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Supplementary Material

Genotypic and seasonal variation in root depth development during establishment of C4 perennial grass ecotypes

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Supplementary data

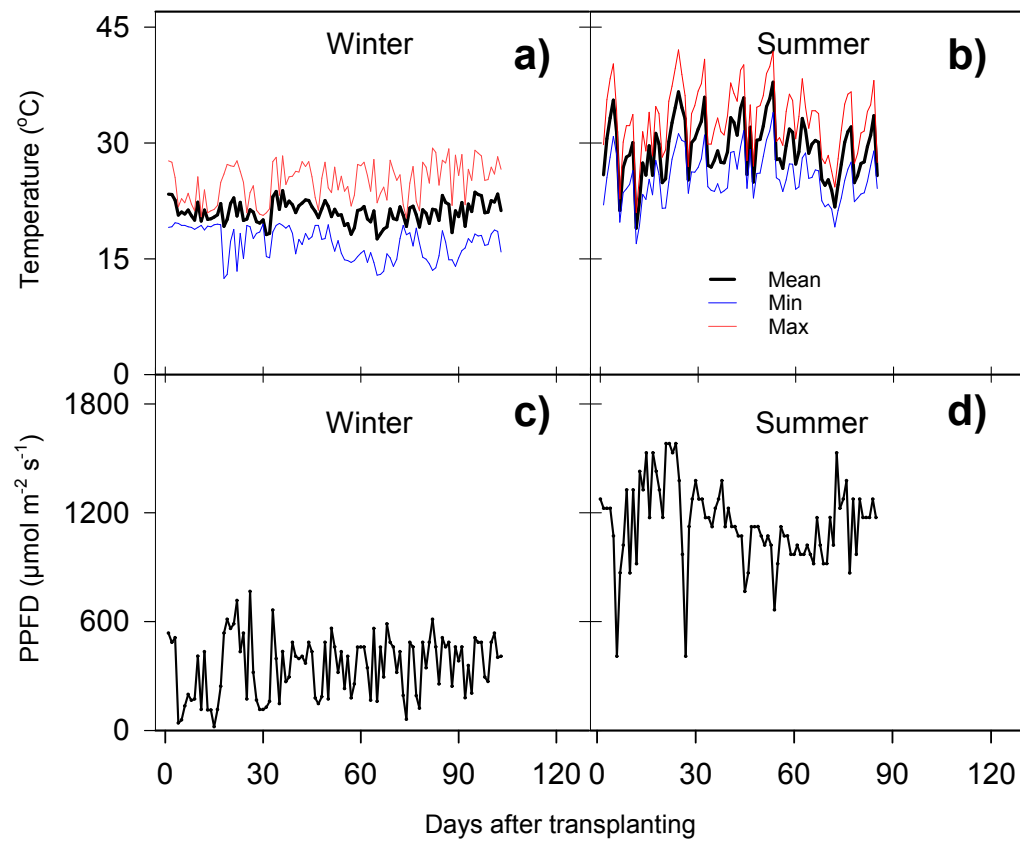


Fig. S1. Temperatures (a & b) and sunlight as photosynthetic photon flux density (PPFD) (c & d) recorded in the glasshouses during both rhizotron experiments in glasses.

Table S1. Pearson's correlation matrix of variables measured in winter experiment. Values represent Pearson's correlation coefficient (r). Symbols indicate *, significant at $P < 0.05$, **, significant at $P < 0.01$, ***, significant at $P < 0.001$, and ns, not significant.

Name of variables	Abbreviation of variable	RRDD	Culm DW	Root DW	Leaf DW	Shoot DW	DW
Rate of root depth development	RRDD						
Culm dry weight	Culm DW	-0.17 ns					
Root dry weight	Root DW	0 ns	0.58 ***				
Leaf dry weight	Leaf DW	-0.15 ns	0.91 ***	0.58 ***			
Shoot dry weight	Shoot DW	-0.17 ns	0.99 ***	0.59 ***			
Total dry weight	DW	-0.16 ns	0.99 ***	0.63 ***	0.96 ***	1 ***	
Culm fraction	CF	-0.11 ns	0.03 ns	-0.41 *	-0.3 ns	-0.07 ns	-0.09 ns
Root fraction	RF	0.29 ns	-0.35 ns	0.41 *	-0.3 ns	-0.34 ns	-0.31 ns
Leaf fraction	LF	-0.05 ns	0.18 ns	0.23 ns	0.53 **	0.29 ns	0.29 ns
Shoot fraction	SF	-0.29 ns	0.35 ns	-0.41 *	0.3 ns	0.34 ns	0.31 ns
Leaf area	LA	-0.08 ns	0.91 ***	0.59 ***	0.95 ***	0.94 ***	0.94 ***
culm-leaf dry weight ratio	CLR	-0.03 ns	-0.24 ns	-0.39 *	-0.52 **	-0.33 ns	-0.34 ns
Root-shoot dry weight ratio	RSR	0.29 ns	-0.35 ns	0.39 *	-0.31 ns	-0.35 ns	-0.31 ns
Specific leaf area	SLA	0.29 ns	-0.23 ns	-0.09 ns	-0.3 ns	-0.26 ns	-0.25 ns
Photosynthetic rate	Pn	-0.1 ns	-0.1 ns	0.14 ns	0.04 ns	-0.06 ns	-0.05 ns
Transpiration rate	Tr	-0.16 ns	-0.11 ns	-0.07 ns	-0.04 ns	-0.09 ns	-0.09 ns
Tiller appearance rate	TAR	0.15 ns	0.07 ns	0.11 ns	0.12 ns	0.09 ns	0.09 ns
Root angle	RA	-0.31 ns	0.11 ns	0.09 ns	0.1 ns	0.11 ns	0.11 ns
Root length in 0-10 cm section	RL0-10	-0.03 ns	0.64 ***	0.7 ***	0.65 ***	0.66 ***	0.67 ***
Root length in 10-20 cm section	RL10-20	-0.05 ns	0.77 ***	0.6 ***	0.72 ***	0.77 ***	0.78 ***
Root length in 20-30 cm section	RL20-30	-0.12 ns	0.8 ***	0.69 ***	0.77 ***	0.81 ***	0.82 ***
Root length in 30-40 cm section	RL30-40	-0.13 ns	0.73 ***	0.75 ***	0.7 ***	0.73 ***	0.75 ***
Root length in 40-50 cm section	RL40-50	-0.09 ns	0.75 ***	0.74 ***	0.77 ***	0.77 ***	0.79 ***

Name of variables	Abbreviation of variable	RRDD	Culm DW	Root DW	Leaf DW	Shoot DW	DW
Root length in 50-60 cm section	RL50-60	-0.15 ns	0.65 ***	0.63 ***	0.7 ***	0.68 ***	0.69 ***
Root length in 60-115 cm section	RL60-100	-0.33 ns	0.52 **	0.5 **	0.43 *	0.51 **	0.52 **
Total root length in 0-20 cm section	RL	-0.12 ns	0.84 ***	0.79 ***	0.82 ***	0.85 ***	0.86 ***
Active root length in 0-10 cm section	Active RL0-10	-0.05 ns	-0.02 ns	0.24 ns	0 ns	-0.01 ns	0 ns
Active root length in 10-20 cm section	Active RL10-20	0.18 ns	0.31 ns	0.52 **	0.33 ns	0.32 ns	0.34 ns
Active root length in 20-30 cm section	Active RL20-30	0.03 ns	0.72 ***	0.65 ***	0.72 ***	0.73 ***	0.75 ***
Active root length in 30-40 cm section	Active RL30-40	0.19 ns	0.66 ***	0.78 ***	0.62 ***	0.66 ***	0.68 ***
Active root length in 40-50 cm section	Active RL40-50	0.19 ns	0.71 ***	0.7 ***	0.69 ***	0.72 ***	0.73 ***
Active root length in 50-60 cm section	Active RL50-60	0.05 ns	0.6 ***	0.65 ***	0.65 ***	0.63 ***	0.64 ***
Active root length in 60-115 cm section	Active RL60-100	-0.15 ns	0.72 ***	0.76 ***	0.66 ***	0.71 ***	0.73 ***
Total Active root length in 0-20 cm section	Active RL	0.13 ns	0.72 ***	0.79 ***	0.71 ***	0.73 ***	0.75 ***
Percentage of Active root length	Active RL %	0.41 *	0.31 ns	0.47 **	0.32 ns	0.32 ns	0.34 ns
inactive root length in 0-10 cm section	Inactive RL0-10	-0.01 ns	0.72 ***	0.67 ***	0.72 ***	0.73 ***	0.74 ***
inactive root length in 10-20 cm section	Inactive RL10-20	-0.19 ns	0.7 ***	0.36 *	0.62 ***	0.69 ***	0.68 ***
inactive root length in 20-30 cm section	Inactive RL20-30	-0.18 ns	0.49 **	0.43 *	0.44 *	0.48 **	0.49 **
inactive root length in 30-40 cm section	Inactive RL30-40	-0.44 *	0.49 **	0.41 *	0.48 **	0.5 **	0.5 **
inactive root length in 40-50 cm section	Inactive RL40-50	-0.59 ***	0.25 ns	0.3 ns	0.3 ns	0.26 ns	0.27 ns
inactive root length in 50-60 cm section	Inactive RL50-60	-0.38 *	0.31 ns	0.23 ns	0.29 ns	0.31 ns	0.31 ns
inactive root length in 60-115 cm section	Inactive RL60-100	-0.36 ns	0.2 ns	0.16 ns	0.12 ns	0.18 ns	0.18 ns
Total inactive root length in 0-20 cm section	Inactive RL	-0.33 ns	0.71 ***	0.55 **	0.68 ***	0.71 ***	0.72 ***
Percentage of root length in 0-10 cm section	%RL0_10	0.04 ns	-0.67 ***	-0.41 *	-0.7 ***	-0.69 ***	-0.69 ***
Percentage of root length in 10-20 cm section	%RL10_20	0.00 ns	-0.52 **	-0.3 ns	-0.63 ***	-0.56 **	-0.56 **
Percentage of root length in 20-30 cm section	%RL20_30	0.07 ns	-0.05 ns	0.23 ns	-0.12 ns	-0.08 ns	-0.06 ns
Percentage of root length in 30-40 cm section	%RL30_40	0.15 ns	-0.11 ns	0.26 ns	-0.18 ns	-0.13 ns	-0.11 ns
Percentage of root length in 40-50 cm section	%RL40_50	0.13 ns	0.04 ns	0.39 *	0 ns	0.03 ns	0.05 ns
Percentage of root length in 50-60 cm section	%RL50_60	0.02 ns	0.09 ns	0.3 ns	0.12 ns	0.1 ns	0.12 ns

Name of variables	Abbreviation of variable	RRDD	Culm DW	Root DW	Leaf DW	Shoot DW	DW
Percentage of root length in 60-115 cm section	%RL60_100	-0.28 ns	0.21 ns	0.32 ns	0.14 ns	0.2 ns	0.21 ns
Percentage of inactive root length in 0-10 cm section	%Inactive RL0-10	0.05 ns	-0.6 ***	-0.43 *	-0.63 ***	-0.62 ***	-0.63 ***
Percentage of inactive root length in 10-20 cm section	%Inactive RL10-20	-0.18 ns	-0.12 ns	-0.21 ns	-0.24 ns	-0.16 ns	-0.16 ns
Percentage of inactive root length in 20-30 cm section	%Inactive RL20-30	-0.13 ns	-0.11 ns	0.09 ns	-0.16 ns	-0.12 ns	-0.12 ns
Percentage of inactive root length in 30-40 cm section	%Inactive RL30-40	-0.39 *	0.01 ns	0.05 ns	-0.05 ns	-0.01 ns	0 ns
Percentage of inactive root length in 40-50 cm section	%Inactive RL40-50	-0.52 **	-0.02 ns	0.06 ns	-0.03 ns	-0.02 ns	-0.02 ns
Percentage of inactive root length in 50-60 cm section	%Inactive RL50-60	-0.37 *	0.1 ns	0.09 ns	0.06 ns	0.09 ns	0.09 ns
Percentage of inactive root length in 60-115 cm section	%Inactive RL60-100	-0.37 *	0.14 ns	0.15 ns	0.07 ns	0.13 ns	0.13 ns
Percentage of inactive root length	Inactive RL %	-0.64 ***	-0.31 ns	-0.47 **	-0.32 ns	-0.32 ns	-0.34 ns
Root length density in 0-10 cm section	RLD0-10	-0.03 ns	0.64 ***	0.7 ***	0.65 ***	0.66 ***	0.67 ***
Root length density in 10-20 cm section	RLD10-20	-0.05 ns	0.77 ***	0.6 ***	0.72 ***	0.77 ***	0.78 ***
Root length density in 20-30 cm section	RLD20-30	-0.12 ns	0.8 ***	0.69 ***	0.77 ***	0.81 ***	0.82 ***
Root length density in 30-40 cm section	RLD30-40	-0.13 ns	0.73 ***	0.75 ***	0.7 ***	0.73 ***	0.75 ***
Root length density in 40-50 cm section	RLD40-50	-0.09 ns	0.75 ***	0.74 ***	0.77 ***	0.77 ***	0.79 ***
Root length density in 50-60 cm section	RLD50-60	-0.15 ns	0.65 ***	0.63 ***	0.7 ***	0.68 ***	0.69 ***
Root length density in 60-115 cm section	RLD60-100	-0.33 ns	0.52 **	0.5 **	0.43 *	0.51 **	0.52 **
Root length density in Root zone	RLDrz	-0.18 ns	0.7 ***	0.74 ***	0.68 ***	0.71 ***	0.73 ***
Root length in 0-20 cm section	RL0-20	-0.04 ns	0.75 ***	0.7 ***	0.73 ***	0.76 ***	0.77 ***
Root length in 0-30 cm section	RL0-30	-0.09 ns	0.75 ***	0.69 ***	0.72 ***	0.75 ***	0.77 ***
Root length in 0-40 cm section	RL0-40	-0.15 ns	0.75 ***	0.68 ***	0.72 ***	0.76 ***	0.77 ***
Root length in 0-50 cm section	RL0-50	-0.19 ns	0.74 ***	0.68 ***	0.72 ***	0.75 ***	0.76 ***
Root length in 0-60 cm section	RL0-60	-0.21 ns	0.75 ***	0.68 ***	0.72 ***	0.75 ***	0.77 ***
Root length density in 0-20 cm section	RLD0-20	-0.04 ns	0.75 ***	0.7 ***	0.73 ***	0.76 ***	0.77 ***

Name of variables	Abbreviation of variable	RRDD	Culm DW	Root DW	Leaf DW	Shoot DW	DW
Root length density in 0-30 cm section	RLD0-30	-0.09 ns	0.75 ***	0.69 ***	0.72 ***	0.75 ***	0.77 ***
Root length density in 0-40 cm section	RLD0-40	-0.15 ns	0.75 ***	0.68 ***	0.72 ***	0.76 ***	0.77 ***
Root length density in 0-50 cm section	RLD0-50	-0.19 ns	0.74 ***	0.68 ***	0.72 ***	0.75 ***	0.76 ***
Root length density in 0-60 cm section	RLD0-60	-0.21 ns	0.75 ***	0.68 ***	0.72 ***	0.75 ***	0.77 ***
specific root length	SRL	-0.07 ns	0.14 ns	-0.54 **	0.18 ns	0.16 ns	0.12 ns
Average root diameter	ARD	-0.06 ns	-0.09 ns	-0.11 ns	-0.04 ns	-0.08 ns	-0.08 ns
Root tissue density	RTD	0.29 ns	0.02 ns	0.61 ***	0 ns	0.01 ns	0.05 ns
Root length with diameter <0.2mm	RL<0.2mm	-0.07 ns	0.78 ***	0.74 ***	0.75 ***	0.78 ***	0.8 ***
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	-0.2 ns	0.76 ***	0.64 ***	0.75 ***	0.77 ***	0.78 ***
Root length with diameter 0.5-1mm	RL0.5-1mm	-0.22 ns	0.86 ***	0.63 ***	0.84 ***	0.87 ***	0.88 ***
Root length with diameter 1-2mm	RL1-2mm	-0.14 ns	0.68 ***	0.75 ***	0.72 ***	0.7 ***	0.72 ***
Root length with diameter >2mm	RL>2mm	-0.08 ns	0.24 ns	0.57 **	0.28 ns	0.26 ns	0.28 ns
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.17 ns	0.19 ns	0.32 ns	0.17 ns	0.19 ns	0.2 ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.13 ns	-0.28 ns	-0.39 *	-0.28 ns	-0.29 ns	-0.3 ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.20 ns	-0.01 ns	-0.35 ns	-0.04 ns	-0.02 ns	-0.04 ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	-0.05 ns	0.04 ns	0.25 ns	0.15 ns	0.07 ns	0.09 ns
Percentage of root length with diameter >2mm	%RL>2mm	0.05 ns	-0.29 ns	0.07 ns	-0.24 ns	-0.28 ns	-0.27 ns
		CF	RF	LF	SF	LA	CLR
Root fraction	RF	-0.51 **					
Leaf fraction	LF	-0.85 ***	-0.01 ns				
Shoot fraction	SF	0.51 **	-1 ***	0.01 ns			
Leaf area	LA	-0.22 ns	-0.26 ns	0.42 *	0.26 ns		
culm-leaf dry weight ratio	CLR	0.89 ***	-0.2 ns	-0.92 ***	0.2 ns	-0.47 **	
Root-shoot dry weight ratio	RSR	-0.5 **	1 ***	-0.02 ns	-1 ***	-0.27 ns	-0.19 ns

Name of variables	Abbreviation of variable	CF	RF	LF	SF	LA	CLR
Specific leaf area	SLA	0.02 ns	0.33 ns	-0.22 ns	-0.33 ns	-0.06 ns	0.06 ns
Photosynthetic rate	Pn	-0.21 ns	0.18 ns	0.13 ns	-0.18 ns	-0.09 ns	-0.06 ns
Transpiration rate	Tr	-0.09 ns	0.05 ns	0.07 ns	-0.05 ns	-0.19 ns	-0.02 ns
Tiller appearance rate	TAR	-0.17 ns	0.12 ns	0.13 ns	-0.12 ns	0.16 ns	-0.1 ns
Root angle	RA	-0.07 ns	-0.05 ns	0.11 ns	0.05 ns	0 ns	-0.1 ns
Root length in 0-10 cm section	RL0-10	-0.38 *	0.16 ns	0.35 ns	-0.16 ns	0.69 ***	-0.51 **
Root length in 10-20 cm section	RL10-20	-0.16 ns	-0.08 ns	0.24 ns	0.08 ns	0.76 ***	-0.34 ns
Root length in 20-30 cm section	RL20-30	-0.22 ns	-0.05 ns	0.28 ns	0.05 ns	0.81 ***	-0.38 *
Root length in 30-40 cm section	RL30-40	-0.25 ns	0.08 ns	0.24 ns	-0.08 ns	0.68 ***	-0.35 ns
Root length in 40-50 cm section	RL40-50	-0.29 ns	0 ns	0.34 ns	0 ns	0.77 ***	-0.43 *
Root length in 50-60 cm section	RL50-60	-0.29 ns	-0.04 ns	0.36 *	0.04 ns	0.58 ***	-0.38 *
Root length in 60-115 cm section	RL60-100	0.01 ns	-0.03 ns	0 ns	0.03 ns	0.4 *	-0.11 ns
Total root length in 0-20 cm section	RL	-0.29 ns	0.02 ns	0.32 ns	-0.02 ns	0.83 ***	-0.45 *
Active root length in 0-10 cm section	Active RL0-10	-0.24 ns	0.37 *	0.05 ns	-0.37 *	0.05 ns	-0.15 ns
Active root length in 10-20 cm section	Active RL10-20	-0.3 ns	0.26 ns	0.19 ns	-0.26 ns	0.42 *	-0.29 ns
Active root length in 20-30 cm section	Active RL20-30	-0.15 ns	-0.13 ns	0.26 ns	0.13 ns	0.75 ***	-0.3 ns
Active root length in 30-40 cm section	Active RL30-40	-0.25 ns	0.19 ns	0.18 ns	-0.19 ns	0.65 ***	-0.33 ns
Active root length in 40-50 cm section	Active RL40-50	-0.19 ns	0.03 ns	0.21 ns	-0.03 ns	0.75 ***	-0.33 ns
Active root length in 50-60 cm section	Active RL50-60	-0.27 ns	0.01 ns	0.32 ns	-0.01 ns	0.59 ***	-0.37 *
Active root length in 60-115 cm section	Active RL60-100	-0.07 ns	0.01 ns	0.08 ns	-0.01 ns	0.69 ***	-0.21 ns
Total Active root length in 0-20 cm section	Active RL	-0.28 ns	0.13 ns	0.25 ns	-0.13 ns	0.75 ***	-0.38 *
Percentage of Active root length	Active RL %	-0.27 ns	0.25 ns	0.16 ns	-0.25 ns	0.36 *	-0.25 ns
inactive root length in 0-10 cm section	Inactive RL0-10	-0.32 ns	0.01 ns	0.36 ns	-0.01 ns	0.74 ***	-0.5 **
inactive root length in 10-20 cm section	Inactive RL10-20	0.04 ns	-0.29 ns	0.13 ns	0.29 ns	0.6 ***	-0.18 ns
inactive root length in 20-30 cm section	Inactive RL20-30	-0.15 ns	0.05 ns	0.14 ns	-0.05 ns	0.46 *	-0.24 ns

Name of variables	Abbreviation of variable	CF	RF	LF	SF	LA	CLR
inactive root length in 30-40 cm section	Inactive RL30-40	-0.09 ns	-0.1 ns	0.17 ns	0.1 ns	0.41 *	-0.17 ns
inactive root length in 40-50 cm section	Inactive RL40-50	-0.18 ns	-0.05 ns	0.24 ns	0.05 ns	0.19 ns	-0.19 ns
inactive root length in 50-60 cm section	Inactive RL50-60	-0.06 ns	-0.08 ns	0.12 ns	0.08 ns	0.18 ns	-0.07 ns
inactive root length in 60-115 cm section	Inactive RL60-100	0.08 ns	-0.05 ns	-0.06 ns	0.05 ns	0.04 ns	0.02 ns
Total inactive root length in 0-20 cm section	Inactive RL	-0.2 ns	-0.1 ns	0.3 ns	0.1 ns	0.66 ***	-0.39 *
Percentage of root length in 0-10 cm section	%RL0_10	0.35 ns	0.18 ns	-0.51 **	-0.18 ns	-0.72 ***	0.6 ***
Percentage of root length in 10-20 cm section	%RL10_20	0.34 ns	0.27 ns	-0.56 **	-0.27 ns	-0.64 ***	0.6 ***
Percentage of root length in 20-30 cm section	%RL20_30	-0.18 ns	0.55 **	-0.12 ns	-0.55 **	-0.12 ns	-0.04 ns
Percentage of root length in 30-40 cm section	%RL30_40	-0.16 ns	0.57 ***	-0.16 ns	-0.57 ***	-0.23 ns	0 ns
Percentage of root length in 40-50 cm section	%RL40_50	-0.22 ns	0.45 *	-0.02 ns	-0.45 *	-0.06 ns	-0.11 ns
Percentage of root length in 50-60 cm section	%RL50_60	-0.21 ns	0.24 ns	0.1 ns	-0.24 ns	-0.04 ns	-0.12 ns
Percentage of root length in 60-115 cm section	%RL60_100	0 ns	0.09 ns	-0.06 ns	-0.09 ns	0.08 ns	-0.04 ns
Percentage of inactive root length in 0-10 cm section	%Inactive RL0-10	0.39 *	0.05 ns	-0.48 **	-0.05 ns	-0.66 ***	0.6 ***
Percentage of inactive root length in 10-20 cm section	%Inactive RL10-20	0.21 ns	0.04 ns	-0.27 ns	-0.04 ns	-0.29 ns	0.23 ns
Percentage of inactive root length in 20-30 cm section	%Inactive RL20-30	-0.14 ns	0.45 *	-0.11 ns	-0.45 *	-0.13 ns	-0.03 ns
Percentage of inactive root length in 30-40 cm section	%Inactive RL30-40	0.06 ns	0.07 ns	-0.11 ns	-0.07 ns	-0.1 ns	0.11 ns
Percentage of inactive root length in 40-50 cm section	%Inactive RL40-50	-0.04 ns	0.08 ns	-0.01 ns	-0.08 ns	-0.12 ns	0.05 ns
Percentage of inactive root length in 50-60 cm section	%Inactive RL50-60	0.01 ns	0.08 ns	-0.06 ns	-0.08 ns	-0.03 ns	0.1 ns
Percentage of inactive root length in 60-115 cm section	%Inactive RL60-100	0.06 ns	-0.01 ns	-0.06 ns	0.01 ns	0 ns	0.02 ns
Percentage of inactive root length	Inactive RL %	0.27 ns	-0.25 ns	-0.16 ns	0.25 ns	-0.36 *	0.25 ns
Root length density in 0-10 cm section	RLD0-10	-0.38 *	0.16 ns	0.35 ns	-0.16 ns	0.69 ***	-0.51 **
Root length density in 10-20 cm section	RLD10-20	-0.16 ns	-0.08 ns	0.24 ns	0.08 ns	0.76 ***	-0.34 ns
Root length density in 20-30 cm section	RLD20-30	-0.22 ns	-0.05 ns	0.28 ns	0.05 ns	0.81 ***	-0.38 *
Root length density in 30-40 cm section	RLD30-40	-0.25 ns	0.08 ns	0.24 ns	-0.08 ns	0.68 ***	-0.35 ns
Root length density in 40-50 cm section	RLD40-50	-0.29 ns	0 ns	0.34 ns	0 ns	0.77 ***	-0.43 *

Name of variables	Abbreviation of variable	CF	RF	LF	SF	LA	CLR
Root length density in 50-60 cm section	RLD50-60	-0.29 ns	-0.04 ns	0.36 *	0.04 ns	0.58 ***	-0.38 *
Root length density in 60-115 cm section	RLD60-100	0.01 ns	-0.03 ns	0 ns	0.03 ns	0.4 *	-0.11 ns
Root length density in Root zone	RLDrz	-0.33 ns	0.12 ns	0.31 ns	-0.12 ns	0.68 ***	-0.43 *
Root length in 0-20 cm section	RL0-20	-0.29 ns	0.04 ns	0.32 ns	-0.04 ns	0.77 ***	-0.46 *
Root length in 0-30 cm section	RL0-30	-0.28 ns	0.05 ns	0.3 ns	-0.05 ns	0.76 ***	-0.44 *
Root length in 0-40 cm section	RL0-40	-0.27 ns	0.03 ns	0.29 ns	-0.03 ns	0.75 ***	-0.42 *
Root length in 0-50 cm section	RL0-50	-0.27 ns	0.02 ns	0.3 ns	-0.02 ns	0.73 ***	-0.42 *
Root length in 0-60 cm section	RL0-60	-0.27 ns	0.02 ns	0.3 ns	-0.02 ns	0.73 ***	-0.42 *
Root length density in 0-20 cm section	RLD0-20	-0.29 ns	0.04 ns	0.32 ns	-0.04 ns	0.77 ***	-0.46 *
Root length density in 0-30 cm section	RLD0-30	-0.28 ns	0.05 ns	0.3 ns	-0.05 ns	0.76 ***	-0.44 *
Root length density in 0-40 cm section	RLD0-40	-0.27 ns	0.03 ns	0.29 ns	-0.03 ns	0.75 ***	-0.42 *
Root length density in 0-50 cm section	RLD0-50	-0.27 ns	0.02 ns	0.3 ns	-0.02 ns	0.73 ***	-0.42 *
Root length density in 0-60 cm section	RLD0-60	-0.27 ns	0.02 ns	0.3 ns	-0.02 ns	0.73 ***	-0.42 *
specific root length	SRL	0.3 ns	-0.63 ***	0.03 ns	0.63 ***	0.19 ns	0.07 ns
Average root diameter	ARD	-0.09 ns	-0.15 ns	0.19 ns	0.15 ns	-0.03 ns	-0.19 ns
Root tissue density	RTD	-0.35 ns	0.72 ***	-0.03 ns	-0.72 ***	0 ns	-0.13 ns
Root length with diameter <0.2mm	RL<0.2mm	-0.22 ns	0.03 ns	0.24 ns	-0.03 ns	0.74 ***	-0.36 ns
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	-0.26 ns	-0.05 ns	0.34 ns	0.05 ns	0.78 ***	-0.43 *
Root length with diameter 0.5-1mm	RL0.5-1mm	-0.19 ns	-0.2 ns	0.34 ns	0.2 ns	0.86 ***	-0.41 *
Root length with diameter 1-2mm	RL1-2mm	-0.37 *	0.06 ns	0.39 *	-0.06 ns	0.75 ***	-0.51 **
Root length with diameter >2mm	RL>2mm	-0.39 *	0.39 *	0.21 ns	-0.39 *	0.28 ns	-0.39 *
Percentage of root length with diameter <0.2mm	%RL<0.2mm	-0.16 ns	0.28 ns	0.02 ns	-0.28 ns	0.16 ns	-0.13 ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	0.18 ns	-0.18 ns	-0.11 ns	0.18 ns	-0.25 ns	0.23 ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	0.35 ns	-0.52 **	-0.09 ns	0.52 **	-0.05 ns	0.25 ns

Name of variables	Abbreviation of variable	CF	RF	LF	SF	LA	CLR
Percentage of root length with diameter 1-2mm	%RL1-2mm	-0.39 *	0.09 ns	0.4 *	-0.09 ns	0.18 ns	-0.48 **
Percentage of root length with diameter >2mm	%RL>2mm	-0.22 ns	0.37 *	0.04 ns	-0.37 *	-0.25 ns	-0.15 ns
		RSR	SLA	Pn	Tr	TAR	RA
Specific leaf area	SLA	0.33 ns					
Photosynthetic rate	Pn	0.17 ns	-0.32 ns				
Transpiration rate	Tr	0.05 ns	-0.36 ns	0.78 ***			
Tiller appearance rate	TAR	0.12 ns	0.23 ns	-0.01 ns	0.06 ns		
Root angle	RA	-0.04 ns	-0.37 *	-0.08 ns	0.05 ns	-0.07 ns	
Root length in 0-10 cm section	RL0-10	0.15 ns	-0.06 ns	-0.08 ns	-0.07 ns	0.23 ns	0.3 ns
Root length in 10-20 cm section	RL10-20	-0.09 ns	-0.09 ns	-0.2 ns	-0.24 ns	0.15 ns	0.19 ns
Root length in 20-30 cm section	RL20-30	-0.06 ns	-0.03 ns	-0.08 ns	-0.18 ns	0.13 ns	0.07 ns
Root length in 30-40 cm section	RL30-40	0.08 ns	-0.16 ns	-0.02 ns	-0.12 ns	0.12 ns	0.23 ns
Root length in 40-50 cm section	RL40-50	-0.01 ns	-0.15 ns	0.01 ns	-0.19 ns	0.06 ns	0.06 ns
Root length in 50-60 cm section	RL50-60	-0.05 ns	-0.38 *	0.33 ns	0.17 ns	-0.07 ns	0.09 ns
Root length in 60-115 cm section	RL60-100	-0.04 ns	-0.22 ns	0.14 ns	-0.03 ns	-0.04 ns	-0.04 ns
Total root length in 0-20 cm section	RL	0.01 ns	-0.13 ns	-0.05 ns	-0.15 ns	0.15 ns	0.19 ns
Active root length in 0-10 cm section	Active RL0-10	0.38 *	0.17 ns	-0.2 ns	-0.22 ns	0.33 ns	0.25 ns
Active root length in 10-20 cm section	Active RL10-20	0.26 ns	0.16 ns	-0.18 ns	-0.36 ns	0.17 ns	-0.16 ns
Active root length in 20-30 cm section	Active RL20-30	-0.15 ns	-0.14 ns	-0.03 ns	-0.22 ns	0.04 ns	-0.09 ns
Active root length in 30-40 cm section	Active RL30-40	0.19 ns	-0.05 ns	-0.02 ns	-0.13 ns	0 ns	-0.12 ns
Active root length in 40-50 cm section	Active RL40-50	0.02 ns	-0.03 ns	-0.05 ns	-0.19 ns	0.04 ns	-0.18 ns
Active root length in 50-60 cm section	Active RL50-60	0 ns	-0.26 ns	0.23 ns	0.07 ns	-0.11 ns	-0.07 ns

Name of variables	Abbreviation of variable	RSR	SLA	Pn	Tr	TAR	RA
Active root length in 60-115 cm section	Active RL60-100	0 ns	-0.1 ns	0.06 ns	-0.15 ns	-0.06 ns	-0.07 ns
Total Active root length in 0-20 cm section	Active RL	0.12 ns	-0.05 ns	-0.06 ns	-0.22 ns	0.09 ns	-0.1 ns
Percentage of Active root length	Active RL %	0.25 ns	0.06 ns	-0.06 ns	-0.16 ns	0.24 ns	-0.3 ns
inactive root length in 0-10 cm section	Inactive RL0-10	0 ns	-0.13 ns	-0.01 ns	0.02 ns	0.11 ns	0.22 ns
inactive root length in 10-20 cm section	Inactive RL10-20	-0.3 ns	-0.22 ns	-0.1 ns	-0.03 ns	0.04 ns	0.32 ns
inactive root length in 20-30 cm section	Inactive RL20-30	0.05 ns	0.08 ns	-0.1 ns	-0.08 ns	0.12 ns	0.15 ns
inactive root length in 30-40 cm section	Inactive RL30-40	-0.11 ns	-0.2 ns	-0.02 ns	-0.1 ns	0.18 ns	0.5 **
inactive root length in 40-50 cm section	Inactive RL40-50	-0.06 ns	-0.25 ns	0.07 ns	-0.09 ns	0.01 ns	0.44 *
inactive root length in 50-60 cm section	Inactive RL50-60	-0.09 ns	-0.26 ns	0.17 ns	0.12 ns	0.04 ns	0.26 ns
inactive root length in 60-115 cm section	Inactive RL60-100	-0.06 ns	-0.23 ns	0.13 ns	0.05 ns	-0.02 ns	-0.01 ns
Total inactive root length in 0-20 cm section	Inactive RL	-0.11 ns	-0.18 ns	-0.04 ns	-0.03 ns	0.15 ns	0.42 *
Percentage of root length in 0-10 cm section	%RL0_10	0.18 ns	-0.12 ns	0.19 ns	0.21 ns	-0.22 ns	-0.11 ns
Percentage of root length in 10-20 cm section	%RL10_20	0.27 ns	-0.02 ns	0.08 ns	0.16 ns	0.12 ns	-0.05 ns
Percentage of root length in 20-30 cm section	%RL20_30	0.55 **	0.3 ns	0.09 ns	0.07 ns	0.3 ns	0.1 ns
Percentage of root length in 30-40 cm section	%RL30_40	0.57 ***	0.02 ns	0.06 ns	0.05 ns	0.19 ns	0.3 ns
Percentage of root length in 40-50 cm section	%RL40_50	0.45 *	-0.07 ns	0.04 ns	-0.08 ns	0.07 ns	0.22 ns
Percentage of root length in 50-60 cm section	%RL50_60	0.24 ns	-0.26 ns	0.39 *	0.28 ns	-0.11 ns	0.18 ns
Percentage of root length in 60-115 cm section	%RL60_100	0.08 ns	-0.23 ns	0.15 ns	0 ns	-0.04 ns	0 ns
Percentage of inactive root length in 0-10 cm section	%Inactive RL0-10	0.05 ns	-0.19 ns	0.24 ns	0.26 ns	-0.29 ns	-0.17 ns
Percentage of inactive root length in 10-20 cm section	%Inactive RL10-20	0.05 ns	-0.16 ns	0.1 ns	0.22 ns	-0.14 ns	0.32 ns
Percentage of inactive root length in 20-30 cm section	%Inactive RL20-30	0.46 *	0.38 *	0.01 ns	0.09 ns	0.22 ns	0.13 ns
Percentage of inactive root length in 30-40 cm section	%Inactive RL30-40	0.07 ns	0.03 ns	-0.03 ns	-0.06 ns	0.13 ns	0.54 **

Name of variables	Abbreviation of variable	RSR	SLA	Pn	Tr	TAR	RA
Percentage of inactive root length in 40-50 cm section	%Inactive RL40-50	0.08 ns	-0.03 ns	0.02 ns	-0.09 ns	0.01 ns	0.43 *
Percentage of inactive root length in 50-60 cm section	%Inactive RL50-60	0.08 ns	-0.05 ns	0.15 ns	0.07 ns	0.02 ns	0.28 ns
Percentage of inactive root length in 60-115 cm section	%Inactive RL60-100	-0.02 ns	-0.23 ns	0.14 ns	0.04 ns	0.02 ns	0.01 ns
Percentage of inactive root length	Inactive RL %	-0.25 ns	-0.06 ns	0.06 ns	0.16 ns	-0.24 ns	0.3 ns
Root length density in 0-10 cm section	RLD0-10	0.15 ns	-0.06 ns	-0.08 ns	-0.07 ns	0.23 ns	0.3 ns
Root length density in 10-20 cm section	RLD10-20	-0.09 ns	-0.09 ns	-0.2 ns	-0.24 ns	0.15 ns	0.19 ns
Root length density in 20-30 cm section	RLD20-30	-0.06 ns	-0.03 ns	-0.08 ns	-0.18 ns	0.13 ns	0.07 ns
Root length density in 30-40 cm section	RLD30-40	0.08 ns	-0.16 ns	-0.02 ns	-0.12 ns	0.12 ns	0.23 ns
Root length density in 40-50 cm section	RLD40-50	-0.01 ns	-0.15 ns	0.01 ns	-0.19 ns	0.06 ns	0.06 ns
Root length density in 50-60 cm section	RLD50-60	-0.05 ns	-0.38 *	0.33 ns	0.17 ns	-0.07 ns	0.09 ns
Root length density in 60-115 cm section	RLD60-100	-0.04 ns	-0.22 ns	0.14 ns	-0.03 ns	-0.04 ns	-0.04 ns
Root length density in Root zone	RLDrz	0.11 ns	-0.15 ns	-0.14 ns	-0.15 ns	0.25 ns	0.39 *
Root length in 0-20 cm section	RL0-20	0.03 ns	-0.08 ns	-0.15 ns	-0.16 ns	0.2 ns	0.26 ns
Root length in 0-30 cm section	RL0-30	0.04 ns	-0.04 ns	-0.15 ns	-0.15 ns	0.2 ns	0.25 ns
Root length in 0-40 cm section	RL0-40	0.02 ns	-0.07 ns	-0.14 ns	-0.15 ns	0.21 ns	0.31 ns
Root length in 0-50 cm section	RL0-50	0.01 ns	-0.09 ns	-0.13 ns	-0.15 ns	0.2 ns	0.33 ns
Root length in 0-60 cm section	RL0-60	0.01 ns	-0.1 ns	-0.11 ns	-0.14 ns	0.2 ns	0.34 ns
Root length density in 0-20 cm section	RLD0-20	0.03 ns	-0.08 ns	-0.15 ns	-0.16 ns	0.2 ns	0.26 ns
Root length density in 0-30 cm section	RLD0-30	0.04 ns	-0.04 ns	-0.15 ns	-0.15 ns	0.2 ns	0.25 ns
Root length density in 0-40 cm section	RLD0-40	0.02 ns	-0.07 ns	-0.14 ns	-0.15 ns	0.21 ns	0.31 ns
Root length density in 0-50 cm section	RLD0-50	0.01 ns	-0.09 ns	-0.13 ns	-0.15 ns	0.2 ns	0.33 ns
Root length density in 0-60 cm section	RLD0-60	0.01 ns	-0.1 ns	-0.11 ns	-0.14 ns	0.2 ns	0.34 ns
Specific root length	SRL	-0.61 ***	-0.02 ns	-0.31 ns	-0.15 ns	0.01 ns	-0.1 ns

Name of variables	Abbreviation of variable	RSR	SLA	Pn	Tr	TAR	RA
Average root diameter	ARD	-0.15 ns	0.12 ns	-0.03 ns	0.03 ns	-0.13 ns	-0.39 *
Root tissue density	RTD	0.71 ***	0.04 ns	0.04 ns	-0.06 ns	0.07 ns	0.06 ns
Root length with diameter <0.2mm	RL<0.2mm	0.02 ns	-0.16 ns	0 ns	-0.11 ns	0.24 ns	0.24 ns
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	-0.06 ns	-0.08 ns	-0.06 ns	-0.15 ns	0.07 ns	0.17 ns
Root length with diameter 0.5-1mm	RL0.5-1mm	-0.21 ns	-0.15 ns	0.01 ns	-0.07 ns	0.09 ns	0.1 ns
Root length with diameter 1-2mm	RL1-2mm	0.05 ns	-0.04 ns	0.08 ns	-0.11 ns	0.04 ns	0.07 ns
Root length with diameter >2mm	RL>2mm	0.39 *	-0.02 ns	0.16 ns	0.07 ns	-0.1 ns	0.03 ns
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.27 ns	-0.08 ns	0.04 ns	-0.02 ns	0.19 ns	0.32 ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.17 ns	0.15 ns	-0.13 ns	-0.04 ns	-0.17 ns	-0.23 ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.52 **	-0.13 ns	0.05 ns	0.14 ns	-0.03 ns	-0.31 ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.08 ns	0.16 ns	0.06 ns	-0.07 ns	-0.19 ns	-0.2 ns
Percentage of root length with diameter >2mm	%RL>2mm	0.37 *	-0.03 ns	0.18 ns	0.13 ns	-0.47 **	-0.11 ns
		RL0-10	RL10-20	RL20-30	RL30-40	RL40-50	RL50-60
Root length in 10-20 cm section	RL10-20	0.76 ***					
Root length in 20-30 cm section	RL20-30	0.74 ***	0.85 ***				
Root length in 30-40 cm section	RL30-40	0.73 ***	0.61 ***	0.84 ***			
Root length in 40-50 cm section	RL40-50	0.7 ***	0.61 ***	0.81 ***	0.86 ***		
Root length in 50-60 cm section	RL50-60	0.38 *	0.37 *	0.55 **	0.64 ***	0.77 ***	
Root length in 60-115 cm section	RL60-100	0.35 ns	0.37 *	0.49 **	0.53 **	0.56 **	0.64 ***
Total root length in 0-20 cm section	RL	0.87 ***	0.87 ***	0.94 ***	0.89 ***	0.88 ***	0.64 ***
Active root length in 0-10 cm section	Active RL0-10	0.41 *	0.25 ns	0.27 ns	0.37 *	0.15 ns	-0.18 ns
Active root length in 10-20 cm section	Active RL10-20	0.41 *	0.54 **	0.5 **	0.42 *	0.45 *	0.3 ns
Active root length in 20-30 cm section	Active RL20-30	0.55 **	0.76 ***	0.67 ***	0.45 *	0.66 ***	0.58 ***

Name of variables	Abbreviation of variable	RL0-10	RL10-20	RL20-30	RL30-40	RL40-50	RL50-60
Active root length in 30-40 cm section	Active RL30-40	0.61 ***	0.6 ***	0.77 ***	0.81 ***	0.79 ***	0.6 ***
Active root length in 40-50 cm section	Active RL40-50	0.59 ***	0.58 ***	0.72 ***	0.73 ***	0.87 ***	0.61 ***
Active root length in 50-60 cm section	Active RL50-60	0.34 ns	0.4 *	0.52 **	0.54 **	0.73 ***	0.81 ***
Active root length in 60-115 cm section	Active RL60-100	0.49 **	0.56 **	0.62 ***	0.63 ***	0.68 ***	0.64 ***
Total Active root length in 0-20 cm section	Active RL	0.66 ***	0.72 ***	0.81 ***	0.79 ***	0.83 ***	0.66 ***
Percentage of Active root length	Active RL %	0.27 ns	0.34 ns	0.36 ns	0.39 *	0.47 **	0.44 *
Inactive root length in 0-10 cm section	Inactive RL0-10	0.92 ***	0.73 ***	0.7 ***	0.65 ***	0.7 ***	0.5 **
Inactive root length in 10-20 cm section	Inactive RL10-20	0.59 ***	0.78 ***	0.64 ***	0.43 *	0.41 *	0.22 ns
Inactive root length in 20-30 cm section	Inactive RL20-30	0.54 **	0.51 **	0.79 ***	0.78 ***	0.56 **	0.24 ns
Inactive root length in 30-40 cm section	Inactive RL30-40	0.52 **	0.36 ns	0.53 **	0.74 ***	0.53 **	0.35 ns
Inactive root length in 40-50 cm section	Inactive RL40-50	0.33 ns	0.22 ns	0.33 ns	0.42 *	0.41 *	0.38 *
Inactive root length in 50-60 cm section	Inactive RL50-60	0.23 ns	0.13 ns	0.26 ns	0.39 *	0.29 ns	0.5 **
Inactive root length in 60-115 cm section	Inactive RL60-100	0.14 ns	0.11 ns	0.25 ns	0.3 ns	0.29 ns	0.41 *
Total Inactive root length in 0-20 cm section	Inactive RL	0.83 ***	0.76 ***	0.79 ***	0.73 ***	0.66 ***	0.43 *
Percentage of root length in 0-10 cm section	%RL0_10	-0.48 **	-0.61 ***	-0.65 ***	-0.52 **	-0.62 ***	-0.56 **
Percentage of root length in 10-20 cm section	%RL10_20	-0.36 ns	-0.24 ns	-0.43 *	-0.39 *	-0.54 **	-0.52 **
Percentage of root length in 20-30 cm section	%RL20_30	0.23 ns	0.19 ns	0.32 ns	0.32 ns	0.15 ns	0.05 ns
Percentage of root length in 30-40 cm section	%RL30_40	0.25 ns	0.02 ns	0.11 ns	0.4 *	0.17 ns	0.1 ns
Percentage of root length in 40-50 cm section	%RL40_50	0.28 ns	0.09 ns	0.19 ns	0.41 *	0.48 **	0.43 *
Percentage of root length in 50-60 cm section	%RL50_60	0.02 ns	-0.03 ns	0.07 ns	0.22 ns	0.34 ns	0.71 ***
Percentage of root length in 60-115 cm section	%RL60_100	0.19 ns	0.18 ns	0.24 ns	0.31 ns	0.35 ns	0.48 **
Percentage of Inactive root length in 0-10 cm section	%Inactive RL0-10	-0.53 **	-0.61 ***	-0.65 ***	-0.56 **	-0.6 ***	-0.48 **
Percentage of Inactive root length in 10-20 cm section	%Inactive RL10-20	-0.08 ns	-0.02 ns	-0.16 ns	-0.19 ns	-0.28 ns	-0.27 ns

Name of variables	Abbreviation of variable	RL0-10	RL10-20	RL20-30	RL30-40	RL40-50	RL50-60
Percentage of Inactive root length in 20-30 cm section	%Inactive RL20-30	0.14 ns	0.06 ns	0.27 ns	0.29 ns	0.03 ns	-0.15 ns
Percentage of Inactive root length in 30-40 cm section	%Inactive RL30-40	0.16 ns	0.04 ns	0.11 ns	0.28 ns	0.11 ns	0.04 ns
Percentage of Inactive root length in 40-50 cm section	%Inactive RL40-50	0.09 ns	0.02 ns	0.05 ns	0.13 ns	0.14 ns	0.17 ns
Percentage of Inactive root length in 50-60 cm section	%Inactive RL50-60	0.07 ns	0.03 ns	0.09 ns	0.18 ns	0.14 ns	0.35 ns
Percentage of Inactive root length in 60-115 cm section	%Inactive RL60-100	0.12 ns	0.1 ns	0.18 ns	0.22 ns	0.25 ns	0.37 *
Percentage of Inactive root length	Inactive RL %	-0.27 ns	-0.34 ns	-0.36 ns	-0.39 *	-0.47 **	-0.44 *
Root length density in 0-10 cm section	RLD0-10	1 ***	0.76 ***	0.74 ***	0.73 ***	0.7 ***	0.38 *
Root length density in 10-20 cm section	RLD10-20	0.76 ***	1 ***	0.85 ***	0.61 ***	0.61 ***	0.37 *
Root length density in 20-30 cm section	RLD20-30	0.74 ***	0.85 ***	1 ***	0.84 ***	0.81 ***	0.55 **
Root length density in 30-40 cm section	RLD30-40	0.73 ***	0.61 ***	0.84 ***	1 ***	0.86 ***	0.64 ***
Root length density in 40-50 cm section	RLD40-50	0.7 ***	0.61 ***	0.81 ***	0.86 ***	1 ***	0.77 ***
Root length density in 50-60 cm section	RLD50-60	0.38 *	0.37 *	0.55 **	0.64 ***	0.77 ***	1 ***
Root length density in 60-115 cm section	RLD60-100	0.35 ns	0.37 *	0.49 **	0.53 **	0.56 **	0.64 ***
Root length density in Root zone	RLDrz	0.88 ***	0.8 ***	0.84 ***	0.84 ***	0.77 ***	0.47 **
Root length in 0-20 cm section	RL0-20	0.94 ***	0.94 ***	0.84 ***	0.72 ***	0.7 ***	0.4 *
Root length in 0-30 cm section	RL0-30	0.92 ***	0.9 ***	0.91 ***	0.8 ***	0.73 ***	0.39 *
Root length in 0-40 cm section	RL0-40	0.91 ***	0.87 ***	0.91 ***	0.84 ***	0.74 ***	0.41 *
Root length in 0-50 cm section	RL0-50	0.9 ***	0.86 ***	0.9 ***	0.84 ***	0.74 ***	0.43 *
Root length in 0-60 cm section	RL0-60	0.9 ***	0.85 ***	0.9 ***	0.85 ***	0.75 ***	0.45 *
Root length density in 0-20 cm section	RLD0-20	0.94 ***	0.94 ***	0.84 ***	0.72 ***	0.7 ***	0.4 *
Root length density in 0-30 cm section	RLD0-30	0.92 ***	0.9 ***	0.91 ***	0.8 ***	0.73 ***	0.39 *
Root length density in 0-40 cm section	RLD0-40	0.91 ***	0.87 ***	0.91 ***	0.84 ***	0.74 ***	0.41 *
Root length density in 0-50 cm section	RLD0-50	0.9 ***	0.86 ***	0.9 ***	0.84 ***	0.74 ***	0.43 *
Root length density in 0-60 cm section	RLD0-60	0.9 ***	0.85 ***	0.9 ***	0.85 ***	0.75 ***	0.45 *

Name of variables	Abbreviation of variable	RL0-10	RL10-20	RL20-30	RL30-40	RL40-50	RL50-60
specific root length	SRL	-0.16 ns	-0.13 ns	-0.08 ns	-0.09 ns	-0.01 ns	-0.13 ns
Average root diameter	ARD	-0.29 ns	-0.02 ns	-0.02 ns	-0.19 ns	-0.15 ns	-0.01 ns
Root tissue density	RTD	0.29 ns	0.06 ns	0.09 ns	0.23 ns	0.25 ns	0.24 ns
Root length with diameter <0.2mm	RL<0.2mm	0.87 ***	0.78 ***	0.8 ***	0.81 ***	0.76 ***	0.5 **
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.76 ***	0.8 ***	0.93 ***	0.84 ***	0.82 ***	0.61 ***
Root length with diameter 0.5-1mm	RL0.5-1mm	0.7 ***	0.83 ***	0.92 ***	0.75 ***	0.82 ***	0.65 ***
Root length with diameter 1-2mm	RL1-2mm	0.72 ***	0.79 ***	0.85 ***	0.73 ***	0.74 ***	0.6 ***
Root length with diameter >2mm	RL>2mm	0.5 **	0.45 *	0.49 **	0.52 **	0.44 *	0.38 *
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.52 **	0.2 ns	0.11 ns	0.27 ns	0.18 ns	0.01 ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.48 **	-0.26 ns	-0.14 ns	-0.23 ns	-0.2 ns	-0.09 ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.54 **	-0.16 ns	-0.14 ns	-0.34 ns	-0.18 ns	0 ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.06 ns	0.17 ns	0.18 ns	0.07 ns	0.11 ns	0.23 ns
Percentage of root length with diameter >2mm	%RL>2mm	-0.08 ns	-0.14 ns	-0.15 ns	-0.08 ns	-0.15 ns	-0.05 ns
		RL60-100	RL	Active RL0-10	Active RL10-20	Active RL20-30	Active RL30-40
Total root length in 0-20 cm section	RL	0.58 ***					
Active root length in 0-10 cm section	Active RL0-10	-0.05 ns	0.29 ns				
Active root length in 10-20 cm section	Active RL10-20	0.32 ns	0.53 **	0.38 *			
Active root length in 20-30 cm section	Active RL20-30	0.41 *	0.71 ***	-0.1 ns	0.54 **		
Active root length in 30-40 cm section	Active RL30-40	0.42 *	0.79 ***	0.16 ns	0.59 ***	0.62 ***	
Active root length in 40-50 cm section	Active RL40-50	0.35 ns	0.76 ***	0.08 ns	0.52 **	0.69 ***	0.9 ***
Active root length in 50-60 cm section	Active RL50-60	0.33 ns	0.57 **	-0.11 ns	0.43 *	0.66 ***	0.69 ***
Active root length in 60-115 cm section	Active RL60-100	0.72 ***	0.7 ***	-0.03 ns	0.51 **	0.67 ***	0.65 ***
Total Active root length in 0-20 cm section	Active RL	0.48 **	0.85 ***	0.26 ns	0.78 ***	0.76 ***	0.92 ***

Name of variables	Abbreviation of variable	RL60-100	RL	Active RL0-10	Active RL10-20	Active RL20-30	Active RL30-40
Percentage of Active root length	Active RL %	0.22 ns	0.41 *	0.21 ns	0.74 ***	0.48 **	0.67 ***
Inactive root length in 0-10 cm section	Inactive RL0-10	0.41 *	0.84 ***	0.03 ns	0.29 ns	0.65 ***	0.61 ***
Inactive root length in 10-20 cm section	Inactive RL10-20	0.2 ns	0.64 ***	0 ns	-0.1 ns	0.52 **	0.3 ns
Inactive root length in 20-30 cm section	Inactive RL20-30	0.31 ns	0.68 ***	0.43 *	0.23 ns	0.1 ns	0.56 **
Inactive root length in 30-40 cm section	Inactive RL30-40	0.39 *	0.59 ***	0.39 *	0.03 ns	0.11 ns	0.23 ns
Inactive root length in 40-50 cm section	Inactive RL40-50	0.48 **	0.4 *	0.11 ns	-0.04 ns	0.12 ns	0 ns
Inactive root length in 50-60 cm section	Inactive RL50-60	0.66 ***	0.34 ns	-0.15 ns	-0.1 ns	0.09 ns	0.11 ns
Inactive root length in 60-115 cm section	Inactive RL60-100	0.85 ***	0.3 ns	-0.06 ns	0.08 ns	0.1 ns	0.14 ns
Total Inactive root length in 0-20 cm section	Inactive RL	0.51 **	0.85 ***	0.23 ns	0.12 ns	0.46 *	0.43 *
Percentage of root length in 0-10 cm section	%RL0_10	-0.32 ns	-0.65 ***	-0.04 ns	-0.32 ns	-0.53 **	-0.44 *
Percentage of root length in 10-20 cm section	%RL10_20	-0.22 ns	-0.43 *	0.1 ns	-0.12 ns	-0.37 *	-0.34 ns
Percentage of root length in 20-30 cm section	%RL20_30	0.15 ns	0.26 ns	0.43 *	0.15 ns	-0.05 ns	0.17 ns
Percentage of root length in 30-40 cm section	%RL30_40	0.15 ns	0.2 ns	0.48 **	0.12 ns	-0.17 ns	0.22 ns
Percentage of root length in 40-50 cm section	%RL40_50	0.31 ns	0.32 ns	0.26 ns	0.16 ns	0.11 ns	0.3 ns
Percentage of root length in 50-60 cm section	%RL50_60	0.41 *	0.18 ns	-0.19 ns	0.04 ns	0.18 ns	0.17 ns
Percentage of root length in 60-115 cm section	%RL60_100	0.92 ***	0.35 ns	0 ns	0.27 ns	0.2 ns	0.2 ns
Percentage of Inactive root length in 0-10 cm section	%Inactive RL0-10	-0.28 ns	-0.66 ***	-0.26 ns	-0.38 *	-0.46 **	-0.43 *
Percentage of Inactive root length in 10-20 cm section	%Inactive RL10-20	-0.21 ns	-0.17 ns	-0.1 ns	-0.53 **	-0.2 ns	-0.31 ns
Percentage of Inactive root length in 20-30 cm section	%Inactive RL20-30	0.01 ns	0.15 ns	0.51 **	0 ns	-0.35 ns	0.06 ns
Percentage of Inactive root length in 30-40 cm section	%Inactive RL30-40	0.12 ns	0.15 ns	0.41 *	-0.12 ns	-0.19 ns	-0.23 ns
Percentage of Inactive root length in 40-50 cm section	%Inactive RL40-50	0.26 ns	0.11 ns	0.17 ns	-0.14 ns	-0.1 ns	-0.28 ns
Percentage of Inactive root length in 50-60 cm section	%Inactive RL50-60	0.55 **	0.17 ns	-0.12 ns	-0.09 ns	0 ns	-0.09 ns
Percentage of Inactive root length in 60-115 cm section	%Inactive RL60-100	0.84 ***	0.26 ns	-0.03 ns	0.11 ns	0.11 ns	0.07 ns
Percentage of Inactive root length	Inactive RL %	-0.22 ns	-0.41 *	-0.21 ns	-0.74 ***	-0.48 **	-0.67 ***
Root length density in 0-10 cm section	RLD0-10	0.35 ns	0.87 ***	0.41 *	0.41 *	0.55 **	0.61 ***

Name of variables	Abbreviation of variable	RL60-100	RL	Active RL0-10	Active RL10-20	Active RL20-30	Active RL30-40
Root length density in 10-20 cm section	RLD10-20	0.37 *	0.87 ***	0.25 ns	0.54 **	0.76 ***	0.6 ***
Root length density in 20-30 cm section	RLD20-30	0.49 **	0.94 ***	0.27 ns	0.5 **	0.67 ***	0.77 ***
Root length density in 30-40 cm section	RLD30-40	0.53 **	0.89 ***	0.37 *	0.42 *	0.45 *	0.81 ***
Root length density in 40-50 cm section	RLD40-50	0.56 **	0.88 ***	0.15 ns	0.45 *	0.66 ***	0.79 ***
Root length density in 50-60 cm section	RLD50-60	0.64 ***	0.64 ***	-0.18 ns	0.3 ns	0.58 ***	0.6 ***
Root length density in 60-115 cm section	RLD60-100	1 ***	0.58 ***	-0.05 ns	0.32 ns	0.41 *	0.42 *
Root length density in Root zone	RLDrz	0.38 *	0.91 ***	0.46 **	0.47 **	0.6 ***	0.68 ***
Root length in 0-20 cm section	RL0-20	0.38 *	0.93 ***	0.36 ns	0.51 **	0.69 ***	0.64 ***
Root length in 0-30 cm section	RL0-30	0.4 *	0.95 ***	0.41 *	0.48 **	0.59 ***	0.68 ***
Root length in 0-40 cm section	RL0-40	0.42 *	0.95 ***	0.43 *	0.44 *	0.55 **	0.65 ***
Root length in 0-50 cm section	RL0-50	0.45 *	0.94 ***	0.43 *	0.41 *	0.54 **	0.63 ***
Root length in 0-60 cm section	RL0-60	0.48 **	0.95 ***	0.41 *	0.4 *	0.53 **	0.62 ***
Root length density in 0-20 cm section	RLD0-20	0.38 *	0.93 ***	0.36 ns	0.51 **	0.69 ***	0.64 ***
Root length density in 0-30 cm section	RLD0-30	0.4 *	0.95 ***	0.41 *	0.48 **	0.59 ***	0.68 ***
Root length density in 0-40 cm section	RLD0-40	0.42 *	0.95 ***	0.43 *	0.44 *	0.55 **	0.65 ***
Root length density in 0-50 cm section	RLD0-50	0.45 *	0.94 ***	0.43 *	0.41 *	0.54 **	0.63 ***
Root length density in 0-60 cm section	RLD0-60	0.48 **	0.95 ***	0.41 *	0.4 *	0.53 **	0.62 ***
specific root length	SRL	-0.1 ns	-0.13 ns	-0.08 ns	-0.23 ns	-0.15 ns	-0.21 ns
Average root diameter	ARD	0.01 ns	-0.13 ns	-0.03 ns	0.18 ns	0.06 ns	0.07 ns
Root tissue density	RTD	0.1 ns	0.21 ns	0.08 ns	0.09 ns	0.18 ns	0.32 ns
Root length with diameter <0.2mm	RL<0.2mm	0.51 **	0.9 ***	0.27 ns	0.35 ns	0.57 ***	0.65 ***
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.51 **	0.93 ***	0.29 ns	0.58 ***	0.67 ***	0.74 ***
Root length with diameter 0.5-1mm	RL0.5-1mm	0.51 **	0.91 ***	0.12 ns	0.48 **	0.78 ***	0.72 ***

Name of variables	Abbreviation of variable	RL60-100	RL	Active RL0-10	Active RL10-20	Active RL20-30	Active RL30-40
Root length with diameter 1-2mm	RL1-2mm	0.55 **	0.87 ***	0.3 ns	0.66 ***	0.73 ***	0.74 ***
Root length with diameter >2mm	RL>2mm	0.5 **	0.56 **	0.47 **	0.6 ***	0.28 ns	0.58 ***
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.12 ns	0.29 ns	0.16 ns	-0.1 ns	0.02 ns	0.09 ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.19 ns	-0.31 ns	-0.08 ns	0.09 ns	-0.14 ns	-0.15 ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.13 ns	-0.3 ns	-0.39 *	-0.19 ns	0.05 ns	-0.15 ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.21 ns	0.16 ns	0.13 ns	0.44 *	0.26 ns	0.24 ns
Percentage of root length with diameter >2mm	%RL>2mm	0.11 ns	-0.12 ns	0.22 ns	0.25 ns	-0.18 ns	0.11 ns
		Active RL40-50	Active RL50-60	Active RL60-100	Active RL	Active RL %	Inactive RL0-10
Active root length in 50-60 cm section	Active RL50-60	0.78 ***					
Active root length in 60-115 cm section	Active RL60-100	0.64 ***	0.65 ***				
Total Active root length in 0-20 cm section	Active RL	0.89 ***	0.75 ***	0.72 ***			
Percentage of Active root length	Active RL %	0.63 ***	0.6 ***	0.41 *	0.75 ***		
Inactive root length in 0-10 cm section	Inactive RL0-10	0.62 ***	0.42 *	0.55 **	0.62 ***	0.21 ns	
Inactive root length in 10-20 cm section	Inactive RL10-20	0.33 ns	0.18 ns	0.33 ns	0.29 ns	-0.15 ns	0.65 ***
Inactive root length in 20-30 cm section	Inactive RL20-30	0.44 *	0.18 ns	0.32 ns	0.48 **	0.07 ns	0.41 *
Inactive root length in 30-40 cm section	Inactive RL30-40	0.24 ns	0.16 ns	0.38 *	0.28 ns	-0.15 ns	0.41 *
Inactive root length in 40-50 cm section	Inactive RL40-50	-0.06 ns	0.08 ns	0.29 ns	0.06 ns	-0.27 ns	0.31 ns
Inactive root length in 50-60 cm section	Inactive RL50-60	-0.04 ns	-0.07 ns	0.23 ns	0.08 ns	-0.16 ns	0.31 ns
Inactive root length in 60-115 cm section	Inactive RL60-100	0.04 ns	-0.01 ns	0.25 ns	0.15 ns	-0.02 ns	0.18 ns
Total Inactive root length in 0-20 cm section	Inactive RL	0.4 *	0.22 ns	0.47 **	0.45 *	-0.06 ns	0.81 ***
Percentage of root length in 0-10 cm section	%RL0_10	-0.51 **	-0.51 **	-0.46 *	-0.55 **	-0.39 *	-0.51 **
Percentage of root length in 10-20 cm section	%RL10_20	-0.47 **	-0.48 **	-0.35 ns	-0.4 *	-0.14 ns	-0.43 *

Name of variables	Abbreviation of variable	Active RL40-50	Active RL50-60	Active RL60-100	Active RL	Active RL %	Inactive RL0-10
Percentage of root length in 20-30 cm section	%RL20_30	0.02 ns	-0.03 ns	-0.02 ns	0.15 ns	0.1 ns	0.06 ns
Percentage of root length in 30-40 cm section	%RL30_40	0.04 ns	0 ns	-0.01 ns	0.15 ns	0.21 ns	0.06 ns
Percentage of root length in 40-50 cm section	%RL40_50	0.27 ns	0.34 ns	0.15 ns	0.3 ns	0.34 ns	0.19 ns
Percentage of root length in 50-60 cm section	%RL50_60	0.16 ns	0.52 **	0.23 ns	0.2 ns	0.25 ns	0.1 ns
Percentage of root length in 60-115 cm section	%RL60_100	0.12 ns	0.16 ns	0.49 **	0.28 ns	0.18 ns	0.21 ns
Percentage of Inactive root length in 0-10 cm section	%Inactive RL0-10	-0.47 **	-0.45 *	-0.41 *	-0.56 **	-0.42 *	-0.47 **
Percentage of Inactive root length in 10-20 cm section	%Inactive RL10-20	-0.33 ns	-0.31 ns	-0.3 ns	-0.42 *	-0.6 ***	-0.05 ns
Percentage of Inactive root length in 20-30 cm section	%Inactive RL20-30	-0.09 ns	-0.22 ns	-0.12 ns	-0.02 ns	-0.18 ns	-0.06 ns
Percentage of Inactive root length in 30-40 cm section	%Inactive RL30-40	-0.2 ns	-0.14 ns	-0.05 ns	-0.12 ns	-0.33 ns	0 ns
Percentage of Inactive root length in 40-50 cm section	%Inactive RL40-50	-0.3 ns	-0.1 ns	0 ns	-0.17 ns	-0.37 *	0.03 ns
Percentage of Inactive root length in 50-60 cm section	%Inactive RL50-60	-0.18 ns	-0.15 ns	0.1 ns	-0.07 ns	-0.28 ns	0.13 ns
Percentage of Inactive root length in 60-115 cm section	%Inactive RL60-100	0 ns	-0.02 ns	0.26 ns	0.12 ns	-0.03 ns	0.14 ns
Percentage of Inactive root length	Inactive RL %	-0.63 ***	-0.6 ***	-0.41 *	-0.75 ***	-1 ***	-0.21 ns
Root length density in 0-10 cm section	RLD0-10	0.59 ***	0.34 ns	0.49 **	0.66 ***	0.27 ns	0.92 ***
Root length density in 10-20 cm section	RLD10-20	0.58 ***	0.4 *	0.56 **	0.72 ***	0.34 ns	0.73 ***
Root length density in 20-30 cm section	RLD20-30	0.72 ***	0.52 **	0.62 ***	0.81 ***	0.36 ns	0.7 ***
Root length density in 30-40 cm section	RLD30-40	0.73 ***	0.54 **	0.63 ***	0.79 ***	0.39 *	0.65 ***
Root length density in 40-50 cm section	RLD40-50	0.87 ***	0.73 ***	0.68 ***	0.83 ***	0.47 **	0.7 ***
Root length density in 50-60 cm section	RLD50-60	0.61 ***	0.81 ***	0.64 ***	0.66 ***	0.44 *	0.5 **
Root length density in 60-115 cm section	RLD60-100	0.35 ns	0.33 ns	0.72 ***	0.48 **	0.22 ns	0.41 *
Root length density in Root zone	RLDrz	0.64 ***	0.45 *	0.5 **	0.74 ***	0.32 ns	0.78 ***
Root length in 0-20 cm section	RL0-20	0.62 ***	0.39 *	0.56 **	0.74 ***	0.32 ns	0.88 ***
Root length in 0-30 cm section	RL0-30	0.63 ***	0.37 *	0.54 **	0.74 ***	0.28 ns	0.83 ***
Root length in 0-40 cm section	RL0-40	0.61 ***	0.36 ns	0.55 **	0.71 ***	0.23 ns	0.82 ***
Root length in 0-50 cm section	RL0-50	0.58 ***	0.35 ns	0.55 **	0.68 ***	0.2 ns	0.81 ***

Name of variables	Abbreviation of variable	Active RL40-50	Active RL50-60	Active RL60-100	Active RL	Active RL %	Inactive RL0-10
Root length in 0-60 cm section	RL0-60	0.56 **	0.34 ns	0.56 **	0.68 ***	0.18 ns	0.81 ***
Root length density in 0-20 cm section	RLD0-20	0.62 ***	0.39 *	0.56 **	0.74 ***	0.32 ns	0.88 ***
Root length density in 0-30 cm section	RLD0-30	0.63 ***	0.37 *	0.54 **	0.74 ***	0.28 ns	0.83 ***
Root length density in 0-40 cm section	RLD0-40	0.61 ***	0.36 ns	0.55 **	0.71 ***	0.23 ns	0.82 ***
Root length density in 0-50 cm section	RLD0-50	0.58 ***	0.35 ns	0.55 **	0.68 ***	0.2 ns	0.81 ***
Root length density in 0-60 cm section	RLD0-60	0.56 **	0.34 ns	0.56 **	0.68 ***	0.18 ns	0.81 ***
specific root length	SRL	0.01 ns	-0.1 ns	-0.13 ns	-0.19 ns	-0.17 ns	-0.14 ns
Average root diameter	ARD	-0.03 ns	0.12 ns	0.08 ns	0.07 ns	0.28 ns	-0.3 ns
Root tissue density	RTD	0.26 ns	0.26 ns	0.22 ns	0.25 ns	0.24 ns	0.28 ns
Root length with diameter <0.2mm	RL<0.2mm	0.66 ***	0.42 *	0.6 ***	0.69 ***	0.22 ns	0.84 ***
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.67 ***	0.53 **	0.61 ***	0.82 ***	0.42 *	0.71 ***
Root length with diameter 0.5-1mm	RL0.5-1mm	0.71 ***	0.62 ***	0.66 ***	0.8 ***	0.41 *	0.72 ***
Root length with diameter 1-2mm	RL1-2mm	0.66 ***	0.59 ***	0.73 ***	0.84 ***	0.5 **	0.66 ***
Root length with diameter >2mm	RL>2mm	0.38 *	0.36 *	0.52 **	0.6 ***	0.47 **	0.35 ns
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.15 ns	-0.07 ns	0.08 ns	0.07 ns	-0.18 ns	0.5 **
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.22 ns	-0.07 ns	-0.2 ns	-0.13 ns	0.1 ns	-0.5 **
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.09 ns	0.11 ns	-0.09 ns	-0.17 ns	0.02 ns	-0.43 *
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.15 ns	0.31 ns	0.34 ns	0.33 ns	0.43 *	0.01 ns
Percentage of root length with diameter >2mm	%RL>2mm	-0.08 ns	0.01 ns	0.1 ns	0.06 ns	0.13 ns	-0.18 ns
Inactive root length in 20-30 cm section	Inactive RL20-30	0.44 *					
Inactive root length in 30-40 cm section	Inactive RL30-40	0.42 *	0.65 ***				
Inactive root length in 40-50 cm section	Inactive RL40-50	0.3 ns	0.34 ns	0.72 ***			

Name of variables	Abbreviation of variable	Inactive RL10-20	Inactive RL20-30	Inactive RL30-40	Inactive RL40-50	Inactive RL50-60	Inactive RL60-100
Inactive root length in 50-60 cm section	Inactive RL50-60	0.21 ns	0.24 ns	0.47 **	0.6 ***		
Inactive root length in 60-115 cm section	Inactive RL60-100	0.06 ns	0.23 ns	0.29 ns	0.46 *	0.75 ***	
Total Inactive root length in 0-20 cm section	Inactive RL	0.8 ***	0.68 ***	0.72 ***	0.63 ***	0.5 **	0.37 *
Percentage of root length in 0-10 cm section	%RL0_10	-0.46 **	-0.4 *	-0.34 ns	-0.25 ns	-0.2 ns	-0.09 ns
Percentage of root length in 10-20 cm section	%RL10_20	-0.2 ns	-0.26 ns	-0.25 ns	-0.14 ns	-0.15 ns	-0.02 ns
Percentage of root length in 20-30 cm section	%RL20_30	0.1 ns	0.46 *	0.29 ns	0.25 ns	0.14 ns	0.24 ns
Percentage of root length in 30-40 cm section	%RL30_40	-0.07 ns	0.29 ns	0.36 *	0.24 ns	0.16 ns	0.22 ns
Percentage of root length in 40-50 cm section	%RL40_50	-0.02 ns	0.16 ns	0.29 ns	0.39 *	0.21 ns	0.32 ns
Percentage of root length in 50-60 cm section	%RL50_60	-0.07 ns	-0.07 ns	0.13 ns	0.32 ns	0.38 *	0.39 *
Percentage of root length in 60-115 cm section	%RL60_100	0.01 ns	0.13 ns	0.25 ns	0.44 *	0.61 ***	0.89 ***
Percentage of Inactive root length in 0-10 cm section	%Inactive RL0-10	-0.42 *	-0.46 *	-0.41 *	-0.27 ns	-0.15 ns	-0.07 ns
Percentage of Inactive root length in 10-20 cm section	%Inactive RL10-20	0.37 *	-0.05 ns	0.07 ns	0.11 ns	0.02 ns	-0.04 ns
Percentage of Inactive root length in 20-30 cm section	%Inactive RL20-30	0.07 ns	0.65 ***	0.39 *	0.23 ns	0.1 ns	0.12 ns
Percentage of Inactive root length in 30-40 cm section	%Inactive RL30-40	0.14 ns	0.31 ns	0.75 ***	0.61 ***	0.31 ns	0.21 ns
Percentage of Inactive root length in 40-50 cm section	%Inactive RL40-50	0.12 ns	0.14 ns	0.55 **	0.86 ***	0.47 **	0.37 *
Percentage of Inactive root length in 50-60 cm section	%Inactive RL50-60	0.09 ns	0.11 ns	0.38 *	0.6 ***	0.85 ***	0.7 ***
Percentage of Inactive root length in 60-115 cm section	%Inactive RL60-100	0.02 ns	0.13 ns	0.26 ns	0.46 *	0.69 ***	0.98 ***
Percentage of Inactive root length	Inactive RL %	0.15 ns	-0.07 ns	0.15 ns	0.27 ns	0.16 ns	0.02 ns
Root length density in 0-10 cm section	RLD0-10	0.59 ***	0.54 **	0.52 **	0.33 ns	0.23 ns	0.14 ns
Root length density in 10-20 cm section	RLD10-20	0.78 ***	0.51 **	0.36 ns	0.22 ns	0.13 ns	0.11 ns
Root length density in 20-30 cm section	RLD20-30	0.64 ***	0.79 ***	0.53 **	0.33 ns	0.26 ns	0.25 ns
Root length density in 30-40 cm section	RLD30-40	0.43 *	0.78 ***	0.74 ***	0.42 *	0.39 *	0.3 ns
Root length density in 40-50 cm section	RLD40-50	0.41 *	0.56 **	0.53 **	0.41 *	0.29 ns	0.29 ns
Root length density in 50-60 cm section	RLD50-60	0.22 ns	0.24 ns	0.35 ns	0.38 *	0.5 **	0.41 *
Root length density in 60-115 cm section	RLD60-100	0.2 ns	0.31 ns	0.39 *	0.48 **	0.66 ***	0.85 ***

Name of variables	Abbreviation of variable	Inactive RL10-20	Inactive RL20-30	Inactive RL30-40	Inactive RL40-50	Inactive RL50-60	Inactive RL60-100
Root length density in Root zone	RLDrz	0.61 ***	0.65 ***	0.65 ***	0.42 *	0.24 ns	0.19 ns
Root length in 0-20 cm section	RL0-20	0.73 ***	0.56 **	0.47 **	0.29 ns	0.19 ns	0.13 ns
Root length in 0-30 cm section	RL0-30	0.72 ***	0.74 ***	0.57 **	0.34 ns	0.22 ns	0.17 ns
Root length in 0-40 cm section	RL0-40	0.71 ***	0.77 ***	0.67 ***	0.42 *	0.27 ns	0.2 ns
Root length in 0-50 cm section	RL0-50	0.71 ***	0.77 ***	0.71 ***	0.49 **	0.32 ns	0.23 ns
Root length in 0-60 cm section	RL0-60	0.71 ***	0.77 ***	0.72 ***	0.51 **	0.37 *	0.28 ns
Root length density in 0-20 cm section	RLD0-20	0.73 ***	0.56 **	0.47 **	0.29 ns	0.19 ns	0.13 ns
Root length density in 0-30 cm section	RLD0-30	0.72 ***	0.74 ***	0.57 **	0.34 ns	0.22 ns	0.17 ns
Root length density in 0-40 cm section	RLD0-40	0.71 ***	0.77 ***	0.67 ***	0.42 *	0.27 ns	0.2 ns
Root length density in 0-50 cm section	RLD0-50	0.71 ***	0.77 ***	0.71 ***	0.49 **	0.32 ns	0.23 ns
Root length density in 0-60 cm section	RLD0-60	0.71 ***	0.77 ***	0.72 ***	0.51 **	0.37 *	0.28 ns
Specif root length	SRL	0.01 ns	0 ns	0.09 ns	-0.08 ns	-0.11 ns	-0.05 ns
Average root diameter	ARD	-0.16 ns	-0.08 ns	-0.4 *	-0.25 ns	-0.24 ns	-0.07 ns
Root tissue density	RTD	0.03 ns	0 ns	0.02 ns	0.05 ns	0.05 ns	-0.01 ns
Root length with diameter <0.2mm	RL<0.2mm	0.69 ***	0.63 ***	0.65 ***	0.38 *	0.36 ns	0.3 ns
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.51 **	0.68 ***	0.54 **	0.41 *	0.32 ns	0.26 ns
Root length with diameter 0.5-1mm	RL0.5-1mm	0.63 ***	0.58 ***	0.44 *	0.35 ns	0.26 ns	0.22 ns
Root length with diameter 1-2mm	RL1-2mm	0.45 *	0.54 **	0.37 *	0.29 ns	0.21 ns	0.22 ns
Root length with diameter >2mm	RL>2mm	0.08 ns	0.42 *	0.17 ns	0.17 ns	0.13 ns	0.29 ns
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.32 ns	0.16 ns	0.37 *	0.14 ns	0.19 ns	0.13 ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.4 *	-0.1 ns	-0.25 ns	-0.06 ns	-0.13 ns	-0.13 ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.05 ns	-0.23 ns	-0.38 *	-0.19 ns	-0.2 ns	-0.13 ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	-0.13 ns	0 ns	-0.19 ns	-0.09 ns	-0.11 ns	0 ns
Percentage of root length with diameter >2mm	%RL>2mm	-0.35 ns	-0.05 ns	-0.29 ns	-0.16 ns	-0.13 ns	0.06 ns

Name of variables	Abbreviation of variable	Inactive RL	%RL0_10	%RL10_20	%RL20_30	%RL30_40	%RL40_50
Total Inactive root length in 0-20 cm section	Inactive RL						
Percentage of root length in 0-10 cm section	%RL0_10	-0.55 **					
Percentage of root length in 10-20 cm section	%RL10_20	-0.34 ns	0.69 ***				
Percentage of root length in 20-30 cm section	%RL20_30	0.3 ns	-0.16 ns	0.22 ns			
Percentage of root length in 30-40 cm section	%RL30_40	0.19 ns	0.04 ns	0.32 ns	0.79 ***		
Percentage of root length in 40-50 cm section	%RL40_50	0.25 ns	-0.2 ns	0.02 ns	0.62 ***	0.77 ***	
Percentage of root length in 50-60 cm section	%RL50_60	0.1 ns	-0.25 ns	-0.13 ns	0.34 ns	0.38 *	0.71 ***
Percentage of root length in 60-115 cm section	%RL60_100	0.33 ns	-0.15 ns	-0.01 ns	0.23 ns	0.27 ns	0.44 *
Percentage of Inactive root length in 0-10 cm section	%Inactive RL0-10	-0.56 **	0.97 ***	0.63 ***	-0.3 ns	-0.11 ns	-0.28 ns
Percentage of Inactive root length in 10-20 cm section	%Inactive RL10-20	0.14 ns	0.23 ns	0.37 *	0.35 ns	0.3 ns	0.09 ns
Percentage of Inactive root length in 20-30 cm section	%Inactive RL20-30	0.27 ns	-0.04 ns	0.18 ns	0.81 ***	0.57 ***	0.26 ns
Percentage of Inactive root length in 30-40 cm section	%Inactive RL30-40	0.37 *	-0.08 ns	0.1 ns	0.52 **	0.51 **	0.41 *
Percentage of Inactive root length in 40-50 cm section	%Inactive RL40-50	0.37 *	-0.08 ns	0.08 ns	0.39 *	0.33 ns	0.45 *
Percentage of Inactive root length in 50-60 cm section	%Inactive RL50-60	0.35 ns	-0.07 ns	0.05 ns	0.31 ns	0.23 ns	0.3 ns
Percentage of Inactive root length in 60-115 cm section	%Inactive RL60-100	0.33 ns	-0.05 ns	0.02 ns	0.23 ns	0.21 ns	0.33 ns
Percentage of Inactive root length	Inactive RL %	0.06 ns	0.39 *	0.14 ns	-0.1 ns	-0.21 ns	-0.34 ns
Root length density in 0-10 cm section	RLD0-10	0.83 ***	-0.48 **	-0.36 ns	0.23 ns	0.25 ns	0.28 ns
Root length density in 10-20 cm section	RLD10-20	0.76 ***	-0.61 ***	-0.24 ns	0.19 ns	0.02 ns	0.09 ns
Root length density in 20-30 cm section	RLD20-30	0.79 ***	-0.65 ***	-0.43 *	0.32 ns	0.11 ns	0.19 ns
Root length density in 30-40 cm section	RLD30-40	0.73 ***	-0.52 **	-0.39 *	0.32 ns	0.4 *	0.41 *
Root length density in 40-50 cm section	RLD40-50	0.66 ***	-0.62 ***	-0.54 **	0.15 ns	0.17 ns	0.48 **
Root length density in 50-60 cm section	RLD50-60	0.43 *	-0.56 **	-0.52 **	0.05 ns	0.1 ns	0.43 *
Root length density in 60-115 cm section	RLD60-100	0.51 **	-0.32 ns	-0.22 ns	0.15 ns	0.15 ns	0.31 ns
Root length density in Root zone	RLDrz	0.82 ***	-0.54 **	-0.31 ns	0.37 *	0.36 ns	0.38 *

Name of variables	Abbreviation of variable	Inactive RL	%RL0_10	%RL10_20	%RL20_30	%RL30_40	%RL40_50
Root length in 0-20 cm section	RL0-20	0.84 ***	-0.58 ***	-0.32 ns	0.22 ns	0.15 ns	0.2 ns
Root length in 0-30 cm section	RL0-30	0.88 ***	-0.58 ***	-0.33 ns	0.31 ns	0.2 ns	0.2 ns
Root length in 0-40 cm section	RL0-40	0.91 ***	-0.58 ***	-0.34 ns	0.33 ns	0.24 ns	0.23 ns
Root length in 0-50 cm section	RL0-50	0.93 ***	-0.58 ***	-0.34 ns	0.33 ns	0.25 ns	0.25 ns
Root length in 0-60 cm section	RL0-60	0.94 ***	-0.58 ***	-0.34 ns	0.34 ns	0.25 ns	0.26 ns
Root length density in 0-20 cm section	RLD0-20	0.84 ***	-0.58 ***	-0.32 ns	0.22 ns	0.15 ns	0.2 ns
Root length density in 0-30 cm section	RLD0-30	0.88 ***	-0.58 ***	-0.33 ns	0.31 ns	0.2 ns	0.2 ns
Root length density in 0-40 cm section	RLD0-40	0.91 ***	-0.58 ***	-0.34 ns	0.33 ns	0.24 ns	0.23 ns
Root length density in 0-50 cm section	RLD0-50	0.93 ***	-0.58 ***	-0.34 ns	0.33 ns	0.25 ns	0.25 ns
Root length density in 0-60 cm section	RLD0-60	0.94 ***	-0.58 ***	-0.34 ns	0.34 ns	0.25 ns	0.26 ns
specific root length	SRL	-0.03 ns	-0.1 ns	-0.2 ns	-0.32 ns	-0.32 ns	-0.26 ns
Average root diameter	ARD	-0.29 ns	-0.19 ns	-0.08 ns	-0.15 ns	-0.27 ns	-0.27 ns
Root tissue density	RTD	0.1 ns	0.01 ns	0 ns	0.32 ns	0.4 *	0.55 **
Root length with diameter <0.2mm	RL<0.2mm	0.85 ***	-0.49 **	-0.34 ns	0.18 ns	0.18 ns	0.22 ns
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.76 ***	-0.65 ***	-0.42 *	0.3 ns	0.19 ns	0.28 ns
Root length with diameter 0.5-1mm	RL0.5-1mm	0.75 ***	-0.73 ***	-0.49 **	0.17 ns	0 ns	0.17 ns
Root length with diameter 1-2mm	RL1-2mm	0.65 ***	-0.63 ***	-0.42 *	0.17 ns	0.07 ns	0.17 ns
Root length with diameter >2mm	RL>2mm	0.35 ns	-0.24 ns	-0.08 ns	0.31 ns	0.33 ns	0.3 ns
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.42 *	0.04 ns	-0.08 ns	0.11 ns	0.27 ns	0.17 ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.39 *	0.09 ns	0.2 ns	0.05 ns	-0.07 ns	-0.04 ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.34 ns	-0.07 ns	0.04 ns	-0.3 ns	-0.49 **	-0.31 ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	-0.06 ns	-0.39 *	-0.33 ns	-0.11 ns	-0.17 ns	-0.1 ns
Percentage of root length with diameter >2mm	%RL>2mm	-0.26 ns	0.27 ns	0.07 ns	0 ns	0.11 ns	0 ns

Name of variables	Abbreviation of variable	%RL50_60	%RL60_100	%Inactive RL0-10	%Inactive RL10-20	%Inactive RL20-30	%Inactive RL30-40
Percentage of root length in 60-115 cm section	%RL60_100	0.51 **					
Percentage of Inactive root length in 0-10 cm section	%Inactive RL0-10	-0.21 ns	-0.14 ns				
Percentage of Inactive root length in 10-20 cm section	%Inactive RL10-20	-0.02 ns	-0.15 ns	0.23 ns			
Percentage of Inactive root length in 20-30 cm section	%Inactive RL20-30	-0.01 ns	0.02 ns	-0.18 ns	0.31 ns		
Percentage of Inactive root length in 30-40 cm section	%Inactive RL30-40	0.23 ns	0.16 ns	-0.2 ns	0.3 ns	0.56 **	
Percentage of Inactive root length in 40-50 cm section	%Inactive RL40-50	0.38 *	0.32 ns	-0.14 ns	0.27 ns	0.37 *	0.77 ***
Percentage of Inactive root length in 50-60 cm section	%Inactive RL50-60	0.49 **	0.59 ***	-0.05 ns	0.16 ns	0.25 ns	0.48 **
Percentage of Inactive root length in 60-115 cm section	%Inactive RL60-100	0.4 *	0.92 ***	-0.04 ns	-0.03 ns	0.08 ns	0.22 ns
Percentage of Inactive root length	Inactive RL %	-0.25 ns	-0.18 ns	0.42 *	0.6 ***	0.18 ns	0.33 ns
Root length density in 0-10 cm section	RLD0-10	0.02 ns	0.19 ns	-0.53 **	-0.08 ns	0.14 ns	0.16 ns
Root length density in 10-20 cm section	RLD10-20	-0.03 ns	0.18 ns	-0.61 ***	-0.02 ns	0.06 ns	0.04 ns
Root length density in 20-30 cm section	RLD20-30	0.07 ns	0.24 ns	-0.65 ***	-0.16 ns	0.27 ns	0.11 ns
Root length density in 30-40 cm section	RLD30-40	0.22 ns	0.31 ns	-0.56 **	-0.19 ns	0.29 ns	0.28 ns
Root length density in 40-50 cm section	RLD40-50	0.34 ns	0.35 ns	-0.6 ***	-0.28 ns	0.03 ns	0.11 ns
Root length density in 50-60 cm section	RLD50-60	0.71 ***	0.48 **	-0.48 **	-0.27 ns	-0.15 ns	0.04 ns
Root length density in 60-115 cm section	RLD60-100	0.41 *	0.92 ***	-0.28 ns	-0.21 ns	0.01 ns	0.12 ns
Root length density in Root zone	RLDrz	0.1 ns	0.2 ns	-0.61 ***	0 ns	0.26 ns	0.31 ns
Root length in 0-20 cm section	RL0-20	-0.01 ns	0.2 ns	-0.61 ***	-0.05 ns	0.11 ns	0.11 ns
Root length in 0-30 cm section	RL0-30	-0.03 ns	0.2 ns	-0.62 ***	-0.06 ns	0.28 ns	0.18 ns
Root length in 0-40 cm section	RL0-40	-0.01 ns	0.22 ns	-0.62 ***	-0.04 ns	0.31 ns	0.28 ns
Root length in 0-50 cm section	RL0-50	0.02 ns	0.25 ns	-0.62 ***	-0.03 ns	0.32 ns	0.32 ns
Root length in 0-60 cm section	RL0-60	0.05 ns	0.28 ns	-0.62 ***	-0.03 ns	0.32 ns	0.33 ns
Root length density in 0-20 cm section	RLD0-20	-0.01 ns	0.2 ns	-0.61 ***	-0.05 ns	0.11 ns	0.11 ns
Root length density in 0-30 cm section	RLD0-30	-0.03 ns	0.2 ns	-0.62 ***	-0.06 ns	0.28 ns	0.18 ns

Name of variables	Abbreviation of variable	%RL50_60	%RL60_100	%Inactive RL0-10	%Inactive RL10-20	%Inactive RL20-30	%Inactive RL30-40
Root length density in 0-40 cm section	RLD0-40	-0.01 ns	0.22 ns	-0.62 ***	-0.04 ns	0.31 ns	0.28 ns
Root length density in 0-50 cm section	RLD0-50	0.02 ns	0.25 ns	-0.62 ***	-0.03 ns	0.32 ns	0.32 ns
Root length density in 0-60 cm section	RLD0-60	0.05 ns	0.28 ns	-0.62 ***	-0.03 ns	0.32 ns	0.33 ns
specific root length	SRL	-0.23 ns	-0.14 ns	-0.04 ns	-0.11 ns	-0.15 ns	-0.02 ns
Average root diameter	ARD	-0.1 ns	0.02 ns	-0.18 ns	-0.29 ns	-0.12 ns	-0.43 *
Root tissue density	RTD	0.39 *	0.11 ns	-0.03 ns	0.07 ns	0.09 ns	0.01 ns
Root length with diameter <0.2mm	RL<0.2mm	0.08 ns	0.31 ns	-0.5 **	-0.06 ns	0.14 ns	0.21 ns
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.15 ns	0.29 ns	-0.67 ***	-0.19 ns	0.2 ns	0.18 ns
Root length with diameter 0.5-1mm	RL0.5-1mm	0.15 ns	0.25 ns	-0.7 ***	-0.16 ns	0.04 ns	0.03 ns
Root length with diameter 1-2mm	RL1-2mm	0.16 ns	0.36 ns	-0.63 ***	-0.34 ns	0.06 ns	-0.01 ns
Root length with diameter >2mm	RL>2mm	0.23 ns	0.49 **	-0.32 ns	-0.3 ns	0.26 ns	-0.03 ns
Percentage of root length with diameter <0.2mm	%RL<0.2mm	-0.01 ns	0.1 ns	0.01 ns	0.23 ns	0.1 ns	0.23 ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	0.02 ns	-0.15 ns	0.08 ns	-0.16 ns	0.08 ns	0 ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.05 ns	-0.16 ns	0.04 ns	-0.04 ns	-0.3 ns	-0.37 *
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.08 ns	0.2 ns	-0.4 *	-0.48 **	-0.15 ns	-0.29 ns
Percentage of root length with diameter >2mm	%RL>2mm	0.02 ns	0.22 ns	0.2 ns	-0.15 ns	0.09 ns	-0.26 ns
Percentage of Inactive root length in 50-60 cm section	%Inactive RL50-60	0.69 ***					
Percentage of Inactive root length in 60-115 cm section	%Inactive RL60-100	0.4 *	0.69 ***				
Percentage of Inactive root length	Inactive RL %	0.37 *	0.28 ns	0.03 ns			
Root length density in 0-10 cm section	RLD0-10	0.09 ns	0.07 ns	0.12 ns	-0.27 ns		
Root length density in 10-20 cm section	RLD10-20	0.02 ns	0.03 ns	0.1 ns	-0.34 ns	0.76 ***	
Root length density in 20-30 cm section	RLD20-30	0.05 ns	0.09 ns	0.18 ns	-0.36 ns	0.74 ***	0.85 ***
Root length density in 30-40 cm section	RLD30-40	0.13 ns	0.18 ns	0.22 ns	-0.39 *	0.73 ***	0.61 ***
Root length density in 40-50 cm section	RLD40-50	0.14 ns	0.14 ns	0.25 ns	-0.47 **	0.7 ***	0.61 ***

Name of variables	Abbreviation of variable	%Inactive RL40-50	%Inactive RL50-60	%Inactive RL60-100	Inactive RL %	RLD0-10	RLD10-20
Root length density in 50-60 cm section	RLD50-60	0.17 ns	0.35 ns	0.37 *	-0.44 *	0.38 *	0.37 *
Root length density in 60-115 cm section	RLD60-100	0.26 ns	0.55 **	0.84 ***	-0.22 ns	0.35 ns	0.37 *
Root length density in Root zone	RLDrz	0.2 ns	0.12 ns	0.16 ns	-0.32 ns	0.88 ***	0.8 ***
Root length in 0-20 cm section	RL0-20	0.06 ns	0.06 ns	0.11 ns	-0.32 ns	0.94 ***	0.94 ***
Root length in 0-30 cm section	RL0-30	0.09 ns	0.08 ns	0.13 ns	-0.28 ns	0.92 ***	0.9 ***
Root length in 0-40 cm section	RL0-40	0.17 ns	0.13 ns	0.16 ns	-0.23 ns	0.91 ***	0.87 ***
Root length in 0-50 cm section	RL0-50	0.23 ns	0.18 ns	0.19 ns	-0.2 ns	0.9 ***	0.86 ***
Root length in 0-60 cm section	RL0-60	0.26 ns	0.23 ns	0.23 ns	-0.18 ns	0.9 ***	0.85 ***
Root length density in 0-20 cm section	RLD0-20	0.06 ns	0.06 ns	0.11 ns	-0.32 ns	0.94 ***	0.94 ***
Root length density in 0-30 cm section	RLD0-30	0.09 ns	0.08 ns	0.13 ns	-0.28 ns	0.92 ***	0.9 ***
Root length density in 0-40 cm section	RLD0-40	0.17 ns	0.13 ns	0.16 ns	-0.23 ns	0.91 ***	0.87 ***
Root length density in 0-50 cm section	RLD0-50	0.23 ns	0.18 ns	0.19 ns	-0.2 ns	0.9 ***	0.86 ***
Root length density in 0-60 cm section	RLD0-60	0.26 ns	0.23 ns	0.23 ns	-0.18 ns	0.9 ***	0.85 ***
specific root length	SRL	-0.1 ns	-0.11 ns	-0.06 ns	0.17 ns	-0.16 ns	-0.13 ns
Average root diameter	ARD	-0.32 ns	-0.34 ns	-0.07 ns	-0.28 ns	-0.29 ns	-0.02 ns
Root tissue density	RTD	0.06 ns	0.08 ns	0 ns	-0.24 ns	0.29 ns	0.06 ns
Root length with diameter <0.2mm	RL<0.2mm	0.13 ns	0.21 ns	0.27 ns	-0.22 ns	0.87 ***	0.78 ***
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.15 ns	0.15 ns	0.2 ns	-0.42 *	0.76 ***	0.8 ***
Root length with diameter 0.5-1mm	RL0.5-1mm	0.06 ns	0.08 ns	0.17 ns	-0.41 *	0.7 ***	0.83 ***
Root length with diameter 1-2mm	RL1-2mm	-0.01 ns	0.04 ns	0.2 ns	-0.5 **	0.72 ***	0.79 ***
Root length with diameter >2mm	RL>2mm	0.02 ns	0.06 ns	0.29 ns	-0.47 **	0.5 **	0.45 *

Name of variables	Abbreviation of variable	RLD20-30	RLD30-40	RLD40-50	RLD50-60	RLD60-100	RLDrz
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.12 ns	0.2 ns	0.15 ns	0.18 ns	0.52 **	0.2 ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	0.05 ns	-0.06 ns	-0.16 ns	-0.1 ns	-0.48 **	-0.26 ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.22 ns	-0.25 ns	-0.13 ns	-0.02 ns	-0.54 **	-0.16 ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	-0.23 ns	-0.23 ns	0.02 ns	-0.43 *	0.06 ns	0.17 ns
Percentage of root length with diameter >2mm	%RL>2mm	-0.16 ns	-0.13 ns	0.08 ns	-0.13 ns	-0.08 ns	-0.14 ns
Root length density in 30-40 cm section	RLD30-40	0.84 ***					
Root length density in 40-50 cm section	RLD40-50	0.81 ***	0.86 ***				
Root length density in 50-60 cm section	RLD50-60	0.55 **	0.64 ***	0.77 ***			
Root length density in 60-115 cm section	RLD60-100	0.49 **	0.53 **	0.56 **	0.64 ***		
Root length density in Root zone	RLDrz	0.84 ***	0.84 ***	0.77 ***	0.47 **	0.38 *	
Root length in 0-20 cm section	RL0-20	0.84 ***	0.72 ***	0.7 ***	0.4 *	0.38 *	0.9 ***
Root length in 0-30 cm section	RL0-30	0.91 ***	0.8 ***	0.73 ***	0.39 *	0.4 *	0.91 ***
Root length in 0-40 cm section	RL0-40	0.91 ***	0.84 ***	0.74 ***	0.41 *	0.42 *	0.93 ***
Root length in 0-50 cm section	RL0-50	0.9 ***	0.84 ***	0.74 ***	0.43 *	0.45 *	0.93 ***
Root length in 0-60 cm section	RL0-60	0.9 ***	0.85 ***	0.75 ***	0.45 *	0.48 **	0.92 ***
Root length density in 0-20 cm section	RLD0-20	0.84 ***	0.72 ***	0.7 ***	0.4 *	0.38 *	0.9 ***
Root length density in 0-30 cm section	RLD0-30	0.91 ***	0.8 ***	0.73 ***	0.39 *	0.4 *	0.91 ***
Root length density in 0-40 cm section	RLD0-40	0.91 ***	0.84 ***	0.74 ***	0.41 *	0.42 *	0.93 ***
Root length density in 0-50 cm section	RLD0-50	0.9 ***	0.84 ***	0.74 ***	0.43 *	0.45 *	0.93 ***
Root length density in 0-60 cm section	RLD0-60	0.9 ***	0.85 ***	0.75 ***	0.45 *	0.48 **	0.92 ***
specific root length	SRL	-0.08 ns	-0.09 ns	-0.01 ns	-0.13 ns	-0.1 ns	-0.21 ns

Name of variables	Abbreviation of variable	RL0-20	RL0-30	RL0-40	RL0-50	RL0-60	RLD0-20
Average root diameter	ARD	-0.02 ns	-0.19 ns	-0.15 ns	-0.01 ns	0.01 ns	-0.25 ns
Root tissue density	RTD	0.09 ns	0.23 ns	0.25 ns	0.24 ns	0.1 ns	0.29 ns
Root length with diameter <0.2mm	RL<0.2mm	0.8 ***	0.81 ***	0.76 ***	0.5 **	0.51 **	0.85 ***
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.93 ***	0.84 ***	0.82 ***	0.61 ***	0.51 **	0.85 ***
Root length with diameter 0.5-1mm	RL0.5-1mm	0.92 ***	0.75 ***	0.82 ***	0.65 ***	0.51 **	0.79 ***
Root length with diameter 1-2mm	RL1-2mm	0.85 ***	0.73 ***	0.74 ***	0.6 ***	0.55 **	0.73 ***
Root length with diameter >2mm	RL>2mm	0.49 **	0.52 **	0.44 *	0.38 *	0.5 **	0.44 *
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.11 ns	0.27 ns	0.18 ns	0.01 ns	0.12 ns	0.38 *
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.14 ns	-0.23 ns	-0.2 ns	-0.09 ns	-0.19 ns	-0.34 ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.14 ns	-0.34 ns	-0.18 ns	0 ns	-0.13 ns	-0.4 *
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.18 ns	0.07 ns	0.11 ns	0.23 ns	0.21 ns	0.02 ns
Percentage of root length with diameter >2mm	%RL>2mm	-0.15 ns	-0.08 ns	-0.15 ns	-0.05 ns	0.11 ns	-0.19 ns
Root length in 0-30 cm section	RL0-30	0.97 ***					
Root length in 0-40 cm section	RL0-40	0.95 ***	0.99 ***				
Root length in 0-50 cm section	RL0-50	0.94 ***	0.98 ***	1 ***			
Root length in 0-60 cm section	RL0-60	0.93 ***	0.97 ***	0.99 ***	1 ***		
Root length density in 0-20 cm section	RLD0-20	1 ***	0.97 ***	0.95 ***	0.94 ***	0.93 ***	
Root length density in 0-30 cm section	RLD0-30	0.97 ***	1 ***	0.99 ***	0.98 ***	0.97 ***	0.97 ***
Root length density in 0-40 cm section	RLD0-40	0.95 ***	0.99 ***	1 ***	1 ***	0.99 ***	0.95 ***
Root length density in 0-50 cm section	RLD0-50	0.94 ***	0.98 ***	1 ***	1 ***	1 ***	0.94 ***
Root length density in 0-60 cm section	RLD0-60	0.93 ***	0.97 ***	0.99 ***	1 ***	1 ***	0.93 ***
specific root length	SRL	-0.16 ns	-0.12 ns	-0.1 ns	-0.1 ns	-0.11 ns	-0.16 ns
Average root diameter	ARD	-0.16 ns	-0.16 ns	-0.2 ns	-0.22 ns	-0.23 ns	-0.16 ns
Root tissue density	RTD	0.19 ns	0.15 ns	0.14 ns	0.14 ns	0.14 ns	0.19 ns

Name of variables	Abbreviation of variable	RLD0-30	RLD0-40	RLD0-50	RLD0-60	SRL	ARD
Root length with diameter <0.2mm	RL<0.2mm	0.88 ***	0.89 ***	0.91 ***	0.91 ***	0.91 ***	0.88 ***
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.83 ***	0.87 ***	0.87 ***	0.87 ***	0.87 ***	0.83 ***
Root length with diameter 0.5-1mm	RL0.5-1mm	0.82 ***	0.83 ***	0.82 ***	0.82 ***	0.81 ***	0.82 ***
Root length with diameter 1-2mm	RL1-2mm	0.8 ***	0.81 ***	0.79 ***	0.78 ***	0.78 ***	0.8 ***
Root length with diameter >2mm	RL>2mm	0.51 **	0.53 **	0.51 **	0.5 **	0.5 **	0.51 **
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.39 *	0.36 ns	0.38 *	0.38 *	0.38 *	0.39 *
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.4 *	-0.35 ns	-0.36 ns	-0.35 ns	-0.35 ns	-0.4 *
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.38 *	-0.37 *	-0.4 *	-0.4 *	-0.4 *	-0.38 *
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.12 ns	0.1 ns	0.06 ns	0.05 ns	0.04 ns	0.12 ns
Percentage of root length with diameter >2mm	%RL>2mm	-0.12 ns	-0.11 ns	-0.14 ns	-0.15 ns	-0.16 ns	-0.12 ns
Root length density in 0-40 cm section	RLD0-40	0.99 ***					
Root length density in 0-50 cm section	RLD0-50	0.98 ***	1 ***				
Root length density in 0-60 cm section	RLD0-60	0.97 ***	0.99 ***	1 ***			
Specific root length	SRL	-0.12 ns	-0.1 ns	-0.1 ns	-0.11 ns		
Average root diameter	ARD	-0.16 ns	-0.2 ns	-0.22 ns	-0.23 ns	0.01 ns	
Root tissue density	RTD	0.15 ns	0.14 ns	0.14 ns	0.14 ns	-0.59 ***	-0.41 *
Root length with diameter <0.2mm	RL<0.2mm	0.89 ***	0.91 ***	0.91 ***	0.91 ***	-0.13 ns	-0.36 *
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.87 ***	0.87 ***	0.87 ***	0.87 ***	-0.07 ns	0 ns
Root length with diameter 0.5-1mm	RL0.5-1mm	0.83 ***	0.82 ***	0.82 ***	0.81 ***	-0.01 ns	0.09 ns
Root length with diameter 1-2mm	RL1-2mm	0.81 ***	0.79 ***	0.78 ***	0.78 ***	-0.21 ns	0.22 ns
Root length with diameter >2mm	RL>2mm	0.53 **	0.51 **	0.5 **	0.5 **	-0.29 ns	0.34 ns
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.36 ns	0.38 *	0.38 *	0.38 *	-0.18 ns	-0.75 ***
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.35 ns	-0.36 ns	-0.35 ns	-0.35 ns	0.2 ns	0.49 **
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.37 *	-0.4 *	-0.4 *	-0.4 *	0.28 ns	0.6 ***

Name of variables	Abbreviation of variable	RTD	RL <0.2mm	RL<0.2-0.5mm	RL0.5-1mm	RL1-2mm	RL>2mm
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.1 ns	0.06 ns	0.05 ns	0.04 ns	-0.21 ns	0.78 ***
Percentage of root length with diameter >2mm	%RL>2mm	-0.11 ns	-0.14 ns	-0.15 ns	-0.16 ns	-0.23 ns	0.43 *
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.03 ns	0.71 ***				
Root length with diameter 0.5-1mm	RL0.5-1mm	-0.02 ns	0.71 ***	0.94 ***			
Root length with diameter 1-2mm	RL1-2mm	0.06 ns	0.68 ***	0.88 ***	0.87 ***		
Root length with diameter >2mm	RL>2mm	0.08 ns	0.39 *	0.56 **	0.47 **	0.75 ***	
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.47 **	0.61 ***	0.01 ns	-0.04 ns	-0.01 ns	-0.07 ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.4 *	-0.63 ***	0.01 ns	-0.05 ns	-0.1 ns	-0.02 ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.45 *	-0.48 **	-0.16 ns	0.06 ns	-0.14 ns	-0.25 ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	-0.15 ns	-0.06 ns	0.24 ns	0.26 ns	0.56 **	0.61 ***
Percentage of root length with diameter >2mm	%RL>2mm	-0.04 ns	-0.21 ns	-0.09 ns	-0.17 ns	0.16 ns	0.67 ***
		%RL <0.2mm	%RL<0.2-0.5mm	%RL 0.5-1mm	%RL1-2mm	%RL>2mm	
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.91 ***					
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.79 ***	0.57 ***				
Percentage of root length with diameter 1-2mm	%RL1-2mm	-0.45 *	0.2 ns	0.16 ns			
Percentage of root length with diameter >2mm	%RL>2mm	-0.18 ns	0.09 ns	-0.15 ns	0.53 **		

Table S2. Pearson's correlation matrix of variables measured in summer experiment. Values represent Pearson's correlation coefficient (*r*). Symbols indicate *, significant at $P < 0.05$, **, significant at $P < 0.01$, ***, significant at $P < 0.001$, and ns, not significant.

Name of variables	Abbreviation of variable	RRDD	Culm DW	Root DW	Shoot DW	Leaf DW	DW
Rate of root depth development	RRDD						
Culm dry weight	Culm DW	0.11ns					
Root dry weight	Root DW	0.07ns	0.79***				
Shoot dry weight	Shoot DW	0.13ns	0.99***	0.83***			
Leaf dry weight	Leaf DW	0.16ns	0.91***	0.88***	0.95***		
Total dry weight	DW	0.14ns	0.98***	0.89***	0.99***	0.96***	
Culm fraction	CF	-0.19ns	0.3ns	-0.09ns	0.22ns	-0.01ns	0.13ns
Root fraction	RF	-0.06ns	-0.01ns	0.48*	0.03ns	0.14ns	0.12ns
Shoot fraction	SF	-0.16ns	0.34ns	-0.09ns	0.29ns	0.13ns	0.18ns
Leaf fraction	LF	0.13ns	-0.07ns	0.05ns	0.01ns	0.25ns	0.03ns
Leaf area	LA	0.23ns	0.77***	0.7***	0.81***	0.88***	0.82***
culm-leaf dry weight ratio	CLR	-0.2ns	0.15ns	-0.1ns	0.06ns	-0.2ns	0.01ns
Root-shoot dry weight ratio	RSR	0.02ns	-0.08ns	0.42*	-0.04ns	0.08ns	0.07ns
Specific leaf area	SLA	-0.11ns	-0.28ns	-0.28ns	-0.28ns	-0.26ns	-0.28ns
Photosynthetic rate	Pn	0.24ns	0.61**	0.67***	0.85***	0.69***	0.67***
Transpiration rate	Tr	0.31ns	0.46*	0.52**	0.79***	0.51**	0.51**
Tiller appearance rate	TAR	0.45*	-0.27ns	-0.19ns	-0.26ns	-0.23ns	-0.26ns
Root angle	RA	-0.1ns	-0.06ns	-0.09ns	-0.07ns	-0.11ns	-0.08ns
Total root length in 0-20 cm section	RL	-0.01ns	0.84***	0.95***	0.88***	0.9***	0.92***
Root length in 0-10 cm section	RL0-10	-0.27ns	0.66***	0.73***	0.67***	0.66***	0.71***
Root length in 10-20 cm section	RL10-20	0.14ns	0.77***	0.89***	0.8***	0.85***	0.85***
Root length in 20-30 cm section	RL20-30	0.25ns	0.84***	0.92***	0.89***	0.94***	0.93***

Name of variables	Abbreviation of variable	RRDD	Culm DW	Root DW	Shoot DW	Leaf DW	DW
Root length in 30-40 cm section	RL30-40	0.24ns	0.88***	0.88***	0.91***	0.94***	0.93***
Root length in 40-50 cm section	RL40-50	0.13ns	0.84***	0.94***	0.88***	0.92***	0.91***
Root length in 50-60 cm section	RL50-60	0.13ns	0.78***	0.9***	0.82***	0.88***	0.85***
Root length in 60-115 cm section	RL60-100	0.01ns	0.59**	0.88***	0.63***	0.69***	0.69***
Percentage of root length in 0-10 cm section	%RL0_10	-0.62**	-0.42*	-0.41*	-0.44*	-0.48*	-0.45*
Percentage of root length in 10-20 cm section	%RL10_20	0.19ns	-0.19ns	-0.15ns	-0.19ns	-0.19ns	-0.19ns
Percentage of root length in 20-30 cm section	%RL20_30	0.59**	0.38ns	0.35ns	0.50*	0.45*	0.43*
Percentage of root length in 30-40 cm section	%RL30_40	0.59**	0.56**	0.44*	0.58**	0.59**	0.58**
Percentage of root length in 40-50 cm section	%RL40_50	0.46*	0.74***	0.67***	0.76***	0.78***	0.76***
Percentage of root length in 50-60 cm section	%RL50_60	0.41*	0.77***	0.7***	0.8***	0.83***	0.79***
Percentage of root length in 60-115 cm section	%RL60_100	0.16ns	0.56**	0.83***	0.59**	0.67***	0.65***
Root length density in 0-10 cm section	RLD0-10	-0.27ns	0.66***	0.73***	0.67***	0.66***	0.71***
Root length density in 10-20 cm section	RLD10-20	0.14ns	0.77***	0.89***	0.8***	0.85***	0.85***
Root length density in 20-30 cm section	RLD20-30	0.25ns	0.84***	0.92***	0.89***	0.94***	0.93***
Root length density in 30-40 cm section	RLD30-40	0.24ns	0.88***	0.88***	0.91***	0.94***	0.93***
Root length density in 40-50 cm section	RLD40-50	0.13ns	0.84***	0.94***	0.88***	0.92***	0.91***
Root length density in 50-60 cm section	RLD50-60	0.13ns	0.78***	0.9***	0.82***	0.88***	0.85***
Root length density in 60-115 cm section	RLD60-100	0.01ns	0.59**	0.88***	0.63***	0.69***	0.69***
Root length density in Root zone	RLDrz	-0.41*	0.46*	0.62**	0.47*	0.48*	0.52**
Root length in 0-20 cm section	RL0-20	-0.15ns	0.76***	0.85***	0.78***	0.79***	0.82***
Root length in 0-30 cm section	RL0-30	-0.08ns	0.8***	0.9***	0.83***	0.85***	0.88***
Root length in 0-40 cm section	RL0-40	0.25ns	0.87***	0.92***	0.91***	0.95***	0.94***
Root length in 0-50 cm section	RL0-50	0.22ns	0.87***	0.93***	0.91***	0.95***	0.94***
Root length in 0-60 cm section	RL0-60	0.13ns	0.82***	0.93***	0.86***	0.91***	0.89***

Name of variables	Abbreviation of variable	RRDD	Culm DW	Root DW	Shoot DW	Leaf DW	DW
Root length density in 0-20 cm section	RLD0-20	-0.15ns	0.76***	0.85***	0.78***	0.79***	0.82***
Root length density in 0-30 cm section	RLD0-30	-0.08ns	0.8***	0.9***	0.83***	0.85***	0.88***
Root length density in 0-40 cm section	RLD0-40	0.25ns	0.87***	0.92***	0.91***	0.95***	0.94***
Root length density in 0-50 cm section	RLD0-50	0.22ns	0.87***	0.93***	0.91***	0.95***	0.94***
Root length density in 0-60 cm section	RLD0-60	0.13ns	0.82***	0.93***	0.86***	0.91***	0.89***
Specific root length	SRL	-0.22ns	-0.26ns	-0.4*	-0.28ns	-0.31ns	-0.31ns
Average root diameter	ARD	0.06ns	0.13ns	0.23ns	0.14ns	0.17ns	0.18ns
Root tissue density	RTD	0.28ns	0.19ns	0.41*	0.21ns	0.25ns	0.26ns
Root length with diameter <0.2mm	RL<0.2mm	-0.01ns	0.85***	0.94***	0.88***	0.9***	0.92***
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.02ns	0.84***	0.95***	0.87***	0.9***	0.92***
Root length with diameter 0.5-1mm	RL0.5-1mm	-0.02ns	0.84***	0.96***	0.87***	0.9***	0.92***
Root length with diameter 1-2mm	RL1-2mm	0.02ns	0.84***	0.98***	0.87***	0.9***	0.92***
Root length with diameter >2mm	RL>2mm	0.36ns	0.52**	0.46*	0.52**	0.48*	0.53**
Percentage of root length with diameter <0.2mm	%RL<0.2mm	-0.2ns	0.36ns	0.25ns	0.36ns	0.35ns	0.35ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	0.37ns	-0.42*	-0.38ns	-0.42*	-0.38ns	-0.41*
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.36ns	-0.14ns	-0.12ns	-0.15ns	-0.19ns	-0.17ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.21ns	0.39ns	0.51**	0.4*	0.41*	0.42*
Percentage of root length with diameter >2mm	%RL>2mm	0.37ns	-0.31ns	-0.29ns	-0.32ns	-0.31ns	-0.32ns
		CF	RF	SF	LF	LA	CLR
Root fraction	RF	-0.4*					
Shoot fraction	SF	0.9***	-0.57**				
Leaf fraction	LF	-0.63***	-0.11ns	-0.21ns			
Leaf area	LA	-0.1ns	0.04ns	0.05ns	0.32ns		

Name of variables	Abbreviation of variable	CF	RF	SF	LF	LA	CLR
culm-leaf dry weight ratio	CLR	0.84***	-0.14ns	0.53**	-0.9***	-0.23ns	
Root-shoot dry weight ratio	RSR	-0.53**	0.98***	-0.72***	-0.09ns	0.03ns	-0.21ns
Specific leaf area	SLA	-0.21ns	-0.12ns	-0.18ns	0.14ns	0.17ns	-0.09ns
Photosynthetic rate	Pn	-0.05ns	0.26ns	0.02ns	0.15ns	0.67***	-0.15ns
Transpiration rate	Tr	-0.07ns	0.25ns	-0.07ns	0.03ns	0.51**	-0.07ns
Tiller appearance rate	TAR	-0.08ns	-0.02ns	-0.03ns	0.13ns	-0.07ns	-0.13ns
Root angle	RA	0.14ns	0.02ns	0.07ns	-0.18ns	-0.02ns	0.23ns
Total root length in 0-20 cm section	RL	-0.04ns	0.34ns	0ns	0.07ns	0.79***	-0.08ns
Root length in 0-10 cm section	RL0-10	-0.04ns	0.34ns	-0.07ns	-0.04ns	0.62***	0.02ns
Root length in 10-20 cm section	RL10-20	-0.03ns	0.29ns	0.02ns	0.09ns	0.7***	-0.1ns
Root length in 20-30 cm section	RL20-30	-0.09ns	0.26ns	-0.02ns	0.16ns	0.82***	-0.18ns
Root length in 30-40 cm section	RL30-40	0ns	0.22ns	0.09ns	0.16ns	0.84***	-0.12ns
Root length in 40-50 cm section	RL40-50	0.02ns	0.27ns	0.1ns	0.14ns	0.76***	-0.11ns
Root length in 50-60 cm section	RL50-60	0.01ns	0.25ns	0.1ns	0.14ns	0.74***	-0.11ns
Root length in 60-115 cm section	RL60-100	-0.07ns	0.35ns	-0.04ns	0.08ns	0.51**	-0.11ns
Percentage of root length in 0-10 cm section	%RL0_10	-0.01ns	-0.04ns	-0.06ns	-0.08ns	-0.38ns	0.11ns
Percentage of root length in 10-20 cm section	%RL10_20	0.11ns	-0.04ns	0.07ns	-0.12ns	-0.26ns	0.07ns
Percentage of root length in 20-30 cm section	%RL20_30	-0.19ns	0.06ns	-0.16ns	0.15ns	0.42*	-0.24ns
Percentage of root length in 30-40 cm section	%RL30_40	-0.06ns	0.03ns	0.02ns	0.17ns	0.59**	-0.15ns
Percentage of root length in 40-50 cm section	%RL40_50	0.06ns	0.07ns	0.17ns	0.18ns	0.69***	-0.12ns
Percentage of root length in 50-60 cm section	%RL50_60	0.08ns	0.05ns	0.22ns	0.21ns	0.78***	-0.11ns
Percentage of root length in 60-115 cm section	%RL60_100	-0.13ns	0.32ns	-0.07ns	0.17ns	0.49*	-0.18ns
Root length density in 0-10 cm section	RLD0-10	-0.04ns	0.34ns	-0.07ns	-0.04ns	0.62***	0.02ns
Root length density in 10-20 cm section	RLD10-20	-0.03ns	0.29ns	0.02ns	0.09ns	0.7***	-0.1ns

Name of variables	Abbreviation of variable	CF	RF	SF	LF	LA	CLR
Root length density in 20-30 cm section	RLD20-30	-0.09ns	0.26ns	-0.02ns	0.16ns	0.82***	-0.18ns
Root length density in 30-40 cm section	RLD30-40	0ns	0.22ns	0.09ns	0.16ns	0.84***	-0.12ns
Root length density in 40-50 cm section	RLD40-50	0.02ns	0.27ns	0.1ns	0.14ns	0.76***	-0.11ns
Root length density in 50-60 cm section	RLD50-60	0.01ns	0.25ns	0.1ns	0.14ns	0.74***	-0.11ns
Root length density in 60-115 cm section	RLD60-100	-0.07ns	0.35ns	-0.04ns	0.08ns	0.51**	-0.11ns
Root length density in Root zone	RLDrz	-0.02ns	0.44*	-0.11ns	-0.15ns	0.41*	0.09ns
Root length in 0-20 cm section	RL0-20	-0.04ns	0.35ns	-0.04ns	0.01ns	0.71***	-0.02ns
Root length in 0-30 cm section	RL0-30	-0.05ns	0.35ns	-0.04ns	0.04ns	0.75***	-0.05ns
Root length in 0-40 cm section	RL0-40	-0.05ns	0.25ns	0.03ns	0.16ns	0.84***	-0.16ns
Root length in 0-50 cm section	RL0-50	-0.03ns	0.26ns	0.05ns	0.16ns	0.83***	-0.15ns
Root length in 0-60 cm section	RL0-60	0.02ns	0.27ns	0.1ns	0.15ns	0.76***	-0.11ns
Root length density in 0-20 cm section	RLD0-20	-0.04ns	0.35ns	-0.04ns	0.01ns	0.71***	-0.02ns
Root length density in 0-30 cm section	RLD0-30	-0.05ns	0.35ns	-0.04ns	0.04ns	0.75***	-0.05ns
Root length density in 0-40 cm section	RLD0-40	-0.05ns	0.25ns	0.03ns	0.16ns	0.84***	-0.16ns
Root length density in 0-50 cm section	RLD0-50	-0.03ns	0.26ns	0.05ns	0.16ns	0.83***	-0.15ns
Root length density in 0-60 cm section	RLD0-60	0.02ns	0.27ns	0.1ns	0.15ns	0.76***	-0.11ns
specific root length	SRL	0.08ns	-0.39ns	0.1ns	0.01ns	-0.07ns	0.06ns
Average root diameter	ARD	-0.14ns	0.3ns	-0.19ns	-0.02ns	0.06ns	-0.05ns
Root tissue density	RTD	-0.07ns	0.5*	-0.17ns	-0.13ns	0.09ns	0ns
Root length with diameter <0.2mm	RL<0.2mm	-0.03ns	0.33ns	0ns	0.06ns	0.8***	-0.07ns
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	-0.05ns	0.34ns	-0.02ns	0.07ns	0.79***	-0.08ns
Root length with diameter 0.5-1mm	RL0.5-1mm	-0.02ns	0.36ns	0ns	0.05ns	0.77***	-0.06ns
Root length with diameter 1-2mm	RL1-2mm	-0.04ns	0.37ns	-0.01ns	0.06ns	0.77***	-0.07ns
Root length with diameter >2mm	RL>2mm	-0.08ns	0.21ns	-0.1ns	0ns	0.49*	-0.04ns
Percentage of root length with diameter <0.2mm	%RL<0.2mm	-0.02ns	-0.08ns	0.02ns	0.08ns	0.45*	-0.04ns

Name of variables	Abbreviation of variable	RSR	SLA	Pn	Tr	TAR	RA
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.17ns	-0.15ns	-0.19ns	0.05ns	-0.32ns	-0.07ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	0.25ns	0.07ns	0.22ns	-0.16ns	-0.33ns	0.14ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.01ns	0.41*	-0.01ns	-0.03ns	0.26ns	0.03ns
Percentage of root length with diameter >2mm	%RL>2mm	-0.18ns	-0.07ns	-0.17ns	0.1ns	-0.24ns	-0.12ns
Specific leaf area	SLA	-0.06ns					
Photosynthetic rate	Pn	0.22ns	-0.07ns				
Transpiration rate	Tr	0.25ns	-0.05ns	0.91***			
Tiller appearance rate	TAR	0ns	0.22ns	-0.01ns	-0.07ns		
Root angle	RA	0.04ns	0.07ns	-0.04ns	-0.1ns	0.1ns	
Total root length in 0-20 cm section	RL	0.28ns	-0.14ns	0.66***	0.48*	-0.24ns	-0.08ns
Root length in 0-10 cm section	RL0-10	0.29ns	0.08ns	0.41*	0.25ns	-0.33ns	0.07ns
Root length in 10-20 cm section	RL10-20	0.22ns	-0.24ns	0.72***	0.56**	-0.18ns	-0.21ns
Root length in 20-30 cm section	RL20-30	0.23ns	-0.24ns	0.73***	0.61**	-0.17ns	-0.18ns
Root length in 30-40 cm section	RL30-40	0.17ns	-0.25ns	0.78***	0.61**	-0.13ns	-0.15ns
Root length in 40-50 cm section	RL40-50	0.2ns	-0.28ns	0.7***	0.5*	-0.11ns	-0.13ns
Root length in 50-60 cm section	RL50-60	0.18ns	-0.24ns	0.6**	0.41*	-0.07ns	-0.05ns
Root length in 60-115 cm section	RL60-100	0.28ns	-0.21ns	0.45*	0.3ns	-0.03ns	-0.07ns
Percentage of root length in 0-10 cm section	%RL0_10	-0.04ns	0.37ns	-0.46*	-0.41*	-0.17ns	0.27ns
Percentage of root length in 10-20 cm section	%RL10_20	-0.06ns	-0.19ns	-0.11ns	-0.1ns	0.13ns	-0.26ns
Percentage of root length in 20-30 cm section	%RL20_30	0.12ns	-0.23ns	0.49*	0.58**	0.06ns	-0.16ns
Percentage of root length in 30-40 cm section	%RL30_40	0.05ns	-0.22ns	0.62**	0.55**	0.14ns	-0.04ns
Percentage of root length in 40-50 cm section	%RL40_50	0.04ns	-0.33ns	0.63***	0.45*	0.06ns	-0.11ns

Name of variables	Abbreviation of variable	RSR	SLA	Pn	Tr	TAR	RA
Percentage of root length in 50-60 cm section	%RL50_60	0ns	-0.24ns	0.56**	0.37ns	0.06ns	-0.02ns
Percentage of root length in 60-115 cm section	%RL60_100	0.26ns	-0.24ns	0.43*	0.26ns	0.07ns	-0.13ns
Root length density in 0-10 cm section	RLD0-10	0.29ns	0.08ns	0.41*	0.25ns	-0.33ns	0.07ns
Root length density in 10-20 cm section	RLD10-20	0.22ns	-0.24ns	0.72***	0.56**	-0.18ns	-0.21ns
Root length density in 20-30 cm section	RLD20-30	0.23ns	-0.24ns	0.73***	0.61**	-0.17ns	-0.18ns
Root length density in 30-40 cm section	RLD30-40	0.17ns	-0.25ns	0.78***	0.61**	-0.13ns	-0.15ns
Root length density in 40-50 cm section	RLD40-50	0.2ns	-0.28ns	0.7***	0.5*	-0.11ns	-0.13ns
Root length density in 50-60 cm section	RLD50-60	0.18ns	-0.24ns	0.6**	0.41*	-0.07ns	-0.05ns
Root length density in 60-115 cm section	RLD60-100	0.28ns	-0.21ns	0.45*	0.3ns	-0.03ns	-0.07ns
Root length density in Root zone	RLDrz	0.39ns	-0.03ns	0.27ns	0.15ns	-0.32ns	0.26ns
Root length in 0-20 cm section	RL0-20	0.3ns	-0.03ns	0.56**	0.39ns	-0.31ns	-0.02ns
Root length in 0-30 cm section	RL0-30	0.29ns	-0.07ns	0.61**	0.45*	-0.29ns	-0.05ns
Root length in 0-40 cm section	RL0-40	0.2ns	-0.25ns	0.76***	0.62***	-0.15ns	-0.17ns
Root length in 0-50 cm section	RL0-50	0.2ns	-0.26ns	0.75***	0.59**	-0.14ns	-0.16ns
Root length in 0-60 cm section	RL0-60	0.19ns	-0.26ns	0.66***	0.46*	-0.09ns	-0.1ns
Root length density in 0-20 cm section	RLD0-20	0.3ns	-0.03ns	0.56**	0.39ns	-0.31ns	-0.02ns
Root length density in 0-30 cm section	RLD0-30	0.29ns	-0.07ns	0.61**	0.45*	-0.29ns	-0.05ns
Root length density in 0-40 cm section	RLD0-40	0.2ns	-0.25ns	0.76***	0.62***	-0.15ns	-0.17ns
Root length density in 0-50 cm section	RLD0-50	0.2ns	-0.26ns	0.75***	0.59**	-0.14ns	-0.16ns
Root length density in 0-60 cm section	RLD0-60	0.19ns	-0.26ns	0.66***	0.46*	-0.09ns	-0.1ns
Specif root length	SRL	-0.37ns	0.62***	-0.42*	-0.49*	0.07ns	-0.06ns
Average root diameter	ARD	0.3ns	-0.24ns	0.19ns	0.38ns	-0.21ns	0.18ns
Root tissue density	RTD	0.47*	-0.45*	0.48*	0.61**	0.02ns	0.01ns
Root length with diameter <0.2mm	RL<0.2mm	0.27ns	-0.11ns	0.65***	0.46*	-0.23ns	-0.09ns

Name of variables	Abbreviation of variable	RL	RL0-10	RL10-20	RL20-30	RL30-40	RL40-50
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.28ns	-0.12ns	0.67***	0.49*	-0.23ns	-0.11ns
Root length with diameter 0.5-1mm	RL0.5-1mm	0.29ns	-0.16ns	0.65***	0.48*	-0.25ns	-0.09ns
Root length with diameter 1-2mm	RL1-2mm	0.31ns	-0.18ns	0.65***	0.47*	-0.21ns	-0.08ns
Root length with diameter >2mm	RL>2mm	0.22ns	0.01ns	0.64***	0.54**	0.2ns	-0.25ns
Percentage of root length with diameter <0.2mm	%RL<0.2mm	-0.06ns	0.2ns	0.17ns	-0.05ns	0.01ns	0.13ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.09ns	0.15ns	-0.26ns	-0.04ns	0.18ns	-0.4*
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.01ns	-0.22ns	-0.13ns	-0.05ns	-0.27ns	0.23ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.34ns	-0.41*	0.33ns	0.27ns	-0.16ns	0.19ns
Percentage of root length with diameter >2mm	%RL>2mm	0ns	0.09ns	-0.01ns	0.03ns	0.67***	-0.26ns
Total root length in 0-20 cm section	RL						
Root length in 0-10 cm section	RL0-10	0.86***					
Root length in 10-20 cm section	RL10-20	0.91***	0.64***				
Root length in 20-30 cm section	RL20-30	0.9***	0.61**	0.89***			
Root length in 30-40 cm section	RL30-40	0.9***	0.61**	0.9***	0.95***		
Root length in 40-50 cm section	RL40-50	0.92***	0.63***	0.9***	0.91***	0.94***	
Root length in 50-60 cm section	RL50-60	0.85***	0.54**	0.79***	0.86***	0.85***	0.96***
Root length in 60-115 cm section	RL60-100	0.79***	0.53**	0.74***	0.75***	0.68***	0.86***
Percentage of root length in 0-10 cm section	%RL0_10	-0.33ns	0.12ns	-0.59**	-0.61**	-0.61**	-0.52**
Percentage of root length in 10-20 cm section	%RL10_20	-0.2ns	-0.45*	0.15ns	-0.08ns	-0.09ns	-0.07ns
Percentage of root length in 20-30 cm section	%RL20_30	0.26ns	-0.04ns	0.35ns	0.61**	0.52**	0.33ns
Percentage of root length in 30-40 cm section	%RL30_40	0.42*	0.14ns	0.45*	0.65***	0.73***	0.54**
Percentage of root length in 40-50 cm section	%RL40_50	0.67***	0.36ns	0.66***	0.76***	0.87***	0.81***
Percentage of root length in 50-60 cm section	%RL50_60	0.67***	0.35ns	0.63***	0.77***	0.83***	0.84***
Percentage of root length in 60-115 cm section	%RL60_100	0.75***	0.49*	0.71***	0.71***	0.67***	0.85***

Name of variables	Abbreviation of variable	RL	RL0-10	RL10-20	RL20-30	RL30-40	RL40-50
Root length density in 0-10 cm section	RLD0-10	0.86***	1***	0.64***	0.61**	0.61**	0.63***
Root length density in 10-20 cm section	RLD10-20	0.91***	0.64***	1***	0.89***	0.9***	0.9***
Root length density in 20-30 cm section	RLD20-30	0.9***	0.61**	0.89***	1***	0.95***	0.91***
Root length density in 30-40 cm section	RLD30-40	0.9***	0.61**	0.9***	0.95***	1***	0.94***
Root length density in 40-50 cm section	RLD40-50	0.92***	0.63***	0.9***	0.91***	0.94***	1***
Root length density in 50-60 cm section	RLD50-60	0.85***	0.54**	0.79***	0.86***	0.85***	0.96***
Root length density in 60-115 cm section	RLD60-100	0.79***	0.53**	0.74***	0.75***	0.68***	0.86***
Root length density in Root zone	RLDrz	0.71***	0.88***	0.55**	0.44*	0.42*	0.46*
Root length in 0-20 cm section	RL0-20	0.96***	0.96***	0.83***	0.77***	0.77***	0.78***
Root length in 0-30 cm section	RL0-30	0.98***	0.93***	0.87***	0.84***	0.84***	0.84***
Root length in 0-40 cm section	RL0-40	0.91***	0.62**	0.91***	0.99***	0.98***	0.94***
Root length in 0-50 cm section	RL0-50	0.93***	0.63***	0.92***	0.98***	0.99***	0.97***
Root length in 0-60 cm section	RL0-60	0.9***	0.59**	0.86***	0.9***	0.91***	0.99***
Root length density in 0-20 cm section	RLD0-20	0.96***	0.96***	0.83***	0.77***	0.77***	0.78***
Root length density in 0-30 cm section	RLD0-30	0.98***	0.93***	0.87***	0.84***	0.84***	0.84***
Root length density in 0-40 cm section	RLD0-40	0.91***	0.62**	0.91***	0.99***	0.98***	0.94***
Root length density in 0-50 cm section	RLD0-50	0.93***	0.63***	0.92***	0.98***	0.99***	0.97***
Root length density in 0-60 cm section	RLD0-60	0.9***	0.59**	0.86***	0.9***	0.91***	0.99***
specific root length	SRL	-0.21ns	-0.04ns	-0.21ns	-0.34ns	-0.31ns	-0.29ns
Average root diameter	ARD	0.15ns	0.11ns	0.11ns	0.24ns	0.19ns	0.11ns
Root tissue density	RTD	0.19ns	-0.02ns	0.26ns	0.36ns	0.27ns	0.26ns
Root length with diameter <0.2mm	RL<0.2mm	1***	0.87***	0.9***	0.89***	0.9***	0.91***
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	1***	0.86***	0.91***	0.91***	0.9***	0.92***
Root length with diameter 0.5-1mm	RL0.5-1mm	1***	0.86***	0.9***	0.9***	0.9***	0.92***

Name of variables	Abbreviation of variable	RL50-60	RL60-100	%RL0_10	%RL10_20	%RL20_30	%RL30_40
Root length with diameter 1-2mm	RL1-2mm	0.99***	0.82***	0.9***	0.91***	0.9***	0.95***
Root length with diameter >2mm	RL>2mm	0.52**	0.43*	0.56**	0.53**	0.61**	0.45*
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.39ns	0.52**	0.26ns	0.19ns	0.27ns	0.28ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.41*	-0.49*	-0.23ns	-0.28ns	-0.35ns	-0.36ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.18ns	-0.13ns	-0.22ns	-0.14ns	-0.18ns	-0.19ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.38ns	0.16ns	0.34ns	0.45*	0.48*	0.5*
Percentage of root length with diameter >2mm	%RL>2mm	-0.36ns	-0.44*	-0.25ns	-0.24ns	-0.22ns	-0.26ns
Root length in 60-115 cm section	RL60-100	0.91***					
Percentage of root length in 0-10 cm section	%RL0_10	-0.48*	-0.33ns				
Percentage of root length in 10-20 cm section	%RL10_20	-0.07ns	-0.04ns	-0.59**			
Percentage of root length in 20-30 cm section	%RL20_30	0.28ns	0.14ns	-0.68***	0.01ns		
Percentage of root length in 30-40 cm section	%RL30_40	0.44*	0.21ns	-0.66***	-0.17ns	0.81***	
Percentage of root length in 40-50 cm section	%RL40_50	0.73***	0.51**	-0.65***	-0.12ns	0.51**	0.84***
Percentage of root length in 50-60 cm section	%RL50_60	0.86***	0.62***	-0.59**	-0.1ns	0.4*	0.68***
Percentage of root length in 60-115 cm section	%RL60_100	0.87***	0.95***	-0.37ns	-0.05ns	0.13ns	0.27ns
Root length density in 0-10 cm section	RLD0-10	0.54**	0.53**	0.12ns	-0.45*	-0.04ns	0.14ns
Root length density in 10-20 cm section	RLD10-20	0.79***	0.74***	-0.59**	0.15ns	0.35ns	0.45*
Root length density in 20-30 cm section	RLD20-30	0.86***	0.75***	-0.61**	-0.08ns	0.61**	0.65***
Root length density in 30-40 cm section	RLD30-40	0.85***	0.68***	-0.61**	-0.09ns	0.52**	0.73***
Root length density in 40-50 cm section	RLD40-50	0.96***	0.86***	-0.52**	-0.07ns	0.33ns	0.54**
Root length density in 50-60 cm section	RLD50-60	1***	0.91***	-0.48*	-0.07ns	0.28ns	0.44*
Root length density in 60-115 cm section	RLD60-100	0.91***	1***	-0.33ns	-0.04ns	0.14ns	0.21ns
Root length density in Root zone	RLDrz	0.4*	0.44*	0.16ns	-0.24ns	-0.16ns	-0.11ns
Root length in 0-20 cm section	RL0-20	0.68***	0.66***	-0.12ns	-0.28ns	0.1ns	0.26ns

Name of variables	Abbreviation of variable	RL50-60	RL60-100	%RL0 10	%RL10 20	%RL20 30	%RL30 40
Root length in 0-30 cm section	RL0-30	0.74***	0.7***	-0.22ns	-0.25ns	0.2ns	0.35ns
Root length in 0-40 cm section	RL0-40	0.87***	0.73***	-0.62**	-0.09ns	0.58**	0.69***
Root length in 0-50 cm section	RL0-50	0.9***	0.77***	-0.6**	-0.08ns	0.52**	0.66***
Root length in 0-60 cm section	RL0-60	0.99***	0.89***	-0.51**	-0.08ns	0.31ns	0.5*
Root length density in 0-20 cm section	RLD0-20	0.68***	0.66***	-0.12ns	-0.28ns	0.1ns	0.26ns
Root length density in 0-30 cm section	RLD0-30	0.74***	0.7***	-0.22ns	-0.25ns	0.2ns	0.35ns
Root length density in 0-40 cm section	RLD0-40	0.87***	0.73***	-0.62**	-0.09ns	0.58**	0.69***
Root length density in 0-50 cm section	RLD0-50	0.9***	0.77***	-0.6**	-0.08ns	0.52**	0.66***
Root length density in 0-60 cm section	RLD0-60	0.99***	0.89***	-0.51**	-0.08ns	0.31ns	0.5*
Specific root length	SRL	-0.26ns	-0.22ns	0.14ns	0.28ns	-0.41*	-0.38ns
Average root diameter	ARD	0.06ns	0.07ns	-0.01ns	-0.3ns	0.41*	0.28ns
Root tissue density	RTD	0.27ns	0.27ns	-0.26ns	-0.04ns	0.43*	0.27ns
Root length with diameter <0.2mm	RL<0.2mm	0.84***	0.76***	-0.31ns	-0.22ns	0.23ns	0.42*
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.84***	0.78***	-0.34ns	-0.2ns	0.28ns	0.44*
Root length with diameter 0.5-1mm	RL0.5-1mm	0.84***	0.79***	-0.32ns	-0.23ns	0.28ns	0.43*
Root length with diameter 1-2mm	RL1-2mm	0.89***	0.85***	-0.36ns	-0.19ns	0.27ns	0.43*
Root length with diameter >2mm	RL>2mm	0.29ns	0.17ns	-0.41*	-0.05ns	0.45*	0.58**
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.25ns	0.13ns	0.21ns	-0.32ns	-0.25ns	0ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.33ns	-0.24ns	-0.17ns	0.43*	0.06ns	-0.16ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.18ns	-0.11ns	0.14ns	-0.06ns	0.07ns	-0.09ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.51**	0.46*	-0.36ns	-0.05ns	0.27ns	0.43*
Percentage of root length with diameter >2mm	%RL>2mm	-0.26ns	-0.24ns	-0.1ns	0.13ns	0.14ns	0.09ns

Name of variables	Abbreviation of variable	RLD30-40	RLD40-50	RLD50-60	RLD60-100	RLDrz	RL0-20
Root length density in 40-50 cm section	RLD40-50	0.94***					
Root length density in 50-60 cm section	RLD50-60	0.85***	0.96***				
Root length density in 60-115 cm section	RLD60-100	0.68***	0.86***	0.91***			
Root length density in Root zone	RLDrz	0.42*	0.46*	0.4*	0.44*		
Root length in 0-20 cm section	RL0-20	0.77***	0.78***	0.68***	0.66***	0.84***	
Root length in 0-30 cm section	RL0-30	0.84***	0.84***	0.74***	0.7***	0.79***	0.99***
Root length in 0-40 cm section	RL0-40	0.98***	0.94***	0.87***	0.73***	0.44*	0.78***
Root length in 0-50 cm section	RL0-50	0.99***	0.97***	0.9***	0.77***	0.45*	0.79***
Root length in 0-60 cm section	RL0-60	0.91***	0.99***	0.99***	0.89***	0.44*	0.74***
Root length density in 0-20 cm section	RLD0-20	0.77***	0.78***	0.68***	0.66***	0.84***	1***
Root length density in 0-30 cm section	RLD0-30	0.84***	0.84***	0.74***	0.7***	0.79***	0.99***
Root length density in 0-40 cm section	RLD0-40	0.98***	0.94***	0.87***	0.73***	0.44*	0.78***
Root length density in 0-50 cm section	RLD0-50	0.99***	0.97***	0.9***	0.77***	0.45*	0.79***
Root length density in 0-60 cm section	RLD0-60	0.91***	0.99***	0.99***	0.89***	0.44*	0.74***
Specific root length	SRL	-0.31ns	-0.29ns	-0.26ns	-0.22ns	-0.06ns	-0.11ns
Average root diameter	ARD	0.19ns	0.11ns	0.06ns	0.07ns	0.12ns	0.12ns
Root tissue density	RTD	0.27ns	0.26ns	0.27ns	0.27ns	0.07ns	0.08ns
Root length with diameter <0.2mm	RL<0.2mm	0.9***	0.91***	0.84***	0.76***	0.71***	0.96***
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.9***	0.92***	0.84***	0.78***	0.69***	0.95***
Root length with diameter 0.5-1mm	RL0.5-1mm	0.9***	0.92***	0.84***	0.79***	0.7***	0.95***

Name of variables	Abbreviation of variable	RLD30-40	RLD40-50	RLD50-60	RLD60-100	RLDrz	RL0-20
Root length with diameter 1-2mm	RL1-2mm	0.9***	0.95***	0.89***	0.85***	0.66***	0.92***
Root length with diameter >2mm	RL>2mm	0.61**	0.45*	0.29ns	0.17ns	0.26ns	0.52**
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.27ns	0.28ns	0.25ns	0.13ns	0.49*	0.47*
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.35ns	-0.36ns	-0.33ns	-0.24ns	-0.52**	-0.44*
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.18ns	-0.19ns	-0.18ns	-0.11ns	-0.01ns	-0.17ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.48*	0.5*	0.51**	0.46*	0.1ns	0.24ns
Percentage of root length with diameter >2mm	%RL>2mm	-0.22ns	-0.26ns	-0.26ns	-0.24ns	-0.46*	-0.41*
		RL0-30	RL0-40	RL0-50	RL0-60	RLD0-20	RLD0-30
Root length in 0-40 cm section	RL0-40	0.85***					
Root length in 0-50 cm section	RL0-50	0.86***	1***				
Root length in 0-60 cm section	RL0-60	0.8***	0.91***	0.95***			
Root length density in 0-20 cm section	RLD0-20	0.99***	0.78***	0.79***	0.74***		
Root length density in 0-30 cm section	RLD0-30	1***	0.85***	0.86***	0.8***	0.99***	
Root length density in 0-40 cm section	RLD0-40	0.85***	1***	1***	0.91***	0.78***	0.85***
Root length density in 0-50 cm section	RLD0-50	0.86***	1***	1***	0.95***	0.79***	0.86***
Root length density in 0-60 cm section	RLD0-60	0.8***	0.91***	0.95***	1***	0.74***	0.8***
Specific root length	SRL	-0.15ns	-0.33ns	-0.32ns	-0.28ns	-0.11ns	-0.15ns
Average root diameter	ARD	0.15ns	0.22ns	0.19ns	0.09ns	0.12ns	0.15ns
Root tissue density	RTD	0.14ns	0.32ns	0.31ns	0.27ns	0.08ns	0.14ns
Root length with diameter <0.2mm	RL<0.2mm	0.98***	0.9***	0.92***	0.89***	0.96***	0.98***
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.98***	0.92***	0.93***	0.89***	0.95***	0.98***
Root length with diameter 0.5-1mm	RL0.5-1mm	0.98***	0.91***	0.92***	0.89***	0.95***	0.98***

Name of variables	Abbreviation of variable	RL0-30	RL0-40	RL0-50	RL0-60	RLD0-20	RLD0-30
Root length with diameter 1-2mm	RL1-2mm	0.96***	0.92***	0.94***	0.93***	0.92***	0.96***
Root length with diameter >2mm	RL>2mm	0.54**	0.57**	0.55**	0.38ns	0.52**	0.54**
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.43*	0.23ns	0.24ns	0.26ns	0.47*	0.43*
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.42*	-0.31ns	-0.33ns	-0.35ns	-0.44*	-0.42*
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.17ns	-0.16ns	-0.17ns	-0.18ns	-0.17ns	-0.17ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.29ns	0.47*	0.48*	0.51**	0.24ns	0.29ns
Percentage of root length with diameter >2mm	%RL>2mm	-0.39ns	-0.24ns	-0.25ns	-0.26ns	-0.41*	-0.39ns
		RLD0-40	RLD0-50	RLD0-60	SRL	ARD	RTD
Root length density in 0-50 cm section	RLD0-50	1***					
Root length density in 0-60 cm section	RLD0-60	0.91***	0.95***				
specific root length	SRL	-0.33ns	-0.32ns	-0.28ns			
Average root diameter	ARD	0.22ns	0.19ns	0.09ns	-0.52**		
Root tissue density	RTD	0.32ns	0.31ns	0.27ns	-0.87***	0.48*	
Root length with diameter <0.2mm	RL<0.2mm	0.9***	0.92***	0.89***	-0.19ns	0.12ns	0.17ns
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.92***	0.93***	0.89***	-0.2ns	0.15ns	0.19ns
Root length with diameter 0.5-1mm	RL0.5-1mm	0.91***	0.92***	0.89***	-0.23ns	0.16ns	0.2ns
Root length with diameter 1-2mm	RL1-2mm	0.92***	0.94***	0.93***	-0.25ns	0.15ns	0.24ns
Root length with diameter >2mm	RL>2mm	0.57**	0.55**	0.38ns	-0.21ns	-0.1ns	0.2ns
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.23ns	0.24ns	0.26ns	0.05ns	-0.25ns	-0.15ns
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.31ns	-0.33ns	-0.35ns	0.33ns	-0.09ns	-0.11ns
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.16ns	-0.17ns	-0.18ns	-0.15ns	0.28ns	0.03ns
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.47*	0.48*	0.51**	-0.46*	0.39ns	0.46*
Percentage of root length with diameter >2mm	%RL>2mm	-0.24ns	-0.25ns	-0.26ns	-0.1ns	-0.31ns	0.11ns

Name of variables	Abbreviation of variable	RL<0.2mm	RL<0.2-0.5mm	RL0.5-1mm	RL1-2mm	RL>2mm	%RL<0.2mm
Root length with diameter <0.2mm	RL<0.2mm						
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm	0.99***					
Root length with diameter 0.5-1mm	RL0.5-1mm	0.99***	1***				
Root length with diameter 1-2mm	RL1-2mm	0.98***	0.99***	0.99***			
Root length with diameter >2mm	RL>2mm	0.54**	0.54**	0.52**	0.49*		
Percentage of root length with diameter <0.2mm	%RL<0.2mm	0.45*	0.37ns	0.34ns	0.33ns	0.3ns	
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm	-0.42*	-0.37ns	-0.42*	-0.4*	-0.12ns	-0.56**
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.23ns	-0.2ns	-0.12ns	-0.16ns	-0.37ns	-0.49*
Percentage of root length with diameter 1-2mm	%RL1-2mm	0.35ns	0.37ns	0.4*	0.46*	0.02ns	-0.32ns
Percentage of root length with diameter >2mm	%RL>2mm	-0.35ns	-0.35ns	-0.37ns	-0.35ns	0.42*	-0.01ns
		%RL<0.2-0.5mm	%RL0.5-1mm	%RL1-2mm	%RL>2mm		
Root length with diameter <0.2mm	RL<0.2mm						
Root length with diameter <0.2-0.5mm	RL<0.2-0.5mm						
Root length with diameter 0.5-1mm	RL0.5-1mm						
Root length with diameter 1-2mm	RL1-2mm						
Root length with diameter >2mm	RL>2mm						
Percentage of root length with diameter <0.2mm	%RL<0.2mm						
Percentage of root length with diameter <0.2-0.5mm	%RL<0.2-0.5mm						
Percentage of root length with diameter 0.5-1mm	%RL0.5-1mm	-0.34ns					
Percentage of root length with diameter 1-2mm	%RL1-2mm	-0.22ns	0.18ns				
Percentage of root length with diameter >2mm	%RL>2mm	0.33ns	-0.37ns	-0.38ns			

Table S3. Pearson's correlation matrix of rhizotron experiments (winter and summer) and field experiment. Values represent Pearson's correlation coefficient (r). Symbols indicate *, significant at $P < 0.05$, **, significant at $P < 0.01$, ***, significant at $P < 0.001$, and ns, not significant.

Name of variables	Root length density 0-30 cm depth	Root length density 0-200 cm depth	Rhizome dry weight	Drought resistance index
Field experiments				
Root length density 0-30 cm depth	-			
Root length density 0-200 cm depth	0.88 ***	-		
Rhizome dry weight	-0.11ns	-0.11ns	-	
Drought resistance index	-0.15ns	-0.16ns	0.95 ***	-
Winter rhizotron experiment				
Rate of root depth development	0.15ns	-0.02ns	0.52ns	0.75**
Root length density 0-10 cm section	-0.02ns	0ns	0.13ns	0.21ns
Root length density 0-100 cm section	-0.08ns	-0.06ns	0.17ns	0.27ns
Total root length	-0.08ns	-0.06ns	0.17ns	0.27ns
Summer rhizotron experiment				
Rate of root depth development	-0.03ns	-0.18ns	0.8**	0.77**
Root length density 0-10 cm section	-0.17ns	-0.12ns	0ns	0.23ns
Root length density 0-100 cm section	-0.14ns	-0.07ns	0.13ns	0.29ns
Total root length	-0.14ns	-0.07ns	0.13ns	0.29ns

Table S4. Principal component analysis in winter experiment. Variables are rate of root depth development (RRDD), root depth at harvest (RD), shoot dry weight (SDW), leaf area (LA), root to shoot ratio (RSR), specific leaf area (SLA), photosynthetic rate (Pn), tiller appearance rate (TAR), root angle (RA), total root length (RL), percentage of inactive root length (%IRL) and average root diameter (ARD).

Variable	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11	PC12
RRDD	-0.01	0.31	-0.02	0.35	0.76	-0.02	-0.08	0.37	-0.23	0.06	-0.06	0.07
RD	0.46	0.08	0.05	0.00	-0.03	-0.17	0.18	0.01	-0.33	-0.74	0.27	-0.02
SDW	0.46	-0.16	0.16	0.06	-0.02	0.01	0.12	0.00	0.06	0.31	0.13	0.78
LA	0.47	-0.02	0.12	-0.03	0.01	-0.05	0.09	0.19	0.05	0.47	0.39	-0.58
RSR	0.04	0.17	-0.69	-0.07	-0.16	-0.44	-0.30	-0.10	-0.27	0.21	0.17	0.11
SLA	0.02	0.46	-0.13	-0.52	0.06	-0.16	0.24	0.34	0.53	-0.09	-0.02	0.12
Pn	0.01	-0.21	-0.50	0.48	-0.26	0.25	0.30	0.46	0.18	-0.10	0.00	-0.01
TDR	0.23	0.24	-0.19	-0.27	-0.03	0.79	-0.36	0.01	-0.13	-0.03	0.05	0.03
RA	0.13	-0.52	-0.06	-0.09	0.24	-0.14	-0.60	0.19	0.39	-0.25	0.08	-0.01
RL	0.48	-0.06	-0.09	-0.05	-0.03	-0.12	0.01	0.00	-0.07	0.05	-0.84	-0.15
% IRL	-0.22	-0.38	0.06	-0.48	-0.05	-0.01	0.12	0.53	-0.52	0.09	-0.03	0.07
ARD	-0.02	0.34	0.40	0.25	-0.52	-0.15	-0.44	0.42	-0.03	-0.01	-0.07	0.06
Proportion (%)	34.40	17.70	11.90	10.90	8.20	5.70	4.60	3.10	2.40	0.90	0.20	0.10

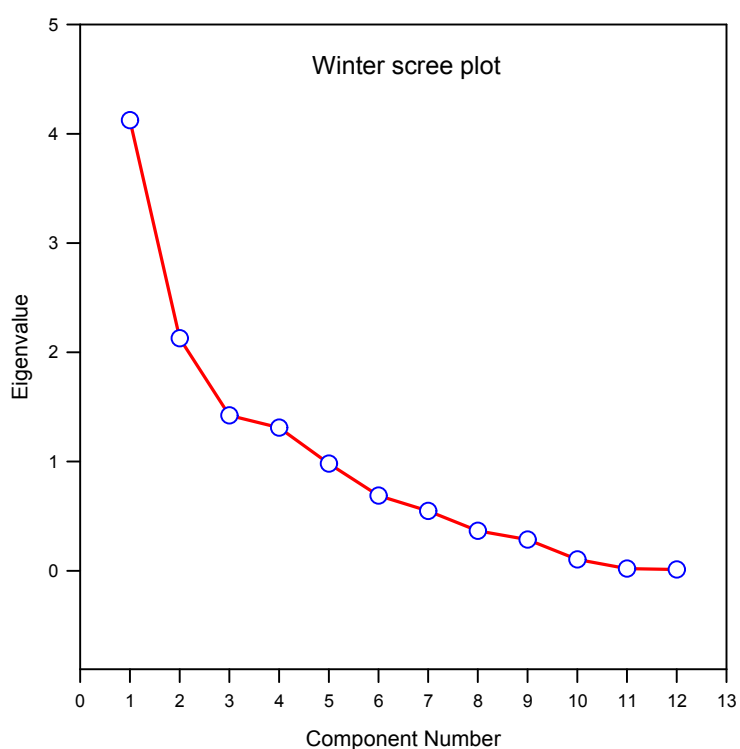


Table S5. principal component analysis in summer. Variables are rate of root depth development (RRDD), root depth at harvest (RD), rhizome dry weight (RhiDW), shoot dry weight (SDW), leaf area (LA), root to shoot ratio (RSR), specific leaf area (SLA), photosynthetic rate (Pn), tiller appearance rate (TAR), root angle (RA), total root length (RL), and average root diameter (ARD).

Variable	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11	PC12
RRDD	0.19	-0.41	0.05	-0.10	0.59	-0.04	0.18	0.49	0.26	-0.30	-0.02	0.00
RD	0.38	-0.20	0.03	0.22	0.15	-0.18	0.16	-0.29	0.32	0.69	-0.12	0.10
RhiDW	0.39	0.08	0.00	0.07	-0.07	-0.11	0.40	0.31	-0.71	0.11	-0.18	-0.08
SDW	0.43	0.17	0.14	-0.16	-0.04	0.04	-0.06	-0.21	0.20	-0.19	-0.09	-0.78
LA	0.42	-0.21	-0.02	-0.01	-0.25	-0.09	-0.02	-0.06	-0.04	-0.14	0.81	0.14
RSR	0.02	0.14	-0.66	0.45	0.05	0.45	0.10	0.18	0.14	0.07	0.15	-0.21
SLA	-0.08	-0.45	-0.08	0.23	-0.63	-0.30	-0.07	0.31	0.21	-0.07	-0.26	-0.17
Pn	0.35	-0.08	-0.02	-0.10	0.02	0.28	-0.79	0.26	-0.15	0.20	-0.16	0.13
TDR	-0.03	-0.62	-0.30	-0.10	0.09	0.21	0.01	-0.53	-0.34	-0.18	-0.18	-0.06
RA	-0.02	-0.03	-0.28	-0.78	-0.25	0.20	0.26	0.17	0.17	0.30	0.01	0.02
RL	0.40	0.19	0.01	0.06	-0.24	0.26	0.19	-0.15	0.24	-0.43	-0.36	0.50
ARD	0.12	0.25	-0.60	-0.15	0.15	-0.66	-0.20	-0.08	0.01	-0.16	-0.09	0.09
Proportion (%)	38.6	14.6	10.4	10.1	8.7	5.7	4.4	3.8	2	1.3	0.4	0.2

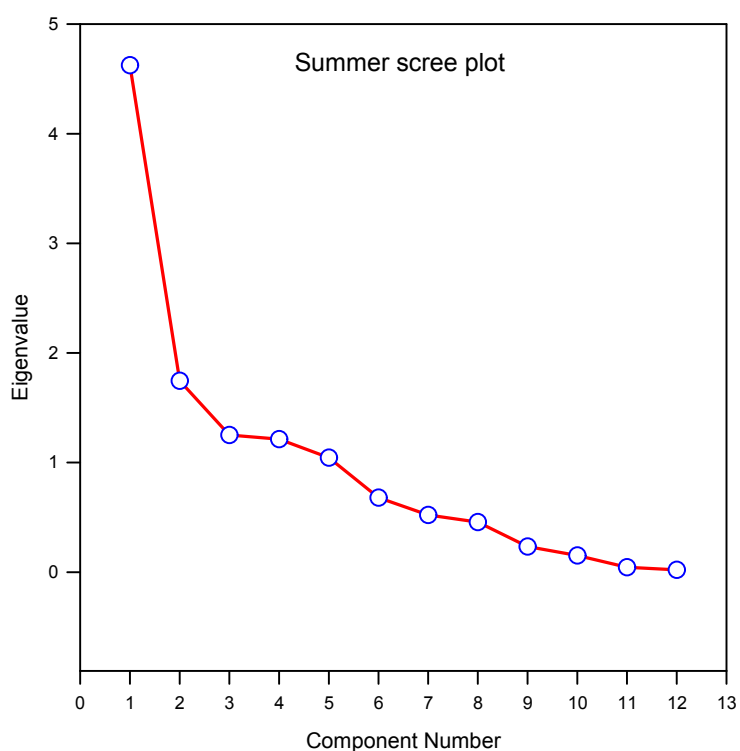


Table S6. Means variables measured at harvest. Symbols indicate *, significant at $P < 0.05$, **, significant at $P < 0.01$, ***, significant at $P < 0.001$, and ns, not significant.

Genotypes	Total root length (m)	Root angle (°)	Average root diameter (mm)	Root tissue density (10 g m ⁻³)	Root dry weight (g)	Shoot dry weight (g)	Leaf area (m ²)	Tiller appearance rate (10 ⁻⁴ °Cd ⁻¹)	Photosynthetic rate (µmol CO ₂ cm ⁻² s ⁻¹)	Transpiration rate (mmol H ₂ O cm ⁻² s ⁻¹)
Winter rhizotron experiment										
MD3	570.65	55	0.53	0.42	0.16	3.10	0.73	25	269	12
MD1	181.22	55	0.55	0.17	0.05	1.45	0.41	30	142	5
MD2	394.64	87	0.50	0.41	0.27	2.14	0.65	26	243	12
40	496.58	63	0.50	0.28	0.28	7.60	2.16	28	275	11
698	364.93	73	0.49	0.59	0.28	3.23	0.63	22	310	14
55	184.74	53	0.45	0.43	0.12	0.90	0.25	28	428	20
1189	288.03	90	0.50	0.16	0.08	3.46	0.61	23	255	17
573	695.94	65	0.48	0.36	0.40	8.35	1.95	23	244	11
659	356.99	73	0.45	0.42	0.23	2.76	0.89	32	263	10
394	465.8	62	0.50	0.29	0.20	3.62	1.24	24	267	10
WG	225.23	69	0.56	0.23	0.10	2.37	0.61	26	225	18
251	25.93	54	0.53	0.14	0.01	0.31	0.04	16	354	15
LSD _{.05}	15***	19*	0.09ns	0.03ns	0.23*	1.68**	4.19**	5.67ns	218ns	8ns
Summer rhizotron experiment										
MD3	57.07	73	0.63	0.43	4.56	6.75	1.59	20	507	91
MD1	18.12	83	0.60	0.23	1.42	3.61	1.76	36	256	43
MD2	39.46	65	0.59	0.30	1.17	2.17	0.92	29	234	41
40	49.66	70	0.60	0.32	4.11	18.85	2.75	14	479	70
698	36.49	93	0.58	0.30	1.50	5.54	0.76	14	306	43
55	18.47	78	0.61	0.29	2.95	6.21	1.22	15	268	45
1189	28.80	73	0.58	0.42	0.76	3.44	0.50	29	330	60
573	69.59	67	0.60	0.38	5.90	14.56	2.07	13	474	65
659	35.70	60	0.57	0.22	0.98	2.33	0.53	11	136	28
394	46.58	66	0.60	0.37	2.81	7.01	1.59	12	295	47
WG	22.52	97	0.60	0.27	1.59	5.08	0.88	18	205	36
251	2.59	68	0.62	0.31	1.29	4.40	0.75	14	310	54
LSD _{.05}	158*	17**	0.06ns	0.13ns	2.16**	5.31***	13*	14*	158**	17***