Can you start with a quick bio? Let us know who is going to be educating us tonight.

Hello everyone. My name is Joe Ailts. I live in Western Wisconsin (Go Pack) and have been a competitive pumpkin enthusiast for 16 years. I am a scientist by training, got a bachelor's degree in biotechnology, a master's degree in clinical nutrition, and a master's level professional certificate in crop production & soil fertility. I'm currently employed by DuPont Pioneer Seed Company, serving in a sales management and agronomist role. I co-founded and currently manage the St. Croix Grower's Association as well as Stillwater Harvest Festival, home of the #1 site in the world in 2015. My personal best effort is 1422lbs in 2010 and I hope to grow a world record someday. I also find great fulfillment in helping/teaching others what I know about the hobby in the interest expanding reach and improving everyone's game. Steve Jepsen was/is a role model for me and I aspire to his level of intellect and generosity to this hobby.

Richard asked: 1st time growing, seed you grew, how big and what made you keep wanting to try and grow a giant pumpkin?

I jumped into the hobby in the summer of 2000, immediately after graduating from college. I planted a few big max seeds from the local garden store and ended up with a handful of ~100lbers. Eager to do bigger and better next year, the still infantile and quite primitive internet led me to resources like the "AGGC", "Mallorn list" and of course, BP.com. After a winter's worth of researching and networking, I planted my garden the following year with legit AG genetics and practiced a number of the techniques that were gospel at the time. That fall, a 568 Andrews seed (of LIpumpkin fame) resulted in the 798 Ailts 2001. That pumpkin was good enough for 2nd place at the Nekoosa Giant Pumpkinfest. I was ecstatic and addicted. The drive that keeps me coming back to this hobby, whether it be utter failure or overwhelming success, is a genetically coded green thumb coupled with an insatiable competitive drive.

What are the major players in the soil and what are target numbers to aim for with those players?

This question strikes at the core of the entire discussion. So fair warning, my answer is long and thorough. Here goes…

Soil fertility, as with any major scientific discipline, is a mix of established dogma coupled with branching hypotheses that often challenge the status quo. I need to state this at the forefront because my training and belief systems on various aspects of soil fertility are somewhat at odds with what the mainstream believes to be written in stone. Take from it what you will, knowing there may be other differing opinions on what "ideal" soil fertility looks like. Philosophy and disclaimers aside, I ascribe to the soil fertility camp that emphasizes balance in primary soil cations (base saturation) with an emphasis on calcium as the core nutrient, as opposed to conventional philosophy that embraces N-P-K as the focus of soil fertility.

If that sounds overly technical, bear with me because I promise to break it down and make it understandable. This line of thinking was developed by Dr. William Albrecht back in the late 60's/early 70's. It's not hocus pocus, it's very well studied, and it's just plain different than what many soil scientists in agriculture embrace. Very simply, it boils down to this- calcium is the most important nutrient in the soil and its levels, compared with levels of all other nutrients in the soil, are the most

important things to consider. So there you have it in a nutshell. I believe calcium is the most important player in the soil. Don't get me wrong, I'm not minimizing the essential role that nitrogen, phosphorous and potassium play. By the numbers, those nutrients will always be the most prevalent in plant tissues relative to the 17 nutrients plants need to grow. I simply ascribe to a system that elevates the relative importance calcium plays in soil health.

Calcium does way more than build strong cell walls. There are a ton of really fascinating and complex duties this thing performs in the soil long before it's taken up by roots. This is partly why I'm such a believer of this philosophy. Unlike conventional agriculture, that seems solely focused on spoon feeding exactly what the plant needs without regard to what's happening down below, this approach takes into consideration the role calcium plays in the soil and how it unselfishly facilitates the uptake of other plant nutrients, how it loosens up tight clays, and a host of other properties.

I could pontificate for hours on this subject, but to keep things moving, the experts in the arena suggest that you want a calcium base saturation of 70% on heavier clay soils, 60-65% on lighter sandy ground. Magnesium should be 10% on heavy soil, 15% on lighter ground. Why the difference? Calcium, due to its chemical properties, loosens soils and is good for tight clays. Magnesium, on the other hand, tightens soils and is good for loose sands. Shoot for calcium + magnesium to equal 80% of your base saturation. Potassium should be 3-5%. The absolute numbers are not as important as the relative numbers provided in the base saturation calculation. These numbers are available on just about every soil test out there. So you should have this info at your fingertips.

Side note: a thorough write up of the Albrecht/calcium/base saturation principles is captured in Neal Kinsey's "Hands on Agronomy". It's a pretty dense read, but a very practical discussion on the real world use of these ideas.

Base Saturation balance is where I always start. Proponents of this idea have found that in many cases, when your BS percentages line up as I've shared above, pH typically normalizes on its own. On the topic of pH, 6.3-6.5 is the sweet spot. This is the range where all nutrients have the greatest ability for plant uptake. Outside of this range, it becomes more challenging for plant roots to take up the nutrients. Everyone knows 7 is neutral on the pH scale. And many believe this is the magic number. But keep in mind that plant roots use acids to help dislodge nutrients from soil particles and absorb them into their system. So you need a little acidity to "unlock" all those important minerals stuck on your clay and organic matter. Cation exchange capacity (CEC) and organic matter (OM) kind of go hand in hand. Higher OM usually corresponds with high CEC. This is because OM is a major storehouse of nutrients and CEC is a measure of the size of the warehouse. Like many things in life, too much of a good thing can be detrimental. Same goes here.

What do you think is a ideal organic % in a well-drained soil?

An OM of 5% and a CEC of 12-20 are considered ideal.

Nitrogen in soil tests. Is it accurate? Will it change if soil sits for a period of time between sampling and being tested? What levels of N should we be shooting for?

Nitrogen is often cited as the most limiting nutrient in pumpkin fertility programs. Frustratingly, it's also the hardest to pin down. Early spring tests can give you a spot indication of nitrogen levels, but the first rain to hit will change that drastically. Nitrogen is dynamic, always moving. Same goes for sulfur. Nitrogen soil tests are accurate; the problem is that your level in the patch has changed by the time you get the results. To overcome this, many farmers will essentially start at "0", taking credit for inputs that may give you a jump start. More on this in a second.

Another challenge is that no one has studied how much nitrogen a giant pumpkin plant consumes in a season. University publications have reported that commercial field pumpkins accumulate 145-160lbs of nitrogen per acre in vegetation and fruit. This converts to about 2.5lbs of nitrogen on a 750sq foot patch per year. The vegetative and fruit mass of an Atlantic Giant is probably many times greater per square foot than a commercial jack-o-lantern plant, and therefore a much higher consumer of nitro. So my gut feeling is that AG's need a lot more than 2.5lbs/750 sq ft. Some of that can come from soil organic matter. Quick rule of thumb…for each percent of OM in your soil, you will get 20-30lbs per acre of nitrogen for the plant. As an example, a patch with 5% OM will give back about 2lbs of nitrogen in 750sq ft. While that's a good number, my suspicion is that giants need more nitro than that. Add in a rigorous watering program that probably leaches a good portion of the nitrogen, it leaves me kind of scratching my head on what's ideal. I'm totally throwing a dart at the wall here, but I think >200lbs/acre (3.5lbs/750 sq ft) is a good ballpark figure. For reference, commercial potato growers will use up to 350lbs/acre on irrigated, sandy potato ground. That's a lot of nitro.

I see soil reports that come in different types of readings.. why do they confuse us?

This is a great question and really boils down to the fact that there are just too many ways to skin the proverbial cat. Measuring the level of nutrients in the soil is tricky business. Ultimately, a lab test should reflect the level of a nutrient that is available for the plant to absorb. In order to achieve this, the lab needs to try and replicate the process a plant uses to take up nutrients. Most labs will use an "acid extraction". Plants do this too. In simple terms, they excrete an acid which then helps the plant (and lab) absorb that particular nutrient. Where this gets fuzzy is how strong of an acid? How much acid? How acid was the environment to begin with? So essentially you have all these crazy variables that dictate how a plant takes up nutrients. And labs across the world have developed an innumerable collections of methods to "measure accurately". Adding to the confusion, labs will differ in the units of measurement they report…some use parts per million (ppm) and some use pounds per acre (lbs/a). With so many ways to skin the cat, the best advice among soil testers is to find a good lab and stick with them. Don't dabble with multiple labs, you'll be comparing apples to oranges.

Which lab soil test do you like the best? Which test gives the best amendment recommendations?

I personally use AgriEnergy Resources out of Princeton, IL. But I also like Western Labs, notably because their staff has spent plenty of time working with pumpkin growers. If you aren't married to a lab, I'd

recommend Western. Regardless of the provider, I always run the full panel with micronutrients. Regarding amendment recommendations, I don't have much experience here cuz I've always made up my own recommendations based on the above described principles. Since most labs don't embrace this philosophy, their recs aren't built upon that foundation. So you have to do your homework and find a philosophy that fits.

Do you rotate Atlantic Giant growing areas and if so how many years do you cover crop before planting AG's in the area again?

If there's one point I'd like to make loud and clear, it's that rotation is the single most important consideration in long term patch planning. I've found this out the hard way and learned from the mistakes. I mono-cropped AG's on the same site for 6 years and built up fungal and insect pressure so bad I had to abandon my patch. Luckily, I have 3.5 acres at my disposal and have since incorporated a 4-year rotation. 1 year pumpkins, 3 years various cover crops. And brand new this spring, I'm actually going to take a parcel and pasture pigs in the season prior to pumpkins as a means of weed control, added fertility, and, of course, bacon!!

I understand that not everyone has the luxury of 3.5 acres. But even if you have 1000sq ft, allowing a cover crop to grow on 500 while growing a giant on the other will save you in the long run.

Mycorrhizae are fungal spores and mycelium which are beneficial to pumpkins. Most growers use fungicides to kill the harmful fungi, so how do we know that the good ones are not being killed in the process?

The short answer is that seed-applied and soil-applied fungicides have a negative impact on mycorrhizal health. Foliar, non-systemic fungicides used to combat diseases like powdery mildew (daconil) will not have ill effect on MF because MF will never come in contact with this chemical. However, systemic and root drench fungicides like Aliette and Ridomil have well researched negative effects on MF. Unfortunately, anti-fungal chemistries have not evolved to the level of specificity where they target only the bad guys and leave the good guys alone. So what do you do then? It comes down to a numbers game. If you are using chemistries that are harmful to MF, ramp up the frequency and quantity of MF applications to compensate. How much and how often is a shot in the dark though. It's up to you to determine what you're comfortable with spending and applying. Lastly, I found a nice write up and chart online that lists which fungicides are MF-safe and which aren't. Shoot me an email if you'd like a copy.

How long can mycos live in soil in our area?

This is a challenging question to answer with a simple response. Obviously MF have evolved to survive in the soil, even in sub-arctic climes where the ground freezes for a good portion of the year. The real question is how much survives? Spores are pretty tough and can survive a couple years in the soil. However, eventually they need a host. In agriculture, there exists a condition in corn called "fallow syndrome". Google it sometime. Essentially, this is a phosphorous deficiency in young corn seedlings caused by fields that have sat fallow for a year or more, which has been documented to be ultimately

due to low populations of MF. It's a pretty well understood condition. Interestingly, conventional agriculture's "solution" to fallow syndrome is increasing the amount of phosphorous fertilizer applied at seeding. One could argue the real solution is inoculation with MF. But that's a whole 'nother debate for some other time. Back to the question, I believe healthy populations of soil MF can be built over time by encouraging lots of hosts coupled with lots of applications of quality fungi.

Is it true that Chris Stevens can eat a dozen pumpkin salted caramel cupcakes in one sitting?

Shannon, if those are your pumpkin salted caramel cupcakes, everyone could & would eat a dozen in one sitting. They are that good.

What are your thoughts on using biochar as a soil amendment/additive? Does it live up to the hype or just snake oil?

So we're all on the same page, biochar is the name given to charcoal that's used as a soil amendment. It's got some pretty unique properties and the information that exists out there seems legit and promising. The most direct benefit is its nutrient holding abilities. So for guys with really sandy or low organic matter soils, it may help improve your soil's ability to hang onto nutrients. They don't wash out as fast if there's a lot of biochar hanging out. There's some talk that it serves as a really good home for beneficial microbes, again in soils that don't hold much, like sand. Scientists know there's probably a boatload of more benefits to biochar, they simply haven't been able to study all the angles. I haven't used it myself, as my soil has plenty of OM and is a heavier clay. But for those on sand, I think it's something to consider.

What are your thoughts on Big Stem & Anthesis? How do we know how much of these products is the proper amount to use?

For what it's worth, I believe that the incorporation of plant growth regulators into pumpkin programs is an exciting frontier that holds much promise. I respect and admire the initial work that's being done in this arena. As for details on proper dosing of the products currently out there, I have to punt on this one and trust that with continued experimentation, trends will emerge that provide clarity on which options offer a potential advantage.

Salt, what are your thoughts? I use a product called seaagri.com I use a couple times a year, it has every mineral there is in it, even gold, the only thing is it is dehydrated sea water and there is a lot of salt in ocean water.

Salt, more specifically sodium, is a nutrient that does not and should not be applied in soil fertility. Base saturation of sodium should be 0.5%-3% and never greater than the saturation of potassium. If sodium is higher than potassium, it will displace potassium uptake leading to disruptions in plant metabolism and other problems. Used as a foliar, the sodium content in the foliar Sea-90 product should not be an issue. However, I'd be cautious about using large quantities of products like these as drenches. Salt build up in soils is not healthy.

Which do you prefer to add to your soil in the fall & spring, Well aged manure (3+ years), Mushroom Compost, triple mix, regular top soil, store bought bagged cow & sheep manure or just good quality compost?

The group of Western WI growers, including Hopkins, Stevens, Zywiec, Midthun, myself, and others are blessed with access to the University of Wisconsin dairy farm composted manure. Each of us utilizes copious amounts of this "black gold" in our patches, some spread and incorporated in the fall, some added to the planting hole, some used in vine burying/trench mix. Any of the amendments listed in the question are super fuel for the soil, we choose the UofW mix because we know its high quality and consistently available in bulk.

Thoughts on bagged manure?

When it comes to enhancing soil fertility, many consider manure as the gold standard. Its got a great balance of macro and micro nutrients, it adds organic matter, it contains robust numbers of microorganisms. Generally speaking, it's neck and neck with high quality compost as the "ideal" amendment. In lieu of using manure directly from an animal's behind, the bagged version is a great compromise. The only caution is to watch your phosphorous levels, as repeated use of manure builds of phos over time.

How long should you wait to test after adding amendments?

Testing guides amendment prescriptions. If you do your homework on adding the proper amendments, then testing afterwards is unnecessary. Using a test to assess your work afterwards may be misleading. Use a tissue test in-season to fine tune.

Cecil also asked about "ideal ratios" for various macro and micros?

I'm making the assumption that Cecil's question stems from the ideas promoted in Mike Astera's "Ideal Soil" compilation. I've thumbed thru this book and see that the author ascribes to Albrecht's principles too. Regarding Ca:Mg, Ca:K, Mg:K ratios, I'll point back to the numbers I've provided above in the base saturation ratios. 70% Ca, 10% Mg, 3-5% K with the absolute numbers not being as important as their relative base saturation percentages. Im not well studied on the ratio of boron to the other nutrients, but I do know that consensus suggests 2-4 ppm on a soil test is good. Boron travels easily thru the soil profile like nitrogen and sulfur, so it's important to stay on top of this micro without overdoing it, as it can become toxic quickly.

What Cecil said.

I could copy and paste the above again. ☺

Should there be any difference in the soil numbers for AGs versus Giant Maters? Including pH?

To answer this question, I consulted the University of Wisconsin nutrient recommendations for vegetable crops. Take it for what you will. Suggested pH range for tomatoes is cited as 5.6-6.0. So they

like a more acidic soil (makes sense, given their highly acidic fruit). Nitrogen needs are very similar to field pumpkins, on a lbs/acre basis. Phosphorous and potassium demand is also similar to field pumpkins. Tomatoes consume relatively higher levels of boron, copper and sulfur as compared to other veggie crops, so make sure these are in good shape. Exact and absolute soil test numbers are really hard to suggest. Just do your best to avoid “low” & “very low” on your test readings.

How do you control the fruit growth at the peak? Is your tactic "Slow and steady wins the race" or you try to push to the limit the growth rate every single day? If so how?

I think this question really depends on your goals and circumstances. Since it’s been 15 years since I’ve had a pumpkin that was competing for top spot at a major weigh-off, I’m little more than an armchair quarterback to my respected peers Chris, John, Lorelee, Pete, and others in the Western Wisconsin contingent. However, when asked their opinion on the topic of pushing fruit, the competitive gambler in me likes to push the envelope. If conditions are good and the fruit appears solid, the best strategy is consistent and copious watering with a little groceries in each application, such as fish/seaweed emulsion. This year, LL’s 2109 had a scary sag line late season. Our collective suggestion was to throttle back, despite knowing she had a potential WR on the vine. In this case, slow and steady didn’t win the race, but it did get her an official fruit over a ton that very well could have gone down if pushed hard.

How beneficial are micro organisms to both the plant and soil? And also mycos to the plant?

I could take a genuine stab at this question, but there’s no better compilation of easy-to-understand information on this topic than Jeff Lowenfels’s “Teaming with Microbes” book. As a pumpkin grower using microbes, this book is an absolute must on your bookshelf. Suffice to say, microbes are more than beneficial, they are absolutely essential to the plant and soil. Same goes for mycorrhiza.

Any superstitions? Must have a garden troll in the garden somewhere? Tractor has to be parked in a certain position?

I got a chuckle out of Richard’s question. I’m not superstitious by nature. And lady luck rarely shines upon me. I’m more about risk mitigation. After 16 at-bats in the hobby, learned too many lessons the hard way and maybe just maybe by the time I’m ready to check out, I’ll get it right.

The hobby is becoming more and more expensive every year!! Can you explain to growers what mycorrhizae product you recommend and why??? Best bang for the buck...especially here in Canada!!

My experience has been that most of the major players in the myco biz are pretty closely matched on a price/pound basis. More importantly, however, is the quality of the product you are getting for a certain price. I’d rather pay $7.00/lb for a product with a reliable certificate of analysis than $3.50/lb for ambiguity. No doubt many recall last year when I rattled cages by warning growers to research their product providers and use diligence when making decisions. I’ve seen numerous certificates of analysis of Ron’s/RTI’s myco product and I like what I see…lots of viable product. This is not to say there aren’t other quality products on the market. I’m simply reporting what I’ve had visibility to.

Bill Foss asks about no till practices if fertility amendments are inline.

Great question. I am an advocate of more sustainable agricultural practices, including no till production. There's a lot of great data coming out of Big Ag on the benefits of no till practices. Those same benefits can be reaped by backyard pumpkin growers too. Two major benefits as I see it. Tillage, notably the recurring rototilling that many of us (myself included) employ to manage weeds and prepare seed beds, disrupts mycorrhizal fungal networks in the soil. No till practices preserve these myco networks and promote a healthier microbial environment. Secondly, tillage exposes soil surfaces to lots of oxygen. Frequent exposure to oxygen accelerates the breakdown of organic matter. For those of us who are OM deficient, no till practices can help build OM over time.

Will the next WR be grown with the use of organics, chemical, or both?

I'd like to answer this question with a question…will the next 100 meter dash world record be run by an athlete chemically dependent or purely organic?

Will Bubba grow the next WR??

While I do not have a crystal ball, I do have admiration for those who set lofty goals. Whether it's a world record, state record, weigh-off place, or even a personal best, patch success starts with a clear and concise goal. Hat's off to you, Bubba.

How to prevent Mosaic Virus? How to treat it once your plants have got it? You should pull the entire plant or just cut off the infected parts?

Prevention is limited to sterilization of garden tools. And, as Garry Gantner has become an advocate of, testing seed for the presence of the virus where applicable. Treatment is non-existent. Not only should you pull infected plants, you should burn the residue and sterilize your tools to limit spread. The virus "vectors" in bugs over winter. Don't give the bugs a place to live.

Do you have access to scientific literature, studies, etc for advance research? What would you consider the top 10 or so PGPRs and why? Please discuss trehalose, transcription factor manipulation, light intensity (such as direct sunlight vs shade cloth) and harpins future/affect on giant pumpkin growing.

Yes, I do have access to scientific lit for advanced research. One of the perks of being a scientist working for a scientific company. He he. As far as the top PGRs, I'll admit this isn't an area of specialty for me. My academic passion is for what goes on below the ground vs above. However, I know that research pertaining to the chemical messengers and mediators inside the plant is a rapidly expanding arena of science that has only been just scratched. As stated previously, I believe hormones/PGRs is an exciting arena full of possibility for our hobby. I just don't think enough work has been done to know exactly what, how much, when, and why. These questions would serve as a great discussion topic for those in the big pumpkin world who take a specific interest and could do a more thorough job of providing answers. Last comment here…some of the major players in the corn/soybean fertilizer industry have

launched products that contain PGRs. If you google “Winfield ascend”, you’ll come across information about a product promoted for use on corn seedlings to enhance growth. There’s positive momentum taking place here.

I would like your opinion on best practices for the use of mycorrhizae. 1)Schedule. add to fall cover?/spring amendments?/each node?/liquid during the growing season?

In both work and play, I’ve always tried to stand behind the mantra “you can’t manage what you don’t measure”. I believe this principle applies to mycorrhizae too, but unfortunately we do not have easily accessible and cost effective means to perform routine MF tests on our plants/soils. Such a platform would help growers fine tune MF applications. I do believe there are many microbially rich soils where little or no applications may be necessary. On the other hand, high dose fungicides in burnt out soils may require much more inoculant to revive. In lieu of idealism, if one wants to ensure mycorrhizal presence, then adding MF all along the path to harvest makes sense. Fall cover? Yes. Spring amendments? Yes. Each node? Yes. Liquid during the season? Yes. Million dollar question is how much. I can’t answer that because I really have no clue. Follow the practices of heavy hitters who are consistently doing things well is the best I’ve got for this question.

2)Phosphates. Is there a phosphate level to stay below to keep mycorrhizae happy?

It is pretty well established that high phosphorous has a negative effect on mycorrhizal infection. The challenge is that despite numerous studies, the point at which phosphorus exhibits its inhibition effect varies significantly. Differences in plant species, difference in MF species, and probably a pile of other factors create ambiguity. Such is biology. Not all is lost though, a synthesis of outcomes suggests that phosphorus levels at or below 50ppm (100lbs/acre) promote “happy mycorrhizae”.

3)Trichoderma plus mycorrhizae. Yes or no?

No...with a caveat. Overly simplistic metaphor (perhaps even to a fault): Let’s say you have a pet venus fly trap who’s preferred diet, oddly, is intact mice and fluffy cats. Would you mix the cat and mice before feeding time? The fly trap needs both mice and cats to survive, but mixing the two could cause some serious issues. Cat eats mouse in the mix, fly trap gets cat plus mouse, but it’s not what the trap wants. Once again, the science geeks are not clear on the specifics, but experts seem to agree that it’s a matter of timing. Trichoderma and mycorrhizae can play nice and even have synergistic affects. The key here is to first allow for MF colonization, only introducing the Trichoderma after you’ve swamped the roots with myco. 2 to 3 weeks after initial MF application seems adequate.

4)Antifungals. Particular antifungals to avoid? Or is timing or spacing of antifungal application after mycorrhizae application important.

I believe this was covered adequately in an earlier response. To reiterate, pretty much anything applied as a seed coating or a drench to control root pathogens will also knock out the good guys. Collateral damage is severe here.

5)Chloramine in the water. Do you think chloramine inhibits mycorrhizae significantly?

This was a tough one to find a clear answer. A search did not reveal any conclusive information that chloramines in water have a negative influence on MF colonization. The chemical has sterilizing effects on bacteria. Interestingly, in many experiments using MF, the MF spores are washed in chloramine to kill off any surface bacteria. It would be stretch to conclude that chloramine doesn't affect MF based on this, but I think it can be reasonably concluded that it doesn't sterilize the soil of MF spores.

Does mycorrhizae die off in the winter or go into a dormant state until it has a host plant to attach to in the spring?

Mycorrhizae go dormant during the winter months. If a suitable host is grown the following spring, good numbers pop back to life. Without a suitable host, portions will die off over time.

What does water temp effect the access of nutrients to the plant and fruit? Will deep watering with water from my well that is 53 degrees effect fruit growth?

To my knowledge, water temp does not limit the access of nutrients. However, cooler temperatures may slow growth via two mechanisms- number one, cooler temps at the root tips will slow cell division. To what degree periodic watering with low 50 degree water impacts this is hard to pin down. Secondly, cool temps in the fluids may slow down the movement of fluids in the plant system. While I don't have any info to substantiate this, my gut feeling is that cool water during peak summer heat in July and August probably isn't much of an inhibitor.

Joze	I'd be happy to take questions, feel free to fire away.
Ken D.	Who has a question for Joe tonight?
spudder	thoughts on leaf mold as compared to leaf compost
LL	What are you growing this year?
Bubba Presley Ma Ma Bubba	Is crop rotation really critical for disease prevention.?
Ken D.	give him a second...
Joze	make sure it's ultra-composted. I introduced Pythium into my garden by this vector...
Joze	LL: giant pumpkins. And probably whatever you are doing.
Joze	Crop rotation is absolutely essentially. do not compromise on this regardless of your patch size

Bubba Presley Ma Ma Bubba	seeing how we add compost & remove debri ETC>
Tconway	Joe what college did you learn all your soil stuff from? ;)
Matt W	You touched on soil pH levels for plant uptake. What is optimal soil pH for micro-fungi?
Joze	I get to sit on the sidelines and watch all my friends kick my ass because I didn't rotate earlier in my growing career. :)
Joze	Same one you are Tanner.
Bubba Presley Ma Ma Bubba	How do you rotate on 10.000 sq feet?
Bubba Presley Ma Ma Bubba	I mean is it possible?
Tconway	That UWRF must teach professionals there. lol
Joze	Fungi do just fine when tucked on a plant root at 6.3-6.5. keeps em in check. the most important pH is the one that's idea for the plant root
cntryboy	joe, to ask one of my questions a different way, if you add compost in the fall, how long should you wait to send your soil test in, or should you test prior to adding compost
Q Tip	Is there such a thing as too much mycorrhizae?
Barbeetoo	Follow up to the calcium for tight soils vs. Mg for loose soils. Would i want to supplement Ca during my growing season in my clay soil vs the grower that has sandy/ high om supplementing with Mg?
Joze	Bubba- incorporate pigs into your rotation.
smoky mtn pumpkin	lol
Bubba Presley Ma Ma Bubba	please explain
Joze	Thanks for clarifying that question. I always soil test in spring. that way your fall amendments have had time to blend in. and you can get a nitrogen snapshot.
cntryboy	so 3 months?
cntryboy	4?
cntryboy	2?
matt-man	hike
Joze	3 months would be adequate
cntryboy	thanks
PatchMaster	Any opinion on Greengro burying mix.
Joze	supplementing Ca or Mg in season to address plant needs will not have a major effect on soil structure, no issues there
Joze	Bubba- let's take that discussion offline, I've got much to share on that topic. More than what I can type here.
Bubba Presley Ma Ma Bubba	ok let's do
Joze	I'm becoming more intrigued with the GreenGro products. Going to do some experiments yet this winter on them. I don't have any comments presently because I don't have any experience yet.
Tyler	I have read MF can change the ph. around the roots of the plants What your opinion on this?

Joze	Yep, MF can adjust pH on a micro scale but at the end of the day, I'm certain the plants and MF's can figure out their issues such that both live symbiotically. They've been doing it for millennia and there's little we should do to try and influence that.
Joze	Too much mycorrhiza....I don't think so. Nothing I've seen suggests you can overdose on it. I'm sure your wallet and/or wife would intervene before you hit that threshold.
Orv	What is your favorite cover crop?
Q Tip	Haha both
Joze	Winter Rye. It's a very good host for mycorrhiza. It's dirt cheap. It does a billion other things. I lay it down as a mat in the spring and grow my field pumpkins over the top of it. So many awesome benefits.
Jeff Reid	Anything been done on ec testers on numbers to keep in check?
Joze	I got excited about ec testers last winter and hoped to investigate further but never prioritized it so it resides on my "projects to explore" to-do list.
Jeff Reid	ok thanks Joze.
rick.j	joe you mentioned rotation, some growers have grown in the same spot for many years and done well, so does that mean, rotation is not so critical especially if you are adding amendments
Bubba Presley Ma Ma Bubba	yes Gene McMullen hasn't rotated in 20 years
Joze	Indeed there are those where pathogens, for any number of reasons, have not been introduced into their ecosystem. Those are lucky individuals. I gambled and lost. You can use sledge hammers and nukes to keep pests at bay, but some don't respond to even those interventions. Just like medicine, an ounce of prevention, pound of cure.
Ken D.	Do YOU feel lucky?
Bubba Presley Ma Ma Bubba	I'm on the spot for 5 years now So I'm getting nervous.
Joze	Sure there are a handful gleaming examples of guys who've bucked the trend, but for the majority, there are pests in your dirt that limit your success.
Bubba Presley Ma Ma Bubba	lol
PatchMaster	What would you recommend to repopulate the "good guys" after a mustard cover crop and solarizing the soil?
Bubba Presley Ma Ma Bubba	Bubbas is always Lucky Ken!
Joze	Loaded question, Ken.
Bubba Presley Ma Ma Bubba	lol
Ken D.	This is main reason I tell people that pumpkin growing gets harder from year to year, not easier.
rick.j	thanks joe
Bubba Presley Ma Ma Bubba	yes thank you
Newcastle	Would you really recommend pigs in a rotation, what about laying hens?
So.Cal.Grower	Good question patch master

Joze	Species diversity is a good thing. If you are repopulating after some nuclear event, try getting as many different types of good bugs as possible. Reliable compost is the most effective tool. Very few, if any pathogens and loaded with billions of good guys.
Bubba Presley Ma Ma Bubba	Pigs in rotation? I can't get them off the couch
PatchMaster	I know lol
Joze	I believe animals have a place in our rotations. Laying hens could work, yes. Their ability to scarf weeds, seeds, and bugs is second to none. Plus you get to eat the tasty animals.
Joze	Back Ken's question, in the context of growing giants, I am both lucky and unlucky. Unlucky that I cannot shake this Pythium infection and it's taken me down year after. Lucky in the sense that I've learned a ton of lessons and feel I can help others avoid my mistakes. Maybe even grow my own whopper someday where the disease hasn't followed me.
spudder	thoughts on compost tea mix
Darren C	Do you use mustard?
Bubba Presley Ma Ma Bubba	How often do you soil drench with benficials Joze?
Joze	I like compost teas. They are bacteria and fungus incubators and I believe our soils can use all we can throw at them in this arena. Especially if you are using fungicides to knock out bad guys.
PatchMaster	Do you solarize?
Joze	I have not used mustard yet, but I do intend to bring it into my CC rotation.
Joze	I soil drench with beneficials at each application. Why not? A little bit everytime...
Bubba Presley Ma Ma Bubba	Each watering?
Joze	I do not solarize. Foremost, my entire ground is 3 acres. So impossible to cover it all. Secondly, I believe that solarizing doesn't get down deep enough to kill the pathogens that affect me...Pythium.
Joze	I'm not against solarization, I just don't think it's an effective solution to my issue.
Joze	Yes bubba, at each watering I try to incorporate at least one species of beneficial. Unless I'm running a fungicide, then obviously not.
Bubba Presley Ma Ma Bubba	ok thx
Joze	It's important to note that my reason for using beneficials may differ from others. I'm trying to both beat a soil pathogen and provide good bugs unrelated to disease.
PatchMaster	Thank you
rick.j	What species do you use the most of?
Joze	Azos, Biotamax, Rootshield, Companion
Bubba Presley Ma Ma Bubba	yes my thinking also re inoclate often as I really can't rotate my garden. It's to small.
LL	I used fungicides biological and chemical religiously, but still suffered some disease issues, is it worthy to use both.
Joze	yep. I believe that if you are using a powerful chemical program, it ramps up your need to be supplementing with beneficials.

Joze	Your fungicides are killing off the good guys with every application. That's been scientifically proven. so you need to send in reinforcements after each fungicide app.
rick.j	After using fungicides, how long to you normally wait to add beneficials?
Bubba Presley Ma Ma Bubba	I used that method for the first time in 2011 growing my 260 melon. With Great white.
Joze	I'll start with the very next watering. I know that these chemicals have residual activity, but I don't see harm in trying to follow up with beneficials in low doses consistently over the season.
Joze	Shannon, did you bring cupcakes?
cntryboy	lol
Ken D.	Are you using some sort of injector in your watering system?
Linus Van Pelt	Not for this many people
Ken D.	How about just for me?
Ken D.	LOL
Linus Van Pelt	For you Ken I would whip up a batch
Ken D.	Nice!!
Joze	Great question Ken. Yes I am. There's a model on amazon that goes for about $60. It's God's gift to guys like us who are using everything under the kitchen sink in our watering systems. Absolute staple in my garden shed.
Linus Van Pelt	See if you can beat Chris Stevens record
Ken D.	Cool. thanks Joe
Joze	Don Young....tell Donald to fly his jet up here. I've got some dirty soil he can take home with him.
Cornhusk	I've had failures and successes, but I have never done a chemical fungicide drench, could teeming with microbes be possible to outdo disease?
don young	lol
Bubba Presley Ma Ma Bubba	Thanks Joze & Ken Great Chat! it's time for Bubba to go play with his cupcake. Have a good night ya AWL!!
Ken D.	Any more questions for Joe?
Joze	John- short answer is no. I hoped to believe I could use microbes exclusively to overcome my problem but sadly, Pythium has the upper hand.
spudder	how much does cool wet conditions (no till) help contribute to diseases like Pythium?
Joze	Nuke the bugs with chemicals then come back in and repopulate with beneficials.
Ken D.	Kind of like reformatting a hard drive eh?
Joze	Cool wet no till conditions are paradise for diseases like Pythium. So as much as I embrace sustainable, no till philosophies, I cannot employ them here.
Joze	yes Ken...wipe the drive clean (as possible) and start from scratch

Rookiesmom1	Joze have you used Calcium silicate in your amendments to bolster your plants cuticle to add to your disease resistance?
don young	Joe I missed part of this did you get anything on boron or any new boron ideas?
Joze	Have not looked into calcium silicate but my interest is now piqued. Thanks for the lead and I'll look into it.
Joze	All I got on boron Don is a number of sources that suggest 2-4ppm is the sweet spot. Don't overdue it. And it also moves fast thru the soil profile so probably have to test for it every spring.
Rookiesmom1	It's worth a look.
Joze	Thanks for the tip!
spudder	thoughts on calcium peroxide
Joze	I'm not a fan of the peroxides...my kids scream when I pour it on their owies. Only imagine what the plants think.
Joze	In all seriousness, haven't looked much into the use of Ca-peroxide as an amendment. I'll add it to the list.
Joze	Well it looks like the questions have been asked. Thanks everyone for participating, hope you found it a good use of time! Feel free to reach out with any further questions that may arise.
Ken D.	Thank you very much Joe!
cntryboy	thanks joe
Tyler	Thank you joe and ken
iceman	Thanks Joe very well done
don young	thanks joe
spudder	much appreciated
Mark G.	TY! Lots of good info
Darren C	thanks joe
Joze	My pleasure. Have a good night everyone.
Just Bill	Thanks joe
LL	Thank you Joe, always very informative !!! :)
Newcastle	Thanks
Orv	Thank you Joe good stuff
Obie1	Thanks Joe!