

Title	NutNet plots Silwood Park
General metadata	
Abstract	<p>The Nutrient Network (NutNet) is a cooperative experiment consisting of more than 130 sites dominated by herbaceous plants and distributed around the globe. One the most important impacts of human activity on herbaceous ecosystems is the application of fertilizers and the alteration of grazers-plant interactions. To study the effect of these activities in plant communities the experimental design of each site consist of plots treated with unique fertilizer combinations and fencing to exclude aboveground mammalian vertebrates. The experimental design and data collection follow the same protocols in all participating sites allowing global analyses that aim to:</p> <ol style="list-style-type: none"> 1. Understand the relationship between productivity and diversity 2. Determine the effect of nutrients in plant production and diversity 3. Understand how grazers and fertilization control plant biomass, diversity, and composition <p>This project started in 2007 and is hosted by the Department of Ecology, Evolution, and Behavior at the University of Minnesota. The experimental sites at Silwood Park are coordinated by Professor Mick Crawley, and Dr. Catalina Estrada Montes and supported by the Department of Life Sciences at Imperial College</p>
Keywords	Nutrient Network
Links	https://nutnet.org/ https://www.imperial.ac.uk/silwood-park/research/silwood-lte/nutnet/
Is this part of a larger study?	Yes. Silwood Park includes two field sites of the Nutrient Network: Heronsbrook and Rookery
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Individual: Associated parties	Peter Wilfahrt
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Organization	Department of Ecology, Evolution, & Behavior, University of Minnesota
Phone	
Email address	wilf0020@umn.edu
Funding	Department of Life Sciences, Imperial College London
Data set status and accessibility	
Status	Ongoing
Latest update	November 2023
Latest archive date	November 2023
Metadata status	November 2023
Accessibility	
Storage location and medium	"Research group space: SilwoodLTE", Imperial College London, ICT department
Usage rights	Open access
Geographic metadata	
Geographic description	<p>The study site is Silwood Park Campus from Imperial College London, Buckhurst Road, Ascot, Berkshire SL5 7PY, United Kingdom. Silwood Park campus, with 78 ha, contains acid grasslands, scrubland, ancient woodlands and few decades old oak-dominated woodlands. Silwood Park experiences an average total annual rainfall of 700 mm with little seasonal pattern (1987-2021). Mean hourly temperature is 10.2 °C with mean max of 23 °C in July and mean min of 1.5 °C in January (1987-2021).</p> <p>Plots are in mesic grassland, at ~60 msnm elevation. 30 plots in two areas Heron's Brook (hero.uk)= Heron's Brook Meadow Rookery (rook.uk) = Rookery slope</p>
Bounding coordinates	For plot location refer to file: Nutnet_location.csv
	Heron's Brook Meadow
Latitude	51.413702
Longitude	-0.64140469
UK National grid	
Square	SU
Easting	94579
Northing	69173
	Rookery slope
Latitude	51.408527
Longitude	-0.64553931
UK National grid	
Square	SU
Easting	94302
Northing	68593
Temporal metadata	

Temporal description	<p>Application of nutrient treatments has been done annually in both sites since 2008.</p> <p>Data of aboveground standing biomass and percent cover has been collected from 2008 to 2023.</p> <p>Specifically, percentage of cover of each plant species, bryophytes and bare ground in each plot is available for Heronsbrook for 2008, 2010 to 2013, 2016, 2021-2023 and from Rookery from 2008, 2010 to 2013 and 2016 (files: NUTNET_heronsbrook_cover.csv and NUTNET_rookery_cover.csv).</p> <p>Data of aboveground biomass separated by functional groups (dead organic matter, bryophytes, graminoids, forbs, legumes, and woody plants) is available for Heronsbrook from 2009 to 2012 and 2023 and for Rookery from 2009 to 2012 (files: NUTNET_heronsbrook_biomass_groups.csv and NUTNET_rookery_biomass_groups.csv).</p> <p>Data of aboveground biomass measured for each plant species, bryophytes and dead organic matter is available for both sites from 2009 and 2010 (files: NUTNET_heronsbrook_biomass.csv and NUTNET_rookery_biomass.csv).</p>							
Begin	2007							
End	Ongoing							
Taxonomic metadata								
Taxonomic authority								
Type	National Biodiversity Network							
Author	United Kingdom Species Inventory UKSI							
General Information								
Taxonomic level: Phylum	Bryophyta							
Taxonomic level:	Angiospermae							
Taxonomic level: Species	Table: NUTNET_Taxa							
Methods metadata								
General experimental design	<p>General methodology adapted from NutNet protocols and templates documents (http://nutnet.org/methods).</p> <p>The core experiment is a completely randomized block design with three blocks (A, B, C) and 10 treatments per block (1 to 30) which results in three replicates per treatment per site (N = 30 total experimental units).</p> <p>Each experimental unit is 5 x 5 m in size, with the experimental units separated by at minimum 1-m walkways. In the field 5 x 5 m plots are marked permanently with iron rods located in the four corners of the plot.</p> <p>Treatments consist of herbivore exclusion and the addition of three nutrients (nitrogen, phosphorus and potassium) in an 8-treatment combination design. NutNet treatments (0=control, 1=nutrient/cage added). A coloured iron rod on the northwest corner of each 5 x 5 m plot indicates the treatment received. Colour codes for each treatment appear in table PLOTTREAT</p> <p>TABLE: PLOTTREAT</p> <table border="1"> <tr> <td>Plot</td> <td>N</td> <td>P</td> <td>K</td> <td>Exclosure</td> <td>Treatment</td> <td>Rod colour</td> </tr> </table>	Plot	N	P	K	Exclosure	Treatment	Rod colour
Plot	N	P	K	Exclosure	Treatment	Rod colour		

	<table border="1"> <thead> <tr> <th>(Block A/B/C)</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>code</th> </tr> </thead> <tbody> <tr> <td>1/11/21</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>none</td> <td>white</td> </tr> <tr> <td>2/12/22</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>none_fence</td> <td>white</td> </tr> <tr> <td>3/13/33</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>NK</td> <td>yellow-red</td> </tr> <tr> <td>4/14/24</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>NP</td> <td>blue-red</td> </tr> <tr> <td>5/15/25</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> <td>PK</td> <td>yellow-blue</td> </tr> <tr> <td>6/16/26</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>NPK_fence</td> <td>grey</td> </tr> <tr> <td>7/17/27</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>P</td> <td>blue</td> </tr> <tr> <td>8/18/28</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>N</td> <td>red</td> </tr> <tr> <td>9/19/29</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>K</td> <td>yellow</td> </tr> <tr> <td>10/20/30</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>NPK</td> <td>grey</td> </tr> </tbody> </table> <p>Minerals have been applied annually during the first weeks of April since 2008</p> <p>N: Ammonium nitrate (NH₄NO₃) or prilled urea (CO(NH₂)₂) at 144 kg ha⁻¹ year⁻¹ K: Muriate of potash (KCl:NaCl) at 224 kg ha⁻¹ year⁻¹ P: Triple superphosphate (Ca(H₂PO₄)₂·H₂O) at 35 kg ha⁻¹ year⁻¹</p> <p>Entire 5 x 5 m plots are caged to exclude grazing herbivores (rabbits and deer). Caged plots receive NPK or no-nutrient treatments.</p>	(Block A/B/C)						code	1/11/21	0	0	0	0	none	white	2/12/22	0	0	0	1	none_fence	white	3/13/33	1	0	1	0	NK	yellow-red	4/14/24	1	1	0	0	NP	blue-red	5/15/25	0	1	1	0	PK	yellow-blue	6/16/26	1	1	1	1	NPK_fence	grey	7/17/27	0	1	0	0	P	blue	8/18/28	1	0	0	0	N	red	9/19/29	0	0	1	0	K	yellow	10/20/30	1	1	1	0	NPK	grey
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Data collection	<p>Core sampling includes <u>aboveground standing biomass</u> (sorted to at least three functional groups) and <u>percent cover of all plant species</u></p> <p><u>Aboveground standing biomass</u>: estimated destructively by clipping at ground level all aboveground biomass of individual plants rooted within two 10 x 100 cm strips. For each strip the standing crop is separated into plant species, dead biomass and bryophytes. Sometimes plants are separated only in species groups: 1. graminoids (grasses, sedges, rushes), 2. forbs (legumes and non-leguminous herbs), 3. woody growth. All biomass is dried at 60°C for 48hrs prior to weighing to the nearest 0.01g. Above standing biomass is reported as dry weight m⁻². In 2023 survey legumes were separated from other forbs.</p> <table border="1"> <thead> <tr> <th>year</th> <th>subplot</th> <th>section</th> </tr> </thead> <tbody> <tr> <td>2009-2012</td> <td>NA</td> <td>NA</td> </tr> <tr> <td>2023</td> <td>b</td> <td>ii</td> </tr> </tbody> </table> <p>*NUTNET_map</p> <p>Cut plant material that cannot be assigned to a plant species is also dried and weighed. This biomass is then divided and added to the biomass of each species present in the plot according to its relative proportion [B_a + ((B_a / B_i) * B_r)] where B_a is the biomass of plant a, B_i is total biomass for plot and B_r is the biomass of the remaining plant material for the same plot]. Thus, although scale precision is two decimal places (0.01g), precision in the biomass data table ranges from 0.1 to up 1 x 10⁻⁹, due to the distribution of weight from each plot's residual biomass.</p>	year	subplot	section	2009-2012	NA	NA	2023	b	ii																																																																				
year	subplot	section																																																																												
2009-2012	NA	NA																																																																												
2023	b	ii																																																																												

	<p><u>Percent aerial cover</u>: Estimated for each plant species in a 5 x 5 m or subplot using a modified Daubenmire method (Daubenmire, R. 1959. A canopy-coverage method of vegetation analysis. Northwest Sci. 33: 43-64). Cover is estimated to the nearest 1% percent for each species rooted within the plot as well for bryophytes. Leaf litter and bare ground. Total cover typically exceeds 100% because cover is estimated independently for each species. For any given plant species, bare soil, or bryophytes with a percentage of cover lower than 1% a qualitative score of "+", "++", or "+++" is recorded. In the data tables "+" was converted to 0.1%, "++" to 0.2% and "+++" to 0.3%.</p> <p>Percentage cover for 2021-2023 was estimated using a 1 m side square located in subplot a (NutNet_map.pdf)</p>
Quality control	<p>Professor Mick Crawley has managed this experiment since 2007. He has been directly involved in the application of fertilizers, collection of data and training of people involved in all aspects of the project. He collected data in all but 2021-2023 surveys. NUTNET_collectors.csv include full list of people involves in data collection for this project.</p> <p>Curation of data files and creation of metadata has been done by Catalina Estrada starting April 2016. Please read README_NUTNET.txt to see specific changes.</p>
Data table metadata	
Number of tables/files	10
	NUNET_plan.csv
	NUNET_taxa.csv
	NUNET_collectors.csv
	NUTNET_heronsbrook_cover.csv
	NUTNET_heronsbrook_biomass.csv
	NUTNET_heronsbrook_biomass.groups.csv
	NUTNET_rookery_cover.csv
	NUTNET_rookery_biomass.csv
	NUTNET_rookery_biomass.groups.csv
	NUTNET_map
Format	.csv, .txt, pdf

File name	NUNET_plan.csv & .txt		
Description	Include treatments and GPS location of plots for both NutNet sites		
Size	7KB		
Case sensitive	No		
Number or records	60		
Number of attributes	13		
Orientation	Variables (attributes) included as columns		
Data table structure and attribute description			
Attribute name	Definition	Type	Attribute description
site	NutNet site	String	Nominal heronsbrook rookery
Site_code	Code that identify site in	String	Nominal

	NutNet		hero.uk rook.uk
block	A letter given to each group of 10 treatments	Character	Nominal letters A, B, C
plot	A unique number given to a plot within a site	Integer	Numbers 1 to 30 Plot code included in table PLOTTREAT
treatment	Name of fertilizers applied and fencing treatment in 25m ² plots	String	Nominal Treatment code included in table PLOTTREAT
n	Whether or not nitrogen is applied	String	Nominal Nitrogen: N added Control: no added
p	Whether or not phosphorus is applied	String	Nominal Phosphorous: P added Control: no added
k	Whether or not potassium is applied	String	Nominal Potassium: K added Control: no added
exclose	Whether plot is fenced for vertebrate exclusion treatment or not	String	Nominal Fenced: enclosed inside a vertebrate-proof fence Control: plot left unfenced
northing	Northward-measured distance distance in the UK geographic cartesian coordinates system	Integer	UK National Grid
easting	Eastward-measured distance distance in the UK geographic cartesian coordinates system	Integer	UK National Grid
latitude	Latitude WGS84 for plot location	Floating point	Precision: 0.0000001 or 0° 00' 0.000000"(degrees, minutes, seconds)
longitude	Longitude WGS84 for plot location	Floating point	Precision: 0.0000001 or 0° 00' 0.000000"(degrees, minutes, seconds)

File name	NUTNET_heronsbrook_cover.csv & .txt
Description	Percentage cover data of each species of plant in plots of subplots of Heronsbrook site
Size	482KB
Case sensitive	No
Number or records	3802
Number of attributes	14
Orientation	Variables (attributes) included as columns
File name	NUTNET_heronsbrook_cover.csv & .txt

Description	Percentage cover data of each species of plant in plots of subplots of Rookery site		
Size	205KB		
Case sensitive	No		
Number of records	1859		
Number of attributes	14		
Orientation	Variables (attributes) included as columns		
Table structure and attribute description			
Attribute name	Definition	Type	Attribute description
site	NutNet site	String	Nominal Heronsbrook (Silwood Park) or Rookery (Silwood Park)
block	A letter given to each group of 10 treatments	Character	Nominal letters A, B, C
plot	A unique number given to a plot within a site	Integer	Numbers 1 to 30 Code included in table PLOTTREAT
subplot	Name of 2.5x2.5m quarter of plot	Character	Nominal letters a, b, c, d (clockwise) (NutNet_map)
treatment	Name of fertilizers applied and fencing treatment in 25m ² plots	String	Nominal Treatment code included in table PLOTTREAT
n	Whether or not nitrogen is applied	String	Nominal Nitrogen: N added Control: no added
p	Whether or not phosphorus is applied	String	Nominal Phosphorous: P added Control: no added
k	Whether or not potassium is applied	String	Nominal Potassium: K added Control: no added
exclose	Whether plot is fenced for vertebrate exclusion treatment or not	String	Nominal Fenced: enclosed inside a vertebrate-proof fence Control: plot left unfenced
taxa	Code for species name or feature for which cover was estimated	String	Name e.g. <i>Agrostis_capillaris</i> for <i>Agrostis capillaris</i> Bare_ground for bare ground. Details in table NUTNET_taxa
cover	Percentage of a 5x5 m	Floating point	Precision: 0.0 but values

	(up to 2016) or 1 x 1 m area covered by plant species (from 2021)		0.1, 0.2, 0.3 included Type: real Min: 0.1 Max: 100
date	Date was collected	Date	Date YYYY or DD/MM/YYYY format Min: 2008
note_cover	Notes	String	Text
collectors	Name code of person responsible for collection and entry of data	String	Nominal Code included in table NUTNET_collectors.csv

File name	NUTNET_heronsbrook_biomass.csv & .txt		
Description	Aboveground biomass (dry weight) data for each species of plant in plots of Heronsbrook site		
Size	190KB		
Case sensitive	No		
Number or records	1569		
Number of attributes	15		
Orientation	Variables (attributes) included as columns		
File name	NUTNET_rookery_biomass.csv & .txt		
Description	Aboveground biomass (dry weight) data for each species of plant in plots of Rookery site		
Size	130KB		
Case sensitive	No		
Number or records	1118		
Number of attributes	15		
Orientation	Variables (attributes) included as columns		
Data table structure and attribute description			
Attribute name	Definition	Type	Attribute description
site	NutNet site	String	Nominal Heronsbrook (Silwood Park) or Rookery (Silwood Park)
block	A letter given to each group of 10 treatments	Character	Nominal letters A, B, C
plot	A unique number given to a plot within a site	Integer	Numbers 1 to 30 Code included in table PLOTTREAT
treatment	Name of fertilizers applied and fencing treatment in 25m ² plots	String	Nominal Treatment code included in table PLOTTREAT
n	Whether or not nitrogen is applied	String	Nominal Nitrogen: N added Control: no added

p	Whether or not phosphorus is applied	String	Nominal Phosphorous: P added Control: no added
k	Whether or not potassium is applied	String	Nominal Potassium: K added Control: no added
exclose	Whether plot is fenced for vertebrate exclusion treatment or not	String	Nominal Fenced: enclosed inside a vertebrate-proof fence Control: plot left unfenced
replicate	One of the two 10 x 100 cm strips sampled for aboveground biomass	Integer	Numbers 1 or 2
taxa	Code for species name or feature for which cover was estimated	String	Name e.g. <i>Agrostis_capillaris</i> for <i>Agrostis capillaris</i> Dead_organic_matter for leaf litter an similar. Details in table NUTNET_taxa
mass	Aboveground biomass of plant species included in a 10 x 100 cm quadrat.	Floating point	Unit: g/dry weight/m ² Precision: varies from 0.1 to 1x10 ⁻⁹ Type: real
date	Date was collected	Date	Date YYYY format Min: 2009, Max: 2010
note__biomass	Notes	String	Text
collector	Name code of person responsible for collection and entry of data	String	Nominal Code included in table NUTNET_collectors.csv

File name	NUNET_heronsbrook_biomass_groups.csv & .txt
Description	Aboveground biomass (dry weight) data for functional groups in plots of Heronsbrook site
Size	96KB
Case sensitive	No
Number or records	781
Number of attributes	15
Orientation	Variables (attributes) included as columns
File name	NUNET_rookery_biomass_groups.csv & .txt
Description	Aboveground biomass (dry weight) data for functional groups in plots of Rookery site
Size	94KB
Case sensitive	No
Number or records	847
Number of attributes	15
Orientation	Variables (attributes) included as columns
Data table structure and	

attribute description			
Attribute name	Definition	Type	Attribute description
site	NutNet site	String	Nominal Heronsbrook (Silwood Park) or Rookery (Silwood Park)
block	A letter given to each group of 10 treatments	Character	Nominal letters A, B, C
plot	A unique number given to a 5x5 m plot with a site	Integer	Numbers 1 to 30 Code included in table PLOTTREAT
subplot	A letter given to each quarter of a plot (2.5 x 2.5 m)	Character	Nominal Clockwise letters: a,b,c,d (NutNet_map)
treatment	Name of fertilizers applied and fencing treatment in 25m ² plots	String	Nominal Treatment code included in table PLOTTREAT
n	Whether or not nitrogen is applied	String	Nominal Nitrogen: N added Control: no added
p	Whether or not phosphorus is applied	String	Nominal Phosphorous: P added Control: no added
k	Whether or not potassium is applied	String	Nominal Potassium: K added Control: no added
exclose	Whether plot is fenced for vertebrate exclusion treatment or not	String	Nominal Fenced: enclosed inside a vertebrate-proof fence Control: plot left unfenced
replicate	One of the two 10 x 100 cm strips sampled for aboveground biomass	Integer	Numbers 1 or 2 or 1,2 if mass value include both
taxa	Name of the functional group dry mass was estimated	String	Name Dead_organic_matter, Bryophytes, Gaminoids, Forbs, Woody, Legumes NA no biomass measured
mass	Aboveground biomass of plant species included in a 10 x 100 cm quadrat.	Floating point	Unit: g/dry weight/m ² Precision: varies from 0.1 to 1x10 ⁻⁹ Type: real
date	Date was collected	Date	Date DD/MM/YYYY or YYYY format Min: 2009
note__biomass	Notes	String	Text
collectors	Name code of person responsible for collection and	String	Nominal Code included in table

	entry of data		NUTNET_collectors.csv
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File name	NUNET_taxa.csv & .txt		
Description	Taxonomic information of plants found in both NutNet sites. Follows NBN atlas names and classification https://nbnatlas.org/		
Size	17KB		
Case sensitive	No		
Number of records	124		
Number of attributes	14		
Orientation	Variables (attributes) included as columns		
Data table structure and attribute description			
Attribute name	Definition	Type	Attribute description
site	NutNet site	String	Nominal Heronsbrook (Silwood Park) or Rookery (Silwood Park)
taxa	Code name used in cover and biomass tables	String	Name e.g. <i>Agrostis_capillaris</i> for <i>Agrostis capillaris</i>
common_name	One common name for the species in England (NBN atlas)	String	Text
kingdom	Taxonomic kingdom the species belongs to	String	Text Plantae
division	Taxonomic (plant) division the species belongs to	String	Text
family	Taxonomic family the species belongs to	String	Text
genus	Taxonomic genus the species belongs to	String	Text
species	Taxonomic species the species belongs to	String	Text
variety	Taxonomic subspecies classification	String	Text
lifeform	Lifeform group the plant belongs too	String	Text Herb, Shrub, Tree,
lifespan	Whether the plant species is an annual, biennial or perennial	String	Text Perennial, Annual, Biennial
provenance	Whether species is native or introduced to the United Kingdom	String	Text Native, Introduced
local.name	Name use at site if different than the standard NBN name. This field is to help link data with local databases	String	Text
note_taxa	Notes (including synonyms used in raw data)	String	Text

File name	NUNET_collectors.csv & .txt		
Description	Information about data collectors for both NutNet sites		
Size	570B		
Case sensitive	No		
Number of records	6		
Number of attributes	5		
Orientation	Variables (attributes) included as columns		
Data table structure and attribute description			
collectors	Code name of data collector reported in cover and biomass tables	String	Text Name initials_second name Eg. C_Estrada
name	Name(s) of data collector	String	Text
surname	Surname or family name(s) of collector	String	Text
affiliation	University of institute the person belongs to (when data was collected)	String	Text
position	Position within institution (when data was collected)	String	Text

Data anomalies	
	<p>In table heronsbrook_biomass_groups.csv data of herb biomass for block A, nutrient treatment NK, in 2012 was changed from "-0.26" to "0.26" assuming the negative signal is an entry error.</p> <p>In table rookery_cover.csv species <i>Salix cinerea</i> was identified in 2016 survey as subspecies <i>oleifolia</i></p> <p>In table heronsbrook_cover.csv species <i>Carex muricata</i> was identified in 2016 survey as subspecies <i>pairae</i></p>

Supplemental descriptors	
Publications	11 used Silwood Park cites <u>and</u> have an ICL author. Full list https://nutnet.org/publications
Order	By year of publication
	<p>Firn J, <i>et al.</i> (2011) Abundance of introduced species at home predicts abundance away in herbaceous communities. <i>Ecology Letters</i> 14: 274–281. doi:10.1111/j.1461-0248.2010.01584.x</p> <p>Keywords: Biogeography, biosecurity, disturbance, global meta-study, homogenization of communities, invasion paradox, mechanisms of invasion, Nutrient Network, plant invasion, propagule pressure</p>
	<p>Lind EM, <i>et al.</i> (2013) Life-history constraints in grassland plant species: a growth-defence trade-off is the norm. <i>Ecology Letters</i> 16: 513–521. doi: 10.1111/ele.12078</p> <p>Keywords: Coexistence, competition-defence hypothesis, life history,</p>

	mammalian herbivory, resource limitation, tolerance, top-down bottom-up, trade-offs.
	Seabloom EW, <i>et al.</i> (2013) Predicting invasion in grassland ecosystems: Is exotic dominance the real embarrassment of richness? <i>Global Change Biology</i> 19: 3677–3687. doi: 10.1111/gcb.12370 Keywords: invasive species, plant diversity, Nutrient Network
	Borer ET, <i>et al.</i> (2014) Herbivores and nutrients control grassland plant diversity via light limitation. <i>Nature</i> 508: 517–20. doi:10.1038/nature1314 Keyword: Nutrient Network, grassland ecology, herbivory, eutrophication
	Seabloom EW, <i>et al.</i> (2015) Plant species' origin predicts dominance and response to nutrient enrichment and herbivores in global grasslands. <i>Nature Communications</i> 6. Doi: 10.1038/ncomms8710 Keywords: native and exotic plant species, perturbations
	Widdig M, <i>et al.</i> (2019) Nitrogen and Phosphorus Additions Alter the Abundance of Phosphorus-Solubilizing Bacteria and Phosphatase Activity in Grassland Soils. <i>Frontiers in Environmental Science</i> 7 (185) Doi: https://doi.org/10.3389/fenvs.2019.00185
	Hautier Y. <i>et al.</i> (2020) General destabilizing effects of eutrophication on grassland productivity at multiple spatial scales. <i>Nature Communications</i> 11: 5375. https://doi.org/10.1038/s41467-020-19252-4
	Widdig M, <i>et al.</i> (2020) Microbial carbon use efficiency in grassland soils subjected to nitrogen and phosphorus additions. <i>Soil Biology and Biochemistry</i> 146. Doi: https://doi.org/10.1016/j.soilbio.2020.107815
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How to acknowledge dataset	Contact c.estrada@imperial.ac.uk
Additional information	-A map is available (NutNet_map.pdf) - Further taxonomic information in file Silwood_species.csv