Farm Adaptation Innovator Program

Evaluation of Drain Spacing and Ditch Pumps in Existing Drainage Systems in Delta, British Columbia

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Geographic Applicability	This study was conducted in Delta; findings should be applied only to locations with humid maritime climate and poorly drained, silty soils
Commodity Relevance	This study was conducted on blueberry and vegetable crop fields but findings may also be applied to other crops
Time Frame	Fall 2015-Spring 2017

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Background

Big-O plastic tile drains are commonly accepted to be effective at moving water from agricultural fields. This type of drainage can be particularly important in regions like Delta, BC, where precipitation in the spring and fall crop production shoulder seasons can impede farm operations or force farmers to compromise soil structure with the use of heavy equipment on wet soils. With increasing precipitation variability due to climate change, especially during important shoulder seasons, drainage management is of increasing importance. While it is likely that the number of days farm equipment can be used without damaging the soil, or "workable days," can be increased by tile drains, it is not clear how effective this practice has been in Delta. It is also unclear how important expensive pumps are, or how management of vegetation post establishment affects such systems. This project addressed these questions by evaluating the performance of various tile drainage systems and spacing in vegetable crop and blueberry fields across Delta from the fall of 2015 to the spring of 2017.

Study Objectives

- Measure effectiveness of Big-O tile drains across Delta, BC
- Investigate if pumping the ditches improves effectiveness of Big-O drains
- Compare different drainage spacings at a single field
- Investigate benefits of grassland set-asides (GLSA) in reducing soil moisture and increasing soil workable days

Results

- Vegetable crop fields with tile drains showed a statistically significant decrease in wintertime surface ponding (data not shown) and an increase in soil workable days (Fig 1). Pumps, however, did not increase the number of workable days significantly.
- Blueberry fields with tile drains showed a trend of lowered water tables which was further decreased with pumps. These differences, however, were not statistically significant.
- Decreasing tile drain spacing had a moderate impact on soil moisture in the spring with 15 ft tile spacing drying down faster than 30 ft, followed by no drainage (Fig 3). These differences were most pronounced above 45% volumetric water content.
- Planting in grassland set-asides had a small impact in reducing soil moisture compared to fields without.
- Tilling in the grassland set-aside had a large impact on soil moisture.

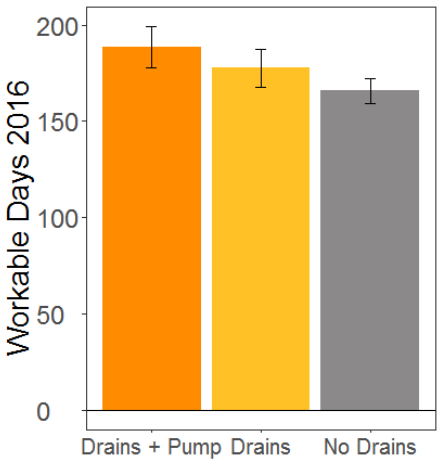

Figure 1. Total workable days for the 2016 production season for **vegetable** fields

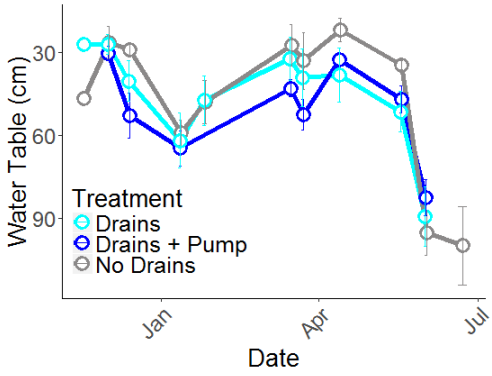

Figure 2. Water table depth in **blueberry** fields from the fall of 2016 and spring of 2017

Definitions

volumetric water content: a measure of soil moisture determined by the ratio of water volume to soil volume

statistically significant: a statistical determination indication that there is a 5% chance that differences were observed when in fact no difference exists

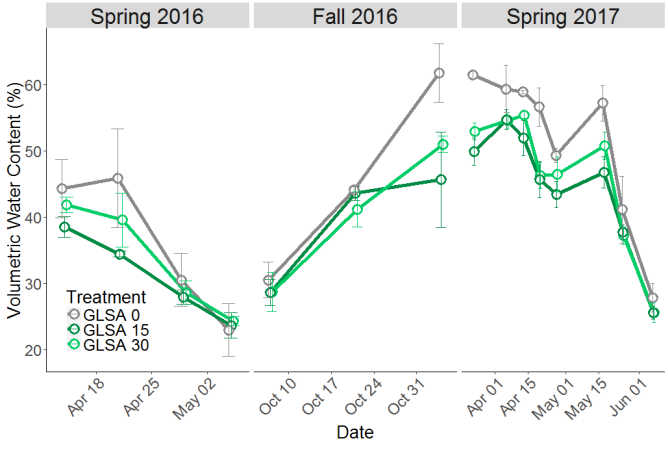

Figure 3. Soil moisture of fields with grassland set-asides (GLSAs) and tile at 15 and 30 ft compared to no tile

For more information:

For more details on the results of this project visit the Climate Action Initiative website:
http://www.bcagclimateaction.ca/faip-project/fi13/

and the Sustainable Agricultural Landscapes Lab:
http://sal-lab.landfood.ubc.ca/projects/delta-drainage-project/

For more information on drainage management visit the BC Ministry of Agricultures website:
http://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/agricultural-land-and-environment/water/drainage

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