



BIO-NEWS

FALL 2010

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Their alfalfa grows ... biologically

Healthy soils help Cal/West find alfalfa's genetic potential.

Would you take your best dairy cow and put her in a barren desert devoid of the nutrients she needs and expect her to be healthy and productive?

Put even the very best quality seeds in dead soils and they won't thrive, either.

And that was a major dilemma facing the researchers at the West Salem, WI research station of Cal/West Seeds.

"We were having challenges getting new alfalfa stands established on-station," recalls David Johnson, Cal/West's Assistant Director of Research. "Plants grew to a few inches tall and stayed stunted." In contrast, the same seeds grown in test plots at off-station locations were thriving and producing higher yields.

During the seeding year Cal/West on-station alfalfa trials were yielding about 3 tons per acre while their off-station trials conducted in farmer fields yielded up to six tons. The research farm's soil tilth was also poor, with tight soils and many areas that would pond with water after rain. And another puzzling observation was the fact that, when the layout of test plots was re-worked, the grass walkways between plots remained clearly visible, with notably greener and taller growth of the interim crops. Those grass walkways, which weren't worked or sprayed with chemicals, also were places that European alfalfa varieties, which don't have resistance to most U.S. pests, grew fine.

It was a puzzling problem.

"You could see the enhanced seedling growth..."



Cutting clover with special equipment that measures yield

Various solutions were considered, including insect and disease problems, but the same issues remained.

And then Gary Zimmer visited the Cal/West farm, Johnson recalls, telling us flat out that "your soils are dead." "I didn't understand what Gary meant, none of us here really did," he admits. "But we started listening and looking at our soils and decided maybe he's right. We were at a teachable moment."

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Gary Zimmer's Fall Letter

Dear Farmer-Agribusiness man,

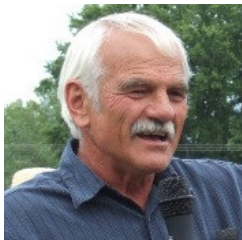
What a year! It's amazing how we pulled it off. The farm produced very good quality forages, not much of it got rained on, great weed control, and wonderful yields, despite the windows for getting things done were so rare and so narrow.

Yes, that meant we were out there in the fields when conditions weren't ideal. Soils were wet, so we intend to do a lot of subsoiling this fall to deal with compaction.

I'm writing this in early October and we're still very busy — baling hay, both dry and balage, and have half the corn already harvested. We're also baling corn stalks for bedding and applying manure and soil correctives.

The weather has been beautiful— we've waited all year for weather like these last several weeks!

What other profession but farming could give you that much challenge, adventure, and 24-7 commitment?



Now, if we got paid a lot for this job, had the most creative, challenging responsible career on the planet, someone would be bound to ruin it. Having economic challenges and the unbelievable com-

mitment that's required for success keeps this farming career in the hands of only a few of us.

It's true that not all farmers are having that much fun. With modern technology, yes, farming can be made less work, and can even allow some time off. Risk can be reduced. Technology has tools that make the work physically easier, such as making hay.

But there is always a price to be paid for taking these options. You give up a part of your income. You keep being forced to produce more, losing touch with the daily system. Soil stewardship and livestock husbandry become old-fashioned concepts.

I must admit that our farm keeps getting larger; now we're talking about milking 300 cows

again. (We cut back several years ago, selling many, but once again we have so many springing heifers.) We do have the feed and the land for them, and it seems necessary to keep the cash flowing. I've said it before, "That's enough!" I do believe (with good people, passionate about their work and farming, and we certainly have some of those working for us) that we can meet the challenge of managing that many more animals and still do a good job.

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BIO-NEWS

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....Gary Zimmer's Fall Letter

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We have many different farms to spread the livestock on, so what is a sustainable unit?

Farmers do what they have to do for survival. It's not the size of the farm that's important, but the way the land and livestock are treated.

Investing in biological farming sure gives hope and excitement for the future as each year it keeps getting better and better.

There's less risk as soil structure, biology and mineral availability are addressed — we can handle the tough times better; disease and insect issues aren't a problem.

I'm convinced, and I've seen enough evidence both in research and on farms, to conclude that providing available calcium, trace minerals and keeping free nitrogen low is a huge step to improvements.

Use nitrogen better, protect it with carbon, make sure soil sulfur is available, and your plants will be healthier.

Trace minerals

Trace minerals, for most farmers, mean zinc, manganese, copper and boron, used in small amounts. But there are certainly many more minerals, of which 20 are known to be needed for crop production.

What we called the micros of yesteryear are now being seen as

something much more major. As a recent *Farm Journal* article titled "Micronutrients Can Have a Macro Impact" indicates, there are certainly many reasons to be aware of their importance.

One reason is that you can't keep growing and selling crops, sending your minerals off the farm, and expect to continue producing 200 bushel corn with only NPK as inputs.

Secondly, a lack of plant diversity affects how different minerals are cycled through and from the soil. Each plant is unique and as such affects different biology, pulls up different minerals, has roots that are more or less efficient, more or less acidic, and also affects minerals in cycle. If we only have corn/beans, for in-

stance, not only do they use some trace minerals more than others, they also limit biology. Because conventional management of both crops leaves soil surfaces bare and requires many chemical mixes (herbicides, pesticides,

and fungicides to mention a few), over time we have altered not only soil biology but also the nutrients in cycle.

That's where our disease and insect populations come from — when you provide the feed, and an ideal place to live with no competition, the bugs will thrive, whether they are good bugs or bad bugs. With a corn/bean cycle, the corn and bean feeders have the whole diner to themselves! (and other

What we called the micros of yesteryear are now being seen as something much more major.

(Continued on page 4)

After our wet summer, breaking up soil compaction, with tools such as this ripper, is one of our fall projects at Otter Creek Organic Farm.



....Gary Zimmer's Fall Letter

(Continued from page 3)

beneficial bugs have no where to go).

Reason number three is that, over the last year, you keep reading and hearing about the problems with glyphosate (RoundUp®) tie up of traces, or as they say, chelating of traces, along with a soil biological change. Availability of our 'major' traces is dropping, and I'm equally sure that the 70 or so other 'minor' trace elements we know little or nothing about are also affected, and threatened.

Traces are now on the radar screens of many agronomists, farmers, and fertilizer providers. Trace elements have been a major part of this business from day one

— we've always seen them as important.

They certainly play a large role in your immune, or health, system. After twenty plus years developing a better mineral delivery system and making traces a large part of that, Midwestern Bio-Ag has developed homogenized trace element blends, once for biological/conventional farmers and one for organic farmers.

These blends make up to one-third of each ton of fertilizer which gives it better distribution within the mix. In addition, what's added to the base to homogenize (which ensures the small amount of traces is thoroughly mixed within the product) the biological products is rock

phosphate with other nutrients like magnesium and iron. This is acidified before pelleting. (In the organic mix, carbon and compost form the base.)

We are continually working to improve these mixes and have just finished another research project at the University of Wisconsin-Madison, measuring plant available nutrients using the MILD test (developed by Professor Phillip Barak). I'm sure you'll hear more about it soon.

We know that traces are an important part of taking the next step to quality, high yielding crops. Our annual consultant and farmer two-day training conference to be held in Reedsburg in December will focus on traces; traces with kelp; natural minded salt as a source of traces; and interesting research by Dr. Larry Phalen, professor at Ohio State University, on soil and the relationship to trace element balance.

This educational event is open to any farmer/agribusinessperson who would like to join us. We have no secrets — we're willing to share what we've discovered.

Come one day or both. All sessions are free. Our consultants and staff will be there as well, discussing some of our programs and projects.



A stretch of warm, dry and sunny fall days provided us with an excellent window for fall harvest.

GFZ

... helping alfalfa reach its potential

(Continued from page 1)

Gary explained how hard, tight soils with low organic matter couldn't provide what the plants needed for optimum growth, so Johnson decided to try the biological system. Well, at least on one trial, taking one of the farm's blocks and dividing it into quarters, they applied MBA's biological methods and products on two reps, and different treatments on the other two reps, all reps planted with the same alfalfa varieties. The initial trial produced an easily seen difference. "You could see the enhanced seedling growth from the road," says Johnson. (It also produced MBA's WinterKing alfalfas, the first variety developed under a specific fertility plan).

Cal/West staff began to recognize that the way the land was being farmed was having an effect: too many chemicals, too much potash, too much high-salt fertilizer and too little rotation.

It was time to change.

"It's our goal to measure genetic potential (but) we can't measure genetic potential on a bad soil," Johnson was realizing. "It doesn't reach its yield or quality potential." And assessing genetic potential is the whole purpose of the Cal/West research farm that breeds and evaluates alfalfas, clovers, sudangrass, and teff grass.

"You get in a rut because you've always done it the same way."



Alfalfa is a mineral-hungry crop. "Alfalfa is a good miner," Johnson knows. With the research farm's system of harvesting the entire plant and leaving no residue behind, mimicking what happens on dairy farms, he knew "nutrients (from the

soil) go to the dairy cow." And this land had been farmed as research plots, with all the plant material hauled away, for more than 25 years.

It had taken years for these problems to develop, and he realized it was going to take time to overcome them.

Lack of soil life is one easily seen indicator of a dead soil. "There was hardly an earthworm on this farm," recalls Mark Darling, Cal/West's assis-

tant plant breeder. Worms were seen on grass walk ways, in breeding nurseries inter-seeded with grass, and even on graveled areas like the driveways, but there were few to none in the variety trials.

Realizing they had to get their soils back into shape, they set out to change their whole system. "You get in a rut because you've always done it the same way," says Johnson. To break that pattern, "everything Gary recommended, we did," They also attended Midwestern Bio-Ag's annual summer Field Day to see first hand what was working on Bio-Ag's Learning Center research farm, and went home inspired to make a host of changes.

What they were doing

Their old systems had been to

(Continued on page 6)

... helping alfalfa reach its potential

(Continued from page 5)

moldboard plow in the fall, and then leave the field open until the next year's crop. Sudangrass or soybeans were planted and grew for three months in the summer before the blocks were put back into alfalfa during August. Plots were plowed and disked, and a float used to fill in the dead furrow resulting in soil compaction.

It was standard practice to spray a pre-plant herbicide, then drag the plot, seed it, and apply a post-emergence herbicide as well. Existing forage stands were routinely sprayed with insecticide, sometimes without being scouted. And they never grew corn because they didn't want to introduce the chemicals they thought they needed to grow that crop.

One major difference between those who grow alfalfa for research, and farmers who grow it for feed, is that the research plots, being very small tracts, must be extremely uniform in order to give valid,

usable results. Even slight variations can be devastating to getting accurate data.

"Uniformity is important," emphasizes Johnson. This unique need led to leaving out one common on-farm practice.

"We never wanted to put manure down," envisioning the plots littered with manure clumps that would mean an un-

even distribution of nutrients, explains Justin Valletta, Cal/West's research

agronomist. Would applying manure provide a fair and farm-accurate setting for testing seed varieties? "We felt any system with livestock would have manure," he decided. And manure would provide the further benefit of adding microbes to the soil that would help break down any excessive plant residue.

A whole new system.

Investing in wholesale changes, throwing out past practices, the Cal/West crew set out to save their soils. "Justin and Mark implemented the plan," relates Johnson. "They believe in it. They've run with the ideas and concepts."

They found a nearby dairy who could supply liquid manure and an applicator who could apply it in an even coat.

They parked the moldboard plow.

The researchers developed their own soil-building rotation to fit the farm's unique needs. Starting with the blocks coming out of an alfalfa test plot (now three to four years), they would harvest the last crop, rotovate or chisel plow, then apply manure and rotovate it in before planting winter wheat as a cover crop. The next spring,

during late April or early May, that green manure crop is then rotovated in. Corn is

planted, and then it is rotovated into the soil during late July or early August. The process is repeated for three years, with manure, wheat, and corn and then

back to alfalfa or clovers.

Plots received the treatment as they came out of research projects. "You can tell which blocks haven't had the rotation," notes Valletta. Covers crops aren't as uniform, and weeds are still present. "They look night and day different," Justin points out. "We've learned some lessons."

Weed infestations are equally problematic and herbicides were routinely applied up to three times a year, whether it was needed or not. "It was just what we did," explains Darling. "You can't measure yield in a stand that's full of weeds." And yet, last year they sprayed only once after first cut. "One key to good weed control is getting a good stand," Mark adds, something they didn't have before. Now, "we try not to spray." No pre-emergence herbicides are now used anywhere on the farm.

Pest control is extremely important on these small plots –

(Continued on page 7)

"Seedling year test plots are now consistently yielding more than 6 tons per acre and as high as 7-8 tons."

"You don't see the results overnight. You have to be patient."

... helping alfalfa reach its potential

(Continued from page 6) just one small area with insect damage like leaf hopper damage area can skew the results of year's worth of work. "Now we only spray if I see a problem," says Darling.

The four years a block/plot is in alfalfa it sees no manure.

The farm also followed recommendations for applications of Midwestern Bio-Ag's Bio-Cal and balanced fertilizers with traces.

And the results?

"The crop grows," says a smiling David Johnson, even as he cautions, "you don't see the results overnight. You have to be patient."

Rather than plants staying short and stunted, yields have increased dramatically, giving what the researchers feel is a much more accurate assessment of the potential of the varieties of alfalfa, clover and other crops they are developing.

Seedling year test plots, (planted during April) are now consistently yielding more than 6 tons/acre, and as high as 7-8 tons, and they've broken that in four cuts in the seeding year, added Valletta. And on second and third year plots, they see some varieties breaking 10 tons/year on a five cut system. Plant size can be visually observed to be bigger in the year of establishment.



Dave Johnson explains the rotation of plots on the Cal/West research farm, and how improved soils help researchers better assess a varieties genetic potential.

The soil looks, smells and feels healthy. Soil tilth is much improved and water infiltration is visibly better. On the relatively flat farm fields, there is a swale and in previous years, they regularly rented pumps to pump out water that ponded on plots. This year, with over 30 inches of rain since June, they've had no ponding whatsoever, and haven't seen water standing for more than an hour

even after a heavy rain, Darling observed.

They used to irrigate some sudangrass trials and would see 'cupping' in the plots. Now, they're 'level like a table,' Johnson adds, ensuring uniformity of those trials.

Soils tests show the farm's previously low organic matter has increased from 2 to 3 and even above. "Our pHs improved, calcium has come up and magnesium is down," says Valletta. Copper and boron are up, too, in these comparisons from soil reports of 1998 to 2010.

Having success with the biological system, they're not standing still but are continuing to make improvements, working with their Bio-Ag consultant. "We're trying to fine tune what we're doing," says Darling. "We try to keep learning."

The research farm gets many visitors each year, including seed growers who produce Cal/West seeds. In the last few years, with the researchers dramatic gains in yield, plant health and soil health, they're getting many questions on the biological system. "Visitor's are more interested in what we're doing to fix our soils."

"We knew we had the potential," Johnson says.

And now they're reaching for it.

Trace minerals focus of conference

Trace Minerals (both in soils and for livestock) will be the focus of this year's annual Midwestern Bio-Ag two-day educational conference. The event will be held Tuesday and Wednesday, Dec. 14-15, 2010, at the Voyager Inn, Reedsburg, WI.

Farmers and other agribusiness professionals are once again invited to join MBA consultants and staff. There is no charge to attend.

Sessions will start at 10 a.m. on Tuesday and run all day.

Wednesday activities will start at 8:30 a.m. and continue until early afternoon.

Our schedule is not yet set; for updates check our website, www.midwesternbioag.com

(Registration is not required; however, we do appreciate a phone call to let us know how many will be attending. This allows us to plan for adequate handouts/materials and room space.)

(To reserve a room, visit www.voyageurinn.com or call the Voyager at 1-800-444-4493.)

Speakers

Once again this year we'll have a varied line-up of outside speakers, along with our own personnel including Gary Zimmer.

Headlining our event this year, and speaking on Tuesday afternoon, is **Professor Larry Phelan** of Ohio State University.

A professor in OSU's Department of Entomology, his focus is on advancing ecologically compatible alternatives to pesticides, including both the develop-

ment of natural chemicals for interventive approaches and improving our understanding of the role of soil biological processes in modulating pest-crop interactions.



Dr. Larry Phelan

Phelan's work has included studies on how plants grown in soils with higher organic matter levels, and higher mineral levels, show lower levels of pest infestation.

He has also studied how cover crops may conserve and increase the activity of insect predators.

He is a regular speaker at the Upper Midwest Organic Conference and many other events.

We are very excited to have Dr. Phelan at our conference because of his work in seeing the relationship and balance of trace minerals for growing healthy crops.



Mined from an ancient deposit near Redmond, Utah, Redmond Natural Minerals are nature's perfect balance and proportion of minerals necessary to support life, says Aaron Ellison. The unique form makes these minerals highly available and preferred by animals.

Newer to general practice but no less powerful are the benefits of applying these minerals to the soil, he adds.

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Midwestern Bio-Ag Annual Two-Day Conference Trace Minerals

Tuesday, Dec. 14 & Wednesday, Dec. 15

Speakers:

Dr. Larry Phelan, Ohio State University

Aaron Ellison, Redmond Minerals

Bill Wolf, Thorvin Kelp

Gary Zimmer, Midwestern Bio-Ag

Dan Davidson, Midwestern Bio-Ag

at the

Voyageur Inn, Reedsburg, WI

....trace minerals focus of conference

(Continued from page 8)

Aaron Elison, our guest speaker from Redmond Minerals, was raised on a small family dairy farm in Idaho. He enjoys hard work and the quality of life that



comes from working a farm. He, his wife Cristie and their five children live in Central Valley, Utah.

Aaron Elison of Utah State University in Animal Science, he has worked as foreman on a cow/calf ranch in Montana with 2000 pairs of Angus crossbreds on 47,000 acres of native rangeland and 2000 acres of irrigated and bottom land. Later he transferred to an 800-cow conventional dairy in Fort Lupton, Colorado as herdsman. He has been involved with Redmond Minerals' Ag team for over 4 years.

For more than 40 years, Redmond salt has served agricultu-

ralists as a natural, healthy solution to meet the nutritional needs of animals. A natural sea salt, Redmond products are clean from chemicals and pollutants that can cause harm.

x-----x

Bill Wolf is founder and President of Thorvin Kelp, the leading seaweed ingredient supplier in the U.S. He became interested in the benefits of kelp back in the early 1970s when he discovered that locals in Maine ate seaweed, fertilized their gardens with it, and fed it to their livestock. Kelp contains a wide variety of nutrients including many trace minerals.



Bill Wolf

Bill is also president of Wolf, DiMatteo + Associates, which delivers strategic expertise to help organic, socially and environ-

mentally responsible products and project with certification, organic system plans, policy advice, sourcing support, and organic regulatory compliance. He has over 35 years experience in nearly every aspect of the organic industry, from farming to feed manufacturing to food processing.

x-----x

Dan Davidson, a Midwestern Bio-Ag certified consultant who has done volunteer work in various locations around the world, will report on his most recent trip that included visiting sustainable farming operations in Indonesia and the Philippines.



Dan Davidson

Other MBA personnel including Gary Zimmer will also be presenters at the conference.

Join us at the annual

Acres USA conference & trade show

Dec. 9-11, Indianapolis, IN

Speakers include: Shannon Hayes, Temple Grandin, Woody Tasch

Dr. Don Huber, Bob Yanda, Gary Zimmer & many more

See more details at www.acresusa.com

Midwestern Bio-Ag is at Booth 5. Stop in & say hello.

Traces getting noticed

By
Leilani Zimmer-Durand
MBA Research specialist

Trace minerals have been in the news a lot this year, in part because of Dr. Don Huber's research documenting problems with micronutrients in the soil being tied up, or chelated by glyphosate (the main ingredient in RoundUp®).

Just last month, two more articles came out in conventional farm magazines talking about the importance of addressing traces in your fertilizer program.

The first was an article in the September 2010 issue of *The Farm Journal* titled "Micronutrients Can Have a Macro Impact". The article covered the importance of "knowing your soils" so you can react to any deficiencies, and focused on manganese deficiencies in soybeans. These deficiencies can occur because of soil type, but they can also occur when manganese ties up with glyphosate.

The second article, titled "Micros Power Through Season" was published in the September, 2010 issue of *Crop Life*. Representatives from five companies that focus their sales on micronutrient products were interviewed for the article. All said they have observed an increased demand for micronutrient products this year.

The problem of micronutrient deficiencies is a big one. The fact that this issue is getting more attention in the conventional farming world just shows that when micronutrients are not addressed, crops are impacted, and farmers are starting to take notice.

In addition to issues with glyphosate, there are other factors suspected of causing micronutrient deficiencies including higher crop yields which increase plant nutrient demands, use of high analysis NPK fertilizers containing lower quantities of traces, and decreased use of farmyard manures on agricultural soils.

At Midwestern Bio-Ag, we've always focused on balanced crop nutrition, and, right from the start, our fertilizer blends have always included trace minerals.

Midwestern Bio-Ag's Trace Mineral Products

WeeMix (5-5-5)	Charger (1-3-3)	MicroHume
A homogeneous blend of rock phosphate, calcium sulfate, sulfate of potash-magnesia, borate, copper sulfate, ferrous sulfate, manganese sulfate and zinc sulfate.	Approved for organic production where micronutrients are needed. Homogenized. Blend of compost, manganese sulfate, copper sulfate, borate and zinc sulfate.	Fertilizer-grade, humate-based homogenized micronutrient blend. Suitable for organic production. <i>A new MBA product, under development. Currently in the research phase, it will be available in limited quantities in Spring 2011.</i>

We recognize that plants have a need for more than just nitrogen, phosphorus and potassium to grow. We also know that we need to both balance soil nutrients and replace the minerals the crop has used if we are to continue growing healthy, high yielding crops year after year.

Homogenized blends

One of the things that makes MBA's trace mineral products unique is that they're homogenized.

Bulk blending of micronutrients with granular NPK fertilizers is a common practice in the U.S., according to the Mosaic Fertilizer Handbook. The main advantage in that is it allows fertilizer grades which will provide the recommended micronutrient rates for a given field at the usual

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....Traces getting noticed

(Continued from page 10)

fertilizer application rates. The main disadvantage is that segregation of nutrients can occur during the blending operation and subsequent handling.

It is vital that each fertilizer pellet contains uniform amounts of all the fertilizer ingredients in the blend, so that there are nutrients within reach of every plant. That's especially important with traces because they are applied at very low rates, usually just one – half to five pounds per acre. Homogenized blending of the fertilizer ingredients ensures that every plant has access to all of the nutrients within the fertilizer. At the same time, it also prevents plants from getting too much of

an ingredient, which could lead to trace element toxicity.

Current & new products

Midwestern Bio-Ag currently offers a choice of two trace mineral blends, Wee-Mix or Triple Five, 5-5-5, and Charger, which is allowed for use on organic farms. Both of these products are homogenized and micronized for better coverage across the field. They have a proven track record of success on hundreds of farms.

We have also been in the development phase for a third micronutrient product for nearly eight years now, and we are getting very close to having this new product ready to market.

MicroHume, Midwestern Bio-

Ag's new product, is a blend of very finely ground (200 mesh) trace minerals combined with humates and other naturally mined ingredients, which is then granulated.

Humates make minerals more available, and we believe this will improve plant availability of the micronutrients in MicroHume. Preliminary studies conducted at the University of Wisconsin-Madison suggest that this will be the case.

Don't wait until you have a deficiency to look at trace mineral levels on your farm.

Test your soils regularly, watch trace mineral levels, and include them as part of your regular soil fertility program



**TRADING
POST**

From the MBA Field Day:
**Guess the pasture
 quality — pasture
 test results**

By Gary Zimmer

At our Field Days last August, at the grazing tent which was on the east side of the road in the Otter Creek Organic Farm dairy pasture, we had a 'guess the minerals and feed quality' contest.

This field was a pasture mix of alfalfa, grasses, and clovers (MBA's Dry Tolerant Pasture blend with 5 lbs/acre Versatile alfalfa plus red and white clover) and by that point of the summer, was about equal to a third or fourth cutting field. We sampled the field and had Dairyland Labs do the tissue test.

From the wide range of answers we received, it was obviously not easy to visually assess the crop. I guess that's why we test, because it's a challenge to get an accurate assessment just looking at a field (though on hay you probably have a better idea than on pasture).

Our winner, with the best guesses on mineral levels and other quality tests on the feed, was Guy Ditzenberger from Browntown, WI. He'll be receiving MBA forage seed as his prize.

He guessed calcium a little high (grasses in a pasture do bring calcium down), but his answers were closest overall. Due to the fact that this pasture was near the barn, one would expect the manure load to be high, and therefore, so would the potassium level.

The pasture was about knee-high at the time, but with lots of legumes (alfalfa and clover), it was still very high in protein and relative forage quality.

By itself, this would certainly NOT be a balanced diet. This is certainly 'rocket fuel' feed and the cows would be squirting if this was their only diet. That's why we feed some corn silage in the ration, to dilute mineral and protein levels that are both too high. In addition, this is not the only pasture we graze - our cattle are also on summer annual pastures such as sorghum-sudan grass.

(Continued on page 13)

	Grass-legume blend pasture	MBA Target Levels
Moisture	79.21%	
Dry Matter	20.79%	
DRY BASIS		
Crude Protein	24.16%	18-21%
Nitrogen	3.87%	
N/S Ratio	14:1	10:1 to 12:1
ADF-Insol. Protein	1.81%	
Protein Solubility	20.90%	
Sugar	10.68%	
ADF	26.37%	28-30%
NDF	37.67%	ADF + 15 pts
NDFD 48	67.99	40-60%
IVTDMD 48	87.94	74-82%
Fat	3.54	
Ash	10.42	7-13
Lignin	5.03	5-11
Calcium	1.05	> 1.0
Phosphorous	0.40	> .35
Magnesium	0.31	> 0.35
Potassium	2.86	1.5-2.0%
Sulfur	0.28	1:10 S:N
Sodium	0.13	1500 ppm/0.15%
Chloride	0.43%	<0.30
Boron	36 ppm	> 40 ppm
Manganese	44 ppm	> 35
Zinc	25 ppm	> 30
Copper	10 ppm	> 15
Iron	140 ppm	< 200 ppm
Aluminum	73 ppm	< 100 ppm
TDN	64.96%	
NEL (mcal/lb.)	0.66	
RFV	169.05	
RFQ	223.24	

.... Pasture test results

(Continued from page 12)

Dairy nutrition is adding what's short or missing in the diet and diluting down whatever is in excess. If this pasture was the only feed, how would cows do?

What's in excess here? To start with, protein. A cow's diet needs to be about 16-18% protein, and if the pasture is 24% as in this case, we have a problem.

This pasture was about knee-high; letting it get more mature would lower that protein, but also decrease digestibility, increase lignin, and increase fibers. The problem with that is the cow can't eat as much, will get less out of what she does eat, and certainly won't milk as well, while wasting more feed. That's why instead we feed the corn silage and summer annuals to offset the high protein levels.

Our pastures do have a lot of legumes in them; getting more grasses would reduce protein, but as grasses head out and mature, cows don't like them.

We have worked with plaintain in our pasture mix; it is highly digestible, with lower protein, but doesn't persist or compete. Also, because we are organic, and don't have an available nitrogen source, grasses don't compete well with our legumes. Healthy soils with good available calcium and phosphorous sure do grow

good legumes! (We could apply chicken manure pellets for N, but they also contain good phosphorous and calcium levels and legumes love those.)

If you look at the cow's need to produce, in this straight pasture the ADF and NDF fibers are too high. Her diet works best at 19-21% ADF and 28-33% NDF. Looking at this feed test, the numbers are too high. The cow will stay healthy but may not produce as much. She could sure use some low



fiber, high energy feeds like corn or grains to offset this.

Looking further at this test, the digestibility of this feed is too high. Look at the NDF-48 digestibility and the IVTDMD 48, which is the total part of the feed that is digestible within 48 hours. This high protein, high digestible feed probably won't stay in the cow for 48 hours.

These are guidelines needed to do your best at meeting the cow's needs. The extra protein is not necessarily good for the cow, she can convert some to energy but

this requires energy and her MUN levels and immune system are challenged. That's why we feed CharCal to help buffer out the excess nitrogen. It's also why we look at the nitrogen to sulfur ratio— having more sulfur will make a better quality protein and reduce the rumen nitrogen, also a benefit.

This test is lower in sulfur than I like. We certainly do add S to the land as well as boron. Both S and B are anions like N and they can and do leach. With all our rain this year, we may have just washed out the extra plant available minerals. Incidentally, in humans, this high protein diet is known as the Atkins' Diet, designed for weight loss. It does the same in cattle.

As for other minerals, the potassium is high as you would expect, being near the barn. With lots of cows grazing here, that means lots of manure. Magnesium is lowered along with calcium. That's why soil ratios are important.

Some of the traces are also on the lower side. Again, that's why we supplement the diet and dilute out this pasture with other feeds.

Remember, this is just one test, and testing is what it is. It is high quality pasture; we do all we can with fertilizers and supplements to achieve that.

Just like testing our balage, it gives us clues and evidence as to management and fertility needed.

Traces: Overlooked & Under Appreciated

By Jon Woolever

The trace minerals in a feeding program are a lot like the nails & screws in your home. They are both small, rarely thought about, & hardly ever seen. We typically think of the "big" items when building a house like lumber, doors, windows, a roof, and a solid foundation. The same concept applies when formulating a ration. We balance first on the major components such as protein, energy, fiber, fat, & maybe macro-minerals. What we often

neglect is the one item that holds all these other things together...nails & screws (and trace minerals in the ration). Without nails & screws, everything in your house would fall apart. The same can be expected in a diet without adequate, high quality trace minerals.

When evaluating the trace mineral portion of a ration it is important to look at two items: quantity & quality (source & biological availability.) First let's take a look at the 6 main trace elements and discuss their

function, source, & the effect of deficiencies.

Determining the exact amount of trace minerals to feed can be a bit of a balancing act between the budget, general animal requirements, & the specific situation on each farm. The National Research Council sets some basic minimums & maximums for each mineral but new research & field experience has shown these minimums as guidelines that often need to be exceeded because

(Continued on page 15)

<u>Element</u>	<u>Function</u>	<u>Signs of deficiency</u>	<u>Sources</u> listed in order of bioavailability
Iodine (I)	-Synthesis of thyroxine for thyroid function -Stimulate metabolism	-Goiter (enlarged thyroid gland in neck) -Lack of vigor -Poor production -Calves born hairless -Increased foot rot & retained placenta	-Kelp -Iodized salt -EDDI -Potassium iodide -Calcium iodate
Copper (Cu)	-Manufacture of hemoglobin -Strong keratin in hooves & hair -Immune function -Coenzyme for many reactions	-Severe diarrhea -Soft hooves, rough hair -Loss of hair color -Poor growth -Abortions not due to other causes	-Chelated copper -Copper sulfate -Copper carbonate -Copper oxide
Cobalt (Co)	-Critical for creation of vitamin B12 in rumen -Enhance selenium availability	-Failure of appetite -Anemia -Decreased milk production -Rough hair coat -Increased ketosis	-Chelated cobalt -Cobalt sulfate -Cobalt oxide -Cobalt carbonate -Kelp (contains vit. B12)
Manganese (Mn)	-Essential for reproduction -Enzyme co-factor in metabolism -Formation of cartilage -Nervous system function	-Delayed or decreased signs of estrus -Poor conception -Stiff, swollen joints -Poor bone formation in calves -General unthriftiness	-Chelated manganese -Manganese sulfate -Manganous oxide
Zinc (Zn)	-Enzyme activator -Wound healing -Aids in immune function	-Skin lesions, increased ringworm, thickening skin -Rough hair coat -Poor reproductive efficiency -Profuse salivation	-Chelated zinc -Zinc sulfate -Zinc oxide -Zinc carbonate
Selenium (Se)	-Antioxidant, immune function -Works with Vit. E	-White muscle disease -Retained placenta -Decreased immune function -Poor conception	-Selenium yeast -Sodium selenite -Sodium selenate

...Overlooked & Under Appreciated

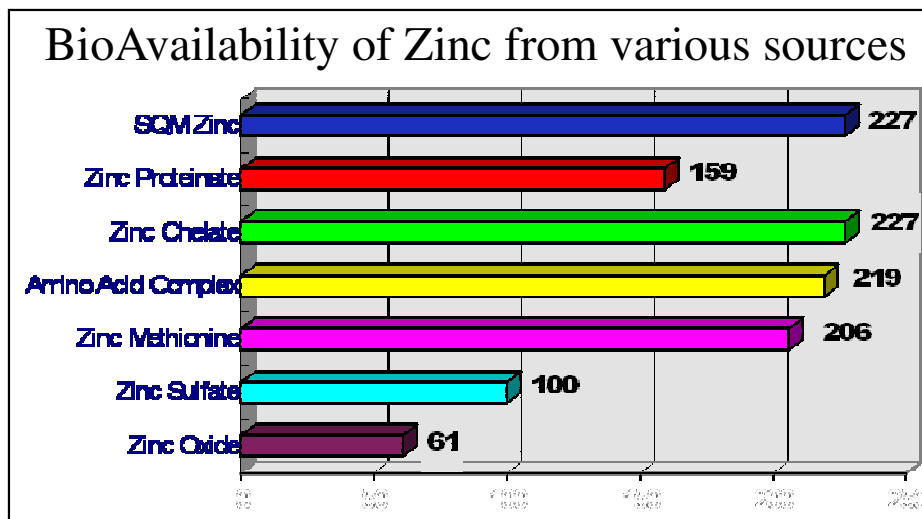
(Continued from page 14)

of dynamic intakes, feed quality, antagonists which bind minerals, & today's higher producing dairy animals. The amount fed also depends heavily on what sources of are used in the mineral mix.

The chart at the bottom of the page shows MBA's typical recommendations for minimum amounts of trace minerals in lactating dairy cattle.

Less available sources such as oxides & carbonates need to be fed at higher levels to achieve an equal amount of absorption compared to the more bio-available sources such as sulfates & chelates. This is one of the reasons some companies have very cheap mineral mixes but use 2-3 different trace packs or "breeder" packs on a farm. They sell based on the price per bag but have to use 2-3 times more bags than MBA which sells one highly available product that is value-priced.

MBA uses only high quality, highly bio-available sources of trace minerals in all of our nutrition products. We've made a commitment to use only sulfate & chelated forms to deliver the highest amount of absorbable trace minerals. While some com-



panies add just enough chelates for "tag dressing," we're proud to use **SQM Protected Trace Minerals** for at least 25-30% of the total amount in all of our pre-mixes & trace packs. SQM Protected Trace Minerals use a proprietary process for chelating the minerals to a polysaccharide complex which provides:

- ◆ Guaranteed delivery to small intestine
- ◆ Benefit to rumen microbes
- ◆ Protection from antagonists
- ◆ Improved absorption

We also stress the importance of increasing the levels of trace minerals in your forages. Not only are forages an excellent source of trace minerals for the animal; plants which are well

mineralized tend to produce more, resist more disease, & tolerate stress better. The MBA soils program stress trace mineral levels & we can offer convenient & cost-effective methods for delivering trace minerals for any crop need.

Trace minerals are an integral part of any good nutrition program. They are some of the "little things" that can make a big difference in terms of feed efficiency, production, reproduction, & immunity. Trace minerals are critical for many metabolic processes that help turn the big pieces of a ration into meat & milk. When selecting a trace mineral product be sure to evaluate not only quantity but also the quality & source of the minerals. Mid-western Bio-Ag offers a number of complete minerals, premixes, & trace packs that utilize only the most available sources to complement your farm's feeding program. Speak with your local MBA representative today to see how we can improve the quality & effectiveness of your ration today!

Minimum Levels for Lactating Dairy Cattle

(based on total diet DM for a 1,400# cow)

Cobalt.....	0.3-0.5 ppm	or	6-12 mg/hd/day
Copper.....	15 ppm	or	300-400 mg/hd/day
Iodine.....	0.6-0.8 ppm	or	12-16 mg/hd/day
Manganese.....	60-100 ppm	or	1,350-2,250 mg/hd/day
Selenium.....	0.3 ppm	or	6-9 mg/hd/day
Zinc.....	80-100 ppm	or	1,800-2,200 mg/hd/day



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Two-Day
Winter
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See details inside! Plan to join us!