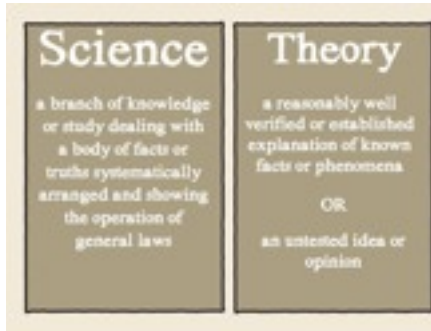


Science and Theory of Weed Grazing - Kathy Voth for VFGC Winter Meetings, 1 /17 - 20, 2012



Presentation for the Virginia Forage and Grassland Council
January 17 - 20, 2012



I was asked to talk about the Science and Theory of weed grazing, so I looked up the definitions. In 2004 I had a theory that cows could be taught to eat more foods. Now after teaching over 1000 to eat our most problematic weeds, it is not just a theory.



Today I'm going to talk about weed-eating cows and challenge us all to begin to think about our relationship with them in a new way.



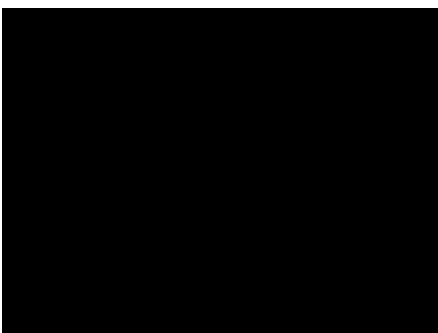
From 1997 to 2002 I researched how to best use goats for fire danger prevention. I learned that goats eat a lot of things and that they could be helpful as part of a cattle operation.



But when I suggested to cattle ranchers that they include goats, they were horrified. Goats are hard to manage and the meat market for them is much different than for cattle, so I could see their point



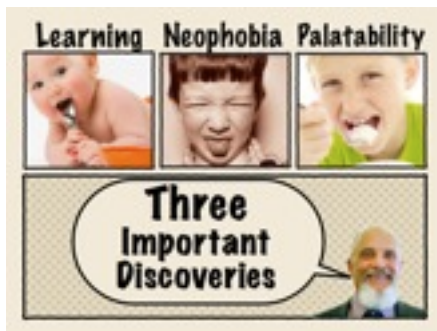
But I'm a person who likes to turn lemons into lemonade. I thought about all the research at Utah State University about how animals choose what to eat and decided if all that were true I could teach cows to eat weeds and that would be easier than getting ranchers to buy goats.



This is a music video of cows learning to eat weeds. You can watch it on my Youtube channel at <http://tinyurl.com/cowseatweeds>.



Although I can successfully teach cows to eat weeds, teaching farmers and ranchers is another challenge. Most are shocked when I tell them what cows can eat.



Dr. Fred Provenza's research uncovered three important discoveries about how animals learn what to eat.



The first is that everybody has to learn what and how to eat. Our most important teacher is our mother. What we learn about food from her will stay with us a lifetime.



This is a video showing 2 groups of ewes teaching their lambs. One group eats russian olive and avoids caragena and the other group does just the opposite. Their lambs do just the same thing when eating alone. Watch the video at <http://tinyurl.com/momteaches>



Animals also have to learn how to graze a new plant. Animals learning to eat weeds often start with tops, then large leaves at the bottom, before finally getting the hang of grazing it even with the grass in their pastures.



Neophobia prevents animals from trying new foods if they have plenty of other alternatives.



In this video you see lambs learning to try new foods. You can watch it here: <http://tinyurl.com/neophobia>



Fred's research at USU shows animals use neophobia to protect them from danger. Here lambs were dosed with lithium chloride after eating four foods. The next day they refused to eat rye, which was the only new food in the group. They ate less corn too because they had previously gotten sick on it, but ate normal amounts the 3rd day.



His research led to a significant change in our understanding of palatability. Good flavor doesn't create palatability. It is a result of how palatable a food is.



This steer is eating a dead rabbit. The reason is that he is low on phosphorous and is getting it from the bones. This slide describes the feedback mechanism. For a good description of it visit: <http://www.livestockforlandscapes.com/palatability.htm>

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Palatability changes. Pregnant animals need different foods than calves or steers. This doesn't happen because cows are superhuman. It's all subconscious and all creatures can do this.



This is why cows sort through their mixed rations. A study at USU showed that cattle given their choice of items in a TMR gained as well as animals fed a TMR, but the group with a choice did it for 20% less cost.



This also explains why it is difficult for us to be on a diet. Our subconscious brains say "You need the cookie!" while our conscious brains, say "You don't need a cookie!" The internal battle is pretty difficult!



We know that nutrients tend to increase palatability.



This video shows sheep who eat straw because they've been given a starch solution after eating it. The good feedback from the starch makes them think straw is tasty. The other group of sheep have a normal reaction to low-nutrient straw. Watch it at: <http://tinyurl.com/sheepeatstraw>



We also know that toxins tend to reduce palatability.



This video shows what happens when animals learn from experience about toxins in foods. You can watch it at: <http://tinyurl.com/aversionlearning>

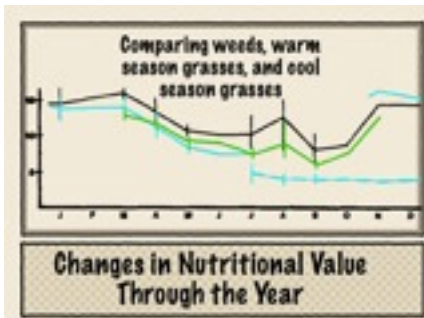
Fred's research shows that animals will eat nutritious foods that contain toxins, but as toxin levels rise they reduce the amount they eat. The top line shows how much grain lambs will eat without an added toxin. The second line show how much they eat with a bit of lithium chloride and the bottom line shows the amount with more lithium chloride.



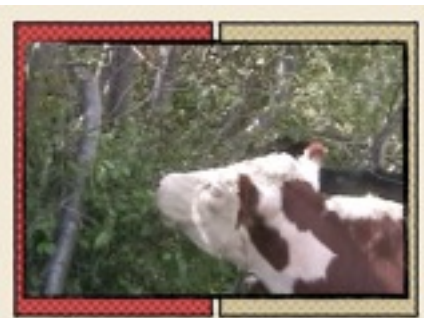
We want to know how the toxins in the plant affect the animals. All plants have toxins, but the group of plants that will kill outright is very small. You can find resources on the books I use on my website. Or you can visit my website to learn about plants that cows can or have eaten.

Knowing nutritional value is good too, but I rarely check a plants nutritional value anymore. Over the last 8 grazing seasons I've learned that weeds are generally as good as alfalfa and better than the grass we have in pasture. Here are some examples.





The black line shows weed nutritional value through the year. The green shows warm season grasses and the blue shows cool season grasses.



My experience is that my cows are every bit as good as my goats ever were at weed and brush management



So now my question is, if cows can eat so many things, why do we think they need grass?



I searched Google books from 1750 to 1850 to see if we've always fed them grass.



I learned that we used to feed them mangel wurzels (giant turnips) carrots, potatoes, and other root crops that stored well in the winter.



One farmer even fed his stock all winter long on the carrot harvest from three acres.



Just like us they did feed trials back then. In this one they learned that cows gained more weight on steamed veggies than they did on raw veggies.



Here's my next question.



What do you think?



We've tried legislating weeds away. This is the oldest weed eradication act in North America. Just by looking in your pasture you can see that this one hasn't worked out so well.



In Virginia, the state spends \$2.4 million in state funds, and adds to it \$1.2 million in federal funds.



If our herbicides don't work, it's not really our fault. Weeds produce lots of seed, that seed remains viable for years, and then some even spread by roots.



We've worked hard and results are not always what we hope.



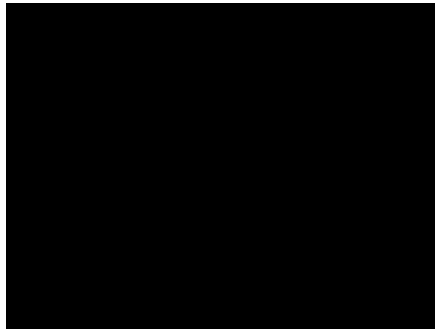
This paper by Rinella et al shows that herbicides can harm native forbs, leaving openings for the invasive species that rebounds much more quickly.



Fuhlendorf et al did a study to see if our assumption that weeds increase grass is true. They found that grass increase was based on precipitation and that cattle gained the same on treated and untreated pastures.



My proposal is that we can be more excellent if we break our enemy's resistance not by fighting them, but by eating them



This video shows a training done in Boulder County Colorado. You can see a portion of it at <http://tinyurl.com/cowseatdiffuseknawweed>. You can order a 30 minute video, suitable for showing to groups, describing 3 years of results from this project at <http://www.livestockforlandscapes.com/newfrontier.com>



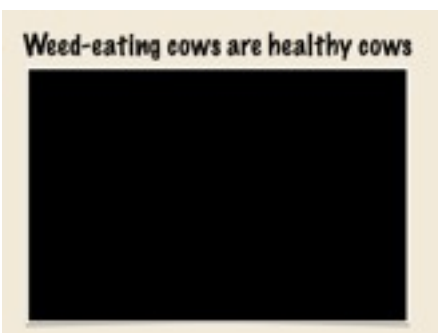
The process works anywhere because it's not based on the environment, but on animal behavior principles.



Everyone from novices to 4th generation ranchers has been successful using this technique.



Fencing isn't required to keep animals eating weeds because the weeds are nutritious, so educated animals will keep on searching for and eating them. This doesn't mean you shouldn't use a rotational grazing system. This is a tool that can make that more successful too.



Weed-eating cows breed back and calve at normal rates. I've never had a cow get injured or be sick as a result of eating weeds. They also gain weight at or above the rate of non-weed-eating cows.



Meat flavor does not appear to be affected by weed-grazing.



I would be more concerned about the possibility for flavors to transfer to milk. But if you are already running a pasture-based dairy, the change shouldn't be noticeable.



Weed seed can spread in manure. Of course, once weeds are in seed, they are lower nutritionally, so cows will eat less or none at all. You can mitigate by avoiding pastures when plants are in seeds or holding cows so they don't spread seed. You can also remember that this is forage that they're planting.



Can cows eradicate weeds?
 Maybe eradication isn't the goal.
 Maybe we should give them a new name.
 Why not call them forage?

Weeds [weedz]
1. Alternative livestock forage.
History: For centuries man battled weeds without success. Then in 2011 a group of Virginia farmers ended the war on weeds by turning them into feed and spreading the word to their friends and neighbors.



This video is a cow version of John Lennon's song "Give Peace a Chance." Here I trained the cows to sing "Give Weeds a Chance."



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The videos "Sheep Eat Straw," "Lambs Eat What Mom Eats," "Aversion Learning," and "Neophobia" were put together by me for Utah State University's BEHAVE program using video they made as part of demonstration projects. You can learn more about BEHAVE at <http://www.behave.net>.

If you sign up for my newsletter, I will send you the first three chapters of my book free. Then you'll get periodic updates from me about what I'm learning about cows eating weeds in various areas. Sign up here: <http://www.livestockforlandscapes.com>