

Hemerocallis Hybridizing Statistics:2009-2010

Working Paper TG 10.001

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1 INTRODUCTION

This is a brief not recording the data from the 2009 and 2010 seasons and looking at several environmental conditions. At a later time we will also do this analysis for the separate species as well.

The data herein is a compilation of all crosses in 2009 and 2010 and a comparison of them to prior years. We gather data on each cross, including viability, data, number seeds, and we follow that for five years on each plant. This data has become useful in assessing the best hybridizing results.

2 ENVIRONMENTAL FACTORS

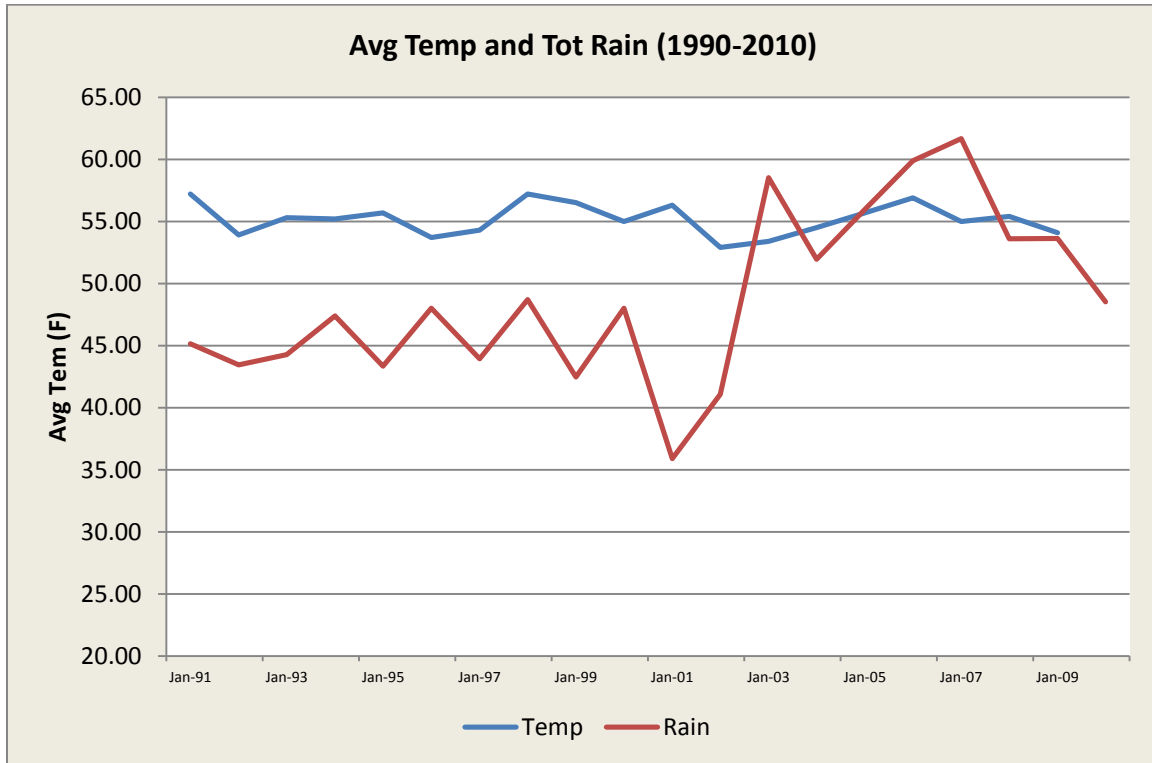
The first issue we try to establish is the environmental conditions on a year by year basis.

2.1 Long Term Data

We have been recording data for over the past twenty years. Specifically we look at average temperature and total rainfall and similar data. The charts below depict these two factors.

Two observations can be made:

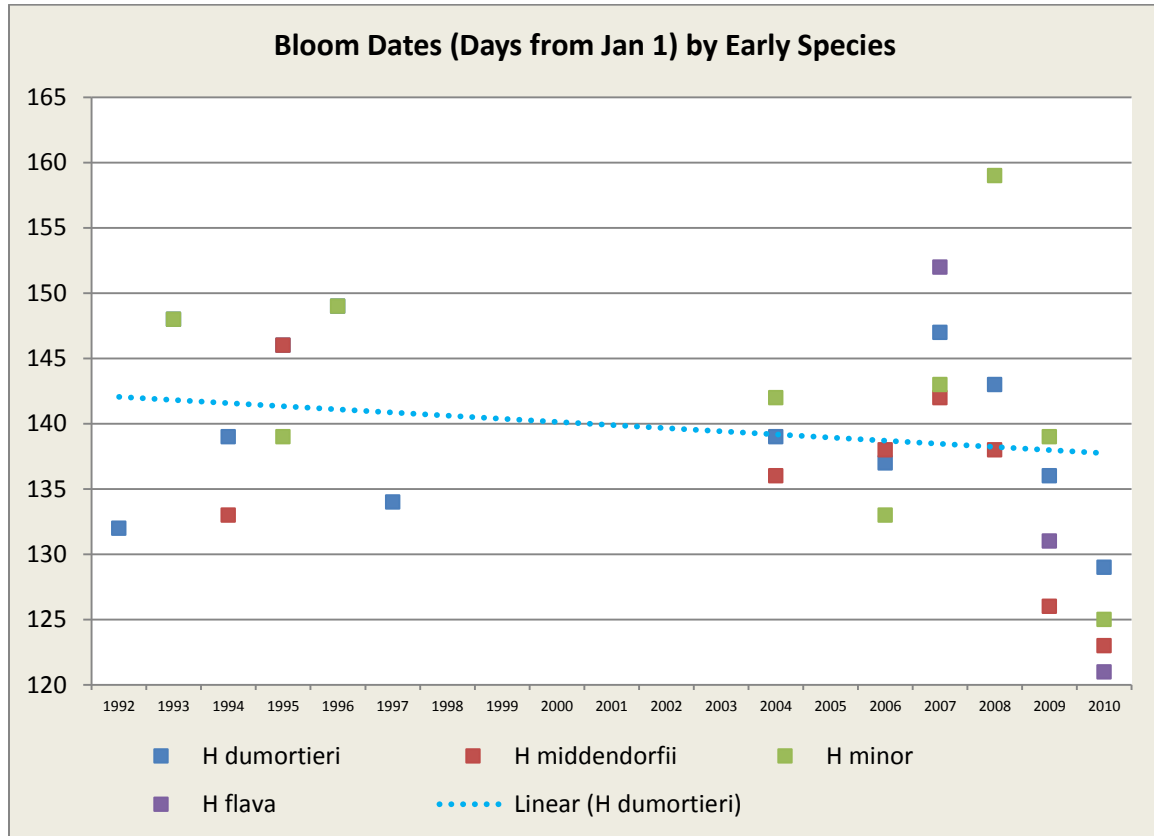
1. The temperature does not demonstrate any statistically credible change in that period despite the claims by many to the contrary. We also have been monitoring sentinel plants like *H middendorfii* and *H dumortierii* and they also fail to demonstrate any change. Recall that plants are one of the strongest measures of environmental warming because they integrate on a season by season basis the total sun flux. As for the past twenty years we have no evidence from this source of any material change.
2. As for rainfall, there is a statically significant increase in the past ten years. We average 48" and this has been exceeded significantly in the past ten years. It is not clear why and the effects are often mitigated against by our watering program.
3. However as we shall show later, despite the fact that until 2010 we had declining temperatures, in dramatic contrast, 2010 had substantially greater temperatures and drastically earlier blooms.



2.2 Sentinel Plants

As for the sentinel plant measures we show in the following the *H dumortierii* bloom time for this period where we have had data. As stated above we will be expanding this to include all other species as they are available. We believe that these will represent excellent environmental measures of any form of long term warming. Also the intake of CO₂ will increase growth as well.

Note that we use the early species as sentinel plants and thus we see in 2010 a dramatic decrease in early bloom times driven by the dramatic warming.



We also have measured the day from the first of the year on which the first bloom of several hybrids are measured as well. This is shown in the following chart. Again we see no statistical difference over this period except for the 2010 year.

Finally we performed two other metrics. They are:

1. The bloom time change, difference between actual and average, versus the average temperature.

and;

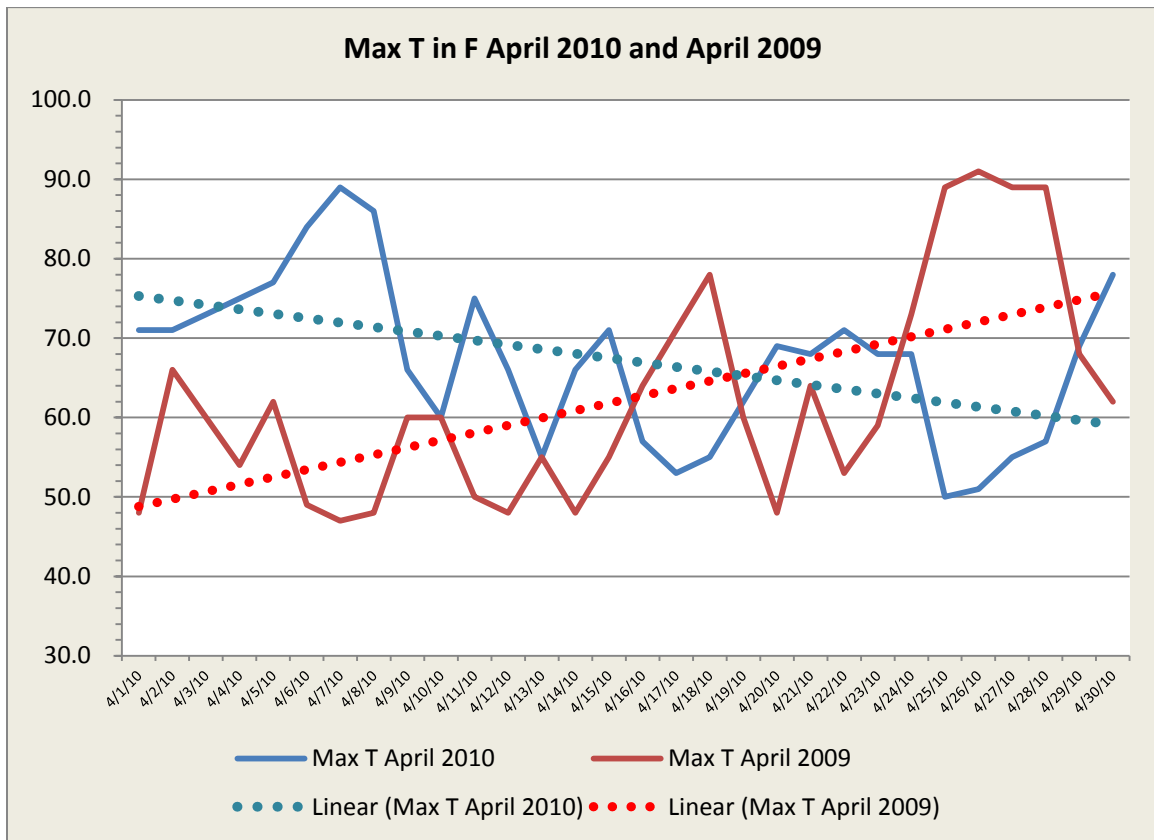
2. The bloom time change versus the total rainfall.

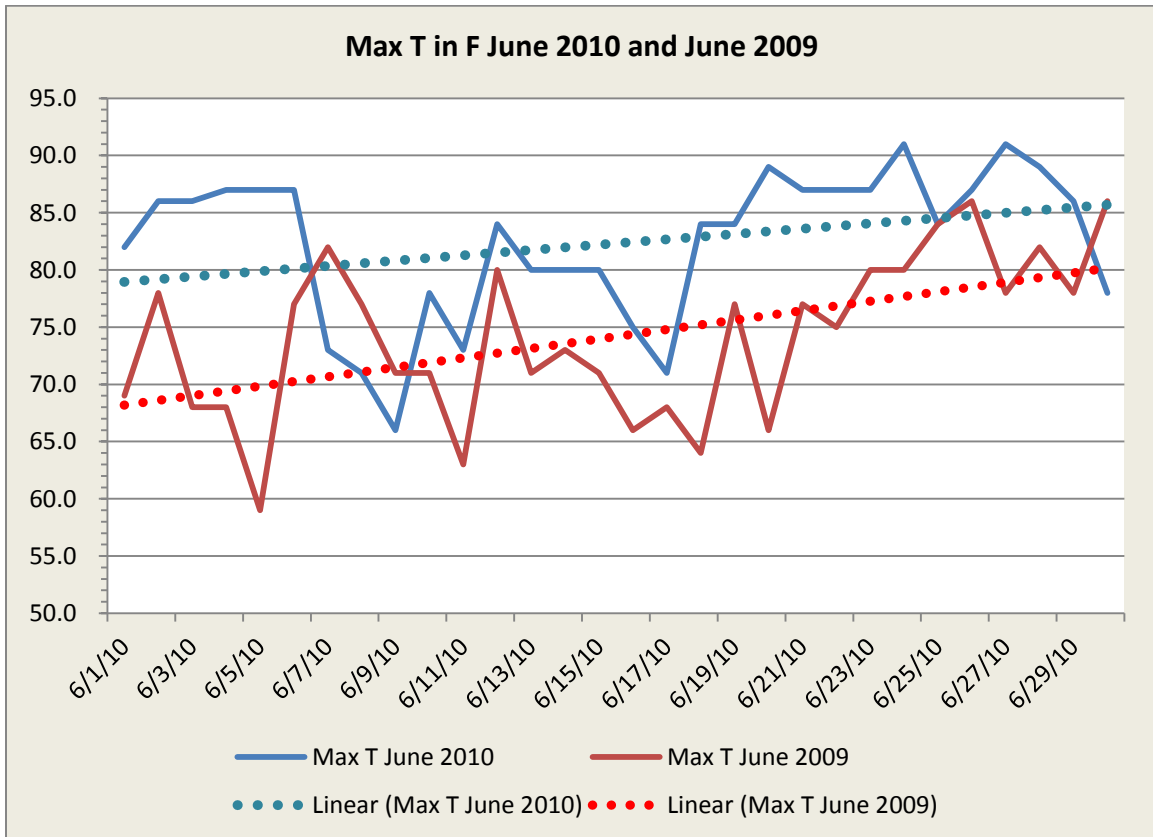
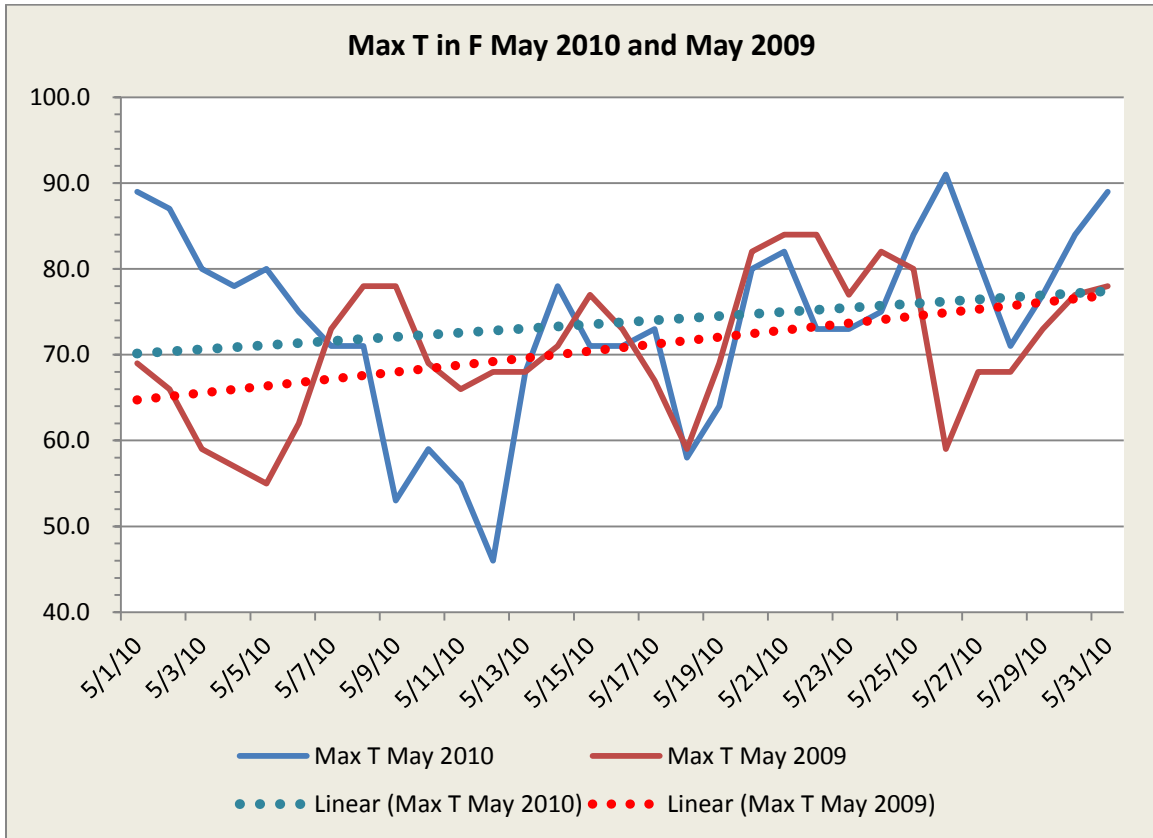
The above bloom time change versus Average Temperature shows no significant correlation. The best we can say with the above is that low rain seems to delay bloom time a bit. Yet there is some delay even with a +7 inch fall of rain.

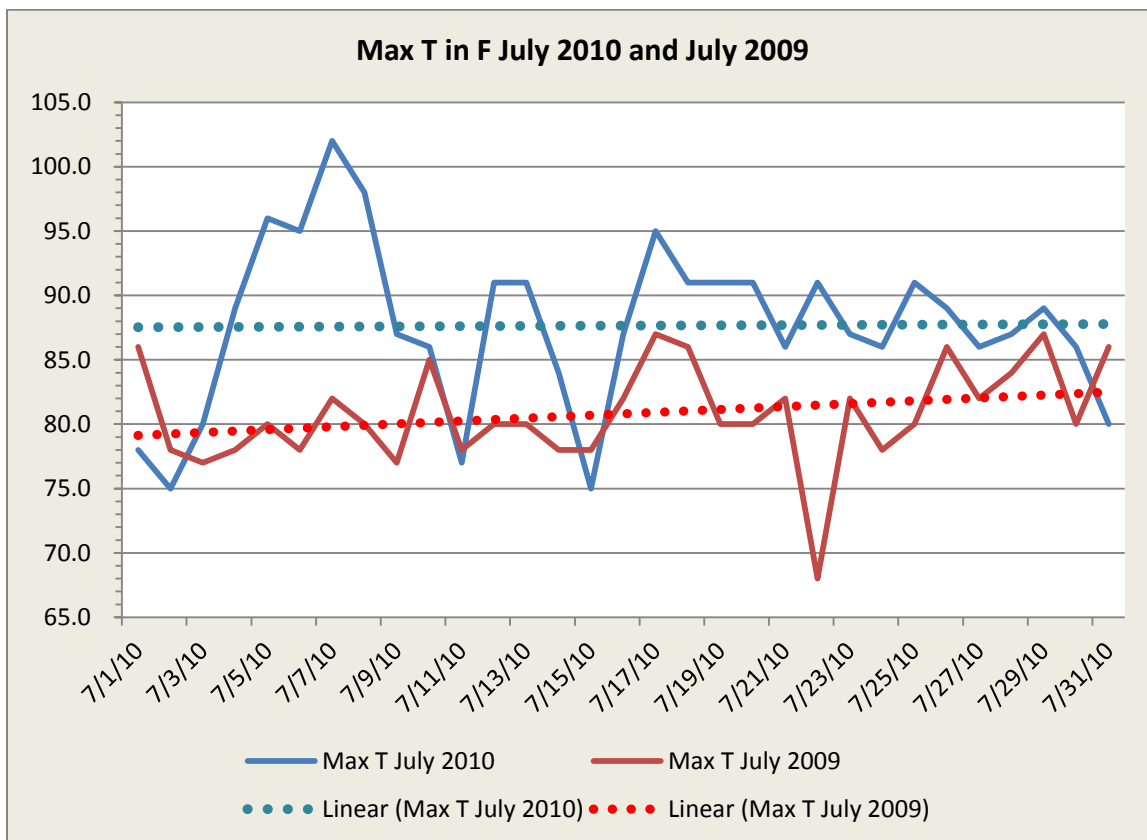
The conclusion is that the environmental data still needs more detailed analyses. We hope to do that with the species data we have gathered over the past twenty years.

2.3 Temperature

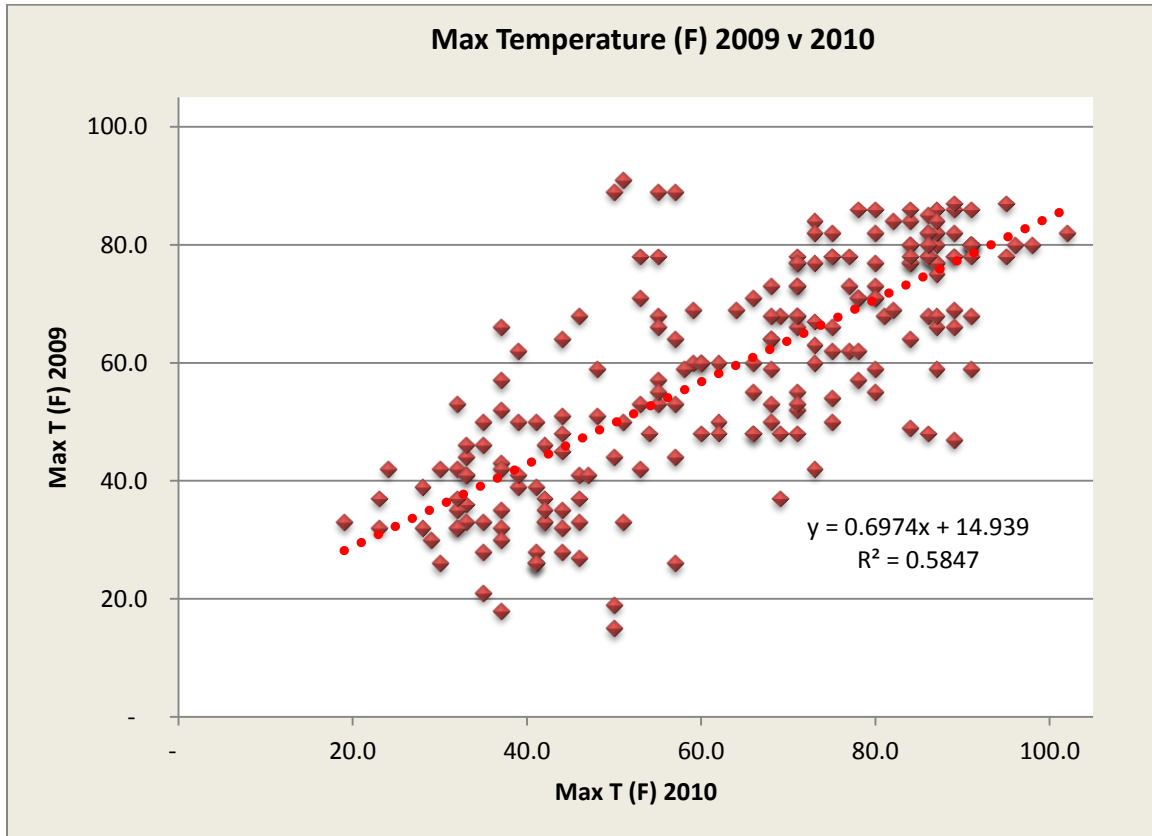
The 2010 season was extraordinarily warm as we show in the following month by month comparisons from 2009 and 2010. The extreme early warming was never seen in the past twenty years. Thus this data is a concern. This is the first season where such warming has occurred.







We finally also plot 2009 v 2010 in terms of daily max temps shown below:



3 CROSSING STATISTICS

We now present data on crosses for the past five years. We present the following statistics:

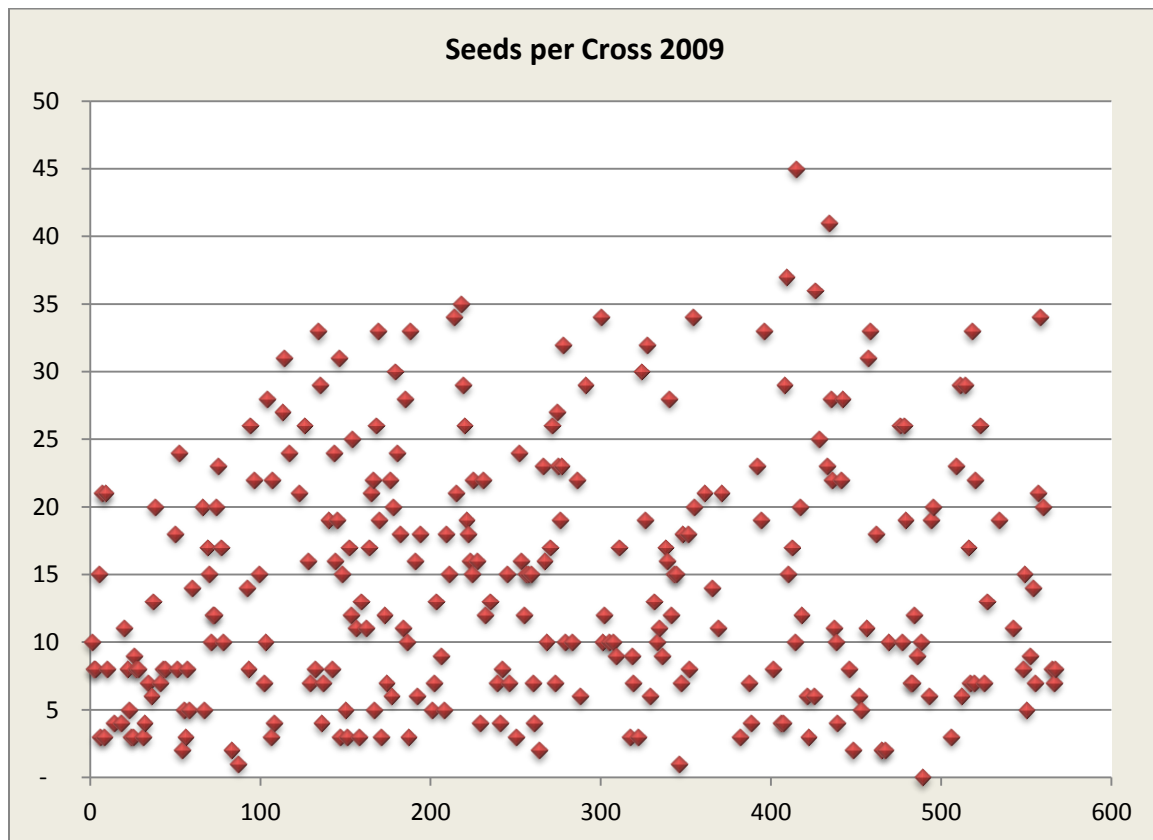
1. Number Crosses
2. Number of seed pods set. Note this is NOT the number of seeds per pod. We consider that latter.
3. Number of successful seedlings. These are the number of crosses which have set seedlings which are then placed out in April of the year following their cross. They are NOT the total seedling plants.
4. Plants Year 1 are the plants surviving after a year. This generally is the April or May of year two after cross.
5. Plants Year 2 are the survivors after the following year of Plants Year 1.
6. Introductions are the plants we register.

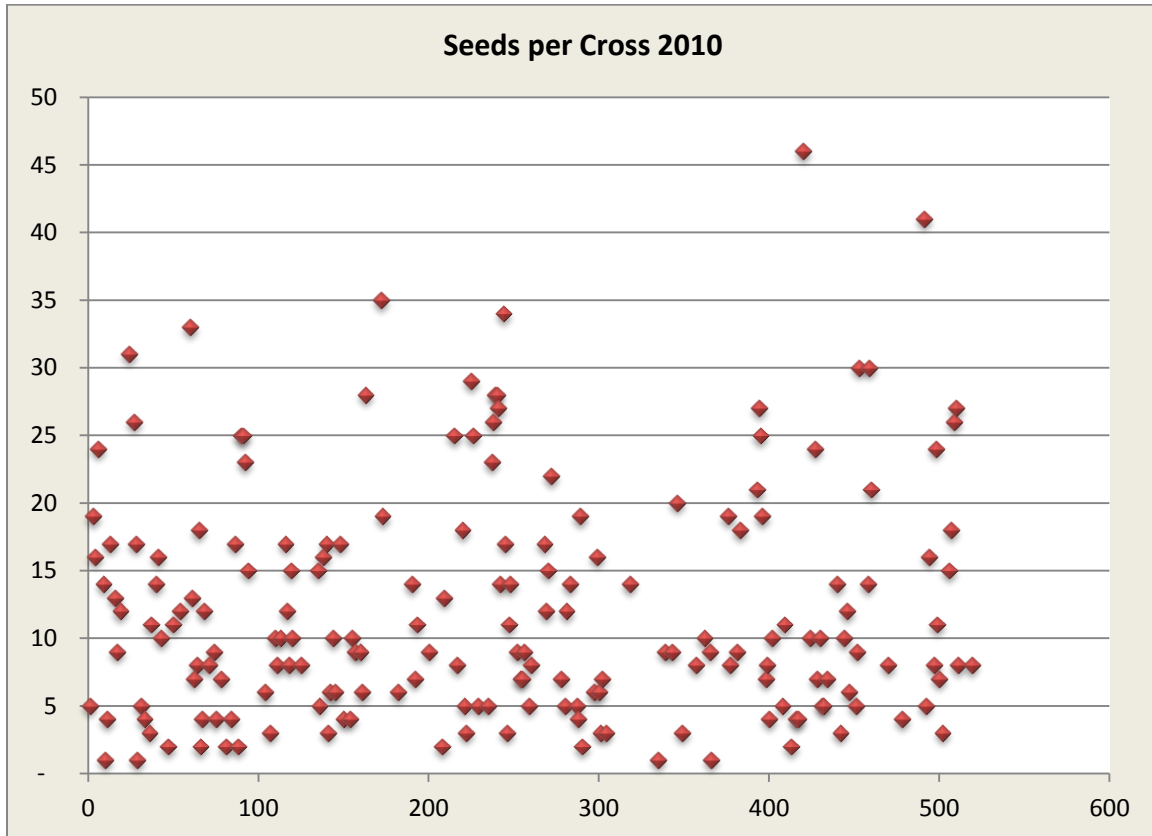
It is important to note that in 2009 and 2010 unlike previous years we had no aggressive deer attacks so that we have a higher percent of seed pods due to the lack of those attacks.

Also we should not that since 2006 we have been placing potential seedlings in 1 and 2 gallon pots and placing them on wooden planks during the summer. In winter planting we saw that pots allowed to dry or unprotected with laves lost vitality. This winter we planted all 2009 seedlings.

3.1 Seeds per Cross

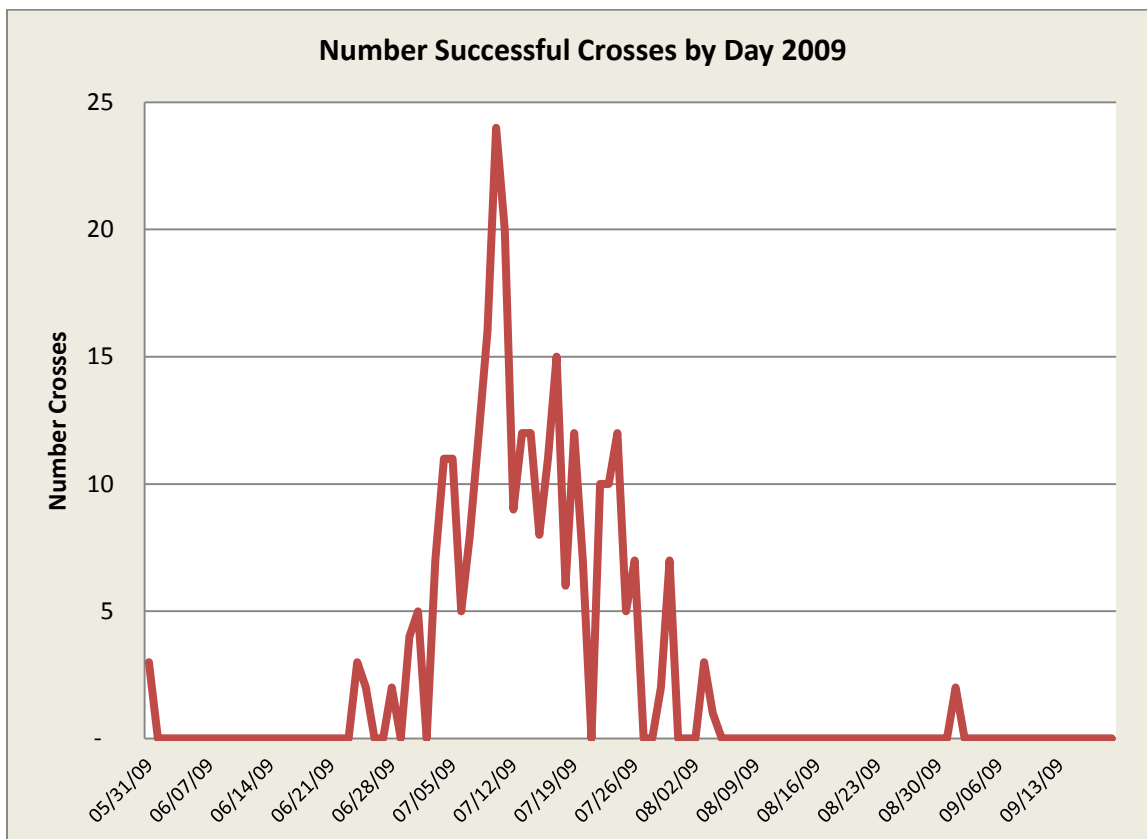
The following represents a scatter plot for seeds per cross per cross.

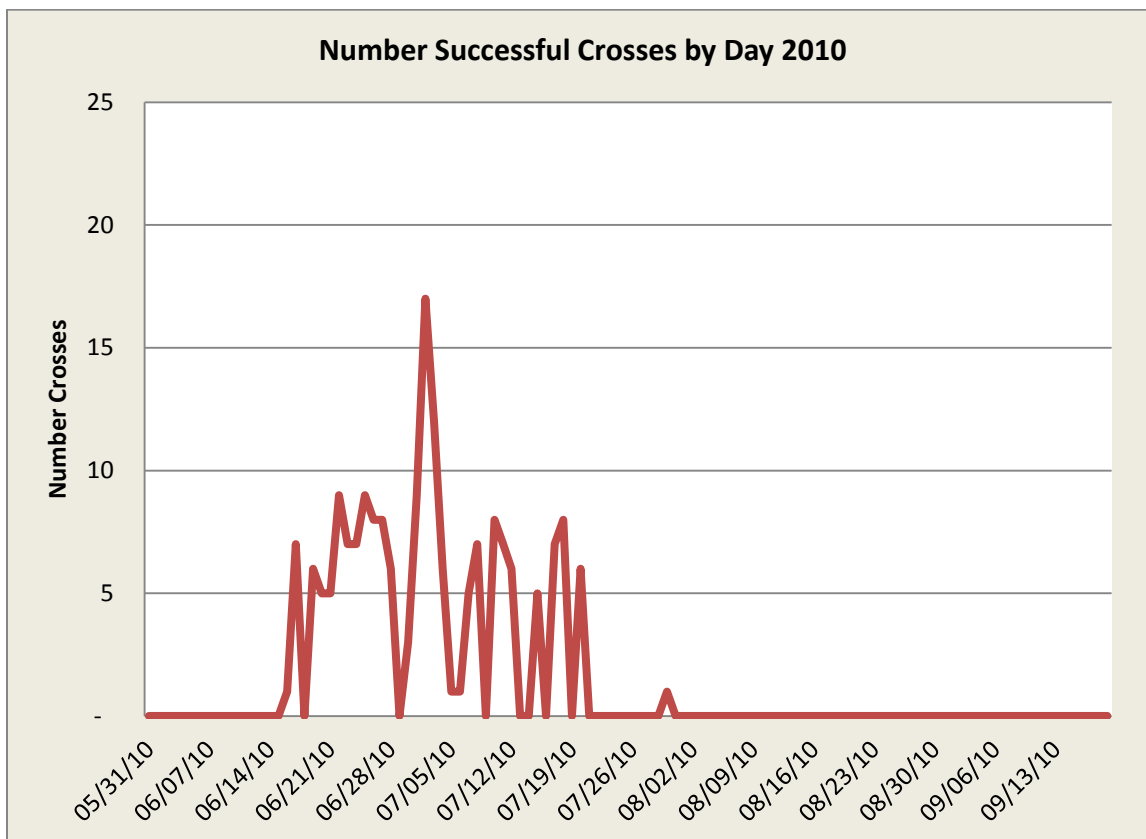




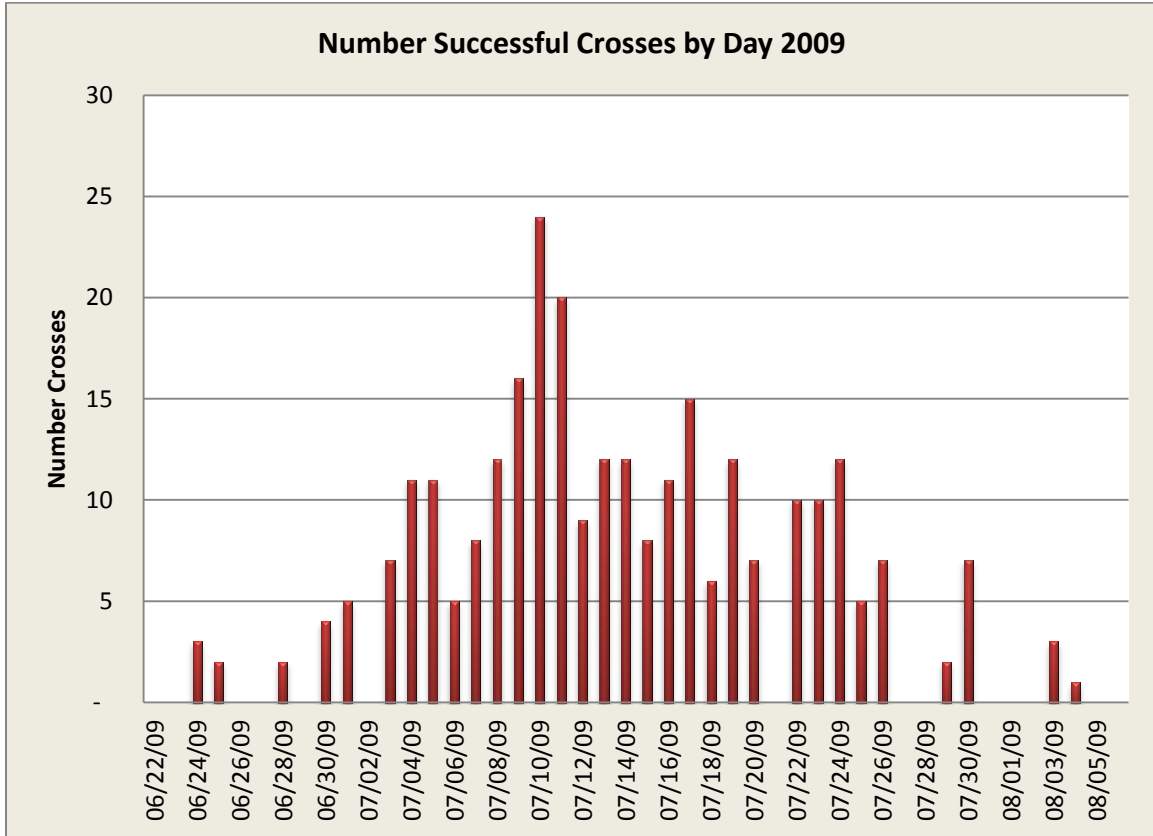
3.2 Crosses

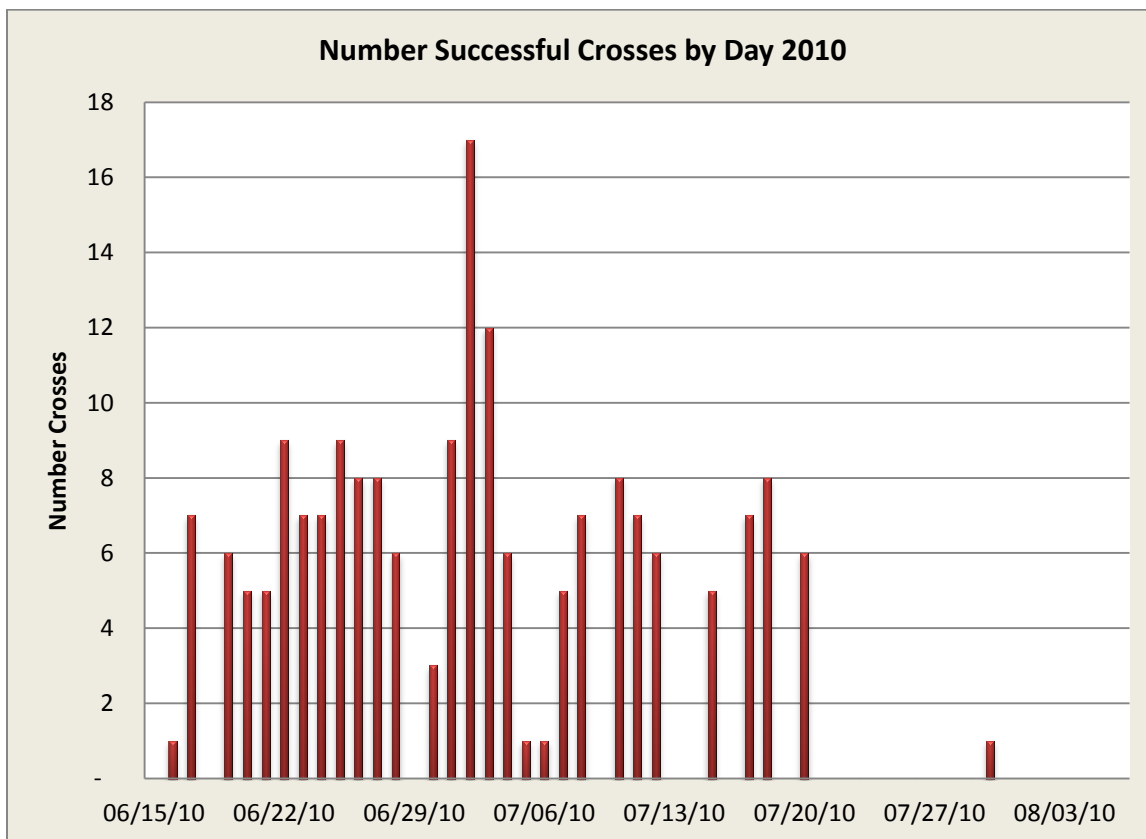
The following represents the number of successful crosses per day. A successful cross is one in which a potential vital seed pod results. We had a 36% cross yield, lower than usual, and 12 seeds per pod on average.





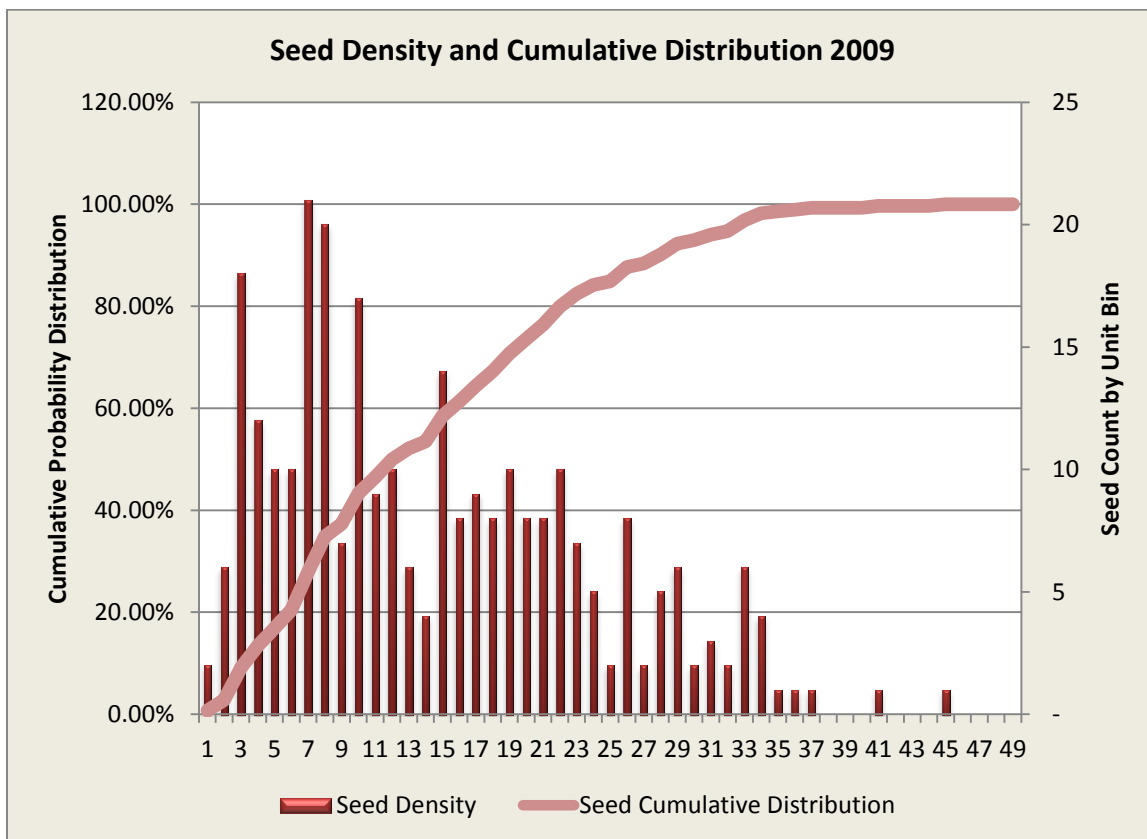
We re-present the above data in a slightly different format below:

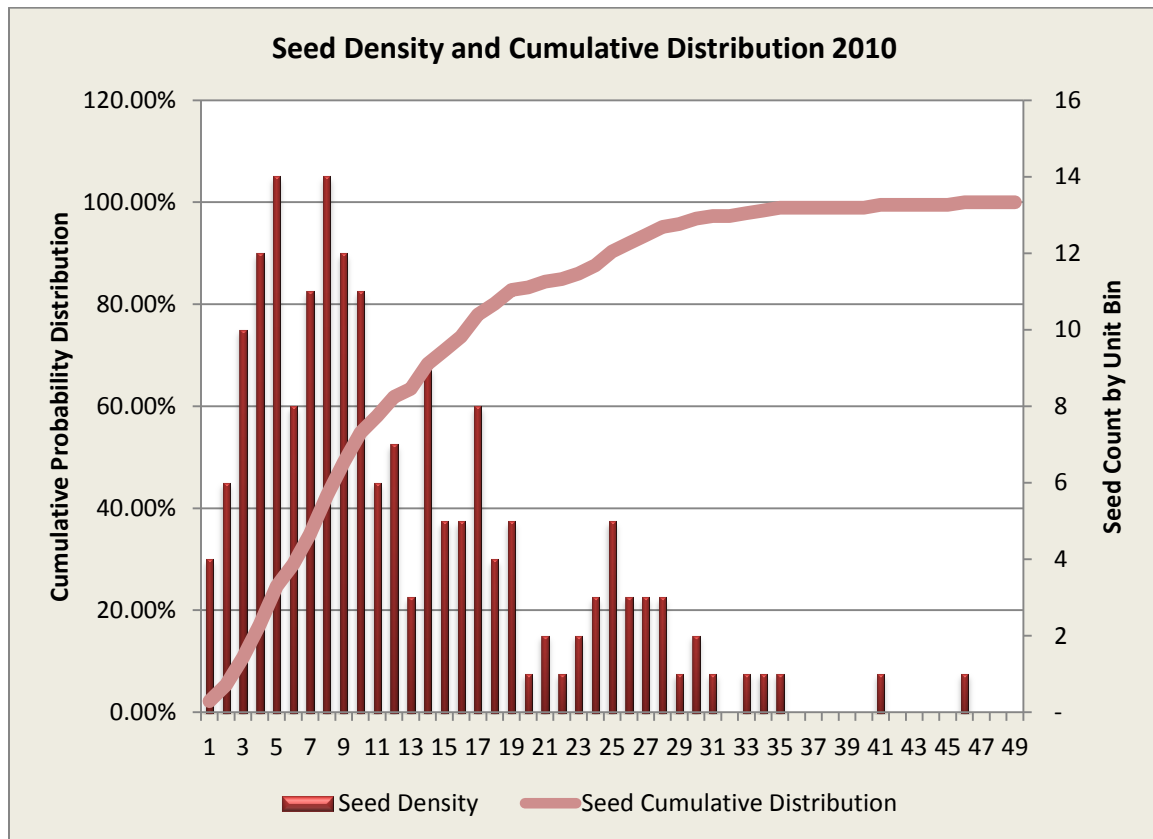




3.3 Distribution

We now show the distribution density of seeds for the two years below:





It seems that 2010 had a sharper peak in the distribution.

4 CONCLUSIONS

This is a brief data summary of crossing data which may be of use to other hybridizers. We find it useful from several perspectives. For example:

1. If we are targeting five to ten intros per year it tells us the cycle of how many crosses we must do.
2. It shows us the impact of the deer attacks and we have been able to use that to present our cases to the State, yet to be of any use.
3. We believe that the use of species to monitor environmental effects has merit yet we have yet to establish a solid base to validate this effect.