Trial: FogPots_Wheat_pH 6,2 vs pH 7,2

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BACKROUND

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Soil properties currently limiting crop yields in Swedish agriculture – An analysis of 90 yield survey districts and 10 long-term field experiments

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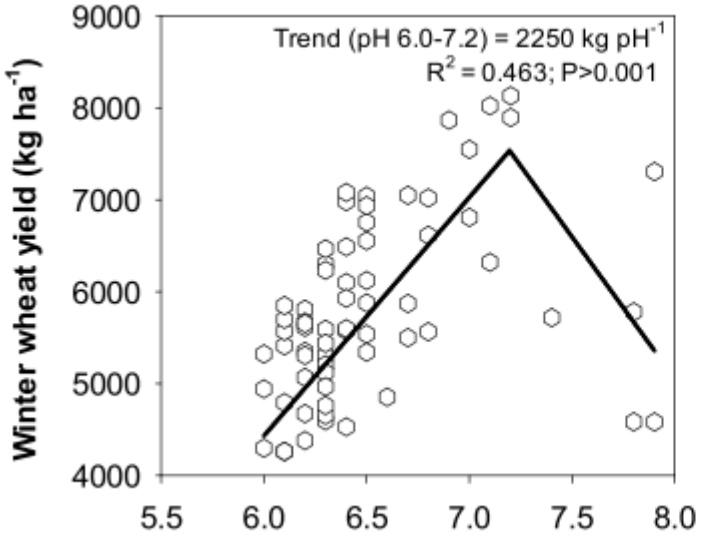
BACKROUND

Winter wheat – yield & pH

Yield survey district

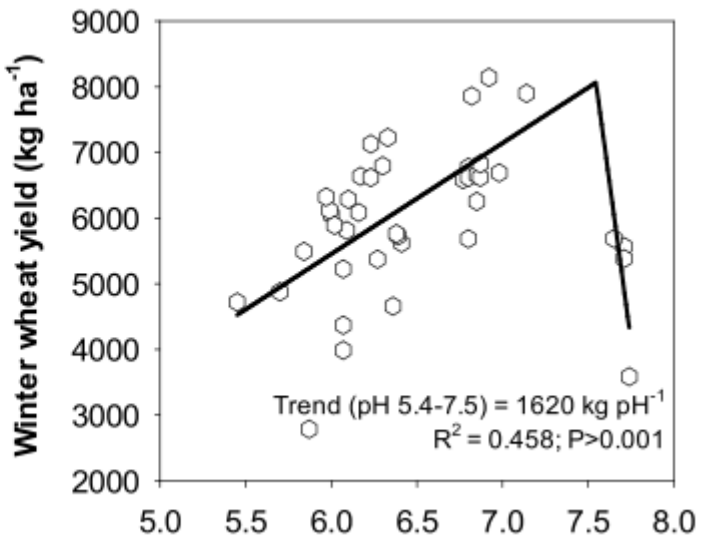


pH threshhold 7.2

Yield increase up to a threshhold pH

1125kg / $^{1/2}$pH

Soil fertility experiments



pH threshhold 7.5

Yield increase up to a threshhold pH

810kg / $^{1/2}$pH

- pH 7,2 is the ideal growth environment for wheat
- We will compare the ideal wheat pH to a lower pH 6,2 (still in the range of recommended pH for plant growth in general)

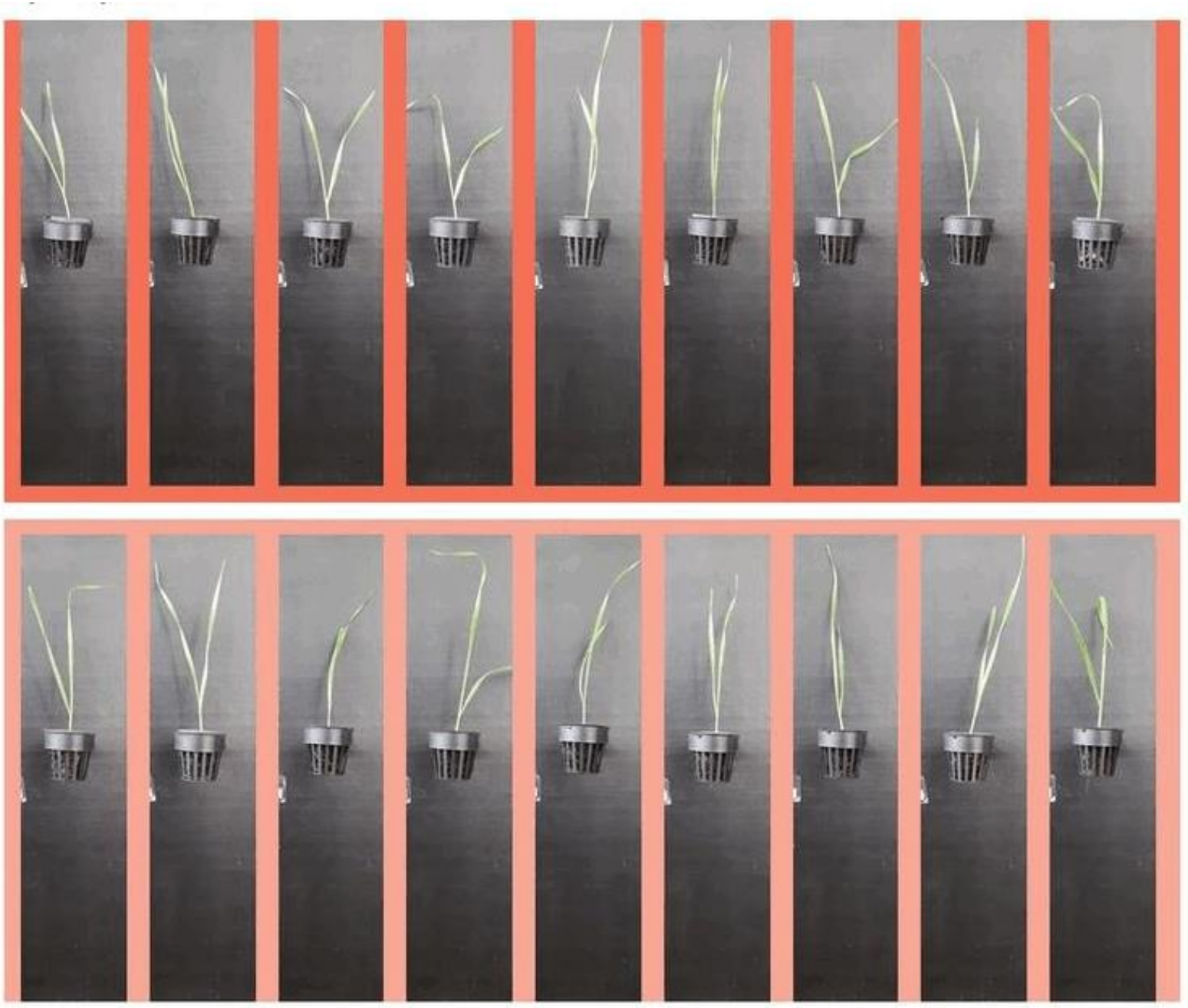
Set-up




- Using pre-grown wheat plugs (14 days)
- Setting 2 pots with nutrient solution and set pot_A: pH 6,2 and pot_B: pH 7,2
- Ultrasonic atomizer provides moisture and nutrients through a cold fog
- Plants grow for two weeks in the FogPots with daily assessments of progress

Results: daily visual assessment

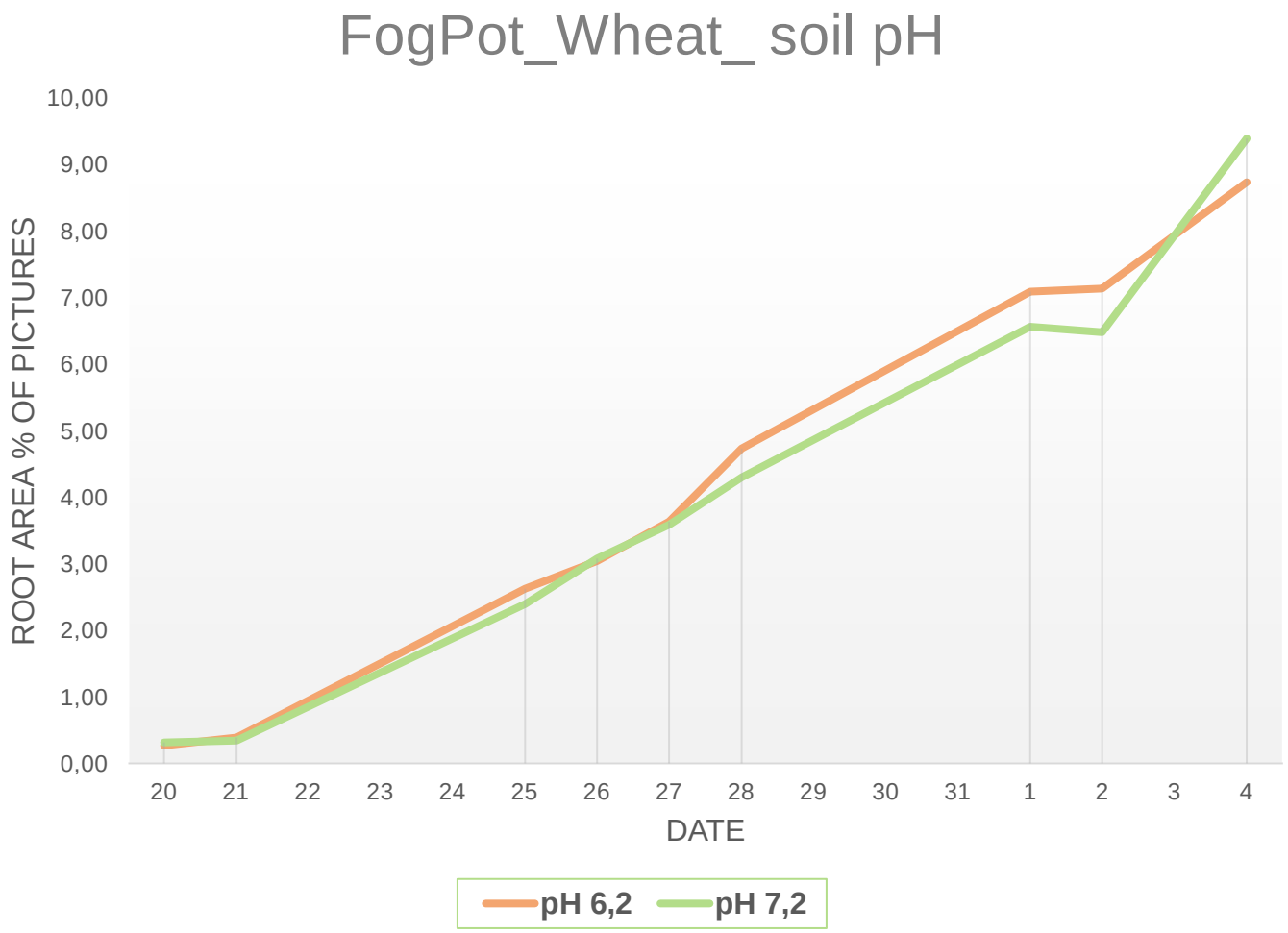
GIF:



pH 6,2

pH 7,2

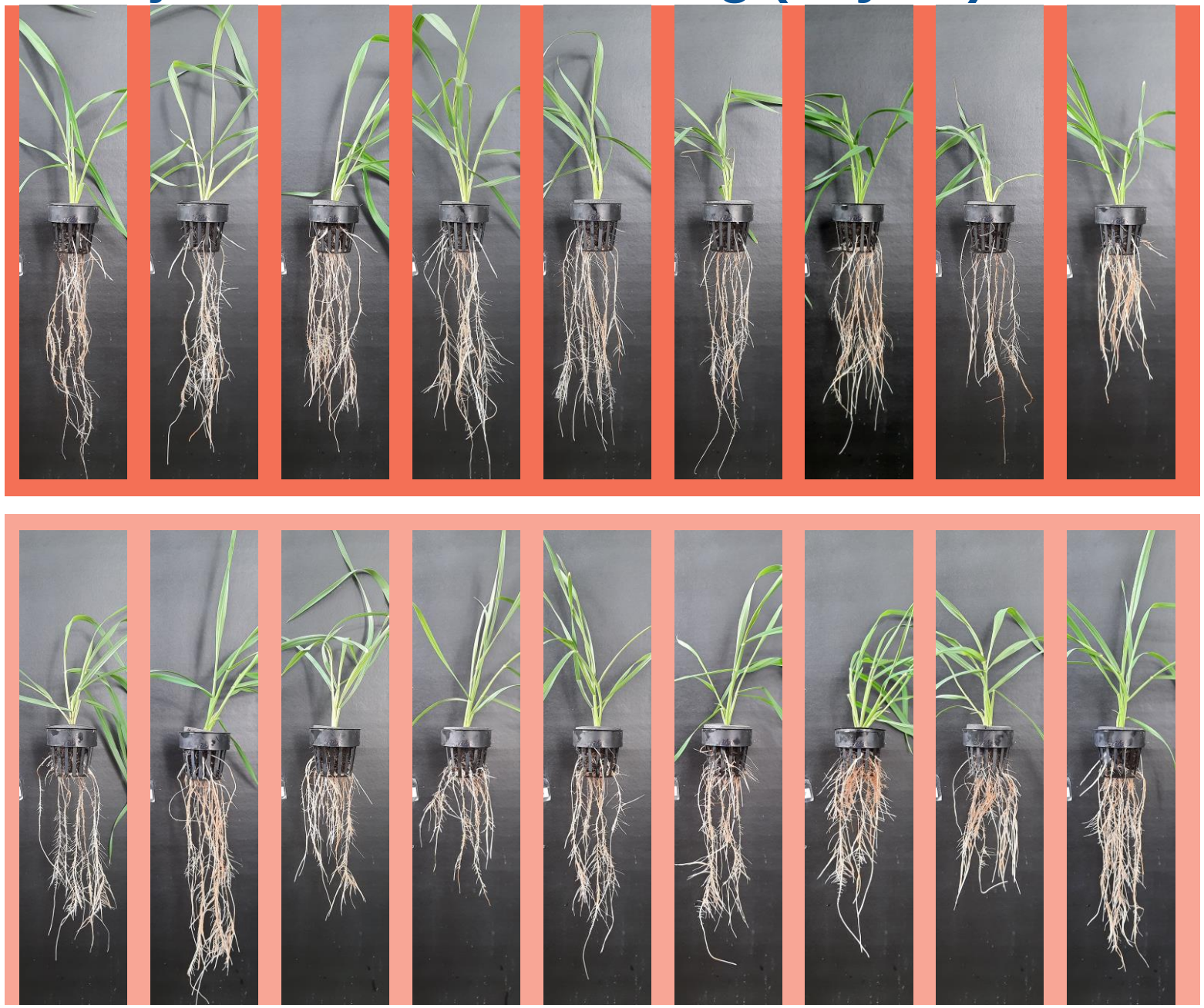
Results: Digital Assessment [%]



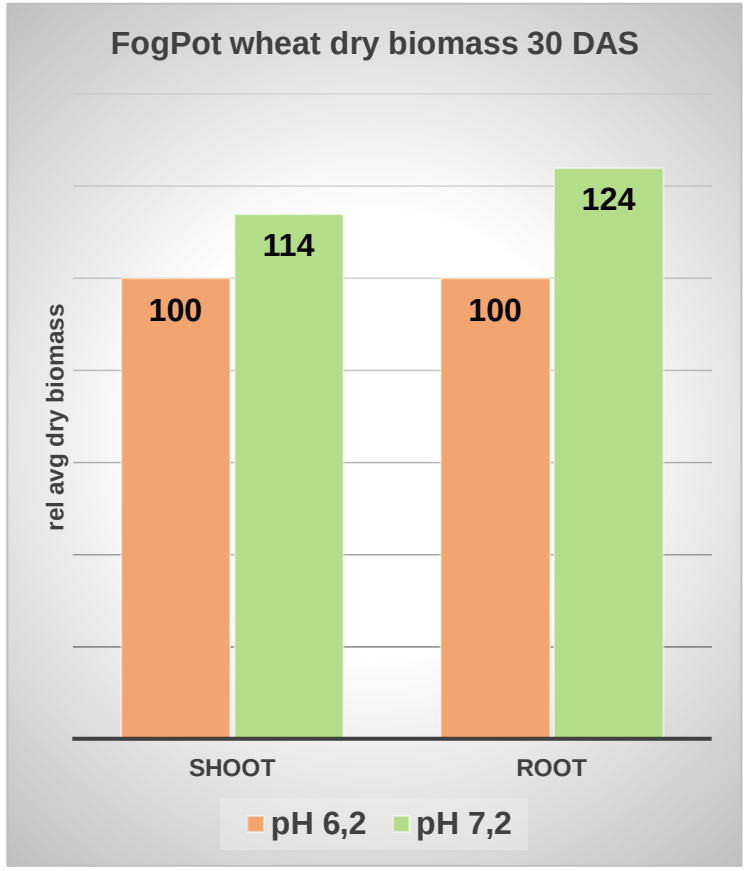
- 15 days of growth in different pH environment
- On the last day the root photos the pH 7,2 pot show **8%** more root area than the pH 6,2 pot
- the photos were analyzed via software to measure the nr of root pixels [% area]

Results: dry biomass assessment

Results: roots just before harvesting (day 15)



Results: Dry Biomass [g] Assessment



	dry root weight [g]	
rep	**pH 6,2**	**pH 7,2**
1	0,07	0,08
2	0,08	0,09
3	0,09	0,11
4	0,11	0,13
5	0,12	0,14
6	0,12	0,14
7	0,12	0,15
8	0,12	0,17
9	0,13	0,18
avg	0,106	0,132
standev	0,02	0,03
CV	19%	24%
P-value		0,08

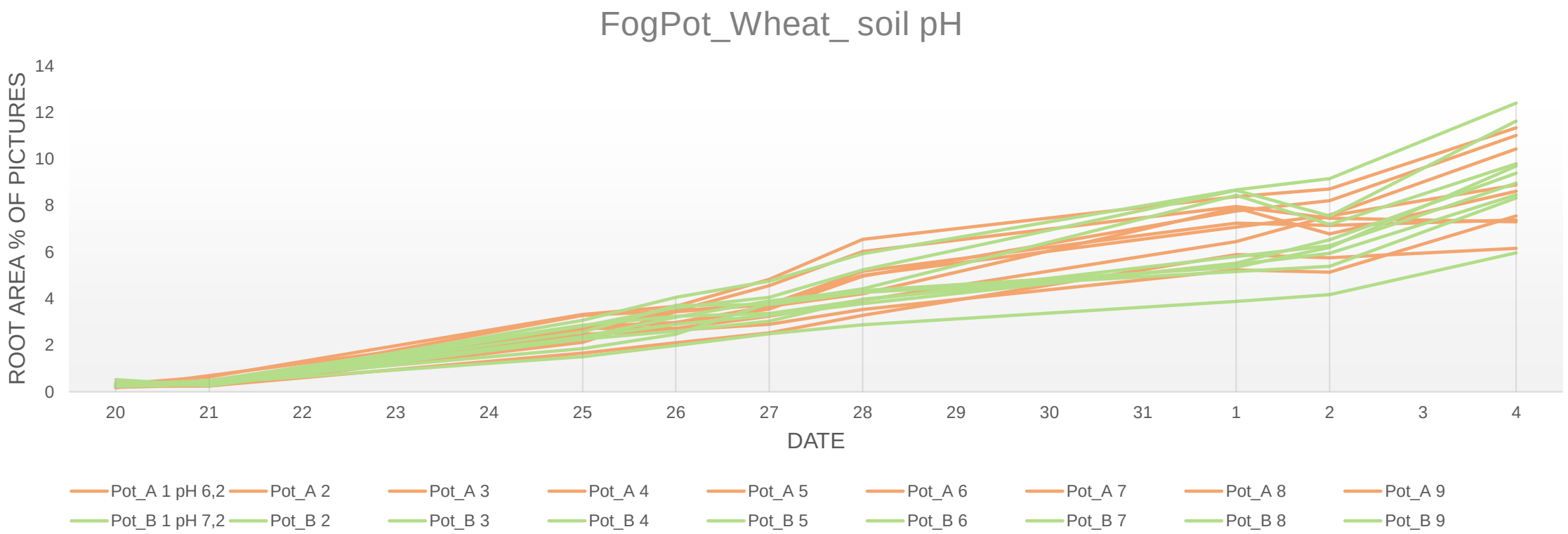
- On the last assessment day the plants were also harvested and shoots and roots dried in an oven.
- In pH 7,2 the plants had an average of 24% more dry root biomass
- The shoots had also more biomass: +14%

Conclusion

- In both assessment types, the wheat in pH 7,2 showed more roots (+8% area) and more dry biomass of both shoots (+14% weight) and roots (+24% weight) than the wheat in pH 6,2.
- The observations of H. Kirchmann and team about the ideal pH for wheat could be confirmed in this trial.
- Root growth assessment via photos does not yield reliable data. The software does not count superimposed root parts individually.
- Measuring the dry biomass is the assessment of choice for the most reliable data set. Only one assessment is possible due to the destructive proceedure.

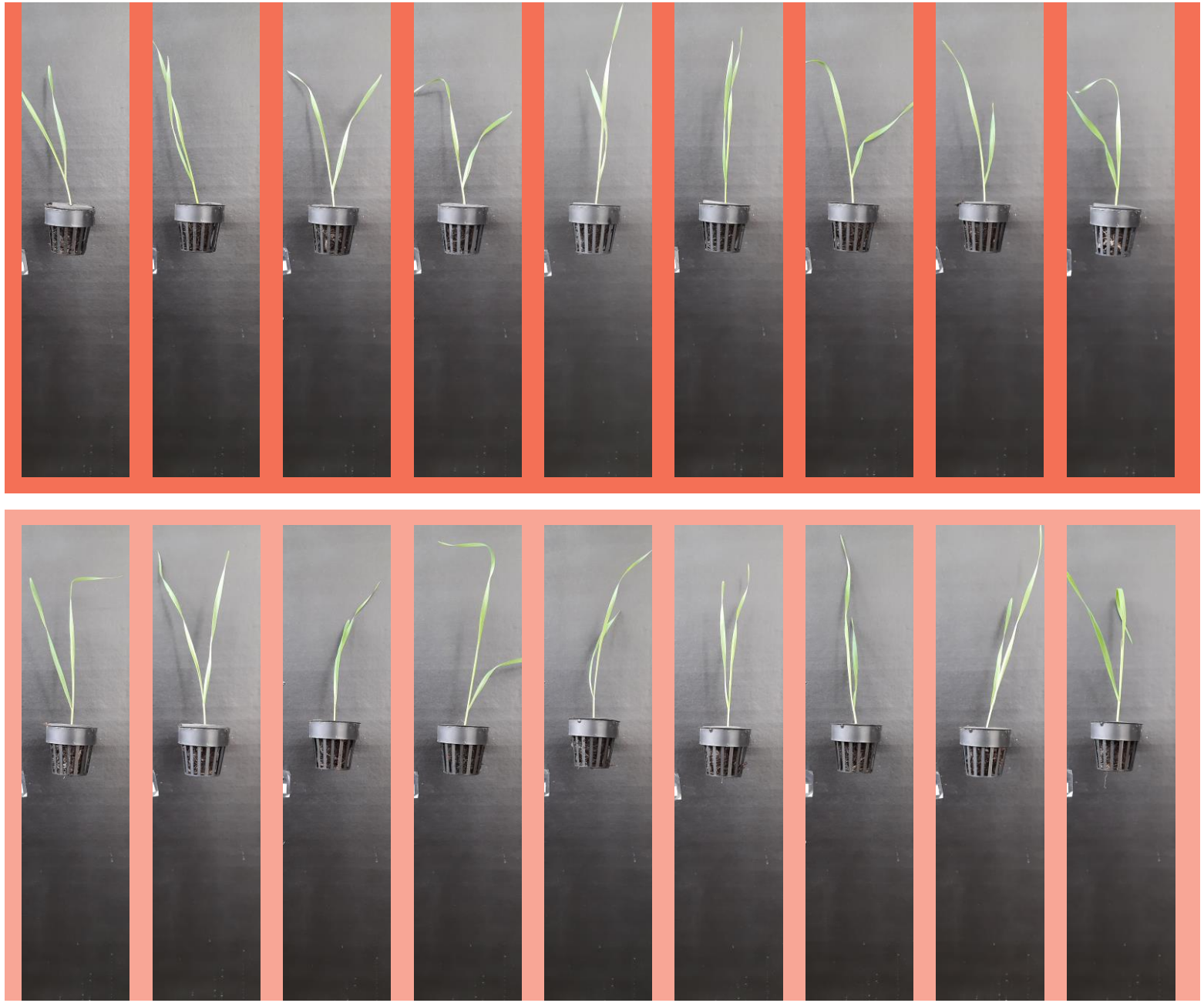
Back Up Slides

Results : Digital Assessment [%]

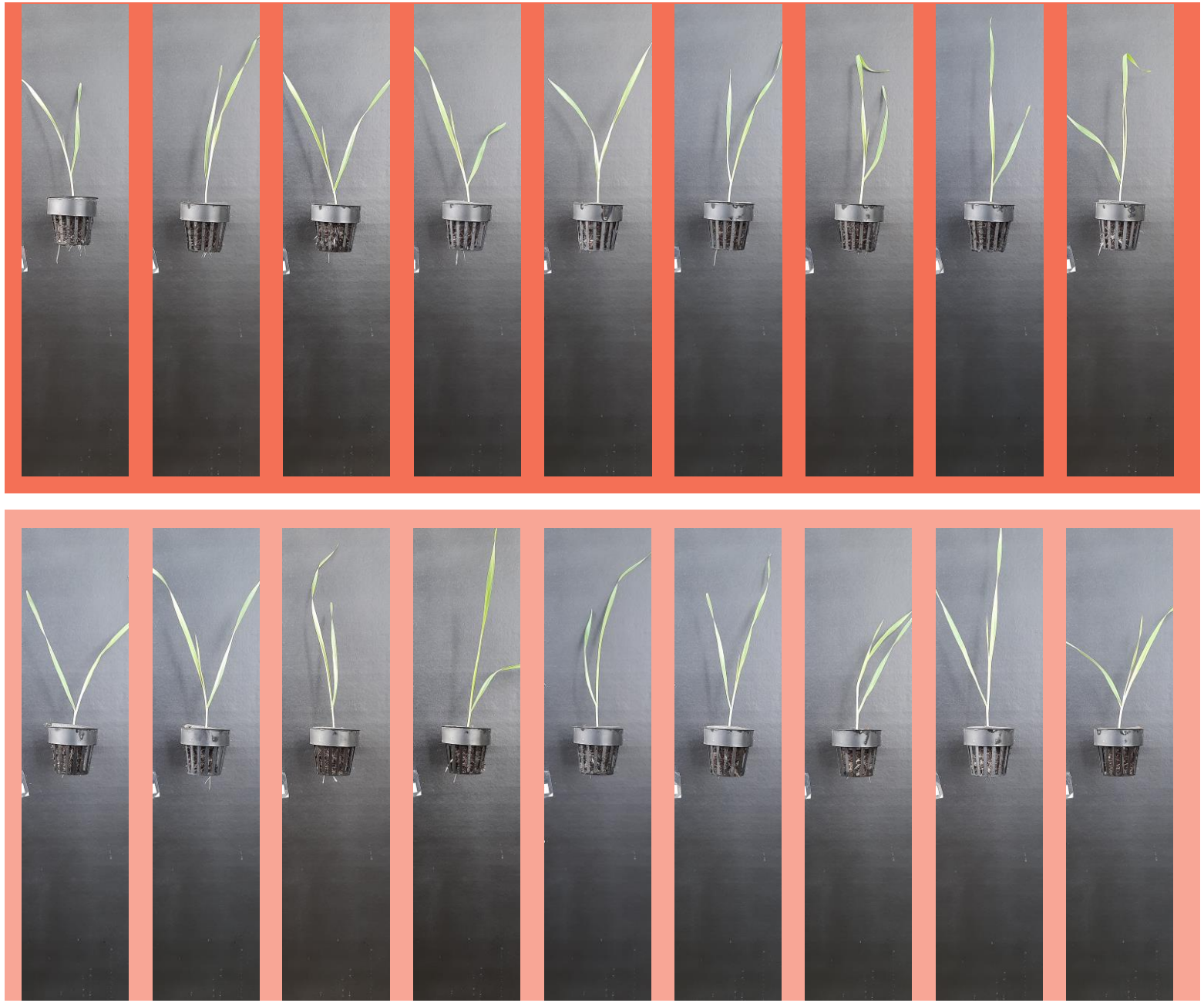


- Root development graph of all plants
- orange: pH 6,2 green: pH 7,2

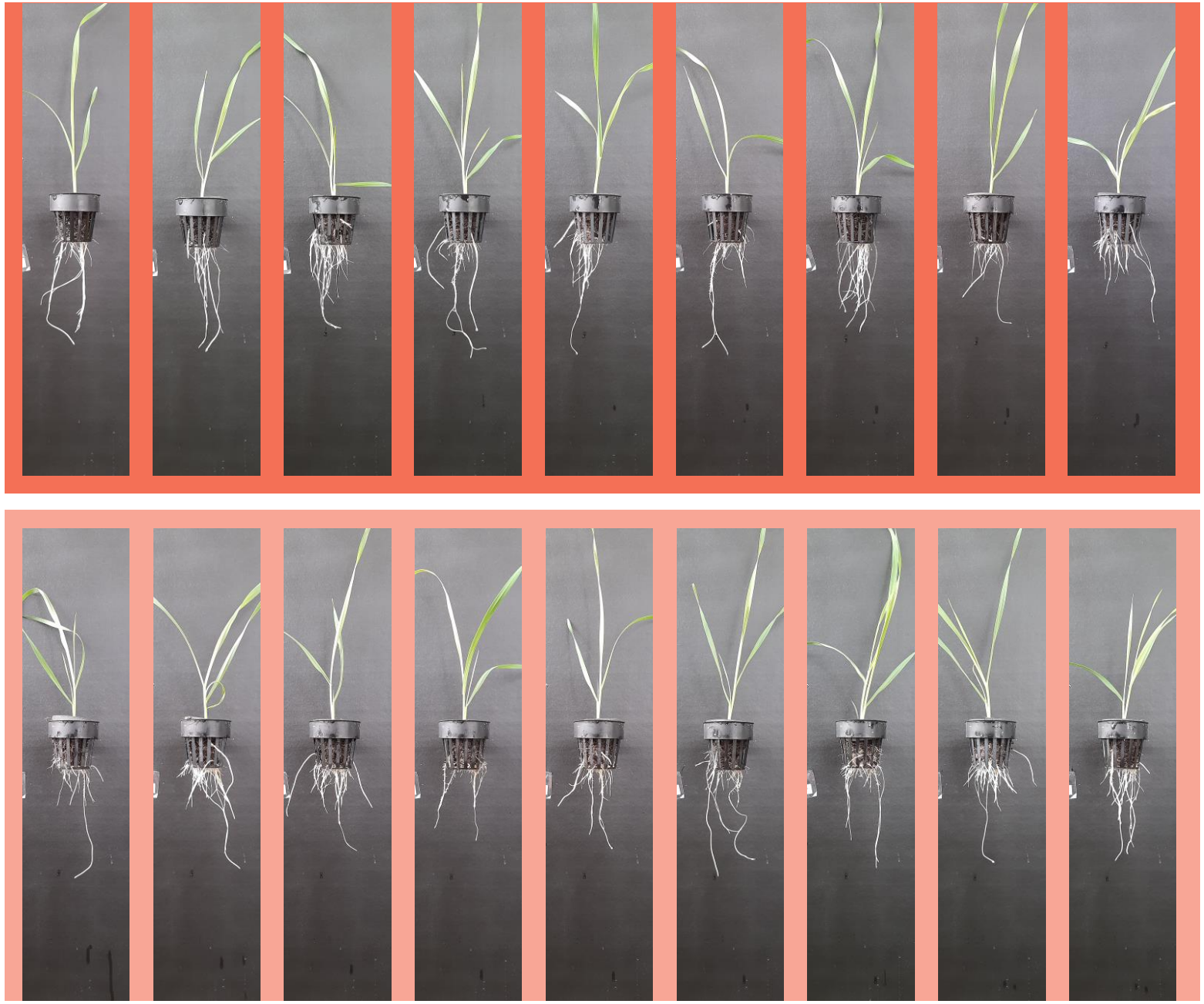
FogPot Trial: 20/10/2021



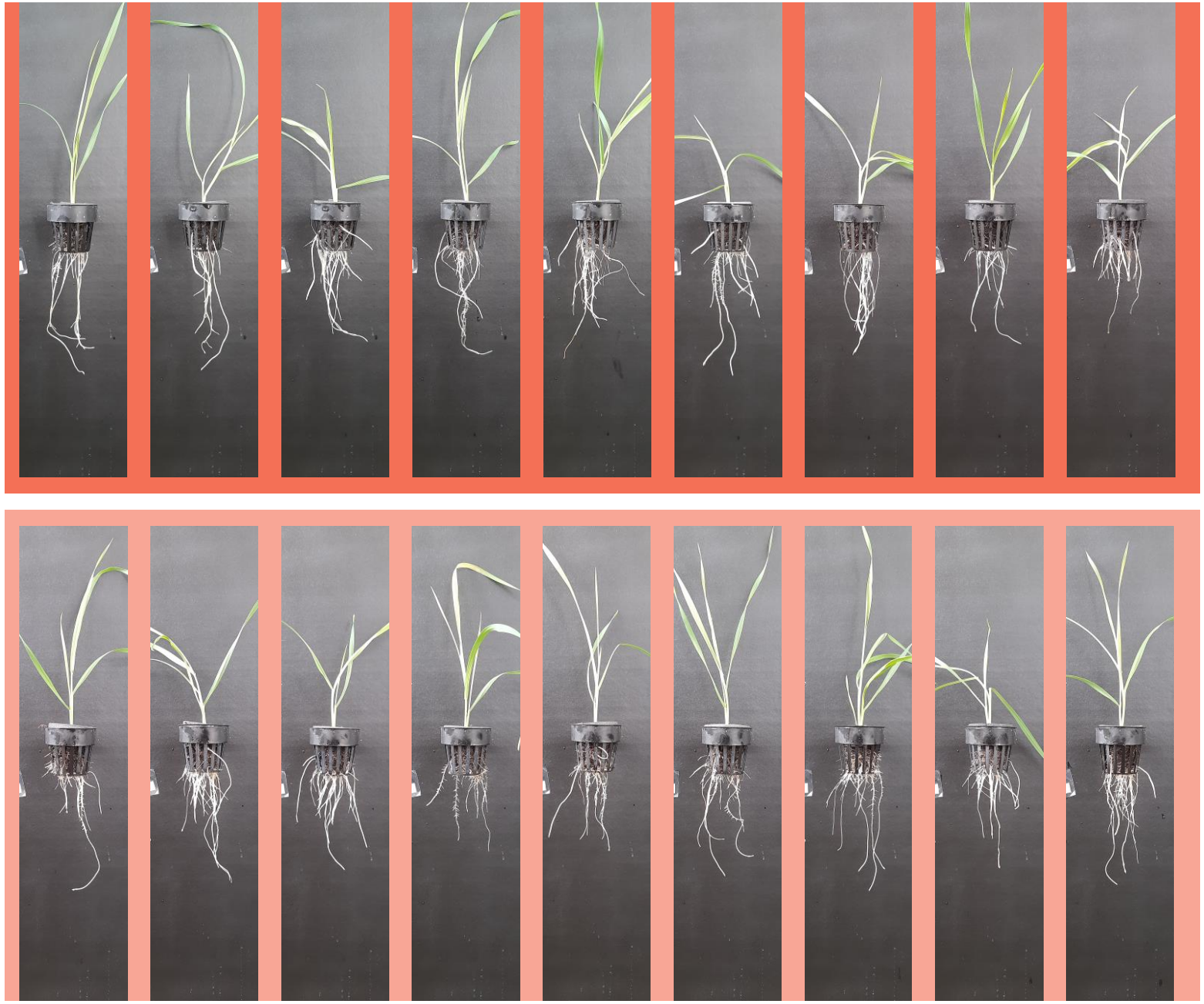
FogPot Trial: 21/10/2021



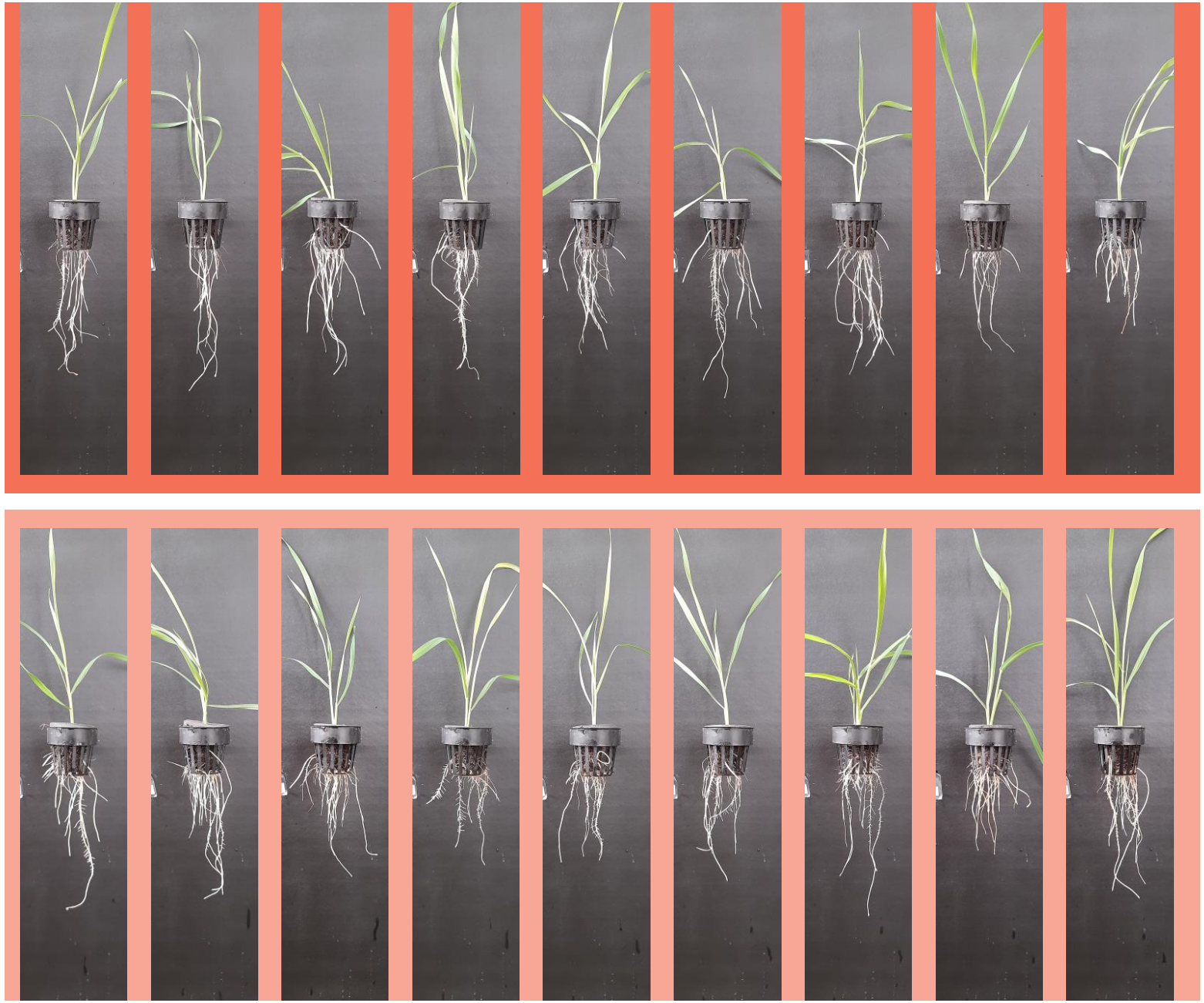
FogPot Trial: 25/10/2021



FogPot Trial: 26/10/2021



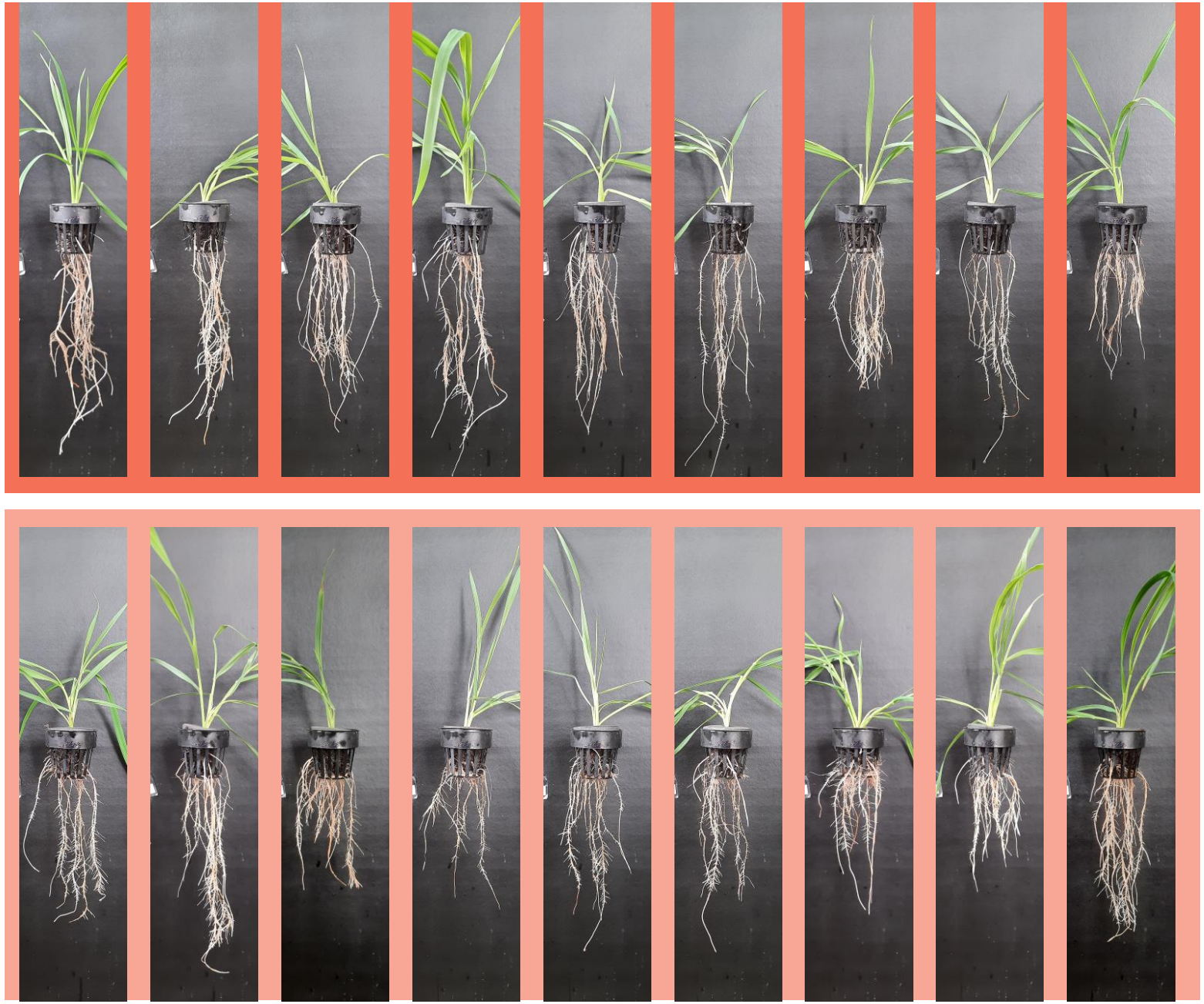
FogPot Trial: 27/10/2021



FogPot Trial: 28/10/2021

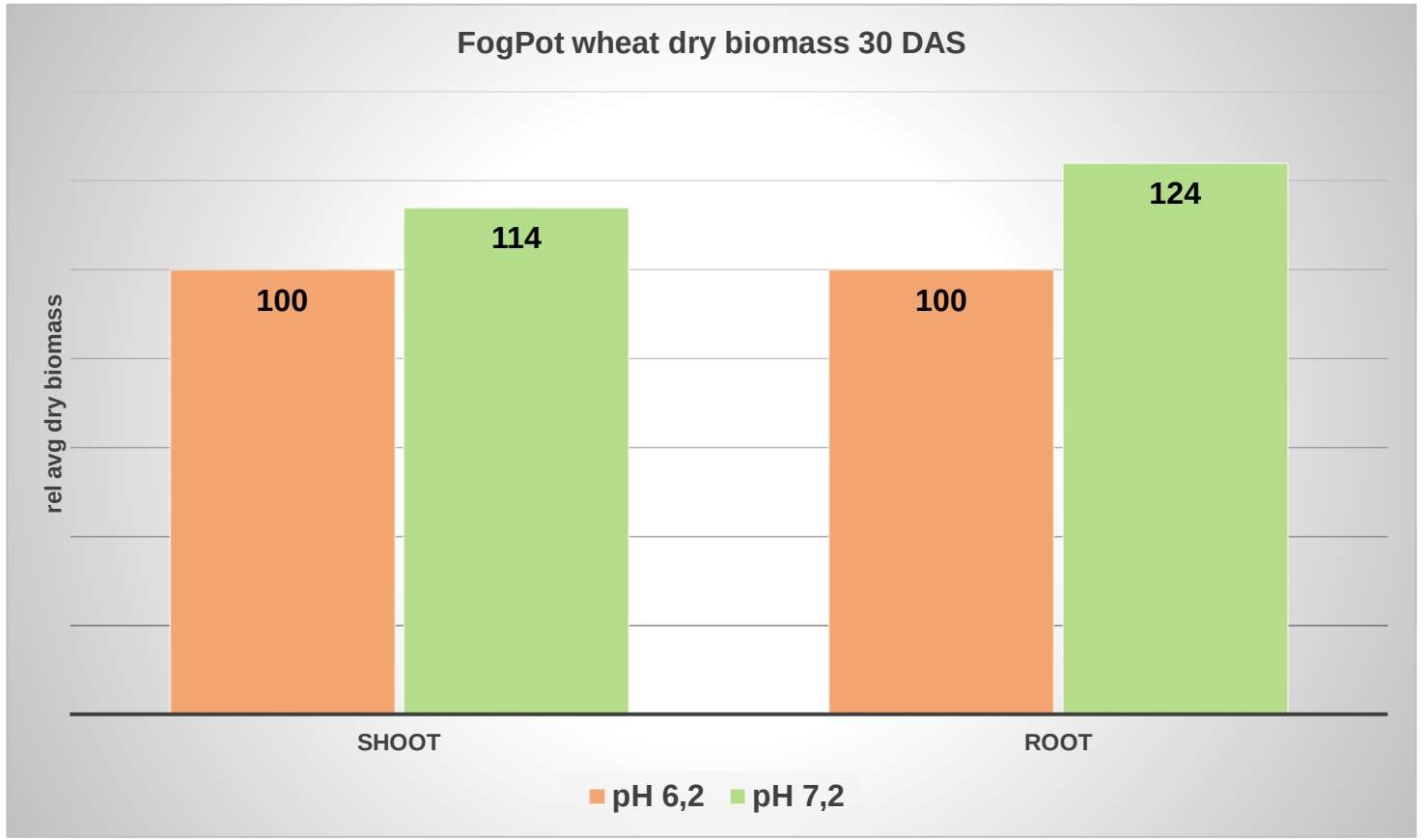
FogPot Trial: 01/11/2021

FogPot Trial: 02/11/2021



FogPot Trial: 04/11/2021 (day 16)

Results: Dry Biomass [g] Assessment



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8	0,12	0,17
9	0,13	0,18
avg	0,106667	0,132222
standev	0,02	0,03
CV	19%	24%
P-value		0,08