GEL BAGS

ARE THEY A GOOD OPTION FOR USE ON DRY PLANTING SITES?

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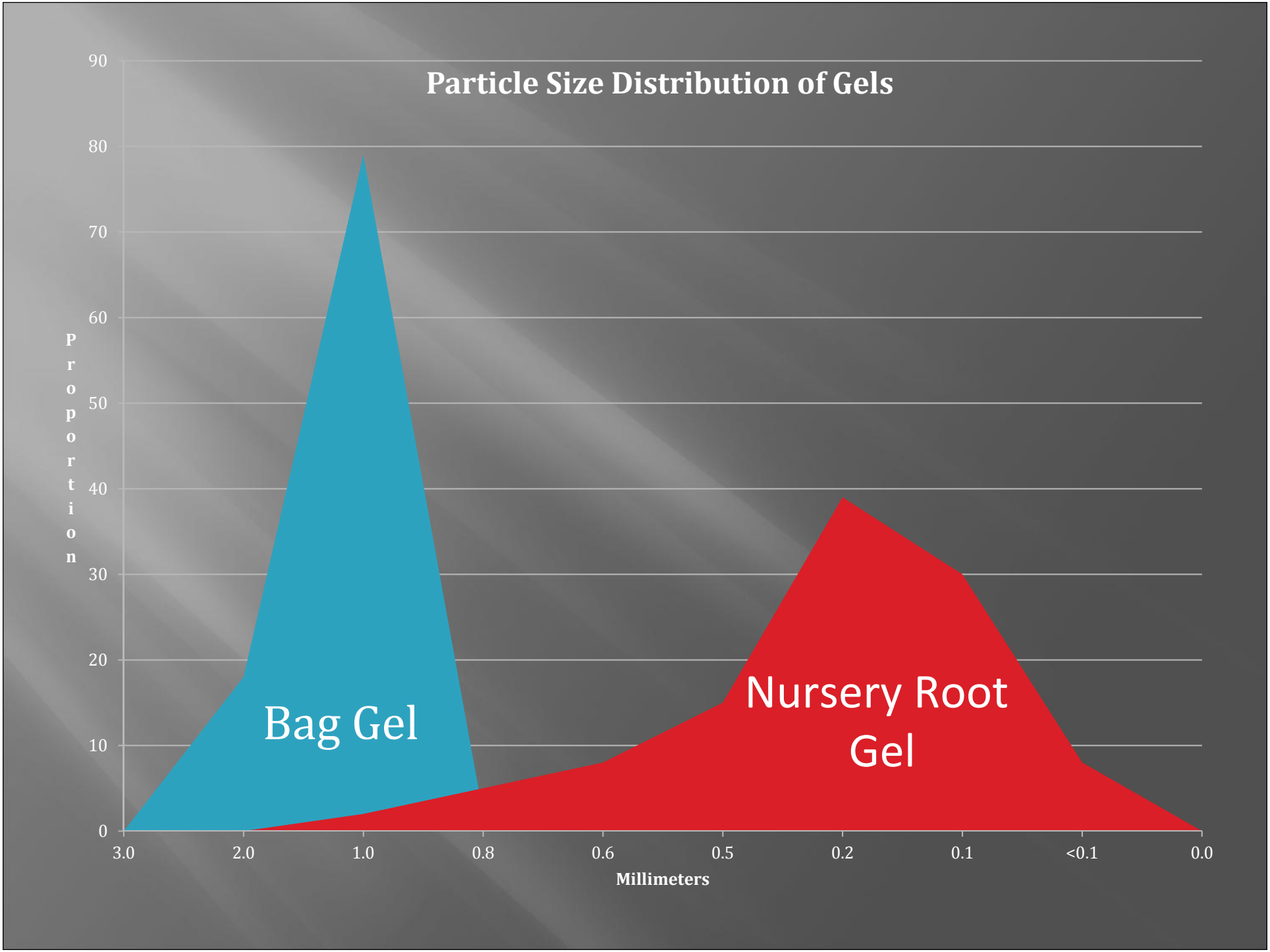
6.7 g Gel/bag
1
2
3
4
INCHES


Particle Size Distribution of Gels
90
80
70
60
50
40
30
20
10
0
Proportion
Bag Gel
Nursery Root Gel
3.0
2.0
1.0
0.8
0.6
0.5
0.2
0.1
<0.1
0.0
Millimeters

Study #1

- 12 boxes (replications) with trt randomized in boxes.
- Each box = 20 trees without gel bag, 20 trees with whole bag of gel placed in planting hole.
- Each box watered to saturation for first 2 days, then no additional water for next 38 days.


After 40 days
No Bag –
3% dead
Bag –
32% dead

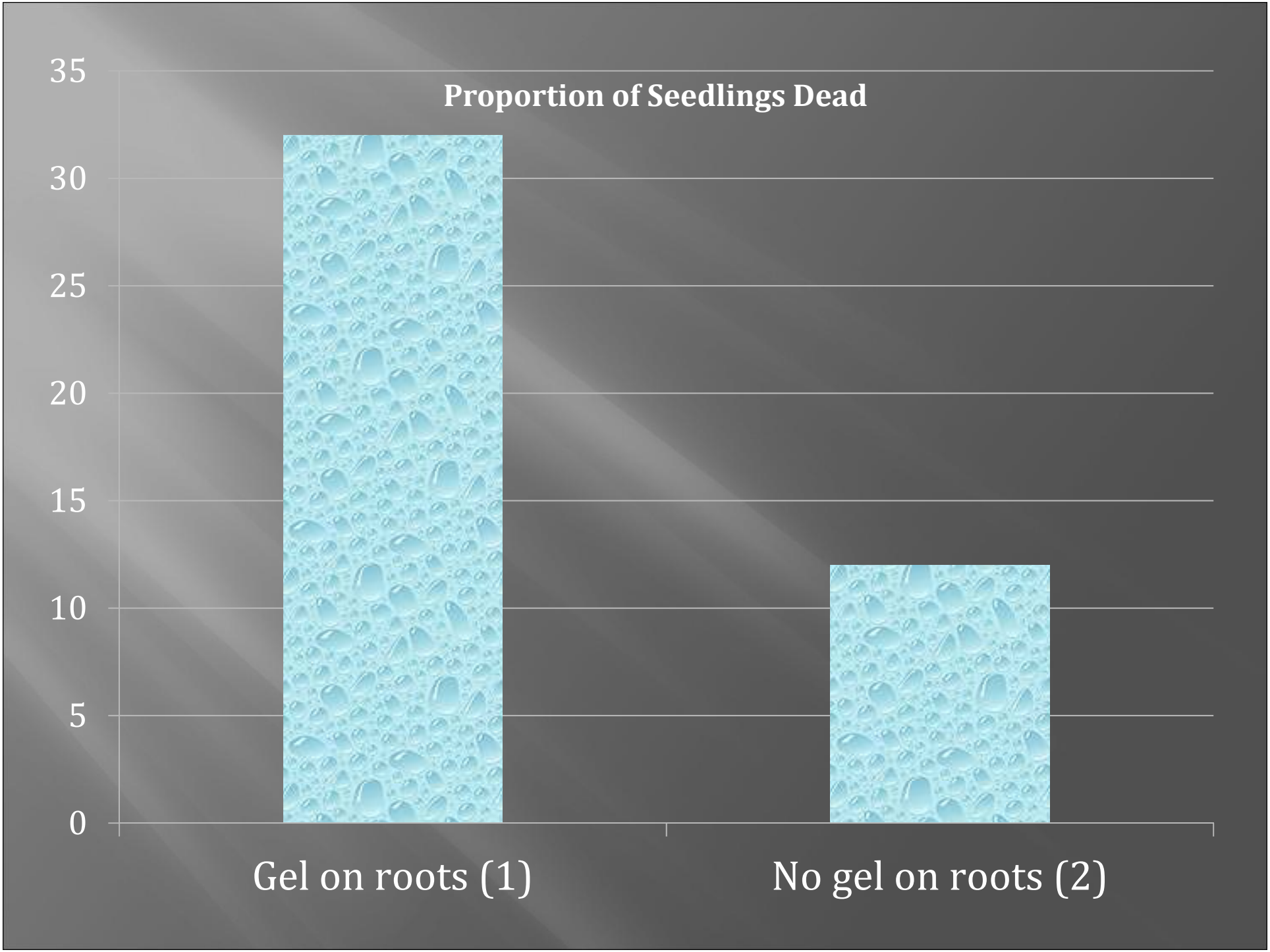
Study #2

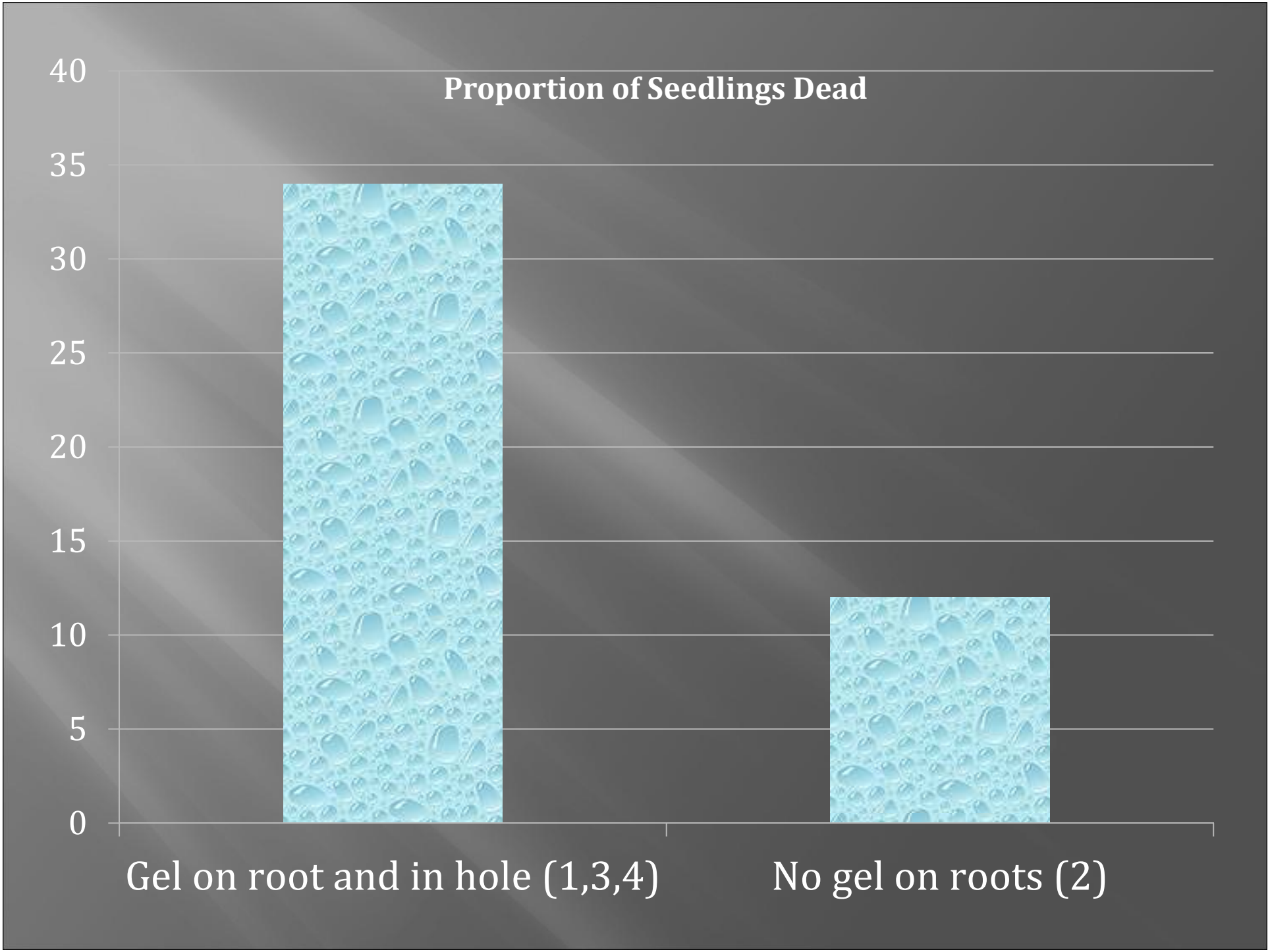
1. Gel on roots @ lifting – No gel bag
2. No Gel on roots @ lifting - No gel bag (*designated as control*)
3. Gel on roots @ lifting plus whole gel bag in planting hole
4. Gel on roots @ lifting plus gel bag emptied into planting hole (no bag in hole)
5. No Gel on roots @ lifting plus whole gel bag in planting hole
6. No Gel on roots @ lifting plus gel bag emptied into planting hole (no bag in hole)

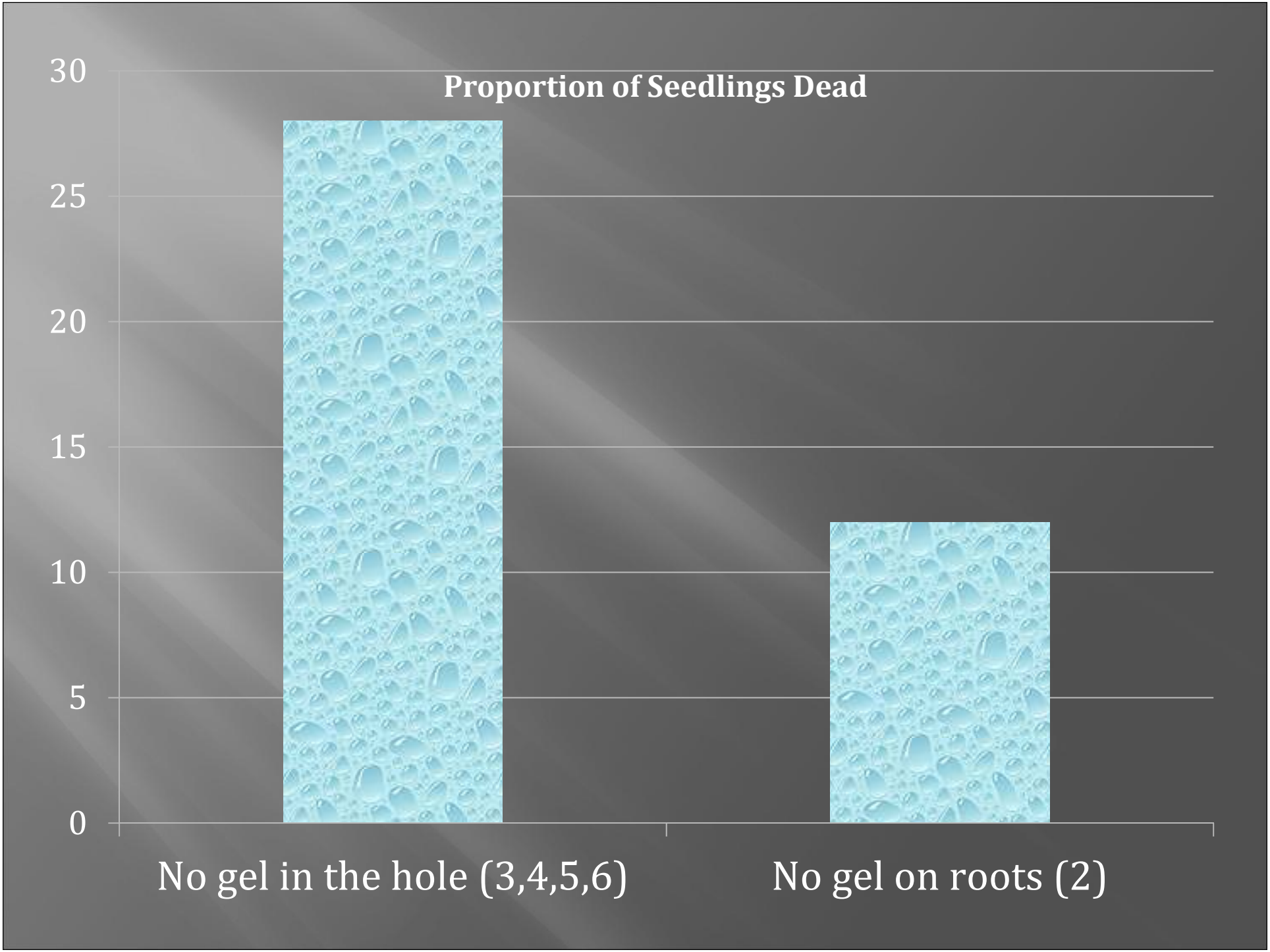
Study Details

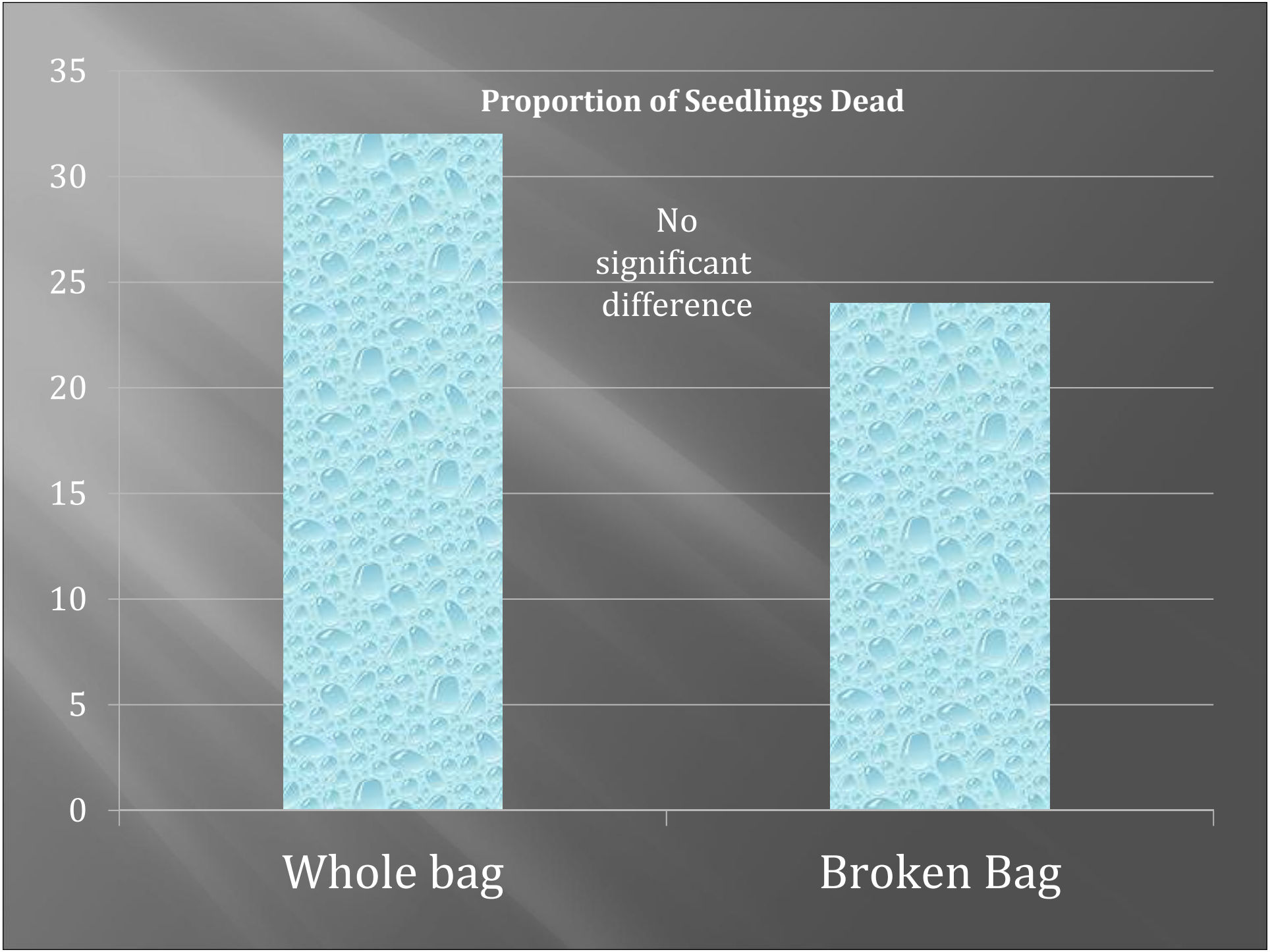
- Six trees of each treatment were randomized in each of 11 boxes.
- Boxes were watered to saturation the day of planting and day following planting. After which all water was withheld.
- 84 days after planting seedlings were removed. The number dead for each trt and each rep was recorded in addition to the root weights of the six trees/trt /rep.

Treatment	Proportion Dead [1]	Root Dry Wt (g)
Gel on roots @ lifting plus whole gel bag in planting hole (TRT #3)	0.39 a	1.8 a
Gel on roots @ lifting - No gel bag(TRT #1)	0.32 ab	1.0 b
Gel on roots @ lifting plus gel bag emptied into planting hole (no bag in hole)(TRT #4)	0.30 abc	1.5 ab
No Gel on roots @ lifting plus whole gel bag in planting hole (TRT #5)	0.24 abc	1.9 a
No Gel on roots @ lifting plus gel bag emptied into planting hole (no bag in hole) (TRT #6)	0.18 bc	1.8 a
No Gel on roots @ lifting – No gel bag (*Designated as Control*) (TRT # 2)	0.12 c	1.2 b
(LSD)	*0.17*	*0.47*

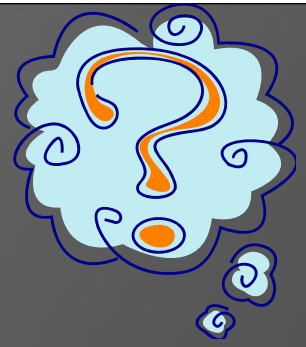

Proportion of Seedlings Dead
35
30
25
20
15
10
5
0
Gel on roots (1)
No gel on roots (2)


Proportion of Seedlings Dead
40
35
30
25
20
15
10
5
0
Gel on root and in hole (1,3,4)
No gel on roots (2)


Proportion of Seedlings Dead
30
25
20
15
10
5
0
No gel in the hole (3,4,5,6)
No gel on roots (2)

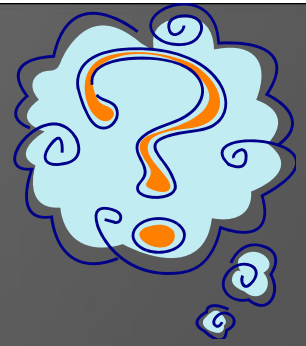

Proportion of Seedlings Dead
35
30
25
20
15
10
5
0
No significant difference
Whole bag
Broken Bag

Points to Ponder



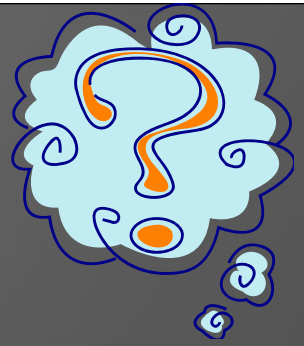
- The stress conditions of our study were stressful – 84 days w/o water in nearly pure sand.
- Why did roots with gel have more mortality?
- Why were the results exactly opposite as to what we would expect?
- Some results from the literature:
- Results of gels as soil amendments vary greatly – dependent on soil type, gel composition, particle size of gel, environmental conditions.

Points to Ponder



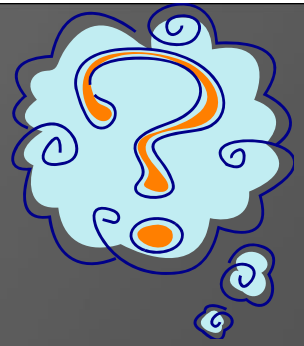
- Soils with high sand content are especially problematic since sandy soils are characterized by low water-holding capacity.
- Tree Planters' Notes 1987. – Terra-sorb (starch based at that time). Survival of tomato plants increased as concentration of T-S increased with drought.
- Tree Planters' Notes 1976. – High rate of hydrogel resulted in low germination of ponderosa pine seed.

Points to Ponder



- Journal of Forest Science 2007. - Scots Pine on sandy site – addition of 7 g of gel in the planting hole resulted in 20% mortality. In addition, trees were "pushed" up in the planting hole due to the expanding gel.

Points to Ponder



- Hortscience 1992. - Blueberries on a S GA loamy sand site. Using recommended rates of gel – resulted on mortality of plants. *"…hydrogel … probably drew water from the blueberry plant roots…. Hydrogel when not mixed with organic matter, could be detrimental to young blueberries."*
- Journal of Amer. Soil Sci Soc. 2007. Focus limited to sandy soils. Recommends mixing gel with sand and forming a thin layer for the plants to grow to. Does not recommend uniformly mixing is the soil profile.

So… Back to the first question…

Gel Bags

Are they a good option for use on dry planting sites?


Intact bag that
absorbed
30 ml water
Gel from 1 bag
+ 350 ml water


+ 30 ml water
Dry
+ 350 ml water

http://www.imdb.com/media/rm1376491776/tt0051418

"Beware of the Blob! It creeps, and leaps, and glides and slides across the floor.
Indescribable... Indestructible!
Nothing Can Stop It!
Indescribable...
indestructible... Insatiable
The indestructible creature!
Bloated with the blood of its victims!
It crawls.... It creeps.... It eats you alive!"

Let's step back and put all this in perspective…

- Evaluated:
  1. PAM Gel (2 grades)
  2. Starch based Gel
  3. Clay
- Results showed that both PAM and Starch based Gels were equally effective in protecting seedlings from lifting to the planting hole.

Let's step back and put all this in perspective…

- Now – What about from the planting hole to seedling establishment?
- What impact does gel have on the roots of seedlings which are planted on dry(sandy, limited rainfall) sites ?????

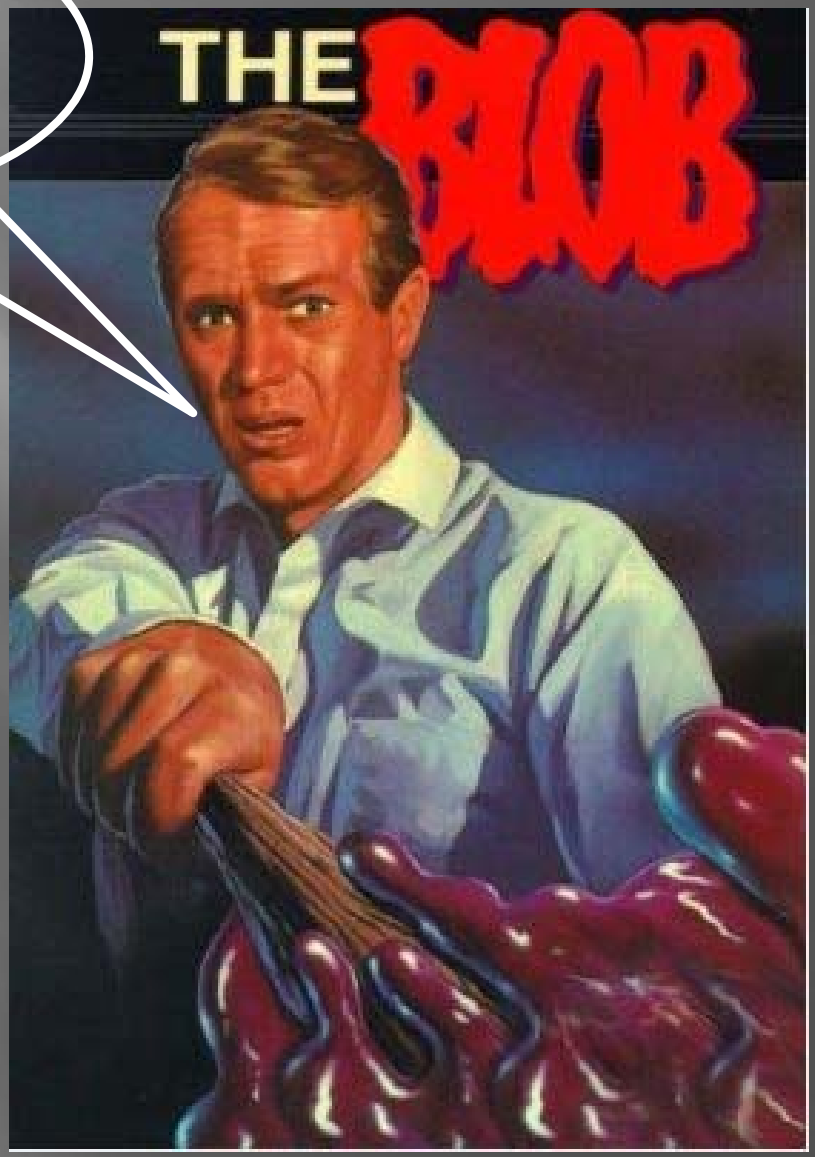
Ideas for Future Research

- Varying particle size of root dips and gel composition (PAM vs Starch) in drought boxes.

If nurseries are wanting something to put in the planting hole:

- Rate of gel mixed with organic matter as a possible amendment to planting hole.
- Organic matter as an amendment to planting holes.

Any Questions?



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