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Growing Natives: Lessons Learned

Kyle Banas

Pizzo Native Plant Nursery, LLC, 10729 Pine Rd, Leland, Illinois 60531 U.S.A.

kyleb@pizzonursery.com

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INTRODUCTION

At Pizzo Native Plant Nursery (PNPN) we grow over 450 species of plants native to the Midwest and Eastern United States. We are a propagation and liner producer of herbaceous perennials focusing mostly on wetland, prairie and woodland species. Native plants can be a difficult term to define and not the goal of this presentation but for simplicity let's just say they are species that evolved naturally within an ecosystem. PNPN is located on 40 acres in Dekalb County Illinois. Illinois is a state in which less than 0.1% of the land area was left unaffected by agriculture or urbanization. Fortunately, for us and those in horticulture, one result of this massive loss of native ecosystem and habitat has spurred a renewed interest placed on these endangered landscapes. This has resulted in the Midwest becoming a hotspot for ecosystem restoration and the use of native plants in the landscape. It makes sense that one of the most disturbed landscapes in the country would hunger the most for restoration or at least some sense of place to be put back into the landscape.

It's for these reasons, among others, that a few of the native plant nurseries in the Midwest have been growing and expanding over the last decade. At PNPN we have increased production from 200 thousand units annually in 2009 to over 1 million units in 2019.

I want to share three main lessons I learned since I began growing natives. The first is a lesson in what fundamentally sets a native plant nursery apart from traditional ornamental growers as it applies to production and the markets they serve. The second is a lesson in what working with native plants has taught me in the way I approach plant production challenges. The last lesson is how working in ecosystem restoration and with native plants has changed the way I view employee management and labor in general. My hope in this presentation is that you leave with a better understanding of what differentiates a native plant nursery from a traditional growing operation and perhaps a few new ideas you can implement in your operation.

LESSONS

Lesson One: Dealing with Genetic Diversity

The largest idea that sets a native plant nursery apart from a traditional grower is that a native plant nursery works exclusively with genetically diverse crops (Fig. 1).

Figure 1. Genetic diversity within an ecotype in *Symphyotrichum novae-angliae* (New England aster).

Native plant nurseries grow wild origin material that has not been selected or further cultivated to meet any certain requirements. This was one of the most difficult things for me to grasp as an ornamental grower. I was used to observing relatively similar attributes among individuals across a crop such as growth rate, heights, flower times, etc. and this is not the case with a genetically diverse crop. This diversity in a crop is apparent at all stages of growth from the size of the seed though the actual finish time of the crop. This makes mechanization and automation more difficult but not impossible. With natives we end up looking more for trends and averages among the whole crop rather than at each individual when making decisions. For instance, when cutting plants back, we have to look at the whole crop and make a determination on what the best height would be for the crop as a whole and not each individual. By cutting all the plants at the same height you can begin to achieve some uniformity. Many of our decisions are driven by averages in an effort to create a more manageable and uniform crop. This method of production increases the uniformity in crops the further along the crop cycle you go. By the time we have a finished liner, the product will lend itself to most mechanical and automated processes.

At PNPN the markets that we sell into are almost as diverse as the species we grow. We service the landscape industry including landscapers, ornamental growers, and park districts as well as the ecological industry including restoration contractors, forest preserve districts, and the USACE. We ship plants across most of the continental United States and into Canada. Some of these restoration type projects require crops of a specific genetic origin, meaning seed stock must have been collected from remnant landscape within a certain region or distance from a particular site that is being restored. Sometimes this is 200 miles, sometimes it is only 20 miles from the site. This is achieved by sustainably collecting small amounts of seed from wild populations that are then used to establish a seed bed at the nursery. This stock bed is then collected from for many years. This adds another layer of complexity to crop management. A native plant nursery may have crops of the same species that are from different genetic populations. For instance, this year we had three distinct lots of *Schizachyrium scoparium* (little bluestem) at the same time; one from Dekalb Co, Illinois; one from Cook Co, Illinois; and one from Berrien Co, Michigan.

In my experience it has been a good practice to not rely on one specific seed lot or origin for a species due to the wide variance and unpredictability in wild genetics. To overcome this, we routinely stock multiple

different genotypes for each species. We have developed a numerical system to track each crop. When seed is collected or purchased, we assign a 4-digit lot number, along with the year it was collected and a code regarding its source. This allows us to track origin and seed treatment methods throughout production and provide this information to the customer if needed. So, in addition to tracking the species, location and ready date we are also tracking genetic origin of all of our crops. Example SCHSCO50-4521-18-LP = *Schizachyrium scoparium* that is our 4,521 seed lot collected, in the year of 2018 that came from our Leland prairie. If I were to go back in our records, I would be able to tell exactly when and how much of this seed was collected, how it was treated, when it was sown, when it was transplanted into the next tray size as well as how many propagules resulted from each ounce of seed sown. We use Microsoft Excel for all pre-transplant information and SBI Software for all finished liner production that consists of deep 50-count plug trays or 3-in. pots in a 32-count tray.

One reason we strive to maintain genetic diversity within our crops is an effort to build resiliency in the landscape, especially when it comes to ecosystem restoration projects. The more genetic diversity that is initially provided increases the likelihood that the correct traits will be present to reproduce and sustain a population. For instance, say there is a really early frost in the fall and there was a wide variance of flower time among a population. Those individuals that flowered and set seed earlier in the year would be more likely to reproduce and survive than those that set seed later.

While we do try to maintain as much genetic diversity as possible there is some genetic selection during propagation and production that is inevitable. For instance, *Baptisia alba* (white indigo) seed usually germinates over a very long window and those seeds that germinate very late in that window are usually not used, so we are inadvertently selecting for the quicker germinating individuals. When growing *Monarda fistulosa* (wild bergamot) from seed there tends to be certain individuals that are far more susceptible to powdery mildew and are removed from the crop, thus we are selecting for more tolerant individuals. For these reasons we do not collect seed from our crops but instead always go back to our seed blocks or second generation wild collected stock at the most. This unintentional selection process does help create a more uniform crop and the further from propagation in the production line you go the more uniformity that is achieved.

Lesson Two: Nature Knows Best

The second lesson is the importance of observing plants in their natural setting. When it comes to making plants grow, IPPS is arguably the most knowledgeable group in the world, the only possible exception would be the plants themselves. I am beginning to learn the importance of observing plants growing in the wild and applying some of those ideas to our production practices, sort of a reverse engineering of nature or biomimicry. Some of the species we grow such as *Phyla lanceolate* (northern frog fruit) or *Lysimachia thyrsiflora* (tufted loosestrife) are rare to see in production at other nurseries so there is not much if any information to start with. I am learning that a good starting point is with natural observations. The following are a few examples of how observing plants in a natural setting has helped us overcome challenges in a production setting. These are not entirely my own observations or conclusions but more so how these practices came to be used in our nursery.

At PNPN we grow a range of wetland species used in retention basins and wetland restorations. For years we had problems overwintering many of the wetland plants for several reasons. One was that the large fleshy

roots were a favorite of mice and voles. Wetland plants are also more susceptible to cold damage than many of the upland plants so extra protection was always required for us to successfully overwinter these plants. As a result, we were finding ourselves over sold in the spring for wetland plantings due to overwinter loss and struggling to fulfill early orders. I remember discussing the issue with our grower while standing at the back of our nursery that overlooks a wetland. The area is a restored wetland ecosystem that also serves as a seed collection area for these species that we grow. We were looking over the wetland and discussing how they seem to overwinter so well in the wild and it dawned on us that in the fall the water levels typically rise and the plants are frozen in a few inches of water. So that fall we built some trial wetland beds. We leveled an area with a little sand and put down ground cloth. On top of that we built two rectangles out of railroad ties and dropped in a pond liner. In the fall the plants were cut back and packed into the beds. We flooded the beds and let winter take care of the rest. In the spring the water levels were dropped, and we were happy to see zero rodent predation and that our overwinter success rate was significantly higher than in previous years with the typical hoop house method (Fig. 2).

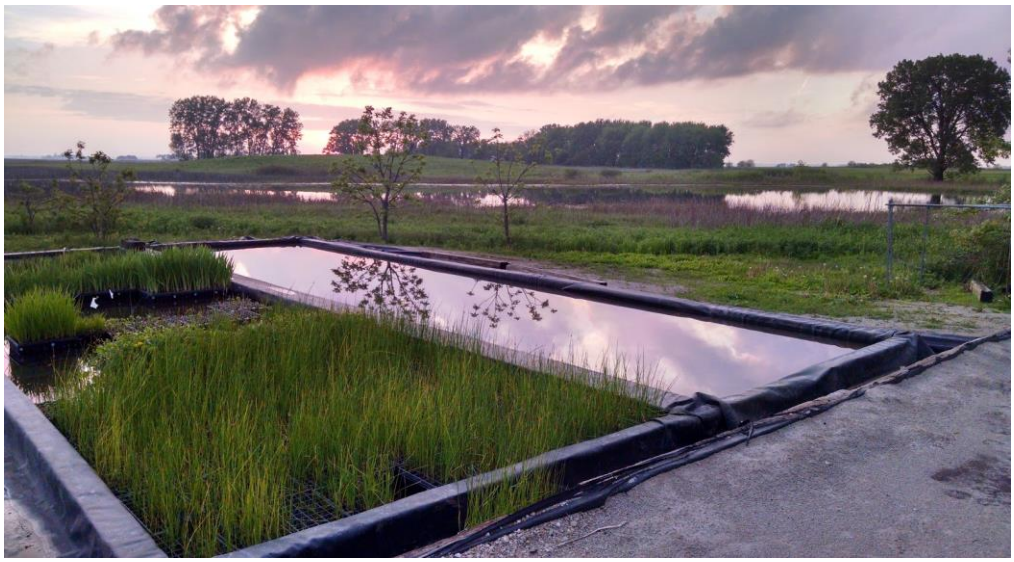

Figure 2. Wetland beds used for growing and overwintering wetland perennials. Biomimicry in action — natural solution in background.

Another example of this type of reverse engineering is the use of rice hulls on our ephemeral crops (Fig. 3). We grow a handful of spring ephemerals such as *Mertensia virginica* (Virginia blue bells) and *Claytonia virginica* (spring beauty). These plants sell very well for us and are in demand in the spring but typically take 2 years from seed so we were left with essentially an empty pot for the remainder of the year. Having the potting mix exposed for the majority of the growing season was a prime spot for weeds, liverwort and algae to grow and colonize. We spent significant amounts of time weeding and spraying to keep the stock clean. We collect the seed for most ephemerals in early summer as the plants begin to go dormant. One year as I was collecting seed and shuffling though the leaf litter from the previous year, I was thinking about it as a natural mulch and possible ways to replicate that in a container.

Figure 3. An example of reverse engineering is the use of rice hulls on our ephemeral crops for weed control, crop is *Mertensia virginica* (Virginia blue bells).

So that summer we waited for the ephemeral crops to go dormant and applied about ¾ in. of rice hulls to the pots. This reduced our labor and spray needs by almost 70% and yielded a much cleaner looking plant the following spring. Since then we have taken to using rice hulls on most of our crops as it seems to lessen weed and liverwort pressure, as well as help retain moisture and reduce some irrigation needs. One interesting observation I have made about the rice hulls is that it lowers the temperature of the potting mix. This can be used to our advantage when growing cool season crops, but it does delay warm season grasses from breaking dormancy in the spring as well as increasing finish times in the summer.

A third natural observation is the dependency that some crops have with other species (Fig. 4). A good example is *Asarum canadensis* (wild ginger), which in the wild I usually compete with the ants to collect the seed. It is a species that we have struggled with to achieve high germination rates, even after trying several stratification methods. The observation that has been documented is that the ants carry the ginger seed into their colony where they ingest only the elaiosome, discarding the rest of the seed in a special chamber where it eventually germinates and establishes its own colony.

Figure 4. *Viola pedatifida* (praire violet) seed showing the elaiosome that attract ants.

A deeper thought here leads me to ask - Who is farming who in this situation. I could make the argument that plants are using the ants in this situation to survive. As a way to try and crack the germination protocol for a given species, I sometimes leave it up to interns to try and figure it out. This season one intern chose to try and crack germination protocol for *Asarum canadensis*. The student set up a trial and tried several chemical and mechanical means inspired by the ants to break dormancy on the seed and improve germination results. It is still an ongoing experiment so let me know if you are interested in the outcome.

Lesson Three: The Importance of Meaningful Work

Since I was 13 years old sweeping floors in the greenhouse after school and asking why sanitation prevents pests, it has been my impression that if you understand the importance of your work you will find meaning in the task. When you have meaning for your

tasks you will be more satisfied with your job. That thought was recently vindicated by a study done by Payscale.com and referenced by the ILCA contractor magazine. The article discusses how important job satisfaction and the feeling of making a difference are when considering employee retention. At PNPN we have worked hard to develop a strong company culture and as a result we have developed a team that is engaged, empowered, and motivated (Fig. 5).

Figure 5. Part of the production team at Pizzo Native Plant Nursery celebrating hitting the production goal for the year.

I think these are traits that are valued by potential employees and make recruitment and employee retention much easier. In an increasingly competitive setting to find labor I believe these traits, along with a good salary will give companies the edge. I believe strongly in having a mission and vision statement that are not only applicable to our production and sales teams' everyday decisions, but also gives them reason to show up every day.

Our vision is:

> "That native plants are used in all planting applications because their value in enhancing and restoring our environment is widely understood and accepted."

Our mission is:

> "To build ecologically balanced communities through education, promotion, cultivation and trade of top-quality native plants."

We regularly revisit these statements and ask for all full-time employees' feedback and input. Unlike many other nurseries today, employee fulfillment is not our nursery's largest hurdle, and we are not exactly located in a heavily populated area. I have had people show up asking to volunteer their time because their interests align with our mission. While this is not a realistic way to staff a wholesale production operation, it does point

out that developing good company culture is important when it comes to recruitment.

Finding people to hire is only half the battle, employee retention is the other half and I have found in most cases the longer we keep someone employed the more efficient and effective they become. I have found that getting our entire staff out for tours of other facilities and job sites that our plants are sent to has helped tremendously. It's a team building exercise and it brings meaning and closure to plant production and completes the cycle of what can seem to some as routine and monotonous production tasks. I think as an industry we tend to get caught up on efficiencies and cutting costs, but it's important to remind ourselves and new prospects that there is a lot of passion and career satisfaction in the horticulture industry.

CONCLUSION

I believe the increased use of native plants in our landscape is not a trend but is more of an evolution in the way we view the landscape. It is the result of more people connecting to the larger systems around them and the realization that we are part of a fragile ecosystem. The use of native plants acknowledges that we are not the only species that needs plants to survive and we are capable of creating landscapes that serve functions beyond our own desires.

It is interesting to think that only by removing parts of the puzzle we realized the complexity of the larger picture, and through this lesson I feel a responsibility to help the pieces fall back in place. In the last 10 years, natives have taught me a lot of lessons about growing. These lessons will help guide my decisions in the next decade as we continue to adapt and innovate to evolve our industry.