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Soybean replant decisions in 2004

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Abstract
After talking to the 12 Iowa State University extension field crop specialists this morning (May 24), corn planting should now be close to done and 80-85 percent of the soybean should be planted. Based on the current weather conditions, it is our "gut feeling" that we can first get back into the fields for planting next weekend - at the earliest. Quite a few soybean fields may need to be replanted based on the flooded fields and hail injuries.

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Standing water in low-lying fields can result in significant soybean yield reduction and last many days due to the lack of soil permeability or surface drainage. It is generally recognized that soybean prefers adequate soil oxygen. When flooding occurs, oxygen availability for respiration is reduced, seeds are more susceptible to stress, and the ability to germinate is further reduced as the flooding period increases. Water logging also leads to accumulations of compounds like ethanol and CO_2,which are toxic to plants when in high concentrations. If temperatures are cool during the flooding period, the survival of the submerged crop increases because the metabolic processes are slowed down. Flooding also has a negative impact on symbiotic nitrogen fixation (a process that requires oxygen) and mycorrhizal colonization of roots. Research from Minnesota shows that flooding for six days or more may result in significant yield loss or losses of the entire crop. Flooding can also leave silt deposits and crop residue that can bury the crop and reduce photosynthetic capacity significantly. Without rainfall to wash silt from the leaves, recovery is greatly slowed.

Accurately estimating soybean plant population is important before making replant decisions. Plant population should be based on an accurate stand count, along with factors such as yield potential of the existing stand, date of replanting, and the real cost of replanting. The existing stand will be determined by evaluating uniformity of stand and overall health of plants. Only some areas of the field may require replanting if the majority of the field seems to have enough viable plants remaining. It is important to wait several days (three to five) after a crop has been damaged (or has emerged) before replanting. Injury can look very serious the day after the event but recovery may be possible. Previous Iowa State University studies have shown that a final stand as low as 73,000 plants per acre have consistently yielded more than 90 percent of the optimum plant population. The reason is that soybean plants can compensate for missing plants and reduced stands by branching out to make up for a thin stand. Keep in mind that the lower the stand count, the more weeds will become a problem due to less shading, especially later in the growing season. If a reduced stand is saved, weed control must be a priority.

Incidence of soil-borne fungal pathogens like *Pythium* spp. and *Phytophthora*, known to cause important losses in germination and seedling stand, may increase under water logging. Free water availability leads to a greater release and movement of flagellated spores, the

zoospores, which are attracted to the roots where they germinate and penetrate the plant. Another seedling pathogen - *Rhizoctonia* - is not favored by oxygen-depleted environments such as flooded soils. Flooding and pathogens will have a greater impact when poor-quality seed is used than when the seed is not mechanically damaged and is free of seed-borne pathogens. For more information on seed and seedling pathogens, see Soybean seedling diseases in 2004 [1].

A replant decision based on a quick look at a field may underestimate the existing plant population. Replanting decisions should be made by analyzing carefully all factors that caused the stand reduction, the percentage of loss of plant population, and the costs of replanting. It is recommended to plant the "original" variety unless replanting occurs later than mid-June in northern and central Iowa, and after early July in southern Iowa. More information on soybean replant decisions is available in the Iowa State University extension publication PM 1851, Soybean Replant Decisions [2].

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Links:
[1] http://www.ipm.iastate.edu/ipm/icm/2004/5-10-2004/soyseeddis.html
[2] http://www.extension.iastate.edu/Publications/PM1851.pdf

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