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Appendix 1–11

Appendices 6 and 10 are supplied as separate .gif files

Appendix 1. All species encountered in the sampled plots of the *Impatiens glandulifera* and *Rosa rugosa* datasets. For each species indicated if it occurred in high abundance (HA) for at least one plot (in which case the traits were measured on field data) and whether it occurred in control plots (NAT_C) and/or invaded plots (NAT_I).

	I. glandulifera dataset			*R. rugosa* dataset		
Species	HA	NAT_C	NAT_I	HA	NAT_C	NAT_I
Acer pseudoplatanus			x		x	
Achillea millefolium		x			x	x
Aegopodium podagraria	x	x	x			
Agrostis stolonifera	x	x			x	x
Alchemilla sp.			x			
Alliaria petiolata			x			
Allium vineale					x	
Alopecurus pratensis	x	x	x			
Ammophila arenaria				x	x	x
Angelica sylvestris		x				
Anthriscus sylvestris	x	x				
Arabis hirsuta					x	x
Arenaria serpyllifolia					x	x
Arrhenatherum elatius		x	x	x	x	x
Artemisia vulgaris		x				
Bellis perennis					x	
Betula pendula		x				
Brassica rapa			x			
Bromus hordeaceus					x	x
Bromus sterilis	x	x	x	x	x	x
Bryonia cretica					x	
Cakile maritima					x	
Calamagrostis canescens	x	x	x			
Cardamine flexuosa			x			
Carduus crispus	x		x			
Carex arenaria				x	x	x
Carex hirta				x		x
Carlina vulgaris					x	x
Cerastium arvense					x	x
Cerastium fontanum					x	x
Cerastium semidecandrum					x	x
Chaerophyllum temulum			x		x	x
Chamerion angustifolium	x	x	x			
Chenopodium album	x		x			
Circaea lutetiana			x			
Cirsium arvense	x	x	x		x	

Cirsium helenioides		x				
Cirsium oleraceum	x	x				
Cirsium vulgare					x	x
Claytonia perfoliata					x	x
Clematis vitalba					x	
Convolvulus arvensis					x	
Convolvulus sepium	x	x	x			
Convolvulus soldanella				x	x	
Cotoneaster horizontalis					x	x
Crataegus monogyna			x			x
Crepis capillaris				x	x	x
Cynoglossum officinale					x	x
Cynosurus cristatus			x			
Dactylis glomerata	x	x		x	x	x
Deschampsia cespitosa	x	x	x			
Deschampsia flexuosa		x	x			
Diplotaxis tenuifolia					x	x
Dipsacus pilosus	x		x			
Dryopteris filix-mas		x				
Elymus athericus					x	x
Elytrigia atherica				x		x
Elytrigia juncea				x	x	x
Epilobium hirsutum	x	x	x			
Epilobium sp.	x	x	x			
Epipactis helleborine		x			x	
Equisetum arvense		x	x			
Equisetum palustre		x				
Erigeron acris						x
Erigeron canadensis					x	x
Erodium cicutarium					x	
Erophila verna					x	x
Euonymus europaeus				x		x
Fallopia convolvulus			x			
Festuca arenaria				x	x	x
Festuca arundinacea		x				
Festuca rubra		x	x			
Filipendula ulmaria	x	x	x			
Fraxinus excelsior			x			
Fumaria officinalis			x			
Galeopsis tetrahit	x	x	x			
Galium aparine	x	x	x	x		x
Galium mollugo	x	x	x		x	x
Galium palustre			x			
Galium verum					x	x
Geranium molle					x	x

Geranium robertianum		x	x	x	x	
Geranium sylvaticum		x	x			
Geum urbanum	x	x	x		x	
Glechoma hederacea		x	x	x		x
Glyceria maxima	x	x	x			
Hedera helix			x			x
Heracleum sphondylium		x	x			
Hieracium umbellatum				x	x	x
Himantoglossum hircinum						x
Hippophae rhamnoides				x	x	x
Holcus lanatus	x	x	x	x	x	x
Honckenya peploides					x	
Humulus lupulus	x	x	x			
Hypericum perforatum		x	x		x	
Hypochaeris radicata				x		x
Impatiens noli-tangere		x	x			
Impatiens parviflora		x				
Inula conyza					x	
Jacobaea vulgaris				x	x	x
Juncus bufonius			x			
Juncus effusus		x	x			
Koeleria macrantha					x	x
Lamium album		x	x			
Lamium galeobdolon	x		x			
Lapsana communis		x	x			
Lathyrus pratensis		x				
Leontodon saxatilis					x	x
Lepidium draba				x	x	x
Ligustrum vulgare					x	
Linaria repens			x			
Lolium multiflorum				x		x
Lolium perenne	x	x	x			
Lonicera periclymenum				x		x
Lotus corniculatus		x			x	x
Luzula campestris					x	
Lysimachia nummularia			x			
Lysimachia vulgaris	x	x				
Lythrum salicaria	x		x			
Melilotus albus	x		x			
Milium effusum		x	x			
Myosotis arvensis		x	x			
Myosotis ramosissima					x	x
Myosoton aquaticum	x	x				
Oenothera glazioviana				x	x	x
Ononis repens				x	x	x

Persicaria amphibia	x	x				
Persicaria hydropiper	x		x			
Persicaria maculosa		x	x			
Phalaris arundinacea	x	x	x			
Phleum arenarium					x	x
Phleum pratense	x	x	x	x		x
Phragmites australis	x	x	x			
Plantago lanceolata		x		x	x	x
Plantago major		x	x			
Poa pratensis		x	x		x	x
Populus tremula			x			
Potentilla anserina	x	x				
Potentilla reptans		x		x	x	x
Prunella vulgaris		x				
Prunus serotina					x	
Prunus spinosa					x	x
Quercus robur		x			x	
Ranunculus repens	x		x			
Rhinanthus minor				x	x	x
Ribes rubrum		x	x			
Rorippa palustris			x			
Rosa canina					x	x
Rubus caesius				x	x	x
Rubus fruticosus	x	x	x			
Rubus idaeus	x	x	x			
Rumex acetosa		x	x			
Rumex crispus	x	x	x	x	x	
Rumex obtusifolius	x	x	x			
Salix alba				x	x	x
Salix caprea			x			
Salix repens						x
Sambucus nigra			x			
Scrophularia nodosa						
Sedum acre					x	x
Senecio inaequidens				x	x	x
Senecio vulgaris					x	x
Silene dioica	x	x				
Silene latifolia					x	x
Solanum dulcamara		x			x	x
Solidago virgaurea			x			
Sonchus arvensis					x	x
Sonchus asper					x	x
Sonchus oleraceus			x		x	x
Sparganium emersum			x			
Spergula arvensis			x			

Stachys palustris	x	x	x			
Stachys sylvestris	x	x	x			
Stellaria graminea		x	x			
Stellaria holostea		x	x			
Stellaria media		x	x			x
Stellaria nemorum	x		x			
Symphytum officinale	x	x	x			
Tanacetum vulgare						x
Taraxacum officinale	x	x				
Thalictrum minus				x	x	
Tragopogon pratensis					x	x
Trifolium pratense		x	x			
Trifolium repens			x			
Tripleurospermum maritimum			x			
Tussilago farfara		x	x			
Typha latifolia		x				
Urtica dioica	x	x	x	x	x	
Valeriana officinalis		x	x			
Valerianella locusta					x	x
Veronica arvensis					x	x
Veronica chamaedrys			x			
Veronica hederifolia					x	
Vicia cracca		x	x			
Vicia hirsuta		x			x	
Vicia sativa			x		x	x
Viola arvensis			x			

Appendix 2. Correlation matrix for all measured functional traits. Pearson R values given for the *I. glandulifera* dataset in the lower left triangle, Pearson R values given for the *R. rugosa* dataset in the upper right triangle. LDMC = leaf dry matter content, LNC = leaf nitrogen content, LPC = leaf phosphorous content, SLA = specific leaf area, SSD = specific stem density. ^{i}= square root transformed for *I. glandulifera* dataset, ^{r}= square root transformed for *R. rugosa* dataset.

	Plant height^{r}	Leaf area^{ir}	SLA^{ir}	LDMC^{r}	SSD^{i}	LNC	LPC
Plant height^{r}	1	0.003	-0.274	0.334	-	-0.075	-0.2
Leaf area^{ir}	0.214	1	-0.028	0.074	-	-0.152	0.229
SLA^{ir}	-0.126	-0.019	1	-0.64	-	0.513	0.414
LDMC^{r}	0.174	0.02	-0.686	1	-	-0.421	-0.487
SSD^{i}	0.213	-0.028	-0.573	0.746	1	-	-
LNC	-	-	-	-	-	1	0.372
LPC	-	-	-	-	-	-	1

Appendix 3. Complete reference list for functional traits obtained from the TRY database.

Dataset	Reference
Functional traits explaining variation in plant life history strategies	Adler PB, R Salguero-Gómez, A Compagnoni, JS Hsu, J Ray-Mukherjee, C Mbeau-Ache, M Franco (2014) Functional traits explain variation in plant life history strategies. PNAS 111 (2) 740-745.
Canopy Traits for Temperate Tree Species Under High N-Deposition	Adriaenssens S. (2012). Dry deposition and canopy exchange for temperate tree species under high nitrogen deposition. PhD thesis, Ghent University, Ghent, Belgium, 209p.
Global Respiration Database	Atkin OK, KJ Bloomfield, PB Reich, MG Tjoelker, GP Asner, D Bonal, G Bönisch, et al. (2015) Global variability in leaf respiration among plant functional types in relation to climate and leaf traits. New Phytologist.
Plant Physiology Database	Atkin, O. K., M. H. M. Westbeek, M. L. Cambridge, H. Lambers, and T. L. Pons. 1997. Leaf respiration in light and darkness - A comparison of slow- and fast-growing Poa species. Plant Physiology 113:961-965.
Plant Physiology Database	Atkin, O. K., M. Schortemeyer, N. McFarlane, and J. R. Evans. 1999. The response of fast- and slow-growing Acacia species to elevated atmospheric CO2: an analysis of the underlying components of relative growth rate. Oecologia 120:544-554.
Leaf Structure, Venation and Economic Spectrum	Blonder, B., Buzzard, B., Sloat, L., Simova, I., Lipson, R., Boyle, B., Enquist, B. (2012) The shrinkage effect biases estimates of paleoclimate. American Journal of Botany. 99.11 1756-1763.
Leaf Structure, Venation and Economic Spectrum	Blonder, B., Vasseur, F., Violle, C., Shipley, B., Enquist, B., Vile, D. Arabidopsis thaliana rejects theories for the origin of the leaf economics spectrum. (in review, New Phytologist)
Leaf Structure, Venation and Economic Spectrum	Blonder, B., Violle, C. and Enquist, B. J. (2013) Assessing the causes and scales of the leaf economics spectrum using venation networks in Populus tremuloides. Journal of Ecology 101: 981–989.
Leaf Structure, Venation and Economic Spectrum	Blonder, B., Violle, C., Patrick, L., Enquist, B. Leaf venation networks and the origin of the leaf economics spectrum. Ecology Letters, 2011.
Italian Alps Plant Traits Database	Bragazza L (2009) Conservation priority of Italian alpine habitats: a floristic approach based on potential distribution of vascular plant species. Biodiversity and Conservation 18: 2823–2835.
Xylem Functional Traits (XFT) Database	Brendan Choat, Steven Jansen et al. (2012) Global convergence in the vulnerability of forests to drought. Nature 491, 752–755.
Xylem Functional Traits (XFT) Database	Brendan Choat, Steven Jansen, Tim J. Brodribb, Herve Cochard, Sylvain Delzon, Radika Bhaskar, Sandra J. Bucci, et al. (2012) Global convergence in the vulnerability of forests to drought. Nature 491:752-755.
Plant Traits from Circeo National Park, Italy	Burrascano S, Copiz R, Del Vico E, Fagiani S, Giarrizzo E, Mei M, Mortelliti A, Sabatini FM, Blasi C (2015) Wild boar rooting intensity determines shifts in understorey composition and functional traits. COMMUNITY ECOLOGY 16(2) 244-253.

Plant Physiology Database	Campbell, C., L. Atkinson, J. Zaragoza-Castells, M. Lundmark, O. Atkin, and V. Hurry. 2007. Acclimation of photosynthesis and respiration is asynchronous in response to changes in temperature regardless of plant functional group. New Phytologist 176:375-389.
Leaf Traits in Central Apennines Beech Forests	Campetella, G; Botta-Dukát, Z; Wellstein, C; Canullo, R; Gatto, S; Chelli, S; Mucina, L; Bartha, S (2011): Patterns of plant trait-environment relationships along a forest succession chronosequence. Agriculture, Ecosystems & Environment, 145(1), 38-48.
Photosynthetic Capacity Dataset	Carswell, F. E., Meir, P., Wandelli, E. V., Bonates, L. C. M., Kruijt, B., Barbosa, E. M., Nobre, A. D. & Jarvis, P. G. 2000 Photosynthetic capacity in a central Amazonian rain forest. Tree physiology. 20, 3, p. 179-186 8 p.
Sheffield & Spain Woody Database	Castro-Diez, P., J. P. Puyravaud, and J. H. C. Cornelissen. 2000. Leaf structure and anatomy as related to leaf mass per area variation in seedlings of a wide range of woody plant species and types. Oecologia 124:476-486.
Sheffield & Spain Woody Database	Castro-Diez, P., J. P. Puyravaud, J. H. C. Cornelissen, and P. Villar-Salvador. 1998. Stem anatomy and relative growth rate in seedlings of a wide range of woody plant species and types. Oecologia 116:57-66.
Floridian Leaf Traits Database	Cavender-Bares, J., A. Keen, and B. Miles. 2006. Phylogenetic structure of floridian plant communities depends on taxonomic and spatial scale. Ecology 87:S109-S122.
Global Wood Density Database	Chave, J., D. Coomes, S. Jansen, S. L. Lewis, N. G. Swenson, and A. E. Zanne. 2009. Towards a world wide wood economics spectrum. Ecology Letters 12:351-366.
Mediterranean psammophytes	Ciccarelli D. (2015) - Mediterranean coastal dune vegetation: Are disturbance and stress the key selective forces that drive the psammophilous succession? Estuarine, Coastal and Shelf Science 165(5):247–253.
Plant Traits from Romania	Ciocarlan V. (2009). The illustrated Flora of Romania. Pteridophyta et Spermatopyta. Editura Ceres, 1141 p (in Romanian).
Sheffield Database	Cornelissen, J. H. C. 1996. An experimental comparison of leaf decomposition rates in a wide range of temperate plant species and types. Journal of Ecology 84:573-582.
Sheffield & Spain Woody Database	Cornelissen, J. H. C., B. Cerabolini, P. Castro-Diez, P. Villar-Salvador, G. Montserrat-Marti, J. P. Puyravaud, M. Maestro, M. J. A. Werger, and R. Aerts. 2003. Functional traits of woody plants: correspondence of species rankings between field adults and laboratory-grown seedlings? Journal of Vegetation Science 14:311-322.
Sheffield Database	Cornelissen, J. H. C., B. Cerabolini, P. Castro-Diez, P. Villar-Salvador, G. Montserrat-Marti, J. P. Puyravaud, M. Maestro, M. J. A. Werger, and R. Aerts. 2003. Functional traits of woody plants: correspondence of species rankings between field adults and laboratory-grown seedlings? Journal of Vegetation Science 14:311-322.
Abisko & Sheffield Database	Cornelissen, J. H. C., H. M. Quested, D. Gwynn-Jones, R. S. P. Van Logtestijn, M. A. H. De Beus, A. Kondratchuk, T. V. Callaghan, and R. Aerts. 2004. Leaf digestibility and litter decomposability are related in a wide range of subarctic plant species and types. Functional Ecology 18:779-786.

Abisko & Sheffield Database	Cornelissen, J. H. C., M. J. A. Werger, P. CastroDiez, J. W. A. vanRheenen, and A. P. Rowland. 1997. Foliar nutrients in relation to growth, allocation and leaf traits in seedlings of a wide range of woody plant species and types. Oecologia 111:460-469.
Sheffield Database	Cornelissen, J. H. C., N. Perez-Harguindeguy, S. Diaz, J. P. Grime, B. Marzano, M. Cabido, F. Vendramini, and B. Cerabolini. 1999. Leaf structure and defence control litter decomposition rate across species and life forms in regional floras on two continents. New Phytologist 143:191-200.
Abisko & Sheffield Database	Cornelissen, J. H. C., P. C. Diez, and R. Hunt. 1996. Seedling growth, allocation and leaf attributes in a wide range of woody plant species and types. Journal of Ecology 84:755-765.
Sheffield Database	Cornelissen, J. H. C., P. C. Diez, and R. Hunt. 1996. Seedling growth, allocation and leaf attributes in a wide range of woody plant species and types. Journal of Ecology 84:755-765.
Sheffield Database	Cornelissen, J. H. C., R. Aerts, B. Cerabolini, M. J. A. Werger, and M. G. A. van der Heijden. 2001. Carbon cycling traits of plant species are linked with mycorrhizal strategy. Oecologia 129:611-619.
Sheffield & Spain Woody Database	Cornelissen, J.H.C. 1999. A triangular relationship between leaf size and seed size among woody species: allometry, ontogeny, ecology and taxonomy. Oecologia 118: 248-255.
Plant Traits for Grassland Species (Konza Prairie, Kansas, USA)	Craine JM, Nippert JB, Towne EG, Tucker S, Kembel SW, Skibbe A, McLauchlan KK (2011) Functional consequences of climate-change induced plant species loss in a tallgrass prairie. Oecologia 165: 1109-1117
Plant Traits for Grassland Species (Konza Prairie, Kansas, USA)	Craine JM, Ocheltree TW, Nippert JB, Towne EG, Skibbe AM, Kembel SW, Fargione JE (2012) Global diversity of drought tolerance and grassland climate-change resilience. Nature Climate Change
Plant Traits for Grassland Species (Konza Prairie, Kansas, USA)	Craine JM, Towne EG, Ocheltree TW, Nippert JB (2012) Community traitscape of foliar nitrogen isotopes reveals N availability patterns in a tallgrass prairie. Plant Soil 356: 395-403
Global 15N Database	Craine, J. M., A. J. Elmore, M. P. M. Aidar, M. Bustamante, T. E. Dawson, E. A. Hobbie, A. Kahmen, M. C. Mack, K. K. McLauchlan, A. et al. 2009. Global patterns of foliar nitrogen isotopes and their relationships with climate, mycorrhizal fungi, foliar nutrient concentrations, and nitrogen availability. New Phytologist 183:980-992.
Roots Of the World (ROW) Database	Craine, J. M., W. G. Lee, W. J. Bond, R. J. Williams, and L. C. Johnson. 2005. Environmental constraints on a global relationship among leaf and root traits of grasses. Ecology 86:12-19.
Jasper Ridge leaf chemistry data	Dahlin KM, Asner GP & CB Field (2013) Environmental and community controls on plant canopy chemistry in a Mediterranean-type ecosystem. Proceedings of the National Academy of Sciences USA. 110(17): 6895-6900
Italian Alps Plant Traits Database	Dainese M, Bragazza L (2012) Plant traits across different habitats of the Italian Alps: a comparative analysis between native and alien species. Alpine Botany 122: 11-21.
Leaf N-Retention Database	De Vries F., Bardgett R.D. (2016) Plant community controls on short-term ecosystem nitrogen retention. New Phytologist.

Sheffield Database	Díaz, S., J. G. Hodgson, K. Thompson, M. Cabido, J. H. C. Cornelissen, A. Jalili, G. Montserrat-Martí, J., et al. The plant traits that drive ecosystems: Evidence from three continents. Journal of Vegetation Science 15:295-304.
SLA responses to environmental gradients through space and time	Dwyer, J. M., R. J. Hobbs, and M. M. Mayfield. 2014. Specific leaf area responses to environmental gradients through space and time. Ecology 95:399-410
The DIRECT Plant Trait Database	Everwand G, Fry, EL, Eggers T, Manning P (2014) Seasonal variation in the relationship between plant traits and grassland carbon and water fluxes. Ecosystems 17, 1095-1108
Ecological Flora of the British Isles	Fitter, A. H. and H. J. Peat 1994. The Ecological Flora Database. Journal of Ecology 82:415-425.
Fonseca/Wright New South Wales Database	Fonseca, C. R., J. M. Overton, B. Collins, and M. Westoby. 2000. Shifts in trait-combinations along rainfall and phosphorus gradients. Journal of Ecology 88:964-977.
Traits from Subarctic Plant Species Database	Freschet, G. T., J. H. C. Cornelissen, R. S. P. van Logtestijn, and R. Aerts. 2010. Evidence of the ‘plant economics spectrum’ in a subarctic flora. Journal of Ecology 98:362-373.
The DIRECT Plant Trait Database	Fry, E.L., Power, S.A. Manning, P. (2014) Trait based classification and manipulation of functional groups in biodiversity-ecosystem function experiments. Journal of Vegetation Science, 25, 248-261.
BASECO: a floristic and ecological database of Mediterranean French flora	Gachet S, Errol Véla, Thierry Tatoni, 2005, BASECO: a floristic and ecological database of Mediterranean French flora. Biodiversity and Conservation 14(4):1023-1034
Species and trait shifts in Apennine grasslands	Giarrizzo E., Burrascano S., Chiti T., de Bello F., Leps J., Zavattero L., Blasi C. (2017) Re-visiting historical semi-natural grasslands in the Apennines to assess patterns of changes in plant species composition and functional traits. Applied Vegetation Science 20(2):247-258.
Leaf traits data (SLA) for 56 woody species at the Smithsonian Conservation Biology Institute-Forest	Gonzalez-Akre, E., McShea, W., Bourg, N., Anderson-Teixeira, K. 2015. Leaf traits data (SLA) for 56 woody species at the Smithsonian Conservation Biology Institute-ForestGEO Forest Dynamic Plot. Front Royal, Virginia. USA. [Data set]. Version 1.0.(www.try-db.org)
French Alps Trait Data	Gos P., Loucougaray G., Colace MP., Arnoldi C., Gaucherand S., Dumazel D., Girard L., Delorme S., Lavorel S. (2016) Oecologia 180:1001.
PLANTSdata USDA	Green, W. 2009. USDA PLANTS Compilation, version 1, 09-02-02. (http://bricol.net/downloads/data/PLANTSdatabase/) NRCS: The PLANTS Database (http://plants.usda.gov, 1 Feb 2009). National Plant Data Center: Baton Rouge, LA 70874-74490 USA.
PLANTATT - Attributes of British and Irish Plants	HILL, M.O., PRESTON, C.D. & ROY, D.B. (2004) PLANTATT - attributes of British and Irish Plants: status, size, life history, geography and habitats. Huntingdon: Centre for Ecology and Hydrology.
Leaf Physiology Database	Kattge, J., W. Knorr, T. Raddatz, and C. Wirth. 2009. Quantifying photosynthetic capacity and its relationship to leaf nitrogen content for global-scale terrestrial biosphere models. Global Change Biology 15:976-991.

Leaf and Whole Plant Traits Database	Kazakou, E., D. Vile, B. Shipley, C. Gallet, and E. Garnier. 2006. Co-variations in litter decomposition, leaf traits and plant growth in species from a Mediterranean old-field succession. Functional Ecology 20:21-30.
The Americas N&P database	Kerkhoff, A. J., W. F. Fagan, J. J. Elser, and B. J. Enquist. 2006. Phylogenetic and growth form variation in the scaling of nitrogen and phosphorus in the seed plants. American Naturalist 168:E103-E122.
Leaf Traits Mount Hutt, New Zealand	Kichenin et al. 2013. Contrasting effects of plant inter- and intraspecific variation on community-level trait measures along an environmental gradient. Functional Ecology, in press.
The LEDA Traitbase	Kleyer, M., R. M. Bekker, I. C. Knevel, J. P. Bakker, K. Thompson, M. Sonnenschein, P. Poschlod, J., et al. 2008. The LEDA Traitbase: a database of life-history traits of the Northwest European flora. Journal of Ecology 96:1266-1274.
Plant traits of grassland species	La Pierre, KJ and Smith, MD. (2015) Functional trait expression of grassland species shift with short- and long-term nutrient additions. Plant Ecology 216: 307.
Plant Traits for Pinus and Juniperus Forests in Arizona	Laughlin, D. C., J. J. Leppert, M. M. Moore, and C. H. Sieg. 2010. A multi-trait test of the leaf-height-seed plant strategy scheme with 133 species from a pine forest flora. Functional Ecology 24:493-501.
Plant Traits for Pinus and Juniperus Forests in Arizona	Laughlin, D.C., P.Z. Fulé, D.W. Huffman, J. Crouse, and E. Laliberte. 2011. Climatic constraints on trait-based forest assembly. Journal of Ecology 99:1489-1499.
French Alps Trait Data	Lavorel, S., Grigulis, K., Lamarque, P., Colace, M.-P., Garden, D., Girel, J., Pellet, G. and Douzet, R. (2011), Using plant functional traits to understand the landscape distribution of multiple ecosystem services. Journal of Ecology, 99: 135–147.
Traits of the Hungarian flora	Lhotsky B., Anikó Csecserits, Bence Kovács, Zoltán Botta-Dukát: New plant trait records of the Hungarian flora.
French Massif Central Grassland Trait Database	Louault, F., V. D. Pillar, J. Aufrere, E. Garnier, and J. F. Soussana. 2005. Plant traits and functional types in response to reduced disturbance in a semi-natural grassland. Journal of Vegetation Science 16:151-160.
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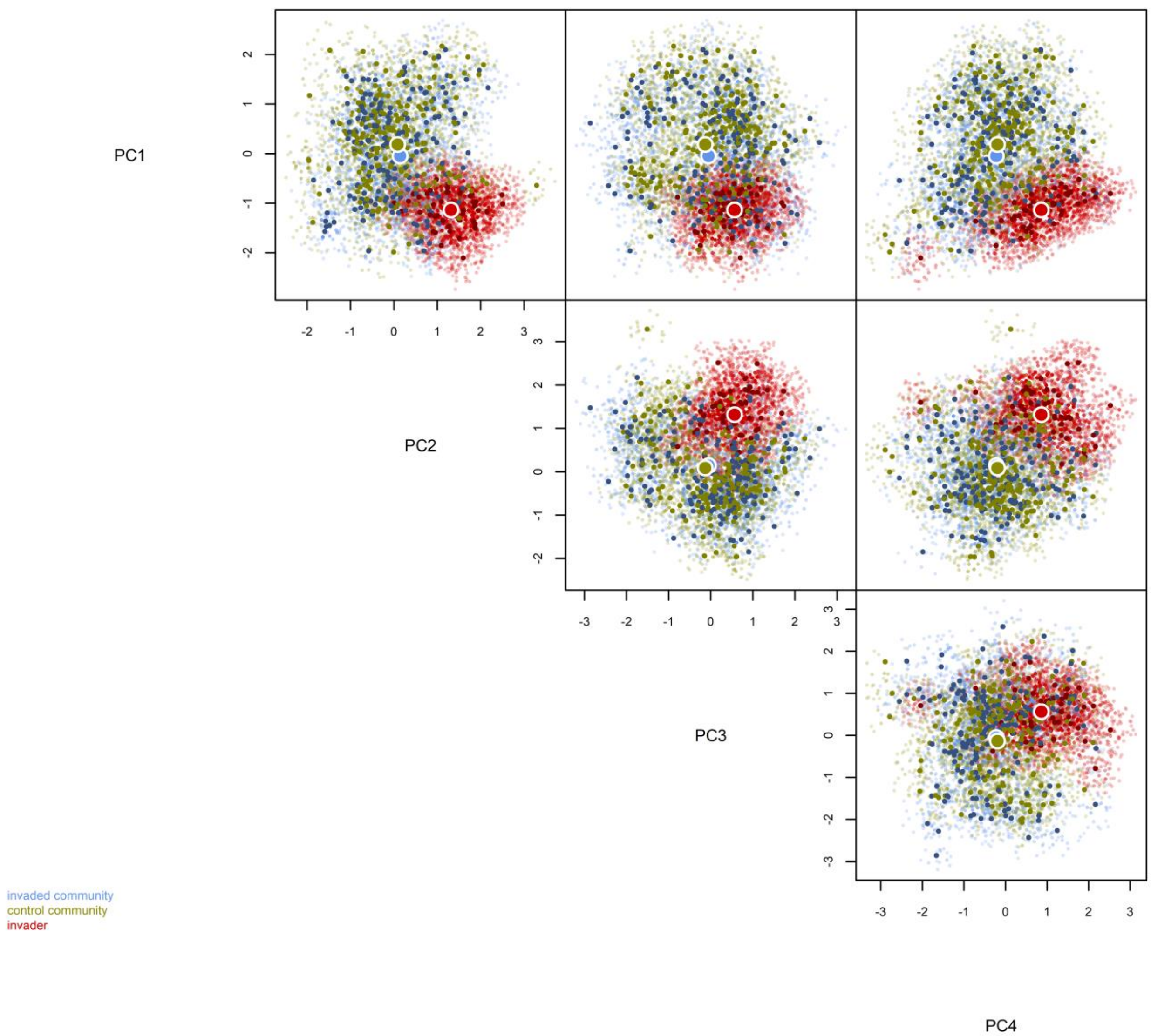
Meadow Plant Traits: Biomass Allocation, Rooting depth	unpub.
New South Wales Plant Traits Database	unpub.
Overton/Wright New Zealand Database	unpub.
Photosynthesis and Leaf Characteristics Database	unpub.
Plant Coastal Dune Traits (France, Aquitaine)	unpub.

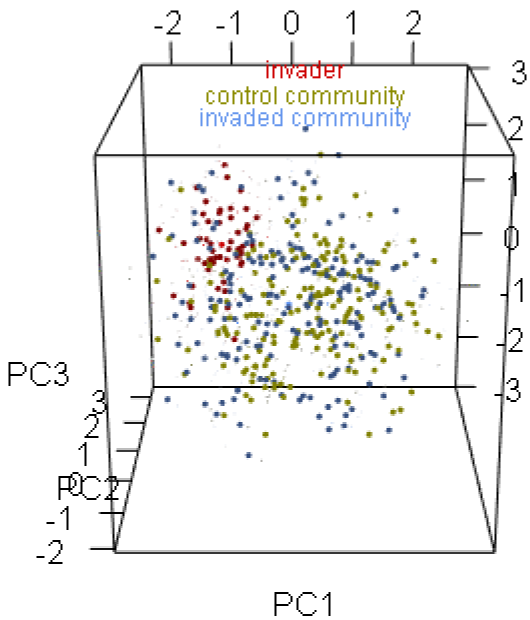
Rocky Mountain Biological Laboratory WSR/gradient plant traits	unpub.
Trait Data from Niwot Ridge LTER (2016)	unpub.
Traits for Common Grasses and Herbs in Spain	unpub.
Traits of Hypochaeris radicata under shade and drought conditions	unpub.
Tundra Plant Traits Database	unpub.

Appendix 4. Average community weighted mean (CWM) trait values for the control plots (NAT_C) and the invaded plots (NAT_I), and average trait values for the invader (INV) for both datasets. LDMC = leaf dry matter content, LNC = leaf nitrogen content, LPC = leaf phosphorous content, SLA = specific leaf area, SSD = specific stem density.

	Plant height	Leaf area	SLA	LDMC	SSD	LNC	LPC
***Impatiens glandulifera* dataset**							
CWM NAT_C	112.33	4392.26	27.90	259.83	0.224	-	-
CWM NAT_I	109.57	4104.44	30.92	245.45	0.211	-	-
INV	146.85	5704.55	39.24	142.40	0.077	-	-
***Rosa rugosa* dataset**							
CWM NAT_C	59.37	2331.89	16.64	306.47	-	22.47	1.94
CWM NAT_I	59.65	2036.27	24.44	249.36	-	24.99	2.19
INV	64.82	4935.54	10.43	368.87	-	21.15	2.35



Appendix 5. Visualization of the trait hypervolume in the four trait (PCA) dimensions for the *I. glandulifera* dataset. Large points depict hypervolume centroids, normal points depict data points, small points depict randomized points. Green = control community (NAT_C), blue= invaded community (NAT_I), red= invader (INV, *Impatiens glandulifera*).



Appendix 6. Three dimensional gif visualization of the trait hypervolume in the four trait (PCA) dimensions for the *I. glandulifera* dataset. Normal points depict data points, small points depict randomized points. Green = control community (NAT_C), blue= invaded community (NAT_I), red= invader (INV, *Impatiens glandulifera*).

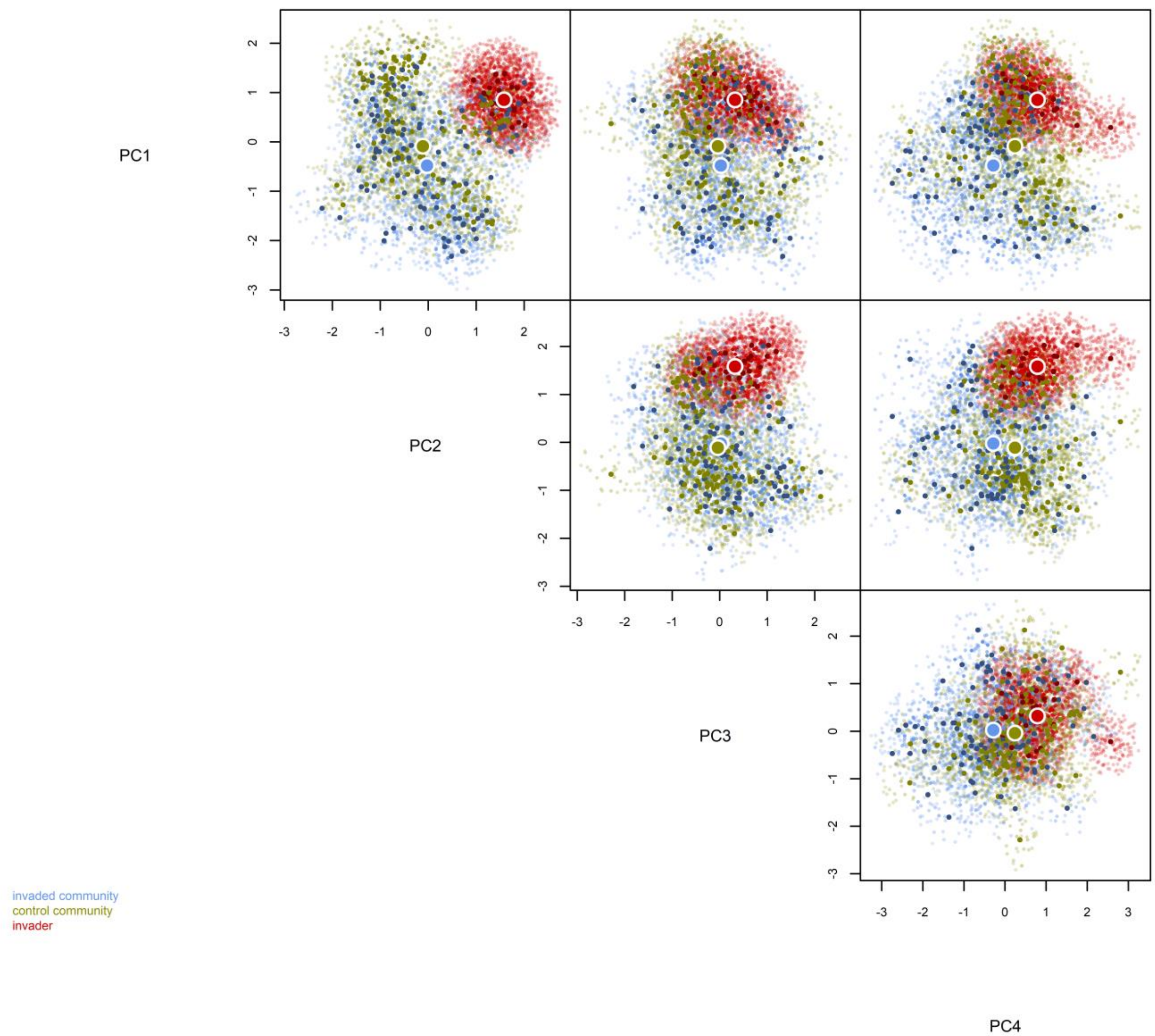
Appendix 7. Size (SD[4]) of the hypervolumes for the *I. glandulifera* dataset containing native plants in the control plots (NAT_C), native plants in the invaded plots (NAT_I) and the *I. glandulifera* records (INV) for the five study regions separately, for the average of the five study regions and for the full dataset across all study regions (all data). Average and 95% confidence intervals given based on a standardized number of samples (N=34). Values on the first row compare hypervolumes that were constructed from the measured traits, values on the second row represent hypervolumes analyses extended with database traits.

Study region	volume INV	volume NAT_C	Volume NAT_I
Ghent		49.1 (44.8-53.4)	47.5 (43.5-51.5)
		51.8 (45.8-57.7)	55.4 (48.7-62.1)
Bremen		48.5 (44.9-52.1)	53.8 (50.9-56.8)
		58.3 (52.5-64.2)	62.7 (57.3-68.1)
Lund		45.3 (41.1-49.5)	49.4 (45.8-53.1)
		49.8 (43.7-55.8)	56.3 (50.8-61.7)
Stockholm		43.7 (39.5-47.9)	49.3 (48.3-50.3)
		53.0 (46.2-59.8)	58.7 (51.9-65.4)
Trondheim		39.4 (36.0-42.7)	41.4 (39.2-43.5)
		51.0 (44.8-57.1)	54.0 (49.1-58.9)
average		***45.2 (41.3-49.1)***	***48.3 (53.0-59.2)***
		52.8 (46.6-58.9)	***57.4 (51.6-63.3)***
ALL	***14.4 (10.5-18.4)***	***50.2 (40.8-59.6)***	***52.4 (44.5-60.4)***
		52.4 (46.2-62.4)	***56.8 (47.7-65.8)***

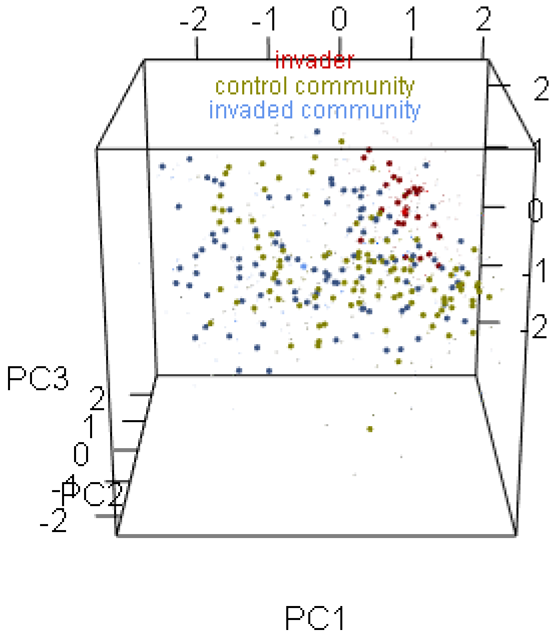
Appendix 8. Pairwise hypervolume overlap metrics between the hypervolume of native plants in the control plots (NAT_C), native plants in the invaded plots (NAT_I) and the invader plants (INV) of the *I. glandulifera* dataset for the five study regions separately, for the average of the five study regions and for the full dataset across all study regions (all data). Average and 95% confidence intervals given for the distance between hypervolume centroids, Jaccard similarity between both hypervolumes and the unique volume fraction of both hypervolumes. Each parameter is based on a standardized number of samples (N=34). Values on the first row for hypervolumes on the measured traits, values on the second row for hypervolumes on measured and database traits.

No TRY	Study region	centroid distance (SD[4])	Jaccard similarity	Unique volume fraction (%)
NAT_C - NAT_I	Ghent	0.312 (0.125-0.498)	0.369 (0.330-0.409)	46.9 (41.6-52.2)/45.1 (40.0-50.2)
		0.323 (0.090-0.556)	0.378 (0.292-0.465)	43.3 (34.1-52.4)/46.9 (36.1-57.6)
	Bremen	0.230 (0.049-0.412)	0.397 (0.368-0.426)	40.0 (36.3-43.8)/46.0 (42.1-49.9)
		0.526 (0.189-0.863)	0.330 (0.268-0.392)	48.5 (40.5-56.6)/52.1 (44.7-59.6)
	Lund	0.421 (0.261-0.580)	0.306 (0.266-0.345)	51.0 (45.1-56.9)/55.2 (50.2-60.1)
		0.453 (0.165-0.741)	0.343 (0.278-0.408)	45.6 (36.9-54.3)/51.9 (43.9-59.9)
	Stockholm	0.490 (0.332-0.649)	0.343 (0.308-0.377)	45.7 (41.0-50.4)/51.9 (47.5-56.3)
		0.507 (0.206-0.807)	0.347 (0.278-0.417)	45.7 (36.0-55.4)/51.0 (42.9-59.0)
	Trondheim	0.577 (0.390-0.763)	0.393 (0.350-0.435)	42.2 (37.3-47.0)/45.0 (39.7-50.3)
		0.472 (0.175-0.769)	0.400 (0.297-0.502)	41.3 (30.6-52.0)/44.6 (32.8-56.4)
	average	***0.406 (0.232-0.580)***	***0.361 (0.324-0.398)***	***45.2 (40.3-50.1)/48.6 (43.9-53.4)***
		0.456 (0.165-0.747)	***0.360 (0.283-0.437)***	***44.9 (35.6-54.1)/49.3 (40.1-58.5)***
	all data	***0.490 (0.150-0.829)***	***0.313 (0.243-0.384)***	***51.1 (40.8-61.4)/53.2 (43.6-62.9)***
		0.453 (0.124-0.782)	***0.288 (0.216-0.360)***	***54.3 (44.8-63.8)/56.2 (45.9-66.6)***
NAT_C - INV	Ghent	2.065 (1.920-2.209)	0.039 (0.018-0.059)	95.3 (92.8-97.8)/82.9 (73.7-92.0)
		2.154 (1.972-2.336)	0.030 (0.006-0.053)	96.4 (93.6-99.2)/86.0 (75.1-96.9)
	Bremen	2.622 (2.543-2.700)	0.001 (<0.001-0.002)	99.8 (99.7-99.9)/99.4 (98.8-99.9)
		2.702 (2.516-2.888)	0.007 (<0.001-0.017)	99.1 (98.0-100)/95.6 (89.9-100)
	Lund	2.560 (2.431-2.688)	0.009 (0.003-0.016)	98.9 (98.0-99.7)/95.8 (92.8-98.8)
		2.103 (1.930-2.275)	0.008 (<0.001-0.015)	99.0 (98.2-99.9)/96.2 (92.5-99.9)
	Stockholm	1.857 (1.750-1.963)	0.012 (0.001-0.023)	98.4 (97.0-99.9)/95.2 (90.9-99.5)
		2.575 (2.353-2.796)	0.016 (<0.001-0.035)	98.0 (95.7-100)/92.7 (83.9-100)
	Trondheim	2.290 (2.158-2.422)	0.009 (<0.001-0.019)	98.8 (97.6-100)/95.6 (91.0-100)
		2.158 (1.975-2.340)	0.011 (<0.001-0.022)	98.7 (97.4-99.9)/93.6 (87.4-99.8)
	average	***2.279 (2.161-2.397)***	***0.014 (0.004-0.024)***	***98.2 (97.0-99.5)/93.8 (89.4-98.1)***
		2.338 (2.149-2.527)	***0.014 (<0.001-0.028)***	***98.2 (96.6-99.9)/92.8 (85.7-99.9)***
	all data	***2.238 (1.917-2.559)***	***0.010 (<0.001-0.029)***	***98.7 (96.3-100)/95.4 (87.6-100)***

		2.283 (1.955-2.610)	***0.011 (<0.001-0.029)***	***98.6 (96.4-100)/94.7 (86.8-100)***
NAT_I - INV	Ghent	1.971 (1.831-2.111)	0.044 (0.023-0.065)	94.6 (92.1-97.1)/81.0 (71.7-90.2)
		2.062 (1.874-2.250)	0.032 (0.006-0.058)	96.1 (93.1-99.2)/84.0 (71.0-97.0)
	Bremen	2.571 (2.479-2.662)	0.001 (<0.001-0.002)	99.9 (99.9-100)/99.9 (99.6-100)
		2.630 (2.467-2.793)	<0.001 (<0.001-0.001)	99.9 (99.9-100)/99.7 (99.2-100)
	Lund	1.913 (1.817-2.010)	0.012 (0.007-0.018)	98.5 (97.8-99.2)/94.1 (91.3-96.8)
		2.269 (2.059-2.480)	0.009 (0.003-0.015)	98.9 (98.1-99.6)/95.0 (91.7-98.4)
	Stockholm	2.469 (2.444-2.493)	0.019 (0.016-0.022)	97.6 (97.2-98.0)/91.7 (90.3-93.1)
		2.578 (2.365-2.791)	0.014 (<0.001-0.028)	98.3 (96.6-100)/93.0 (85.9-100)
	Trondheim	2.026 (1.942-2.110)	0.035 (0.022-0.048)	95.8 (94.2-97.4)/83.7 (77.7-89.7)
		2.094 (1.932-2.257)	0.025 (0.008-0.041)	97.1 (95.3-99.0)/85.4 (75.6-95.1)
	average	***2.190 (2.103-2.277)***	***0.022 (0.013-0.031)***	***97.3 (96.3-98.3)/90.0 (86.1-94.0)***
		2.327 (2.139-2.514)	***0.016 (0.003-0.029)***	***98.1 (96.6-99.6)/91.4 (84.7-98.2)***
	all data	***2.167 (1.795-2.539)***	***0.016 (<0.001-0.041)***	***97.9 (94.9-100)/92.6 (82.0-100)***
		2.252 (1.907-2.596)	***0.015 (<0.001-0.037)***	***98.1 (95.5-100)/92.2 (81.1-100)***



Appendix 9. Visualization of the trait hypervolume in the four trait (PCA) dimensions for the *R. rugosa* dataset. Large points depict hypervolume centroids, normal points depict data points, small points depict randomized points. Green = control community (NAT_C), blue= invaded community (NAT_I), red= invader (INV, *Rosa rugosa*).



Appendix 10. Three dimensional gif visualization of the trait hypervolume in the four trait (PCA) dimensions for the *R. rugosa* dataset. Normal points depict data points, small points depict randomized points. Green = control community (NAT_C), blue= invaded community (NAT_I), red= invader (INV, *Rosa rugosa*).

Appendix 11. Paired t-tests comparing soil conditions between control plots and invaded plots for *Impatiens glandulifera* and *Rosa rugosa*. Total nitrogen, NO_3^- and NH_4^+ are soil available nitrogen proxies, which were quantified with PRS probes (Plant Root Simulator, Western Ag Innovations, Saskatoon, Canada) during the growing season. Test-statistic (t) and p-value presented for each paired t-test. SOM = soil organic matter.

	I. glandulifera		*R. rugosa*	
	t	p	t	p
Total N	0.118	0.907	1.539	0.138
NO_3^-	0.196	0.845	1.512	0.145
NH_4^+	0.887	0.379	1.456	0.158
pH	0.545	0.589	1.224	0.233
SOM	1.935	0.059	-0.9203	0.367