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Water, Water Everywhere...

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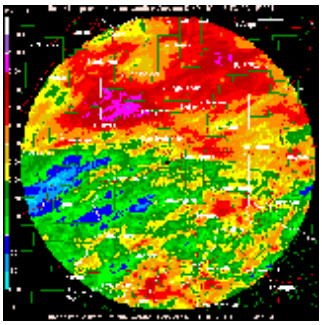

The rain storms of the past week left a lot of things floating or submerged throughout Indiana, including corn fields. Total rainfall over the several day period was greater than 10 inches for some areas in northern Indiana. The consequences of such extreme weather events on crops this late into the growing season are often severe, with few available remedies to recover lost yield potential. Here are a few thoughts to consider relative to water-damaged crops.

1. Given the warm soil temperatures, young corn will not tolerate more than several days of outright ponding before whole plant death occurs. Oxygen deprivation quickly results in significant deterioration and death of above- and below-ground plant tissue. See my earlier article for more info (Nielsen, 2004a).
2. Older plants will technically tolerate ponding or saturated soil conditions somewhat longer than young corn before death occurs. Crops that survive bouts of ponding and saturated soils will nonetheless suffer significant damage to their root systems. The immediate effects will be stunting of plant development. In the longer term, root systems compromised by ponding and saturated soils today will be less able to sustain the crops IF drought conditions develop later in the growing season.
3. For corn, damage to its root system today will predispose the crop to the development of root and stalk rots later in the season by virtue of the photosynthetic stress imposed by the limited root system during the important grain filling period following pollination. Monitor affected fields later in August for the possible development of stalk rots and modify harvest-timing strategies accordingly (Nielsen, 2003).
4. Ponding or flooding over the top of young corn plants increases the risk of infection by the soil borne fungus, *Sclerophthora macrospora*, that causes Crazy Top disease (Lipps and Mills, 2000).
5. Once the water recedes, deposits of sediment and crop residues that remain on crop plants either outright smother any surviving plants or greatly reduce their ability to capture sunlight and photosynthesize carbohydrates. Ironically, more rain later on may be beneficial to help wash off these deposits.
6. Given the warm soils, loss of nitrate nitrogen due to denitrification can easily approach 4 to 5% per day of saturated soil conditions (Hoeft, 2004). Loss of nitrate nitrogen on coarse-textured, sandy soils is also very rapid. Pre-plant or early side-dress applications are at most risk. More

recent sidedress applications of nitrate-containing fertilizers (e.g., liquid 28%) are at more risk of N loss than are applications of anhydrous ammonia (Nielsen, 2004b).

7. Many cornfields in the affected area are "smack dab" (a Nielsen term, meaning "exactly") in the middle of their rapid growth phase prior to pollination when nitrogen uptake rates are at their peak. Assessing the need for supplemental nitrogen is complicated by the fact that the yield potential of (surviving) ponded corn will be less than normal. Where estimated nitrogen loss is significant (60 lbs or greater) in fields not yet tasseling and yield potential is still reasonable, corn may respond to an additional 50 – 80 lbs of applied fertilizer N up to or shortly after tasseling (Hoeft, 2004).
8. Replant considerations for damaged or destroyed corn fields will not be easy decisions, particularly in the northern half of Indiana, given that many damaged fields will not be dry enough to replant for another week. Technically, corn could still be replanted in northern Indiana through the end of June by selecting unusually early maturity hybrids (Table 1). However, such late replanting is not without risk itself, including the fact that unusually early maturity hybrids are often unadapted to diseases common to an area of the state (Nielsen & Thomison, 2003).

Table 1. Relative hybrid maturities "safe" for replanting in late June throughout Indiana.

Area of Indiana	Replanting June 21	Replanting June 28
Northwest	96	92
Northcentral	95	91
Northeast	94	90
Westcentral	104	100
Central	102	98
Eastcentral	96	92
Southwest	117	112
Southcentral	108	104
Southeast	109	105

Listed hybrid maturity values aim at reaching maturity (kernel black layer) about 1 week prior to the date of an average fall frost for a given area of the state.

Related References

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