

CAN THIAMINE TREATMENT REDUCE POTATO VIRUS Y ON POTATOES?

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Potatoes are a large commodity for Oregon and the Pacific Northwest; 56% of the United States potatoes are grown in Idaho, Oregon, and Washington. Potato Virus Y (PVY) is a major pathogen affecting potato fields in the Pacific Northwest. PVY is an extremely important disease of potato worldwide that causes significant yield losses depending on the strain and the potato cultivar. It is a non-persistent virus transmitted by aphids. Foliar symptoms include mosaic, chlorosis, leaf drop and with certain PVY strains and potato cultivars can lead to Potato Tuber Necrotic Ringspot Disease (PTNRD) in tubers. Thiamine, or vitamin B₁, has been shown in many crops to boost the plant's immunity and increase its tolerance to diseases, thereby increasing resistance against pathogens by inhibiting disease progression and reducing pest populations. Our objective for this study was to test the effect of thiamine



application on potato resistance to PVY, an economically important disease vectored by aphids. This is the first time that thiamine was tested using potatoes as a model crop.



Thus, a screenhouse study was conducted to determine whether thiamine provided resistance against aphids and PVY. We tested different densities of aphids (1, 5, and 10 per plant) on potatoes using four treatments of thiamine at different concentrations (0, 1, 10 and 50 mM) in a randomized complete block design. We released aphids negative for PVY into clip cages on our two “clean” plants in each plot, and mechanically inoculated two “hot” plants in each plot with PVY^{N:O}. We collected weekly leaf samples and made visual observations of foliar symptoms. ELISA will be used to determine PVY

presence in leaflets and whether thiamine delays disease expression. Plants were individually hand-harvested and tubers were individually weighed and checked for PTNRD symptoms.

Treatment 4 (50 mM thiamine) was the only treatment with a similar yield to the control. All other treatments (T1, T2, and T3) had significantly lower mean yields compared to the control (Figure). However, it is possible that thiamine application delayed disease expression. ELISA testing is ongoing. Foliar symptoms in all treatments were mild, moreover, plants were still very green and upright when we harvested plots in early October 2014. These are preliminary results for the first attempt of thiamine as a control measure on potatoes that will be repeated in 2015.

