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Optimum Irrigation Management



Sarah Sommerfeld, PAg
Irrigation Agronomy Workshop
March 18 & 20, 2014



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Outline

- Scheduling approach for projects
- Moisture monitoring technologies
- Are you irrigating to crop potential?
- Water management considerations



Irrigation Scheduling

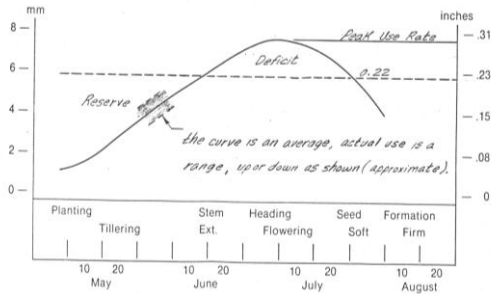
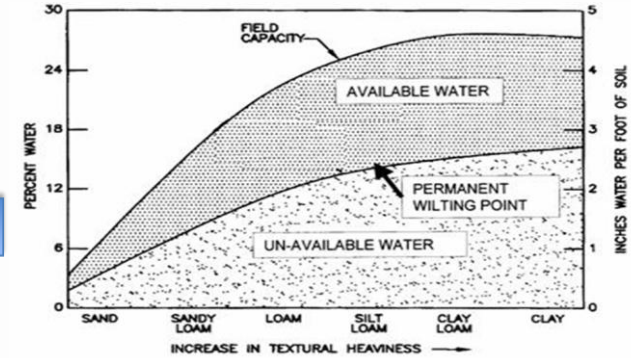
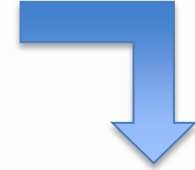
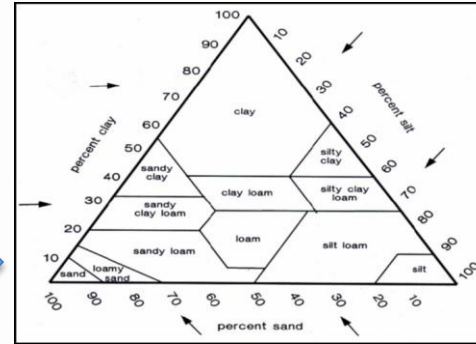
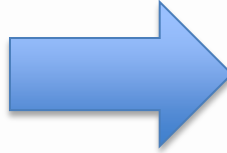


What is Irrigation Scheduling?

- Ensure that water is consistently available to the plant and that it is applied according to crop requirements
- Improve water use efficiency
- Improve profitability



Our approach



APPROXIMATE DAILY CROP WATER USE FOR CEREAL GRAIN
Hobbs, E.H. and Krogman, K.K., 1974.



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Soil Moisture Monitoring Equipment



John Deere Field Connect



Watermark™ sensor



Tensiometer



Soil Auger



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What are these readings telling us???

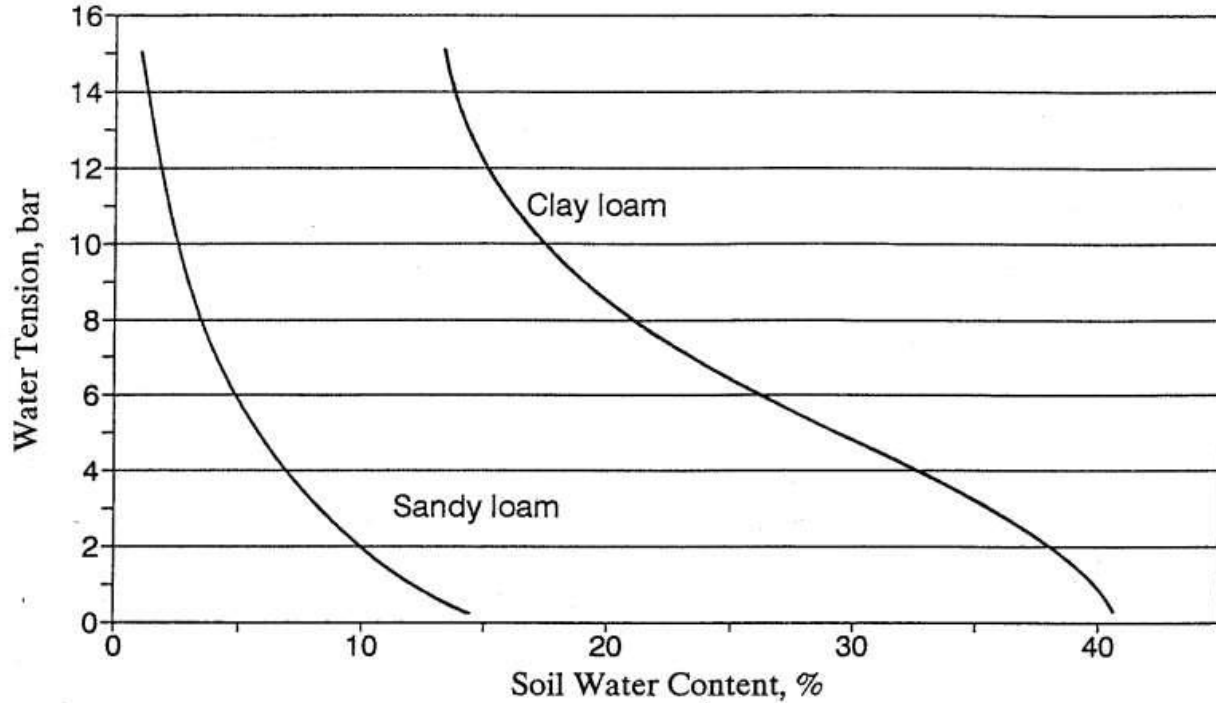
When there is lots of water
in the soil – tension is low



As soil dries – tension
increases



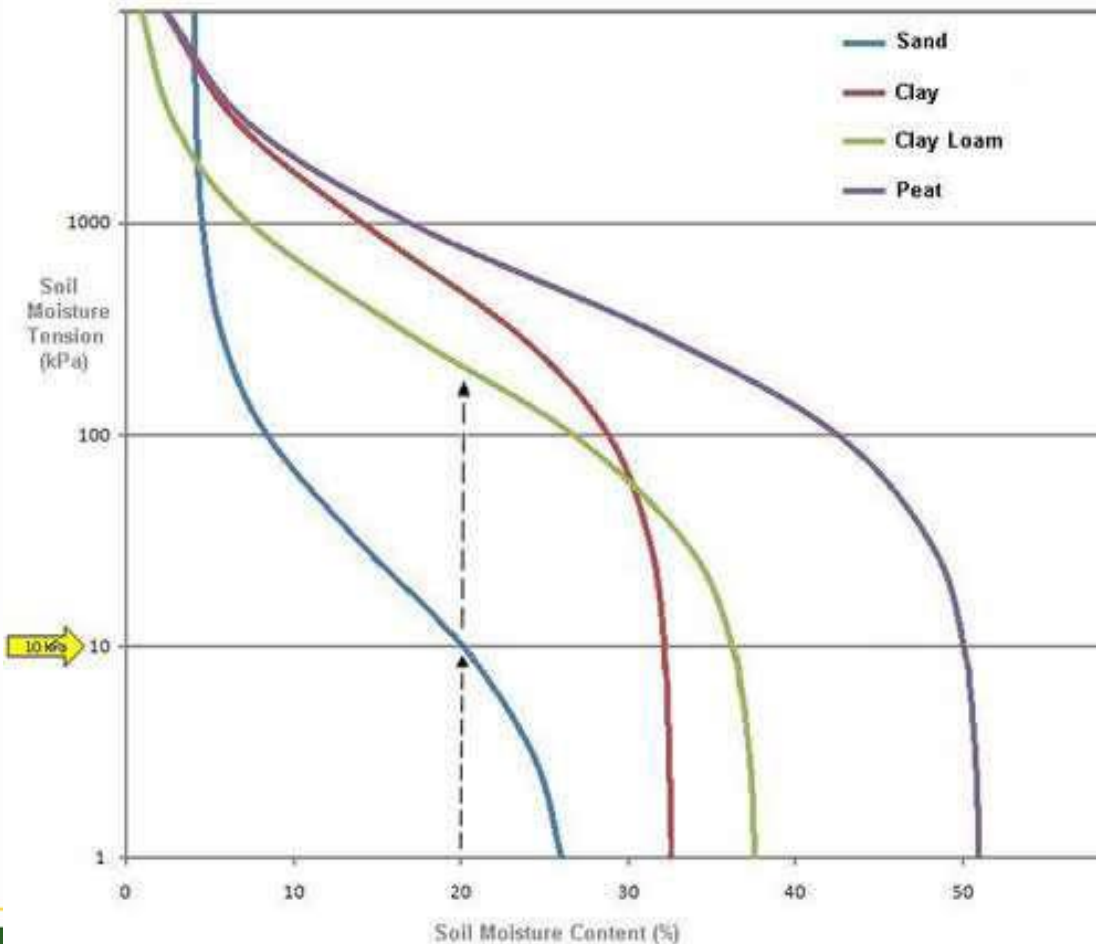
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Soil tension
related to soil
moisture



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When do you irrigate?
Depends on soil texture of the field



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What has been the uptake by irrigation producers to use of soil water instruments for irrigation scheduling?

- United States – 10.4% of the irrigators use soil water instruments for irrigation scheduling.
(Henggeler et al., 2010)
- Southern Alberta -Henning et al. 2008, reported about 9% of irrigators in the Taber area and 6% in the Raymond area.
- Australia and New Zealand – about the same



What equipment are producers using?



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Scheduling Models

Weather based

- Estimation of soil moisture
- Estimation of evapotranspiration (ET)



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Field

Bagshaw
Pederson
Test Field
True North
Vestre - alfalfa
Vestre - Corn

Sample Site

1
2

Field Inputs System Pump Sample Site Moisture Model Tables **Graphs**

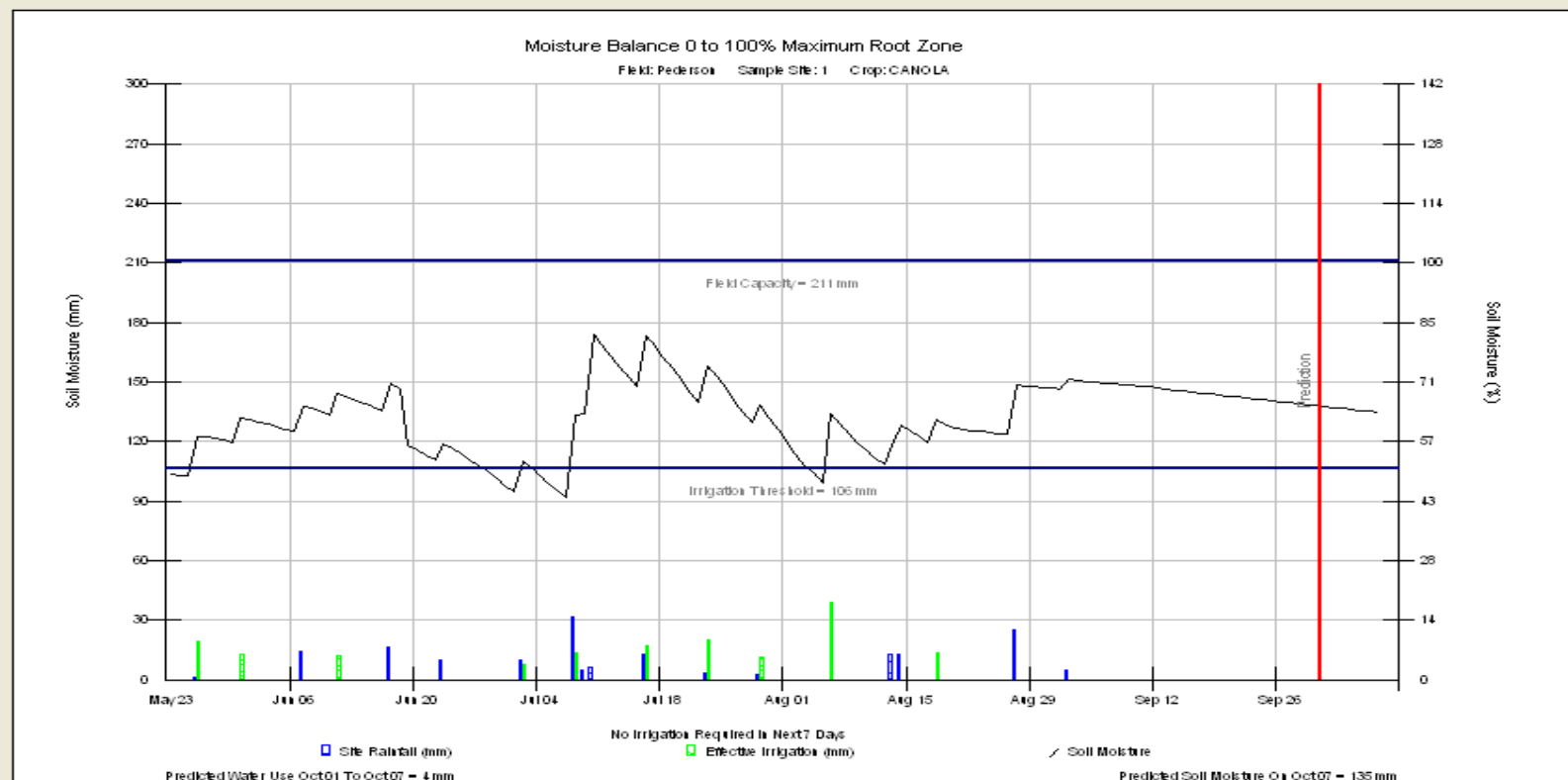
Graph Moisture Balance 0 to 100% Maximum Root Zone

Start

End

Print

Export

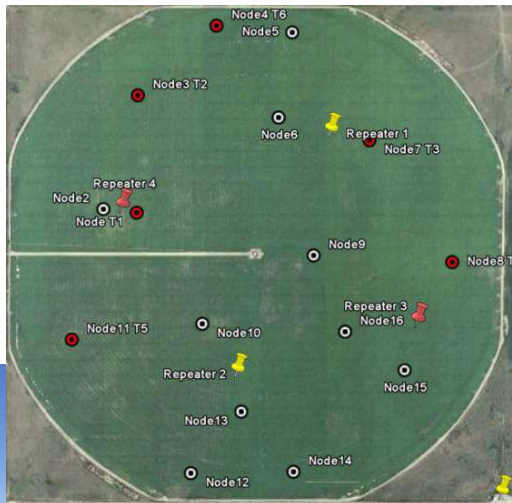


Graphs

Many other options



HoboNode sensors



Wireless TDR sensor



Tipping bucket rain gauge



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Are these options realistic



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So even if you are using this ...



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And if you are okay with computers ...



<http://agriculture.alberta.ca/acis/imcin/about.jsp>



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Irrigation Crop Diversification Corp.



Gary Kruger



Rory Cranston



Sarah Sommerfeld



Garry Hnatowich



Jeff Ewen

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Crop Water Use

Crop	Total Water Use (mm)	Peak Use (mm/day)	Allowable Depletion (%)
Silage Corn	500 - 550	8	40
Canola	400 - 480	7	40
HRSW	420 - 480	7	40
Dry beans	300 – 375	7	40

Source: Alberta Agriculture and Rural Development



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What is adequately irrigated?

Inches Applied					
8	10	12	13	15	16
Peas	Barley	HRSW	SWSW	Alfalfa	Faba bean
Dry bean	Oats	Durum	Canola		
Cereal silage	Flax	CPS	Corn		
		Soybean	Potato		



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Source: Irrigation Economics and Agronomics, 2014

Irrigation Operation Considerations

- Canola requires 13 inches irrigation
- Centre pivot efficiency = 0.80
 - Irrigation applied = 16.25 inches
- Designed for 7 US gal/minute/acre (900 gpm)
 - 0.3 inches/acre/day
- Need to operate system 54 days to apply 16.25 inches





IRRIGATION

Irrigation Scheduling Manual



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Questions??



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