

## Protocol: p8 Setup & Measure 2014

### qGen2 Experiment

#### Background

In the summer of 2013 we initiated a large experiment to assess adaptive potential called qGen2. We crossed maternal plants in cg1 with pollen from Landfill and Staffanson. We sowed the resulting achenes in October 2013 in a newly cleared experimental plot named p8. The outline of p8 is not a rectangle. In general, **697 is the lowest Position** (on the South end closest to HWY 27) and **755 is the highest Position** (on the North end closest to the Hjelm House). Planted **Rows** range from **104** on the West edge (closest to Tower Rd.) to **181** on the East edge (closest to the electric lines). Note that not all rows are planted.

#### Goal

To measure fitness traits including emergence and survival in progeny of qGen2 crosses.

#### Equipment Needed

Visor with assigned rows & segments, meter stick, toothpicks, rulers, 50-meter, 30-meter, and 5-meter tapes, *Echinacea* seedling search image in your head

#### Flag

Flags were left in these locations over the 2013-2014 Winter (See Figure 1, below):

1. Every row (100 – 189) Min & Max Positions
2. Rows divisible by 5 at position 725

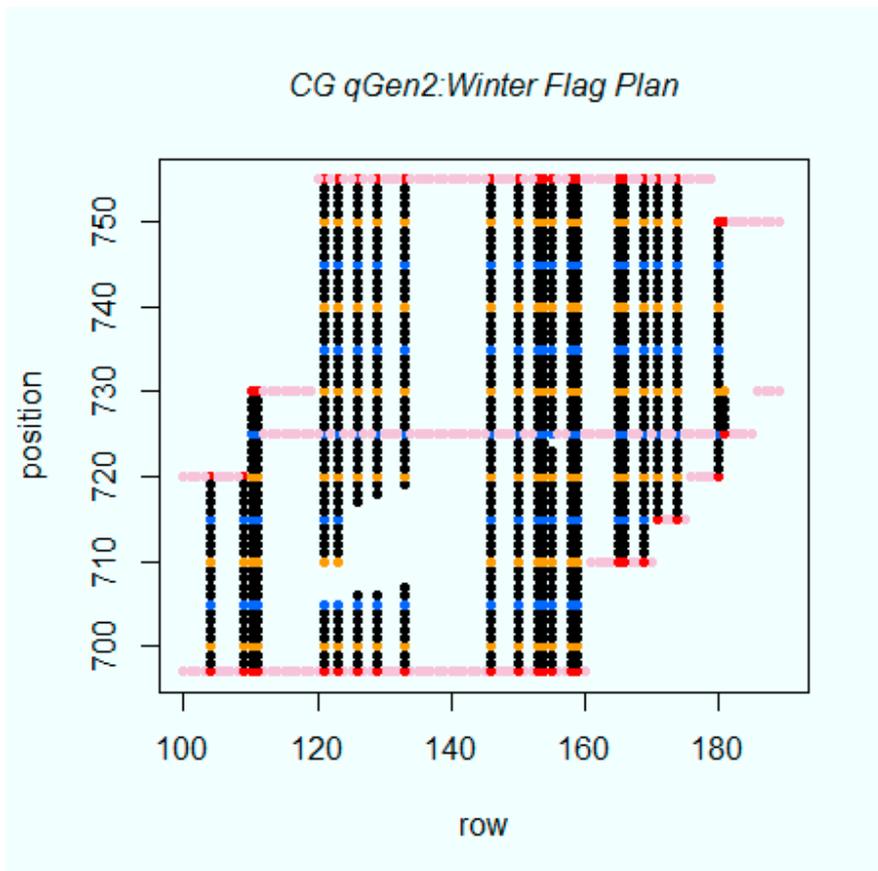


Figure 1. Winter Flag Plan. Black dots are nails, all other dots are flags.

## Lay Measuring Tapes

Use meter sticks to measure from 697 to 700. On shorter rows (< 120), set 30-meter tapes at 700. On all other rows (shorter rows >160 included), Set 50-meter tapes with 0 at 700 (or with 10m at pos 710, etc) so the tape can be used to check the position of the segment being searched. Use meter sticks or 5-meter tapes for positions 750-754. See table in Figure 2 to assist with setting up measuring tapes.

**Search/Mark/Measure:** Most often we will be measuring in blocks of 10 (1-meter ) segments. Choose a visor and open the form “2014MeasureQ2Expl8” and locate the starting row and nail. Enter initials for you and your partner in the “**measuredBy**” field. **Double check that you are in the correct location!** At each nail, search a linear segment from 0.05 to 0.95m. Look for seedlings away from the tape. Mark any Echinacea seedlings found with colored plastic toothpicks. Place toothpicks 2cm north of each seedling found. Use different colored toothpicks for seedlings that are next to each other. For example, do not place two of the same colored toothpicks in a row! Use colors in a rotation so that when you have to repeat the use of a certain color, the seedlings are as far apart as possible. An ideal color rotation follows the order that the toothpick colors are listed in the visor. Keep track of how many seedlings you have found in the segment. Once you have thoroughly searched the segment, record the total number of seedlings on the main form under “**seedlingCount.**” Record anything unusual or noteworthy about the segment in the field “**segmentNotes.**” Use a semicolon to separate notes – **no commas!**

After searching and marking seedlings with toothpicks, measure each seedling as follows:

1. Click on the **seedlingMeasure** subform button that looks like a rectangular icon.
2. Double check that the **row** and **nail** being searched match the position in the visor! If you are working on nail 700, you should be between nails at positions 700 and 701. Do not change the row and nail fields – these are tied to the main form.
3. **tPickColor:** Using the dropdown selection box, select the color of the toothpick. (blu, org, wht, grn, red, yel)
4. **northDist:** Determine the distance of your seedling along the tape in centimeters. Distances should range from 5 to 95 centimeters.
5. **eastDir:** Determine the direction of your seedling in relation to the tape. Select if you seedling is West, On, or East of the tape. (West is toward Tower Rd.)
6. **eastDist:** Determine the east/west distance of the seedling from the tape in centimeters. If your seedling is west of the tape (toward Tower Rd), record as negative centimeters. If your seedling is East of the tape (toward Electric lines), record as positive centimeters. If your seedling is on the tape, record as 0 cm. Example: seedling 10 cm west of tape, record “-10.”
7. **1LeafCm:** Record the length of first leaf in cm. Record additional leaves in **2LeafCm** & **3LeafCm** fields. Measure from the top of the cotyledons to the top of the leaf using a ruler.
8. **cotyledonStatus:** Using the multi-selection box, select the status of the cotyledons. You can make multiple selections. Options include: present, not present, green, yellow, brown, shriveled, 1, 3. Most EA seedlings have 2 cotyledons, but some may have 1 or 3.
9. **seedlingNotes:** Record anything unusual or noteworthy in this field.
10. Repeat for each seedling found at your position.
11. Return to the main form creating a new seedling record & then deleting it.
12. Double check that the number of seedlings measured matches the number recorded in **seedlingCount.**
13. **Completed:** Click the completed checkbox & proceed to the next record/nail.

qGen2MeasureStartingPositions						
row	seg1min	seg1max	seg2min	seg2max	notes	count
104	697	719				23
109	697	719				23
110	697	729				33
111	697	729				33
121	697	705	710	754	tpplot caused gap	54
123	697	705	710	754	tpplot caused gap	54
126	697	706	717	754	tpplot caused gap	48
129	697	706	718	754	tpplot caused gap	47
133	697	707	719	754	tpplot caused gap	47
146	697	754				58
150	697	754				58
153	697	754				58
154	697	754				58
155	697	723	725	754	rock @724 caused gap	57
158	697	754				58
159	697	754				58
165	710	754				45
166	710	754				45
169	710	754				45
171	715	754				40
174	715	754				40
180	720	749				30
181	725	730				6

Figure 2. Rows & Position to be searched w/ count of positions