Potato Progress

Research & Extension for the Potato Industry of Idaho, Oregon, & Washington

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Volume XIX, Number 2 | *8 March 2019*

Columbia Basin Volunteer Potato Outlook - 2019

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Winter soil temperatures were recorded at four depths (2", 4", 6", and 8") at 3 sites in the Columbia Basin this winter; the WSU Othello Research Unit, the USDA-ARS Research Farm at Paterson, and a grower field near Quincy. Data have been collected since early December in ground planted to winter wheat in the fall of 2018 at the Othello and Paterson sites. Soil temperatures were recorded in a circle planted to winter wheat near Quincy after a faulty datalogger installed on December 5th was replaced on January 23rd.

Potato tubers are normally killed when they reach temperatures ≤ 28° F. The vast majority of potato tubers left in the field are in the upper 8 inches of the soil profile unless deep post-harvest tillage, such as mold board plowing was done. Previous research on post-harvest tuber depth (Newberry and Thornton, 2004) and data generated in the Lower Columbia Basin (Boydston, unpublished) indicated that about 43% of tuber leavings are located in the top 2" of the soil profile, a further 19% between 2-4" deep, and the remainder at depths >4".

Agweathernet data prior to installation of sensors at Othello on December 5th, Paterson on December 10th and Quincy on January 23rd indicate minimum air temperatures of 16° F, 21° F, and 20° F, respectively. Similar air temperatures at the 3 sites subsequent to those dates and prior to snowfall on February 4th did not result in critical soil temperatures at 2" deep, although tubers on the soil surface were likely killed. Table 1 summarizes minimum soil temperatures by depth and the Agweathernet (AWN) minimum air temperatures for the 3 sites.

Table 1. MINIMUM TEMPERATURE BY DEPTH (°F)

Site	AWN 5' Air	2" Soil	4" Soil	6" Soil	8" Soil
Othello	4.2	28	28.7	29.7	30.6
Paterson	1.7	19.6	22.1	26.9	30.6
Quincy	7.4	16.3	20.7	24.2	28.2

CONCLUSION:

Soil temperatures at the WSU Othello facility were higher than at the other 2 sites, presumably due to substantial snow cover. Tubers <2" deep were killed during the 2nd week of February but soil temperatures at depths >2" remained above critical. We estimate that about 43% of tubers were killed and that leavings at depths >2" will produce volunteer plants this spring.

At the USDA Research Farm at Paterson most tubers <8" deep were killed during the first week of March.The high level of mortality despite substantial snowfall occurred because strong winds removed most of the snow from the site where data were being collected. We estimate that tuber mortality was about 90% and that some leavings between 6-8" deep and all leavings >8" deep will produce volunteer plants.

The Quincy site experienced lower minimum soil temperatures than the other sites and as a result tuber mortality was higher. Strong winds in early February evidently removed the snow cover at the installation site, allowing soil temperatures to fall below critical starting on February 4th. We estimate that tuber mortality was about 95% and that only tubers greater than 8" deep will produce volunteer plants.

Substantial drifting of snow that occurred in February makes generalizations about tuber mortality more difficult than usual. In areas from which snow was removed by strong winds tuber mortality will be high, but snow drifts in areas protected from wind provided enough insulation to keep soil temperatures above critical.