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Whalley, W. R., Zhang, X., Whalley, P. A., Ashton, R. W., Evans, J., Hawkesford, M. J., Griffiths, G., Huang, Z. D., Zhou, H. and Mooney, S. J. 2020. A comparison between water uptake and root length density in winter wheat: effects of root density and rhizosphere properties . *Plant and Soil*.

The publisher's version can be accessed at:

- <https://dx.doi.org/10.1007/s11104-020-04530-3>
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A comparison between water uptake and root length density in winter wheat: effects of root density and rhizosphere properties

Supplemental data

XX Zhang¹, PA Whalley², RW Ashton¹, J Evans¹, MJ Hawkesford¹, S. Griffiths³, ZD Huang⁴
H Zhou^{5,6}, SJ Mooney⁵ and WR Whalley¹

¹Rothamsted Research, Harpenden, Hertfordshire, AL5 2JQ.

² University of Oxford, Radcliffe Observatory, Andrew Wiles Building, Woodstock Rd, Oxford OX2 6GG

³John Innes Centre, Norwich Research Park, Norwich, NR4 7UH, UK

⁴ Farmland Irrigation Research Institute, Chinese Academy of Agricultural Sciences, Xinxiang 453002, Henan, China.

⁵ School of Biosciences, University of Nottingham, Sutton Bonington Campus, Loughborough, Leicestershire LE12 5RD, United Kingdom

⁶ State Key Laboratory of Soil and Sustainable Agriculture, Institute of Soil Sciences, Chinese Academy of Sciences. 71 East Beijing Road, Nanjing 210008, P.R. China

Lines used in this study

	Name	Plot number			BTK Code	Genotype	Allele
1	nil1-1	65	188	461	1	141-16-10P-2DEM(4-2)	p
2	nil1-10	91	127	378	10	141-7-11W-2DYLD(6-13)	w
3	nil1-100	183	201	380	100	729-77-2W-5AEM(6-24)	w
4	nil1-101	25	43	96	101	729-77-4P-5AEM(6-30)	p
5	nil1-102	171	281	463	102	729-77-6W-5AEM(6-25)	w
6	nil1-12	230	262	332	12	141-7-13P-7BHT(5-12)	p
7	nil1-14	84	243	272	14	141-7-16P-2DYLD(6-18)	p
8	nil1-17	191	336	480	17	141-7-17P-7BHT(5-13)	p
9	nil1-19	319	455	501	19	141-7-18W-7BHT(5-7)	w
10	nil1-2	17	202	269	2	141-16-12W-2DEM(5-16)	w
11	nil1-20	23	106	225	20	141-7-19P-2DYLD(6-20)	p
12	nil1-22	126	355	385	22	141-7-2W-2DYLD(6-8)	w
13	nil1-25	135	194	333	25	141-7-5P-7BHT(5-8)	p
14	nil1-28	123	282	354	27	141-7-6P-7BHT(5-9)	p
15	nil1-29	38	182	261	29	141-7-7P-7BHT(5-10)	p
16	nil1-33	160	239	409	33	209-38-15P-6AHT(4-16)	p
17	nil1-35	99	122	134	35	209-38-1W-6AHT(4-6)	w
18	nil1-43	8	72	404	43	209-57-17W-3AEM(3-7)	w
19	nil1-44	76	138	151	44	209-57-18P-3AEM(3-14)	p
20	nil1-45	20	348	371	45	209-57-19W-3AEM(3-11)	w
21	nil1-48	41	343	365	46	209-57-1P-3AEM(3-12)	p
22	nil1-53	278	345	351	53	292-69-10P-6AHT(2-3)	p
23	nil1-55	79	364	437	54	292-69-13W-6AHT(3-17)	w
24	nil1-64	176	198	213	64	34-19-11P-2BEM(6-7)	p
25	nil1-65	234	296	423	65	34-19-12W-1BEM(6-6)	w
26	nil1-66	114	337	459	66	352-54-11W-5AHT(2-18)	w
27	nil1-69	129	155	167	69	352-54-18W-5AHT(2-17)	w
28	nil1-70	190	223	289	70	352-54-1W-5AHT(2-16)	w
29	nil1-71	169	235	473	71	352-54-20P-5AHT(1-3)	p
30	nil1-72	70	347	353	72	352-54-22W-3AEM(2-11)	w

31	nil1-73	34	287	472	73	352-54-3P-3AEM(2-12)	p
32	nil1-79	279	315	499	79	468-69-15W-6AHT(1-11)	w
33	nil1-80	74	137	406	80	468-69-17P-6AHT(6-21)	p
34	nil1-85	21	471	490	85	468-69-22P-6AHT(6-23)	p
35	nil1-86	346	470	489	86	468-69-2P-6AHT(1-16)	p

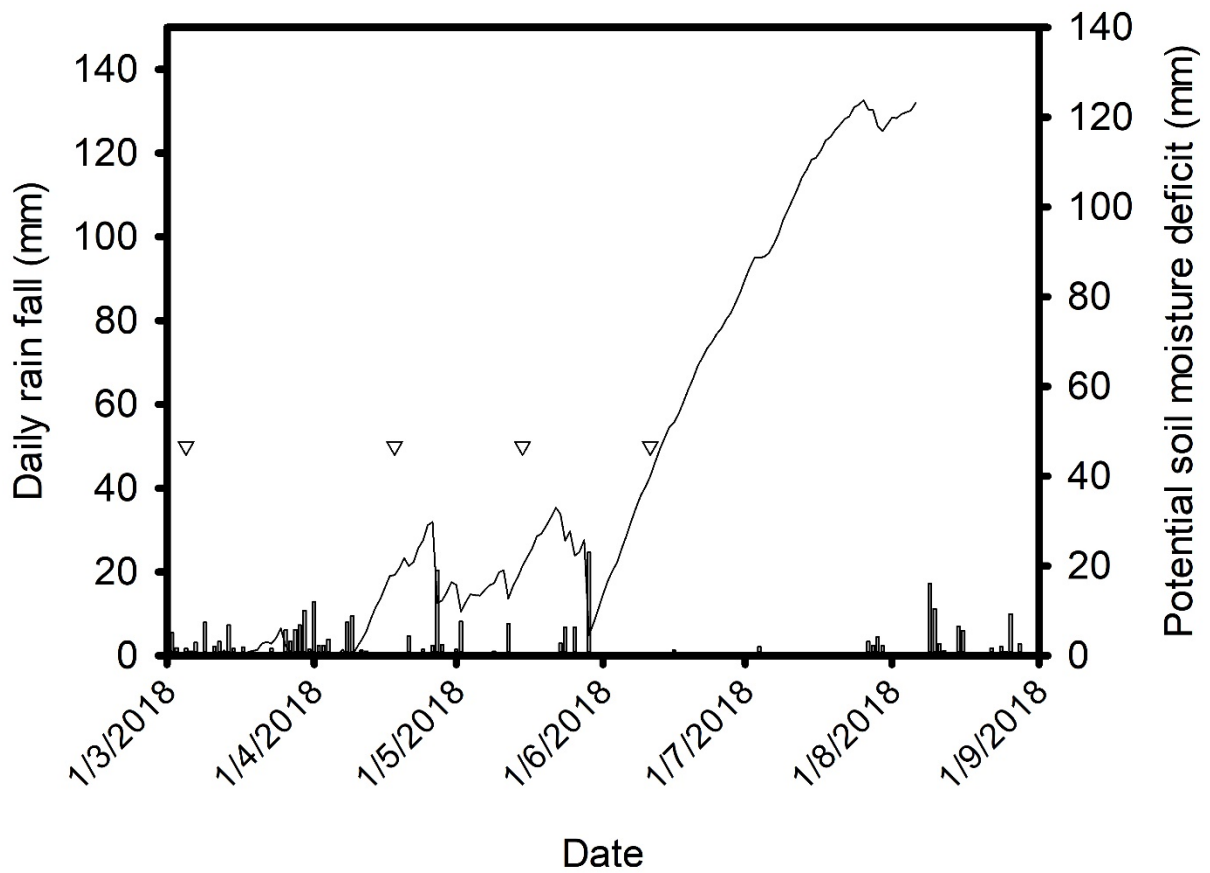


FIGURE S1. Patterns of rainfall and soil moisture deficit in the 2017/2018 winter wheat season. The measurement points of soil moisture monitoring are shown by the open triangles.

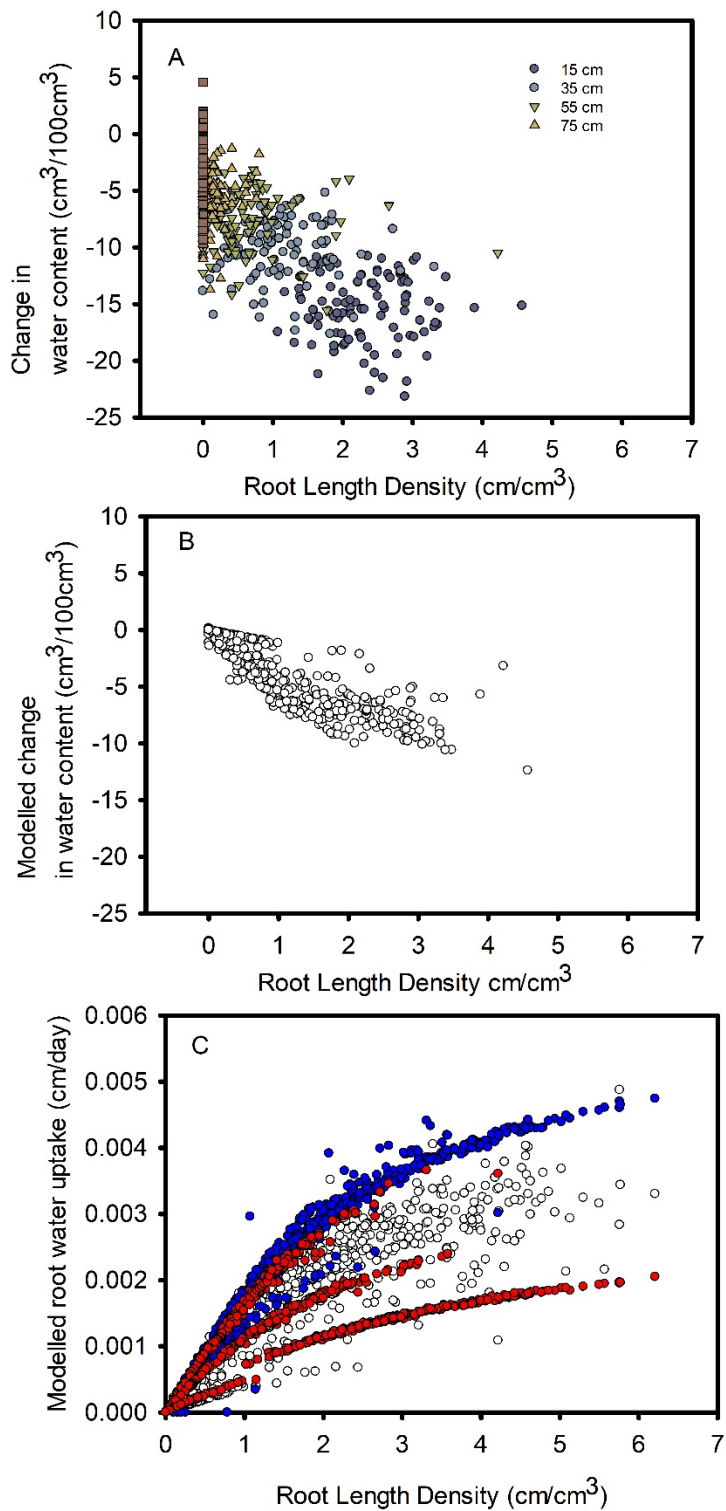


FIGURE S2. In panel A the measured drying of soil is plotted against root length density. In panel B an adjust water content that takes account of vertical flow is plotted against root length density. Comparisons of panels A and B shows that the change in water content at very low root length densities is related to either drainage in the deeper layers or evaporation in the shallow layers. Panel C shows the modelled root water uptake plotted against root length density for the three simulations: blue symbols for the initially wet profile, open symbols for the actual water profile and red symbols for the initially dry profile.

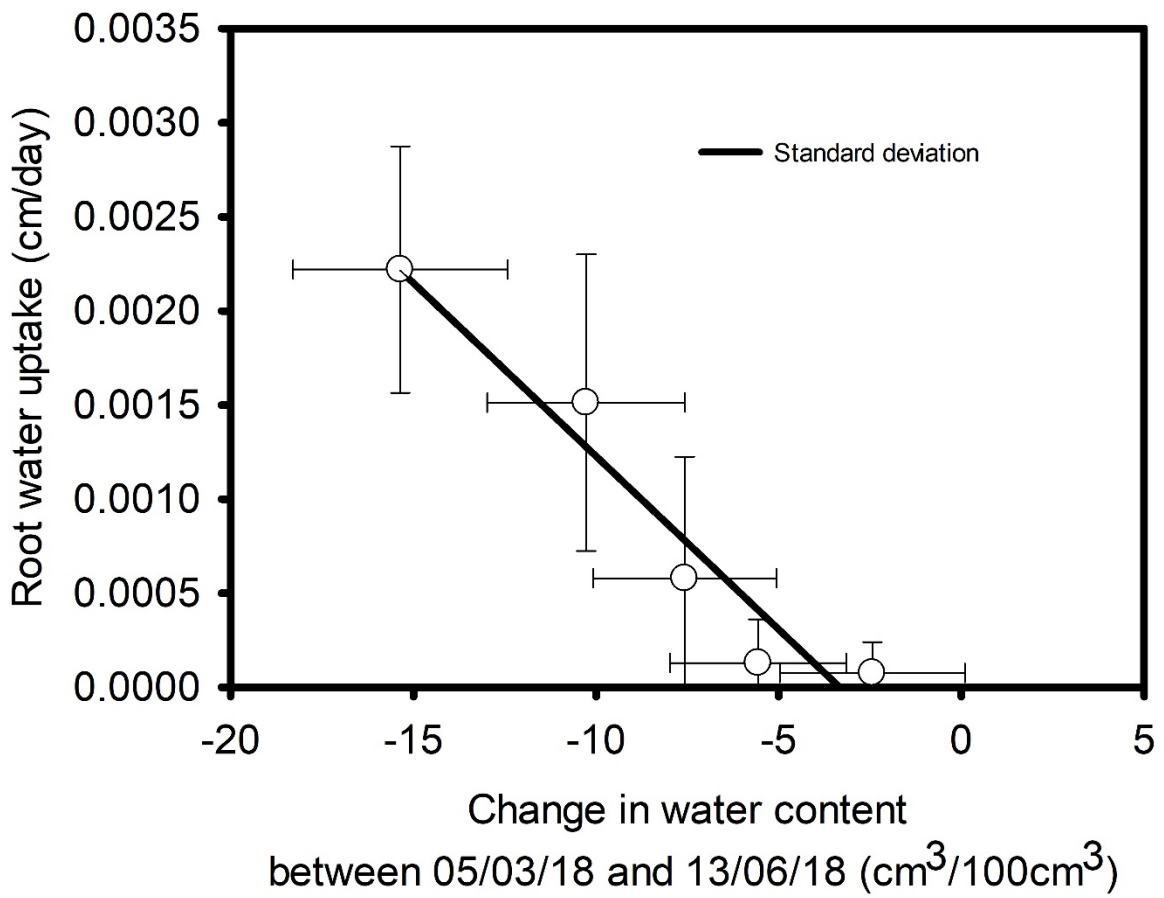


FIGURE S3. The respective predictions of root water uptake from the model plotted against the mean change in water content at depths of 15, 35, 55, 75, and 95 cm. The standard deviation of the mean is indicated. The regression explains 38 percent of the variance in the data ($P < 0.001$).

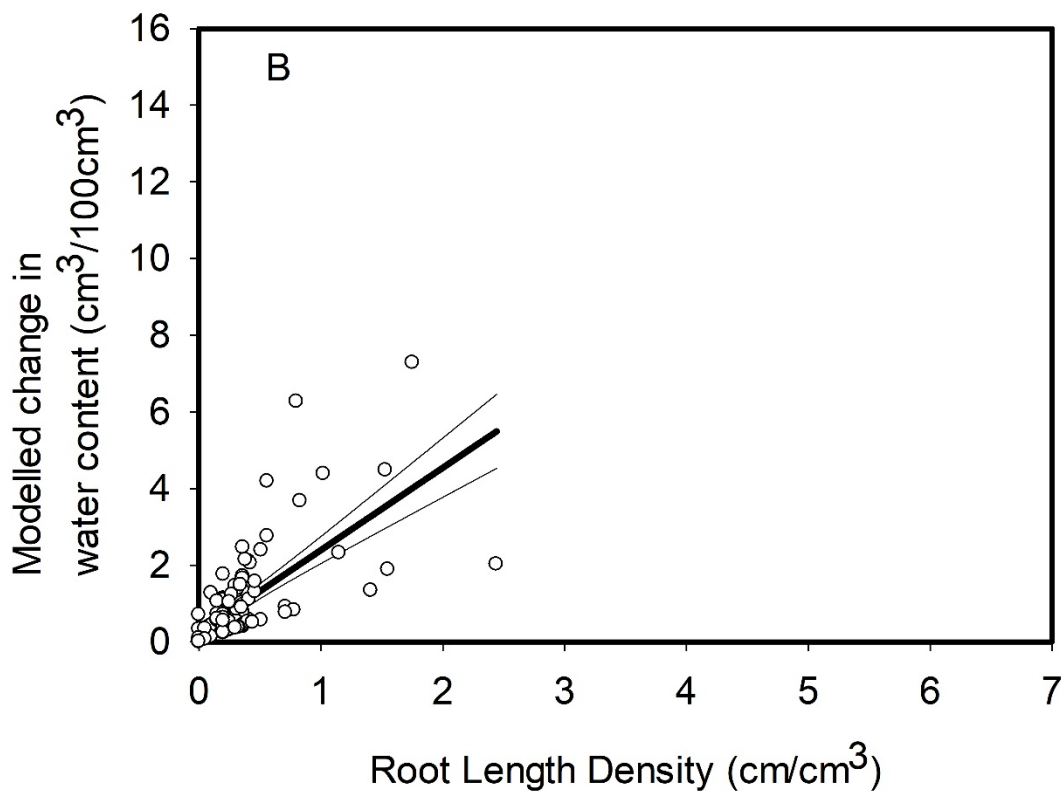
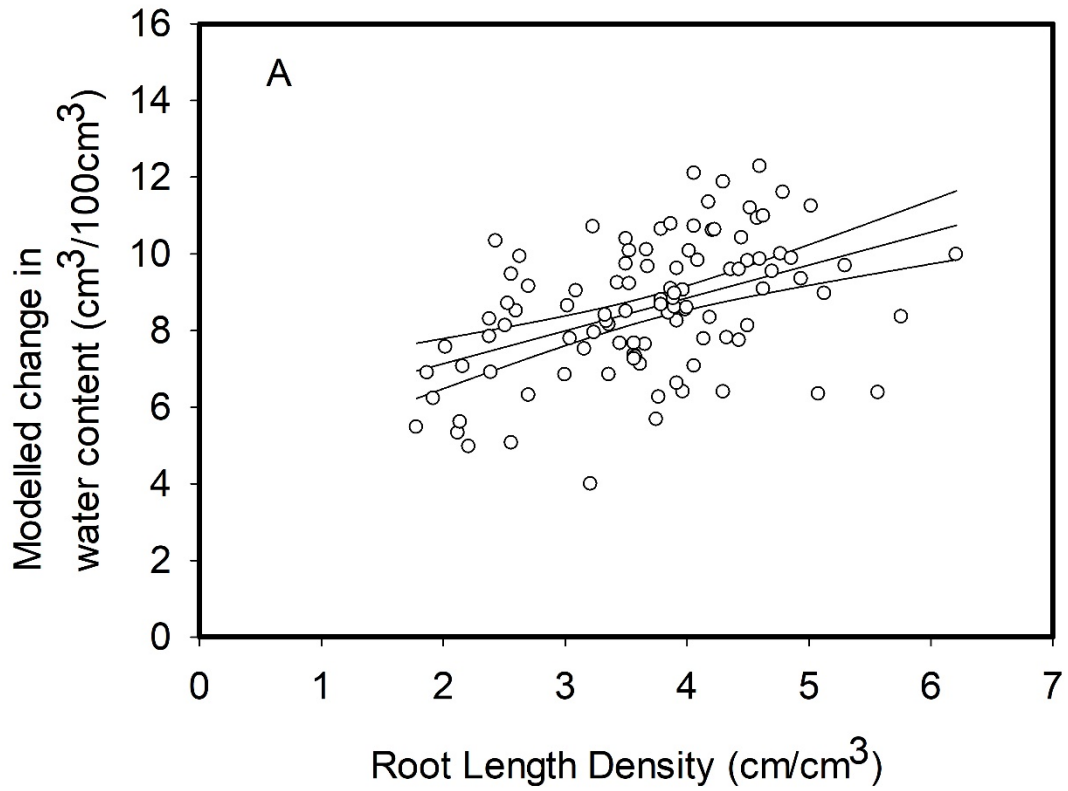


FIGURE S4. Modelled change in water content plotted against root length density at depths of 5 cm (A) and 65 cm (B). In the shallow, 5 cm, layer only 21.3% of soil drying is explained by root length density whereas at 65 cm, 46.4% of the change in water content is explained by root length density.

