E. coli and Onions

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Proposed rule defines "agricultural water"

"Any applied water that comes into contact with the produce surface"

Prior to harvest, agricultural water would need to be tested regularly

Agricultural water would need to have fewer than 235 units of *E. coli*/100 ml to be applied**

Producers would *not* be allowed to use agricultural water that does not meet the standard for fresh produce


What is the problem?

Agricultural Water Quality in the Treasure Valley

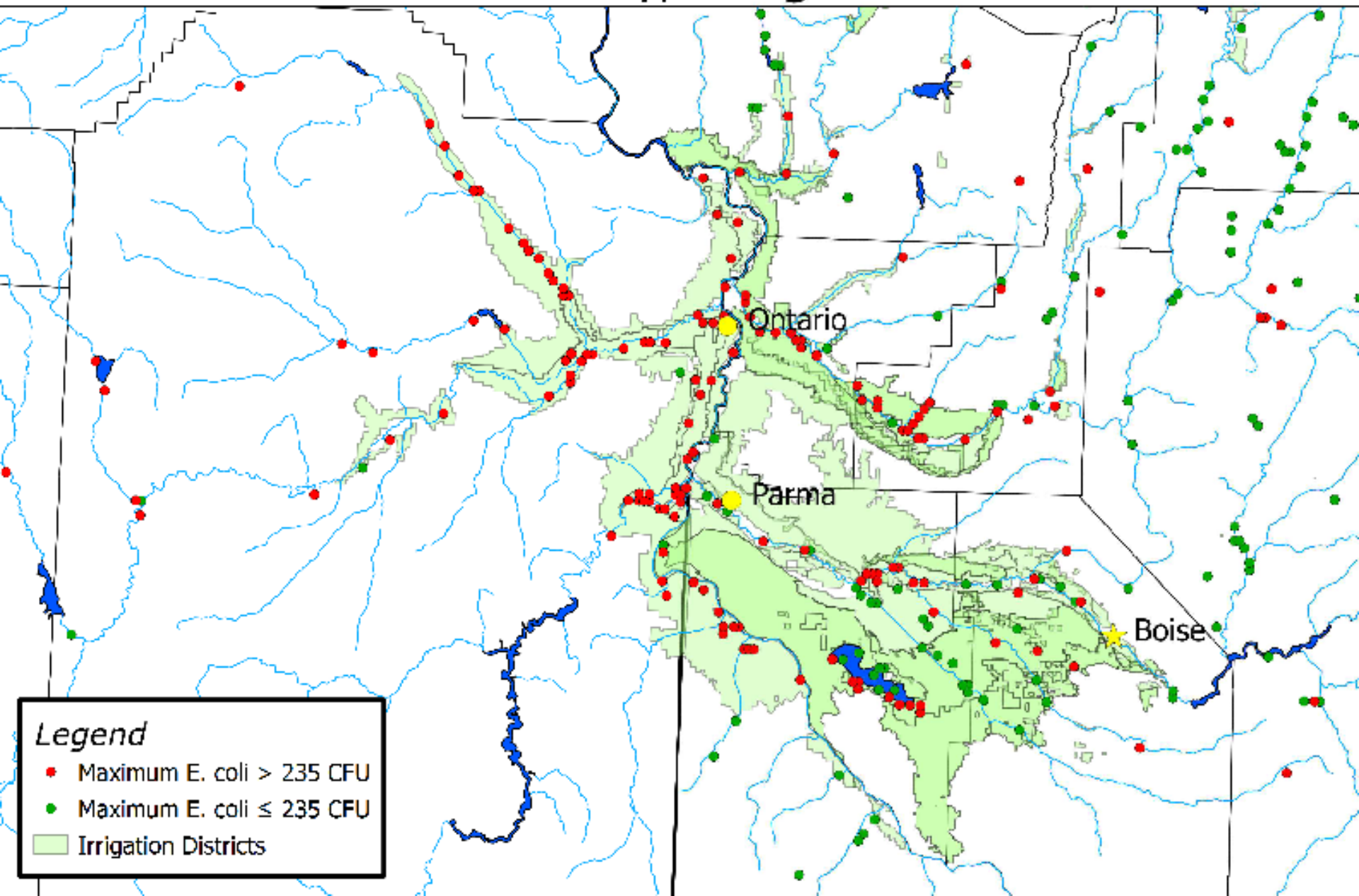
Treasure Valley irrigation systems mix clean water with runoff water.

E.g., runoff water in the Owyhee River basin is typically around 570 CFU /100 ml.

E.g., runoff water in the Malheur River basin is typically around 1,000 CFU /100 ml.

Some water exceeds 10,000 CFU /100 ml.

Historical Surface Water Quality: Treasure Valley, Oregon - Idaho

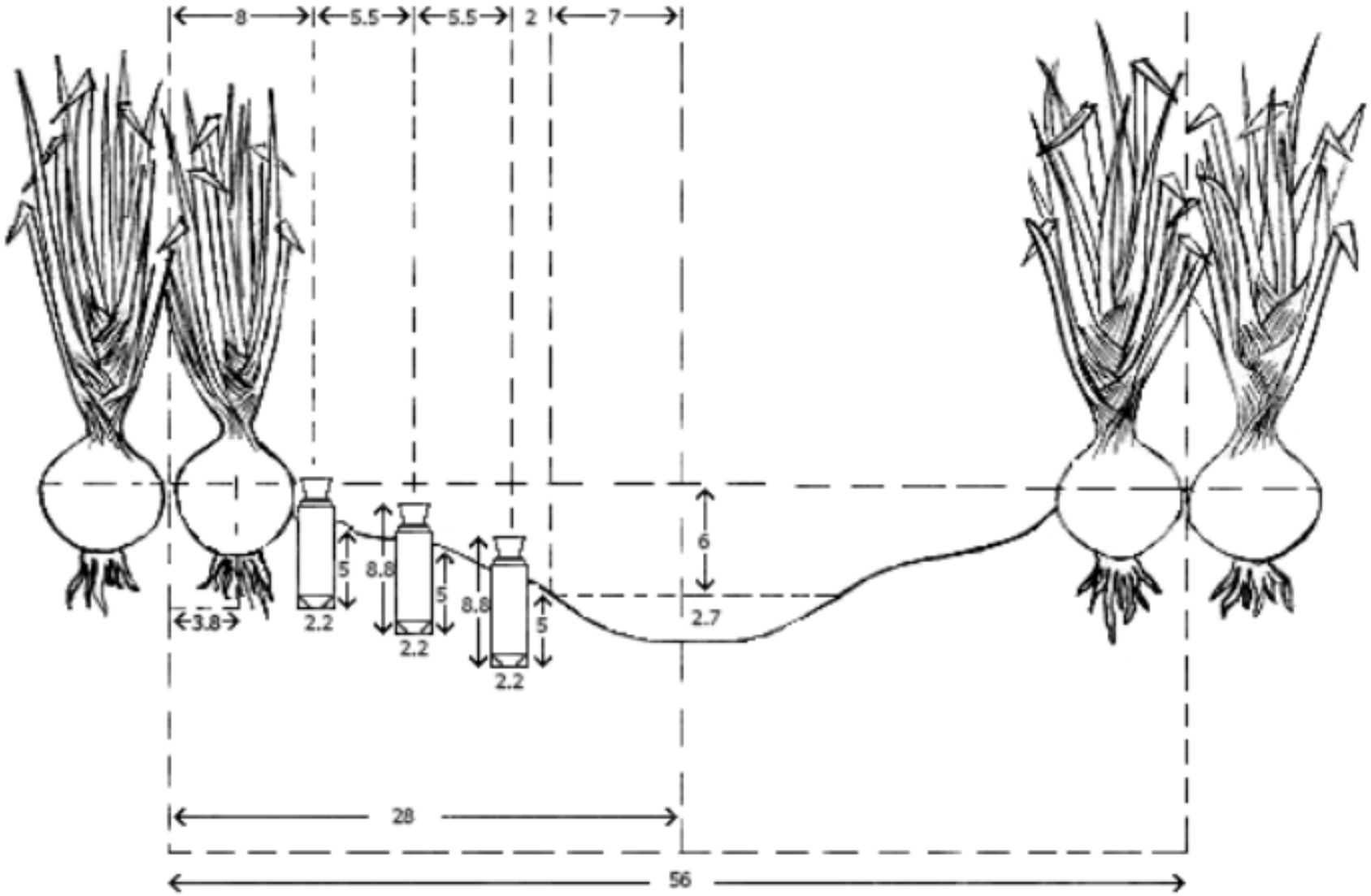


Irrigation systems and water sources?

Stop irrigation with 235 CFU of E. coli /100 ml of water

Treatments

- **Furrow Irrigation, 0 CFU/100 ml**
- **Furrow Irrigation, 500-2,500 CFU/100ml**
- **Drip Irrigation, 0 CFU/100 ml**
- **Drip Irrigation, 500-2,500 CFU/100ml**


8
5.5
5.5
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7
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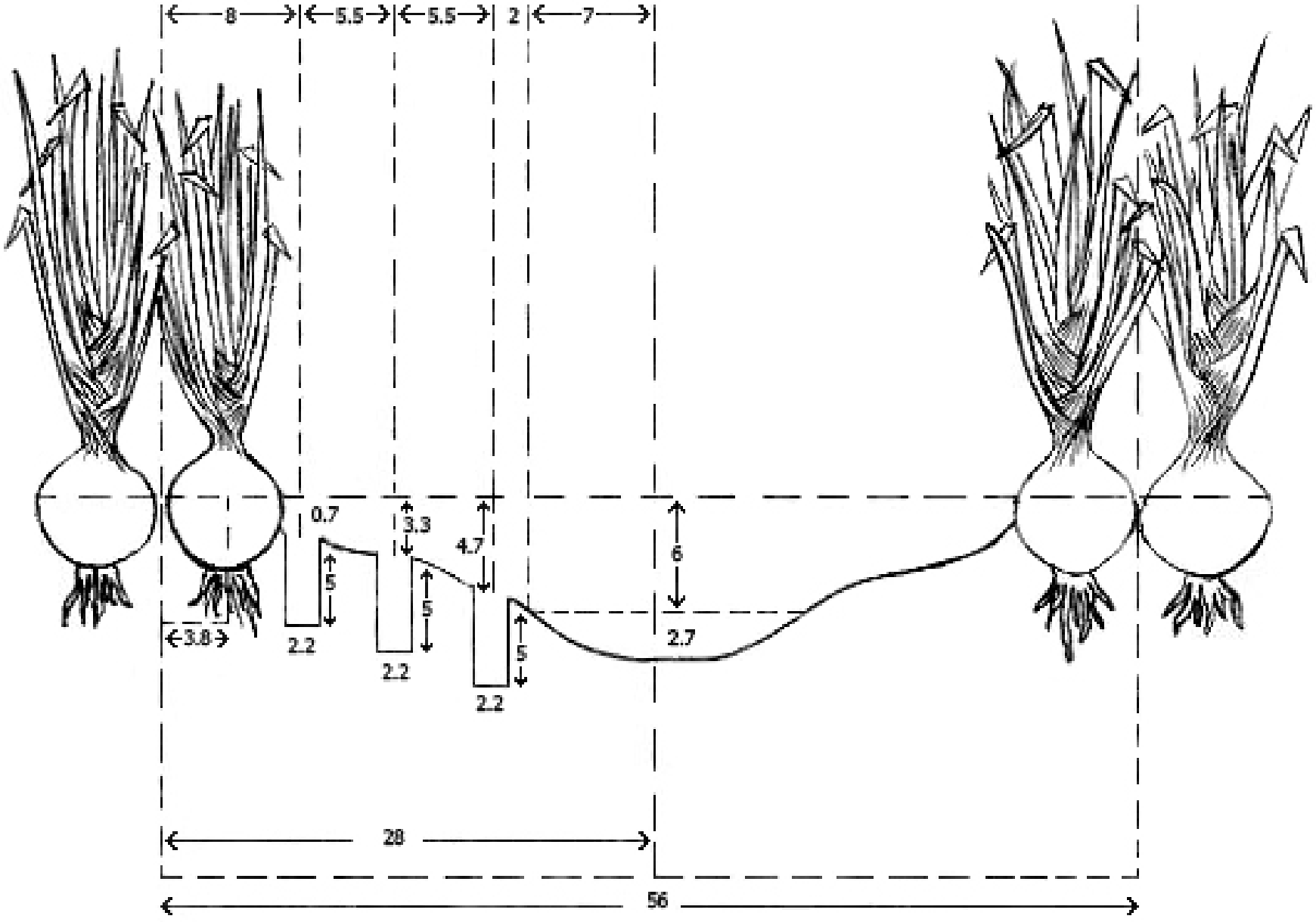
5
6
2.7
28
56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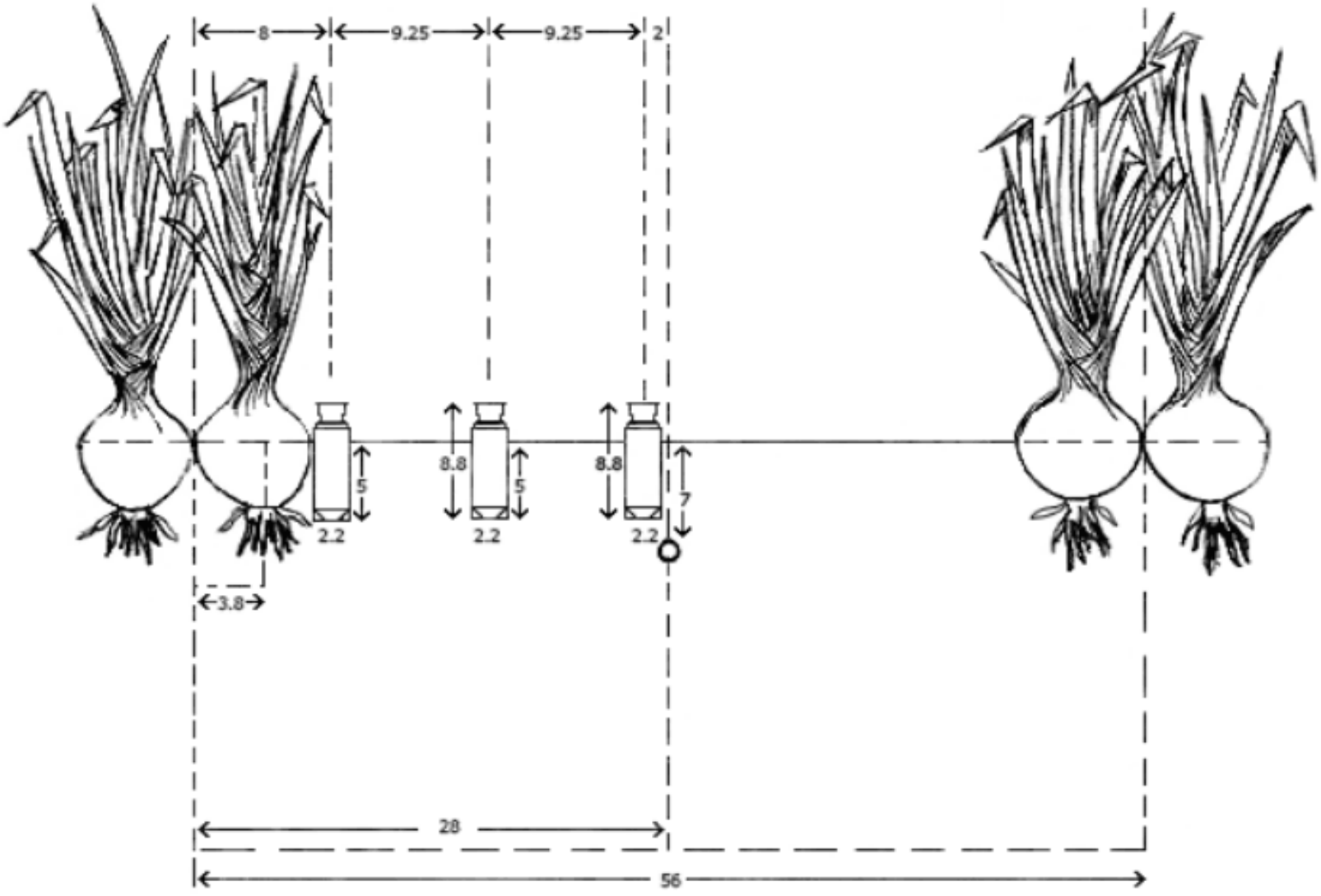
2.2
2.7
28
56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2
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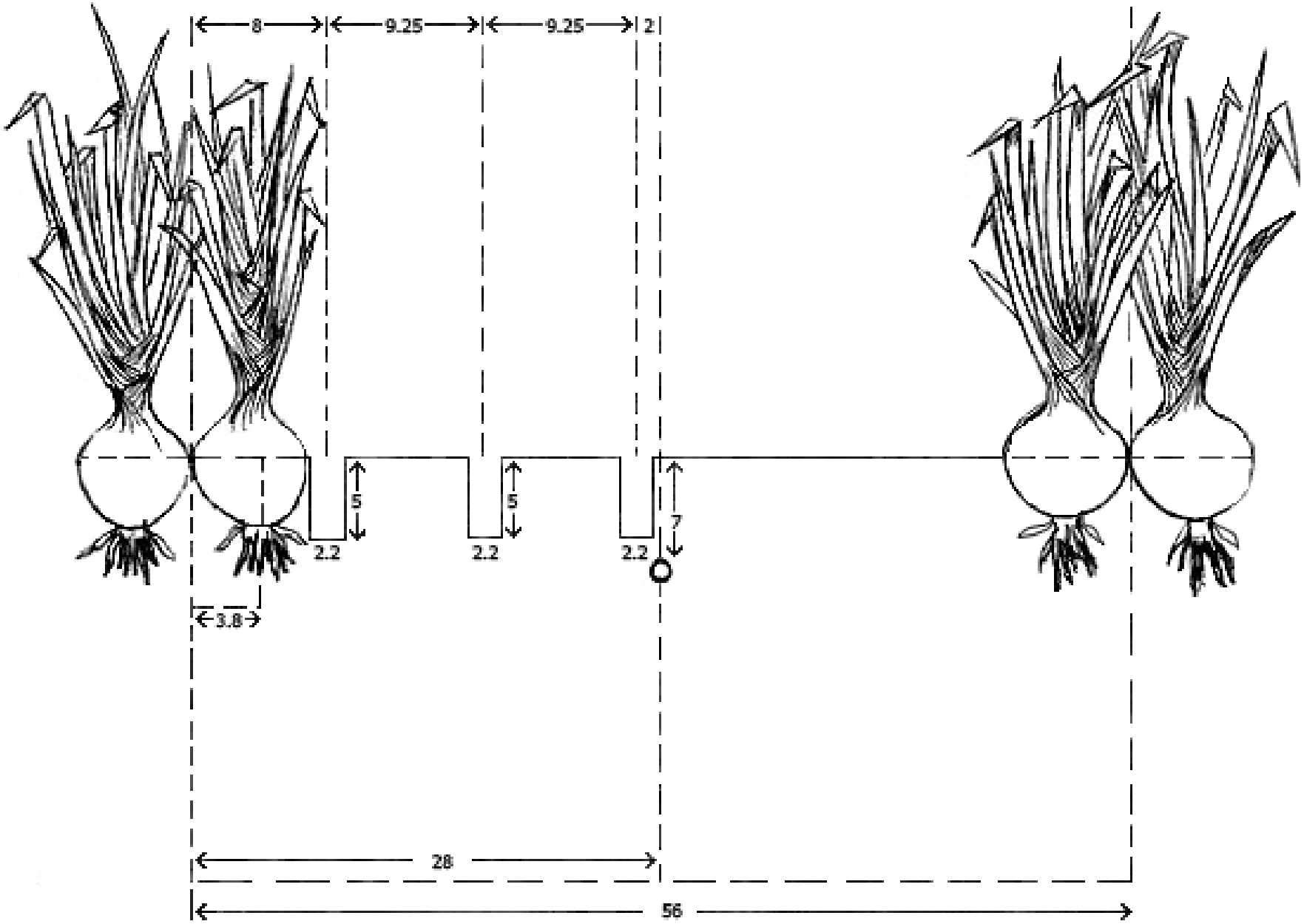
28
56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28
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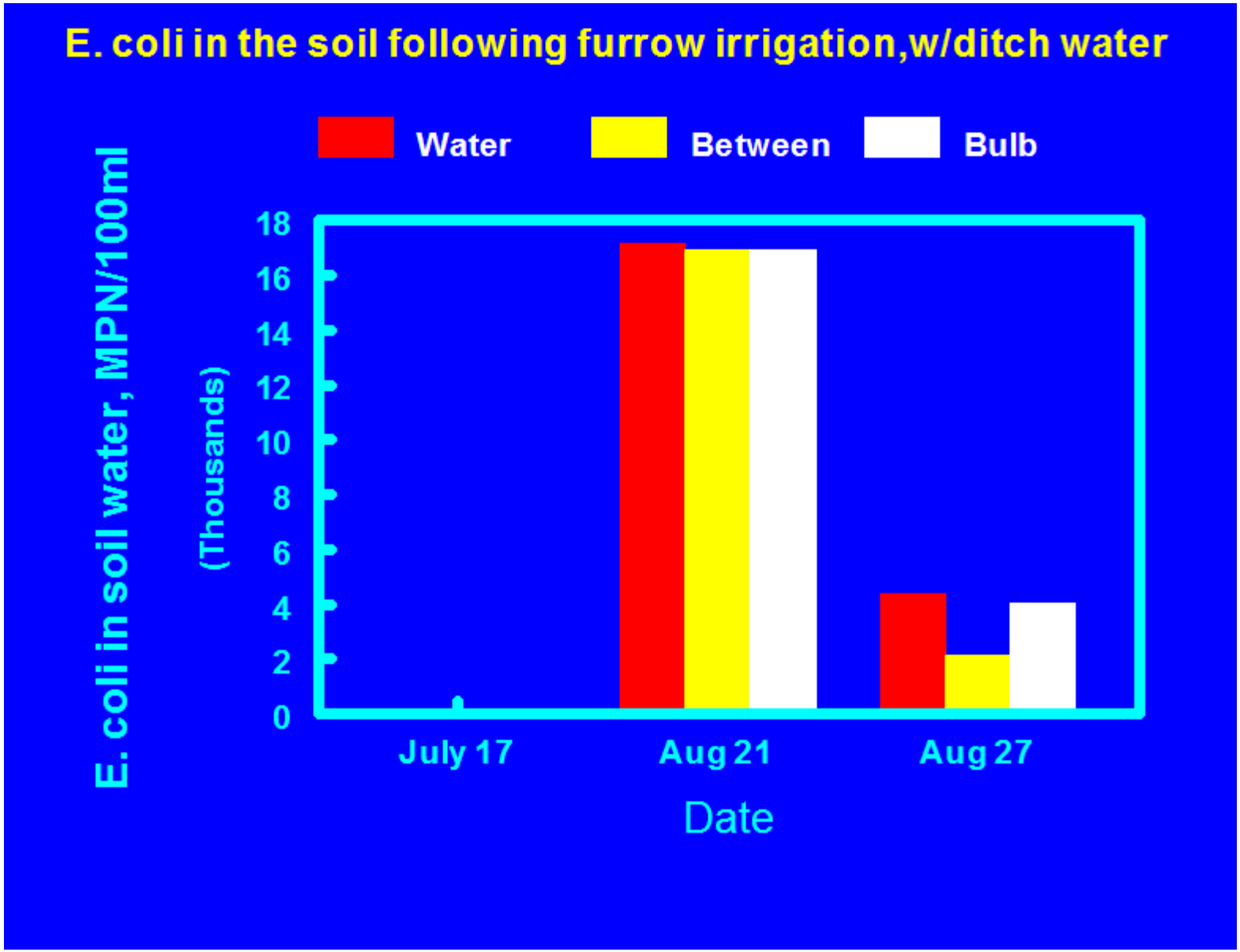
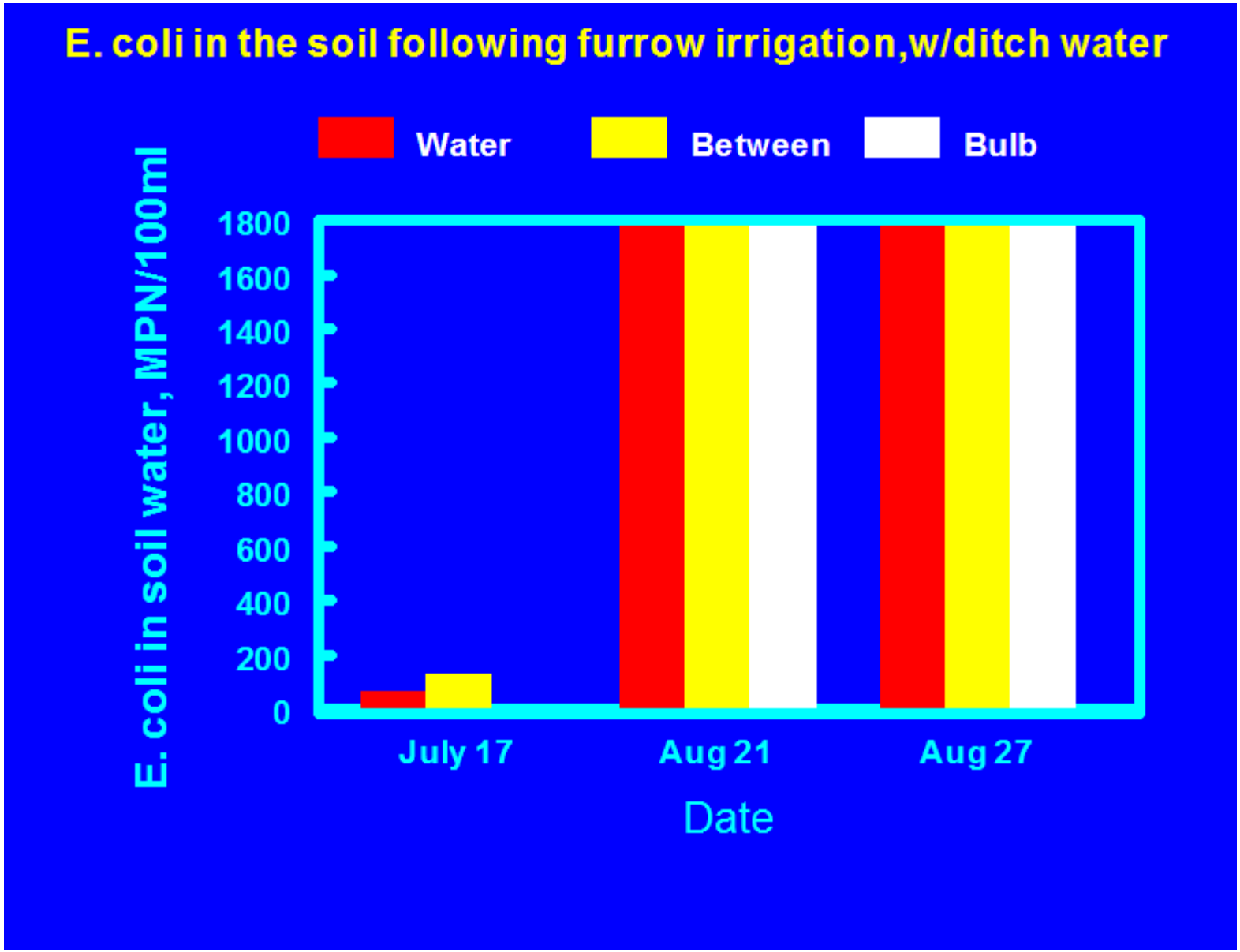
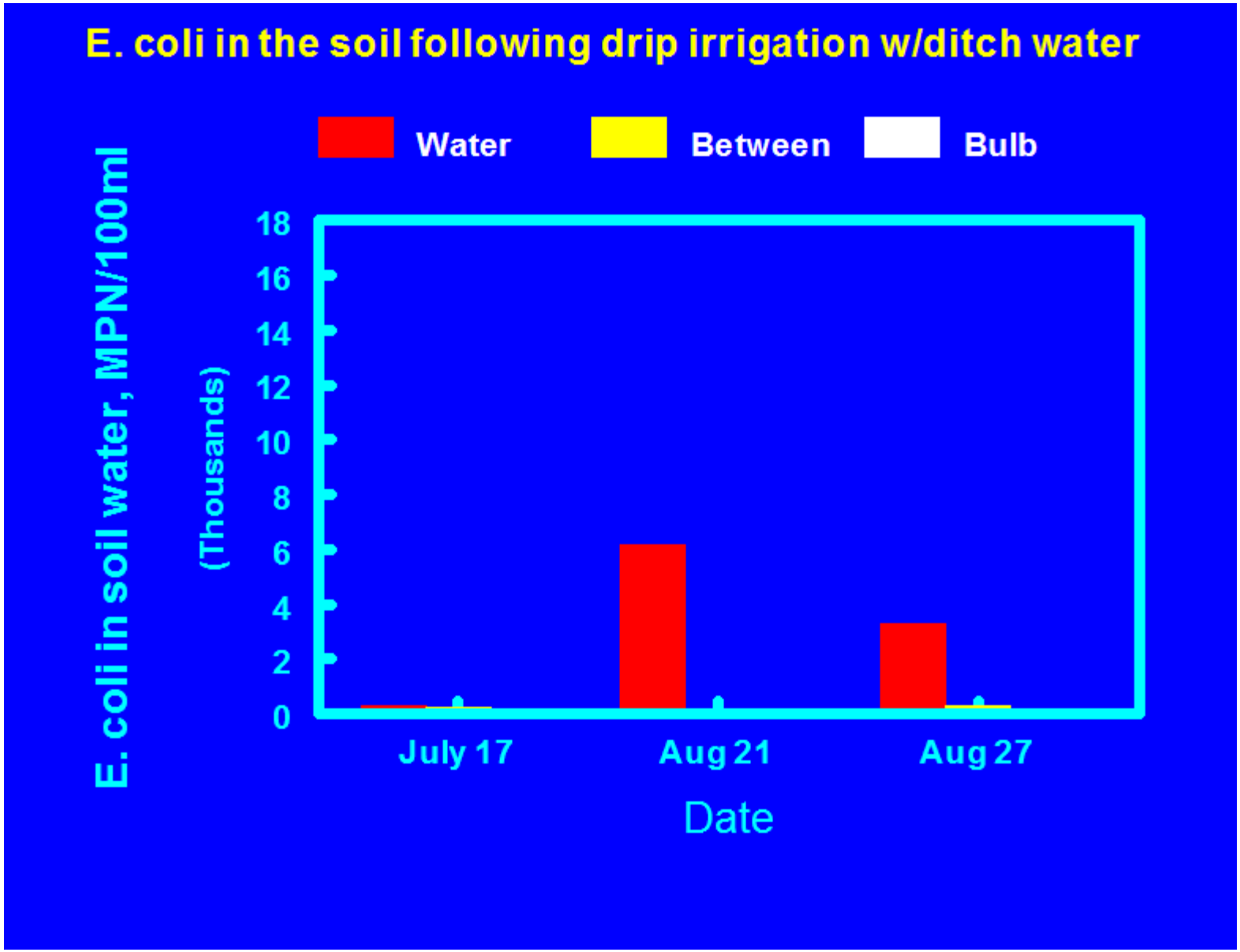
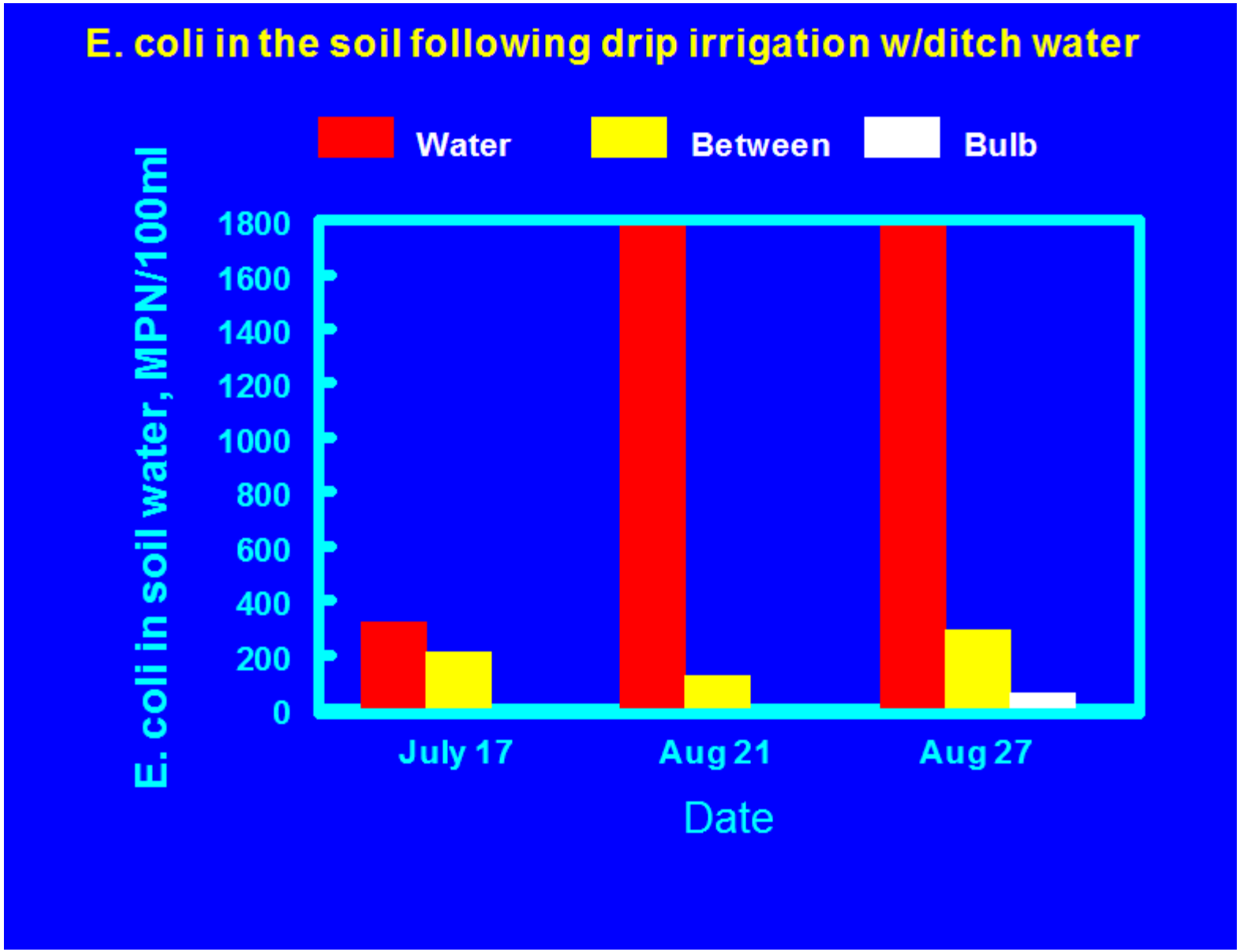

E. coli in the soil following furrow irrigation,w/ditch water
Water
Between
Bulb
E. coli in soil water, MPN/100ml
(Thousands)
18
16
14
12
10
8
6
4
2
0
July 17
Aug 21
Aug 27
Date


E. coli in the soil following furrow irrigation,w/ditch water
Water
Between
Bulb
E. coli in soil water, MPN/100ml
1800
1600
1400
1200
1000
800
600
400
200
0
July 17
Aug 21
Aug 27
Date


E. coli in the soil following drip irrigation w/ditch water
Water
Between
Bulb
E. coli in soil water, MPN/100ml
(Thousands)
18
16
14
12
10
8
6
4
2
0
July 17
Aug 21
Aug 27
Date


E. coli in the soil following drip irrigation w/ditch water
Water
Between
Bulb
E. coli in soil water, MPN/100ml
1800
1600
1400
1200
1000
800
600
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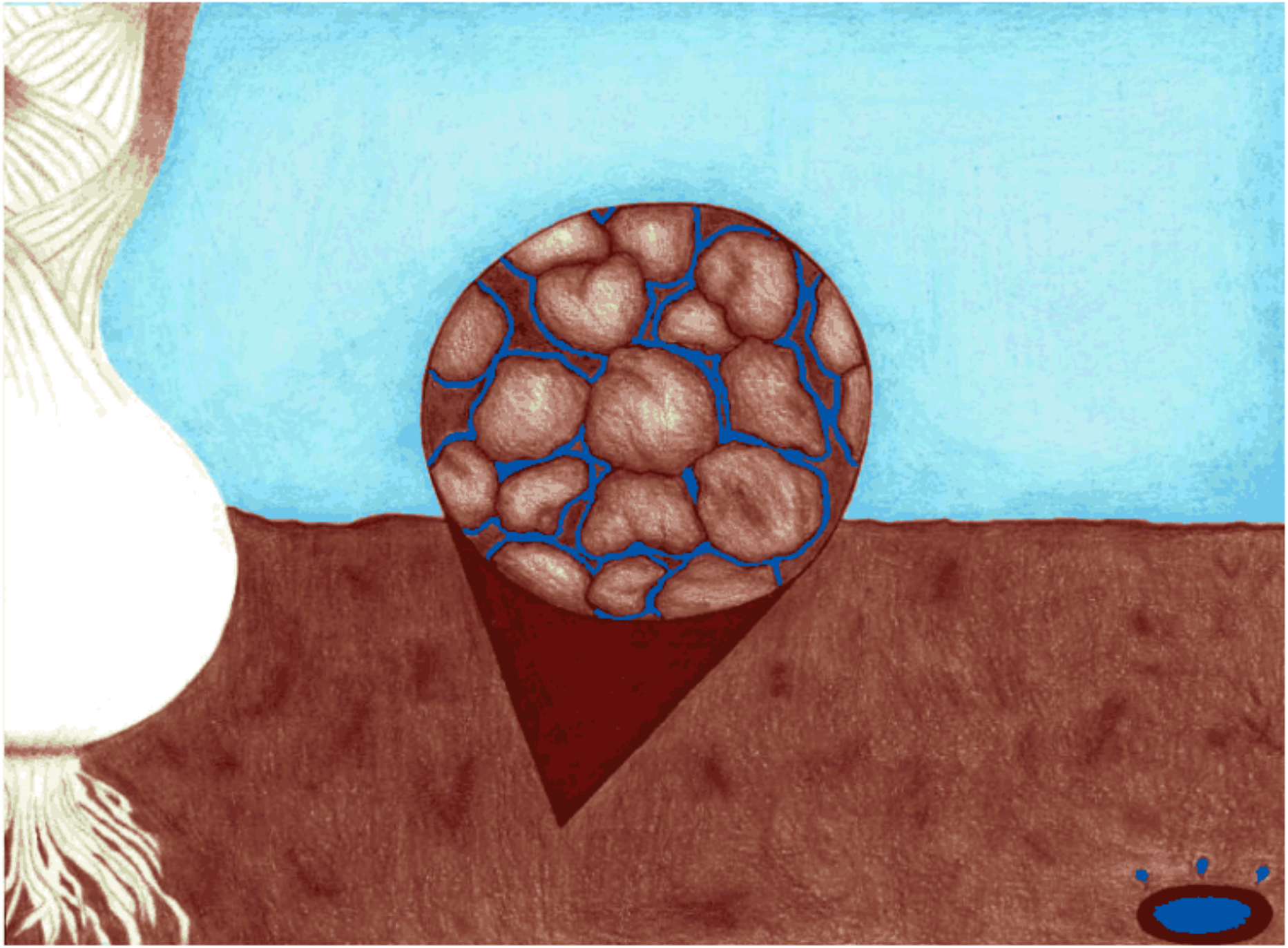
200
0
July 17
Aug 21
Aug 27
Date

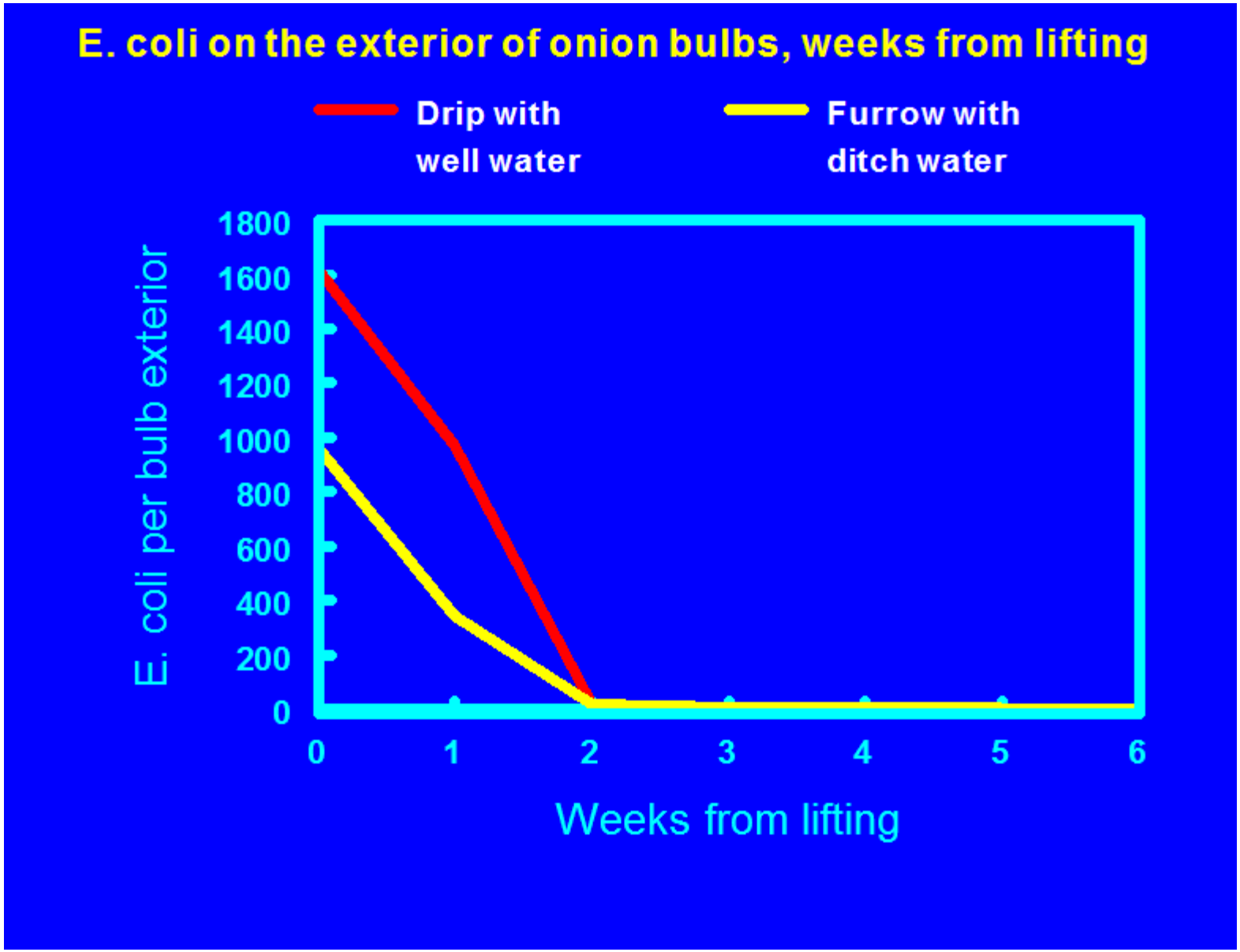


E. coli survival in and on onions?

E. coli on and inside of onion bulbs, Ontario, OR 2013.

Days from lifting	Treatment		Average *E. coli* next to the onion bulb (Aug. 27) MPN/100ml of soil water	Average weight of skins, peel, roots, and soil (g/bulb)	Average external *E. coli* per onion	*E. coli* inside the bulb
	Irrigation System	Water Source				
0	Drip	Well	0 (0)*	15	1,615 (3,570)*	0
	Furrow	Ditch	4,033 (4,165)	18	956 (1,397)	0
7	Drip	Well		23†	972 (2,166)	N/A
	Furrow	Ditch		26†	343 (353)	N/A
14	Drip	Well		12	18 (28)	N/A
	Furrow	Ditch		13	15 (17)	N/A
21	Drip	Well		1	0 (0)	N/A
	Furrow	Ditch		16	5.3 (5.6)	N/A
28	Drip	Well		14	0 (0)	0
	Furrow	Ditch		15	6.7 (6.7)	0

Days from lifting	Treatment		Average *E. coli* next to the onion bulb on October 1 (MPN/100ml of soil water)	Average weight of skins, peel, roots, and soil on October 15 (g/bulb)	Average MPN external *E. coli* per onion on October 15
	Irrigation System	Water Source			
41	Drip	Well	0	6.2	0 (0)*
	Furrow	Ditch	611	7.6	0 (0)


E. coli on the exterior of onion bulbs, weeks from lifting
Drip with well water
Furrow with ditch water
E. coli per bulb exterior
1800
1600
1400
1200
1000
800
600
400
200
0
0
1
2
3
4
5
6
Weeks from lifting


Storage in plastic totes or wooden bins?

E. coli on onion bulbs after storage, Ontario, OR 2013.

Storage containers	Average weight of skins, peel, roots, and soil on 15 October 2013 (g/bulb)	Average MPN external E. coli per onion on 15 October 2013
Sterilized new plastic crates	5.9	0
	5.8	0
	6.8	0
	8.4	0
	5.9	0
	7.5	0
	10.9	0
	7.3	0
	5.6	0
	7.9	0
	4.6	0
Old wooden boxes	6.5	0
	6.5	0
	7.6	0
	5.2	0
	4.0	0
	6.9	0
	6.8	0
	6.6	0
	5.7	0
	5.1	0
	7.6	0
	4.9	0
	6.5	0

MALHEUR EXPERIMENT STATION
SPECIAL REPORT 2013, Ext/CrS 148

http://www.cropinfo.net/crops/PrelininaryStudiesOnEcoliAndOnion_ExtCrS148_31Oct2013.pdf

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