Forage Fact # 30

Date:
April 2004

Getting the most from your soil moisture

Available soil moisture depends on:

- Soil texture
- Organic matter & surface residue
- Soil compaction
- Tillage system
- # of tillage passes
- Water used & left by previous crop
- Fall recharge after previous crop harvest
- Snow retention
- Conservation of snow melt & early spring rains

"Conserving every inch of soil moisture will be so important for forage stands this year, after so little recharge last season."
John Kendrew

Soil texture	Soil water inch/ foot
Sand	0.75
Loamy sand	1.0
Sandy loam	1.25
Loam	1.5
Clay loam	1.75
Clay	2.0

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Introduction & Objectives of this Forage Fact

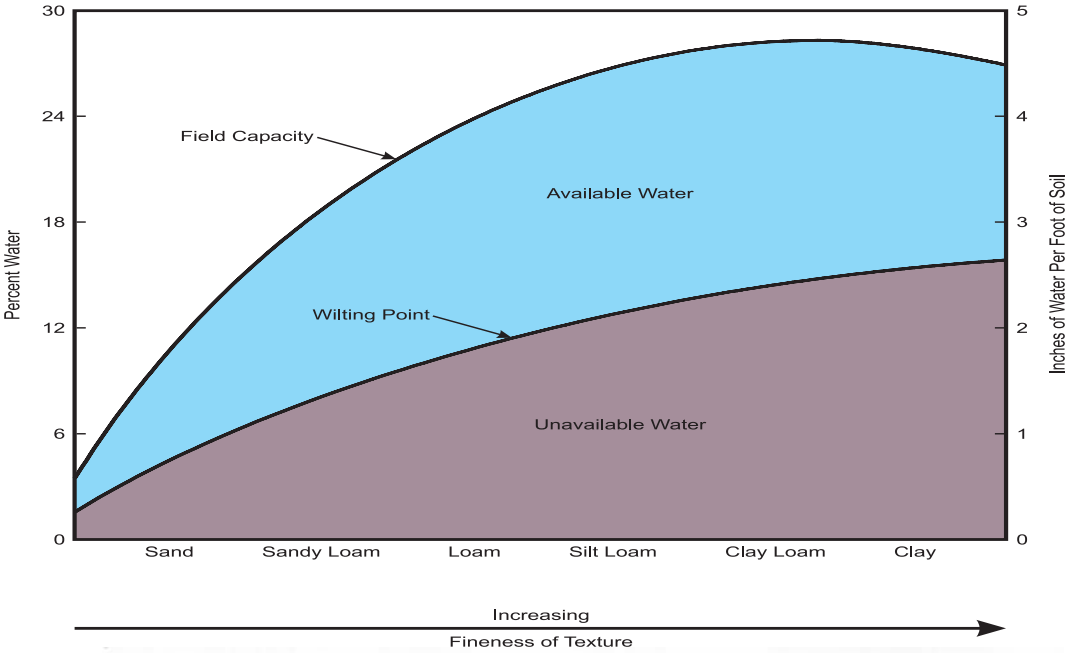
Last year's growing season and lack of rain left much of the soil moisture depleted, especially in the South Peace region. Ranchers have been asking "How can I make the best use of what little moisture I have?"

This forage fact attempts to share some of the knowledge from other prairie areas with experience managing drought conditions. It also integrates some local experience.

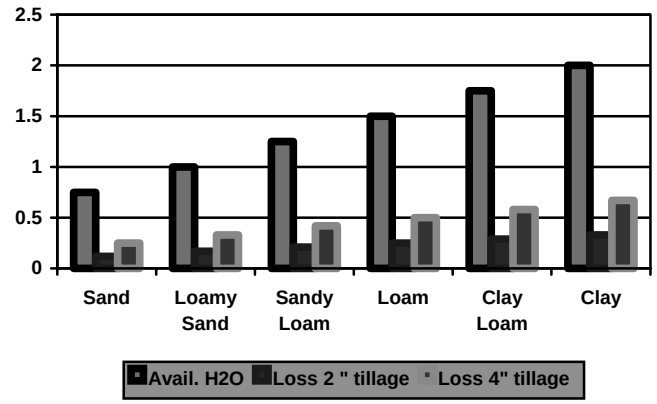
Understanding Soil Moisture & Available Water

Field capacity is the term for the amount of water in the soil when deep drainage stops. **Wilting point** is the moisture content when crops wilt and do not recover overnight. **Available water** is the amount of soil water held between the field capacity and wilting point. (blue area in graph below)

As a rule of thumb, about $^1/_2$ of the total soil water is available to plants. Available water varies with soil texture. The graph below shows the inches of available water per foot of soil stored in different soil types: sands can store more than clays (sands: $^3/_4$ in/ft versus clays: 2 in/ft available water)



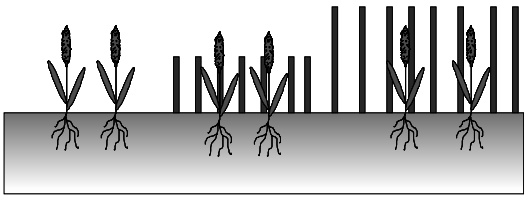
Peace River Forage Association of British Columbia



Moisture loss with depths of tillage: 2" versus 4". For

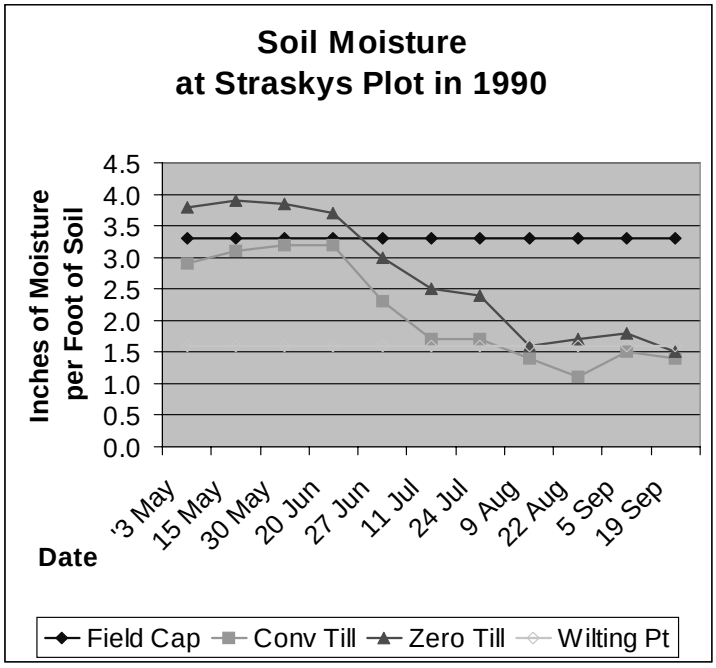
Reducing tillage passes and depth will save valuable moisture needed to germinate and grow the crop, while simultaneously saving costs (fuel, repairs capital). Reducing tillage can also buffer the soil from reaching wilting point by 2 to 4 weeks under low rainfall conditions. (see graph from Straskys' plot at right).

Managing your hay cutting and restricting fall grazing will help trap snow and in the following season conserve snow melt, trap spring rains and reduce evaporation. The graph below illustrates this point and summarizes some work by Cutworth and McConkey in 1995. During times of hay shortages, this may not be possible on all your fields, but try this on at least one of your fields.

Impact of	Surface on	Moisture	Losses
Ht After Cut or Grazed	Minimum Ht	6-8"	12-14"
			
Wind	100%	85%	32%
Evapora-tion	100%	95%	70%

Managing soil moisture

While the soil texture of your fields is a given, there are other factors effecting soil moisture within your control. **Retaining organic matter in litter or additions of manure** can improve the soil's ability to store moisture. Managing **crop rotation** to include annual forages, or to use seed mixtures with both tap rooted and shallow rooted species will maximize available water. **Seeding early** will also decrease moisture loss.



Summary Points

- ⇒ Consider soil texture and available moisture.
- ⇒ Reduce depth of tillage if reseeding forage land.
- ⇒ Pay attention to seeding depth, closing behind opener and packing.
- ⇒ Reduce width of seed opener if possible.
- ⇒ Reduce tillage passes or consider direct seeding into stubble.
- ⇒ Ensure soil to seed contact with all seeding.
- ⇒ Plant annual forages that are more resilient in low moisture conditions.
- ⇒ Cut higher and leave more residue to reduce evaporation loss and retain more soil moisture.
- ⇒ Add organic matter to increase available water holding capacity.

Compiled by: Sandra Burton, Peter Gamache & Brian Haddow in April, 2004.
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