

county Ag educator to send in a livestock water quality analysis to determine the sulfate content of the water. This winter some stocker cattle operators in Custer County, who were feeding safe levels of sulfur in byproduct feeds, experienced death of calves due to polio. The water in a 5 mile stretch of creek, was found to have high sulfur levels, which caused an additive effect when combined with the sulfur in the byproduct feed. Both the feed and water sulfur values combined to cause the problem. I would recommend testing all groundwater supplies before feeding byproduct feeds that are potentially high in sulfur.

### COW CALF: HETEROSIS...HYPE OR LEGIT?

For as long as the beef industry has existed, crossbred commercial cattle operations have made up the lion's share of the beef cattle population, and those "in the know" were telling producers to "clean up their acts." Now, it seems every publication you read or every expert you hear is talking about heterosis. So, you ask, "What's this fancy word 'heterosis,' and can I capitalize on it in my herd?" Well, simply put, heterosis is hybrid vigor. At the Noble Foundation's recent Beef Cattle Female Selection School, livestock specialist Clay Wright defined hybrid vigor as "the added advantage in performance of a crossbred over the average of its purebred parents." So, you say, "Hey, I've been doing things right all along and didn't even know it, right?" Well, not so fast...

There is more to hybrid vigor than just taking a crossbred cow and breeding her with any old bull. Numerous studies have been conducted over the years to look at this very subject. If you want to take full advantage of this phenomenon, there has to be some thought put into the process.

Hybrid vigor is most fully expressed when you use bulls and cows of known ancestry - not just breeding any bull to a cow you pick up from Joe down the road or you bought at the sale barn because the price was right. Work conducted at Texas A&M University by Dr. Jim Sanders has shown a 10 to 20 percentage point increase in calf crop born to F1 cows (a cow which is a first-generation cross between two breeds) when compared to straight-bred cows. The advantage will fall dramatically when F2 (F1 x F1 bred cows) or greater cows are used.

One of the most effective and simplest ways for calves to exhibit hybrid vigor is to use an F1 cow and a pure-blood bull of known performance and ancestry; this is what the Foundation livestock specialists have been suggesting to certain cooperators. Use of a pure-blood bull allows the producer to have some predictability of how the bull's progeny will perform. The prediction is made through the bull's EPDs. In the Foundation publication *Crossbreeding Beef Cattle for Western Range Environments*, Don Kress and Michael MacNeil stated that an average F1 crossbred cow returns up to \$70 more per cow per year than the average

straight-bred cow. To arrive at this number, they looked at the various traits (Table 1) that cross breeding affects and the advantage that hybrid vigor afforded to or detracted from the calf.


Trait	Individual heterosis <sup>a</sup> %	Maternal heterosis <sup>a</sup> %	Total heterosis <sup>a</sup> %
Calving rate	0	6	6
Weaning rate	0	8	8
Weaning weight	5	6	11
Yearling weight	4	.	4
% reaching puberty @ 15 mo.	15	.	15
Cow longevity	.	.	38
USDA carcass grade	2	.	2
Days on feed	-4	.	-4

After studying the table, it becomes obvious that a well-thought-out terminal crossbreeding program can work for many beef producers. Breeding a pure-blood bull to a crossbred cow is one way to maximize hybrid vigor (total heterosis in right-hand column of table). Research has shown, though, that taking crossbred bulls and breeding them with crossbred cows reduces the amount of hybrid vigor that can be expected. This is the reason the Foundation's livestock discipline is recommending an F1-type cow bred to a straight-bred bull of known performance data (EPDs) and ancestry. It does not matter if you are selling your calves at weaning, as yearlings or retaining ownership through the feedlot; you cannot afford to give up the advantages that hybrid vigor will convey to your bottom line.

Source: [Robert Wells](#), Ag Specialist, Ohio State University, Noble Foundation

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# AG NEWS

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**June 2007**

### THE BENEFITS OF GARDENS TO YOU AND THE ENVIRONMENT

Gardening has been part of the human experience for thousands of years. From our earliest gardening experiences of growing food to current urban reforestation projects, the need to be surrounded by greenery and beauty is part of human nature. Gardening adds quality to our lives.

Today over 85 million households across America enjoy some form of gardening. It is the No. 1 leisure time activity in America.

Here are some of the benefits of gardening:

**Environmental quality enhancement:** Plants play a key role in urban areas to improve the quality of the environment. Plants absorb greenhouse gases through photosynthesis, reduce glare from buildings and paved surfaces, absorb unwanted noise and moderate the climate by blocking wind and providing shade.

**Mind, body and spirit:** Numerous health studies have shown the benefits of gardening. The physical activity of gardening contributes to a healthy, active lifestyle and can provide as much exercise as a workout at the gym. Gardens also improve mental health by lowering stress and anxiety and by providing a relaxation response. Horticultural therapy programs have shown people of any age can enjoy these benefits.

**Reduced crime:** Recent university studies have shown the greener the surroundings, the fewer crimes occur against people and property. Compared with apartment buildings that had little or no vegetation, buildings with high levels of greenery had 52 percent fewer total crimes. In urban neighborhoods, relationships between neighbors were made stronger simply through the presence of more trees and grass in common spaces.

**Food for you and wildlife:** Gardening has many tangible rewards, such as producing fresh vegetables, fruit and herbs for homemade meals and area restaurants. It also provides culinary delights and a habitat for songbirds, butterflies and other wildlife.

Source: [www.scotts.com](http://www.scotts.com)

### VEGETABLES

#### Mulching Tomatoes

Soils are warm enough now that tomatoes can benefit from mulching. Tomatoes prefer even levels of soil moisture, which

mulches provide by preventing excessive evaporation. Other benefits of mulching include weed suppression, moderating soil temperatures and preventing the formation of a hard crust on the soil. Crusted soils restrict air movement into and out of the soil and slow the water infiltration rate.

Hay and straw mulches are popular for tomatoes but may contain weed or volunteer grain seeds. When using grass clippings apply as a thin layer – only 2 to 3 inches thick. Clippings should be dry because wet clippings can mold and become so hard that water can't pass through. Do not use clippings from lawns that have been treated with a weed killer until some time has passed. If a homeowner type weed killer has been used, clippings from the fourth mowing after treatment may be used. If the lawn is commercially sprayed and a product containing clopyralid has been applied, clippings should not be used as mulch.

#### 'Staggering' Sweet corn Planting

Sweet corn is one of those crops that is only "good" for a few days. If you want longer periods of production, consider staggering the planting. In other words, plant a small block, wait a period of time and then plant the next block. Though it is tempting to follow a calendar schedule, such as planting a small block every week, it is better to use crop development as a trigger. If you plant on a calendar schedule, you will note that later plantings often catch up with earlier ones. Instead, plant the next block of sweet corn when the previous one reaches 1/2 to 1 inch in height.

#### Cucumber Beetles and Bacterial Wilt

If you had cucumbers or muskmelons that suddenly turned brown and died last year, you may have had a disease known as bacterial wilt. The cucumber beetle carries this disease. Once a plant is infected, there is no cure, so prevention is the key. Because cucumber beetles overwinter as adults, early control measures are essential.

There are two types of cucumber beetles: striped and spotted. The striped cucumber beetle is the most common. The 1/4-inch-long beetles are conspicuously colored with black head and antennae, straw-yellow thorax, and yellowish wing covers with three distinct parallel and longitudinal black stripes. Young plants can be protected with row covers, cones, or other types of me-

chanical barriers. Edges must be sealed to ensure that beetles do not find a place to enter. Plants will eventually outgrow these barriers, or they will need to be removed to allow insect pollination of the flowers. Apply insecticides before beetles are noticed in the planting. Continue to spray weekly, at least until the plants start to run. Homeowners can use Sevin, Rotenone, or Methoxychlor. Once plants have started flowering, spray late in the evening after bees have returned to the hive. Check labels for waiting periods between when you spray and when the fruit can be picked.

#### **A “Hummingbird Harbinger” of Things to Come: Hornworms**

Actually, “the hummingbird” is not an actual hummingbird. Rather, it is a large sphinx moth – the tomato and/or tobacco hornworm moth. Sphinx moths are nicknamed hummingbird moths because of their large 4- to 5-inch wingspread, which approximates the small size of a hummingbird; their ability to hover like hummingbirds; and their elongated proboscis – akin to a hummingbird’s long beak – probing deep into open flowers. Tomato and tobacco hornworm moths are active now.

Tomato/tobacco hornworm moths deposit eggs that eventually give rise to the familiar “big-as-your-thumb” green worms with the “horn” on their posterior.

Given their initial small size and green color, young larvae are seldom detected and feeding damage is slight and inconsequential. The presence of hornworm larvae is usually first detected when stems have been stripped of their foliage. Even then the large worms are difficult to detect because they remain motionless.

To find early infestations, inspect tomato plants closely. This is not easy because there are many leaves that camouflage the eggs. Perhaps the best method for preventing tomato/tobacco hornworms is to screen individual tomato plants with mesh covering to keep moths from laying eggs. The covering will need to be expanded as plants grow. This is time-consuming and labor intensive and only practical in smaller garden plantings.

There are various synthetic insecticidal products available to homeowners for prevention. Organic options include products such as horticultural oils and soaps or products containing spinosad and *Bacillus thuringiensis*. It is the user’s responsibility to read product labels to ensure the safe and legal/intended use of the product.

### **CORN PRICES INCREASE AMERICANS' GROCERY BILL \$14 BILLION**

If you're producing anything that consumes corn, value-added may be the most likely source of future profits. At least this non-commodity approach seems like sound advice given the fact that ethanol-fueled corn prices have already catapulted U.S. retail food prices by \$14 billion annually. And that's a conservative estimate, according to a new study released last week by the Center for Agricultural Affairs and Rural Development at Iowa State University.

The study evaluated two scenarios. First, researchers looked at crude oil prices at \$55-60/barrel, which the study projects would result in U.S. ethanol production reaching about 15 billion gals./year. That serves up the \$14-billion increase in retail food prices. If crude oil moves to \$65-70/barrel -- the second scenario researchers considered -- the study projects the potential increase in U.S. ethanol production at nearly 30 billion gals./year. That pegs corn prices at about \$4.42/bu., and the increase in annual retail food prices at \$20 billion.

The study didn't expressly project the impacts of higher federal mandates on renewable fuels production and use. But the ethanol production levels evaluated in the two crude oil price scenarios roughly mirror some legislative proposals being considered in Con-

gress.

"We recognize the importance of the U.S. diversifying its energy sources to enhance energy security," said J. Patrick Boyle, president and CEO of the American Meat Institute, one of the study's sponsors. "But this study clearly shows we're reaching a tipping point, and that over-reliance on corn-based ethanol to meet stringent government mandates would further drive up retail food prices, reduce domestic meat and poultry production, and erode our vital meat and grain export markets."

Other survey sponsors included the Grocery Manufacturers/Food Products Association, National Cattlemen's Beef Association, National Chicken Council, National Grain and Feed Association, National Pork Producers Council and National Turkey Federation.

The study projected the following U.S. commodity impacts if season-average corn prices over a 10-year period ending in 2016 increased to \$4.42/bu.:

- **Pork:** Production costs would increase 36.8%, production would decline 9.2%, retail prices would increase 8.4% and exports would decline 21%, reversing 15 consecutive years of pork export growth.
- **Poultry:** Broiler exports would decline 15%, while turkey exports would fall 6%. Wholesale broiler prices would increase 15%, retail prices would increase 5%, and domestic consumption would decline 4%.
- **Beef:** Retail beef prices would increase 4% and production would decline 1.6%.

Significantly, since the study projects that the price of dried distillers grains with solubles will closely track increasing corn prices, the impacts of such price increases are nearly as significant for beef and dairy as for hogs and poultry.

The study indicates corn yield gains would ultimately provide sufficient additional corn stocks to moderate grain price increases if corn-based ethanol production peaks at 14-15 billion gals./year by 2010, when existing ethanol plants and those already under construction come on line. Using this scenario, the study projects corn prices would peak at about \$3.43/bu. in 2009 before leveling off at \$3.16/bu. by 2016. Ethanol production at that level would equate to approximately 10% of U.S. gasoline consumption.

The study projects cellulosic-based ethanol will likely provide little relief. The vast majority of ethanol growth for the foreseeable future likely will come from corn. Specifically, the study found that neither corn stover nor switch grass planting as replacement feedstocks for ethanol makes economic sense on U.S. acres capable of growing corn. It concluded that because of high conversion, handling, logistics and capital costs and constraints, cellulosic ethanol would be viable economically only if the U.S. government paid about \$270/acre in subsidies to entice producers to convert from corn to switch grass.

The study also examines the impacts of removing some acres from the Conservation Reserve Program (CRP), and eliminating the current tariff on ethanol imports. As the largest source of available U.S. tillable acres, the study suggests CRP acres could help alleviate some of the financial stress on livestock producers during the early years of rapid ethanol growth; these acres could mitigate short-term disruptions in grain supplies, too.

Still, the study finds that shifting 11 million of the 36 million CRP acres into crop production would only mildly temper the impact on long-term constrained supplies of basic commodities. It would add just more than 1% to corn supplies and reduce long-term corn prices by 2.2% (7¢/bu.) under the low-price crude oil scenario.

Visit [www.card.iastate.edu/publications/synopsis.aspx?id=1050](http://www.card.iastate.edu/publications/synopsis.aspx?id=1050) for the complete study.

### **WHAT'S THE VALUE OF EXPORTS TO U.S. CATTLEMEN?**

Even at a limited level, the value of beef exports is evident. "Korea's renewed interest in U.S. beef has already generated tremendous additional value," according to NCBA. And we're not talking chicken scratch, either. The recent sales to South Korea, limited though they are in volume, are calculated to be worth between \$40 and \$48 million to the beef industry.

Wholesale prices on the three cuts exported to Korea -- chuck rolls, brisket and deboned short ribs -- have risen recently and analysts say the reopening of the Korean market has added about \$31/head to the value of fed cattle sold the past 3-4 weeks.

### **ROPES USED TO DETECT E. COLI O157:H7 BACTERIA IN FEEDLOT CATTLE**

Food safety division scientists have found that hanging pieces of rope in feedlot cattle pens is an inexpensive, fast and convenient way to detect and potentially manage the *E. coli* O157:H7 bacteria in animals before slaughter.

"We're trying to get a handle on and keep track of the contamination levels of *E. coli* O157:H7 in livestock to prevent outbreaks that have happened in other parts of the country," says Margaret McFall, a food safety division (FSD) laboratory scientist with Alberta Agriculture and Food. FSD conducts similar studies regularly to support industry's commitment to improving food safety.

The study involved hanging ropes in feedlot pens the night before the cattle were slaughtered. "The ropes were used as sampling devices," says McFall. "When you put something strange in a pen, the animals are attracted to it and rub and chew on it, and the *E. coli* O157:H7 in their mouth can be transferred to the rope."

In this study, there were seven ropes hung per pen. Some of the pens held more than 300 head of cattle. The ropes were tested the next morning for the presence *E. coli* O157:H7. Fecal and hide samples were also taken to compare with the rope samples. *E. coli* O157:H7 can be transmitted to humans if meat, particularly ground meat, becomes contaminated and is not cooked properly.

The cattle from pens that are identified as having potentially high levels of *E. coli* O157:H7 could potentially be managed differently, controlling the spread of the bacteria. Processors manage to control contamination quite well most of the time but they would prefer that it never came in the plant in the first place. The FSD is very interested in developing mitigation strategies that are efficient and easily adapted for use in the food production industry.

Source: [CattleNetwork.Today](http://CattleNetwork.Today) 5/22/2007

### **SULFUR TOXICITY AND PLOLIOENCEPHALOMALACIA IN CATTLE**

*Gene Parker Jr. DVM*

In today's economy as more and more corn is used in the manufacture of ethanol, corn syrup, and other corn products we are finding that while corn prices are on the rise, corn byproduct feeds are available in ever greater supplies and at attractive prices. The livestock producer's need for economical feedstuffs is made even greater by the current weather pattern that has made forages more scarce and expensive than usual, and in many cases of poor quality. These byproduct feeds can be a valuable feed

resource, but they require more management and care in their feeding. One of the more common problems associated with byproduct feeds is sulfur toxicity resulting in polioencephalomalacia (PEM).

During the industrial process, the corn is treated with sulfuric acid. Since this chemical is valuable it is reclaimed as much as possible from the byproduct corn gluten. Batches vary widely, however, on how much sulfur is left in the feed. Unless batches are checked for sulfur content, it is hard to tell how much you can safely use in the ration. Sulfur also comes from other feeds in the ration and often from the water source. The following chart shows typical sulfur contents for various feedstuffs. Typically, if the sulfur content of the overall intake of the animal is between .3 and .4%, you can expect to see problems such as reduced feed intake and poor performance. When the averaged level is above .4% you can expect to see clinical disease. Therefore, if using feeds with high sulfur content, you must combine it with feeds containing low amounts of sulfur such as corn, sorghum, or silage to dilute out the possible toxic levels of sulfur.

Sulfur toxicity is usually not a problem in monogastric animals because most of the inorganic sulfur found in feeds is relatively inert. In ruminants however, problems occur because the microflora of the rumen convert the inert sulfates to sulfides which cause the problems. Initially the organisms' ability to convert sulfur is limited, but after 10 to 12 days on high sulfur feeds, the capacity to form sulfides is greatly increased. The sulfides are absorbed directly into the blood stream across the rumen wall, and also get to the lungs and brain tissue when the sulfides are belched with the rumen gases and then inhaled. The resulting condition is called polioencephalomalacia (PEM), which is necrosis of certain parts of the brain tissue.

Feed	Sulfur (% of DM)	Feed	Sulfur (% of DM)
Alfalfa hay	0.30	Corn steep liquor	0.70
Barley malt sprouts	0.85	Corn gluten meal	0.90
Beet pulp, dehydrated	0.22	Molasses, beet	0.60
Beet pulp w/ molasses	0.42	Molasses, cane	0.47
Blood meal	0.80	Sorghum grain	0.14
Brewers grains	0.40	Sorghum silage	0.10
Canola meal	1.17	Soybean meal	0.46
Corn, dent	0.14	Sunflower meal	0.33
Corn silage	0.12	Turnip root	0.43
Corn distiller grains	0.44	Wheat midds	0.22
Corn gluten feed	0.47	Whey, dehydrated	1.12

The clinical signs of PEM include head pressing into inanimate objects, fixed stare (star gazing), blindness, staggering, convulsions, recumbancy and death within 48 hours. Thiamine is a sulfur containing B vitamin produced by the organisms in the rumen. The relationship between thiamine, the enzymes that control it's levels, and PEM are not fully understood, but a complex relationship exists. Many times the administration of injectable thiamine is beneficial in the treatment of sulfur induced PEM, but sometimes nothing is effective. The degree of help derived from thiamine depends on the severity and longevity of the disease process. Some animals recover but always have CNS problems while some animals will return to apparently normal healthy status if taken off of the problem feed or water source soon enough.

Prevention of sulfur toxicity consists mainly of knowing the amount of sulfur in the byproduct feeds used and mixing it with a suitable amount of low sulfur feedstuffs to bring the total sulfur levels down to safe values. It may pay dividends to contact your local