

THE CORE OF THE ONION CLEANSING THE WEED BANK

Ick

Stump



April 2013

If I do clear all the weeds where they have germinated, the seed still remains viable where they have not. For example, when one cuts down a tree, the weeds suppressed by the duff are then dosed with sun and warmth. The duff decays, leaving nitrate behind and up they come! Yep, it's broom, despite 25 years of control in this spot and a burn. Waiting it out is not a long term option here.



More Ick

January 2013

The same thing happened here where catch-weed bedstraw (*Galium aparine*) responded to a tree removal. Typically this was close to the driveway where bedstraw first showed up. Broom and several other weeds are in here too.





January 2013

I have reached the point that I can usually predict what will come up if I initiate a disturbance in a particular area on our property, such as thinning trees, a burn pile, or digging out the silt in a channel. Here it is hedge parsley (*Torilis arvensis*), which was both as predicted and very easy to deal with. Yet there is a reason this kind of knowledge may yet become unnecessary, and a hopeful reason at that, but before we get to that, we need one more example to show you how hard the hand work we did can be.



December 2013

This is pretty typical these days of a shady spot that has just been exposed. French Broom, catchfly, pop-weed, mouse-eared chickweed, scarlet pimpernel, and what might be rip-gut brome. Usually, I hose a spot this bad these days, so this is part of that one quart or so of RoundUp I use anymore.



April 2012

This is how small mouse eared chickweed (*Cerastium glomeratum*) can get. These weeds came up where I removed some bag-seed fescue I'd planted years before. We pulled literally millions of these, this small, by hand (by "we" I am including my two daughters here, who developed remarkable patience and tenacity in doing it). I am certain you are wondering why we bothered. One could easily overwhelm them with other larger plants, declare victory, and no one would be the wiser, here. Elsewhere it can grow to 24" tall and does a very good job of suppressing native annual groundcovers because it germinates early. This was the hard part, by hand. There were millions of them. Each flower "pod" has about five or six seeds.



Mid April 2012

Here you see the native that came in on this spot after we got rid of the chickweed. These are "slender wooly-heads" (*Psilocarphus tenellis*). It is said in the botanical literature, that this plant prefers muddy spots. That's because that is the only place botanists find them anymore. This is a hot rocky slope. Since we got rid of most of the *Cerastium*, the wooly heads are spreading.



Late April 2012

Here are slender wooly heads moving into a grassland, on very poor soil. My purpose in bringing this up is that we don't know what role this plant plays in this system because it has been suppressed by weeds for so long. Like many native plants, *Psilocarphus* germinates rather late, making it easy for weeds to displace from places in which it is less competitive. The Spanish grazed much of the State for over 100 years before Americans arrived in numbers, plenty of time for the landscape to change unrecognizably.



Late April 2012

Interesting, isn't it? Here is a plant that we did not believe inhabited a niche like this, doing very nicely in its second year in this area. Do you get the impression that it is going to spread? It may even perform an important function for all we know.



Chickweed

Chickweed

Wooly heads

1



April 2012

Yet if you want native forbs, until you have a more efficient process, this is what you do: pull the weeds, one at a time with the faith that you might learn something once they are gone. Guess what happens?



April 2012

Nearby, we have another little native plantlet starting to make a resurgence. This is “dew cup” or “lady’s mantle” (*Aphanes occidentalis*). The first individual appeared here in 2006 and it took quite a while for its presence to become noticeable.



April 2012

And here is dew cup taking it's place among lotuses and clovers in a stand of purple needle grass! Unlike slender wooly heads (which are of the Everlasting family), dew cup is a rose by another name. That means it may be a host to actinomycetes of the Frankia genus. In other words, it might be a nitrogen fixer. Nobody knows. Next year, I'll dig some up and look for nodules.



W

April 2010

So now you understand a bit more about what is meant by an image like this.



April 2010

That prior image came from the red spot in the background toward which the arrow on the next slide is directed. Variety and detail that intense occur on a scale like this.



April 2009

April 2010

This is the ridgeline 75' above the base of the sand hill. On the left is 2009 and on the right is the same spot the next year. Although the bumper crop of lupine in the left slide bred successfully, their seedlings did not appear the next year (instead, we got *Filago californica* and *Navarretia*). 2010 was not a good year for lupine, but it was a GREAT year for clover (prior slides). However, you don't see the clover up here, except in a few denser patches near the back (red outline). This distribution, plus the fact that I stirred up this patch with a hoe five years prior, is strong indication that the clover seed bank on this ridge had been exhausted. The dense clover patches in the red-outlined area are from the colonizers up on top in recent years. **Santa Cruz Sand Hills** are demanding because they are wide open for weeds. Yet as it turned out, we had bigger challenges than weeding what was at the surface.



April 2010

Yes, 2010 was an awesome year for clover. In general, they tend to be more prevalent in wetter years. Here it is growing amid poison oak and irises.



When I get a great year for clover like 2010, that is the time to harvest. Because harvesting clover is such a messy and destructive business, I have no worry about depriving that spot of seed. Besides, we now have a seed bank with plenty of natives. Is this really, "The onion is dead, long live the onion"? Are we really done???





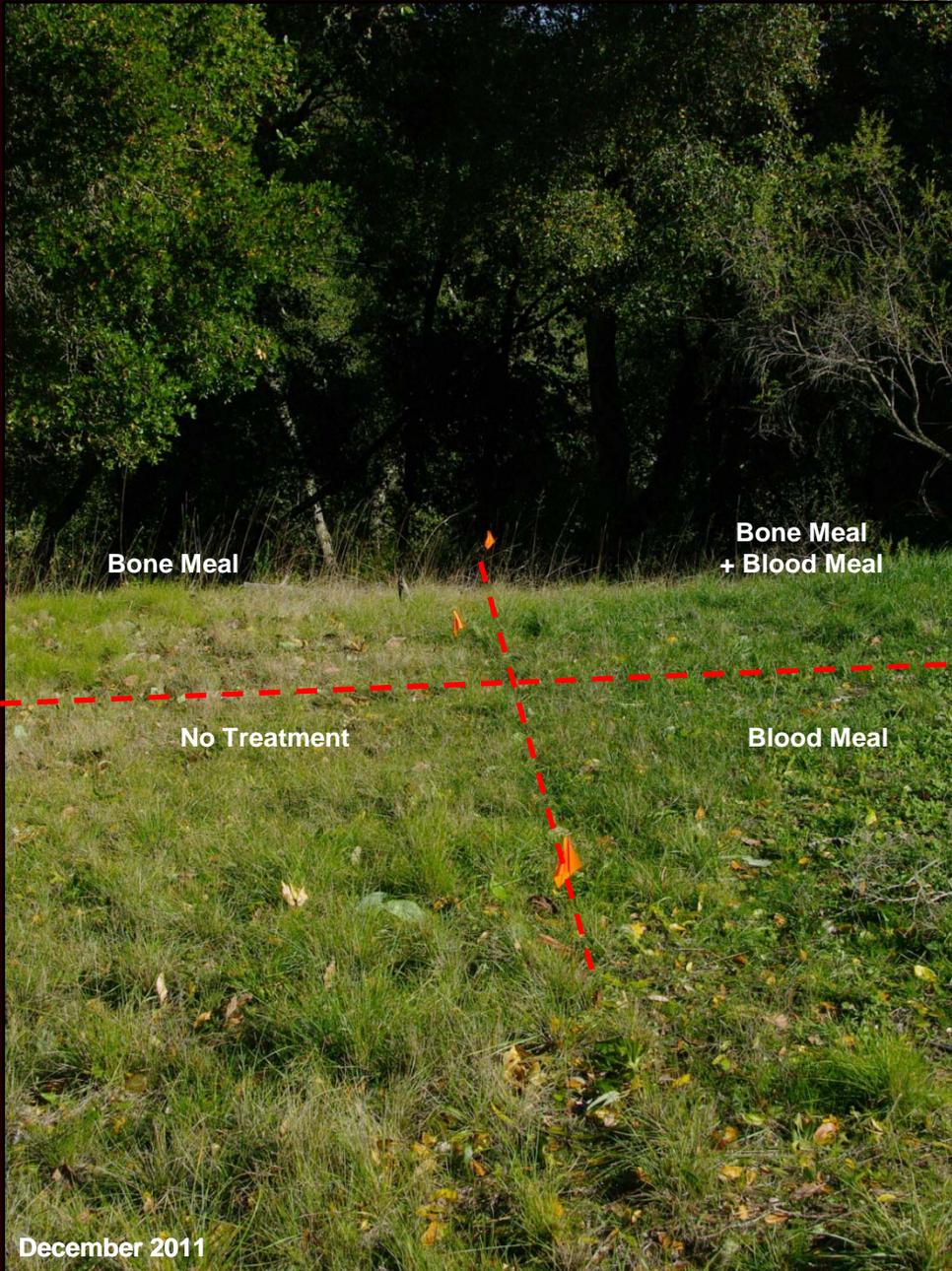
February 2013

These mouse-eared chickweed seedlings are likely symptomatic of what I call an “incidental error,” a weed from last year that seeded. The spot is too small for nitrate deposition from urine to have caused this and I would see more them than I do considering all the piles of deer pellets I find. So this is more likely simply a weed I missed last year, although there are two catchfly seedlings at the top edge. Yet that these are rare these days is a real indication that the chickweed seed bank is on the way out. For the most part, weeds have become fairly predictable these days but for one thing.



April 2012

I am sure you remember this grassland experiment and how the burn made room for more clover production. Well, there was another problem this experiment had already exposed related to nitrate leaching out of these sandy soils.



What was a surprise was that adding nitrogen brought up a filaree (*Erodium moschatum*) of which I had never seen more than one or two in this area. The good news was that it came up very early, so I had plenty of time to pull them all well before they flowered. But don't think I didn't get the message.

Remember from the site history that the place had once been grazed. Cows love filaree because it is high in protein; they spread it very efficiently because the seed is a bur. I once had a bout with *Erodium botrys* about 60 yards from here, but had not expected this irruption of *E. moschatum* in this area because I had never seen more than one or two in infrequent years anywhere. Interestingly, the places where I had battled *E. botrys*, including this hilltop, were notably LOW in nitrate. Equally interesting, despite the heavy germination of *E. moschatum*, I saw virtually no *E. botrys* on the hilltop in 2012-13.

Needless to say, I felt rather sheepish realizing that I still had filaree and possibly other weeds in the seed bank I had not yet eliminated before starting with reestablishing the grassland. I had made the mistake of presuming that it would be “unnatural” to add amendments when I was waiting for the weed bank to clear. One would think the compost pile that had been here leaking its tea should have been enough. But perhaps that was long gone too because of the sandy soil.

My concern is increased by the presence of the native grasses and their propensity to *suppress* weed germination, holding them off until that particular bunch dies off. I once had to deal with exactly that phenomenon when I got rid of red fescue I had seeded as an erosion control. When I took out the *Festuca*, up came the chickweed and hop clover. Fortunately, I had correctly anticipated exactly that response. Note that in the image above, the filaree came up heavily in a former burn spot where there was no grass, yet it has not done so in any other burn spot on this hilltop which did not receive the blood meal.

Recall the characterization of a repetitive ordinal sequence of weed expression as resembling an “onion,” with each weed species “layer” suppressing the next until it had been substantially removed. Well, this is quite possibly a multi-axis phenomenon among nitrate levels, pH, mulch cover, moisture profile, temperature profile, light exposure, and the rate of germination as precipitates what I call a multivariate allelo-suppressive hierarchy. So if I do add nitrate or if my grassland improves the soil over time, other weeds may come up after dealing with the filaree.

Still, all other things being held fairly constant, it was quite apparently the speed of germination with the roots giving off their respective auxins that appeared to govern the ordinal properties of the onion here; hence appearing to be strictly ordinal lacking the additional nitrate. There were times when I took advantage of this principle, spraying early in late December and then getting an opportunity to kill a second germination of the next weed “layer” the same year. That I had to deal with the same sequence out of phase from place to place is strong confirmation of the hierarchy, at least under low nitrate conditions such as has been the case on this property. Even today, when I initiate a disturbance, such as felling trees to increase sunlight, the sequence starts off the same as before: broom seems to go first, followed by filaree and rip gut (depending upon whether cows were there), hedge parsley and the bedstraws (which seem to get along famously), catchfly, *Cerastium*, and then *Anagalis* at the bottom. Cranesbill (a geranium) and cat’s ear don’t seem to heed the hierarchy, germinating in a slow decay pattern relatively uniformly from year to year. So there are exceptions. The one that scares me is four-leaved allseed (*Polycarphon*), which has shown up here and there in profusion even after several years of nearly pure native germination. Allseed can breed when very small albeit it matures relatively slowly. I am suspecting that it too may require higher levels of nitrogen to germinate, an experiment I’ll be performing in the winter of 2014-15. To a degree, weedy grasses also seem to have their own pecking order, but I have not been able to make sense of it yet but for the observation that rip gut appears to be king.



2014-15 Charcoal, Molybdenum, & Clay Array



1. This is a different location than the prior bone meal, blood meal, burn, and charcoal+Azomite® array.
2. Again, each cell is 240 square feet.
3. Four cells were amended with charcoal at a rate of 1 cubic yard of charcoal / 960 ft²
4. Four cells were amended with used kitty litter (no feces) at a rate of # / 960 ft²
5. Four cells were amended with molybdenum by foliar spray at a rate of XX gm sodium molybdate dihydrate / 960 ft²
6. Eight half-cells were sprayed with Surflan® pre-emergence herbicide.



So the onion is at least three dimensional, which I guess I should have expected. I began this process in 2004 with planting grasses so I am not about to kill it all and start over just to get the seed under the grasses, yet, partly because I have not seen that big a problem in the “blood meal + burn” areas of the hilltop experiment. So where we go from here is to continue our soil experiments elsewhere along this ridge and keep the fields of the experiment small enough that I can deal with the consequences should additional nitrogen bring up filaree and/or other weeds. Obviously, the cat litter has urea in it to stimulate the filaree, albeit in uncertain concentration. You do what you can with what you have.

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