Delayed Development Puts U.S. Crops at Risk for Frost Damage

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The slowest developing corn continues to be in the northern and northwestern Corn Belt. As of Sunday, August 4th, Iowa had 2% of its corn in the dough stage compared to an average of 21% with Minnesota at 2% dough compared to an average of 11% and North Dakota at 3% dough compared to 16% average.

If the corn crop continues to develop at a slower than normal pace, then there will be a significant risk from frost for the later planted corn in Iowa, Wisconsin, Minnesota, South Dakota, and North Dakota. I continue to feel that any frost during the month of September will negatively impact the corn in the above mentioned states. The ideal situation for the corn in the northern and northwestern Corn Belt would be if the first frost occurred two weeks later than normal, which would be early to mid-October.

Any damage from cold temperatures will be determined by how cold it gets and for how long. If the temperatures drop to just 32 or 31 degrees for a brief period of time, then there will be little damage. To get a killing frost that ends the growing season, the temperatures generally need to drop to 28 or 27 degrees for three or four hours. Additionally, how fast the temperatures recover after the frost also impacts the amount of damage. If the temperatures recover quickly, the damage can be mitigated somewhat. If the cold temperatures remain in place for a number of days after the frost, then the damage can be even worse.

If the first frost occurs two weeks later than normal (early to mid-October), then the U.S. corn yield might end up being as high as 160 bu/ac. If the first frost occurs on October 1st, then I think the corn yield will end up being in the mid-150 range. If the first frost occurs two weeks earlier than normal on September 15th, then we would have a big problem and the corn yield could end up as low as 150 bu/ac or below.

The corn plant is safe from frost when it reaches black layer, which is 30% to 32% moisture and it occurs about 60 days after pollination.

The development of the U.S. soybean crop continues to be behind schedule with 39% of the crop setting pods compared to an average of 51% as of Sunday, August 4th. The most delayed soybeans are in Iowa where 35% are setting pods compared to the average of 65% followed by Minnesota at 28% setting pods compared to 51% average, and North Dakota at 48% setting pods vs. the average of 63%.

The cooler than normal temperatures lowers the water demand for the soybean crop, but it doesn’t necessarily slow down the development of the crop because soybean development is driven by the amount of daylight and nighttime hours. What the cooler temperatures do though is to slow the growth of the plant resulting in shorter than normal plants and therefore fewer nodes and fewer pods. In the dryer areas, the growth of the soybeans is also being slowed down due to a lack of soil moisture. Therefore, cool and dry conditions are not a good combination for the late
developing soybeans in the northern and northwestern Corn Belt. A much better scenario would be a warm and wet month of August.

These later developing soybeans will also be at risk from a potential early frost just like the corn. If the first frost occurs two weeks later than normal, then the U.S. soybean yield might be 43.5 to 44.0 bu/ac. If the first frost occurs October 1st, then the soybean yields might be 42.0 to 42.5 bu/ac. If the first frost occurs two weeks earlier than normal on September 15th, then these late developing soybeans are going to have a big problem and the nationwide soybean yield could be reduced to 40 bu/ac and in a worst case scenario, maybe even lower than 40 bu/ac.