International Ag Labs

Jon Frank

Interview with Dr. Dan Skow

Nutrient Dense Foods

Mr. Jon Frank: I want to thank everybody for joining us on this second Call to Arms call, and I'm very delighted to have and interview Dr. Skow in regards to market gardens and the Reams program.

I'd just like to start off, Doc, a lot of people know you. So I'll just let you tell a little bit about yourself and start with that.

Dr. Dan Skow: First of all, I'm a veterinarian. I've been a veterinarian since 1968. I graduated from Iowa State University in Ames, Iowa in June of 1968, moved to Fairmont, Minnesota, and entered a practice here called Fairmont Veterinary Clinic and have been here right at 40 years now.

Mr. Jon Frank: Wow. That's a good long time. I'm sure you must have learned a whole lot about nutrition being a link back, and must have had a big impact on it.

Can you give us just a little bit of history on Dr. Reams and your association with him?

Dr. Dan Skow: I first found out about Dr. Reams in about 1974. There was a book written by Nord Davis called Curseless

Cause Shall Not Come. And this was a little pamphlet or a booklet about Dr. Reams' health program for people.

And I read that and decided I'd like to figure out who this man was. And so, I made some calls and phone contacts and ran across a friend that knew where he was at. So he went to visit with him, and I told him I didn't have time to get away. And so he went to visit with him and says, "You know, I think you need to meet this man."

So, I found out about a class that was coming up and that he was teaching in Roanoke, Virginia in November of 1976. And he was teaching an Ag class there. It was a weeklong class. And that was my first introduction to Dr. Reams.

Mr. Jon Frank: Continue on. You had a longstanding relationship, then?

Dr. Dan Skow: From that point on, why, we struck it off pretty good. It was obvious that he was struggling to figure out how to move the program and how to teach the program. And so, we got more acquainted.

One of the first things I did as far as what he taught us, or told us in the class, that alfalfa was supposed to be solid stemmed and not hollow stemmed. Since I'd been in practice about four or five years at that point in time, I knew that alfalfa was hollow stemmed and it wasn't solid stemmed.

We got into quite a debate about it. So, when I got out of the class, why, I went and started investigating alfalfa fields and investigated about 24 or 25 fields in my area and finally found an alfalfa field that had solid stemmed alfalfa. So I drove into the farmer's yard and inquired about it, and he did one thing different than other people in the area. Instead of putting potassium on his alfalfa, he was putting limestone, or calcium, on his alfalfa. And it was all solid stemmed.

Once I saw that, I thought, "Hmm. This is interesting." Then I contacted him again and attended another class in the spring of '78. And I got more acquainted with him and then I teamed up with him and we taught our first class together in March of 1979. And from that point on, why, we put on classes together until he passed away around 1986 or '87, in there somewhere.

Mr. Jon Frank: And by this time, Dr. Reams was getting up in age already, by the time you met him?

Dr. Dan Skow: I don't know for sure just exactly how old he was. I think when I met him he was in his seventies. Just exactly how old, I don't really know.

Mr. Jon Frank: Dr. Reams, early on, did some work. Can you comment on his work with Dr. Northern and some of the collaboration they did and what they were doing? Can you comment on that?

Dr. Dan Skow: I knew that he mentioned that he worked with Dr. Northern. As far as the details of what he did or didn't do, the only thing I learned from him was either Dr. Northern or Dr. Northrop taught him the frequency of grapes. And that got him going on, and then as he worked with him he discovered and developed the frequency of all the different species of plants.

Basically, that comes from the DNA and RNA and the way they're put together and the number of chromosomes in the RNA and DNA. He always told us in class, “Once you establish the frequency, then you know the diet.” And I have never really completely understood that. I just know that certain groups of plants need certain nutrients in certain ratios, and other plants need it in other ratios.

And the books that had that information in were in Roanoke, Virginia in the classes that I was attending. And he was explaining it to us and he had the books out in front of the class. And we went to lunch and when we come back, they were gone. And no one that I'm aware of to this day has seen them since. And I haven't been able to find anybody that has even a clue where they went or what happened to them.

Mr. Jon Frank: One thing I'd like to just stop and pause and say, if anybody has some questions, I’d be happy if you wanted to e-mail them to me at jon.frank@aglabs.com. And I'll try to work these questions in for Dr. Skow

Well, that's interesting. I know that, from what I recall, Dr. Northern was also involved in doing some research on getting the soil better and then feeding kids and feeding people and maybe getting some good results with nutrition. But, that's about as much as I can remember having read.

Dr. Dan Skow: I did learn with Dr. Northern, I believe it was, he had a clinic in the east somewhere, and I'm not sure where that was at, where he grew nutrient dense food. And just by the feeding of the food, why, numerous health conditions would seem to correct themselves, especially in younger children. And most of it was fresh, raw greens and fresh vegetables that were steamed lightly and with a small amount of seasoning, mainly the use of herbs.

Mr. Jon Frank: These days, what would you say is kind of a passion of yours now? You've had a lot of years after Dr. Reams. What's a passion these days for you? What would you like to see happening in the years you have left?

Dr. Dan Skow: Well, I'd like to see this thing progress and develop on, and get more people involved with raising nutrient dense food in particular. And be able to influence and affect people's lives with high quality food so that they wouldn't have all the different health problems that are occurring today like overweight, for instance, autoimmune

diseases like fibromyalgia, Crohn’s and arthritis and diabetes, onset diabetes and things of that sort.

Currently, there is some research work going on at the University of Colorado that's real interesting that they're finding when you have nutrient dense food, high brix foods, the blood sugars of the people that consume this food don't fluctuate like they do when they're on low mineralized foods.

And I think that's a very significant thing and I'd love to see that continued and people carry the ball and get a lot more people involved with it in the future.

Mr. Jon Frank: That's great. And I'd just like to thank you publicly. I've been able to learn a lot from you and the resources from your teaching with Dr. Reams and a lot of those resources I've been able to pick up on.

So, just really want to say thank you. It's been a great opportunity to learn. And I hope to make a lot of that information ongoing available for new generations.

Dr. Dan Skow: Thank you.

Mr. Jon Frank: We're going to get into market gardens here in just a little bit, but I'm just trying to lay a little bit of foundation. Can you give a little inner history on International Ag Labs? And then, we'll start moving into some more specific things.

Dr. Dan Skow: Actually, International Ag Labs was a company that I just went off from that Dr. Reams started in Orlando, Florida in the '30s. He ran a lab there where he was kind of a consultant to other consultants around the United States and did some special work with the Crystal Sugar company at the time, and Bayer Pharmaceutical company also. They're the ones that made Bayer aspirin.

And he got a contract with Bayer to do some work on colloidal chemistry and the makeup of soft rock phosphate, so that helped him finance and research soft rock phosphate, which was his backbone of using to grow crops with to get nutrient dense foods and get high sugars.

And then, he shut that down. He was injured in a landmine in World War II, so the lab was shut down for a while. Then, he came back and started it up. And then, he retired, shut it down again. And then, when he had that done, then I took over the name of International Ag Labs from him, and I've been running it under International Ag Labs since about 1983, somewhere in there.

And carried on his work, and he gave me all of his materials that he had left that hadn't been stolen. And I'm using them to this day and have most of what there was left of his research work as well as papers and stuff that he had at the time. And I've been using them and carrying on ever since.

Mr. Jon Frank: I've seen some of his work and it seems that he left most of the things by audio, but he had a little bit of written material.

Can you give an overview of what is the Reams program? You touched on soft rock phosphate, but how would you describe the Reams program to somebody brand new?

Dr. Dan Skow: Well, the Reams program is a method of farming and a discovery whereby it centers around a soil test that was developed by Lamont Chemical Company in Maryland. And he took that testing system and by observing what was going on in plants and animals and then what he saw in the test, he started to piece, by observation and testing, together a process by which he could predict and see the cause and effect--he was always so strong on cause and effect. It was a term he often used, and another term he often used was "see what you look at."

And as you work with nature and work with things, as you start to understand what he meant by these terms, especially the one "see what you look at" because many times when you look something the first time, you don't really see it. You kind of think you do, maybe, but you start to see things more in depth. Like, for instance, the green maybe is green, but there's different depths of green--there's dull greens and light greens and dark greens, and then there's also a green that has a shiny sheen to it.

And as you start to learn and see those things, then you start to correlate them with plant nutrients. And when we started studying the plant nutrients, then they correlate with the soil test.

So, in the soil test, he has a number of different things that he looks at. But, compared to what most people look at, he has two primary things. And basically--one in particular, anyway, and that is the ratio of potassium and phosphorus. He likes to see a one-to-one ratio of potassium to phosphorus--I mean, a one-to-one ratio of phosphorus to potassium for row crops and seed crops and this type thing. And then, on leaf crops, why, he wants to see a two-to-one ratio of phosphorus to potassium.

And that ratio is very critical to whether you're growing a seed crop or whether you're growing a leaf crop. Now, that's one thing that's completely different and has a huge impact on how you grow crops. For instance, if you're growing leaf crops like lettuce, spinach, celery, things of this sort, cauliflower, broccoli, brussel sprouts, they're all basically leaf crops because you're not growing them for seed. They require a two-to-one ratio of phosphorus to potassium.

And then, when you go to seed crops, why, you want a one-to-one ratio of phosphorus to potassium as the results come from

the laboratory. And these are very specific things that are not taught in other circles, in other realms.

And then, he has another key thing that is very interesting and is very useful, anyway, is when you're growing a seed crop versus a leaf crop is that the use of the nitrogens and so on--his salt tests—-why you always test for ammonia nitrogen and nitrate nitrogen. And the ammonia nitrogen, you use for seed crops and then the nitrate nitrogen you will use for leaf crops.

So, when you're growing grasses, for instance, why, you want a nitrate nitrogen in your program instead of an ammonia nitrogen. And many people use ammonial nitrogens like urea on grass, and then that grass will be short, go to seed early, and it'll not be as productive in the end as it will when you use urea as if you were to use a nitrate nitrogen. So, you learn to use nitrate nitrogens growing grasses, unless you're going to grow them for seed. And if you're growing them for seed, then you want an ammonia nitrogen involved.

So, when you look at his program and you're being introduced to his stuff, you learn very specific things, and learn how to use specific nutrients for specific things you want to accomplish. If you want to grow seeds, why, then you want a one-to-one ratio of calcium--I mean of phosphorus to potassium, and then you want a more ammonia nitrogen than nitrate nitrogen for seed production.

If you're going to grow grass just for hay in particular and you're not growing it for seed, then you want more nitrate nitrogen than ammonia nitrogen and you want your phosphorus ratio to be two parts of phosphorus to one part of potassium.

The other interesting thing with his program--if you want to do it--is that he's very adamant about the levels and the need for calcium. So, when you use the Lamont test for calcium, why, he would like to see, especially in grasses, around 3,000 pounds of calcium per acre, row crops at least 2,000 pounds. And these took some very key things that you can manipulate and influence crop production, crop quality, yield, by manipulating these numbers, by applying the nutrients in the ratios that he is after.

Now, that's only part of the story, but that gets you off to a good start. The thought process goes that he wants plenty of organic matter or humus in the soil. And that's another part of the equation because the humus holds the water in the soil so that you can stand a much longer time without rainfall and still grow a successful crop.

And then, he put together another plan whereby you have to have bacteria available in the soil also. So, what he had done and what's very unique about his plan is that he addresses minerals, he addresses organic matter, and he addresses biolife or bacteria, fungi, and then whole hosts of things.

Now, you can have the minerals and you can have the organic matter, but without the biolife--the biolife excretes and produces exudates called glomulins which hold and cause the soil particles to cohese together so that the soil becomes granular. And then, it allows air and water to flow through it, and it works like a sponge that can hold nutrients in place and then release them much like a sponge would release water.

This is what's so extremely unique about his teaching and his thought process and this type of thing.

He also defined the elements in the soil specifically. Like nitrogen, he explained it was very important and how it enters into the cell. In other words, if nitrogen wasn't present, a new cell in the plant couldn't begin to form. And you learn you don't need a lot of it, but you definitely need some.

Some neat things that he taught about nitrogen. Nitrogen--if you see the blue color in the sky, that's nitrogen. And there's factors--air is 78 percent nitrogen, and the trick is getting that nitrogen into the soil. A slow 24-hour drizzle will put about four to six pounds of nitric acid into the soil. A strong electrical storm will put nitrogen into the soil.

If you have a soil that has granulation so that air can flow into the soil, the bacteria can capture that gaseous nitrogen and convert it into amino acids as they die off and

actually leave nitrogen in the soil. So, there's a whole interesting cycle of the way he approached it and the way he talked about it that made it very, very interesting.

Then, he taught--once you got done with the nitrogen, he taught about phosphorus being the important element that lets the plant produce the carbohydrates or sugars. So, phosphorus has a very key role. And for most production models today in agriculture, why, they're often quite short in having adequate amounts of phosphorus to produce the carbohydrates and sugars that are necessary to have high quality produce.

Then, he'd discuss potassium at great length, anyway, and potassium --we were taught--determines the number of seeds that set in seed producing plants, determines the caliber of the stalk, and also determines the thickness of the attachment of seeds or produce to the stem of a plant. For instance, how well a ear of corn--the shank of the ear of corn is attached to the stalk, the stem on an apple, how well it's attached to the tree. That's all determined by the level of potassium. But, the potassium has to be in ratio with the phosphorus to be effective. And these are many things that I didn't pick up on or wasn't taught when I was in college.

And then, the other key thing is calcium. Calcium determines the thickness and density of the cell wall of plants, and also, in the end, finally ultimately determines the volume

of produce or crop or grass or whatever you're raising off an acre of land.

And so, these are all tied together and they have kind of set amounts, or a window of amounts that they should be within, in order to grow a good healthy crop.

The next thing teaches is the value of copper in a program to keep molds from attacking crops. It's important that the copper be in a phosphate form. In fact, he wants all elements to be in phosphate form as they're taken in the plants. And if they are, then the plant can keep molds from attacking them.

And he taught that iron in the crop determined the thickness of the leaf. And the thicker the leaf is, the more energy it can capture from the sun so that they can grow faster and be more stable in erratic weather patterns.

So, these are all things that he taught that were very, very important.

Mr. Jon Frank: We're building up a few questions, and I've got some more questions here, but I'm just going to work in a few questions from some of the people who gave either blog comments or e-mail. Then we'll get into specifics on some market gardens after this.

Dave Hansen writes, "After doing a plant tissue test, how do I determine what to apply in a foliar spray to assist my native grass? I do soil testing each year and apply recommended

fertilizers, but my brix level still remains low, less than 3 percent. How do I raise high brix grass so I can fatten my grass-fattened beef?"

Dr. Dan Skow: Okay. To raise high brix grass, one of the first things is that we've got to get water soluble or available calcium into a plant. That's number one.

And that's not always easy to do. One of the best things I have found to start out and get it going is to use the calcium nitrate as a product on grass if it's feasible. It depends a little bit on your location and where you're at. To get that to go on my own cows, why, I put on about 200 pounds of calcium nitrate twice a year. And that will get the grass in a terrific volume.

Now, the other thing is that you've got to get an ergs reading there. In other words, that's the energy in the soil up in there, and that's another problem that you run into. You can do a lot of things, but you have to use a conductivity meter and measure the level of energy in the soil.

And what I find, and I've done it a lot this past season, it's quite low. And if you're not moving in at around 200, 300 ergs and maintain it there, you won't be able to get high-energy grass that has a good brix reading, for one thing.

Some soils and stuff--in order to get this to come about--they're going to need some biological inoculants. Now,

depending on whether you're in the east or western part of the United States, there's a big variable to where you're at as to how you approach this. But, at the end of the day, you've still got to get calcium up around 2,000. You need to keep the ergs around--between 200 and 300, and that you can do primarily with nitrogen. If you use the right form, especially on grass, especially a nitrate form--so you need things like sodium nitrate, calcium nitrate, in particular.

And then, get calcium available. Calcium can be released and available by using humates and bacterial combinations and foliar sprays. These are all things that can be done.

Aeration becomes a very important issue. Sometimes the use of things like an airway to break it up and get some air into the soil so you can get the microbial life to work.

These are just a few things. I'm currently working with a particular farm that has several thousand acres of grass, and this has been a real challenge. And when we started out with them, why, they had less than 500 pounds of calcium to the acre, and the last tests now show we're around 1,800. So, we've made some serious progress by putting on lime and then also putting on calcium sulfate, which is called gypsum. And that'll help open up the soil, mellow the soil, so that air can get in and allow the bacteria to establish to start releasing nutrients so that you can get high brix grass.

Those are just a few of the things, but if you're really having trouble then you need to find someone to work with that you're comfortable with. And get pretty intense with it because sometimes there're hidden factors that we're not aware of. Sometimes in some areas there's high sodium soils that have to be addressed that prevent you from achieving the goals you'd want, for instance.

Obviously, you've got to have water. And obviously you've got to have air. And if you fail to accomplish these things, why, it will not happen.

Mr. Jon Frank: Right. Well, there's a lot of factors, and I think you touched on a bunch of them.

And so, we've got a number of questions. Let's move on here. Talking about market gardens, how effective is the Reams program, do you feel, when applied to market gardens?

Dr. Dan Skow: In my opinion, it's probably the Cadillac program in the industry. But, I will also say it's probably one of the more challenging programs to implement and get everything to work the way it should.

The difficulty is getting people to understand when to apply something and when not to apply something. People are very susceptible to putting on and wanting to purchase products as a quick fix. And this program doesn't work that way.

But, if you follow it and really get involved with it, why, there is no question about you can raise nutrient dense foods and also high quality foods that have excellent shelf life, have excellent color or depth of color, and have flavor so that you don't need to add a lot of condiments. In fact, a lot of times you don't need to add any.

Mr. Jon Frank: So, it is probably a program where, until you thoroughly have mastered it, you may want to continue working with a consultant who understands it, is that what I'm hearing?

Dr. Dan Skow: I think you need a consultant big time if you're really going to get to the point to understand it, or somebody you could work with. And that basically starts out with a soil test. And we, at International Ag Labs, have access to working with the lab we got and we can help you get together with people to help you get established and get going on something. We have people that work with us and we also furnish services ourselves over the telephone.

But, I think you're kidding yourself a lot of times if you're really serious about it and try to do it on your own until you get a basic understanding of when to do certain things.

Dr. Dan Skow: One of the things with the program, for instance, if you're growing leaf crops, you don't put the same

material on leaf crops, for instance, that you do seed crops. So, if you're growing lettuce, you don't put the same program on a lettuce patch as you do a tomato vine.

Mr. Jon Frank: That gets back to the overall principles of the Reams program is that it's based off of the soil test. And then, there's certain key principles that are based on just crop physiology and how you approach your fertility program based on which crops you're growing.

Dr. Dan Skow: Yes. There's general things you can do to get a good crop. But, to refine it and to maximize the quality, then you've got to go further.

He taught about putting down a base program of basically how he would start, and I watched him do this and I find that it's pretty consistent and pretty true in areas where I get people to do it is. But, he likes to start in the fall. And he likes to have the ground plowed as deep as you can plow it in the area you're in, and he'd prefer to get it down eight, 10 inches to a foot ultimately. And he'd like to have a foot of aerated working soil that holds moisture and has a lot of carbons in it.

But, basically, he'd start out with a minimum of one to two ton of soft rock phosphate on top of the ground, then apply a ton and a half to two ton of limestone. And then, he wanted four to five ton of chicken manure in it without the litter.

That was his preferred approach to start somebody out, and that would be applied in the fall and left on top of the ground and then blended in in the spring. That was his core approach to it, especially with gardens and this type thing.

And then, after that, depending on what you raise, then you would do some foliar spraying for the appropriate plants. In otherwords, make a foliar spray for leaf crops versus seed crops to finish out the season, and then depending on what you needed.

By doing that program that we just outlined, by putting on soft rock, putting on the lime, and then putting on the three to four to five ton of chicken manure without the litter, that put trace minerals, bacteria, carbon, all the nitrogen, phosphorus, potassium and all the trace minerals, and basically you had it pretty well covered.

Now, if you're starting out with a very poor soil, that'll take one to two years to blend into that soil and truly become active. But, you can make some tremendous progress fast that way if you start out that way.

Mr. Jon Frank: Did he use this same program on richer soils?

Dr. Dan Skow: Yeah, you would modify it. I mean, that's why you did the soil test. You know, if you already got 3,000 pounds of calcium, which you do in some areas, obviously you didn't need the lime, for example.

We're also running into stuff that's been in the lab, I mean, I got some soils in some areas that are running up to 1,000 to 1,500 pounds of phosphorus per acre, and obviously we don't need any soft rock in those situations, for example. But then they're short of lime in some cases. So, that's why it's so critical to do a soil test to really know where you're at.

But, when he first started doing this program, he was working in Florida on white sand, which, when you do a soil analysis of it, it basically was zero, zero, zero, zero.

Mr. Jon Frank: We've got a question going the other direction here from Ryan. He says he's used too much compost in the garden. "How do I lower the P and K levels?" And then, he's got another question. "Can you explain the benefits of cover crops, green manures in the high brix market garden, specifically the value of setting aside a portion of field for a growing season dedicated to green manures?"

Dr. Dan Skow: In order to get the P and K level down, I'm run into that more frequently than in the first years. I've got farms right now with 1,500 pounds of phosphorus and probably 1,200, 1,300 pounds of potassium. Now, what do you do?

The main thing you got to do is get into a heavy liming program and soil aeration. One of the things I would encourage you to do in that situation, anyway, is at least 500 pounds of gypsum in the fall here, and consider an equivalent of two ton

of lime equivalent in the fall on a per acre basis. And then, in the spring, work that in or till it into the ground. And then, I would also do a soil inoculation with a humate bacterial combination in that particular situation.

Some of these, if they've put on an excessive amount of compost and stuff, it's almost easier to start somewhere else if it's a garden situation o correct the problem.

Mr. Jon Frank: I've seen that and I've recommended that same thing.

My observation is if you keep the calcium coming in, it seems like potassium may, if there's a lot of compost and it's still digesting, it might even go up the first, after one year, even though you haven't put any additional. But, then it starts to drop pretty good.

But, the phosphorus generally is only going to drop about 200 pounds a year. It's not a fast dropping thing, from what I'm seeing so far.

Dr. Dan Skow: I would agree with you there. The only thing you can do is bring the calcium up in ratio with the phosphorus and the potassium, that’s basically what's you're doing.

Mr. Jon Frank: Yep. And I have seen the gypsum and the limestone seems to be the best approach in that.

I had a gardener who had over 2,000 pounds of phosphorus. And I said, "Well, why don't you just move your garden?" He says, "I'm 84 years old. I'm not going to do it. They're all raised beds. What can I do?"

And we did do the limestone and the gypsum. And of course, we didn't put any P and K on. We just managed everything else, and he said he had a very good garden this year. So, he was pretty encouraged. And his phosphorus and potassium did drop some.

Dr. Dan Skow: Yeah, if you keep doing that, that will drop some. How fast, that'll depend on how hard you're working, and what kind of volume of produce you get off an acre.

Mr. Jon Frank: I've got a question here from Bob Jorgenson. He asks, "We grow several varieties of open pollinated corn and field peas, and we have been testing them for brix levels as we eat them at the table. We've been getting levels into the mid to high 20s, and on some of the peas, even close to 30. We have noticed that when we test them green before cooking, that they get a different brix reading than after cooking. Why is this and which reading should we be using to evaluate them? The higher reading is after cooking."

So, he's got a number of questions, but I think I'll just go one at a time, just kind of move through these kind of quickly.

Dr. Dan Skow: I would assume if it's after cooking, that's because you're concentrating the sugars and you're driving out the water. That's what I would assume would be occurring if the brix are higher after cooking than before cooking.

Essentially you're dehydrating them, so--and so the water's going out but the sugars aren't.

Mr. Jon Frank: So, basically use the fresh as your evaluation, is that what you're saying?

Dr. Dan Skow: Yes.

Mr. Jon Frank: Okay. Another question, "There are a number of foods that we are growing or using which are not listed on a standard brix chart. Where can we get a complete chart that would include all foods, or how can we go about establishing values for foods that are not listed?"

Dr. Dan Skow: Well, most foods are. All the ones that Dr. Reams worked with are on the chart. I don't know that there is a master chart anywhere. That's something you've got to compare to the similar produce that you're growing that isn't on the chart.

As a kind of a rule of thumb, though, most produce--there are some exceptions--but with most produce, the goal is to get around 12. When he made diets and stuff, anyway, why, I know if you eat food that was around 12 brix in all your foodstuff, why that was considered kind of an ideal number.

Now, obviously there is some produce that gets a lot higher and there's some maybe a little bit lower. Lettuce is typically 8, 10 probably is in your good category, and most of them are 2, 2. So, they could be improved quite a little. It's difficult to get string beans up, but I've seen string beans 12, 13. Typically, they're 3 to 4.

Mr. Jon Frank: You mentioned string beans. That brings in another question. A gentleman named Rex Collish had a question about Dr. Reams experimenting with growing green beans. And I think some of that's written up in some of the little booklets that we have, pushing that about 18 days.

Can you comment on that and see if that has any application to market gardens today?

Dr. Dan Skow: Well, I've taken string beans and we've got them ready for market in 30 days or less in Wisconsin. It's just a matter of getting your nutrient density up. That means getting phosphate numbers around 400, potassium numbers around 400 on a test, and then having calcium around 3,000. And then, foliar feeding two or three times a week with the appropriate foliar spray.

That can be accomplished, so you can definitely speed crops up by doing that and then maintaining your ergs at a adequate level. That's been the number one thing, really, that you'll finally learn is you got to track ergs every day. And when you

have cloud days, they drop. When you have too much rain, they drop. There's any number of things.

And so, that's what you got to do in order to speed things up. And it's very applicable because the faster you grow a plant and the faster it will grow the more nutrient dense it is.

Mr. Jon Frank: So, it's basically following the principles and getting the energy up in the soil and then tracking the energy and then keeping a foliar program to just keep pushing those plants to perform as optimum as they can.

Dr. Dan Skow: Yeah, and one of the main principles that you sit around and watch is the ratio of phosphorus to potassium. That's very, very critical and very, very important. Many times, the ratio is like four parts of potassium to one part of phosphorus. Under that kind of a situation, whether it's garden crops or field crops or whatever it is, it's difficult to get good nutrient dense produce because of such an excess amount of potassium.

Potassium is extremely important in growing a crop, but at the same time when it gets out of ratio with the phosphorus, why, you fail to get quality.

Mr. Jon Frank: And I just want to mention, we've got three classes you're going to be covering more in depth on the Call to Arms conference. Your first class is the “See What You Look At,” an overview of the International Ag Labs soil test. So,

this'll definitely be a lot more in depth than what you've given tonight.

And another class that you'll be teaching is the “Plant Growth, It's All About Energy.” And then, the last major class is on “Foliar Fundamentals.”

So, there is a lot coming into that class that kind of has to be all tied together. And so, you got, you know, three big tools that gardeners and market gardeners really need to understand, or their consultants really need to understand.

So, I would encourage people to consider the class, and if not, we will have the material available if they'd like to purchase it later.

So, any comments on your upcoming class or what you're going to be teaching?

Dr. Dan Skow: Yes. I think if anyone--whoever can attend, why, I think it'll be well worth your time, especially if you've got any interest in gardening in particular and want to raise quality produce because the better the quality, why, the greater the demand. So, if it's just for you family, that's important. But, if you're marketing it, it's really important because flavor, taste, color, density is extremely important if you want to market your produce because once they get a taste of it, they'll want more. So then you'll be selling produce before your competitors are. And this will become more important.

I have one particular account right now that's starting to achieve some of that, and when they get it up there, why, they can sell everything they can raise. But, if it doesn’t get there, then it's difficult to sell, so people have choices.

So, I would strongly encourage you to, if you can, attend the class we got coming up in Shipshewana, Indiana, and I think we'll have an exciting time.

Mr. Jon Frank: And I've still got more questions here, but I did want to kind of get that in.

And then, for people who want to get more in depth into the soil test, I just want to mention that we're going to have a much more in depth soil test class coming up in February. So, that's something they can keep track of with us or check on the website www.aglabs.com--but it is February 25, 26, 27.

Okay, moving on. We've got a couple questions, one from Cathy, one from Bob. They're both kind of asking the same thing. "Are you concerned about contaminants, heavy metals, or over applying soft rock phosphate? Is there any indication that you're putting too much on?"

Dr. Dan Skow: I don't know where that myth gets manufactured from, and it's a little bit irritating to me. If it's true soft rock phosphate, your elements are in colloidal form and they're in a so-called "complex" as such that as long as they're in that form and with other elements and they're not

in their pure form without the other elements, why, there's no problem with toxicity.

Now, there is heavy metal toxicity and all that kind of stuff, and soft rock does have some what is defined as heavy metals in it. And if the heavy metals in that soft rock were by themselves and not in complex with other things, then it would definitely be an issue. But, as long as it's true soft rock, it's not an issue.

Now, if you take hard rock phosphate where there is heavy metals in some of them, why, then that can be a problem. And that is something you want to be careful where it's sourced from.

So, there is definitely a difference. It's a totally different type of chemistry in the soft rock than it is with a hard rock. And as long as you're using that, you don't have to worry.

Mr. Jon Frank: One of the last questions here that Bob has, "What's an effective way to get high brix in tomatoes?"

I will mention that Dr. Reams wanted to see 4,000 pounds available calcium for tomatoes, and that was one thing I read recently.

Dr. Dan Skow: In high brix in tomatoes, the biggest headache you got is when the flowers are set and they start the

tomato on the vine, so to speak, is maintaining the ergs. And that is a real, real challenge.

And when you're starting out, even though you're putting on our recommendations that we often recommend, you still need to monitor ergs or the energy flow in the soil. We'll be talking a lot about that coming up in the next few classes, and the importance of it and how to maintain the ergs.

And that sometimes is very difficult to do. But, we'll give you some pointers and this type thing as to what to apply, when to apply it, how often to apply it. But, first of all, you need a meter and learn how to do an ergs test on your soil so that you know and can maintain it at 200 or better every day, not just one day a week.

Mr. Jon Frank: And I find that the base level of the ergs is somewhat variable depending on what your sodium level is to start with. And sometimes you want to keep the ergs above 200 and sometimes it maybe needs to be above 300, depending on where your sodium is at.

Dr. Dan Skow: You've got to know where your ergs are coming from or what's causing them. Sodium will give you a false reading.

Mr. Jon Frank: Right. And that's one of the reasons why we've got to integrate all these tools. We just can't pick out one tool and say, "Okay, this is all you need. Here's foliar,

that's all you need." But, we've got to look at the conductivity in the soil ongoing. We've got to reference back to the soil test even.

Dr. Dan Skow: We sure do. It's very important that that be done.

Mr. Jon Frank: One more question here. This is coming from Cathy Davis, "Is there a relationship to soil fertility and minerals and the occurrence or non-occurrence of bloat on clover pastures?"

Dr. Dan Skow: Minerals in clover pastures are extremely important. And the biggest problem they got in clover pastures, you get an excess of nitrogen and not enough calcium. And so, what happens is the rumen produces too much ammonia gas and causes bloat.

Some other things is weather conditions can really affect it. At the core of the issue on those kind of things is the level of phosphorus available. That's the first thing. And where you run into trouble, even though you do everything right, is if you get a cold, wet spring, clover grows real fast. It takes heat to get adequate levels up in a crop, especially when you first start out the first few years. And so, you can still get bloat even though you do a lot of these things just due to weather patterns. Now, you'll have a lot less, but it's still a concern.

The other thing with bloat on cattle, on grass, this type thing, is keeping them off the grass when it's heavy dews early in the morning and this type thing, and depending on what area of the country you're in. And then, when they go out to grass it’s making sure they’ve got some dry hay in their stomach before so they don't engorge on that lush growth until they get somewhat acclimated.

But, every time I've run into it in the veterinary practice anyway, why, there's always some weather event or something occurred, tremendous swings in barometric pressure and stuff. And the only way I know how to protect yourself against that is have adequate mineral in the grass itself.

But, if you don't have that, then here's some things you can do, keep in mind, anyway, is make sure you have free choice diatomaceous earth at all times. That will tie up some of the excess gases and ammonia in the rumen for one thing. Have adequate free choice kelp meal at all times, and have adequate free choice dry humates at all times. And then, have a good calcium phosphorus mineral blend at all times, and have salt available at all times. So, that will definitely put you in a situation where you're not near as likely to have trouble.

Mr. Jon Frank: Great answer. Got a lot of things to look at. Excellent.

Somebody here has got 48 acres of land. They'd like to get it repaired. They've got some pretty good results in brix of tomatoes and spinach. Now, they're looking at going from the small scale to the larger. How should they get started on a large piece of land towards growing nutrient dense foods?

Dr. Dan Skow: Well, if you start in the fall, and if you're really into it, anyway, I would want a soil test to figure out just exactly where you are on your P and K and calcium, in particular. But, if they're like typical ones, why, you're probably going to need a ton of soft rock phosphate. You may or may not need calcium, depending on where you're at. You may or may not need potassium.

If you do need potassium, why, then potassium sulfate is a good source or chicken litter with either sawdust in it, or whatever they use for bedding and this type thing, will provide you with some potassium.

Then, if you can't get chicken manure or litter or this type thing, then you need to take a look at the appropriate nitrogen sources for the type of crop you're going to grow with the appropriate microbial inoculants for your particular situation and location.

And there's where we at International Ag Labs could probably do you a lot of good the first year to get started. And we'll try to do our best to teach you so that you can carry

on on your own to some extent, or just by monitoring your soil with a soil test regularly and also having an ergs meter on your farm to monitor the energy level so that you can do the appropriate things at the appropriate time to grow fresh produce for whatever market you're going to go after.

Mr. Jon Frank: And here's another question. It comes from David Pelley. "Why do you use the word phosphorus and measure it as such in soil tests when Reams used phosphate?"

Dr. Dan Skow: Oh, hi, Dave. I know who you are.

The main reason is that currently the test as it comes out of the lab is as phosphorus. And rather than converting it over to phosphate and doing that, it's easier just to teach the ratio of 1 to 1 as is on the test for seed crops and 2 to 1 for grass crops rather than the old method of 4 to 1 and 2 to 1.

Mr. Jon Frank: But, you have not really changed the ratios, is that correct?

Dr. Dan Skow: No. In the end, it comes out the same.

Mr. Jon Frank: I'd just like to point out as well that the phosphorus on the test is still a measurement. It's still a reference to the phosphate. It's the same Morgan test as well. So, we haven't changed anything except the terminology.

Okay, another guy here--"How do I study or learn more about the Reams program?" And then, his second question, "Did Dr. Reams have insight on how to remineralize the human body? I

understand that eating high-density food is key. What can I do until that is available?"

Dr. Dan Skow: Wow. Well, that I guess a lot of people know what to do. The problem is will we do it? It’s basically that if you just quit eating processed foods, take sugar out of the diet, eat fresh vegetables, or something that hasn't been put though a can, you can go a long ways to doing a lot of good.

But, that's not necessarily what fits into our lifestyle in our current society, and so it's difficult to do. So, probably to emphasize fresh vegetables, good fruits and not juices, and eat the whole fruit. In other words, eat a whole orange instead of just the juice. Same with grapefruit, any of the juices. Everybody's buying juice, yeah, even grape juice is okay, but you're better off if you eat a good grape. But, eat the grape itself. Get the fiber and all that stuff with it rather than the other.

And if you do all that, you'll do quite well compared to eating anything processed and all that stuff, or canned. Then, avoid all foods that have additives to it for preservation. That's why it's important to eat the fresh produce like fresh vegetables. Cook them fresh instead of pre-processed, so to speak.

Mr. Jon Frank: We've got some more questions, but before we do, I just wanted to ask. You've got a lot of years of

experience consulting and working with a lot of different farmers and market gardeners and many other people. Can you just relate a couple experiences that kind of stick out. When the Reams program is applied, what's something that sticks out in your mind?

Dr. Dan Skow: The biggest thing that sticks out in my mind, when we get it put through, anyway, is the demand is greater than the supply for an individual. I've watched them in Pennsylvania down there. I had a young guy who had 40 acres down there, and I'd say in order to get the piece of ground, he was kind of like 40 miles from nowhere on his 40 acres. And he was shorthanded because he was trying to raise 40 acres of fresh produce. And he was raising melons of different kinds and squash of different kinds and carrots and string beans and peas, all these different things, which is a lot of work. And strawberries.

He had a roadside stand, and he didn't even have anybody to man it. They come up there he had the price on it, it was the honor system. I was out to his farm several times, anyway, and people would drive clear out there once they got the word of mouth. And the taste and flavor of it was such that they'd drive by all kinds of places out to his place. He was kind of like at the last place at the end of the road.

He was a young fellow and he worked darn hard and he put on the basic program and got excellent results. And that was what was all the fun, anyway. His only marketing program was word of mouth and quality of the produce. People drove out there to buy it. That's been one of the more impressive things that I've seen since I've been involved with this.

My other most impressive thing, I think it was in Mexico. We watched them raise grape tomatoes, several thousand acres of them. And the intense work of picking them and this type thing, when they have tomato vines that are 10 to 12 feet tall on a couple thousand acres, why, that's pretty impressive. Takes a lot of labor to pick them. But, boy, they were sure good.

Dr. Dan Skow: One thing I might mention, I learned this year that is really an eye-opener, anyway, is the people with market gardens are doing irrigating and stuff. And if you're in near towns and you're using city water that's got chlorine in it, that's not a very good plan.

That chlorine water, using that on your gardens and market gardens and this type thing, if you're using municipal water supply, why, that's absolutely something you shouldn't be doing. It'll make produce not taste very well and you'll never accomplish the flavor, taste, and color by using that kind of water.

So, you got to either put in a filtering system or a system to remove the chlorine so that doesn't happen. That's one thing I've really learned, a big thing, this year.

Mr. Jon Frank: Well, that's a key little point there.

And another question from David, "What is a high brix for potatoes, the tubers?"

I'm not sure about the tubers, what he means. But, I think he's looking for a high brix number, I suppose.

Dr. Dan Skow: I don't know. I don't have the chart in front of me or I don't remember on that. I know the vine, you can get it to 12 to 18. I do know that. What the actual tuber is, I don't know that I remember checking any of them. I did it one time, and I don't know.

Mr. Jon Frank: I believe seven is is probably an excellent or the start of excellent, anyway. From memory, anyway.

Okay. I think we're starting to come down to the end here. One last question here from a guy, "Whiteflies in a vineyard, wanting to correct it without pesticide. Any ideas?"

Dr. Dan Skow: Well, I don't know. Whiteflies in vineyard, one of the sprays that I've used through the years is four ounces of seaweed powder and two quart of liquid fish, especially if it's got some oil in it. Some liquid fish has the oil removed and some liquid fish, the oil is still in it. And you want the fish with oil in it.

That particular ratio combination can be very useful in some areas. I've had good success with that keeping something like that out without using a chemical spray of any kind.

The other thing is that in the environment it's in, you want to be checking your leaves of your crop and see whether you've got excess nitrogen. A lot of insects are in--especially in grape vineyards--if you got too much nitrogen. There's a lot of nitrogen used in areas I've been in in order to get faster, more rapid growth and this type thing.

But, there's a downside to that because that makes the plant more attractive to all kinds of insects, whether it's aphids or spider mites, whiteflies, whatever. They'll definitely be a lot worse in that kind of a situation, and then ultimately it’s getting the brix of the petioles up.

When I first started working with grapes and the petioles on the farm I worked in California, anyway, where the petiole brix reading was about 2 or 3. And we learned that by aggressively going after it with compost and soft rock and different things, when we got them petioles starting out in the spring at 8, why, basically there were no insects after that.

So, that's just a couple of comments I'll make. There again, there is no single solution to these things. It's a whole integrated plan that you need to put together in order to accomplish and correct some of these problems.

In the short-term, the other thing is considering some of these new products that contain neem oil and blends with some of the other oils. We have a product here at the International Ag Labs that we call Dagger. It might be a possibility that would also work in this kind of a situation.

So, ultimately, in the end, the odds are that your plants are out of ratio as far as your nitrogen relative to your calcium and potassium in the leaf. And the closer you can get the nitrogen and the potassium and the calcium in a one to one ratio in the leaf tissue, why, the greater the odds of having less trouble with any kind of a disease or insects.

Mr. Jon Frank: We've got a couple last questions from Bob Jorgensen. He says, "Can you suggest sources of places or people where research is being done that will identify which varieties of different foods are capable of taking up the most nutrients and showing the highest brix reading? For example, Celebrity tomato never will give a high brix reading even on rich soil, while Brandywine and some others will give a much higher brix reading if the soil nutrients are available."

Dr. Dan Skow: That is probably true. I've been working with a guy this summer who's got about 20 different varieties of tomatoes. And on his current soil fertility, there’re some varieties that are much, much higher in brix than other

varieties on that particular soil, even though the nutrient density of the soil is not very good.

I don't know of anybody doing specific research in that area. I do know, I've got individual farms where they're finding that different varieties of lettuce in particular, for example, different varieties of tomatoes, different varieties of squash, and some of the old heirloom ones, there is huge differences in the brix readings on them.

I don't know about the total nutrient, in other words, if you did a total mineral analysis, what you would learn or find. I haven't done enough of that to make any comments. So, I don't know.

But, I would agree that heirloom produce, due to their root system, even though the soil isn't so well, still can have a high brix. Now, the reason why this can occur is some of your older plant stuff, their ability to take nutrients from the air, that's something that nobody talks about much. But plants, the only element they really can't get from the air, according to Dr. Reams, was calcium. Otherwise, all of the other elements they can get from the air. And some of these older heirloom probably could do a better job of that than some of our recent bred up hybrids.

Mr. Jon Frank: I would like to just throw something out here. When a person is restoring soil and they're still not to

where they want to be, I advocate being very cautious about just wholesale going over to open pollinated varieties just because they might take quite a tumbling in yield. And depending on the way they're marketing their produce, they may want to get their soil nutrition up good before they're switching over to a larger quantity of the open pollinateds, because I have seen where, as you begin the program, if you keep what you know works really well and then start introducing it slowly, it can be better to take a cautious approach there.

Dr. Dan Skow: Yes, I would agree to that.

Mr. Jon Frank: And I think this is about my last question here. "When I talk with people about the value of using a refractometer, some people have objected to me that brix is only a measure of sugar and doesn't tell you about mineral levels. Other than the fact that higher sugar corresponds with higher minerals, what information is available that I could share with them to validate the use of a refractometer for checking mineral content?"

Dr. Dan Skow: These past two summers, I had my daughter do a lot of mineral analysis as well as brix analysis on a lot of produce sent to the lab. And without exception, if you take and added up the total value of the minerals we were tracking, I would say it was pretty consistent that the higher the total minerals, basically the brix was pretty well following it.

Now, there is some possible rare exceptions, but as a general rule that will still apply that the higher the rix is, the general rule, the higher the total mineral nutrient density of that produce.

We can argue about whether iron is higher in this one or that based on the brix and whether magnesium is higher based on the brix. But, let's not get hung up on all that. From the broad perspective, if you add the total of them all up, as the brix goes up the total of all the numbers goes up.

Mr. Jon Frank: One of the key indicators for that that I have found is the dry matter can increase it significantly. And sometimes you could take something that's an average brix and something that's a high brix, and the level and ratios of the various elements are very similar on the major elements. But, the total quantity in that high brix is significantly more. In fact, in green beans it was double, in what I did.

But, you wouldn't really pick that up looking at just the dry matter percentages because they all look pretty similar.

Dr. Dan Skow: The other sleeper in this whole thing that's forgotten is if the brix are up, that means there's more carbon, hydrogen, oxygen in that plant, and that is not recorded when you measure minerals.

But, carbon, hydrogen, oxygen is a mineral, so to speak.

Mr. Jon Frank: It's human energy.

Dr. Dan Skow: Therein is where the energy is that we survive on. And the brain requires glucose in order to function, and without glucose your brain doesn’t work too well.

When you're looking at brix and you're trying to argue about the minerals, then you got to take and figure in--because the higher that brix reading is, that means there's more carbon, hydrogen, oxygen without question.

Mr. Jon Frank: That's a very good point. And I think people dismiss sugars, but in fact they should be a little slower to dismiss sugars. It's a very important part.

Dr. Dan Skow: You won't function very long without sugar, I'll tell you that. And anybody's that's got diabetes and gets short of sugar, they're seriously dead if they don't do something about it in a hurry.

Mr. Jon Frank: I'm finished with the questions here. We went over about 18 minutes. Do you have anything else that you would like to add from your perspective?

Dr. Dan Skow: What I'd like to, and what I'm concerned about is that we’ve got a lot of people to get exposed to our concept, the Reams program. And rather than talk to a lot of other people, since we got our new website up, I would really strongly encourage you if you got questions to call us and get it from the source rather than all this secondhand stuff, like the question here tonight about the soft rock.

I've had three people this summer that didn't use it and they're set back five, six years and never got any quality in their produce because they believe that and they're worried about the heavy metals. I've got three of them farms we got it on, and we put on two ton to the acre. Our quality of our produce is up, our brix are up, and now we got product to sell that people want to buy. And it doesn't have heavy metals in it.

So, that's first of all. I'm glad to hear Jon here has gotten this set up. And get your questions in. This--with the e-mail and computers and this type thing nowadays, why, get them in and we'll see if we can get a way to have maybe more of these kind of conference calls and answer your questions so that you get it on the right track, and so you have a better understanding and have some excellent produce to eat so that it tastes good.

Mr. Jon Frank: I'd like to thank everybody for listening. And we look forward to seeing those of you who will be over at his class. And if not, there's still a lot of great gems in this call. And so, thank you for joining with us.

And thank you, Dr. Skow, for taking the time on an evening. And we appreciate all the things we can learn.

Dr. Dan Skow: Okay. Thank you very much. And hope everybody has a good, prosperous year.

Mr. Jon Frank: Okay. Thank you. Good night.

Dr. Dan Skow: Night.

Mr. Jon Frank: Bye.

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