Field Notes
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Johnny Saichuk

The above photographs show somewhat similar symptoms on the leaves of rice plants that are caused by two different stresses. Both are temporary effects. The photograph to the left is a classic cold temperature effect. I mentioned this one last week. The plants on the right are exhibiting Command injury. The field as a whole appeared white, but the effect is cosmetic. By the time we visit it next week I do not expect to see many, if any symptoms. In fact, whenever I have seen fields to which this herbicide has been applied that do not exhibit whitening, weed control is less than desirable.

Dr. Dunand explained the "bleaching" due to cold injury in this manner. Chlorophyll, the green pigment necessary for photosynthesis, builds up in the plant when temperatures are above 65 F and breaks down when temperatures fall below this level. Under normal conditions even if there are cool nights the manufacture of chlorophyll will exceed the breakdown. What happens under either extreme cold or sustained cool conditions is breakdown exceeding manufacture.

I'm still not sure why the white bands are so typical of cold temperature injury not only on rice, but on many grass plants.

Both photographs above are of round leaf mud plantain. The seedling closely resembles ducksalad as it should because both are in the same genus, *Heteranthera*. It is not clear here, but the seedling is larger than ducksalad. Without a ducksalad seedling nearby it is difficult to compare the two or to separate them in the field.

Like many aquatic plants the leaves of the juvenile and in many cases the leaves that remain submerged are different from the leaves the older plant or the leaves on the surface of the water. In the photograph on the left one leaf in the very center of the plant is beginning to show signs that this plant is not ducksalad. On the right it is now clear this is not ducksalad because of the deeply cleft leaf that is floating on the surface. This leaf is more pointed or "heart" shaped than the leaves of the mature plant will be. Later the leaves will become more rounded or "kidney" shaped which gives rise to the species name *reniformis*.

We have presented this information before. This opportunity presented itself again so I decided to improve the photographs we had and send them to you. Repetition is one of the best ways to learn – at least it is for me.

The significant thing here is the difference in herbicides required to control this weed in comparison to what will effectively control ducksalad. We will try a combination on this weed in one verification field where the problem is significant and let you know how it turns out. We have not been able to apply it yet because the rice is still struggling as a consequence of the cold.

Above are two photographs on seedlings, one showing a problem or potential problem and the other a desirable situation.

In the photograph on the left the leaves of the seedling on the right are caught in the soil while the seedling is attempting to emerge. Luckily the next leaf does appear to be coming out reasonably well. If that leaf had been trapped as was the first, then this seedling would probably not emerge. Once the leaf is bent it loses its ability to push through a crust or compacted soil. On clay soils keeping the soil surface moist is usually enough to prevent the problem. On silt loam soils once they have compacted even flushing may not resolve the problem. In extreme cases we have had to recommend either using a rotary hoe or similar tool to break the crust or hold water on the field until the spikes break through the surface, then drain to allow oxygen to get to the seedling.

The seedlings on the right were about ¾ to 1 inch below the soil surface, but because they are still very erect and the soil was moist were going to emerge well. We took these photographs in a verification field Thursday. The seedlings on the right are probably going to be emerged by Saturday. The field with the seedlings on the left may have to be flushed again and will definitely require close observation before we can feel confident about the stand.