Gel Study

This study was funded by USFS

Purpose of Gel Study

- Root Gels/dips have been used for yrs just prior to planting
- Historically
  - Wet moss
  - Peat moss/vermiculite
  - **Kaolin clay**
  - **Super absorbent hydrogels**

Purpose of Gel Study

- Effectiveness of gels has not been well documented.
- Popularity based upon cost and easy shipping to nurseries.
- Most nursery mgrs feel the root dips give good “insurance” against unknowns after seedlings leave nursery.

Studies

1) Survival: Trees treated, stressed & outplanted for survival

2) RGP: Trees treated, stressed & root growth potential quantified

3) Fungal Growth: Ability of these gels to support fungal growth

Gel Study Treatments

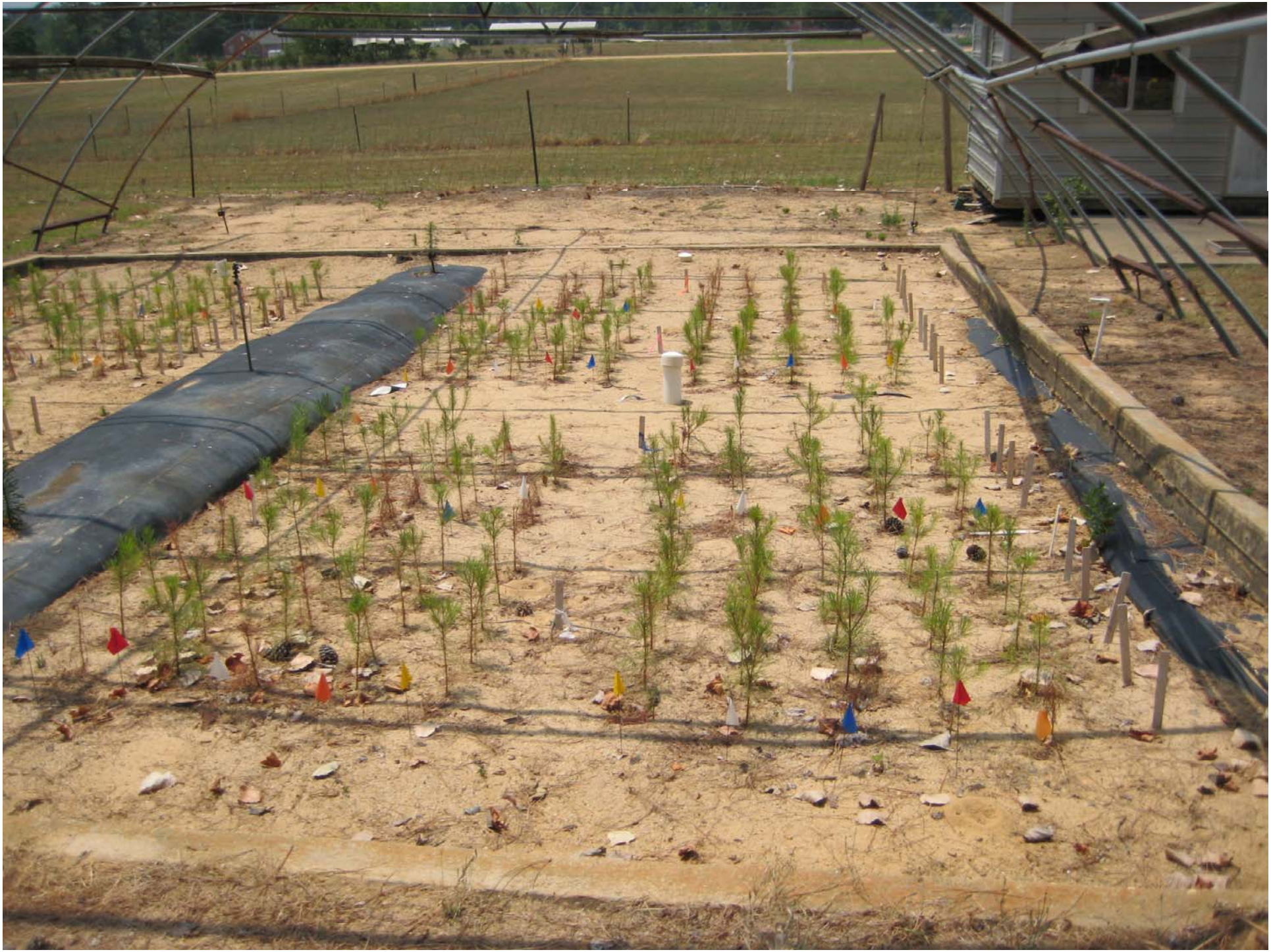
- Water
- Clay - kaolin
- Gel “A” - polyacrylamide (PAM) gel
- Gel “B” - polyacrylamide (PAM) gel
- Zeba - starch-based gel

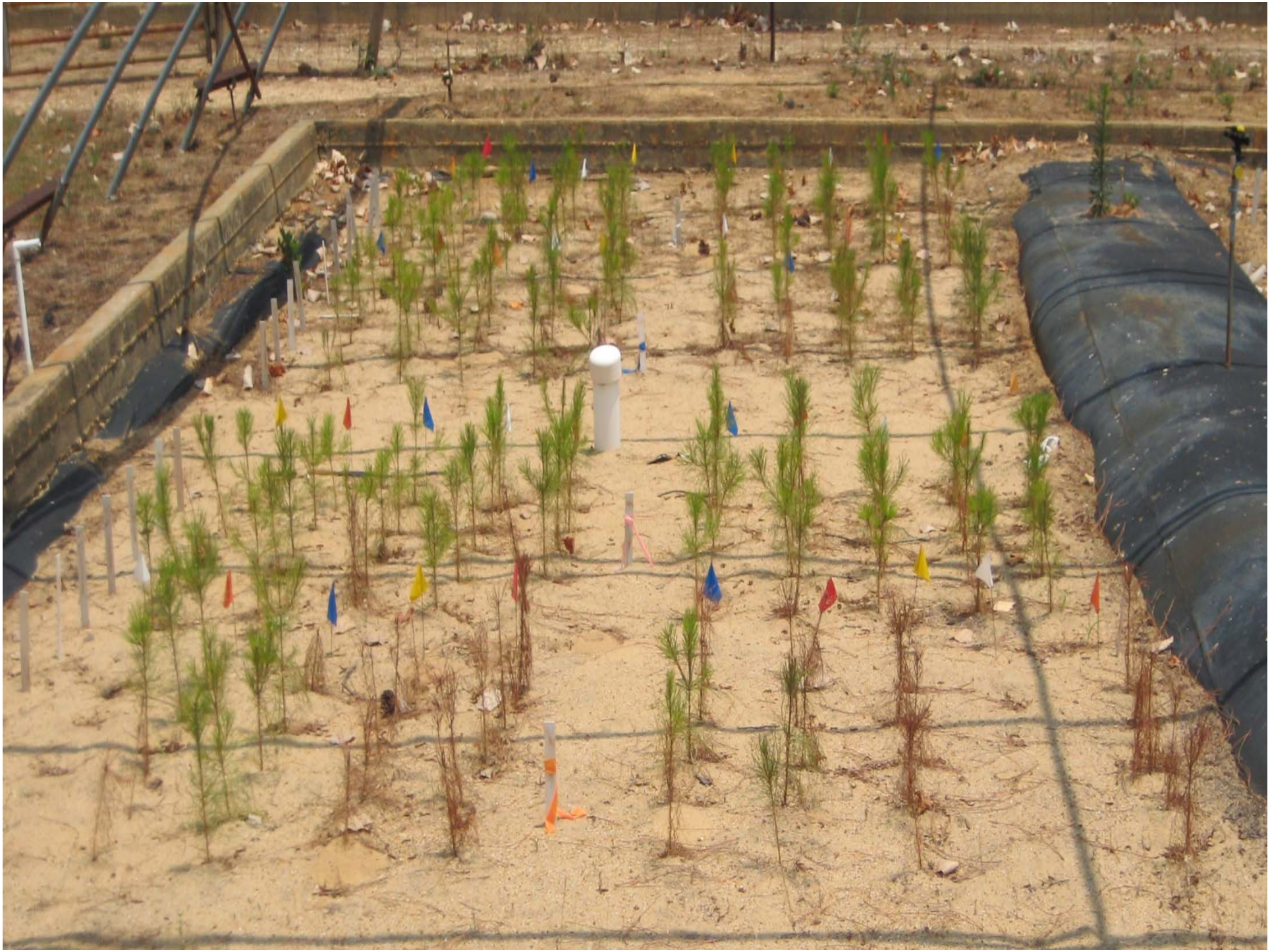
Sieve Analysis

	Clay	Zeba®	Gel "B"	Gel "A"
Less than 500µ	3.4%	0.0%	3.0%	60.0%
250µ to 500µ	16.2%	34.0%	54.2%	22.8%
Less than 250µ	80.4%	66.0%	42.8%	17.2%

Survival Study Info

- Gel & Clay used at nursery rate.
- Amt of gel on roots equal to nursery application.
- After trt application roots exposed for 0, 60 , 120, 240 min. desiccation before planting.
- Outside Survival test - 20 seedlings x 5 gel/clay trt x 4 exposure times x 3 reps = 1200 seedlings.





Outplanting Study

Percentage dead by minutes of exposure

	0 min	60 min	120 min	240 min
Gel “B”	5.5	13.2	13 b	40.0 b
Gel “A”	17.4	11.1	6.5 b	43.9 b
Zeba	20.8	23.8	14.1 b	47.2 b
Clay	8.8	12.1	47.1 a	87.9 a
Water	2.2	14.3	22.8 ab	87.9 a
lsd	*23.8*	*13.5*	*30.3*	*15.0*

RGP Study Info

- Gel & Clay used at nursery rate.
- Amt of gel on roots equal to nursery application.
- After trt application roots exposed for 60, 120, 240 min. desiccation before placing in tanks .
- RGP - 2 seedlings x 5 gel/clay trt x 3 exposure times x 20 reps = 600 seedlings.

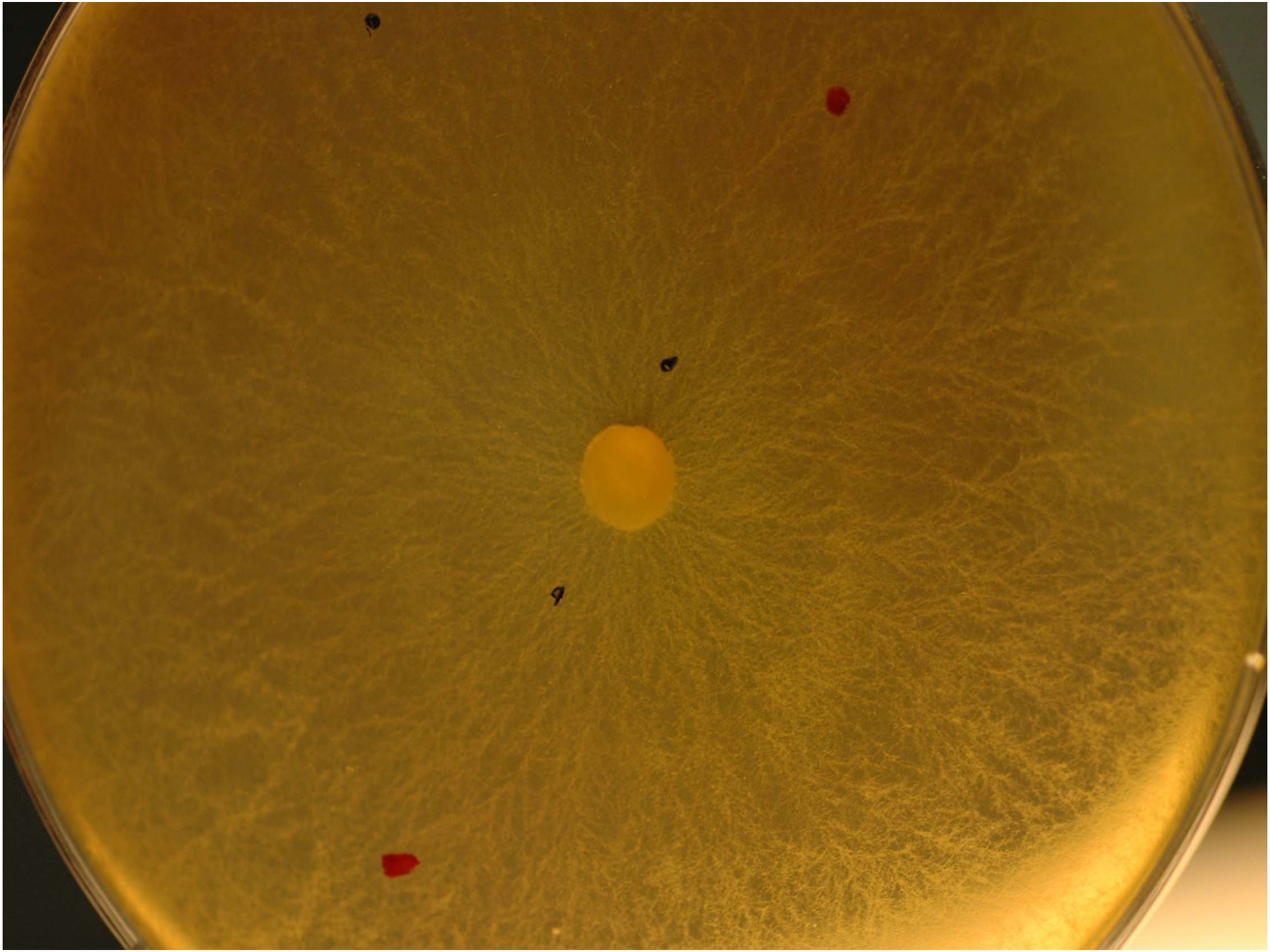
Root Growth Potential Study

Average Number of White Root Tips Following Exposure

	60 min	120 min	240 min
Gel “B”	32.1 ab	29.3 b	19.9 a
Gel “A”	41.3 a	16.8 c	22.6 a
Zeba	45.3 a	39.3 a	14.9 a
Clay	43.1 a	1.2 d	0.0 b
Water	22.0 b	3.4 d	0.0 b
lsd	*12.4*	*8.3*	*7.9*

Fungal Growth Study Info

- Gel & Clay used at nursery rate.
- Water agar was augmented with Gel & Clay treatments.
- 12 petri plates per treatment were plug inoculated with *Pythium*, *Rhizoctonia* and *Fusarium*.
- Growth rate of each fungi on each treatment was measured daily.



Fungal Growth in mm

	Pythium	**Fusarium**	**Rhizoctonia**
Clay	10 d	51 c	58 c
Gel "A"	26 c	60 b	75 a
Gel "B"	31 c	60 b	74 a
Zeba	42 b	63 a	76 a
Control	69 a	61 b	70 b
lsd	*6.5*	*1.6*	*2.8*

Pythium & Fusarium – Day 6; Rhizoctonia – Day 4