DELLAVALLE®
Laboratory, Inc.
Chemists and Consultants

Interpreting Soils
New and Old Techniques

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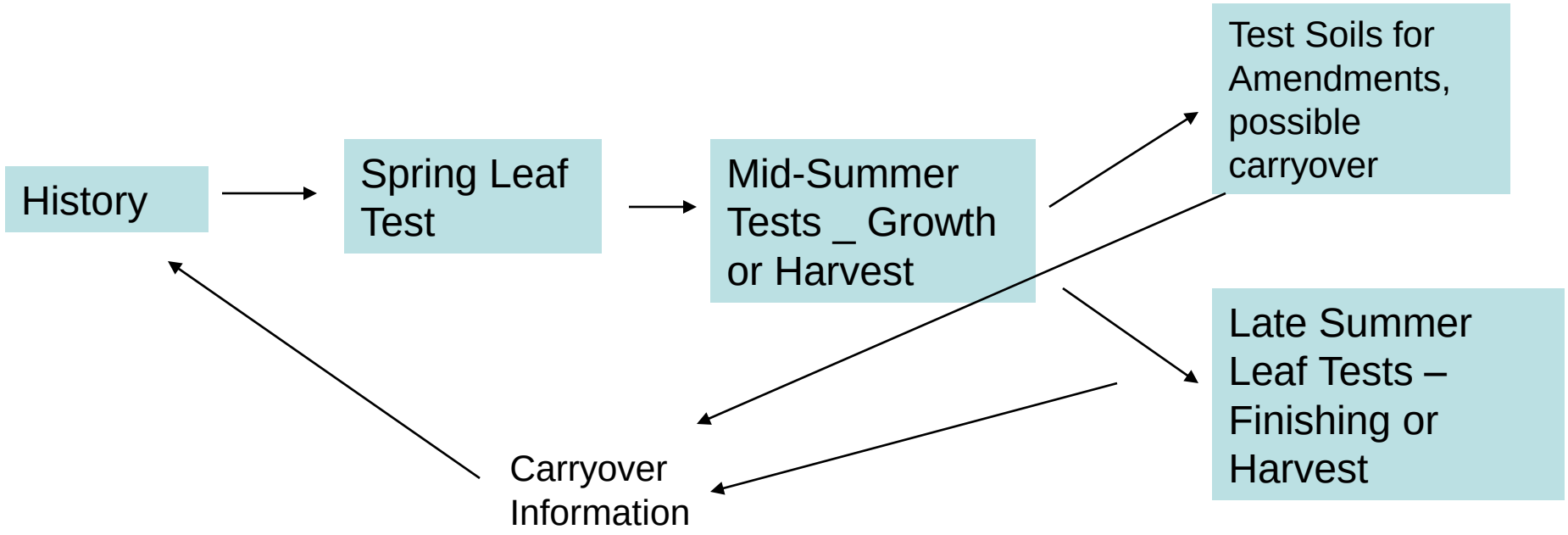
American Society for Horticultural Science

Basic Strategy of Growing a Crop

Basic Monitoring Strategy of N for Consistent Crop Growth



Providing for a growing corn crop

1974 _ N Management Row Crops

- Cotton: Fall Soil and 4 petiole samples
- Wheat: Fall Soil 3 stem samples
- Beets: Fall soil, N sidedress N core, 4 petioles
- Tomatoes: Fall soil, N sidedress N core, 4 petioles
- Lettuce: Fall soil, 4 midribs
- Potatoes: Fall soil, 4 petioles
- Corn: Preplant soil, 3 midribs

Tissue Sample Timing

- Early Season
- Pre bloom
- Bloom
- Mid season
- Pre harvest
- Harvest
- Post harvest

How Do You Start a Nitrogen Management Program?

How Do You Start a Nitrogen Management Program?

Soil Contribution

+

Water Contribution

+

Farmer Contribution

Create a “Preliminary Estimate”

- Example:

- Begin the season with a plan, Taking into account **crop need**, minus N in soil & anticipated water N contribution

- 25# soil N
- 5 tons compost/ac (40%?)
- 100 #N preplant
- 50 #N side dress
- 50 #N from the irrigation water

Tomato Plan

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Tomato Nitrogen Fertilization Plan

Client

Crop

Field

	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Test			Soil			Weekly	Weekly	Weekly		Soil		
Rec units N/ac*												
Applied units/ac												

Signature _____ Certified Crop Advisor _____ Date

*** Recommended Units of N takes into account crop demand, soil carryover N ,and Irrigation water contribution.**

Proj Next years recs												

Nitrate Nitrogen In Soil NO_3-N Shallow Rooted Situation

- Example
- 0-12” 15 mg/kg x 4 = 60
- sum = 60 #N in application area
- Example
- 0-18” 12 mg/kg x 6 = 72
- sum = 108 #N in application area
- Example
- 0-12” 8 mg/kg x 4 = 32
- 12-24” 40 mg/kg x 4 = 160
- sum = 96 #N in application area

Corn Post Harvest Soil

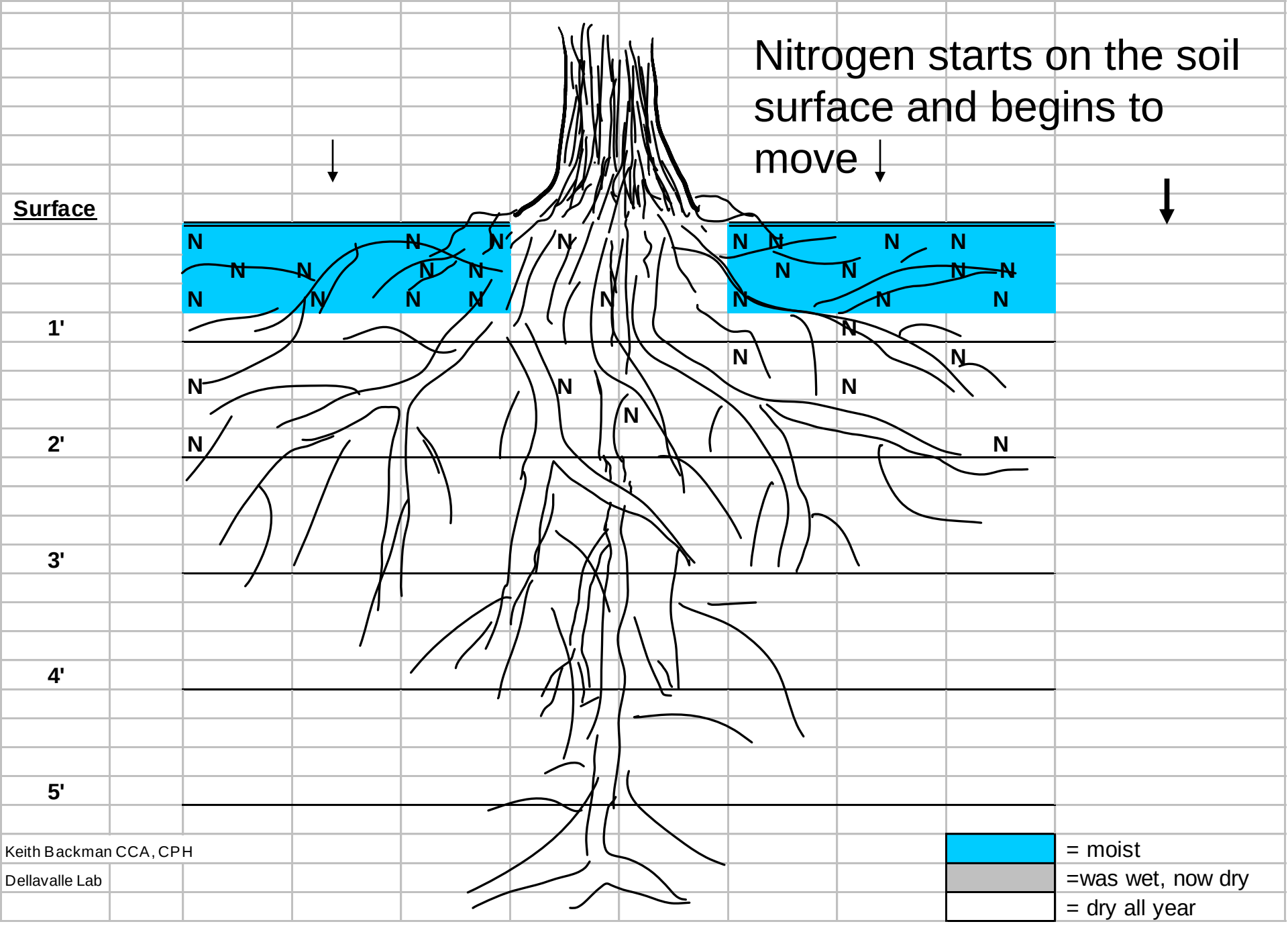
Soil Nitrate-N composite – Hanford FSL

- Fld 1A 0-18” 57 #N/ac
- 18-36” 57

- Fld 10 0-18” 67 #N/ac
- 18-36” 14

- Fld 11 0-18” 144 #N/ac
- 18-36” 595

Spatial Variables in Nitrogen Movement



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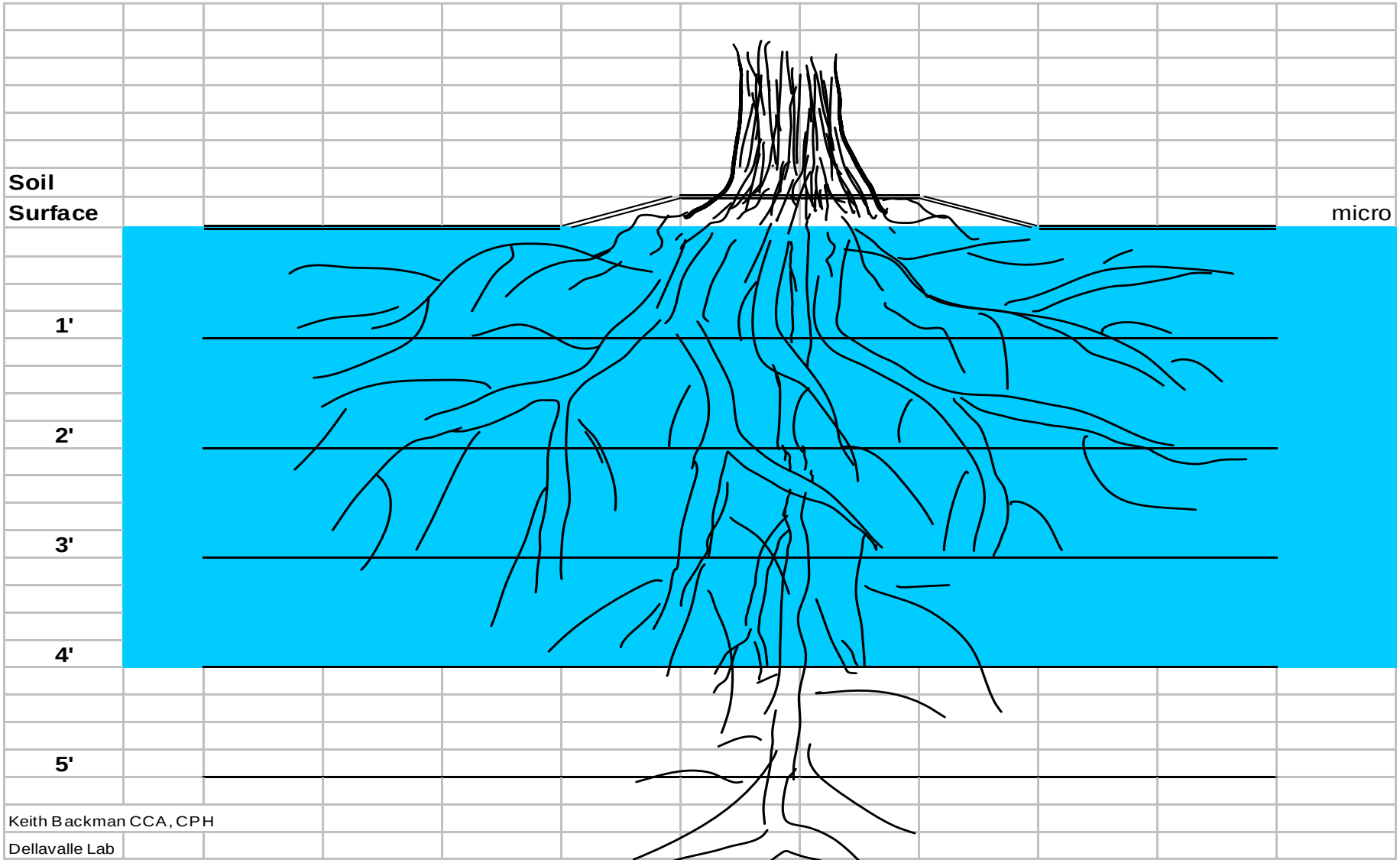
Irrigation


Soil
Surface
micro
1'
2'
3'
4'
5'
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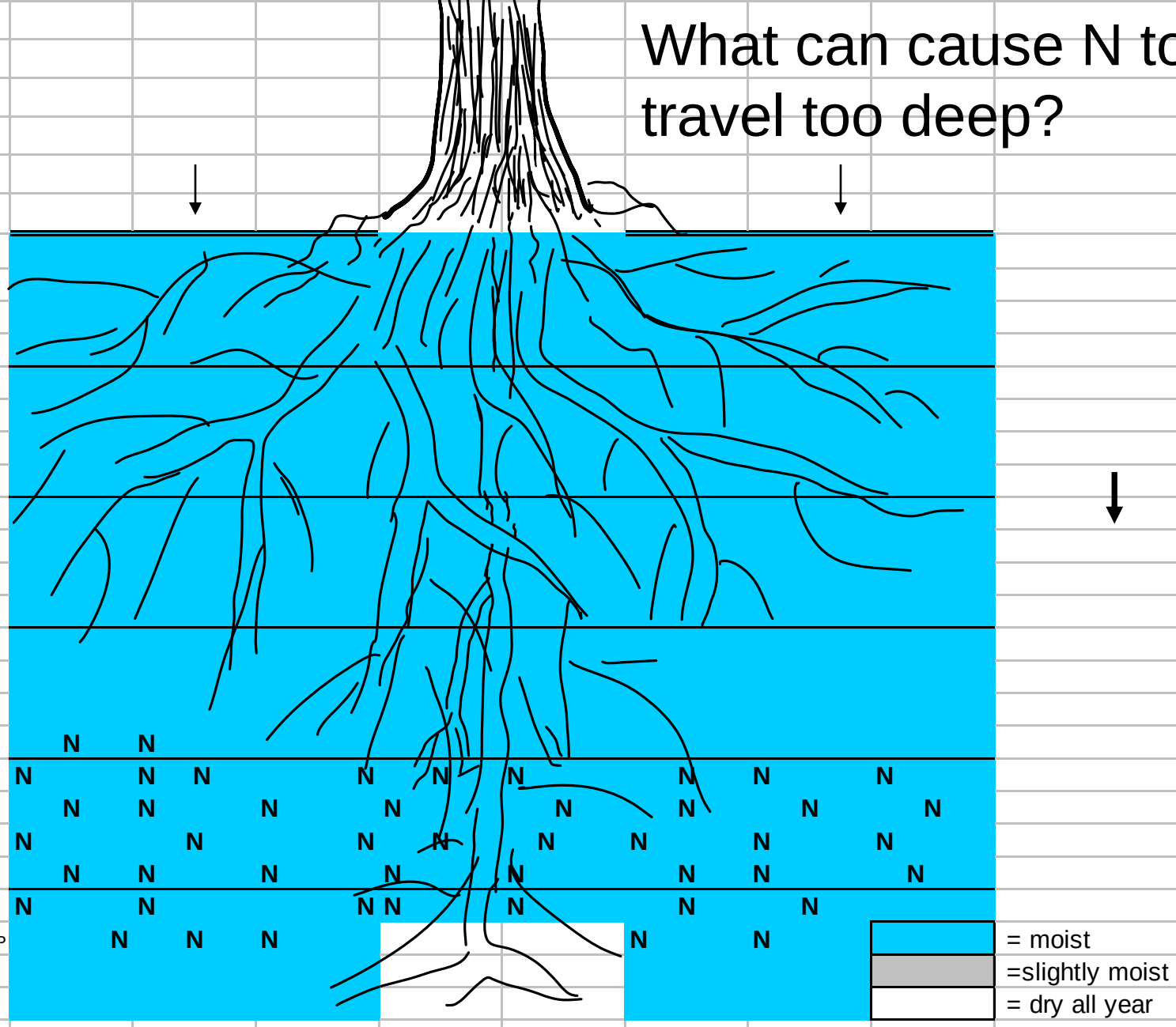
What can cause N to travel too deep?



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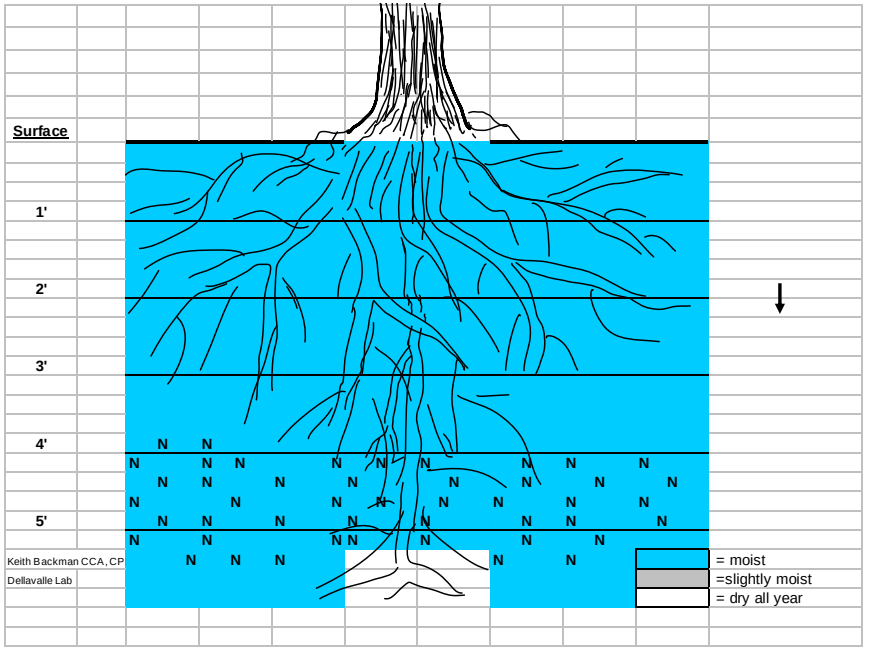
Control N Leaching by:

Accurate Irrigation Volume

Accurate Irrigation Timing

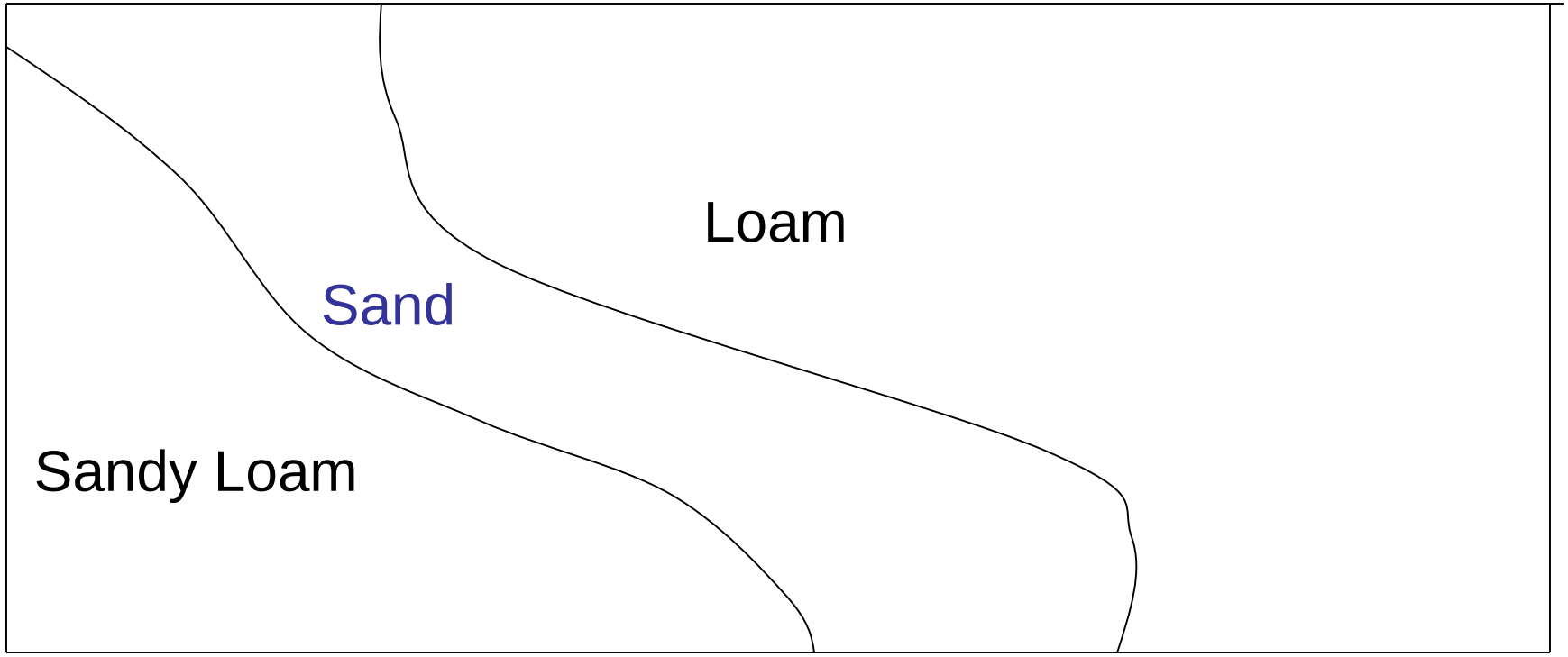
Adjusting Multiple N Applications

Choosing Fertilizer Characteristics



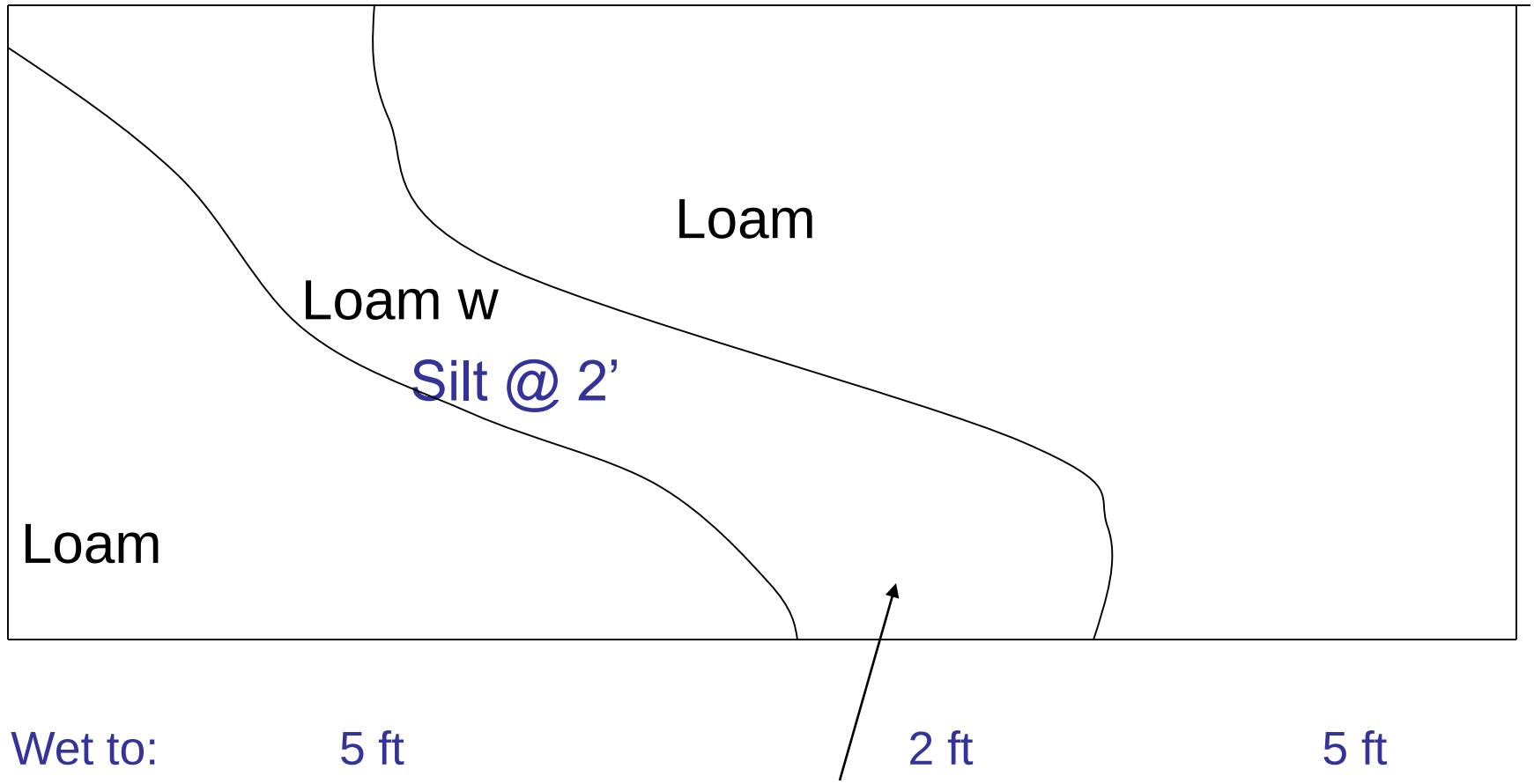
How Do You Control Leaching

Example: 24 hour set?



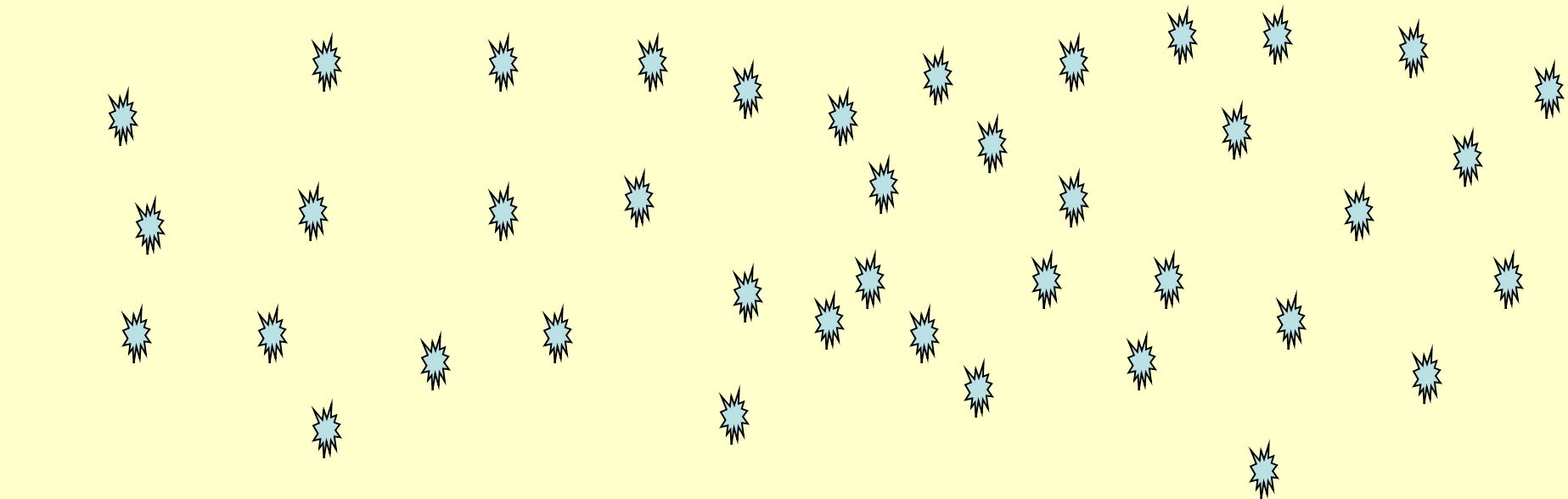
Layered Soil _ Example Block

Irrigate with an 18 hr set



How Do We Soil Test For Nitrogen Carryover?

Is there a uniform pattern?

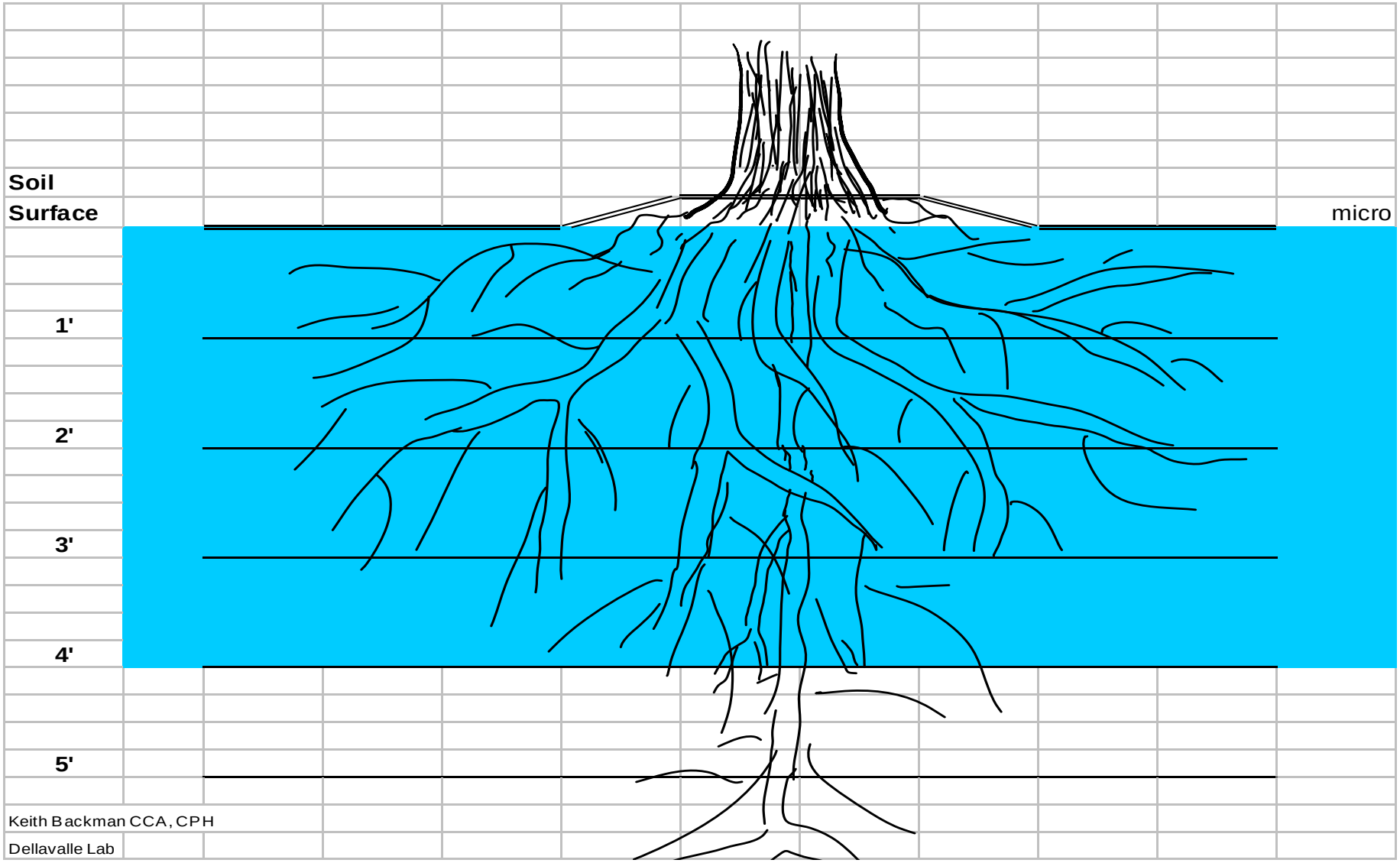


Nitrogen Tracking

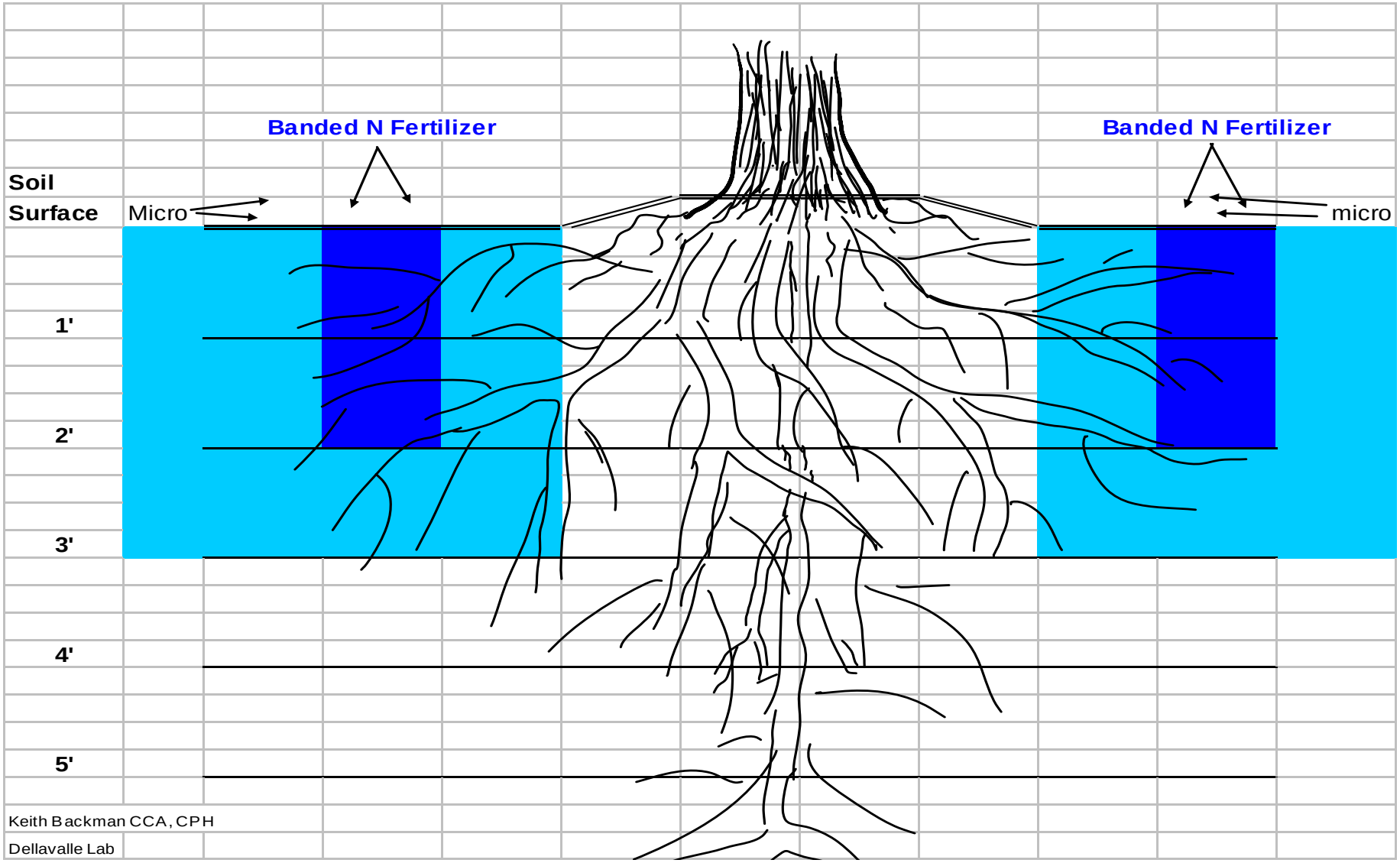
What's the Irrigation System?

- Flood
- Furrow
- Micro
  - Mini-sprinklers
  - Drip
  - Subsurface Drip
- Sprinkler

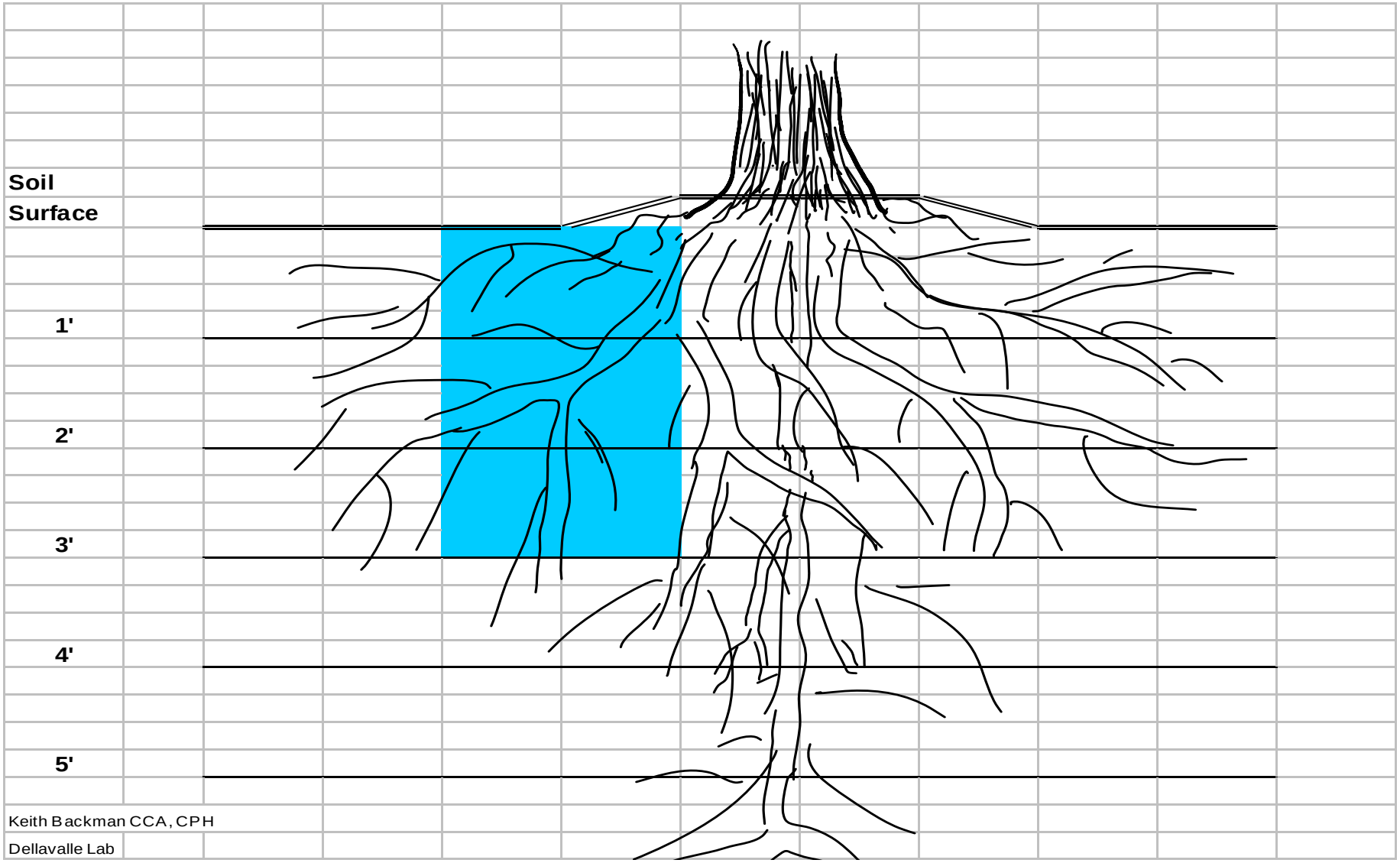
Irrigation – Flood



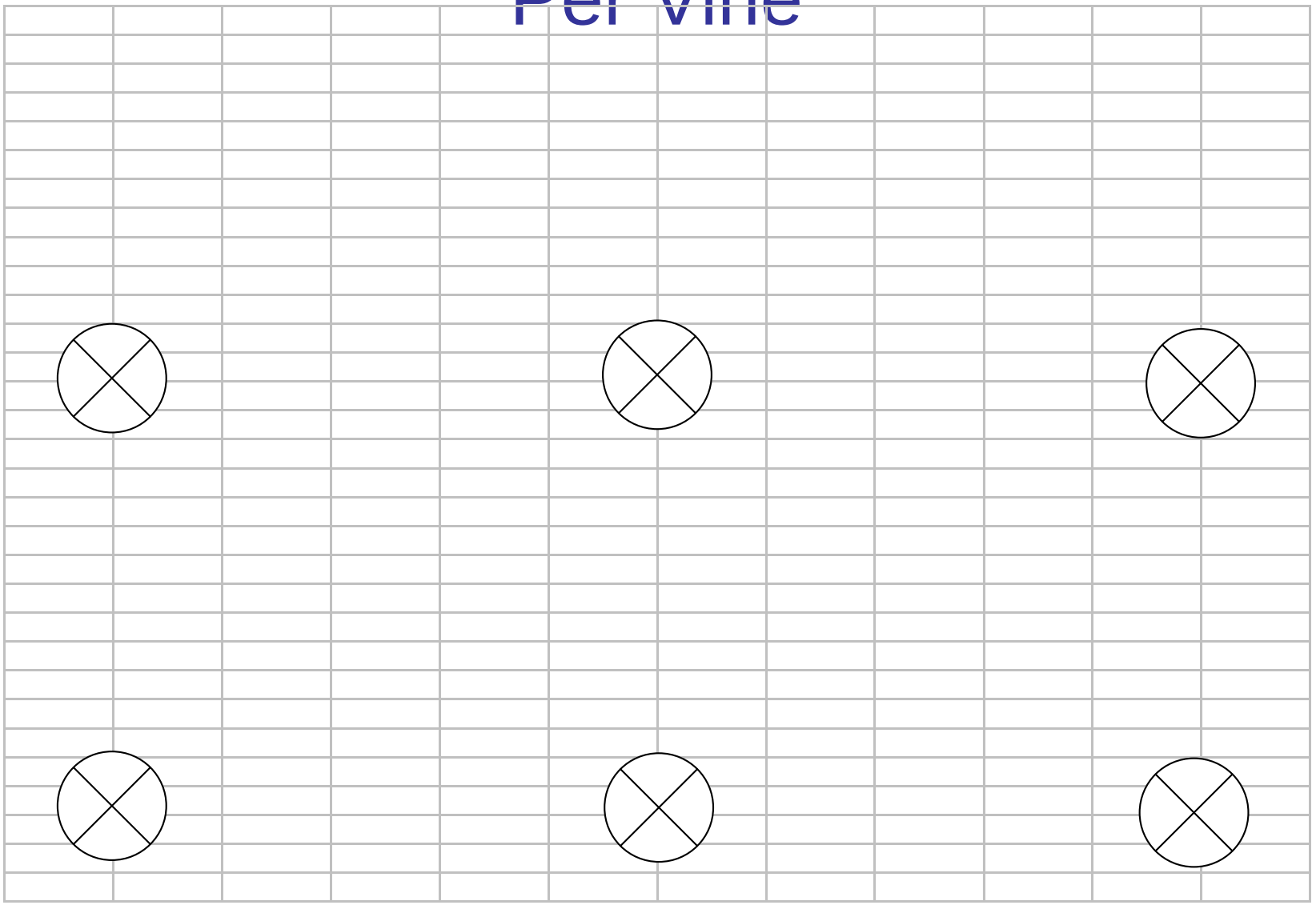
Irrigation – Micro Jet/Sprayer
Banded N Fertilizer



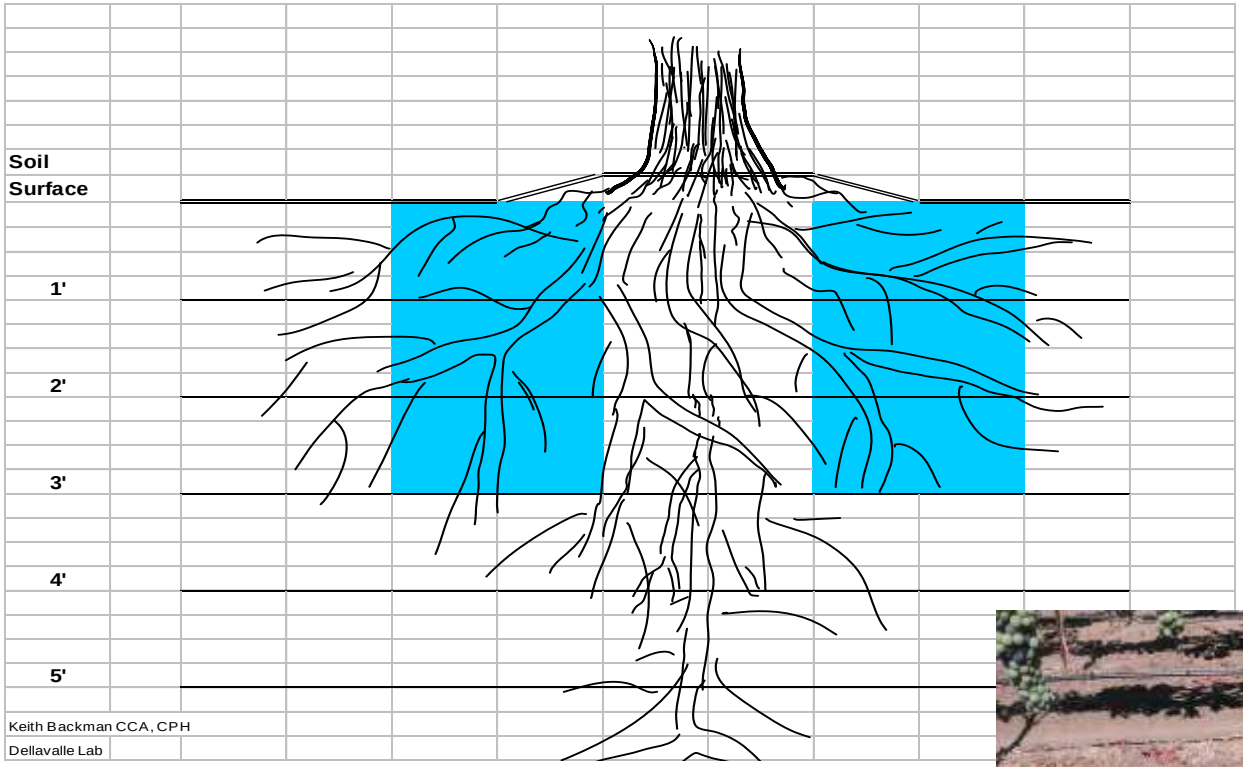
Irrigation – Single Dripper



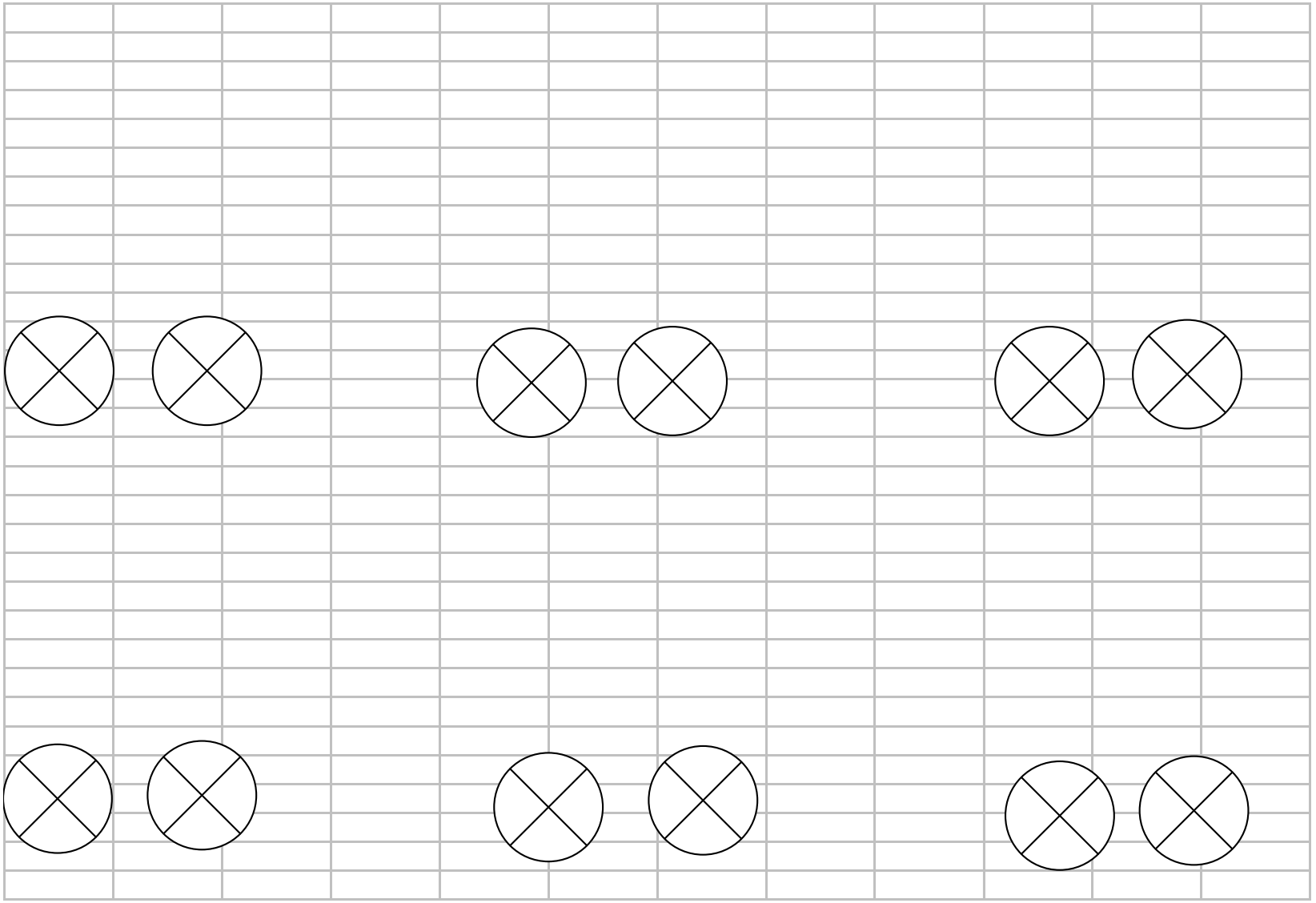
Irrigation – Single Dripper Per Vine



Irrigation – Double Dripper



Irrigation – 2 Drippers Per Vine



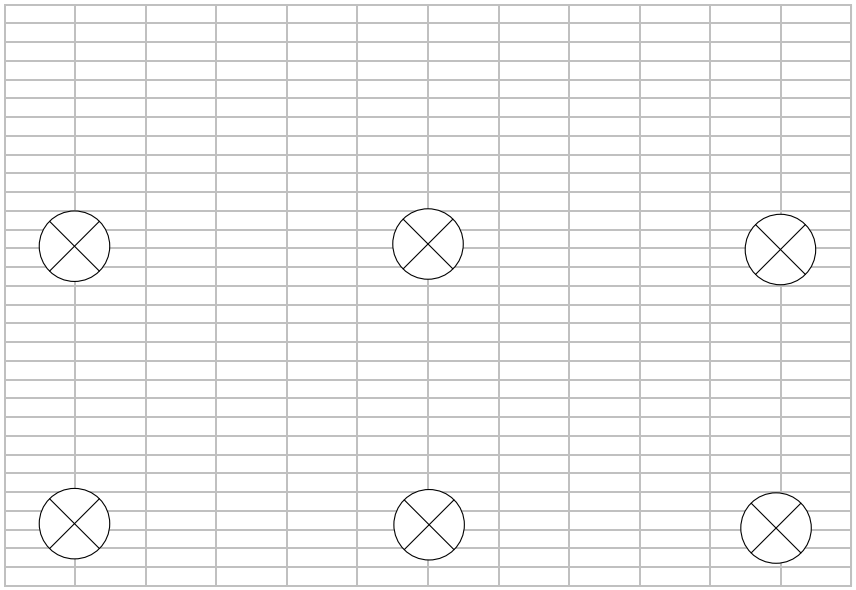
Nitrate Nitrogen In Soil NO_3-N
Deep Rooted Situation

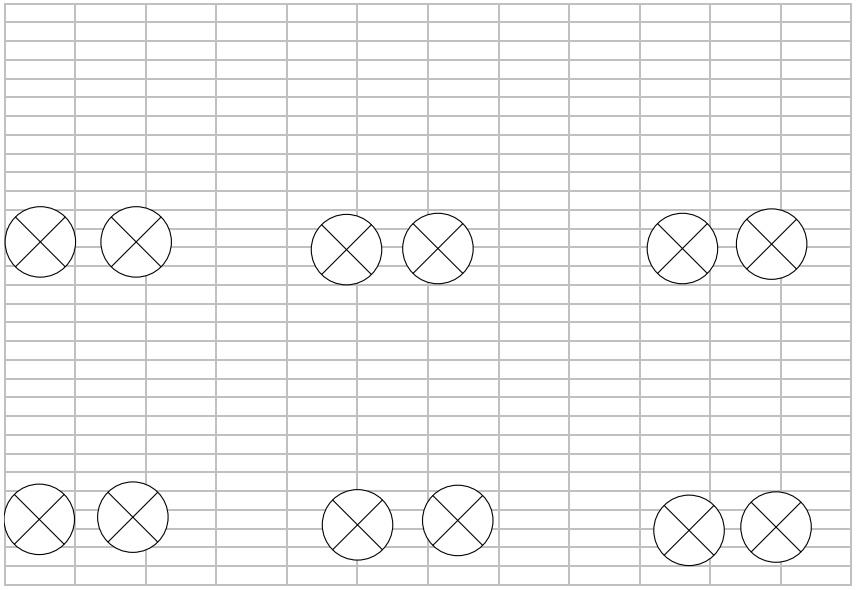
- Example
- 0-12” 15 mg/kg x 4 = 60
- 12-24” 8 mg/kg x 4 = 24
- 24-36” 5 mg/kg x 4 = 20

- sum = 104 #N in application
- Example
- 0-18” 12 mg/kg x 6 = 72
- 18-36” 6 mg/kg x 6 = 36
- sum = 108 #N in application area
- Example
- 0-36” 8 mg/kg x 12 = 96
- sum = 96 #N in application area

1 Dripper per Vine or 2 ?

This changes your soil test results





Plum Post Harvest Soil
Soil Nitrate-N composite

- Fld 40J 0-18” 0 #N/ac
- 18-36” 2

- Fld 52A 0-18” 12 #N/ac
- 18-36” 0

Plum Post Harvest Soil

Soil Nitrate-N composite - plums

- **Fld 40D (drip tree) 0-18” 9 #N/ac**
- **18-36” 2**

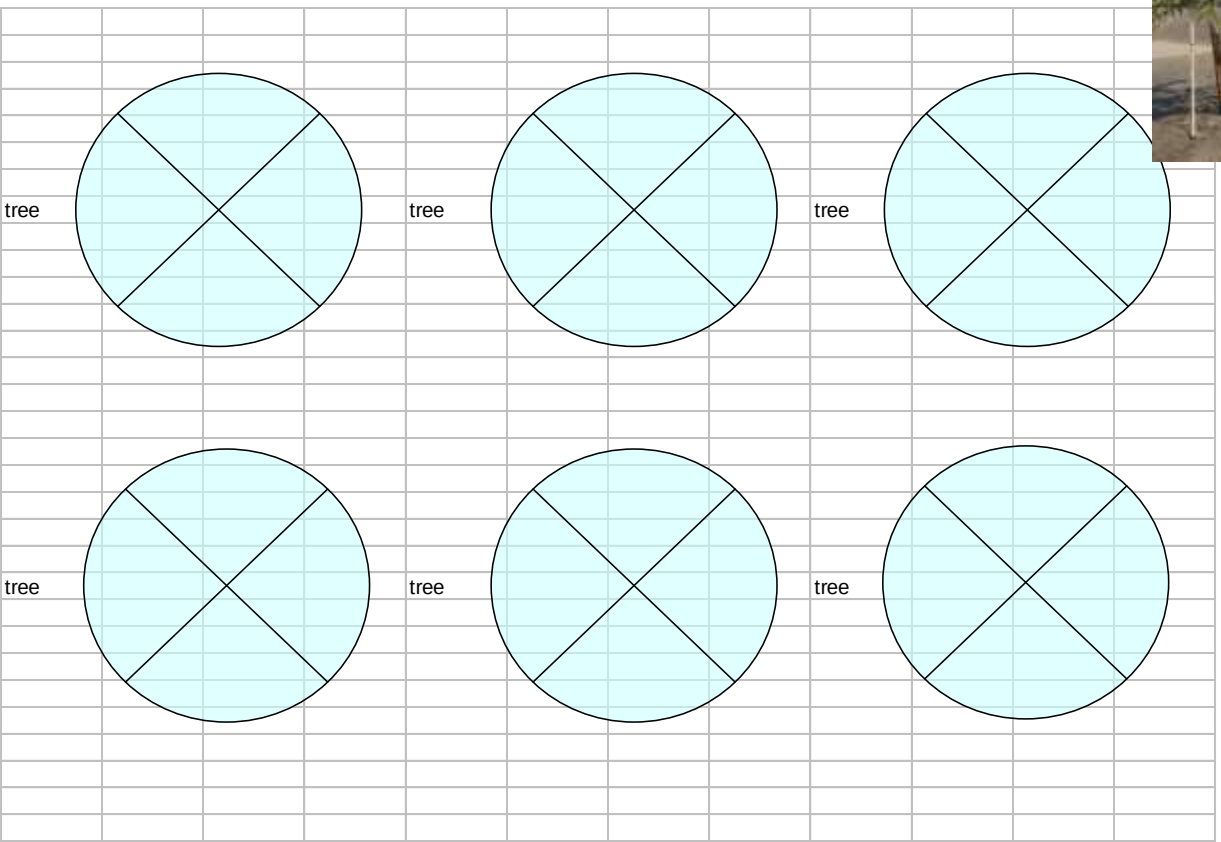
- **Fld 40H (flood recent graft tree) 0-18” 147 #N/ac**
- **18-36” 27**

Soil Nitrate-N Cores _ Corcoran Area

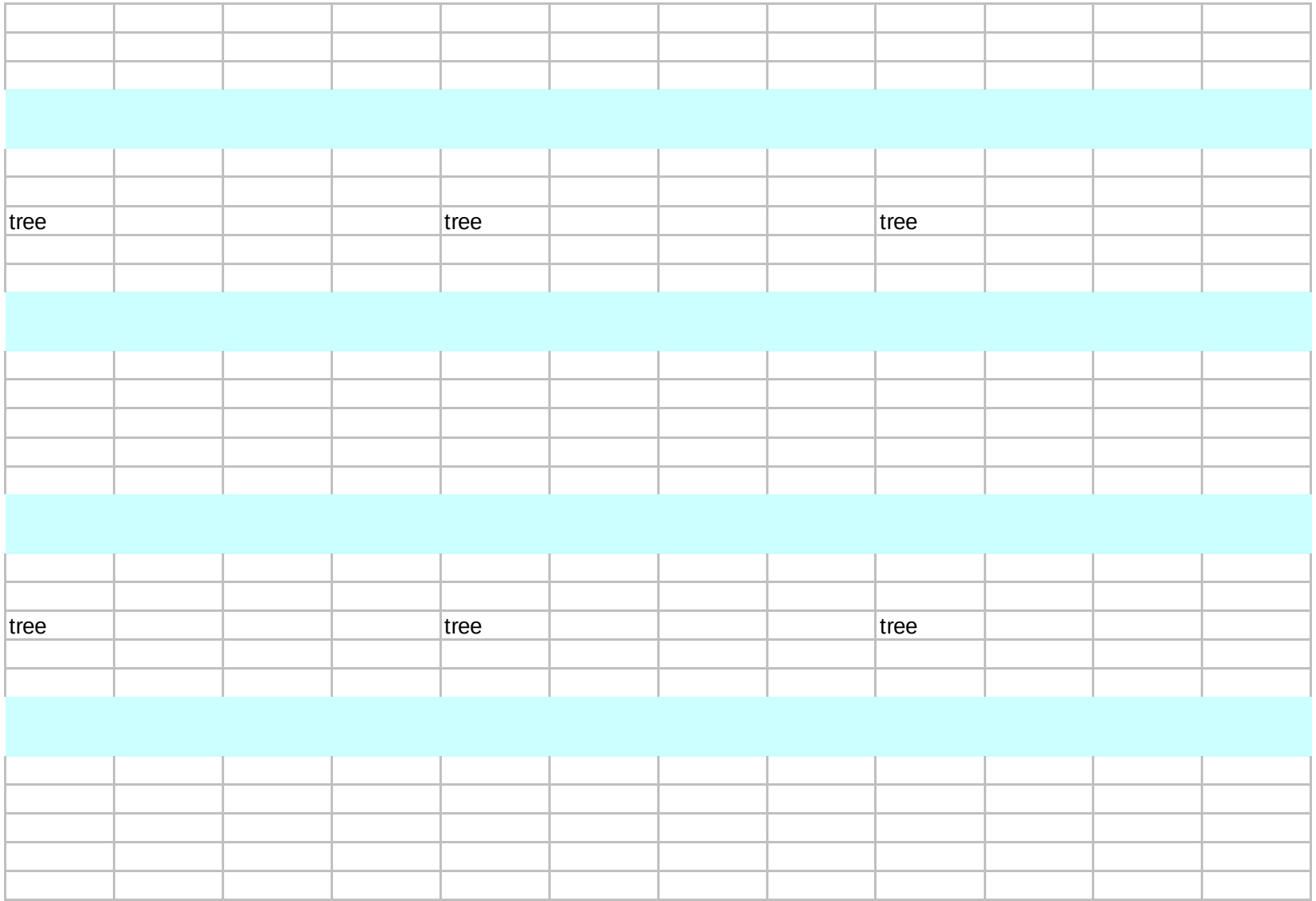
				NO3-N		lbs N	**3 foot**
				mg/kg		20% Appl Area	**Root Zone**
Blk 1	Pistachio	2011	1'	**172**		**69**	**93.6**
			2'	**59**		**24**	
			3'	**3**		1	
			4'	**41**		16	
			5'	6		2	
Blk 3	Pistachio	2011	1'	**172**		**69**	**188.8**
			2'	**181**		**72**	
			3'	**119**		**48**	
			4'	**134**		**54**	
			5'	**81**		32	
Blk 6	Pistachio	2001	1'	**2**		1	**20.8**
			2'	**47**		19	
			3'	**3**		1	
			4'	**2**		1	
			5'	**2**		1	
Blk 7	Pistachio	2001	1'	**4**		2	**33.2**
			2'	14		6	
			3'	**65**		**26**	
			4'	**94**		**38**	
			5'	**74**		**30**	

Irrigation – Continuous Dripper

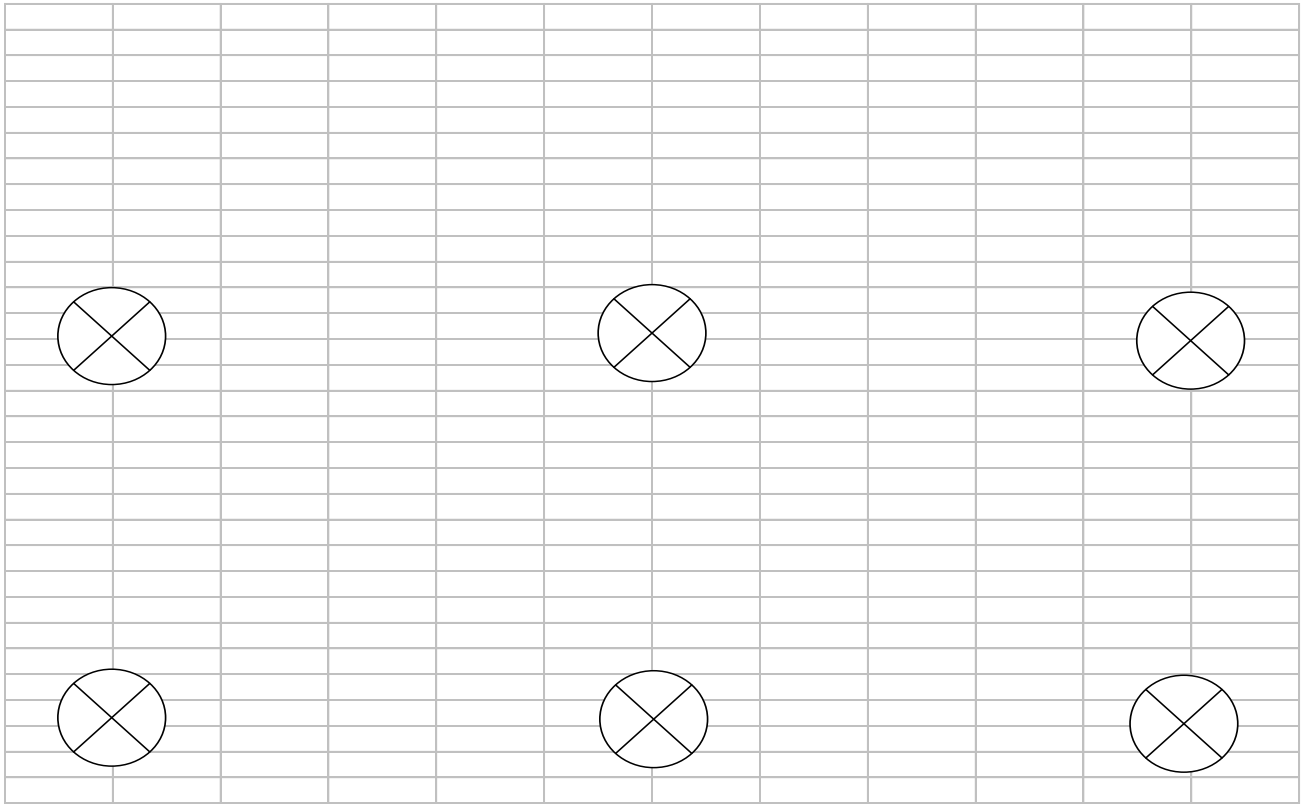
Irrigation – Single Micro-sprayer Per Tree



Furrow Irrigation



General Soil Analysis
“ Applied Area Problems”



General Soil Analysis
“ Applied Area Problems”

Be Observant For Surface Changes

Surface Acidification

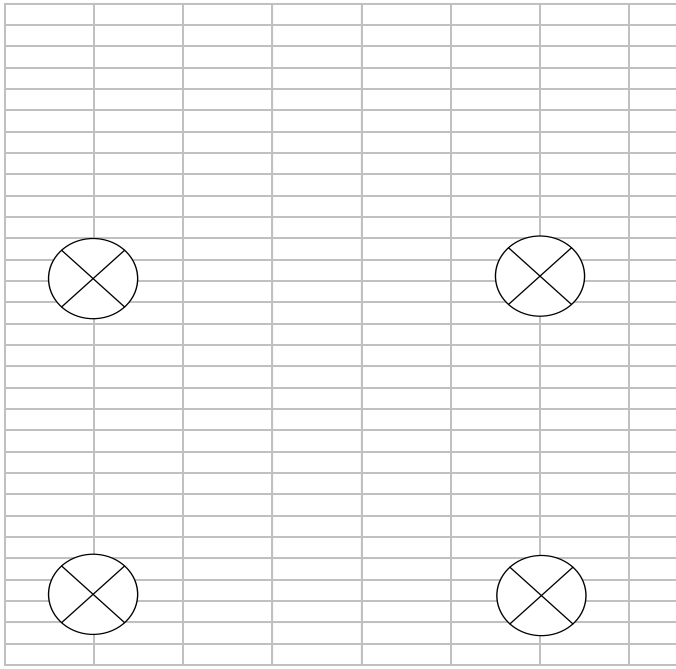
Low Total Salts

Low Calcium

Low/No Lime

High Calcium

High Salts



“ Applied Area Problems”
Soil pH Analysis

Be Observant For Surface Changes

Surface Acidification begins in the top inch and works it’s way down.

Symptoms start with water run off.

Especially no till.

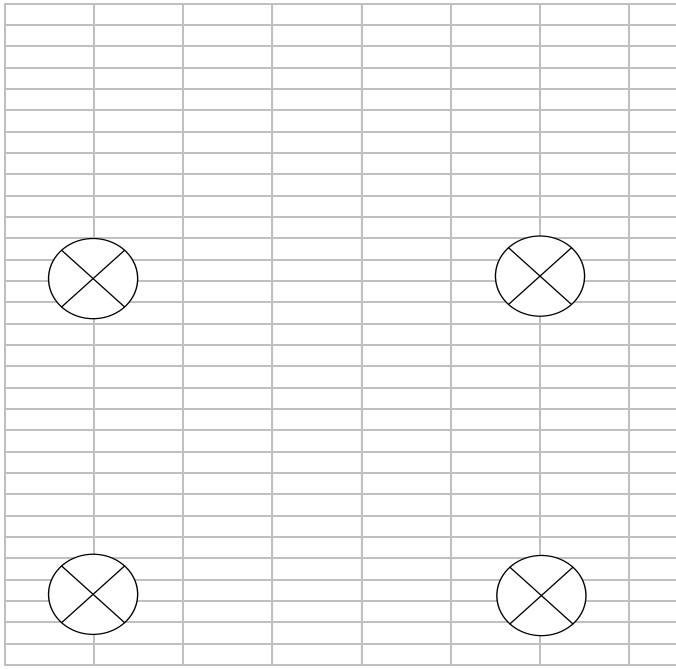
	Depth	pH		Depth	pH
	0-12"	6.8		0-3"	5.5
				3-6"	6.1
				6-9"	6.4
				9-12"	6.6
					6.7

General Soil Analysis
“ Applied Area Problems”

Be Observant For Surface Changes

How does this affect slow or non-moving nutrients?

Does a soil test work or is a tissue program advised?!



NITROGEN MANAGEMENT PLAN WORKSHEET

NMP Management Unit: _____

1. Crop Year (Harvested): _____

2. Member ID# _____

3. Name: _____

4. APN(s):	5. Field(s) ID	Acres
	Field 5	40

CROP NITROGEN MANAGEMENT PLANNING		N APPLICATIONS/CREDITS	15. Recommended/ Planned N	16. Actual N
6. Crop	Almonds	**17. Nitrogen Fertilizers**		
7. Production Unit	pounds	18. Dry/Liquid N (lbs/ac)	140	190
8. Projected Yield (Units/Acre)	3000	19. Foliar N (lbs/ac)	15	7
9. N Recommended (lbs/ac)	280	**20. Organic Material N**		
10. Acres	40	21. Available N in Manure/Compost (lbs/ac estimate)		
Post Production Actuals		**22. Total Available N Applied** (lbs per acre)	155	197
11. Actual Yield (Units/Acre)	3126	**23. Nitrogen Credits (est)**		
12. Total N Applied (lbs/ac)	294	24. Available N carryover in soil; (annualized lbs/acre)	75	44
13. ** N Removed (lbs N/ac)	287	25. N in Irrigation water (annualized, lbs/ac)	50	53
14. Notes:		**26. Total N Credits** (lbs per acre)	125	97
		27. Total N Applied & Available	280	294

PLAN CERTIFICATION		
28. CERTIFIED BY:	**29. CERTIFICATION METHOD**	
	30. Low Vulnerability Area, No Certification Needed	
	31. Self-Certified, approved training program attended	
DATE:	32. Self-Certified, UC or NRCS site recommendation	
	33. Nitrogen Management Plan Specialist	

**Your Coalition will provide the method to be used to estimate N Removed. Approved by the Central Valley Water Board 23 December 2014.

Instruction numbering in this document differs slightly from the NMP template approved by the Water Board to accommodate this publication design.

Irrigation Management
Needs to Consider:

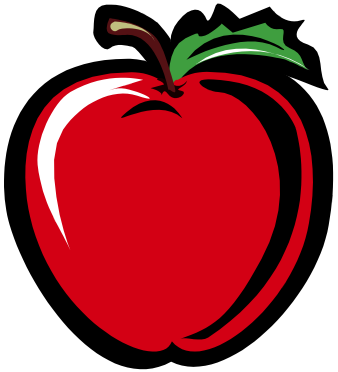
- Plant Need

  Root Depth
- Soil Type
- Duration
- Frequency
- Delivery Rate

To Fine Tune Your Crop:

- Find an experienced consultant to get started
- Know your N carryover N and water N
- Take tissue samples at specific points in the season to manage and evaluate growth
- Keep records regarding what you have done and what you have achieved

Advantages of an Accurate Program



- Crop Quality
- Crop Size
- Environmental Management
- A Proactive Program Prevents Deficiencies
- You Control Plant Growth
- Keep the Farmer's Profitably where it needs to be!

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