Anthony Bengough

List of Publications by Year
in descending order

155 papers	11,443 citations	34105 52 h-index	32842 100 g-index
160 all docs	160 docs citations	160 times ranked	8889 citing authors

#	Article	IF	Citations
1	Rhizosphere: biophysics, biogeochemistry and ecological relevance. Plant and Soil, 2009, 321, 117-152.	3.7	950
2	Root elongation, water stress, and mechanical impedance: a review of limiting stresses and beneficial root tip traits. Journal of Experimental Botany, 2011, 62, 59-68.	4.8	766
3	Desirable plant root traits for protecting natural and engineered slopes against landslides. Plant and Soil, 2009, 324, 1-30.	3.7	513
4	Mechanical impedance to root growth: a review of experimental techniques and root growth responses. Journal of Soil Science, 1990, 41, 341-358.	1.2	485
5	Root responses to soil physical conditions; growth dynamics from field to cell. Journal of Experimental Botany, 2006, 57, 437-447.	4.8	399
6	Root- and microbial-derived mucilages affect soil structure and water transport. European Journal of Soil Science, 2000, 51, 435-443.	3.9	340
7	Root traits as drivers of plant and ecosystem functioning: current understanding, pitfalls and future research needs. New Phytologist, 2021, 232, 1123-1158.	7.3	277
8	Plant roots release phospholipid surfactants that modify the physical and chemical properties of soil. New Phytologist, 2003, 157, 315-326.	7.3	250
9	Matching roots to their environment. Annals of Botany, 2013, 112, 207-222.	2.9	247
10	A starting guide to root ecology: strengthening ecological concepts and standardising root classification, sampling, processing and trait measurements. New Phytologist, 2021, 232, 973-1122.	7.3	216
11	Root hairs improve root penetration, rootâ€“soil contact, and phosphorus acquisition in soils of different strength. Journal of Experimental Botany, 2013, 64, 3711-3721.	4.8	215
12	Root phenomics of crops: opportunities and challenges. Functional Plant Biology, 2009, 36, 922.	2.1	163
13	Disentangling the impact of AM fungi versus roots on soil structure and water transport. Plant and Soil, 2009, 314, 183-196.	3.7	159
14	Planting density influence on fibrous root reinforcement of soils. Ecological Engineering, 2010, 36, 276-284.	3.6	156
15	Root Caps and Rhizosphere. Journal of Plant Growth Regulation, 2002, 21, 352-367.	5.1	144
16	Plant exudates may stabilize or weaken soil depending on species, origin and time. European Journal of Soil Science, 2017, 68, 806-816.	3.9	144
17	Contributions of roots and rootstocks to sustainable, intensified crop production. Journal of Experimental Botany, 2013, 64, 1209-1222.	4.8	139
18	Penetrometer resistance, root penetration resistance and root elongation rate in two sandy loam soils. Plant and Soil, 1991, 131, 59-66.	3.7	138

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19	Soil strength and macropore volume limit root elongation rates in many UK agricultural soils. Annals of Botany, 2012, 110, 259-270.	2.9	138
20	Sloughing of root cap cells decreases the frictional resistance to maize (Zea maysL.) root growth. Journal of Experimental Botany, 1997, 48, 885-893.	4.8	134
21	Root growth models: towards a new generation of continuous approaches. Journal of Experimental Botany, 2010, 61, 2131-2143.	4.8	132
22	Mechanical Reinforcement of Soil by Willow Roots: Impacts of Root Properties and Root Failure Mechanism. Soil Science Society of America Journal, 2009, 73, 1276-1285.	2.2	128
23	Measuring root traits in barley (Hordeum vulgare ssp. vulgare and ssp. spontaneum) seedlings using gel chambers, soil sacs and X-ray microtomography. Plant and Soil, 2009, 316, 285-297.	3.7	127
24	Analyzing Lateral Root Development: How to Move Forward. Plant Cell, 2012, 24, 15-20.	6.6	125
25	Gel observation chamber for rapid screening of root traits in cereal seedlings. Plant and Soil, 2004, 262, 63-70.	3.7	118
26	Highâ€resolution synchrotron imaging shows that root hairs influence rhizosphere soil structure formation. New Phytologist, 2017, 216, 124-135.	7.3	116
27	Sloughing of cap cells and carbon exudation from maize seedling roots in compacted sand. New Phytologist, 2000, 145, 477-482.	7.3	114
28	Material stiffness, branching pattern and soil matric potential affect the pullout resistance of model root systems. European Journal of Soil Science, 2007, 58, 1471-1481.	3.9	110
29	Plant influence on rhizosphere hydraulic properties: direct measurements using a miniaturized infiltrometer. New Phytologist, 2003, 157, 597-603.	7.3	108
30	A lattice BGK model for advection and anisotropic dispersion equation. Advances in Water Resources, 2002, 25, 1-8.	3.8	107
31	Water Dynamics of the Root Zone: Rhizosphere Biophysics and Its Control on Soil Hydrology. Vadose Zone Journal, 2012, 11, vzj2011.0111.	2.2	105
32	Understanding the genetic control and physiological traits associated with rhizosheath production by barley (<i><scp>H</scp>ordeum vulgare</i>). New Phytologist, 2014, 203, 195-205.	7.3	105
33	Root hair length and rhizosheath mass depend on soil porosity, strength and water content in barley genotypes. Planta, 2014, 239, 643-651.	3.2	101
34	Hard-setting soils. Soil Use and Management, 1987, 3, 79-83.	4.9	97
35	Title is missing!. Plant and Soil, 2003, 250, 273-282.	3.7	97
36	A biophysical analysis of root growth under mechanical stress. Plant and Soil, 1997, 189, 155-164.	3.7	88

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37	Deep rooting and drought screening of cereal crops: A novel field-based method and its application. Field Crops Research, 2009, 112, 165-171.	5.1	85
38	Root hairs aid soil penetration by anchoring the root surface to pore walls. Journal of Experimental Botany, 2016, 67, 1071-1078.	4.8	75
39	Influence of soil strength on root growth: experiments and analysis using a critical-state model. European Journal of Soil Science, 2002, 53, 119-127.	3.9	74
40	A mass balance based numerical method for the fractional advection-dispersion equation: Theory and application. Water Resources Research, 2005, 41, .	4.2	74
41	Determination of soil hydraulic conductivity with the lattice Boltzmann method and soil thin-section technique. Journal of Hydrology, 2005, 306, 59-70.	5.4	73
42	Root elongation of seedling peas through layered soil of different penetration resistances. Plant and Soil, 1993, 149, 129-139.	3.7	72
43	Root cap removal increases root penetration resistance in maize (Zea mays L.). Journal of Experimental Botany, 2003, 54, 2105-2109.	4.8	71
44	Scaling of the reinforcement of soil slopes by living plants in a geotechnical centrifuge. Ecological Engineering, 2017, 109, 207-227.	3.6	70
45	Mechanical impedance of root growth directly reduces leaf elongation rates of cereals. New Phytologist, 1997, 135, 613-619.	7.3	69
46	Domain-decomposition method for parallel lattice Boltzmann simulation of incompressible flow in porous media. Physical Review E, 2005, 72, 016706.	2.1	68
47	Impact of fungal and bacterial biocides on microbial induced water repellency in arable soil. Geoderma, 2006, 135, 72-80.	5.1	66
48	Root elongation is restricted by axial but not by radial pressures: so what happens in field soil?. Plant and Soil, 2012, 360, 15-18.	3.7	65
49	Root biomechanical properties during establishment of woody perennials. Ecological Engineering, 2017, 109, 196-206.	3.6	60
50	Upscaling from Rhizosphere to Whole Root System: Modelling the Effects of Phospholipid Surfactants on Water and Nutrient Uptake. Plant and Soil, 2006, 283, 57-72.	3.7	57
51	Biomechanics of nodal, seminal and lateral roots of barley: effects of diameter, waterlogging and mechanical impedance. Plant and Soil, 2013, 370, 407-418.	3.7	57
52	Estimating rootâ€“soil contact from 3D Xâ€ray microtomographs. European Journal of Soil Science, 2012, 63, 776-786.	3.9	55
53	The effect of mechanical impedance on root growth in pea (Pisum sativum). II. Cell expansion and wall rheology during recovery. Physiologia Plantarum, 2000, 109, 150-159.	5.2	54
54	Quantifying rhizosphere particle movement around mutant maize roots using timeâ€lapse imaging and particle image velocimetry. European Journal of Soil Science, 2010, 61, 926-939.	3.9	54

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55	Root cap influences root colonisation by Pseudomonas fluorescens SBW25 on maize. FEMS Microbiology Ecology, 2005, 54, 123-130.	2.7	53
56	Correlating hydrologic reinforcement of vegetated soil with plant traits during establishment of woody perennials. Plant and Soil, 2017, 416, 437-451.	3.7	53
57	Surface tension, rheology and hydrophobicity of rhizodeposits and seed mucilage influence soil water retention and hysteresis. Plant and Soil, 2019, 437, 65-81.	3.7	53
58	Modelling Rooting Depth and Soil Strength in a Drying Soil Profile. Journal of Theoretical Biology, 1997, 186, 327-338.	1.7	52
59	Root cap structure and cell production rates of maize (Zea mays) roots in compacted sand. New Phytologist, 2003, 160, 127-134.	7.3	51
60	Centrifuge modelling of soil slopes reinforced with vegetation. Canadian Geotechnical Journal, 2010, 47, 1415-1430.	2.8	51
61	Imaging microstructure of the barley rhizosphere: particle packing and root hair influences. New Phytologist, 2019, 221, 1878-1889.	7.3	51
62	Application of Bayesian Belief Networks to quantify and map areas at risk to soil threats: Using soil compaction as an example. Soil and Tillage Research, 2013, 132, 56-68.	5.6	50
63	A new physical interpretation of plant root capacitance. Journal of Experimental Botany, 2012, 63, 6149-6159.	4.8	49
64	Can root electrical capacitance be used to predict root mass in soil?. Annals of Botany, 2013, 112, 457-464.	2.9	49
65	Small-scale modelling of plant root systems using 3D printing, with applications to investigate the role of vegetation on earthquake-induced landslides. Landslides, 2017, 14, 1747-1765.	5.4	49
66	Root anatomical traits contribute to deeper rooting of maize under compacted field conditions. Journal of Experimental Botany, 2020, 71, 4243-4257.	4.8	48
67	Developmental morphology of cover crop species exhibit contrasting behaviour to changes in soil bulk density, revealed by X-ray computed tomography. PLoS ONE, 2017, 12, e0181872.	2.5	48
68	Biophysics of the Vadose Zone: From Reality to Model Systems and Back Again. Vadose Zone Journal, 2013, 12, 1-17.	2.2	47
69	A novel three-dimensional lattice Boltzmann model for solute transport in variably saturated porous media. Water Resources Research, 2002, 38, 6-1-6-10.	4.2	46
70	Water stress induced by PEG decreases the maximum growth pressure of the roots of pea seedlings. Journal of Experimental Botany, 1998, 49, 1689-1694.	4.8	45
71	Mechanistic framework to link root growth models with weather and soil physical properties, including example applications to soybean growth in Brazil. Plant and Soil, 2018, 428, 67-92.	3.7	45
72	Title is missing!. Plant and Soil, 1998, 200, 157-167.	3.7	44

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73	On boundary conditions in the lattice Boltzmann model for advection and anisotropic dispersion equation. Advances in Water Resources, 2002, 25, 601-609.	3.8	44
74	Soil compactionâ€"N interactions in barley: Root growth and tissue composition. Soil and Tillage Research, 2010, 106, 241-246.	5.6	44
75	The effect of mechanical impedance on root growth in pea (Pisum sativum). I. Rates of cell flux, mitosis, and strain during recovery. Physiologia Plantarum, 1999, 107, 277-286.	5.2	43
76	Relations between root length densities and root intersections with horizontal and vertical planes using root growth modelling in 3-dimensions. Plant and Soil, 1992, 145, 245-252.	3.7	42
77	Significance of root hairs at the field scale â€" modelling root water and phosphorus uptake under different field conditions. Plant and Soil, 2020, 447, 281-304.	3.7	42
78	Estimating soil frictional resistance to metal probes and its relevance to the penetration of soil by roots. European Journal of Soil Science, 1997, 48, 603-612.	3.9	41
79	Effects of root dehydration on biomechanical properties of woody roots of Ulex europaeus. Plant and Soil, 2018, 431, 347-369.	3.7	41
80	Rhizosphereâ€Scale Quantification of Hydraulic and Mechanical Properties of Soil Impacted by Root and Seed Exudates. Vadose Zone Journal, 2018, 17, 1-12.	2.2	41
81	Centrifuge modelling of soil slopes containing model plant roots. Canadian Geotechnical Journal, 2012, 49, 1-17.	2.8	40
82	Simultaneous measurement of root force and elongation for seedling pea roots. Journal of Experimental Botany, 1994, 45, 95-102.	4.8	39
83	Resistance of simple plant root systems to uplift loads. Canadian Geotechnical Journal, 2010, 47, 78-95.	2.8	36
84	Rainfall infiltration and soil hydrological characteristics below ancient forest, planted forest and grassland in a temperate northern climate. Ecohydrology, 2016, 9, 585-600.	2.4	36
85	Effect of root age on the biomechanics of seminal and nodal roots of barley (Hordeum vulgare L.) in contrasting soil environments. Plant and Soil, 2015, 395, 253-261.	3.7	35
86	Rootâ€"soil friction: quantification provides evidence for measurable benefits for manipulation of rootâ€tip traits. Plant, Cell and Environment, 2013, 36, 1085-1092.	5.7	35
87	Soil tillage effects on the efficacy of cultivars and their mixtures in winter barley. Field Crops Research, 2012, 128, 91-100.	5.1	34
88	Timelapse scanning reveals spatial variation in tomato (Solanum lycopersicum L.) root elongation rates during partial waterlogging. Plant and Soil, 2013, 369, 467-477.	3.7	34
89	A new model for root growth in soil with macropores. Plant and Soil, 2017, 415, 99-116.	3.7	32
90	In situ measurement of root reinforcement using corkscrew extraction method. Canadian Geotechnical Journal, 2018, 55, 1372-1390.	2.8	31

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91	Root Border Cells Take Up and Release Glucose-C. Annals of Botany, 2004, 93, 221-224.	2.9	30
92	3D deformation field in growing plant roots reveals both mechanical and biological responses to axial mechanical forces. Journal of Experimental Botany, 2016, 67, 5605-5614.	4.8	30
93	Soil factors determined nematode community composition in a two year pot experiment. Nematology, 2003, 5, 889-897.	0.6	28
94	Analysis of root growth from a phenotyping data set using a density-based model. Journal of Experimental Botany, 2016, 67, 1045-1058.	4.8	26
95	Title is missing!. Plant and Soil, 1999, 209, 101-109.	3.7	25
96	New in situ techniques for measuring the properties of root-reinforced soil â€“ laboratory evaluation. Geotechnique, 2016, 66, 27-40.	4.0	25
97	The extent to which nematode communities are affected by soil factors-a pot experiment. Nematology, 2002, 4, 943-952.	0.6	23
98	Centrifuge modelling of climatic effects on clay embankments. Proceedings of the Institution of Civil Engineers: Engineering Sustainability, 2009, 162, 91-100.	0.7	23
99	Hydrologic reinforcement induced by contrasting woody species during summer and winter. Plant and Soil, 2018, 427, 369-390.	3.7	23
100	A critical evaluation of predictive models for rooted soil strength with application to predicting the seismic deformation of rooted slopes. Landslides, 2020, 17, 93-109.	5.4	23
101	Soil penetration by maize roots is negatively related to ethyleneâ€induced thickening. Plant, Cell and Environment, 2022, 45, 789-804.	5.7	23
102	Biophysics of the growth responses of pea roots to changes in penetration resistance. Plant and Soil, 1994, 167, 135-141.	3.7	22
103	Modelling minirhizotron observations to test experimental procedures. Plant and Soil, 1997, 189, 81-89.	3.7	22
104	Does the Presence of Detached Root Border Cells of Zea mays Alter the Activity of the Pathogenic Nematode Meloidogyne incognita?. Phytopathology, 2003, 93, 1111-1114.	2.2	22
105	Quantitative image analysis of earthworm-mediated soil displacement. Biology and Fertility of Soils, 2009, 45, 821-828.	4.3	22
106	Plant age effects on soil infiltration rate during early plant establishment. Geotechnique, 0, , 1-7.	4.0	22
107	Hardsetting and structural regeneration in two unstable British sandy loams and their influence on crop growth. Soil and Tillage Research, 1991, 19, 383-394.	5.6	21
108	Tribology of the root cap in maize (Zea mays) and peas (Pisum sativum). New Phytologist, 1999, 142, 421-425.	7.3	21

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109	Predicting Penetrometer Resistance from the Compression Characteristic of Soil. Soil Science Society of America Journal, 2012, 76, 361-369.	2.2	21
110	Measuring root system traits of wheat in 2D images to parameterize 3D root architecture models. Plant and Soil, 2018, 425, 457-477.	3.7	21
111	Spatial variation of effective porosity and its implications for discharge in an upland headwater catchment in Scotland. Journal of Hydrology, 2004, 290, 217-228.	5.4	20
112	PIV as a method for quantifying root cell growth and particle displacement in confocal images. Microscopy Research and Technique, 2010, 73, 27-36.	2.2	20
113	The resistance experienced by roots growing in a pressurised cell. A reappraisal. Plant and Soil, 1990, 123, 73-82.	3.7	19
114	Biomechanics of Plant Roots: estimating Localised Deformation with Particle Image Velocimetry. Biosystems Engineering, 2006, 94, 119-132.	4.3	19
115	Estimating the motion of plant root cells from in vivo confocal laser scanning microscopy images. Machine Vision and Applications, 2010, 21, 921-939.	2.7	19
116	Hydro-mechanical reinforcement of contrasting woody species: a full-scale investigation of a field slope. Geotechnique, 2021, 71, 970-984.	4.0	19
117	Efficient methods for solving water flow in variably saturated soils under prescribed flux infiltration. Journal of Hydrology, 2002, 260, 75-87.	5.4	18
118	Automated motion estimation of root responses to sucrose in two Arabidopsis thaliana genotypes using confocal microscopy. Planta, 2011, 234, 769-784.	3.2	17
119	Fluid flow in porous media using image-based modelling to parametrize Richards' equation. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2017, 473, 20170178.	2.1	17
120	Characterisation of flow paths and saturated conductivity in a soil block in relation to chloride breakthrough. Journal of Hydrology, 2008, 348, 431-441.	5.4	16
121	The search for the meaning of life in soil: an opinion. European Journal of Soil Science, 2018, 69, 31-38.	3.9	15
122	Modelling the seismic performance of root-reinforced slopes using the finite-element method. Geotechnique, 2020, 70, 375-391.	4.0	15
123	Image Analysis of Maize Root Capsâ€"Estimating Cell Numbers from 2-D Longitudinal Sections. Annals of Botany, 2001, 87, 693-698.	2.9	14
124	Root elongation rate is correlated with the length of the bare root apex of maize and lupin roots despite contrasting responses of root growth to compact and dry soils. Plant and Soil, 2013, 372, 609-618.	3.7	14
125	Analysis of coupled axial and lateral deformation of roots in soil. International Journal for Numerical and Analytical Methods in Geomechanics, 2019, 43, 684-707.	3.3	14
126	Reorganisation of rhizosphere soil pore structure by wild plant species in compacted soils. Journal of Experimental Botany, 2020, 71, 6107-6115.	4.8	14

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127	Non-destructive analysis of root growth in porous media. Plant, Cell and Environment, 1992, 15, 123-128.	5.7	12
128	Method to quantify root border cells in sandy soil. Soil Biology and Biochemistry, 2004, 36, 1517-1519.	8.8	11
129	Root age influences failure location in grass species during mechanical testing. Plant and Soil, 2021, 461, 457-469.	3.7	11
130	In situ root identification through blade penetrometer testing â€" part 2: field testing. Geotechnique, 2018, 68, 320-331.	4.0	10
131	Performance evaluation of the cellâ€based algorithms for domain decomposition in flow simulation. International Journal of Numerical Methods for Heat and Fluid Flow, 2008, 18, 656-672.	2.8	9
132	Morphological and genetic characterisation of the root system architecture of selected barley recombinant chromosome substitution lines using an integrated phenotyping approach. Journal of Theoretical Biology, 2018, 447, 84-97.	1.7	9
133	The design, construction and use of a rotating-tip penetrometer. Biosystems Engineering, 1991, 48, 223-227.	0.4	8
134	Differences in potato development (Solanum tuberosum cv. Maris Piper) in zero and conventional traffic treatments are related to soil physical conditions and radiation interception. Soil and Tillage Research, 1993, 26, 341-359.	5.6	8
135	The helical motions of roots are linked to avoidance of particle forces in soil. New Phytologist, 2020, 225, 2356-2367.	7.3	8
136	Penetrometer resistance equation: Its derivation and the effect of soil adhesion. Biosystems Engineering, 1992, 53, 163-168.	0.4	7
137	Part-Based Multi-Frame Registration for Estimation of the Growth Of Cellular Networks in Plant Roots. , 2006, , .		7
138	Root branching affects the mobilisation of root-reinforcement in direct shear. E3S Web of Conferences, 2019, 92, 12010.	0.5	7
139	Reversible and irreversible root phenotypic plasticity under fluctuating soil physical conditions. Environmental and Experimental Botany, 2021, 188, 104494.	4.2	7
140	Rhizosphere Engineering by Plants: Quantifying Soil-Root Interactions. Advances in Agricultural Systems Modeling, 0, , 1-30.	0.3	6
141	Desirable leaf traits for hydrological reinforcement of soil. E3S Web of Conferences, 2016, 9, 12006.	0.5	5
142	In situ root identification through blade penetrometer testing â€" part 1: interpretative models and laboratory testing. Geotechnique, 2018, 68, 303-319.	4.0	5
143	Potential of thermal imaging in soil bioengineering to assess plant ability for soil water removal and air cooling. Ecological Engineering, 2019, 141, 105599.	3.6	5
144	Measuring the Strength of Root-Reinforced Soil on Steep Natural Slopes Using the Corkscrew Extraction Method. Forests, 2019, 10, 1135.	2.1	5

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145	Spectral and Growth Characteristics of Willows and Maize in Soil Contaminated with a Layer of Crude or Refined Oil. Remote Sensing, 2021, 13, 3376.	4.0	5
146	Role of hydromechanical properties of plant roots in unsaturated soil shear strength. Japanese Geotechnical Society Special Publication, 2019, 7, 133-138.	0.2	4
147	Root reinforcement: continuum framework for constitutive modelling. Geotechnique, 2023, 73, 600-613.	4.0	4
148	Root-reinforced sand: kinematic response of the soil. E3S Web of Conferences, 2019, 92, 12011.	0.5	3
149	Reinforcement of Soil by Fibrous Roots. Advances in Agricultural Systems Modeling, 2015, , 197-228.	0.3	2
150	Modelling of stress transfer in root-reinforced soils informed by four-dimensional X-ray computed tomography and digital volume correlation data. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2022, 478, 20210210.	2.1	2
151	Preface. Journal of Experimental Botany, 2013, 64, 1179-1179.	4.8	1
152	Non-invasive Protocol for Kinematic Monitoring of Root Growth under Infrared Light. Bio-protocol, 2017, 7, e2390.	0.4	1
153	Scaling root growth responses from seedlings to field. Comparative Biochemistry and Physiology Part A, Molecular & Integrative Physiology, 2009, 153, S222.	1.8	0
154	Imaging the 3D kinematics of circumnutation in maize roots. Comparative Biochemistry and Physiology Part A, Molecular & Integrative Physiology, 2009, 153, S225.	1.8	0
155	Scaling of plant roots for geotechnical centrifuge tests using juvenile live roots or 3D printed analogues. , 2018, , 401-406.		0