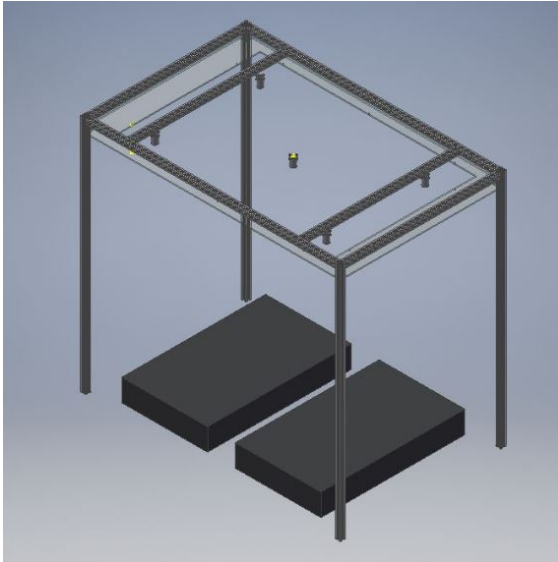


Appendices

Appendix 1

Inventor ® 3D-CAD Software design model of the aluminum framework used in the radiation treatment (Kamman, 2017).



Appendix 2

The average measured absorbed radiation dose including standard deviation at five different location in the radiation fume hood. Radiation doses were obtained with thermoluminescence dosimetry (TLD) with two TLD cups at each location. TLDs were kept at the same height as the plants' growth tips during the whole experiment. The final amount of counts measured was multiplied with a ^{60}Co -conversion factor of $2.29 \mu\text{Gy count}^{-1}$ to obtain the final dose for each location. Daily absorbed dose is derived by dividing total dose by the 26 days duration of the experiment.

Location of the fume hood and the total absorbed dose and the absorbed dose per day

Location fume hood	Absorbed dose (μGy)	Absorbed dose ($\mu\text{Gy d}^{-1}$)
Right-front	$6,635 \pm 31$	255
Right-back	$6,799 \pm 113$	262
Middle	$8,195 \pm 86$	315
Left-front	$6,648 \pm 36$	256
Left-back	$6,888 \pm 515$	265
Average	$7,033 \pm 658$	271 ± 25

Appendix 3

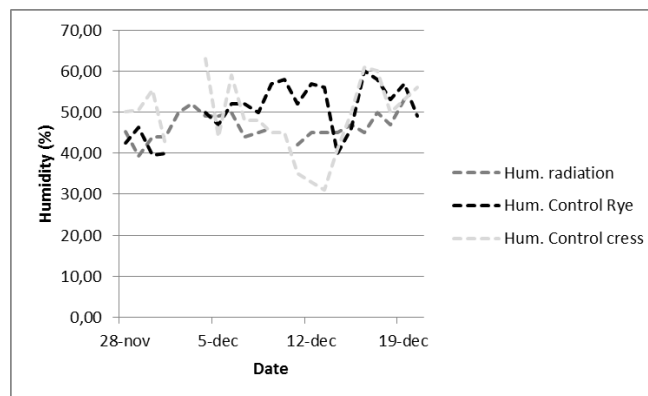
The measured radiation dose for individual Solar Energetic Particle (SEP) events for rye and cress. Individual treatments are indicated with their abbreviations in the first and third column. Radiation doses were obtained with thermoluminescence dosimetry (TLD) with four TLD cups used for each individual SEP-event. Measured counts were multiplied with a ^{60}Co -conversion factor of $2.29 \mu\text{Gy count}^{-1}$ to obtain the radiation dose. Displayed doses are average final dose for each treatment based on the four TLD measurements. Overall average of all treatments is shown per species in the last row.

Absorbed dose after SEP events for Rye and cress.

Treatment	Absorbed dose	Treatment	Absorbed dose
Rye	(μGy)	Cress	(μGy)
T2	$29,256 \pm 1,111$	T2	$26,357 \pm 675$
T3	$28,731 \pm 368$	T3	$27,635 \pm 510$
T4	$25,974 \pm 1,401$	T4	$26,567 \pm 829$
T5	$26,769 \pm 830$	T5	$27,057 \pm 1.670$
Average	$27,683 \pm 1,563$	Average	$26,904 \pm 569$

Appendix 4

Humidity and temperature data were documented over the course of the experiment to track the daily environmental conditions in the fume hoods used. The device used had a temperature measurement accuracy of approximately 1 °C and sampled every ten seconds. Relative humidity ranged from 10-99% with a humidity measurement accuracy of approximately 5% at room temperature (25 °C).



Humidity percentage changes over the course of the experiment for control and radiation fume hoods. Gaps in lines indicate missing data. Humidity percentages were obtained with a 2-in-1 humidity- and temperature measurement device.

Appendix 5

Germination data and the germination percentage. nGerm indicates the amount of seeds germinated at the end of the 26 days experiment. nTotal displays the total amount of seeds sown. % are the final germination percentage calculated based on nGerm and nTotal. The first column shows the abbreviations of the individual treatments of which the data are displayed.

Trea tme nt	Rye			Cress		
	nGerm.	nTotal	%	nGerm.	nTotal	%
CE	83	84	98.8	166	168	98.8
CM	81	84	96.4	165	168	98.2
T1	11	12	91.7	22	24	91.7
T2	10	12	83.3	23	24	95.8
T3	11	12	91.7	22	24	91.7
T4	10	12	83.3	22	24	91.7
T5	9	12	75.0	23	24	95.8
NSE P	10	12	83.3	23	24	95.8
E	11	12	91.7	22	24	91.7

Appendix 6

Pairwise p-values of Fisher exact test on final germination percentages as shown in Appendix

5. Significant differences are obtained at $p < 0.01$. **6a)** Pairwise differences for rye treatments.

6b) Pairwise differences for cress treatments.

Rye									
CE	*								
CM	0.620	*							
T1	0.471	0.838	*						
T2	0.081	0.232	1.000	*					
T3	0.471	0.838	1.000	1.000	*				
T4	0.081	0.232	1.000	1.000	1.000	*			
T5	0.011	0.049	0.590	1.000	0.590	1.000	*		
NSEP	0.081	0.232	1.000	1.000	1.000	1.000	1.000	*	
E	0.471	0.838	1.000	1.000	1.000	1.000	0.590	1.000	*
	CE	CM	T1	T2	T3	T4	T5	NSEP	E

Cress									
CE	*								
CM	1.000	*							
T1	0.154	0.237	*						
T2	0.663	0.833	1.000	*					
T3	0.154	0.237	1.000	1.000	*				
T4	0.154	0.237	1.000	1.000	1.000	*			
T5	0.663	0.833	1.000	1.000	1.000	1.000	*		
NSEP	0.663	0.833	1.000	1.000	1.000	1.000	1.000	*	
E	0.154	0.237	1.000	1.000	1.000	1.000	1.000	1.000	*
	CE	CM	T1	T2	T3	T4	T5	NSEP	E

Appendix 7

Pairwise p-values of Fisher exact test on mean DW as displayed in Appendix VI. Significant differences are obtained at $p < 0.01$. **7a)** Pairwise differences for rye treatments. **7b)** Pairwise differences for cress treatments.

Rye									
CE	*								
CM	0.000	*							
T1	0.000	0.000	*						
T2	0.000	0.000	0.942	*					
T3	0.000	0.000	0.890	0.949	*				
T4	0.000	0.000	0.881	0.940	0.988	*			
T5	0.000	0.001	0.477	0.445	0.400	0.394	*		
NSEP	0.000	0.000	0.643	0.702	0.743	0.751	0.257	*	
E	0.000	0.641	0.000	0.000	0.000	0.000	0.000	0.000	*
	CE	CM	T1	T2	T3	T4	T5	NSEP	E

Cress									
CE	*								
CM	0.000	*							
T1	0.000	0.020	*						
T2	0.000	0.014	0.934	*					
T3	0.000	0.001	0.379	0.415	*				
T4	0.000	0.000	0.105	0.115	0.443	*			
T5	0.000	0.001	0.339	0.371	0.936	0.492	*		
NSEP	0.000	0.020	0.991	0.939	0.382	0.106	0.342	*	
E	0.000	0.483	0.119	0.095	0.015	0.002	0.013	0.118	*
	CE	CM	T1	T2	T3	T4	T5	NSEP	E

Appendix 8

The mean shoot dry weight per pot of each treatment including their corresponding standard deviations (sd). Treatments are indicated with their abbreviations in the first column. N represents the number of pots per treatment used to calculate the treatment mean. Pots without germinated plants were not included in the calculations of the treatment means.

Treat ment	Rye			Cress		
	N	Mean	Sd	N	Mean	Sd
CE	12	0.0414	0.0062	12	0.0077	0.0024
CM	12	0.0215	0.0056	12	0.0052	0.0013
T1	11	0.0125	0.0043	11	0.0037	0.0018
T2	10	0.0124	0.0042	12	0.0037	0.0012
T3	11	0.0122	0.0036	12	0.0031	0.0011
T4	11	0.0122	0.0042	12	0.0027	0.0010
T5	9	0.0141	0.0020	12	0.0031	0.0016
NSEP	10	0.0115	0.0027	11	0.0037	0.0014
E	11	0.0224	0.0074	10	0.0048	0.0015