The Agrower

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Agro Engineering, Inc.

Dealing with drought

As all water users are undoubtedly aware, 2002 is quickly developing into a drought of unparalleled magnitude. The drought monitor index now lists the San Luis Valley as having an extreme to exceptional drought severity based upon a lack of surface water supplies, a lack of precipitation, a lack of residual soil moisture, and poor vegetation health. Dropping ground water levels in the unconfined aquifer and a decrease in artesian pressure in the confined aquifer are also being experienced. Irrigators who rely solely on ditch water have already watched their prospects for full crops this year disappear. Many irrigators, who rely heavily on ground water, have never seen their well production drop off so heavy this early in the irrigation season before. Other areas seem to be somewhat immune from the well production problems thus far and are hoping for the best.

Given an available water supply, our obvious goal is to apply enough water to meet the crops current and full irrigation requirements. With dropping water levels, we don't want to over-irrigate now if we can conserve that limited amount of available water for more critical time periods later in the season. Consequently, it is more important now than ever that sprinklers have an accurate percent chart so that the depth of water that is being applied is known. Also pay close attention to crop evapotranspiration estimates so that you know how much water is needed to provide for current crop needs. It is fairly easy to get behind this time of year. Alfalfa water requirements shall increase to a fairly stable requirement after first cutting. The period of peak water use on barley is nearly over now and will begin to drop slightly after heading. Potato water requirements are increasing dramatically as the crop grows toward full cover.

Over the past two months, we have seen an unprecedented number of well production problems, especially on one-well systems that are in areas accustomed to having sufficient recharge from surface water. It is very important to monitor water levels and pay close attention to the irrigation system's operating pressure at the pivot. A pressure drop is an indication that the system's flow rate has also dropped. The ratio of the drop in flow is proportional to the square root of the ratio of the drop in pressure. As an example, if an irrigation system that was designed for 1000 gpm and 47 psi is now operating at 30 psi, the flow rate has dropped to around 800 gpm. At a given timer setting, 20% less water is being applied than expected.

For a pivot to easily keep up with crop water needs, systems are designed to have a flow rate of at least 6 gpm per acre of land irrigated. Consequently, when the system flow rate of a 125-acre pivot drops below 750 gpm, it becomes increasingly difficult to keep up with crop needs. If you are facing this situation, there are several alternatives that may help.

One of the simplest alternatives is to remove the end guns. A large Nelson 100 end gun with a booster pump may require up to 150 gpm. By removing the end gun, you free up that amount of flow for use under the rest of the pivot. The end gun area tends to be the least uniform and least productive area of the field, and abandoning these 20 to 30 acres makes more sense than abandoning acreage under the pivot.

There are several well remediation techniques that may stabilize or improve well production. If there is sufficient depth in the well, you might be able to lower the bowls to provide better submergence for the impellers and allow the pump to capture more water from a greater depth in the aquifer. If the well was not drilled to the confining layer (the Blue Clay Series for wells in the unconfined aquifer), the well can be deepened after obtaining a permit from the Division of Water Resources. If the well casing is encrusted, well surging or re-perforation techniques might help to redevelop its productive capability. The impellers or pump motor can be replaced if necessary. In the worst-case scenario, the well may need to be re-drilled. Several farmers are in the process of piping other old, decreed wells along the edge or corner of the field into the pivot. In drought conditions, it is certainly easier to provide a full system capacity with two or three wells pumping fairly easily (at say 300 to 600 gpm per well), rather than trying to provide the full system capacity with one well pumping hard (at say 1000 to 1200 gpm).

If the irrigation system begins pumping an excessive amount of air or begins surging, the situation can be stabilized by modifications to the irrigation system itself. It is relatively cheap to re-nozzle the system down so that it is not pumping the well so hard. Usually, the majority of the existing nozzles can be re-used as smaller orifices are placed in the inner spans and the existing nozzles are shifted down the system. Re-nozzling alone only works effectively if there is still sufficient flow to keep up with the crop needs for the acreage irrigated.

Controlling Nematodes with Vydate

The timing of Vydate applications for suppression of stubby root and root knot nematodes in the potato crop is critical. The first Vydate treatment for stubby root nematode has already been applied on most fields. Applications are done at the time of hooking, but just before the stolons begin to swell. Some late planted fields will have Vydate applied this week. The first application for root knot nematode should be just prior to 1700 Growing Degree Days Fahrenheit (GDD), which is when the root knot nematodes have completed a generation in the roots and are ready to invade potato tubers. Data loggers have been placed in potato fields, and temperatures are read on a weekly basis. This information is used to determine the current GDD and estimate when 1700 GDD will be reached. Based on current data, it is estimated that 1700 GDD will be reached on July 16th. Therefore, Vydate should be applied between July 10th and 15th for root knot nematode, with subsequent applications on a 14- to 16-day interval.

When chemigating Vydate, it is very important to buffer the solution to a pH of 5 or lower before the Vydate is added to avoid rapid breakdown of the product in the tank. During chemigation, the Vydate solution is only in the irrigation water for a short period of time; consequently, degradation should not occur. The recommended irrigation amount is generally 0.5".

If you have questions or concerns regarding nematode treatments, please contact your Agro consultant.

Aerial Photographs

Due to the hot, dry spring this year, sprinkler pattern problems are much more pronounced and obvious. Generally, late-season grain fields that are maturing are the best indicator of sprinkler patterns. We recommend an aerial photograph at this time to help evaluate and analyze pattern problems so corrections can be made for next season's crop. Let us know if we can be of service.

ALERT - Agro Percent Chart Accuracy

Due to the drought, static water levels have dropped considerably throughout the entire Valley. This lower level directly relates to a decreased design flow in a majority of the sprinkler systems. Percent vs. depth charts from several years ago may not be accurate due to lower flows. Our crop management service has monitored on a regular basis system operating pressures and pumping water levels, and has made corrections to the percent chart, if necessary. Those of you who do not have this service on a particular field should monitor the operating pressure closely, as the accuracy of an older percent chart could be in question due to less flow.

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