



NeWold Times



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We have been rained on. We have been stuck in the mud and fallen down in it. We have been chilled and soaked in the early morning while shootbagging. We have sweat through multiple layers of clothing in minutes on 92+ degree days during a three day heat advisory. We have had days with no breeze. We have struggled to grab tassels as the wind whipped them through the air.

With about 15 days to go in our 2016 pollination/detasselling season, we have experienced a wide range of uncomfortable days that make working outside in the field...unpleasant. And yet year after year, we come back and do it again. Most of us are even excited about the approach of the season, even though we know we will be working very long hours; spend most of the day dirty, sweaty, and smelly; and be tired and sore for 4-5 days out of every week. **Why?**



Why? *(continued from page 1)*

By: *Raechel Baumgartner*

Why do we do this? Why do we trade days that could have been spent at the lake swimming and fishing for days in a corn field? Why do we not attend family gatherings, Saturday parties, and (dare I mention it?) the festivities of Corn Capital Days?

It is not because we would rather be in the corn field than do all of those other things. I quite like my family and truly enjoy spending time with them.

The reason we sacrifice so much of our time and so many of the few nice Minnesota summer days to the corn field is because we are passionate about creating better corn. We need to be out looking at corn when it is hot, cold, dry, and wet to see how the corn responds, because most of the time the corn dislikes the difficult conditions just as much as we do. We use these conditions as selection tools to help us weed out the weaklings and identify potential problems in hybrids. We are serious about giving farmers more control over their operations, and part of that is stabilizing not only hybrid yield under less-than-ideal conditions but also stabilizing inbred yield in the seed production field. This helps to keep the cost per unit of seed corn down and ensures that the users of our genetics will have sufficient supply of the hybrids desired by each of the farmers with whom they work.

I was told last week by one of our new summer workers that it is obvious that I am passionate about working with corn. While that is true, it goes beyond just the “small” daily tasks of making sure pollinations get made and customers are happy at the end of the season. I am passionate about breeding better corn, but that passion goes beyond just thinking corn genetics are interesting. I am a planner who seriously dislikes variables that I cannot control. By working with 3MG and developing tougher inbreds and tougher hybrids, we can help mitigate the “uncontrollable” variables for farmers, who can then plant the hybrids they actually want for as long as they want them and not worry so much about things like hot or dry weather during pollination. Those are my reasons. Each of us here has our own specific ones, but they all boil down to the same thing: helping farmers control more of their destiny, helping them worry just a little less, providing a better situation for the next generation.

I will happily sacrifice some days at the lake for that.



Guadalupe cutting silk to set up crosses.



Debbie, Susan & Raechel still smiling after a hard day's work



Breeding for Generations

by Erin Rodríguez

Have you ever stopped to think how much knowledge is lost when a farmer no longer has someone to whom they can pass down the farm? Furthermore, consider how much knowledge is lost when one of the large ag companies decides to shut down a breeding project that has been in the works for multiple crop cycles. Breeding is something that takes years, if not decades, to see the results. It requires dedication and long term vision. If a family has been farming the land for years or even generations, or a breeder has been breeding their crop for multiple generations, how does that work continue in his or her absence? Does that knowledge or breeding work to fall by the wayside?

Here at 3MG we are fortunate to have continuity in our breeding program that will endure because we have a multigenerational family operation. Ed and Raechel have worked side by side for years (since Raechel was a child) and that collective experience is invaluable. They both share that crazy corn passion that continually drives them to work towards breeding better conventional corn. In addition, this shared passion provides a teaching opportunity for the other



Ed and Raechel: 2 generations of Baumgartners doing breeding work.



Zeke & Finn Snyder - the next generation.

members of our breeding team. This is not only a boon for the Baumgartner family, but it is also an advantage to our R&D customers. There is consistency that will continue for many years because of the shared knowledge base, shared experience, and the shared breeding goals of the team that propels them forward.

We all know that plant breeding is nothing new. Human beings have been doing it for 10,000 years. There have been continual improvements in the yield, crop adaptation, and trait developments of various crops over these millennia. The advances made in the last century can be attributed in part to the consistent building upon both the traditional knowledge base as well as the scientific advances in understanding genetics. We take that same approach on an internal level because we have a series of breeding techniques (called our NeWold methodology) that is continually building upon that consistent body of both traditional and scientific information, data and genetics. The NeWold breeding methodology, developed by Ed and continually fine-tuned by the whole breeding team, is the cornerstone of our breeding program.

Breeding for Generations

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Unlike a large agricultural company that can lose consistency as one researcher leaves a project or a project is scrapped because of a merger, 3MG R&D enjoys a certain amount of autonomy, freedom, and most importantly, consistency. What is more consistent than a family company that passes down information from one generation to the next? Consistency is important in breeding. It may seem that this is an obvious point and possibly a little repetitive. However, plant breeding is work that reaches farther than just today—it reaches into the future and to the generations to come. As people who work in agriculture, we are aware of the challenges that we face to feed an ever increasing population while facing diminishing resources. This is why we are so dedicated to breeding Durayield products. This is why it is important to have a long term and continual approach to breeding.

Plant breeding is not a quick process, nor is it one that provides instant gratification. It takes a certain level of tenacity and dedication. It also takes a lot of time. We are fortunate that not only do Ed and Raechel have this devotion to breeding better corn but that the other team members, like Susan Johnson and Rey Rivera, are equally excited. They have invested and continue to invest the time and work required to make our breeding program successful and continuous. Their steadfast approach to breeding high quality, high yielding, conventional corn provides the base for continuity that is so important to the success of our products and processes. Furthermore, and possibly more importantly, their passion is infectious. Their excitement extends to the other breeders in our program and it ensures that there will be continuity in our genetics.

We are in this business for the long haul. We want the word “generations” to refer to more than just consecutive corn nurseries. We want generations to describe the future of our farm and those of our customers. We are looking to the future optimistically as we breed more sustainable products and implement proven practices to ensure that continuity and consistency become synonymous with NeWold breeding techniques and Durayield products.



Rebekah Baumgartner in the corn field.



The Importance of Diversity

by Ed Baumgartner

Last year I spent some time putting together a list of all of the crop breeding programs that I know of in the United States and less extensively, around the globe. It started out as an idea to understand who our potential customers are for our service business, and it turned into a surprise for me on a couple of different fronts. The first realization was that there are not many customers left out there for us to call upon due to the consolidation that has occurred over the past few decades in all crop sectors. That list will again be shrinking over the next several months as the largest players in the seed industry consolidate again. I knew going into my search that the list would not be big, but I did not find more than 35 active corn breeding programs in the USA. I hope that I missed some or will learn of some recent start-ups. All is not lost as we do have the potential for start-ups due to excellent germplasm availability from the Germplasm Enhancement of Maize (GEM) program (<http://www.public.iastate.edu/~usda-gem/>) and the US National Plant Germplasm System. (<https://npgsweb.ars-grin.gov/gringlobal/search.aspx>) The "GRIN" system contains the Plant Variety Protected (PVP) material, and the expired PVP lines are available to the general public. The base genetics for all of the US corn companies are stored in this system.



When you get outside of our immediate customer list concerns for our service business, you move into what should be a huge concern for farmers: as a farmer, I have only 35 potential sources for corn hybrid genetics from which to select what I grow on my farm in the US. Twenty-five years ago more than 150 active corn-breeding programs with over 300 brands selling seed were present in the US. Now the reality is even worse as even though 35 potential sources exist, most of the hybrid genetics sold in the US come from only five companies. The other 30 developers, including 3MG, work in less than 20% of the market place to sell our genetics due to the market share of the large companies. The genetic base becomes even narrower when you add in the transgenic traits (commonly known as GMOs). We have

only three providers of transgenes: Monsanto, Dow and Syngenta. (Dow and Pioneer co-developed the Herculex genes, and Dow licenses Herculex out to retail brands.) What this means is that genetic options or diversity available for your farm is further narrowed again because the transgenes are sold and grown on 90% of the corn acres in the US.

Think long and hard about 90% of the corn in the marketplace having similar or the same genes. Wow. I know that this last statement will ruffle feathers and be challenged by my colleagues. The truth is that we had a similar situation in the late 1960s. Please take the time to read these links: (<http://www2.nau.edu/~bio372-c/class/sex/cornbl.htm>), (<http://www.sciencemag.org/site/feature/data/plants2001/PDFs/250-4983-942.pdf>) T cytoplasm was used in hybrid seed production to sterilize the tassel in the female inbred in the seed field but then be completely restored to fertile in the hybrids planted in farmers' fields. This eliminated the need for detasseling and lowered seed field production costs. This cytoplasm was used in over 85% of the seed production at that time. No issues were known or seen until 1968-1970 when Mother Nature struck, affecting millions of corn acres with disease on hybrids that contained this one trait. We are in

The Importance of Diversity

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a position for this to happen again with multiple transgenic traits on large numbers of acres. Pay attention to the new diseases that have been showing up over the past couple of years.

Another scenario we find while examining genetics that make it to the farm after the above revelations is the fact that many hybrids that you grow on your farm may have one parent in common. This is nothing new because good inbreds that make superior hybrids are hard to find. Once identified, seed companies will use good inbreds in as many hybrid combinations as possible to take advantage of them. This became even more common after transgenes hit the market. Inserting a transgene into an inbred takes another three years after the 10 generations it took to develop and discover the inbred. To meet the market demand for transgenes, a lot of inbreds were (and still are) used in multiple hybrids in companies' lineups. Using the same inbred in multiple hybrids is not necessarily a problem but it becomes one when you, the consumer or farmer, are not aware of it. You need to decide how much genetic diversity you want on your farm and how much risk you want to take with related hybrids, not the vendor of the seed. A good salesman should tell you how closely related their hybrids are to each other. However, remember that even buying from different seed companies may still get you the same hybrid. Many companies sell genetics from the same developers...another consequence of so few developers remaining in the US.

What are the solutions to these problems? For our service work we need to assist new start up companies and the 30 smaller developers as much as we can. We will provide advice, service, genetics, and maybe even some marketing opportunities for their products. I have learned a lot of lessons the hard way and want to help others avoid the high tuition that I have paid. Service work will continue to be a shrinking business, so we need to focus on new opportunities in genetic development as the large companies consolidate to keep their shareholders happy. No matter what the press releases say, service opportunities for us and product diversity for farmers will be reduced due to the impending mergers.

For farmers, I would encourage all who purchase seed to ask their sales rep the relationship level of the products that they are offered to purchase for their farm. If two or more products have the same parent in them, do not put the related products on more than 1/3 of your acres unless you are very, very comfortable with them. Even then do not go over 50% of your acres with related products. Ask who is the developer of the genetics in the hybrids you are purchasing. You know you are getting genetic diversity with different developers. Discussing genetic sources has been taboo in the seed industry in the past, and the question may not be answered. If you purchase transgenic hybrids, you will have some clue regarding the developer based on the owner of the transgenic package.

We work very hard developing diverse genetics with high yield and defensive traits so we can offer a unique portfolio of products to the industry and to farmers. We offer these genetics to seed retail brands that are looking for something different to distinguish themselves from the rest of the pack. We allow our inbreds to be crossed to other inbred lines, thereby allowing differentiation in the market as well as genetic diversity beyond what any one company can do. Plant On!



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We thank our staff at all our locations for providing us with support as well as many of the photographs used on our articles. Keep on contributing!

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3MG R&D

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Raechel, Debbie & Susan taking a break after a long day in the nursery and yes, that is Debbie's lucky nursery shirt.



Founded in 2012, 3MG R&D has been involved in the creation of innovative products that we hope will be in the forefront of the seed market. Guided by our principle that we can develop food crops that combat environmental pressures naturally and economically, we continuously research new solutions using a mix of millennia-old breeding techniques with high-end modern genetic technologies.