



## LAKEVIEW ORGANIC GRAIN

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## CHOOSING CORN AND SOYBEAN VARIETIES FOR ORGANIC PRODUCTION

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By September, long before corn is harvested and test plot data is tabulated, already the seed salesmen are there, hanging out in your milkhouse and on your tractor, offering great early order deals with bright new pictures and charts. Are you bewildered yet? Relax! You are merely suffering from a very common malady afflicting farmers at this time of year called "Seed Catalog Confusion". With all the catalogs and sales people claiming this new hybrid, that new feature - actually, it sounds like every single hybrid in all the catalogs is totally excellent, with great agronomics and terrific yield potential . . . somewhere! But, what about on **YOUR** farm?

The fact is - **MOST FARMERS FARM BY LAST YEAR'S PROBLEMS.** It was cool and wet in New York in 2009 and long season corn matured slowly . . . so, in the spring of 2010, everyone asked "what do you have in a 85 day?" But this year has been long, hot and dry, a nearly perfect corn year and the 85 day corn was all done by the first of September, leaving almost 2 months of beautiful fall when we *could* have made more yield, had we planted a 95 day corn! Now, with this long beautiful 2010 season, we're expecting farmers to choose really long season hybrids for 2011. Get the picture? Perhaps now is a good time to consider your variety choice decisions a little more carefully, building in some well-planned diversity, and buying with both eyes looking forward, rather than firmly fixed on the rear view mirror!

**Corn maturity ratings** - contrary to what many catalog-readers believe, maturity ratings are surprisingly variable, depending on the year, the location and the company. They do give a relative idea of how different hybrids will perform in a given location as compared to each other, but you just can't expect a 90 day corn to mature in exactly 90 days everywhere. The same hybrid may vary by as much as 3 days in maturity rating by different companies, depending where it was tested!

It is generally recommended to choose varieties that will reach 'black layer' (physiological maturity) at least one to two weeks before the first killing frost in your area. Full season hybrids usually will yield better than short season hybrids, so the longest season hybrid you can 'get away with' will often give the greatest yield. But, if a hybrid is 'too long', the grain will have higher moisture and lower quality at harvest, with a higher cost of drying and an increased risk of frost, pest and mycotoxin damage. In New York, most organic farmers choose 85-95 day hybrids, though there are areas where 96-105 day corn varieties do very well. On our farm, the 107 day hybrid yielded by far the best this year, though last year, our winner was a 97 day. Longer season corn varieties will usually shine in hot, dry years or under drought conditions, since they are more drought and heat-tolerant with a stronger root system. Conversely, short season hybrids perform in the cool, wet years.

**Yield** Look for consistent performance in test plots in a number of locations, especially in areas similar to your farm. If possible, look at several years of data. Research done by Syngenta from 1995-2002 showed that the probability of a particular variety topping a test plot more than one year in a row was only about 19%. Remember that test plots are usually conducted under the very best conditions in the best locations, which are not usually typical of many 'real' farms. Most hybrids on the market are selected and produced in the Midwest, with better soil and weather conditions than New York, so be reasonable in your expectations when reading test plot data. Most importantly, don't be tempted by high numbers on hybrids poorly adapted to your area since you probably won't see the same results and may end up with acres of frost-killed immature corn!

Seed catalogs will sometimes distinguish between '**race horse**' varieties, which can produce very high yields under nearly perfect conditions but can't handle stress well, and '**work horse**' varieties, which may not produce the top yield, but can handle a wider range of conditions and managements. The difference between Midwest and Northeast conditions becomes most apparent with racehorse varieties that really need those superior Midwest conditions to perform as promised. Workhorse varieties may not seem as glamorous, but around here, they usually make their farmers more money!

Keep in mind that yield potential is only partly genetic. The highest ratings in the world will not compensate for yield loss due to weed pressure, soil fertility, soil condition/drainage problems, insufficient crop rotation, or waiting to harvest too long after physiological maturity. It has been proven that more yield is lost from a poorly adjusted corn planter than at any other point in the season, but a poorly adjusted combine takes a close second! Putting extra effort into variety selection may be disappointing unless a similar level of attention is put into all those more demanding good farming practices!

**Suitability for Silage vs. Grain** It isn't as easy to find comparative yield data or often even an adequate description in the seed catalogs of hybrids most suitable for silage. In general, a tall, leafy, hybrid with good grain yield potential, lower standability (low lignin) and slower dry down (softer starch) will make higher quality, more digestible silage. As compared to the main grain corn varieties for your area, slightly longer season (2-5 days) hybrids can be chosen for high moisture corn, and a little longer (5 - 10 days) varieties will work for silage unless wet soils interfere with harvest. When choosing a good grain variety, it is important to note that very high test weight corn may not make the best feed corn. The harder endosperm takes more energy to digest, thereby limiting the nutrients an animal can get from it.

**Dry down** A fast dry-down period for ear corn and dry shelled corn will usually save you money on heat drying and field loss. Some new hybrids possess a characteristic known as **stay-green**, or the ability to retain leaf color after black layer. This can improve late season plant health and increase rate of dry-down, but may also extend the harvest window for silage production by reducing the whole-plant dry-down rate.

**Standability** is an important characteristic in areas where the corn harvest often extends late into the fall. Poor standability is generally due to stalk rot, weak stalks or poor root systems and can lead to yield loss, quality problems, and the greater possibility of mold. Remember that while high standability scores are desirable in grain corn, they often indicate higher lignin (woodiness) in the stalks, which can be less desirable in a silage corn.

**Seedling vigor** - Differences in seedling vigor can have a strong impact on stand establishment when corn is planted early or into wet or cold soil, though vigor is as much affected by seed quality and growing conditions as genetics. Seedling vigor is especially important in organic farming, where rapid uniform emergence is critical for effective, well timed mechanical

weed control. Seed companies usually assess seedling vigor with a cold germination test, which more accurately tests vigor than the standard germination test usually reported on the seed tag, though some are finding that a warm germ test more closely correlates with actual field performance.

While there definitely are differences in seedling vigor potential between varieties, field conditions are often more important in early seedling establishment. When planting into marginal conditions, you may want to consider the value of some of the organically approved seed coatings (Profitcoat, Natural II) which cost a little more, but can give significant protection and yield benefit in cold, wet soil. However, don't count on organic seed coatings to give as much protection against cold wet soil as conventional chemical seed treatments. There's no substitute for a well-prepared seed bed and waiting until the soil temperature reliably above 60 degrees when planting organic corn, even if using coated seed!

**Disease / insect resistance** Most current corn hybrids include a fairly comprehensive disease resistance package that should be sufficient for normal conditions. Keep in mind that mid-late season leaf disease will cause plant death from the top down, while normal maturity or nutritional/water stress will cause plant death from the bottom up, but early leaf disease can also kill from the bottom up. It is a good idea to become familiar with the symptoms/signs so you can more accurately diagnose problems and fine tune your variety selection needs.

**Am I getting enough 'diversity' if I buy two 90 day corn varieties from two different companies?** Probably not. Most corn seed companies produce hybrids from the same or very similar parental inbred lines, resulting in relatively little true genetic diversity in our available choices. If the variety descriptions of two hybrids in two different catalogs are within 2-3 days of maturity and sound remarkably alike, especially for ear height and structure, it's a pretty good guess they **are** the same or share one common parent. If you want genetic diversity, spread maturities by at least 5 days.

**Special nutritional quality features** Hybrids advertised to produce higher oil or protein can be of much value to the livestock farmer raising their own corn for feed, since this corn can replace more expensive protein feed, resulting in improved milk yield and animal performance. But to the grain farmer selling commodity organic corn, these features can reduce yield a little and may not be sufficiently rewarded in the market to compensate for the yield drag. If you are intrigued by the American Organic Value Plus corn or other similar high oil/protein varieties, it makes sense to first develop a market that is willing to reward the added value, higher nutrition product.

**What does 'flex' mean?** Some hybrids are able to “flex” to produce a larger ear and more kernels in response to reduced plant population. This is a useful characteristic in organics, because it allows the plant to compensate yield if the stand is reduced by early weather stress, cultivating or weeding. Flex also is valuable under exceptionally good growing conditions, such as high fertility or perfect weather, because it allows the plants to take advantage of the more ideal conditions. Remember that early nutrient availability stress can limit the amount of flex benefit possible, even in 'good flex' varieties.

**What about open pollinated corn?** Open Pollinated, or OP corn is not a hybrid. Varieties of OP corn are genetically variable. In a field of OP corn, there will be different size and type plants, different placement of ears, and different colored kernels. Typical of open pollinated corn, seed labeled "Wapsie Valley" from several different sources labeled may produce very different appearing plants and grain, depending on who did the selection. OP corn plants tend to be tall and leafy, lower in lignin, and really outstanding as highly digestible and palatable silage. Most varieties will also produce good grain, though the yield is usually about half to two-

thirds that expected for a similar maturity hybrid. OP corn should be planted at a lower population for better standability. The seed can be saved and re-used the next year. This allows you to 'customize' an OP corn to your farm conditions after a few years of active selection, but if you wish to do that, be sure you have adequate isolation from other corn fields because OP corn **will** cross pollinate with other corn. We're finding that OP corn really shines as a 'heritage corn' for a growing and enthusiastic market of customers making unique cornmeal, polenta and whiskey. If nothing else, grow some OP corn in your garden for the most outrageously delicious cornmeal you've ever tasted!

**What is Cornell D2901?** For the past 5 years, we've been working with Dr. Margaret Smith, the corn breeder at Cornell University, to test and produce traditionally bred, non-GMO hybrid corn varieties that are specifically suited for New York organic farm conditions. Many of her hybrids are extremely impressive, but the one that has risen to the top is Cornell D2901, a 90 day 4-way cross. It is a real 'workhorse' that is stable and adaptable, with high yield and good grain quality. It is tall, leafy plant than can be used for grain or silage, and is truly genetically different from other similar maturing varieties. Cornell D2901 is certainly equal to anything the Gene Giants can turn out, but has the added benefit of being "one of our own", developed, selected and tested under our conditions, the result of one of the few independent, university corn breeding programs left in the country, and one of the nicest, smartest corn breeders we know!

Cornell is not the only independent, non-GMO corn-breeding program worth noting. There are other university and independent small seed companies that are trying to keep their plant breeding programs going against steep opposition and rapidly rising expenses. The US Testing Network was formed in 2008 of leaders from the organic and non-GMO seed industry, university breeding programs, the farming community, and USDA to equally evaluate each other's varieties in similar test plots around the country under more 'ordinary' farm conditions. In 2010, there were 11 plots, from North Dakota to North Carolina, allowing the breeders to see their material in a wide range of typical on-farm conditions. The Organic Seed Alliance is a similar effort, a broad-based collaboration of the organic seed industry leaders, university breeders and farmers, to develop, preserve, select and distribute seeds from a wide range of heritage and improved vegetable and field crop varieties.

We farmers have the ability and the responsibility, to vote with our dollars. If we truly want retain the benefits of independent, non-GMO, and non-industry crop breeding programs and companies, and preserve our ability to choose from a wider genetic repertoire than what the big seed companies offer, then we must support these groups - actively, vocally, and with our purchases.

**UMM . . . so, which one should I choose?** It takes experience and a little luck to develop a good strategy for choosing and placing corn hybrids on your farm. Talk to other organic farmers in your area! Don't expect next year to present the same challenges as this year! Since we don't know what weather will bring, many farmers recommend diversification, planting several different hybrids with different characteristics and maturities to reduce the risk of weather related stress. A good approach might include 20% short-season, 60% medium-season, and 20% longer-season, with a 10-day range in relative maturity, to avoid weather risks and allow for timely, labor-efficient harvesting. On our farm, we have our favorites that have done well year after year, but we also like to get a bag or two of several new, interesting varieties each year to try out and see which ones will succeed – and maybe even do better!

## **WHAT ABOUT CHOOSING SOYBEAN VARIETIES?**

**Soybean maturity ratings** are based on when a soybean plant starts and stops flowering and finishes the seeds it has set. The higher the maturity rating, the longer the plant will stay

actively reproductive into the fall. For soybeans, maturity is a function of day length (not accumulated heat units as in corn). In New York, most people plant either short season soybeans (group 0.8-1.5) and mid season soybeans (group 1.5 - 2.5). Longer season soybeans (>2.5) often don't mature reliably by first frost in New York, but are favored in areas south of here.

As with corn, the longer maturity soybeans will generally yield better than short season ones, and soybeans planted earlier will have a longer reproductive period (and therefore more potential yield) than ones of the same maturity planted later in the spring. We have found that that when we run late in planting, we can switch from corn planter to grain drill and plant at a higher population. This actually avoids many weed problems and usually brings a decent yield because of the higher population. We've also been experimenting with double cropping, a practice that is not usually considered feasible in New York. We've drilled soybeans no-till after harvesting barley and that works remarkably well most years.

Soybeans are classified as (1) '**food grade**' for the tofu, tempeh and soy milk market, high protein with a clear, buff or yellow hilum, or (2) '**feed grade**' - lower protein, higher yield, for the feed and soymeal market, often with a black hilum. Many of us New York farmers first got into organics back in the 1990's because of the strong Vinton 81 food grade soybean market. While Vinton is still a good variety, the Iowa State breeding program has some new food grade varieties, notably IA1010, IA1018, and IA2053 (group 1.9 - 2.0, available from Albert Lea) that are outyielding Vintons with excellent quality - we've been very impressed with them this year. Blue River also has some new food grade soybean varieties (1F44, 15F1) that also appear superior to Vinton in yield and quality. As with specialty food-grade corn, it is a wise idea to develop a food-grade bean market, before planting, since selling food beans into the feed market will generally not sufficiently reward the extra protein value enough to compensate for the lower yield.

**Our own soybean variety, Boyd**, is rated as a "late group 1" or 1.6, maturing in our area by the end of September. Nearly thirty years ago, Klaas found a single off-type plant in a soybean field and immediately recognized its unique value - a very tall, vigorous plant with pods borne high off the ground, making for easier, cleaner harvest. After finding the plant, he consulted with a Cornell plant breeder about testing it . . . and then he married her. And that is where all this started! We named it for Bill Boyd, a old farmer and local ag leader who, years ago, inspired Klaas to grow soybeans and other 'different' crops, to farm with active curiosity and innovation, and to teach others. Boyd has a clear (or colorless) hilum, but generally is not high enough protein to enter the food market. It is high yielding feed bean, a tall branching plant with strong emergence and vigor that is reliable over a wide range of fertility and growing conditions - a true soybean 'workhorse'. The larger plant size makes weed control easier by filling the rows quickly. It may not give the very top yield possible under high fertility, but it has proven itself to be exceptionally well adapted to typical Northeast organic conditions.

Boyd is also 'in the public domain', meaning that it is neither patented nor proprietary. We are actively trying to identify, test and bring back worthwhile public domain varieties of small grains, soybeans and other crops that can actually perform better under organic conditions than more modern varieties. If a farmer buys our Boyd seed this year and saves enough for replanting, that is fine with us, we WILL not come after him with lawsuits, intimidation or even hurt looks! As a soybean variety, Boyd predated the GMO revolution and the plant patenting frenzy, and we intend to keep it that way. There are many varieties like Boyd out there - basic, hard-working plants without the bells and whistles designed to attract attention, but they come through reliably and inexpensively year after year. We need to identify, propagate and save these varieties before they disappear!

**Thinking a little about soybean aphid, because next year is an 'odd numbered' year.** Huh? Why should that matter? It seems a little strange, but both farmers and researchers in New York are noticing a trend. In the years we have problems with soybean aphids, we see lots of ladybugs in the fall. Then the following year, the numbers of both are down, and then the following year, both are up again. 2010 has been a light year, we're seeing virtually no ladybugs this fall, so all indications point to heavier pressure in 2011. If you have had problems with soybean aphid in the past, you might want to consider some of the aphid resistant varieties on the market, such as Blue River 19AR1.

**Finally, regardless of what varieties you choose,** the most important decision is to keep good records and when you are harvesting, really look at and think about what was planted in that field. You may even want to save one or two of those catalogs and compare the maturity and variety descriptions to what you are actually seeing in front of the combine. Being truly aware of how different varieties perform on your farm and in your markets, year after year, is ultimately your best defense against "Seed Catalog Confusion"!