

Hello everybody, coming to hot and live on this what will be a 99 degree day in the Ozarks of Southern Missouri and I'm here to talk about my squash patch once again. This is a growing experiment of a mash up of genetics known as a grex of *C. moschata*. So *moschata* are mainly known as the butternuts, crooknecks, or cheeses, but we have some fun genetics going on here. I think the last video I did here was about a month ago, a little over a month. It's July 29. And you know, we are seeing the squash bug pressure that we would expect at this time of year. Very few of the plants have succumbed completely to the squash bug pressure. But there are a lot of squash bugs here!

What is really cool is that some of these plants I actually crossed last year so we're seeing the F1 populations and a lot of crosses show something called hybrid vigor which means that the two, usually inbred genetics (usually heirlooms are inbred), two heirlooms come together and that genetic diversity just really makes that next generation pop. So before us we have the Seminole Pumpkin. If you're not familiar with the Seminole, it is quite an impressive genetic from the everglades, the swamps of southern Florida. The Seminole Indians grew it and they were actually able to stave off the Spanish with their stands in the hammocks of these pumpkins. So the story is not only cool, but imagine them growing in the everglades and the strength that you'd need to grow there. We see that here in the field. The Seminole is a small pumpkin. But it's not very large and it can grow in trees, which is really cool, and that's how the Seminole Indians had it. So last year I had crossed it with a Cheese Pumpkin that has been grown in the Ozarks for quite a while. Lets see if I can get that on film. And a Thai Kang Kob pumpkin, both of which also do very well here and both show up. So this no longer looks like a Seminole. You can see the phenotype has the ridges of the Cheese specifically and the mottling of the Thai Kang Kob and to me that's what's really exciting about creating a new variety, breeding our own vegetable varieties, is that once these genetics meet with each other, we're really going to see a lot of crossing and we're going to be able to select from the most vigorous plants and the tastiest plants.

Let's just take a little walk through the patch. We have another Seminole in here. Smaller. This is quite exciting. So this line here, you can see some yellowing of the leaves. This is a Rancho Marques which is a landrace squash from Mexico and I feel so much gratitude and just like sheer love for this squash. Thank you people of Sonora, Mexico, Rancho Marques, for breeding this squash for generations. The phenotypes, if you look on Native Seed Search, are very diverse and this squash does amazing with the squash bug pressure. And I got one from last year so I planted that – seed from that which crossed with South Anna and a butternut from Dancing Rabbit Ecovillage and who knows what else the bees brought in there. But that's what a young one looks like. And I also crossed back to the original landrace just because the genetics are so diverse in that original landrace from Mexico, that I really wanted to keep them. We have another one here. So that actually set fruit pretty early. I was pretty impressed because that is a longer season squash from Mexico. Let's just keep walking through the patch.

So as a part of my SARE grant this year, one of the things I'm doing is monitoring the squash bug predation and I'm doing that on a scale of 1-4 and so that's where the science comes in here. For my experiment, I am not managing for any type of squash bug pressure, so if we look under this leaf here we're probably going to see quite a bit, or at least there's the signs of quite a bit, of squash bugs. Oh I'm not seeing many. So they've already hit – here's a baby. So they've already hit and they're taking off. So I'm not only not managing, but I'm also taking data on how the plants are responding to the squash bug pressure. So that way in my notes I can know what varieties contain a lot of genetic information that is helping them be more resilient immediately in the face of it.

Let me show you that. You saw that yellowing of the leaf. Check these out. I think this is probably the Rancho Marques. It just shows incredible, incredible resistance to these squash bugs. You can see a

little bit of hit leaves right next to though, a bomb plant, that's gonna keep going. And this is in relation to other plants that look like this. So this is Lofthouse, a Joseph Lofthouse out of Utah, and he's inspired a lot of my work with landrace gardening. The cool thing about his plants is that they have an 85 day squash cycle so 120 days vs 85, that's a huge differentiation. And they set fruit early and they set fruit abundantly. So while they might not have the strength of things like the Rancho Marques, that early genetic is definitely something I want. So we're going to move this hose here, we're doing a deep watering. I do a deep watering once a week. And on these 99 degree days, they really need it. Just get that hose in there.

And this one's really cool guys, check it out. This is a Cheese from last year, crossed with a Thai Kang Kob, and if you type in Long Island Cheese, that's what you'll see. The one I grow has been adapted to the Ozarks for many years. Let's see what else we've got going on here. It's just really cool to see all of the crosses.

This is the row of Lofthouse squash and lot of little fruits popping on there. His phenotypes vary greatly. This is seed, Mrs. Amerson's (crossed with Crookneck). Really big early fruit from my friend in Virginia. More Lofthouse. Here's an interesting Lofthouse. This is crossed with Autumn's Choice. The seed is from William Schlegel in Montana. With Lofthouse, Autumn's Choice, who knows what else. The phenotypic variation in this squash patch will change a lot over the years and it's just going to keep getting more diverse.

Here's a little Thai Raw Kaw Tok also mixed from last year. So a lot of these are already the F1 and as far as I understand from all of my reading about breeding, the third year is the most exciting. The third year is when a lot of the crosses start mashing up genetics and they create something completely different than parents. And my hope is that the strength of a lot of these plants, and the epigenetic memory. If you're not familiar with epigenetics, I am recently looking into it and I am just so blown away by the wisdom and the layers of gene expression that can show up. So epigenetics is not a hard gene like a green, like a pure green instead of a mottled leaf, an epigenic expression will come up in relation with pest pressure or stress. So the experiment is not to take away the plants that are showing, getting hit by the squash bugs. If they survive, if they put on fruit, that fruit is going to have an epigenetic memory, a layer on the gene expression there that contains the memory like, "hey we got hit by squash bugs last year," and they've shown studies, not specifically squash, but on other plants where the leaves will actually put more acid in the leaves, more acid will be expressed and that will make them less palatable for bugs. Bugs that chew on leaves will actually gain less weight, they found that with caterpillars. I find that really fascinating. So the fact that these are getting hit. We're going to save the seed in this locale, we're going to save the seed that's had a lot of squash bug pressure, will mean that future generations, they are going to have even greater resilience in the face of that because they have that memory.

Here's another squash. About two months in, about two and a half months in, we have a lot of fruit set, we have a lot of squash bug pressure. Again that's kinda, you'll see it like this. The yellowing of the leaves. You know, but if this were *mixta* or *maxima*, other varieties of squash, we would just see that they would just die. And you know this Thai Kang Kob, it is one of the most resilient plants I've grown, but they were also the first ones to come out of the gate, and the most vigorous, so it's really interesting to see, that the first plants out of the gate attracted the most squash bug pressure and are now dying. So I'm really curious if they put on some fruit, that is definitely a genetic that is already mixed with Seminole and Cheese from last year. I really like the Thai Kang Kob, they lasted, we just ate one last week. We also still have some Seminole. So they're very long keeping.

The *moschata* is very long keeping. This is where I'm at with the two months of the project. If you have any questions drop them in the comments. I will be writing an article on this and keeping you updated as the season progresses. Overall, I'm amazed at the strength of these genetics in the face of the squash bug pressure and the bacterial wilt and other things that they cause. Over and out.