pregnancy rate (DPR), and milk according to USDA-AIPL and for 2 hypothetical farms A and B.

	USDA-AIPL	Farm A	Farm B	
1 month PL is worth:	111.59	48.48	109.09	lbs 305-d milk*
1 month PL is worth:	1.53	1.60	1.50	% DPR
1 % DPR is worth:	72.96	30.30	72.73	lbs 305-d milk*

* Milk with 3.5% fat and 3.0% protein

Ideally, every dairy should use its own economic values to rank bulls and cows for lifetime merit. But the effect of using different economic values for PL and DPR on the ranking and merit of the top 200 all Holstein sires evaluated by USDA-AIPL for FM$ in August 2005 is minor. For practical purposes, the USDA-AIPL ranking of sires seems adequate under conditions in Florida.

UF DAIRY CALENDAR OF EVENTS
http://dairy.ifas.ufl.edu

The **Southeast Dairy Management Conference** will be held in Macon, Georgia, on November 9-10, 2005. The event is co-sponsored by the University of Florida. The program is available on http://dairy.ifas.ufl.edu. For more information, contact Lane Ely, University of Georgia, (706) 542-9107, or laneely@arches.uga.edu,

The **17th Florida Ruminant Nutrition Symposium** will be held at the Best Western Gateway Grand in Gainesville on February 1-2, 2006. For the program and to register, visit http://conference.ifas.ufl.edu/ruminant/index.html. For more information, contact Charlie Staples, staples@animal.ufl.edu, (352) 392-1958.

The **3rd Florida Dairy Road Show** is planned at the UF/IFAS Extension Offices in:

- Okeechobee, FL, Tuesday February 28, 2006
- Mayo, FL, Wednesday March 1, 2006
- Chipley, FL, Friday March 3, 2006
- Tifton, GA, Tuesday March 7, 2006

The meetings will run from 10 AM to about 3 PM. For more information, contact Brent Broaddus, (813) 744-5519 ext 132, babroaddus@mail.ifas.ufl.edu, or Albert de Vries, (352) 392-7563, devries@animal.ufl.edu, or your local UF/IFAS Dairy Extension Agent.

The **43rd Florida Dairy Production Conference** is planned for Tuesday May 2, 2006, at the Hilton UF Conference Center in Gainesville, FL. For more information, contact or Albert de Vries at devries@animal.ufl.edu, (352) 392-7563.

The **2006 Corn Silage/Conserved Forage Field Day** is planned for Thursday May 25, 2006 at the Plant Science and Education Unit in Citra, FL. For more information, contact Jerry Wasdin at wasdin@animal.ufl.edu or (352) 392-1120.

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