# 2011 Organic Corn Variety Trial Results

The following tables present the results of organic corn variety trials that took place on research stations and cooperating farms in Washington, Oregon, Wisconsin, and Minnesota in 2011. These trials were part of the USDA-OREI funded project Northern Organic Variety Improvement Collaborative. Trials will continue in 2012 and 2013.

Detailed descriptions of the trial methods and rating systems are listed after the results tables.

# List of Tables

Best                                                    Worst

Table 1: NOVIC 2011 Washington Corn Data

| Variety Name | Useable Ears | Husk Appearance (1-5) | Husk Protection (1-5) | Flavor (1-5) | Tenderness (1-5) | Tip Blanking (cm) | Weight of 10 Ears (kg) | Notes |
|---|---|---|---|---|---|---|---|---|
| Brocade | 19.00 a | 3.00 a | 5.00 a | 2.00 c | 3.00 a | 2.50 ab | 1.55 ab | not mature, not fully mature |
| Fisher's Earliest | 28.33 a | 3.83 a | 2.67 a | 2.20 bc | 3.20 a | 2.08 ab | 1.50 ab | |
| Frank's Red | 36.33 a | 4.67 a | 4.33 a | 3.40 abc | 3.40 a | 2.17 ab | 0.90 b | |
| Luscious | 8.50 a | 3.50 a | 4.50 a | 4.00 abc | 5.00 a | 0.12 b | 1.21 ab | not mature, not mature, not fully mature |
| MDseE | 25.17 a | 3.00 a | 3.17 a | 4.60 ab | 4.20 a | 3.50 a | 1.75 ab | |
| MDseL | 17.50 a | 2.80 a | 3.25 a | 4.00 abc | 4.25 a | 2.19 ab | 1.87 ab | Almost half of ears still immature by Oct 4, barely mature, not mature, not mature, stunted plants, not fully mature |
| Spring Treat | 21.33 a | 3.67 a | 3.00 a | 5.00 a | 3.50 a | 2.17 ab | 1.62 ab | |
| Sugar Buns | 22.50 a | 4.00 a | 4.00 a | 4.00 abc | 4.00 a | 3.00 ab | 1.17 ab | not mature, |
| Temptation | 34.17 a | 3.67 a | 4.50 a | 4.40 abc | 3.80 a | 0.58 ab | 1.84 ab | |
| Top Hat | 26.00 a | 2.60 a | 3.50 a | 4.75 ab | 4.75 a | 2.38 ab | 2.23 a | not mature, not mature, not fully mature |

Letters after the scores represent groups of varieties whose means are not significantly different for that trait. In other words, all the varities which have a score with an "a" after the number have essentially the same score for that trait. NA indicates that data were not available for that trait for a particular variety. For more information on how traits were measured, please see the protocols at the end of this document.

Best                                          Worst

Table 2: NOVIC 2011 Oregon Corn Data

| Variety Name | Useable Ears | Husk Appearance (1-5) | Husk Protection (1-5) | Rowing (1-5) | Flavor (1-5) | Tenderness (1-5) | Tip Blanking (cm) | Weight of 10 Ears (kg) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Amaize | 18.00 a | 4.00 abc | 5.00 a | 3.00 a | 5.00 a | 5.00 a | 5.00 a | 2.38 a | |
| Brocade | 13.33 a | 5.00 a | 5.00 a | 2.50 a | 5.00 a | 5.00 a | 5.00 a | 2.70 a | |
| Fisher's Earliest | 21.25 a | 3.25 abc | 3.00 a | 2.75 a | 2.00 c | 2.00 a | 4.00 a | 2.34 a | ears very low to ground, |
| Luscious | NA NA | NA NA | NA NA | NA NA | NA NA | NA NA | NA NA | NA NA | |
| MDseE | 21.75 a | 3.00 abc | 3.50 a | 3.75 a | 3.67 ab | 3.33 a | 2.50 a | 2.27 a | |
| MDseL | 16.50 a | 2.75 bc | 3.50 a | 3.50 a | 3.67 ab | 3.67 a | 3.00 a | 1.81 a | bad pollinaton and doubles, bad pollination and doubles, bad pollination and doubles, strong plants/big ears, |
| Spring Treat | NA NA | NA NA | NA NA | NA NA | NA NA | NA NA | NA NA | NA NA | |
| Sugar Buns | NA NA | NA NA | NA NA | NA NA | NA NA | NA NA | NA NA | NA NA | |
| Temptation | 28.25 a | 4.50 ab | 3.75 a | 3.00 a | 3.33 bc | 3.33 a | 4.75 a | 2.25 a | most stalks have only one ear, |
| Top Hat | 17.50 a | 2.00 c | 4.00 a | 3.25 a | 3.67 ab | 4.00 a | 4.12 a | 1.72 a | bad pollinaton and doubles; bent tips; fragile, bad pollination and doubles, |

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Table 3: NOVIC 2011 Wisconsin Corn Data

| Variety Name | Useable Ears | Husk Appearance (1-5) | Husk Protection (1-5) | Rowing (1-5) | Flavor (1-5) | Tenderness (1-5) | Tip Blanking (cm) | Weight of 10 Ears (kg) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Bodacious | 19.50 a | 4.00 a | 4.00 a | 3.75 a | 3.00 abc | 3.00 ab | 9.50 abcd | 1.68 cd | |
| Brocade | 16.00 a | 3.33 a | 3.33 a | 3.33 a | NA NA | NA NA | 2.50 cd | 2.42 ab | |
| Fisher's Earliest | 22.67 a | 2.50 a | 2.50 a | 3.33 a | 1.67 c | 2.00 b | 13.67 ab | 1.31 de | |
| Frank's Red | 22.50 a | 5.00 a | 3.67 a | 3.17 a | 2.67 bc | 3.33 ab | 3.83 bcd | 0.75 e | rowing was variable and younger, lighter ears were sweeter, ears were missing, likely due to racoons, |
| Luscious | 22.50 a | 5.00 a | 2.50 a | 3.50 a | NA NA | NA NA | 4.50 abcd | 2.50 a | |
| MDseE | 16.00 a | 3.50 a | 3.00 a | 3.50 a | 4.33 ab | 4.33 a | 15.20 a | 1.68 cd | wide variation in flavor from ear to ear, |
| MDseL | 19.80 a | 3.33 a | 2.67 a | 3.33 a | 4.00 ab | 3.67 ab | 13.00 abc | 1.74 bcd | wide variation in flavor from ear to ear, wide variation in flavor from ear to ear, |
| Precocious | 15.00 a | 5.00 a | 3.00 a | 2.50 a | NA NA | NA NA | 3.00 bcd | 1.16 de | |
| Spring Treat | 18.20 a | 4.00 a | 3.50 a | 3.75 a | 4.67 a | 4.33 a | 7.00 abcd | 1.35 de | |
| Sugar Buns | 12.33 a | 4.50 a | 3.00 a | 3.50 a | 3.00 abc | 3.00 ab | 5.00 abcd | 1.29 de | |
| Temptation | 25.20 a | 4.83 a | 4.67 a | 3.83 a | 4.00 ab | 3.33 ab | 1.00 d | 2.21 abc | "Good corn" say tasters |
| Top Hat | 19.60 a | 2.83 a | 4.17 a | 3.50 a | 4.33 ab | 3.67 ab | 15.00 a | 1.56 cd | poor rowing due to poor pollination, better pollinated ears had better rowing, unuseable ears were due to poor pollination, |

Letters after the scores represent groups of varieties whose means are not significantly different for that trait. In other words, all the varities which have a score with an "a" after the number have essentially the same score for that trait. NA indicates that data were not available for that trait for a particular variety. For more information on how traits were measured, please see the protocols at the end of this document.

# SWEET CORN VARIETY TRIALS
*(By Bill Tracy and Alex Lyon, May 7, 2011)*

**Planting Specifications**

Sweet corn should be planted when soil has reached at least $55^{o}$ F at a depth of 2" by 10:00 AM. Bill says that $60^{o}$ F is preferable, so use your judgment about pushing the planting to evaluate early germination.

Trials should be planted in four row plots. At the daughter sites there will be one plot per variety, and at the mother site there will be three replications laid out in a complete randomized block design. Total row length should be 14.5 feet, including a three foot alley (thus, 11.5 feet of corn plus 3 feet for an alley). Plant 30 kernels per row (120 per plot*). This is best accomplished with a jab planter. Set the planter to plant 9 inches apart, and plant 2 seeds per jab on most jabs, so that you have planted a total of 30 seeds per 11.5' row. This can also be accomplished by hand—plant 2 seeds together every 9 inches. You may need to plant a single seed rather than 2 seeds in some places so that you only plant 30 seeds per row. Plant seeds at a depth of 1 to 2 inches.

When the plants reach the V-5 stage (Figure 1), thin them by cutting them off at soil level with a hoe or knife. Thin to a stand count of 15 plants per row. Planting as described above will help accomplish an even, 9-inch spacing after thinning. **Be sure to take the emergence stand count before thinning.** If you have planted more or less than 30 seeds per row, be sure to make a note of this, as it will affect evaluation of emergence.

Have growers plant to the same specifications where possible, but row length is more flexible on the daughter sites.

*__Note:__ In 2011, seeds for all varieties except Temptation were packaged at 160 seeds per packet, which is a carry-over based on the longer row length from last year's protocol. You will have about 40 leftover seeds for each plot for all varieties except for Temptation.*

**Data Collection**

*All data **except for emergence stand count** will be collected only from the center two rows of each (four row) plot. Exclude the plants on either end of the rows.* At daughter sites, be sure to record plot length and the number of seeds planted per row, if it was adjusted from the protocol. In WI, we find that we need 3 farm visits for corn: one for planting, one for collecting emergence stand count and thinning, and one for harvest. This could be cut back to 2 visits if farmers are willing to take the emergence stand count and thin on their own.

**Emergence Data**

Emergence data should be collected when varieties reach the V-5. Stages are noted by the number of leaves whose collars are visible (Figure 1). The rationale is that by the fifth collar there will be very little more mortality while there can be quite a lot from emergence to leaf five. In our WI trials, Temptation is clearly the strongest performer, so

in order to limit farm visits we recommend taking emergence stand count on all varieties when Temptation reaches the V-5 stage.

**Emergence Stand Count**: Count all the plants in all 4 rows.  Record the stand count as a total from all 4 rows. (On farm sites, count as all the plants that have emerged, record number of rows and row length.)

**Figure 1. Corn plants at the V1 stage (left) and the V3 stage (right).** Although more than 3 leaves can be seen on the V3 plan, only 3 leaf collars are visible. From *How a Corn Plant Develops, Special Report No. 48, Iowa State University, 1998.*
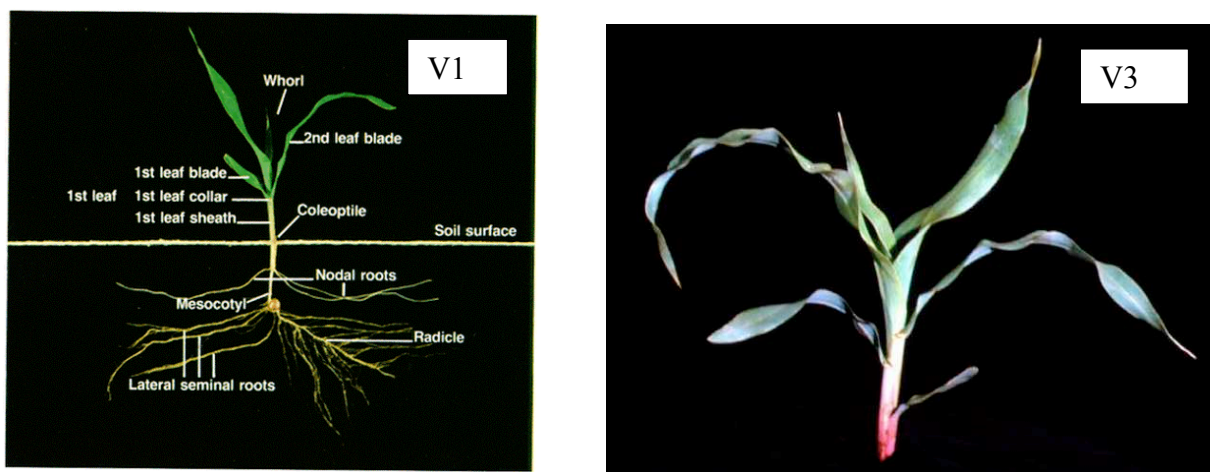
**Silking Date**
Silk date should be recorded as the date that 50% of the plants in the center two rows have emerged silk.  Check every other day. (Ask farmers to check on daughter sites).

**Harvest Data**
These instructions are guide for harvesting the sweet corn and collecting the data.  For traits that will be scored on a 1-5 scale, see Table 1 (Page 4) for further details and example photographs at the end of this document.  It may be helpful to print out pages 4-6 and bring them to the field.

Harvest data should be collected at the mother site when each plot is at peak maturity, which may be different for each variety.  Determine peak maturity by tasting a sample ear from the border rows.  Harvest is expected 21 days after silking, on average.  Some varieties may mature much earlier than others, so it is important to check early and often.  At the mother site, ears should be harvested when they are very sweet but not yet starchy.

On the farm sites, wait until all varieties are mature (meaning that some will be over-mature).  Then collect all data *except* for flavor and weight.  The reasoning is that flavor is highly heritable, so we can expect that the rankings will not change between mother and daughter sites.

**On harvest day, before picking, record the following data for each plot:**

1. Harvest date.
2. Ear and tassel height of 5 plants.  Measure from the ground to the ligule (collar) of the leaf from which the highest ear emerges.  For tassel height, measure to the ligule of the first leaf directly beneath the tassel.
3. Final stand count *just from the plants in the 2 middle rows.* (Do not count the end plants).

**Pick all harvestable ears in the middle two rows, except for the ears on the end plants.**
**Ears can then be brought to the lab for assessment or assessment can be done in the field.**

1. Working with the ears for one plot, husk all ears except for 2 representative ears.  These will be used for judging the husks and doing bite tests.  Count and record the total number of ears.
2. Count and then discard any smutted, immature, or otherwise unusable ears.  Record smutted ears separately, and the rest as "Other Unusable Ears."
3. Using the 2 unhusked ears from Step 1, evaluate and record husk appearance and protection.  Remove husks, take a bite from the middle of the ear**, and record flavor and tenderness.
4. Weigh all the useable ears, including those used for the bite test.   All husks should have been removed at this point, so the weight is without husks. Record as "Total Usable weight."
5.  Randomly select 10 ears. Measure and record cumulative 10 ear diameter, length, tip blank, and weight.  We use a board marked with a centimeter grid to line up ears and measure diameter.  For length, we line ears up end-to-end next to 2 meter sticks.  Tip blank can be eyeballed—the number you record should be the cumulative tip blank on all 10 ears, in cm.

*** Hint: Potato chips, or anything salty and crunchy, are a good palate cleanser when you start to lose your sense of taste.*

**Table 1. Descriptions for scoring traits.**

| Trait | Description | Score |
|---|---|---|
| Husk appearance: | Dark green, flag leaves > 6 inches | 5 |
| | Green husks, 4-6 inch flags | 4 |
| | Green husks, 2-4 inch flags | 3 |
| | Pale green 1-2 inch flags | 2 |
| | Yellow or brown or no flag leaves | 1 |
| Husk protection: | V. Long > = 3 inches beyond ear tip | 5 |
| | Long  2 3 inches | 4 |
| | Medium 1 2 inches | 3 |
| | Short < = 1 inch | 2 |
| | Exposed ear tips | 1 |
| Row configuration: | Absolutely straight rows | 5 |
| | Nearly straight one or two breaks | 4 |
| | Spiral rowing or occaisonal breaks | 3 |
| | Many broken rows | 2 |
| | No definable rows or large gaps between rows | 1 |
| Tipfill: | One to four kernels at the tip | 5 |
| | Less than 0.5 inches without kernels (blank) | 4 |
| | Top 0.5 inch blank | 3 |
| | Top 0.5 1 inch blank | 2 |
| | Top >1 inch blank | 1 |
| Ear shape: | Perfectly cylindrical | 5 |
| | Tip slightly tapered | 4 |
| | Gradual taper from the middle of the ear | 3 |
| | Strong taper or curve (like a banana) | 2 |
| | Pyramidal | 1 |
| Kernel color: | Buttery, glossy yellow | 5 |
| | Darker yellow | 4 |
| | Pale yellow | 3 |
| | Tan  yellow | 2 |
| | Mottled, discolored, brown | 1 |
| Flavor: | Excellent, sweet and good corn flavor | 5 |
| | Pleasant | 4 |
| | Acceptable | 3 |
| | Little sweetness | 2 |
| | Objectionable | 1 |
| Tenderness: | Very tender not chewy | 5 |
| | Easy to bite through with slight chewiness | 4 |
| | Initial resistance to biting | 3 |
| | Slightly hard to bite  through | 2 |
| | Tough hard to bite through | 1 |

**Scoring Examples**



4-5 on husk appearance
4-5 on tipfill
4 on rowing
4 on shape
4 on kernel color



This would be nearly fives for rowing, shape and tip fill

No better than a 3 on rowing or shape, husk appearance would be 2, maybe a 3



Hybrid on the left would be 1-2 ear shape, 1 tip fill, 1 husk appearance, 2-3rowing