Dr. Jim's INSIGHT

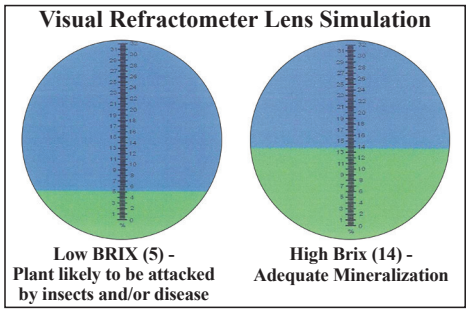
Dr. Jim Ladlie, *Crop/Livestock Management Consultant* • **507-383-1325 (cell)**

Are you a High-Brix Farmer?

Five Reasons to Check This Vital Grain Quality Measure

You track yield and test weight at harvest, but what if there were a "vitality score" that could help you assess your crop's health during the growing season? Would you be willing to invest less than $100 in a simple tool to assess the quality of your crop, week by week?

Visual Refractometer



It's easy when you use a refractometer to measure Brix levels in your plants, right in the field. While a refractometer looks like a small flashlight, it's a precision instrument that allows you to quickly measure the percentage of dissolved sugars in plant sap. These sugar levels are correlated with the plant's food-producing efficiency (photosynthesis) and the nutrition contained in the plant, including protein, mineral content and more.

Simply put, Brix levels reflect the quality of your crop, from nutrient density to flavor. Refractometers are routinely used in the food industry, from canneries to wineries, to measure the quality of the fruits and vegetables they buy from farmers, and the quality of the foods and beverages they manufacture. A refractometer can also be a row-crop farmer's best friend, too.

Brix levels are measured on a scale from 0 (poorest) to 32 (best). Your goal is to produce crops with a Brix measurement of 12 or higher. Anything below 8 is not worthy of reproducing or eating. In fact, it's nature's garbage. Unfortunately, many of the crops we test, including corn, soybeans and forage, have Brix levels of 4 to 6.

Measuring Brix levels during the growing season is a key part of ProfitProAG's *Farming the Controllables* system. High-Brix crops produce high-quality, nutrient-dense feed for livestock. These animals, in turn, provide healthy, nutritious food for people. It's divine design, and it inspires our sustainable, Full-Circle System. When you implement this system on your farm, you take a big step forward to supporting healthier soils, healthier crops, healthier livestock and healthier profit potential.

What are your plants telling you?

Here are five big reasons to test your crops' Brix levels:

1. **It shifts your focus to soil health.** Brix levels are a reflection of the environment in which your crops are growing, particularly the soil. Growing high-Brix crops depends on healthy soil. Improving soil health is a foundational principle of *Farming the Controllables*.
2. **Farm with, not against, Mother Nature.** Improved soil health increases beneficial microbial activity in the soil, which helps boost Brix levels in plants. Any activity that promotes better soil biology contributes to efficient photosynthesis and the natural flow of plant sugars to the root system to feed the soil microbes. These beneficial soil microbes help make micronutrients readily available to your crop.

3. **Build resilience in your crops.** Plants that have higher Brix levels are less prone to frost, since high-Brix plant sap has a lower freezing point than low-Brix sap. Plants with higher Brix readings are also more resistant to disease. Less crop disease means fewer problems with aflatoxins and mycotoxins that lower the nutritional value of feed and can harm livestock. High-Brix crops can also resist insect attacks more effectively. Insects don't have a pancreas, so they can't digest sugars. Insects have an incredible ability to sense healthy crops from stressed crops, and they favor the latter. Fewer insect pests can lessen your need for costly insecticides. If that weren't enough, fields of high-Brix crops also tend to have fewer weed problems, since healthier soils and plants make it harder for weeds to get established. Fewer weeds mean less need for herbicides.

4. **Produce healthier, higher-quality food.** Crops with Brix levels above 12 (especially those in the 20+ Brix range) are higher in sugar, minerals and vitamins. They also taste better, because they're sweeter. If you're feeding these crops to your livestock, these nutrient-dense rations contribute to higher-producing, healthier animals. Some people say it's easier and cheaper to just give livestock vitamin and mineral supplements to make up for what should be in the grain. But is it really better that way? Synthetic supplements can never contain the hundreds of organic substances contained in healthy plants, including vitamins, amino acids, proteins, enzymes and more.

Animals thrive when they eat a well-balanced diet containing vitamins, minerals, enzymes, amino acids and proteins in natural forms. This contributes to lower veterinary bills, animals that breed back better and higher productivity.

"Think of it this way," I told a dairy producer who runs a 5,000-head operation. "What's your greatest expense? "He didn't hesitate when he said "feed." I shared studies that show bovine utilize approximately 45% of the nutrition and energy from their feed intake in the 30 hours it takes to move feed through a cow's digestive tract. "If I can boost this by 5% to 15%, what would that do for you?" I asked the producer. Then I explained more about Brix levels and their connection to nutrient-dense grain. When livestock consume healthier feed, this enhances their feed efficiency, which adds up to greater profits for you.

5. **Reap more profit potential**. OK, you say, high quality is important to farmers who raise livestock, fruit or vegetables. But I raise corn and soybeans and the market only pays for bushels. Why should I worry about Brix? First of all, you aren't really paid by volume (bushels) but by test weight. Higher Brix levels go hand in hand with heavier, more nutrient-dense corn. The heavier your corn, the more profit you make. High-quality grain will automatically have a higher test weight, plus it won't be docked due to cracked kernels or mold.

Follow the ProfitProAG "Recipe for Success"

Taking Brix measurements is part of ProfitProAG's full-circle system of *Farming the Controllables* to lower your cost of production and raise your profit potential. It's a "Recipe for Success" that includes three phases:

- **Phase I: Residue Management "Second Harvest"** Never underestimate the power of microbes to break down residue efficiently and recycle nutrients. This "second harvest" promotes soil health, improves nutrient retention, enhances nitrogen fixation, reduces disease and insect pressure, improves yield potential and boosts profit potential.

- **Phase II: At-Plant "Jump Start Yield"**

  Farming the Controllables at this phase helps "jump start your yield." Now's the time to protect seeds properly to get seedlings off to a strong start. Biological seed coatings offer a seedling and season-long plant health enhancement approach while also supplying key nutrients. This will establish a healthy plant below ground and above ground. This phase is critical to the in-season push for higher yields.

- **Phase III: In-Season "Stay Green"**

  Look at most fields across the Midwest and it's clear that corn is dying prematurely each growing season. Think "stay green" instead. This is tied to minimizing plant stress during the growing season. In-season foliar feeding can provide needed nutrients and energy as the plant progresses through its in-season key reproductive stages (early, middle & late) to maximize yield and quality. This reduces the likelihood of premature death and promotes the in-season stay green objective.

If you have livestock, another important strategy to improve crop Brix levels is to biologically treat the manure. The predigestion process will improve nutrient content and drop manure salt levels. This improves the crops' Brix levels on fields when the manure is applied.

To learn more about Brix levels, *Farming the Controllables* and boosting your farm's profit potential, contact us. Our team looks forward to hearing from you.

Brix values in the field: sampling procedures

If you'd like to test your crops' Brix levels, using a refractometer is easy. Squeeze a few drops of juice from the stems or leaves of the plant onto the glass prism of the refractometer, close the lid, and look through the eyepiece. The sugar content is read on a numbered scale in units called Brix (which is the same as percent).

To make Brix value readings as reliable and useful as possible:

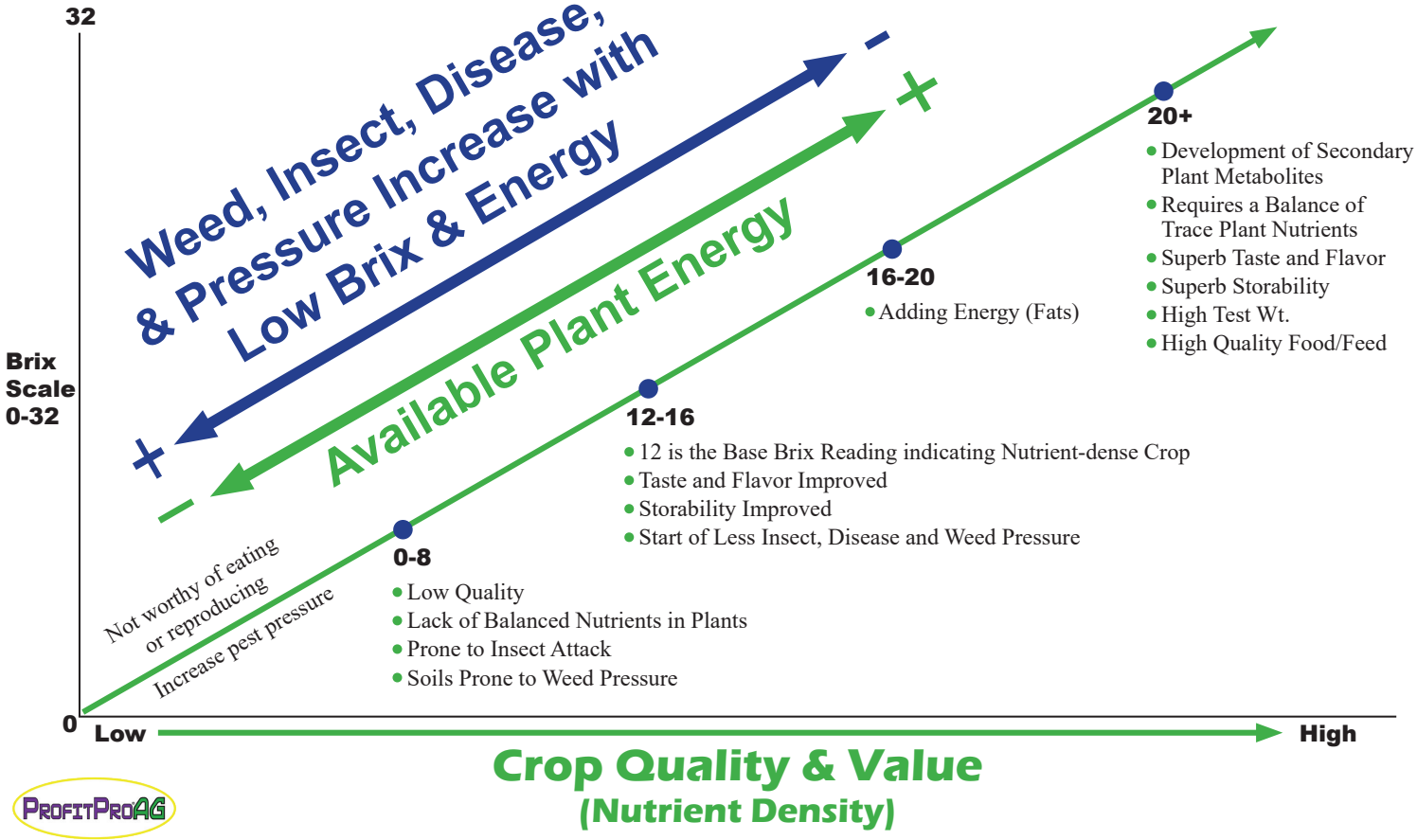
- Calibrate your refractometer properly before you use it. (Follow the instructions supplied with the refractometer. This tool can be ordered at various sites online.)
- Choose sampling locations ahead of time, depending on your goal. (Do you want to compare Brix levels between fields, within a field, etc.?)
- Be consistent with sampling point(s) on plants. (The top leaf is good.) Also, ensure the sample is free of debris and moisture.
- Each time you read and record the Brix value, also record the location, time of day, outside temperature and other important weather conditions.
- Be consistent with sampling procedures. We recommend that you sample Brix weekly.
- Know that collecting data during stressful times (e.g. drought or other inclement weather conditions) may affect Brix measurement readings, as plants may store sugar differently during these times.

ProfitPro, LLC ◆ 408 S. 1st Ave. ◆ Albert Lea, MN 56007 ◆ 507-373-2550 ◆ Fax: 507-373-2520 ◆ Email: info@ profitproag.com ◆ BL-6_7-1-21
www.profitproag.com

Refractometer Readings

REFRACTIVE INDEX OF CROP JUICES *Calibrated in % Sucrose or °Brix*				
	Poor	**Average**	**Good**	**Excellent**
Crops				
Alfalfa	4	8	16	22
Corn Stalks	4	8	14	20
Corn (Young)	6	10	18	24
Small Grains	6	10	14	18
Sorghum	6	10	22	30
Soybeans	4	8	12	16
Sugarbeets	4	8	10	12

Growing High Brix, Nutrient-dense Crops is Dependent on Soil & Plant Health



ProfitProAG