Trait–Service Evidence Map

Table of Contents

# Trait–Service Evidence Map (based on Pan et al. 2021)

Source: papers/mmd/Effects of plant functional traits on ecosystem services\_ a review.mmd

This document summarizes, by ecosystem service, the plant functional traits shown to correlate with service provision and the papers providing the evidence. Citations follow the author–year keys used in the source review.

## Provisioning Services

### Biomass (Aboveground biomass)

* Key correlated traits: **maximum plant height**, **specific leaf area (SLA)**, **leaf nitrogen (Leaf N)**, **wood density**, **leaf area**, **leaf dry matter content (LDMC)**.
* Evidence papers and findings:
  + Adair et al. 2018: In mature forests, community **maximum height** is the strongest trait predictor of biomass.
  + Falster et al. 2011: Theoretical and model results indicate **wood density** influences biomass accumulation capacity.
  + Conti & Díaz 2013; Zuo et al. 2016: Along succession/restoration, biomass increases with diversity in **leaf N** (trait diversity effect).
  + Yang et al. 2019: Biomass relates inversely to **leaf carbon content** and **SLA** during restoration.
  + Grigulis et al. 2013: In grasslands, higher **SLA** and **leaf N** and lower **LDMC** are associated with greater biomass.
* Full titles:
  + Adair EC, Hooper DU, Paquette A, Hungate BA (2018). Ecosystem context illuminates conflicting roles of plant diversity in carbon storage. Ecology Letters, 21, 1604–1619.
  + Falster DS, Brännström Å, Dieckmann U, Westoby M (2011). Influence of four major plant traits on average height, leaf-area cover, net primary productivity, and biomass density in single-species forests: a theoretical investigation. Journal of Ecology, 99, 148–164.
  + Conti G, Díaz S (2013). Plant functional diversity and carbon storage: an empirical test in semi-arid forest ecosystems. Journal of Ecology, 101, 18–28.
  + Zuo XA, Zhou X, Lv P, Zhao XY, Zhang J, Wang SK, Yue XY (2016). Testing associations of plant functional diversity with carbon and nitrogen storage along a restoration gradient of sandy grassland. Frontiers in Plant Science, 7, 189.
  + Yang Y, Dou YX, Cheng H, An SS (2019). Plant functional diversity drives carbon storage following vegetation restoration in Loess Plateau, China. Journal of Environmental Management, 246, 668–678.
  + Grigulis K, Lavorel S, Krainer U, Legay N, Baxendale C, Dumont M, Kastl E, Arnoldi C, Bardgett RD, Poly F, Pommier T, Schloter M, Tappeiner U, Bahn M, Clément J (2013). Relative contributions of plant traits and soil microbial properties to mountain grassland ecosystem services. Journal of Ecology, 101, 47–57.

### Net Primary Production (NPP)

* Key correlated traits: **leaf N**, **maximum height**, **SLA**, **LDMC**, **leaf P**, **stomatal conductance**, **leaf thickness**, **leaf toughness**, seed mass (negative for belowground productivity).
* Evidence papers and findings:
  + Klumpp & Soussana 2009: Diversity in **SLA** and **LDMC** explains variation in NPP in grasslands.
  + Lienin & Kleyer 2012: In agroecosystems, **maximum height** shows a weak negative correlation with NPP.
  + Quétier et al. 2007: Higher **leaf N** enhances light-use efficiency and increases NPP.
  + Fu et al. 2014: **Leaf thickness** strongly correlates with NPP in wetlands.
  + La Pierre & Smith 2015: **Leaf toughness** affects NPP in controlled experiments.
  + Zirbel et al. 2017: Increasing seed mass reduces belowground productivity.
* Full titles:
  + Klumpp K, Soussana J (2009). Using functional traits to predict grassland ecosystem change: a mathematical test of the response-and-effect trait approach. Global Change Biology, 15, 2921–2934.
  + Lienin P, Kleyer M (2012). Plant trait responses to the environment and effects on ecosystem properties. Basic and Applied Ecology, 13, 301–311.
  + Quétier F, Thébault A, Lavorel S (2007). Plant traits in a state and transition framework as markers of ecosystem response to land-use change. Ecological Monographs, 77, 33–52.
  + Fu H, Zhong JY, Yuan GX, Ni LY, Xie P, Cao T (2014). Functional traits composition predict macrophytes community productivity along a water depth gradient in a freshwater lake. Ecology and Evolution, 4, 1516–1523.
  + La Pierre KJ, Smith MD (2015). Functional trait expression of grassland species shift with short- and long-term nutrient additions. Plant Ecology, 216, 307–318.
  + Zirbel CR, Bassett T, Grman E, Brudvig LA (2017). Plant functional traits and environmental conditions shape community assembly and ecosystem functioning during restoration. Journal of Applied Ecology, 54, 1070–1079.

## Regulating Services

### Soil Organic Carbon (SOC)

* Key correlated traits: **maximum height**, **SLA / leaf mass per area (LMA)**, **leaf N**, **LDMC**, **wood density**, **leaf carbon content**, root traits: **specific root length (SRL)**, **root diameter**, **root tissue density**.
* Evidence papers and findings:
  + Conti & Díaz 2013; Lundholm et al. 2015: Taller communities (greater **maximum height**) promote canopy growth, increasing SOC.
  + Adair et al. 2018: Community-weighted mean **LMA** positively correlates with SOC; reduced **LMA diversity** lowers SOC in forests.
  + Lin et al. 2016: SOC correlates positively with **wood density**, and negatively with **SLA** and **leaf N**.
  + García-Palacios et al. 2018: In croplands, higher **leaf N** promotes SOC sequestration.
  + Klumpp & Soussana 2009: Diversity in **SLA** and **LDMC** explains 48% of SOC variation in grasslands.
  + Garcia et al. 2019: SOC is tightly associated with root traits: **SRL**, **root diameter**, **root tissue density** via aggregate stability.
* Full titles:
  + Conti G, Díaz S (2013). Plant functional diversity and carbon storage: an empirical test in semi-arid forest ecosystems. Journal of Ecology, 101, 18–28.
  + Lundholm J, Tran S, Gebert L (2015). Plant functional traits predict green roof ecosystem services. Environmental Science & Technology, 49, 2366–2374.
  + Adair EC, Hooper DU, Paquette A, Hungate BA (2018). Ecosystem context illuminates conflicting roles of plant diversity in carbon storage. Ecology Letters, 21, 1604–1619.
  + Lin DM, Anderson-Teixeira KJ, Lai JS, Mi XC, Ren HB, Ma KP (2016). Traits of dominant tree species predict local scale variation in forest aboveground and topsoil carbon stocks. Plant and Soil, 409, 435–446.
  + García-Palacios P, Gattinger A, Bracht-Jørgensen H, Brussaard L, Carvalho F, Castro H, Clément JC, de Deyn G, D’Hertefeldt T, Foulquier A, Hedlund K, Lavorel S, Legay N, Lori M, Mäder P, et al. (2018). Crop traits drive soil carbon sequestration under organic farming. Journal of Applied Ecology, 55, 2496–2505.
  + Klumpp K, Soussana J (2009). Using functional traits to predict grassland ecosystem change: a mathematical test of the response-and-effect trait approach. Global Change Biology, 15, 2921–2934.
  + Garcia L, Damour G, Gary C, Follain S, Bissonnais Y, Metay A (2019). Trait-based approach for agroecology: contribution of service crop root traits to explain soil aggregate stability in vineyards. Plant and Soil, 435, 1–14.

### Water Regulation (hydrologic regulation)

* Key correlated traits: **maximum height**, **SLA**, **life form**, **wood density**, **leaf lifespan**, **leaf tissue density**, **canopy density**, root very fine fraction, **leaf thickness**, **stomatal conductance**.
* Evidence papers and findings:
  + Wen et al. 2019: **Canopy density** and the fraction of very fine roots strongly affect hydrological services; functional diversity can override CWM effects.
  + Lundholm et al. 2015: Rainwater capture is primarily controlled by **plant height** and **canopy architecture**.
  + Everwand et al. 2014: **SLA** and **leaf thickness** are strongly positively correlated with community evapotranspiration.
  + Everwand et al. 2014; Matheny et al. 2017: **Stomatal conductance** drives evapotranspiration, with seasonal variation due to water–carbon trade-offs.
* Full titles:
  + Wen Z, Zheng H, Smith JR, Zhao H, Liu L, Ouyang ZY (2019). Functional diversity overrides community-weighted mean traits in linking land-use intensity to hydrological ecosystem services. Science of the Total Environment, 682, 583–590.
  + Lundholm J, Tran S, Gebert L (2015). Plant functional traits predict green roof ecosystem services. Environmental Science & Technology, 49, 2366–2374.
  + Everwand G, Fry EL, Eggers T, Manning P (2014). Seasonal variation in the capacity for plant trait measures to predict grassland carbon and water fluxes. Ecosystems, 17, 1095–1108.
  + Matheny AM, Mirfenderesgi G, Bohrer G (2017). Trait-based representation of hydrological functional properties of plants in weather and ecosystem models. Plant Diversity, 39, 1–12.

### Heat Regulation (temperature moderation)

* Key correlated traits: **maximum height**, **SLA**, **leaf N**, **canopy architecture**, **stomatal conductance**.
* Evidence papers and findings:
  + Monteiroa et al. 2017: Communities with high **stomatal conductance** and **canopy density** provide stronger daytime cooling and nighttime insulation on green roofs.
  + Lundholm et al. 2015: **SLA** and **height** influence **canopy density**, mediating temperature regulation.
  + Lundholm et al. 2014: Direct height–temperature regulation relationship is only weakly positive (context dependent).
* Full titles:
  + Monteiroa MV, Blanusa T, Verhoef A, Richardson M, Hadley P, Cameron RWF (2017). Functional green roofs: importance of plant choice in maximising summertime environmental cooling and substrate insulation potential. Energy and Buildings, 141, 56–68.
  + Lundholm J, Tran S, Gebert L (2015). Plant functional traits predict green roof ecosystem services. Environmental Science & Technology, 49, 2366–2374.
  + Lundholm J, Heim A, Tran S, Smith T (2014). Leaf and life history traits predict plant growth in a green roof ecosystem. PLOS ONE, 9, e101395.

### Soil Retention (erosion control)

* Key correlated traits: foliage interception traits (**leaf shape**, **leaf size**, leaf circularity index), stem traits (**stem dry matter content**, **projected stem area**), root traits (**root diameter**, **SRL**, **root length density**, external root surface area).
* Evidence papers and findings:
  + Burylo et al. 2012a: **Leaf circularity index** and **leaf size** scale positively with sediment interception during concentrated flow.
  + Burylo et al. 2012b: Erosion intensity increases with **root diameter**; correlations with **SRL**, **root length density**, and external root surface area.
  + Zhu et al. 2015: Communities with smaller **root diameter** reduce erosion in semi-arid grasslands.
  + Kervroedan et al. 2018: Designing herbaceous hedges using **trait-informed** species reduces runoff for erosion control.
* Full titles:
  + Burylo M, Rey F, Bochet E, Dutoit T (2012a). Plant functional traits and species ability for sediment retention during concentrated flow erosion. Plant and Soil, 353, 135–144.
  + Burylo M, Rey F, Mathys N, Dutoit T (2012b). Plant root traits affecting the resistance of soils to concentrated flow erosion. Earth Surface Processes and Landforms, 37, 1463–1470.
  + Zhu HX, Fu BJ, Wang S, Zhu LH, Zhang LW, Jiao L, Wang C (2015). Reducing soil erosion by improving community functional diversity in semi-arid grasslands. Journal of Applied Ecology, 52, 1063–1072.
  + Kervroedan L, Armand R, Saunier M, Ouvry J, Faucon M (2018). Plant functional trait effects on runoff to design herbaceous hedges for soil erosion control. Ecological Engineering, 118, 143–151.

### Disturbance Prevention (floods, fire)

* Key correlated traits: for floods — **deep roots**, high proportion of **very fine roots**; for fire — **thick bark**, **fast growth rate**.
* Evidence papers and findings:
  + Miedema Brown & Anand 2022: Review identifies multiple subservices under disturbance prevention and links traits to mechanism-specific resistance/resilience, e.g., deeper rooting and fine-root fraction for flood resistance; thicker bark and faster growth for fire resilience.

### Biocontrol (natural enemy support, herbivory control)

* Key correlated traits: **flowering time/phenology**, **maximum height**, **SLA**, **leaf N**, floral traits (**flower type**, **flowering duration**, **nectar type**, **flower color**, **UV reflectance**), leaf palatability traits (**LDMC**, **SLA**).
* Evidence papers and findings:
  + Hatt et al. 2017; Santala et al. 2019: Greater trait diversity enhances biocontrol performance.
  + Hatt et al. 2018: **Flower color** (yellow) attracts more parasitoids; pollen beetles prefer flowers with high **UV reflectance**; **nectar availability** modulates attraction.
  + Lundin et al. 2019: **Late flowering** can avoid pest peaks, reducing damage.
  + Storkey et al. 2013: **SLA** and **LDMC** (leaf palatability) correlate with herbivore assemblages and biocontrol value in arable plant communities.
* Full titles:
  + Hatt S, Uyttenbroeck R, Lopes TCM, Mouchon P, Chen J, Piqueray J, Monty A, Francis F (2017). Do flower mixtures with high functional diversity enhance aphid predators in wildflower strips? European Journal of Entomology, 114, 66–76.
  + Santala K, Aubin I, Hoepting M, Bachand M, Pitt D (2019). Managing conservation values and tree performance: lessons learned from 10 year experiments in regenerating eastern white pine (Pinus strobus L.). Forest Ecology and Management, 432, 748–760.
  + Hatt S, Uyttenbroeck R, Lopes T, Chen JL, Piqueray J, Monty A, Francis F (2018). Effect of flower traits and hosts on the abundance of parasitoids in perennial multiple species wildflower strips sown within oilseed rape (Brassica napus) crops. Arthropod-Plant Interactions, 12, 787–797.
  + Lundin O, Ward KL, Williams NM (2019). Identifying native plants for coordinated habitat management of arthropod pollinators, herbivores and natural enemies. Journal of Applied Ecology, 56, 665–676.
  + Storkey J, Brooks D, Haughton A, Hawes C, Smith BM, Holland JM (2013). Using functional traits to quantify the value of plant communities to invertebrate ecosystem service providers in arable landscapes. Journal of Ecology, 101, 38–46.

## Supporting Services

### Soil Fertility (nutrient cycling, decomposition)

* Key correlated traits: **maximum height**, **SLA**, **LDMC**, **leaf N**, litter chemistry diversity (**leaf C:N**), root system distribution and depth (lower lateral branching, deeper rooting).
* Evidence papers and findings:
  + Handa et al. 2014: Diversity in **leaf C and N** contents promotes litter decomposition, increasing soil fertility across biomes.
  + Quétier et al. 2007: Lower **LDMC** accelerates decomposition, enhancing nutrient cycling.
  + Zuo et al. 2016: Community-weighted mean **SLA** is a strong predictor of soil C and N in arid systems.
  + Navarro-Cano et al. 2018: Root architecture (lower lateral branching, greater **max rooting depth**) improves fertility in restoration contexts.
  + Pommier et al. 2018: Including key microbial traits improves prediction of nitrogen-related services in managed grasslands.
* Full titles:
  + Handa IT, Aerts R, Berendse F, Berg MP, Bruder A, Butenschoen O, Chauvet E, Gessner MO, Jabiol J, Makkonen M, McKie BG, Malmqvist B, Peeters ET, Scheu S, Schmid B, et al. (2014). Consequences of biodiversity loss for litter decomposition across biomes. Nature, 509, 218–221.
  + Quétier F, Thébault A, Lavorel S (2007). Plant traits in a state and transition framework as markers of ecosystem response to land-use change. Ecological Monographs, 77, 33–52.
  + Zuo XA, Zhou X, Lv P, Zhao XY, Zhang J, Wang SK, Yue XY (2016). Testing associations of plant functional diversity with carbon and nitrogen storage along a restoration gradient of sandy grassland. Frontiers in Plant Science, 7, 189.
  + Navarro-Cano JA, Verdú M, Goberna M (2018). Trait-based selection of nurse plants to restore ecosystem functions in mine tailings. Journal of Applied Ecology, 55, 1195–1206.
  + Pommier T, Cantarel AAM, Grigulis K, Lavorel S, Legay N, Baxendale C, Bardgett RD, Bahn M, Poly F, Clément JC (2018). The added value of including key microbial traits to determine nitrogen-related ecosystem services in managed grasslands. Journal of Applied Ecology, 55, 49–58.

### Pollination

* Key correlated traits: **flower height**, **flowering time**, **inflorescence type**, **flower color**, **nectar type/concentration**, **flowering duration**, **UV reflectance**, **flower size and density**, **flower symmetry**, **corolla shape**.
* Evidence papers and findings:
  + Fornoff et al. 2017: Functional flower traits and their diversity drive pollinator visitation; pollinator attraction increases with **flower height** and **nectar concentration**, and decreases with wider reflectance spectra and high **flower shape diversity**.
  + Lundin et al. 2019: **Flower area** and **phenology** (timing) influence pollinator attraction in agricultural landscapes.
  + Robleño et al. 2018: At landscape scale, co-occurrence of multiple **life forms**, **flower types**, and **phenologies** supports robust pollination service.
* Full titles:
  + Fornoff F, Klein AM, Hartig F, Benadi G, Venjakob C, Schaefer HM, Ebeling A (2017). Functional flower traits and their diversity drive pollinator visitation. Oikos, 126, 1020–1030.
  + Lundin O, Ward KL, Williams NM (2019). Identifying native plants for coordinated habitat management of arthropod pollinators, herbivores and natural enemies. Journal of Applied Ecology, 56, 665–676.
  + Robleño I, Storkey J, Solé-Senan XO, Recasens J (2018). Using the response-effect trait framework to quantify the value of fallow patches in agricultural landscapes to pollinators. Applied Vegetation Science, 21, 267–277.

### Disturbance Prevention (floods, fire)

* Key correlated traits: floods — deep roots, higher very-fine-root fraction; fire — thick bark, fast growth rate.
* Evidence papers and findings:
  + Miedema Brown & Anand 2022: Review identifies flood- and fire-related trait mechanisms; deeper roots and fine-root fraction for flood resistance; thicker bark and faster growth for fire resilience.
* Full titles:
  + Miedema Brown L, Anand M (2022). Plant Functional Traits as Measures of Ecosystem Service Provision. Ecosphere, 13(2), e3930.

## Notes

* Trait abbreviations: **SLA** = specific leaf area; **LDMC** = leaf dry matter content; **SRL** = specific root length; **LMA** is the inverse of SLA.
* Many relationships are context dependent (ecosystem type, seasonality, management). Where the review distinguishes ecosystems, this is indicated in the findings above.

## Additional Evidence (Miedema Brown & Anand 2022)

* Scope: Review of 19 ES (16 with trait indicators). Highlights potential “universal” indicators across services and habitat/season dependence of many links.
* Cross-service indicators: **SLA**, **LDMC**, **leaf nitrogen** recur as quantitative indicators across multiple services; suitable as economical proxy measures when detailed trait suites are infeasible.
* Context dependence: Trait–service relationships can flip or vary by habitat type and season; emphasizes selecting indicators specific to ecosystem and subservice (e.g., floods vs. fire under disturbance prevention).

## References (Full Titles)

* Adair EC, Hooper DU, Paquette A, Hungate BA (2018). Ecosystem context illuminates conflicting roles of plant diversity in carbon storage. Ecology Letters, 21, 1604–1619.
* Falster DS, Brännström Å, Dieckmann U, Westoby M (2011). Influence of four major plant traits on average height, leaf-area cover, net primary productivity, and biomass density in single-species forests: a theoretical investigation. Journal of Ecology, 99, 148–164.
* Conti G, Díaz S (2013). Plant functional diversity and carbon storage: an empirical test in semi-arid forest ecosystems. Journal of Ecology, 101, 18–28.
* Zuo XA, Zhou X, Lv P, Zhao XY, Zhang J, Wang SK, Yue XY (2016). Testing associations of plant functional diversity with carbon and nitrogen storage along a restoration gradient of sandy grassland. Frontiers in Plant Science, 7, 189.
* Yang Y, Dou YX, Cheng H, An SS (2019). Plant functional diversity drives carbon storage following vegetation restoration in Loess Plateau, China. Journal of Environmental Management, 246, 668–678.
* Grigulis K, Lavorel S, Krainer U, Legay N, Baxendale C, Dumont M, Kastl E, Arnoldi C, Bardgett RD, Poly F, Pommier T, Schloter M, Tappeiner U, Bahn M, Clément J (2013). Relative contributions of plant traits and soil microbial properties to mountain grassland ecosystem services. Journal of Ecology, 101, 47–57.
* Klumpp K, Soussana J (2009). Using functional traits to predict grassland ecosystem change: a mathematical test of the response-and-effect trait approach. Global Change Biology, 15, 2921–2934.
* Lienin P, Kleyer M (2012). Plant trait responses to the environment and effects on ecosystem properties. Basic and Applied Ecology, 13, 301–311.
* Quétier F, Thébault A, Lavorel S (2007). Plant traits in a state and transition framework as markers of ecosystem response to land-use change. Ecological Monographs, 77, 33–52.
* Fu H, Zhong JY, Yuan GX, Ni LY, Xie P, Cao T (2014). Functional traits composition predict macrophytes community productivity along a water depth gradient in a freshwater lake. Ecology and Evolution, 4, 1516–1523.
* La Pierre KJ, Smith MD (2015). Functional trait expression of grassland species shift with short- and long-term nutrient additions. Plant Ecology, 216, 307–318.
* Zirbel CR, Bassett T, Grman E, Brudvig LA (2017). Plant functional traits and environmental conditions shape community assembly and ecosystem functioning during restoration. Journal of Applied Ecology, 54, 1070–1079.
* Lin DM, Anderson-Teixeira KJ, Lai JS, Mi XC, Ren HB, Ma KP (2016). Traits of dominant tree species predict local scale variation in forest aboveground and topsoil carbon stocks. Plant and Soil, 409, 435–446.
* García-Palacios P, Gattinger A, Bracht-Jørgensen H, Brussaard L, Carvalho F, Castro H, Clément JC, de Deyn G, D’Hertefeldt T, Foulquier A, Hedlund K, Lavorel S, Legay N, Lori M, Mäder P, et al. (2018). Crop traits drive soil carbon sequestration under organic farming. Journal of Applied Ecology, 55, 2496–2505.
* Garcia L, Damour G, Gary C, Follain S, Bissonnais Y, Metay A (2019). Trait-based approach for agroecology: contribution of service crop root traits to explain soil aggregate stability in vineyards. Plant and Soil, 435, 1–14.
* Wen Z, Zheng H, Smith JR, Zhao H, Liu L, Ouyang ZY (2019). Functional diversity overrides community-weighted mean traits in linking land-use intensity to hydrological ecosystem services. Science of the Total Environment, 682, 583–590.
* Everwand G, Fry EL, Eggers T, Manning P (2014). Seasonal variation in the capacity for plant trait measures to predict grassland carbon and water fluxes. Ecosystems, 17, 1095–1108.
* Matheny AM, Mirfenderesgi G, Bohrer G (2017). Trait-based representation of hydrological functional properties of plants in weather and ecosystem models. Plant Diversity, 39, 1–12.
* Monteiroa MV, Blanusa T, Verhoef A, Richardson M, Hadley P, Cameron RWF (2017). Functional green roofs: importance of plant choice in maximising summertime environmental cooling and substrate insulation potential. Energy and Buildings, 141, 56–68.
* Lundholm J, Tran S, Gebert L (2015). Plant functional traits predict green roof ecosystem services. Environmental Science & Technology, 49, 2366–2374.
* Lundholm J, Heim A, Tran S, Smith T (2014). Leaf and life history traits predict plant growth in a green roof ecosystem. PLOS ONE, 9, e101395.
* Burylo M, Rey F, Bochet E, Dutoit T (2012a). Plant functional traits and species ability for sediment retention during concentrated flow erosion. Plant and Soil, 353, 135–144.
* Burylo M, Rey F, Mathys N, Dutoit T (2012b). Plant root traits affecting the resistance of soils to concentrated flow erosion. Earth Surface Processes and Landforms, 37, 1463–1470.
* Kervroedan L, Armand R, Saunier M, Ouvry J, Faucon M (2018). Plant functional trait effects on runoff to design herbaceous hedges for soil erosion control. Ecological Engineering, 118, 143–151.
* Hatt S, Uyttenbroeck R, Lopes TCM, Mouchon P, Chen J, Piqueray J, Monty A, Francis F (2017). Do flower mixtures with high functional diversity enhance aphid predators in wildflower strips? European Journal of Entomology, 114, 66–76.
* Hatt S, Uyttenbroeck R, Lopes T, Chen JL, Piqueray J, Monty A, Francis F (2018). Effect of flower traits and hosts on the abundance of parasitoids in perennial multiple species wildflower strips sown within oilseed rape (Brassica napus) crops. Arthropod-Plant Interactions, 12, 787–797.
* Santala K, Aubin I, Hoepting M, Bachand M, Pitt D (2019). Managing conservation values and tree performance: lessons learned from 10 year experiments in regenerating eastern white pine (Pinus strobus L.). Forest Ecology and Management, 432, 748–760.
* Lundin O, Ward KL, Williams NM (2019). Identifying native plants for coordinated habitat management of arthropod pollinators, herbivores and natural enemies. Journal of Applied Ecology, 56, 665–676.
* Storkey J, Brooks D, Haughton A, Hawes C, Smith BM, Holland JM (2013). Using functional traits to quantify the value of plant communities to invertebrate ecosystem service providers in arable landscapes. Journal of Ecology, 101, 38–46.
* Handa IT, Aerts R, Berendse F, Berg MP, Bruder A, Butenschoen O, Chauvet E, Gessner MO, Jabiol J, Makkonen M, McKie BG, Malmqvist B, Peeters ET, Scheu S, Schmid B, et al. (2014). Consequences of biodiversity loss for litter decomposition across biomes. Nature, 509, 218–221.
* Navarro-Cano JA, Verdú M, Goberna M (2018). Trait-based selection of nurse plants to restore ecosystem functions in mine tailings. Journal of Applied Ecology, 55, 1195–1206.
* Pommier T, Cantarel AAM, Grigulis K, Lavorel S, Legay N, Baxendale C, Bardgett RD, Bahn M, Poly F, Clément JC (2018). The added value of including key microbial traits to determine nitrogen-related ecosystem services in managed grasslands. Journal of Applied Ecology, 55, 49–58.
* Fornoff F, Klein AM, Hartig F, Benadi G, Venjakob C, Schaefer HM, Ebeling A (2017). Functional flower traits and their diversity drive pollinator visitation. Oikos, 126, 1020–1030.
* Robleño I, Storkey J, Solé-Senan XO, Recasens J (2018). Using the response-effect trait framework to quantify the value of fallow patches in agricultural landscapes to pollinators. Applied Vegetation Science, 21, 267–277.
* Miedema Brown L, Anand M (2022). Plant Functional Traits as Measures of Ecosystem Service Provision. Ecosphere, 13(2), e3930.