

LIVESTOCK AND RANGE NEWS

SERVING VENTURA AND SANTA BARBARA COUNTIES

Results from testing the trace minerals status of beef cattle herds

In the Winter 2017-2018 issue of Livestock & Range News I wrote about trace mineral deficiencies in our counties (“Trace mineral concerns: Looking at copper”). While most producers supplement their cattle with trace minerals, and while it’s long been thought that copper in particular is deficient in our area, there has not to my knowledge been a systematic effort to measure these deficiencies in local beef cattle herds. And so starting this last spring, I began drawing blood from herds and testing samples through a trace mineral panel at the UC Davis California Animal Health & Food Safety Laboratory. Since then I’ve been able to test thirteen herds across the two counties. What follows is a summary of the results and some basic recommendations.

See Table 1, following page.

The rows descending down the left side of the table list the thirteen ranches tested, by county. Ten to fourteen cows were sampled at each ranch and the numbers in the table represent an average of those animals, by herd. There was a wide range of trace mineral levels between cows in any one herd. In some instances, the average of a herd was in the “inadequate” range while some individual animals were at adequate levels, and vice versa. Columns running across the top of the table represent individual trace minerals. Manganese and Selenium levels are separate tests at the lab and were only completed as funding allowed. The column on the right (“Previous supplementation program”) briefly describes trace mineral supplementation practices at the ranch in the twelve months preceding the test.

A few highlights:

- Manganese (Mn) (different from Magnesium) was only tested for five herds but all five herds were significantly deficient. This testing was done in collaboration with my colleague in Tehama County who is testing Mn in herds across the state. His preliminary results show significant deficiencies statewide (*Davy et al., in prep*). Mn is not typically emphasized in trace mineral supplementation, so more research is needed to determine the practicality of pushing herds into adequate levels and to examine the impacts of Mn deficiency on production.
- Selenium (Se) levels in Ventura and Santa Barbara Counties are notably higher than in other parts of the state. Of the 126 animals tested for Se in this study, there was not a single result in the deficient range. Compare that to an estimated statewide average of 12% deficiency in beef cattle (*Davy et al., in prep*).
- Eight of the thirteen herd averages were below a normal reference range in Copper (Cu). Within the five herds whose average was in the adequate range, however, 32% of animals were still deficient (17/53). Overall, only 39% of animals tested were in the adequate range for Cu.
- The only herd where every tested individual animal was in the adequate range for blood copper levels (Ranch 6) had given a copper bolus two months before testing.
- There appeared to be no obvious correlation between mineral deficiencies and geographic location, however more testing is necessary in order to say that with more certainty.

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How many ground squirrels does it take to equal one AUM?

by Julie Finzel

Livestock & Range Symposium flyer

Table 1.

SUMMARY - Trace mineral results - Ventura and Santa Barbara Counties

County	Ranch	Manganese	Selenium	Calcium	Copper	Iron	Magnesium	Phosphorus	Potassium	Sodium	Zinc	Test Date	Previous supplementation program
Ventura	1	<u>3.23</u>	0.23	98.92	<u>0.62</u>	<u>1.22</u>	22.25	58.33	4.47	137.42	0.88	4/11/18	none
Ventura	2	<u>2.57</u>	0.23	98.60	<u>0.74</u>	1.47	21.60	65.90	4.50	144.30	0.80	4/11/18	stopped protein tub in February; Multimin shot in Aug '17
Ventura	3	<u>2.80</u>	0.26	85.90	<u>0.58</u>	1.44	24.80	66.40	4.15	139.70	0.91	3/30/18	copper glycinate injection Oct '17
Ventura	4	<u>2.38</u>	0.38	93.70	<u>0.41</u>	1.35	24.10	79.20	4.05	141.40	1.07	4/11/18	none
Ventura	5	-	0.17	103.60	0.87	1.38	23.40	58.50	4.10	145.80	<u>0.76</u>	5/26/18	Multimin shot Dec '17; access to salt and protein tubs year round
Santa Barbara	6	<u>1.93</u>	0.16	99.30	0.97	1.35	23.10	64.60	4.16	144.20	<u>0.72</u>	4/16/18	copper bolus in Feb '18
Santa Barbara	7	-	0.43	111.86	0.83	<u>0.93</u>	21.29	68.79	4.55	142.86	0.86	5/8/18	copper bolus in June '17
Santa Barbara	8	-	0.20	98.40	0.80	1.30	20.60	66.90	4.34	139.80	<u>0.74</u>	5/24/18	Multimin and copper bolus in July '17; year round access to salt; stopped protein tub in Sept '17
Santa Barbara	9	-	0.22	86.20	<u>0.66</u>	1.35	21.40	63.90	8.49	138.60	<u>0.75</u>	5/25/18	Multimin, copper glycinate in November '17; year round access to salt
Santa Barbara	10	-	0.45	104.00	<u>0.79</u>	<u>1.21</u>	23.40	78.60	5.16	144.20	0.99	5/31/18	Multimin, copper glycinate in November '17; year round access to salt
Santa Barbara	11	-	0.42	99.67	0.85	1.32	22.56	57.11	4.88	142.67	1.14	6/5/18	Multimin, copper glycinate in November '17; year round access to salt
Santa Barbara	12	-	0.32	96.25	<u>0.64</u>	<u>0.98</u>	18.83	70.25	4.11	137.50	0.96	6/2/18	none
Santa Barbara	13	-	-	98.10	<u>0.62</u>	<u>1.25</u>	19.60	76.90	5.43	142.40	<u>0.78</u>	7/19/18	year round access to protein tub
Total percent adequate		4%	100%	96%	39%	34%	93%	98%	85%	91%	61%		
Adequate threshold		>5ppb	>.08ppm	>80ppm	>0.8ppm	>1.3ppm	>18ppm	>45ppm	>3.9 mEq/L	>135 mEq/L	<.8ppm		

Results in red and underlined are below the critical threshold for adequate.

Table 2. Summarizes options for trace mineral supplementation and associated costs for one cow and her calf for one year.

Supplementation options:

Option	Price/unit	Consumption/pair/yr	Cost/pair/yr
Plain 50lb. salt block	\$300/ton	22.81 lbs @ 1oz./day	\$3.42
Trace mineral 50lb. salt block (e.g. American Stockman brand)	\$360/ton	22.81 lbs @ 1oz/day	\$4.11
Loose salt (e.g. Bar Ale brand)	\$800/ton	46 lbs @ 2oz/day	\$22.80
Bolus injection of trace minerals (e.g. Multimin 90)	\$42.80/100mL	19mL @ 2 x 5mL, 3 x 3mL	\$8.13
Copper glycinate	\$30/100mL	7mL @ 2 x 2mL, 3 x 1mL	\$2.10
Copper bolus (e.g. Copasure)	\$3.21/bolus	1 bolus	\$3.21

Plain 50lb. salt block:

Does not provide any trace mineral supplementation.

Trace mineral 50lb. salt block:

Provides very limited trace mineral supplementation: amount of trace minerals is low and minerals are sometimes not in bio-available forms, depending on the brand. In general, “sulfates” are more bioavailable than “oxides” (e.g. copper sulfate rather than copper oxide). Cheaper blocks have trace minerals in oxide forms.

Loose salt (e.g. Bar Ale brand):

Can have higher/more adequate trace mineral contents. Higher-end products will have “chelated,” or organic (as opposed to inorganic) trace minerals, which improves trace mineral absorption in the animal. Can be custom designed. Significantly higher price point but perhaps significantly more effective supplementation.

Bolus injection of trace minerals (e.g. Multimin 90):

Easy application, consistent dose, not a continuous source of supplementation. Typically, requires multiple shots per year.

Copper glycinate:

Not easily available. Only provides copper and no other trace minerals. Requires multiple shots per year.

Copper bolus (e.g. Copasure):

Longer-term availability in animals. Some boluses provide copper and no other trace minerals. Some producers prefer not to have to administer bolus.

As always, I would encourage you to work with your veterinarian to develop a supplementation program specific to your operation. In closing, this topic deserves further examination. I believe a good next step will be to trial different supplementation regimes alongside one another in order to compare the efficacy of methods, such as free choice mineral supplementation versus bolus supplementation. Moving forward will largely depend on identifying funding to support the project.

If you are interested in learning more on this topic, please plan to attend the Livestock & Range Symposium (see flyer in this newsletter). Dr. Gabriele Maier, DVM, PhD will be presenting on “Trace Mineral supplementation in beef cattle.”

How many ground squirrels does it take to equal one AUM?

by Julie Finzel, *Livestock and Natural Resource advisor for Kern, Tulare, and Kings Counties*

First, let me define an AUM. An AUM, or an Animal Unit Month, is the equivalent of the amount of feed needed to support one cow, with a calf, for one month. The cow is generally assumed to be 1,000 pounds. Most cows are larger than that these days, but the calculations can be adjusted for any weight of animal. For simplicity in this case, I will use a 1,000 pound cow. The amount of feed a cow consumes each day varies throughout the year and is influenced by forage availability, her physiological requirements, and more. In this case, we will assume the cow is eating 2% of her body weight for one month.

1,000 pound cow x 0.02 (% of body weight) = 20 lbs of forage consumed each day
20lbs of forage/day x 30 days = 600 lbs of forage/month

So one AUM is equal to 600 pounds of forage. Now we need to know how much a ground squirrel eats each day. I reviewed a couple of journal articles to determine this and the estimates range from 15 grams per day up to 50 grams per day. I calculated daily ground squirrel forage consumption at three levels: 15 grams/day, 30 grams/day, and 50 grams/day. One pound equals about 453 grams. To keep the calculations simple, I'm going to round down and say that one pound equals 450 grams.

15 grams/day x 30 days = 450 grams/month	450 grams/450 grams = 1 pound
30 grams/day x 30 days = 900 grams/month	900 grams/450 grams = 2 pounds
50 grams/day x 30 days = 1500 grams/month	1500 grams/450 grams = 3.3 pounds

According to the calculations above, a ground squirrel could eat anywhere from 1 to 3.3 pounds of forage each month. I found an estimate in one of the articles I read that 200 ground squirrels eat as much as one 1,000 pound steer. Working off of that estimate, and using the numbers above, we can test that theory.

1 lb of forage/month/squirrel x 200 squirrels =	200 pounds of forage/month
2 lbs of forage/month/squirrel x 200 squirrels =	400 pounds of forage/month
3.3 lbs of forage/month/squirrel x 200 squirrels =	660 pounds of forage/month

As you can see from the numbers above, on the higher end of the estimate, 200 squirrels can consume as much as (or slightly more than) one AU in a month. On the lower end of the estimate it would actually take 600 squirrels to consume as much as one cow does in a month. Just like cows, a ground squirrel's forage requirements change throughout the year based on their physiological needs. Both of the articles I read pointed out that the highest competition between cows and squirrels for forage resources occurs in early winter, before rapid spring growth. In other times of the year, squirrels are either dormant (winter), there is an abundance of feed, or squirrels are consuming different types of forage than cows. One criticism of both of the articles is that neither accounted for the forage destroyed by trampling, burrowing, etc. of the squirrels. One of the citations in the literature review of Howard, et al., was that 6 male ground squirrels confined to a half acre enclosure decreased potential forage yield by 529 pounds.

That estimate brings to mind another question, what would happen if 6 teenage boys were confined to a half acre for a month? Eek!

References used for this article:

Howard, W.E., K.A. Wagnon, and J.R. Bentley. 1959 Competition between ground squirrels and cattle for range forage. *Journal of Range Management*. 12:3 110-115.
Schitoskey Jr., F. and S.R. Woodmansee. 1978. Energy requirements and diet of the California ground squirrel. *Journal of Wildlife Management*. 42:2 378-382.

***If you are interested learning more about the impact of ground squirrels on California rangelands, please plan on attending the Livestock & Range symposium. Dr. Roger Baldwin will be presenting on "Developing an integrated pest management plan for controlling ground squirrels."**

Sincerely,

Matthew Shapero

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University of California

Agriculture and Natural Resources | Cooperative Extension

Livestock & Range Symposium



Santa Barbara County

November 8th, 2018

4pm-7pm, followed by dinner

Far Western Tavern

300 East Clark Avenue

Santa Maria

Ventura County

November 9th, 2018

9am-12pm, followed by lunch

Hansen Research and Extension Center

287 South Briggs Road

Santa Paula

Join UC Cooperative Extension for a symposium featuring current research from four UC Specialists. Speakers and presentation topics will include:

- **Alison Van Eenennaam**, UCCE Specialist in Animal Genomics and Biotechnology
“What’s new in beef cattle genetics?”
- **Gabriele Maier**, UCCE Specialist in Beef Veterinary Medicine
“Trace mineral supplementation in beef cattle”
- **Ken Tate**, UC Davis Professor and UCCE Specialist in Rangeland Watershed Sciences
“Clean Water, Healthy Soils, and Productive Ranches”
- **Roger Baldwin**, UCCE Specialist in Wildlife, Fish, and Conservation Biology
“Developing an integrated pest management plan for controlling ground squirrels”

Cost is \$30 pre-registration; \$40 at the door

Meal included

For more information contact Matthew at (805) 645-1475 or mwkshapero@ucanr.edu.

Visit http://ceventura.ucanr.edu/Live_Stock_-_Range_Programs/ to access agenda and online registration.



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Please Visit: http://ceventura.ucanr.edu/Live_Stock_-_Range_Programs/

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In this Issue...

Livestock and Range News is a newsletter published by the UCCE Livestock & Range advisor serving Ventura and Santa Barbara Counties. The newsletter contains research, news, information, and meeting notices related to the areas of livestock production, rangelands, and natural resource management.