Seedling traits of two promising native grasses at early developmental stages

Magda Garbowski, Cynthia Brown, Danielle Johnston

Colorado Plateau Native Plant Program Annual Meeting

February 6, 2018

Traits and ecological processes

Growth Rate	Specific Leaf Area	Leaf Dry Matter Content	Height
g/day	cm^2/g	Dry mass/saturated mass (g/g)	cm

Root Mass Fraction	Specific Root Length	Root Diameter	Total Root Length
Root mass /Total plant mass (g/g)	Length of roots / weight of roots (cm/g)	Average root diameter (mm)	Total root length (cm)

Traits and ecological processes

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- Positively associated with **shade tolerance,** negatively associated with **drought tolerance** (Suding 2003)	- High SLA has been linked to **efficient carbon capture** that leads to **rapid growth** and competitive ability - Low SLA has been linked to **leaf longevity and stress tolerance**	- High leaf dry matter content has been linked with **nutrient conservation strategies** (Bochet 2015)	- **Competitive ability, growth strategies**

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- High RMF has been linked to **survival in invaded systems** (Leger 2015, 2017) - High RMF has been linked to increased **competitive ability**	- High SRL has been linked to high **above ground growth rates** (Laughlin 2010) and **competitive ability** (Funk 2016)	- High root diameter has been related to **stress tolerance** (Bennett 2016)	- Higher total root length has been linked to greater **competitive abilities** (Ravenek 2016)

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Seedling traits

- Seed and seedling traits can greatly inform recruitment outcomes (Larson 2015)
- Traits at early stages of growth may influence resource preemption and longer-term competitive advantages (Pattison & Goldstein 1998, Hely & Roxburgh 2005)
- Competitive advantages based on growth rates may be gained in the first 2-3 weeks post-germination (Reichmann et al. 2016)

Among population variation may influence community structure and ecosystem function (Des Roches, 2017)

nature ecology & evolution

ARTICLES

https://doi.org/10.1038/s41559-017-0402-5

The ecological importance of intraspecific variation

Simone Des Roches[1*], David M. Post[2], Nash E. Turley[3], Joseph K. Bailey[4], Andrew P. Hendry[5], Michael T. Kinnison[6], Jennifer A. Schweitzer[4] and Eric P. Palkovacs[1]

Review

Cell PRESS

AoB PLANTS

Research Article

The return of the variance: intraspecific variability in community ecology

Cyrille Violle[1,2], Brian J. Enquist[1,3], Brian J. McGill[4], Lin Jiang[5], Cécile H. Albert[6,7], Catherine Hulshof[1], Vincent Jung[8,9] and Julie Messier[1]

Trait variation along elevation gradients in a dominant woody shrub is population-specific and driven by plasticity

Alix A. Pfennigwerth*, Joseph K. Bailey and Jennifer A. Schweitzer

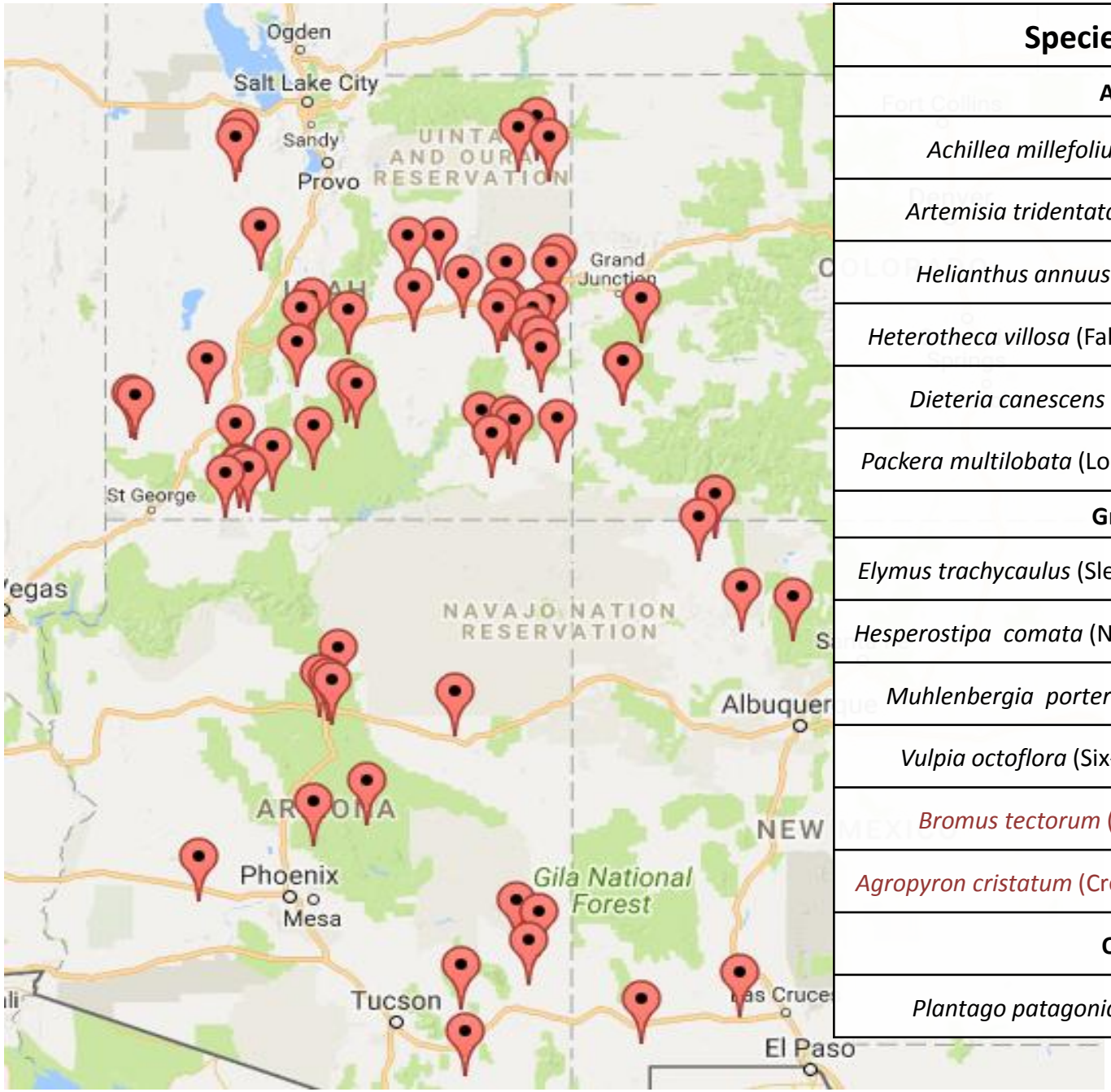
Basic and Applied Ecology

me 10, Issue 6, September 2009, Pages 535-543

Comparing intra- and inter-specific effects on litter decomposition in an old-field ecosystem

Gregory M. Crutsinger [a], Nathan J. Sanders [a], Aimée T. Classen [a, b]

Species and populations



Species	Pops
Asters	
Achillea millefolium (Yarrow)	3
Artemisia tridentata (Sagebrush)	6
Helianthus annuus (Sunflower)	4
Heterotheca villosa (False Golden Aster)	4
Dieteria canescens (Tansy Aster)	5
Packera multilobata (Lobeleaf groundsel)	6
Grasses	
Elymus trachycaulus (Slender wheatgrass)	4
Hesperostipa comata (Needle and thread)	5
Muhlenbergia porterii (Bush Muhly)	3
Vulpia octoflora (Six-week fescue)	5
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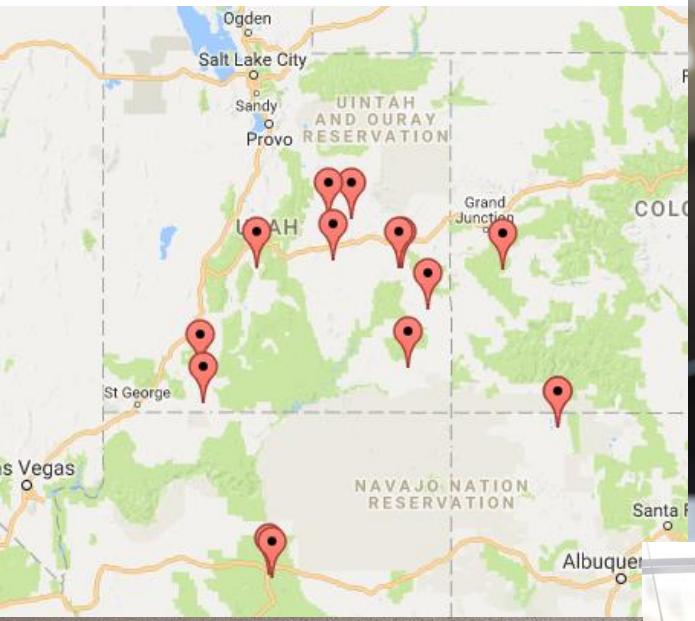
Agropyron cristatum (Crested wheatgrass)	5
Other	
Plantago patagonica (Plantago)	6

Methods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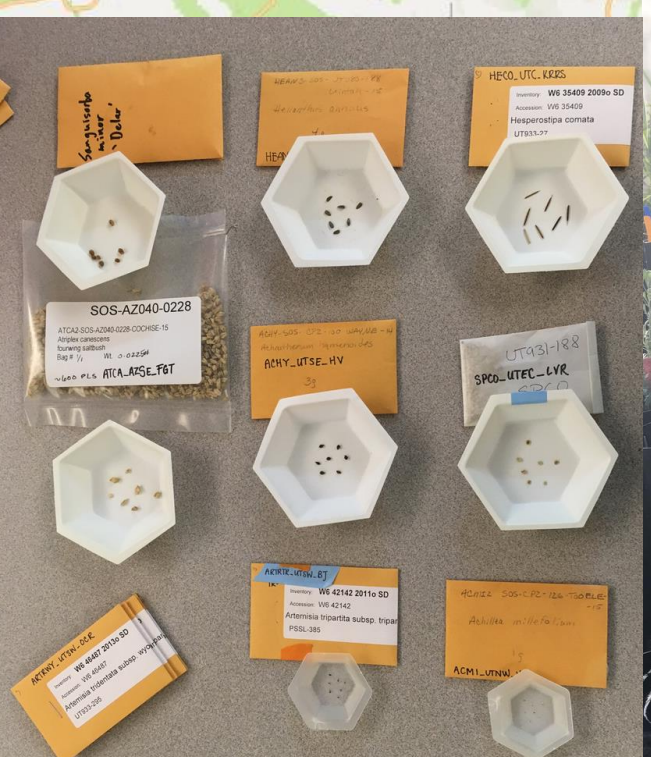
Salt Lake City
Sandy
Provo
UINTAH AND OURAY RESERVATION
Grand Junction
St George
NAVAJO NATION RESERVATION
Albuquer


SOS-AZ040-0228
ACHY_UTSE_HV
SPCO_UTEC_LVR
HECO_UTC_KRRS
Hesperostipa comata


ACMI_UTNW_VE
(84 days)

Hesperostipa comata and *Vulpia octoflora* populations

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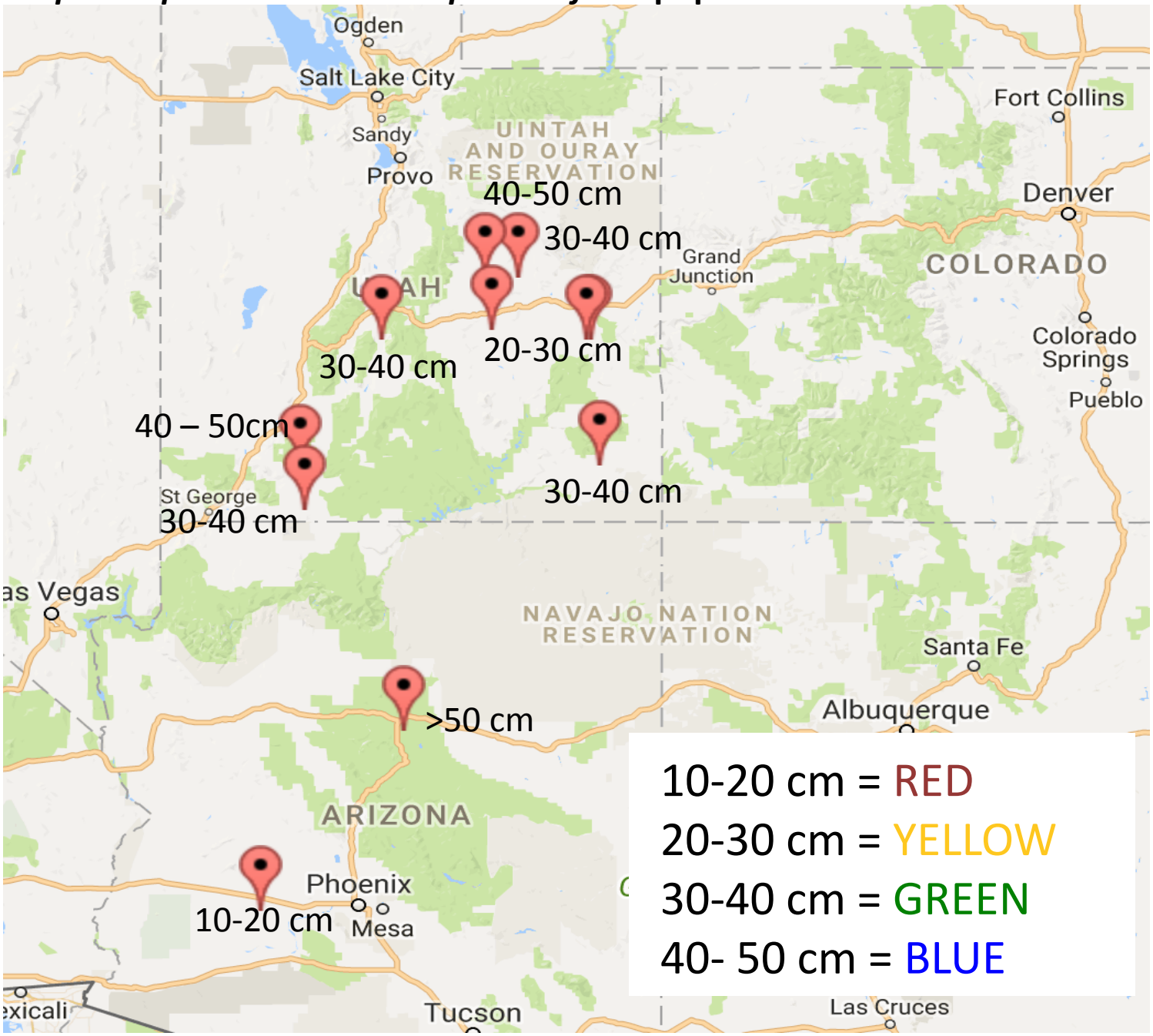
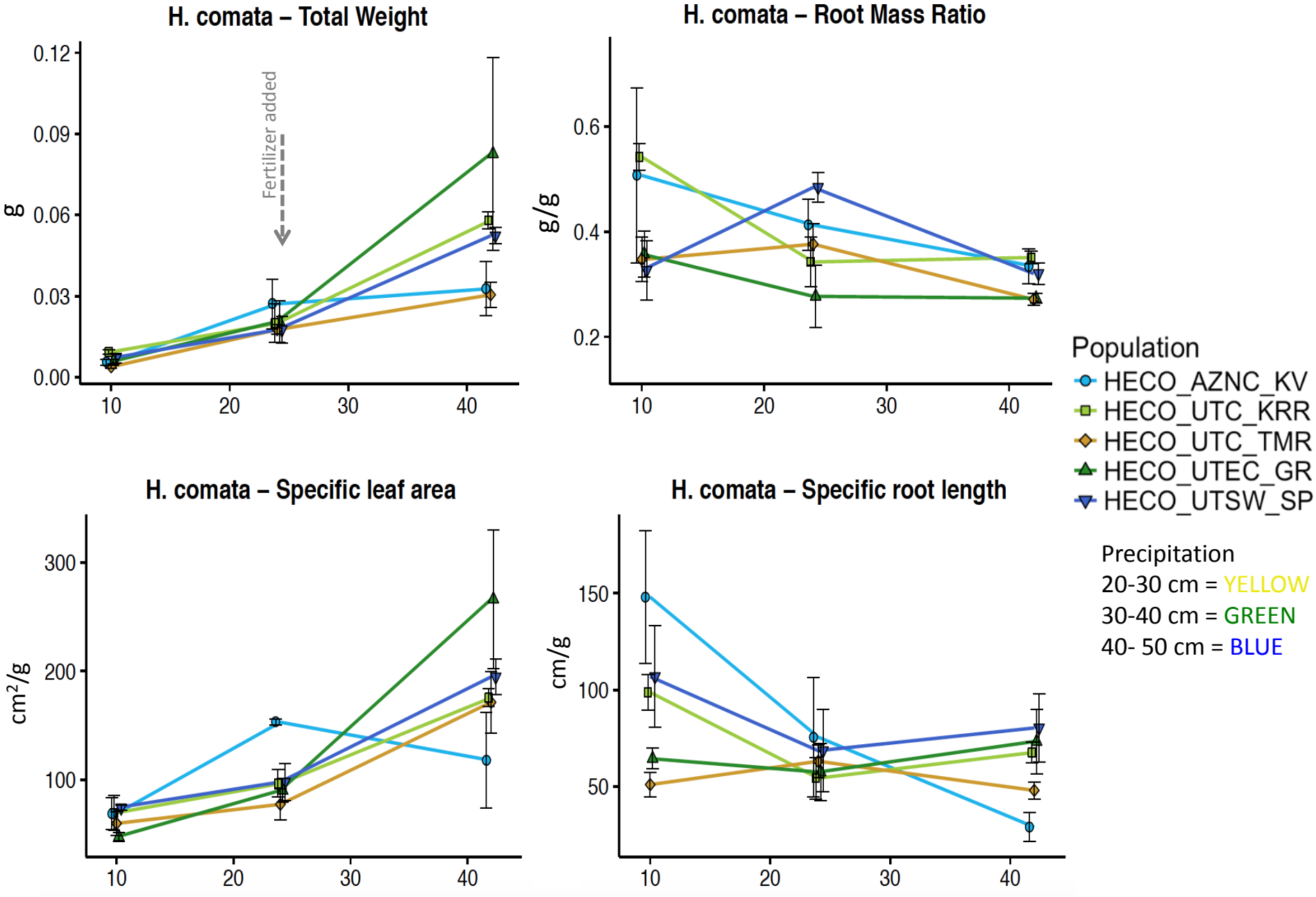


Hesperostipa comata – Needle and thread

Ladybird Johnston Wildflower Center

Hesperostipa comata – Needle and thread grass



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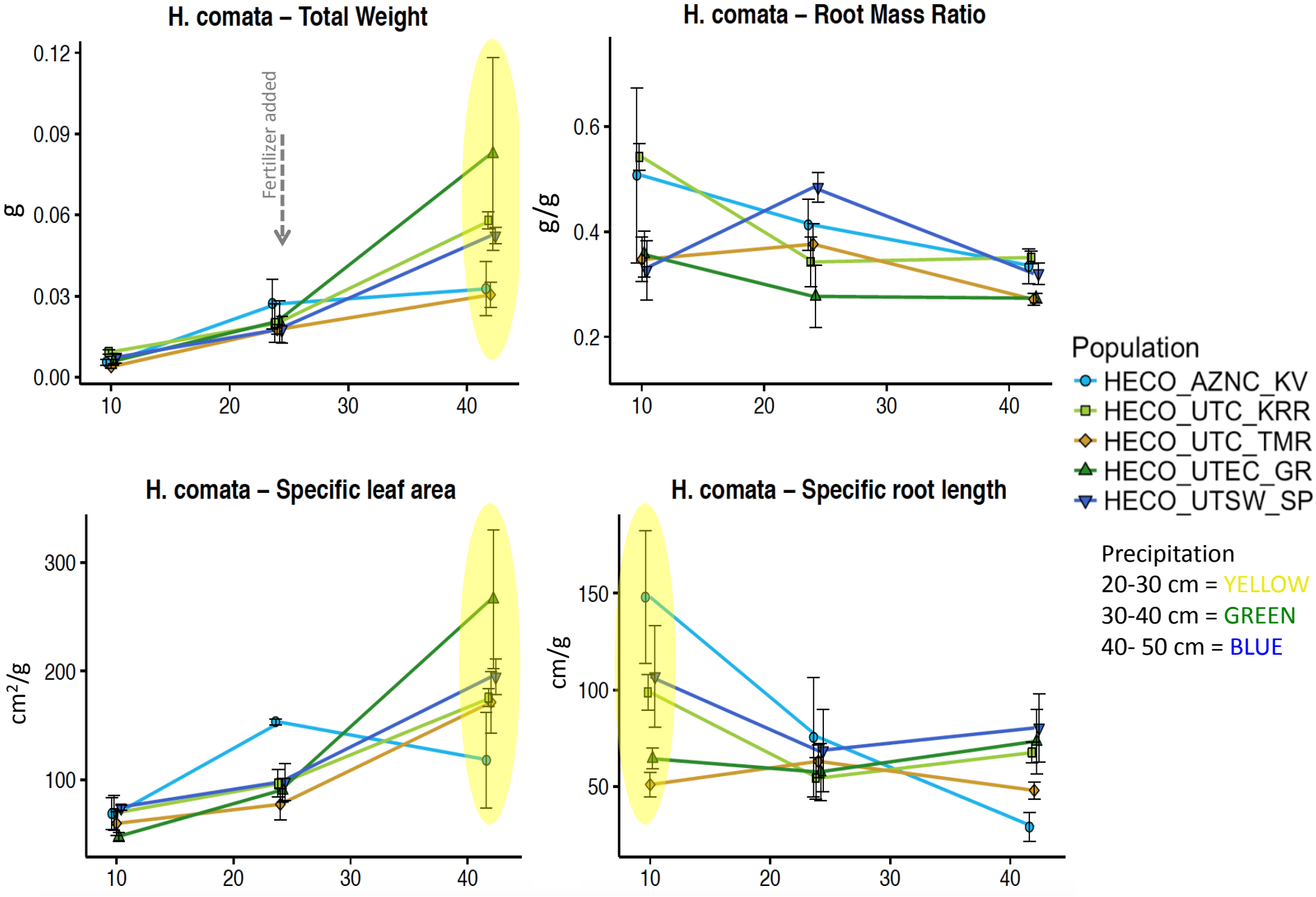

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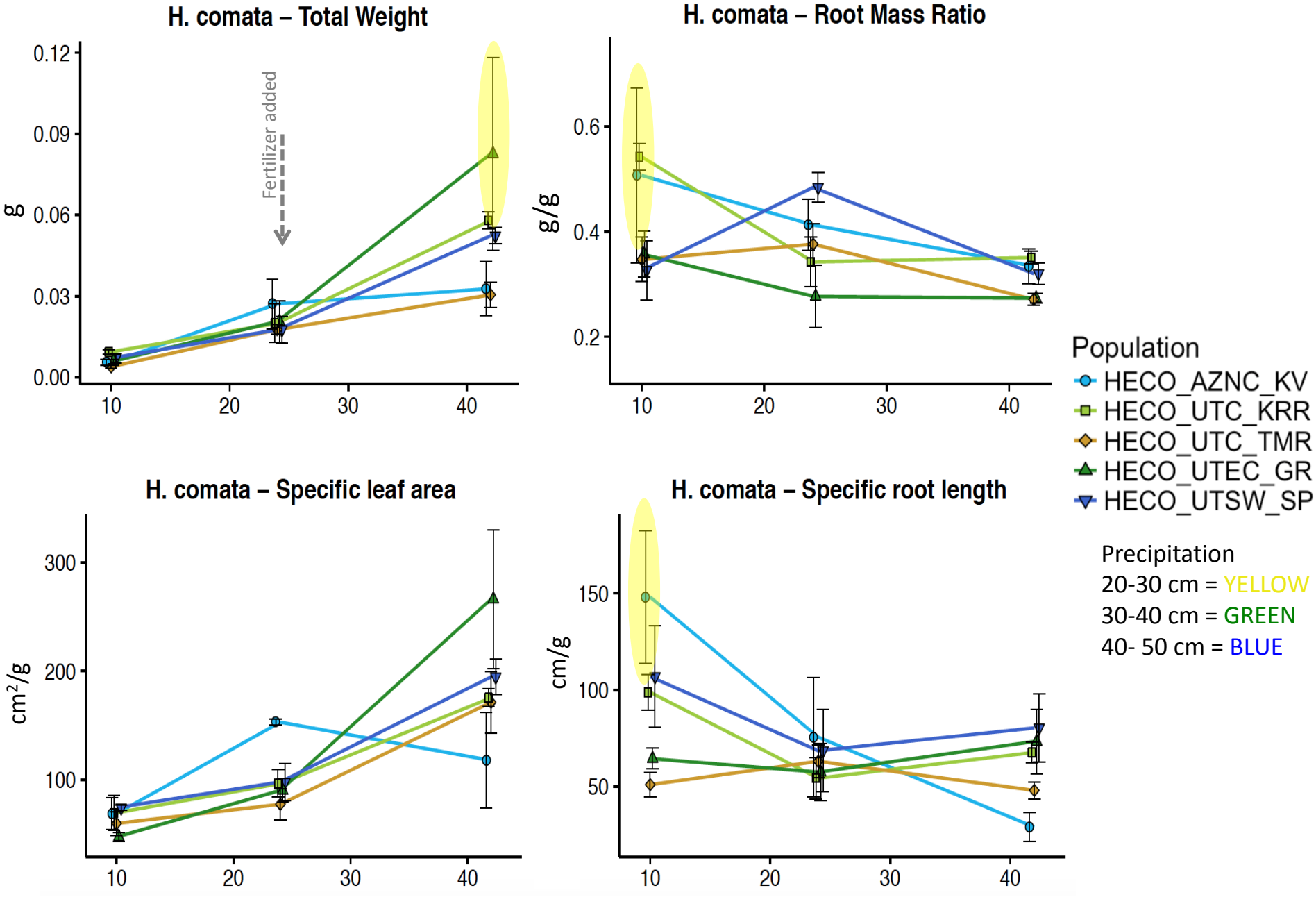

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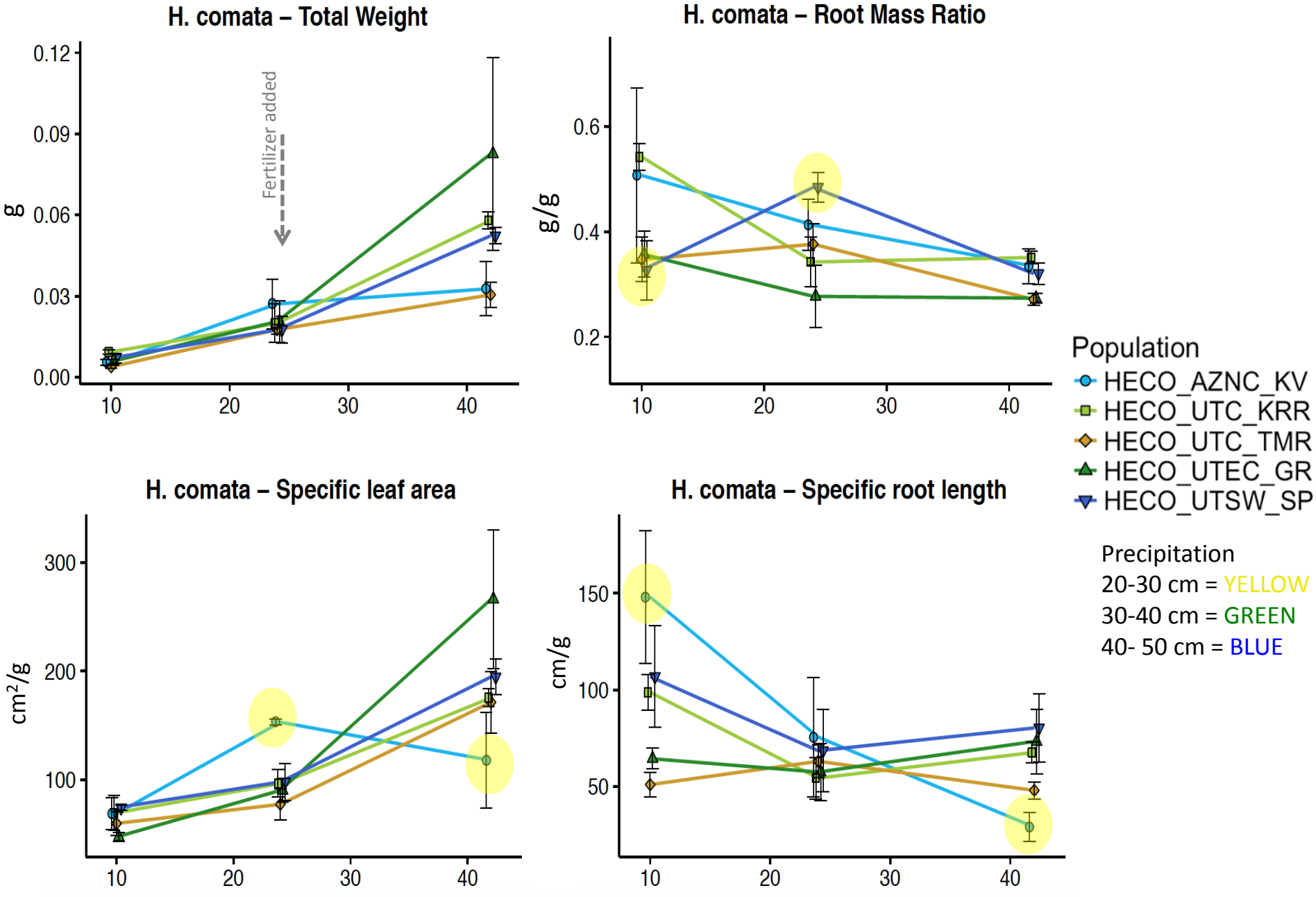

Vulpia octoflora – Six-week fescue

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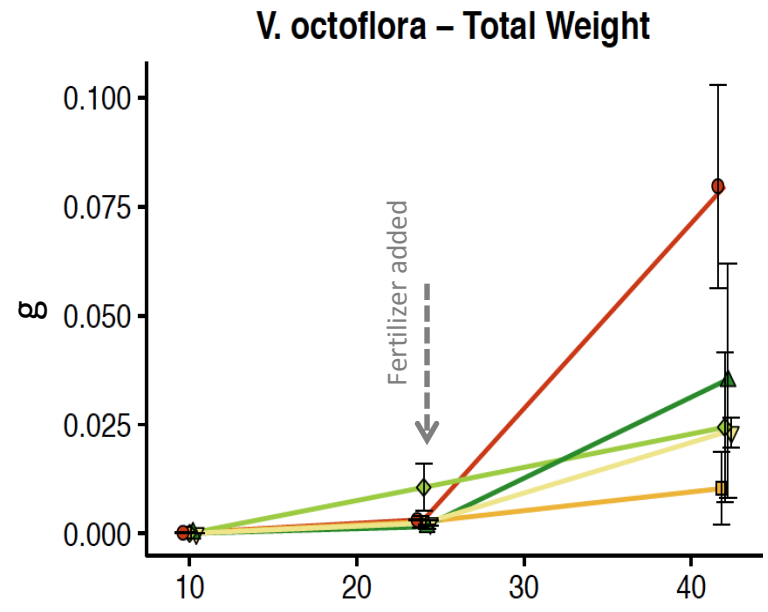

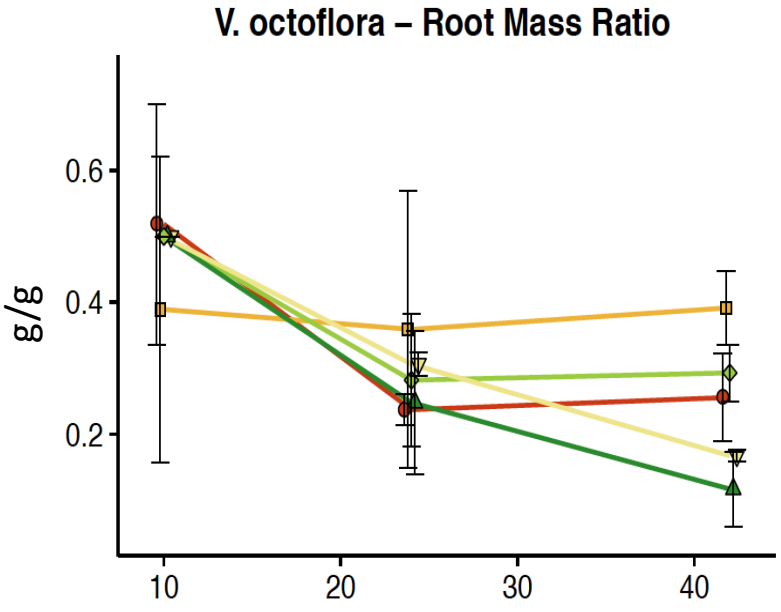

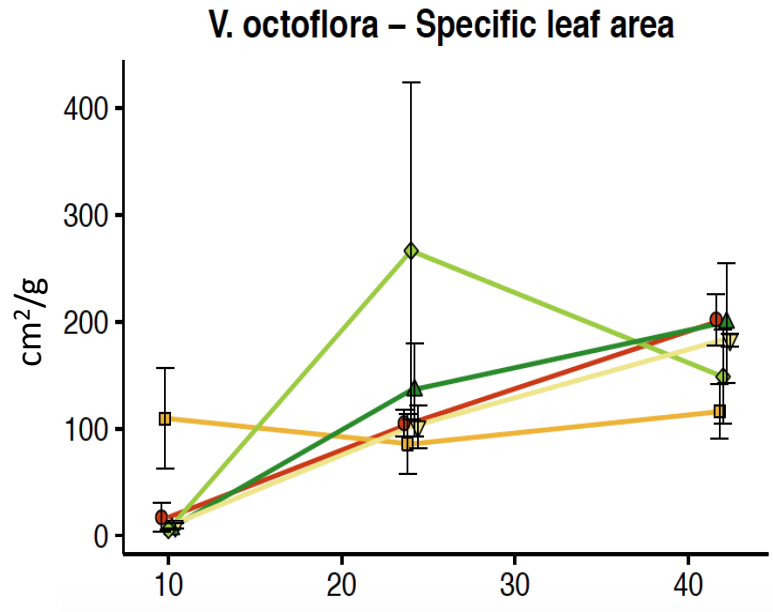

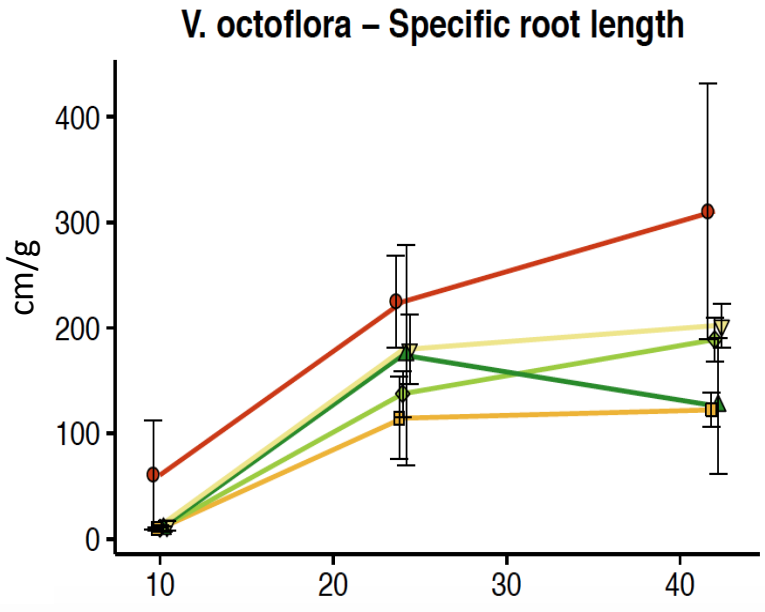

Population
- VUOC_AZSW_WB
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Precipitation
10-20 cm = RED
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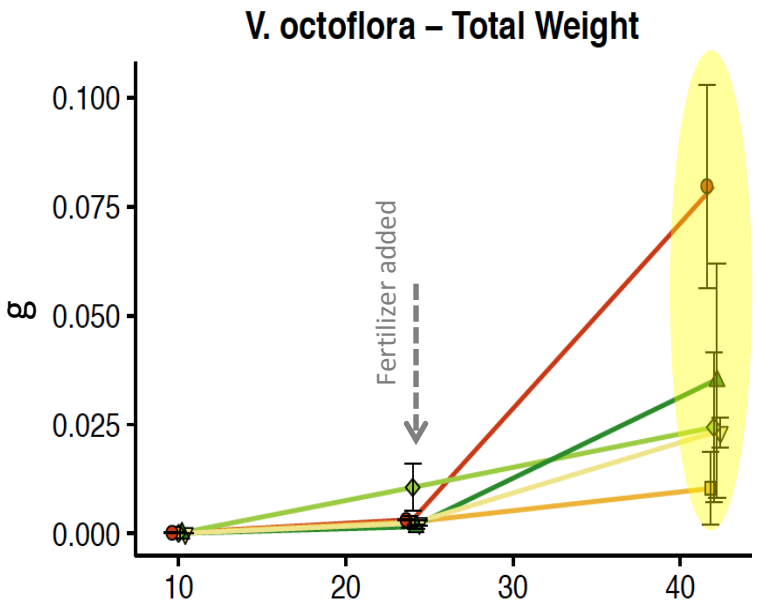
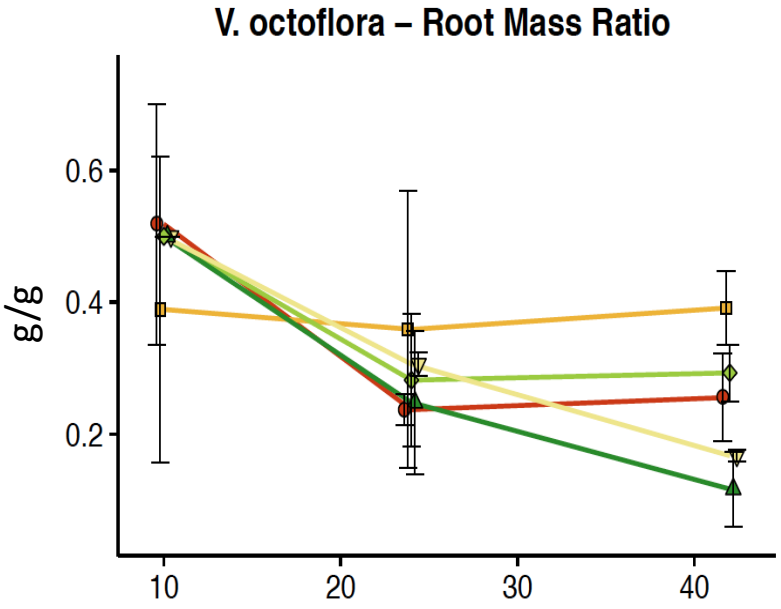
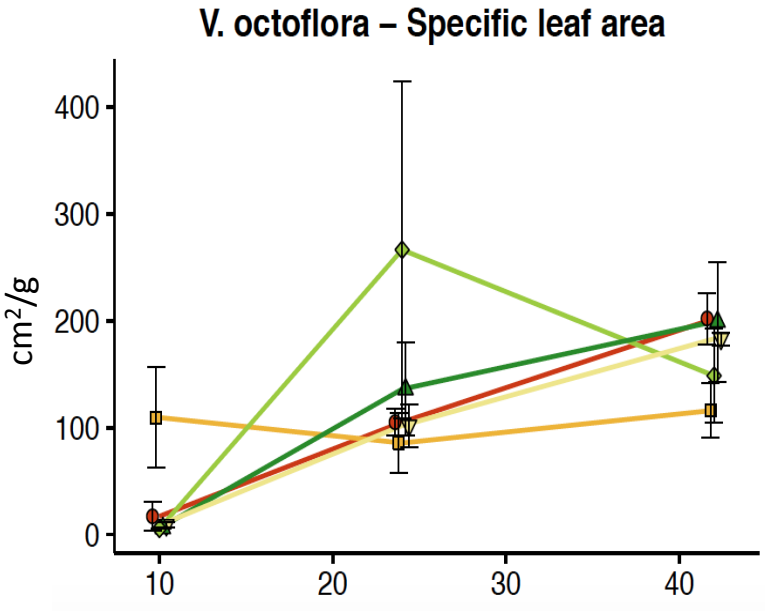
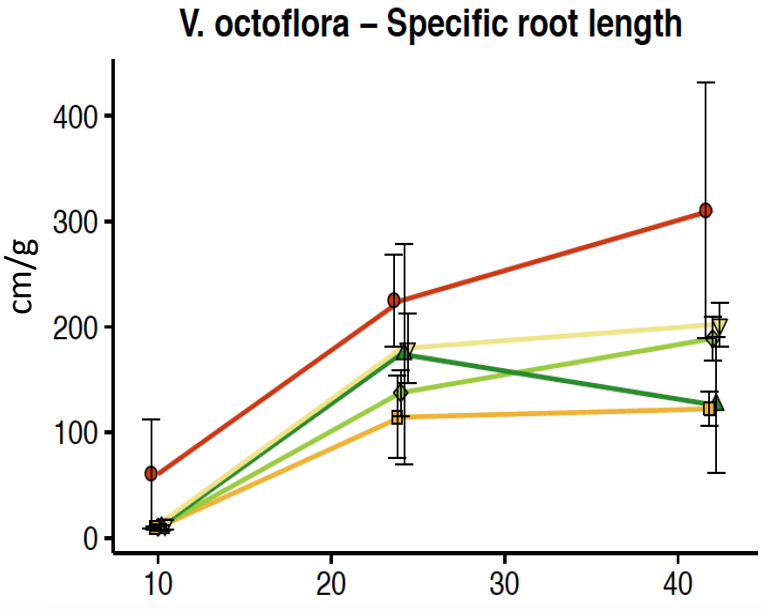
Vulpia octoflora – Six-week fescue









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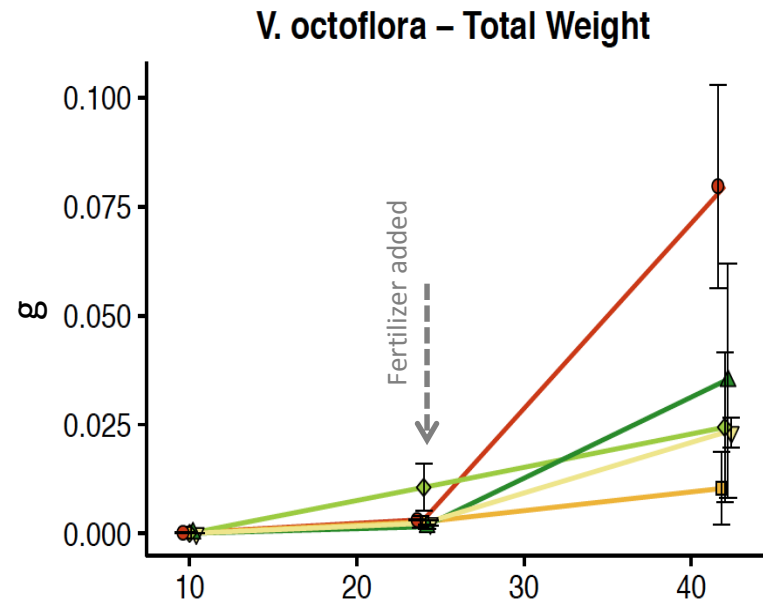

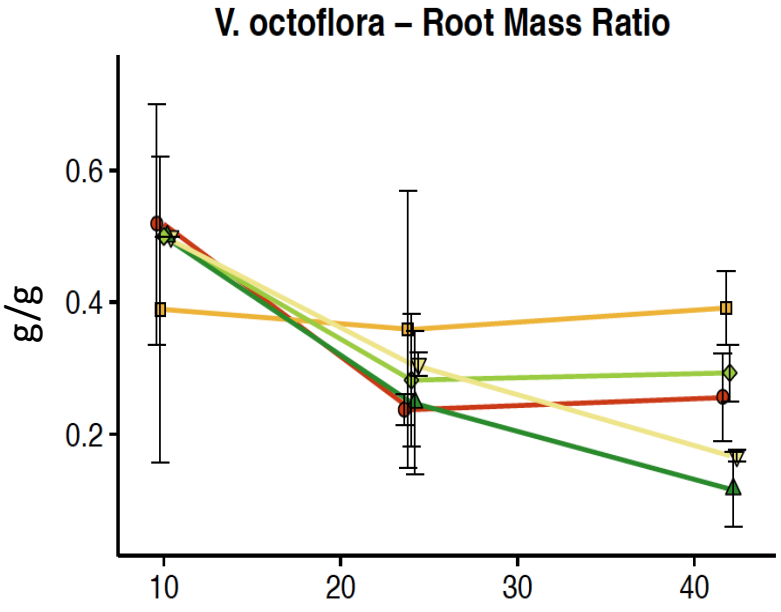

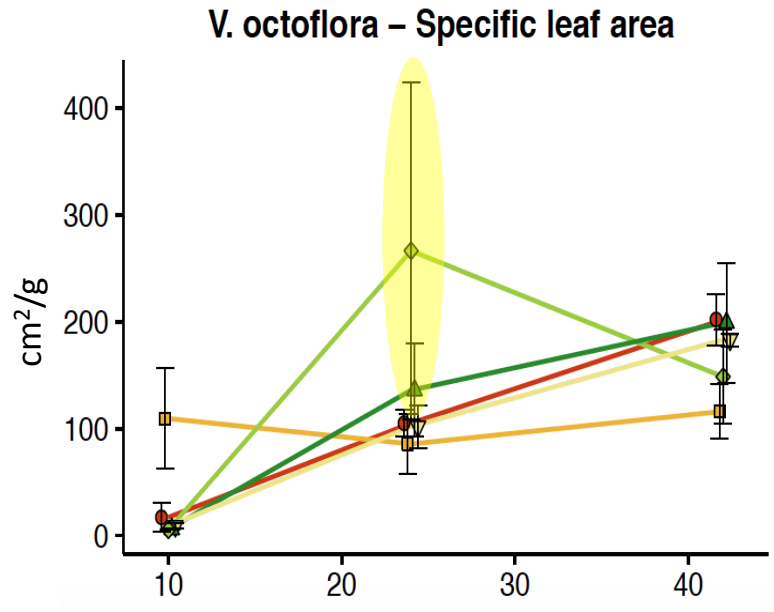

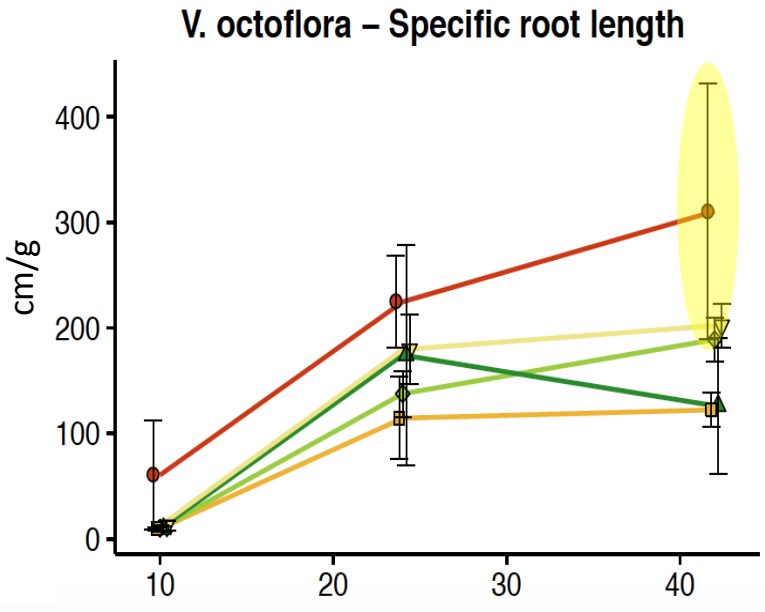

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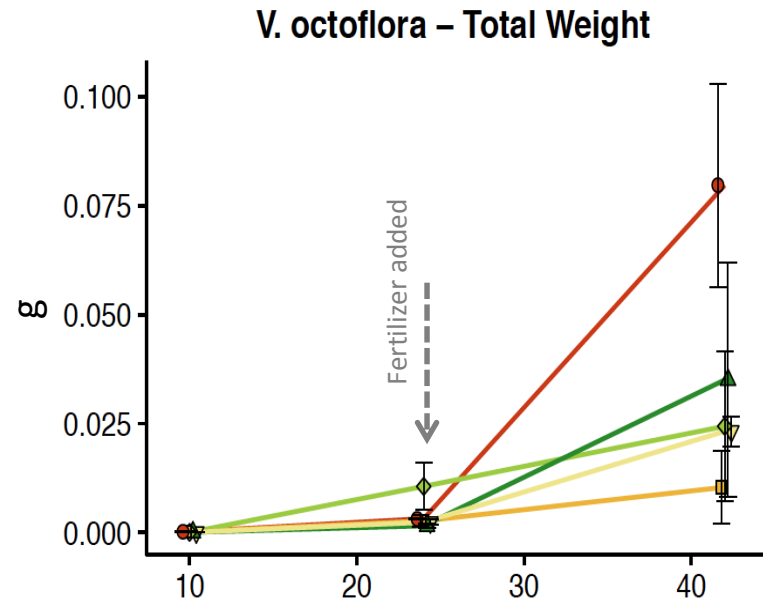

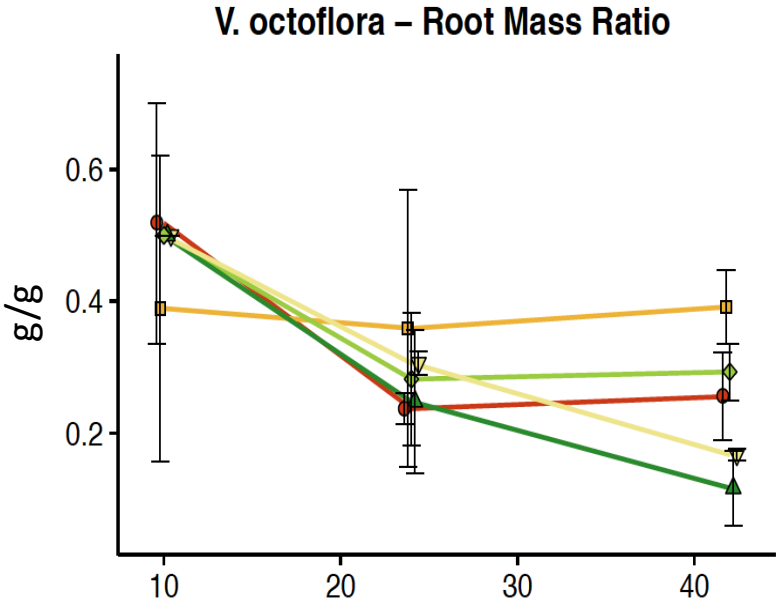

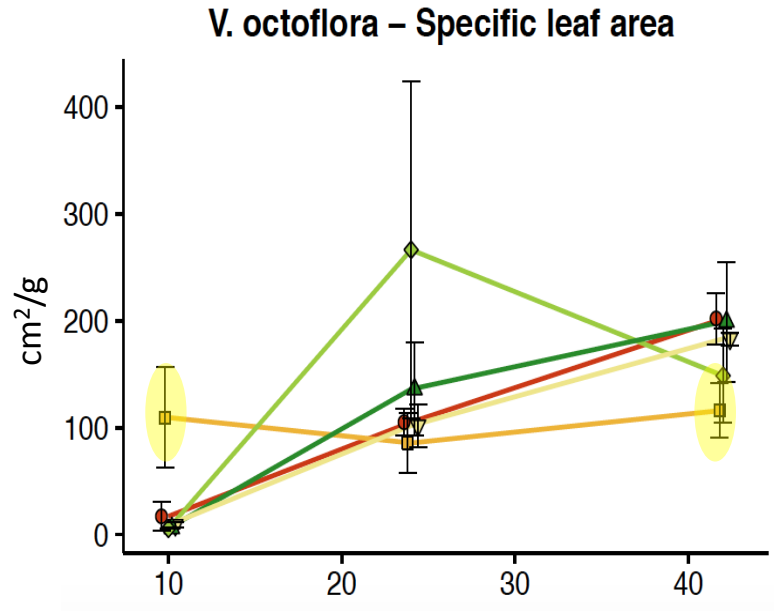

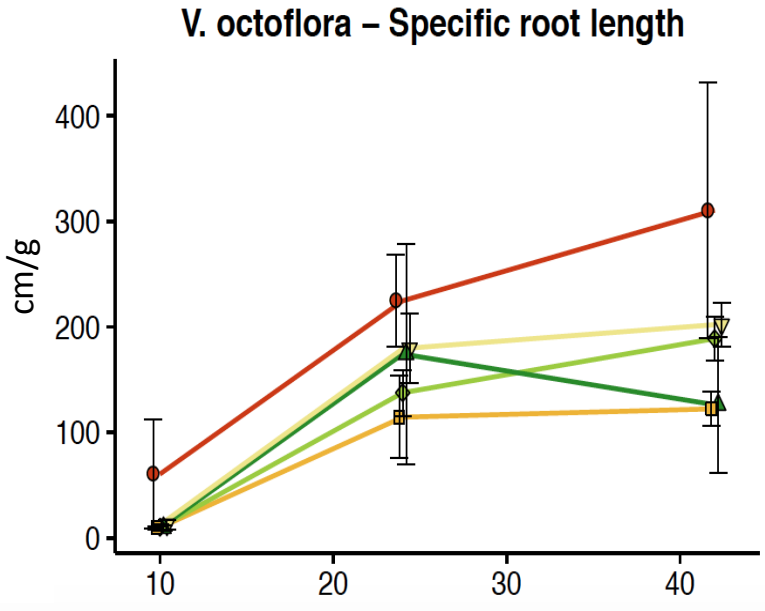

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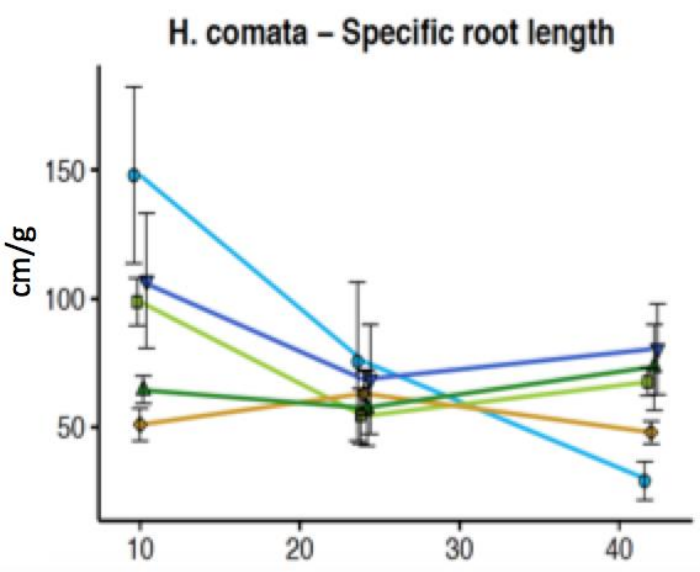

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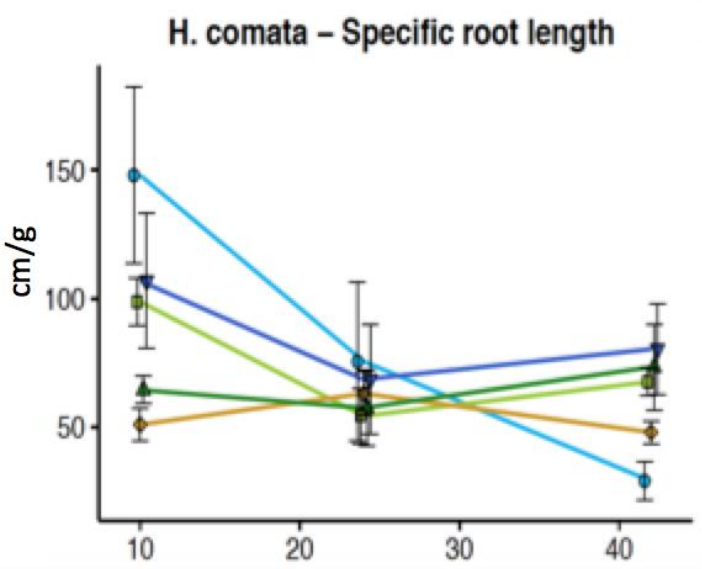

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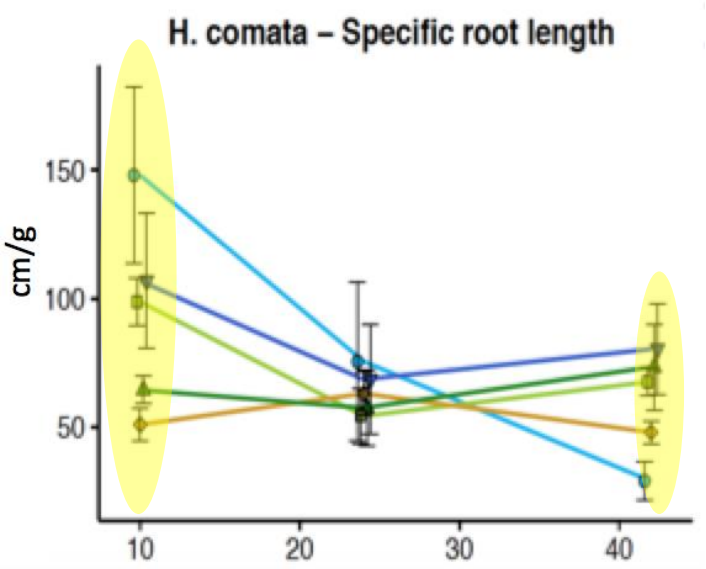

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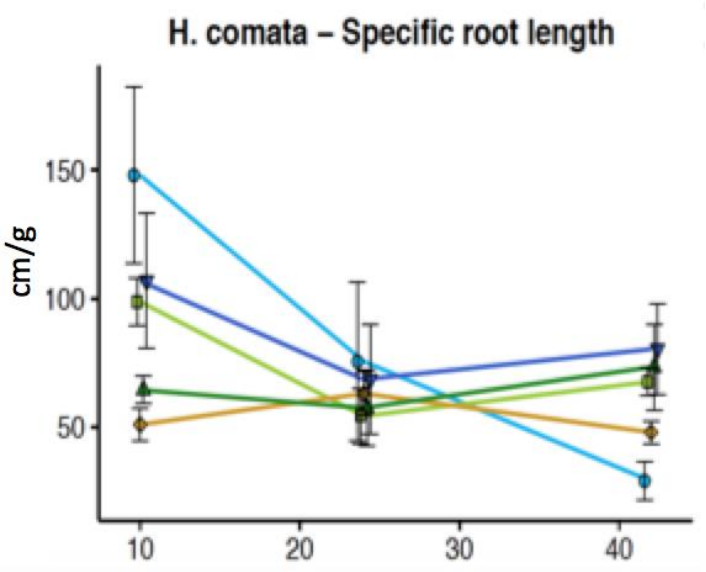

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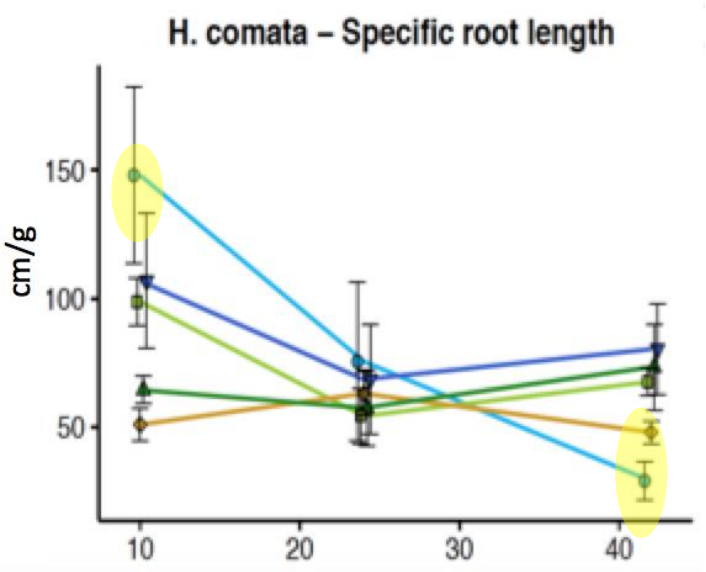

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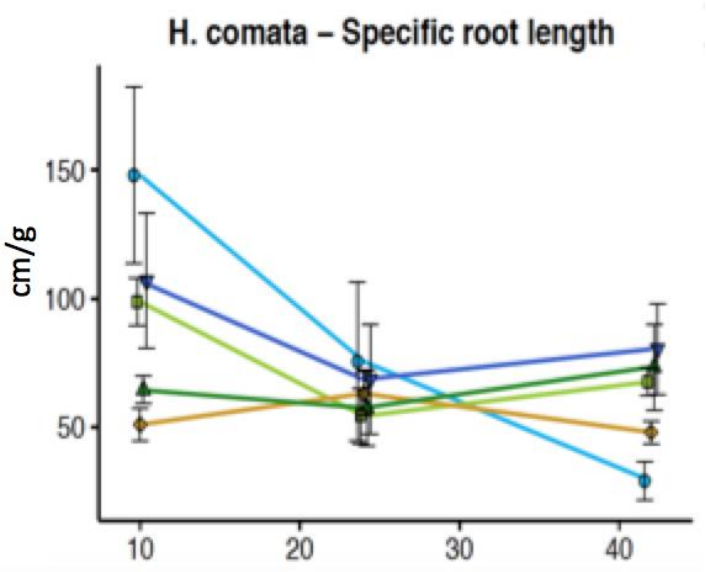

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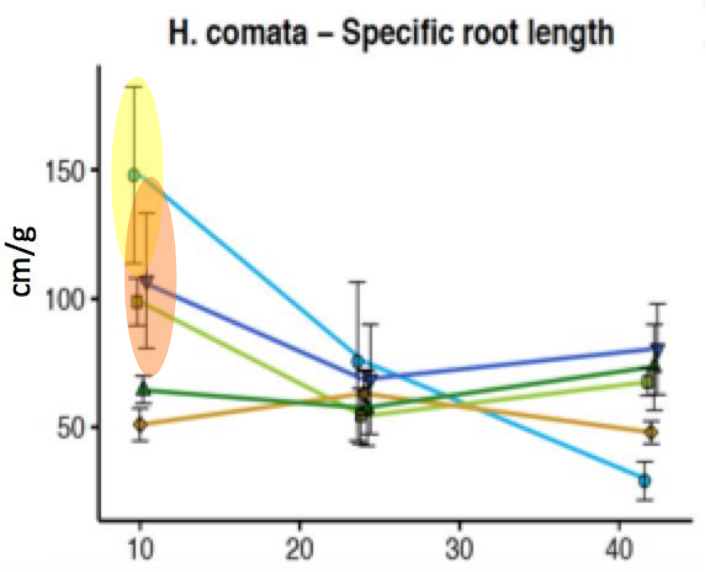

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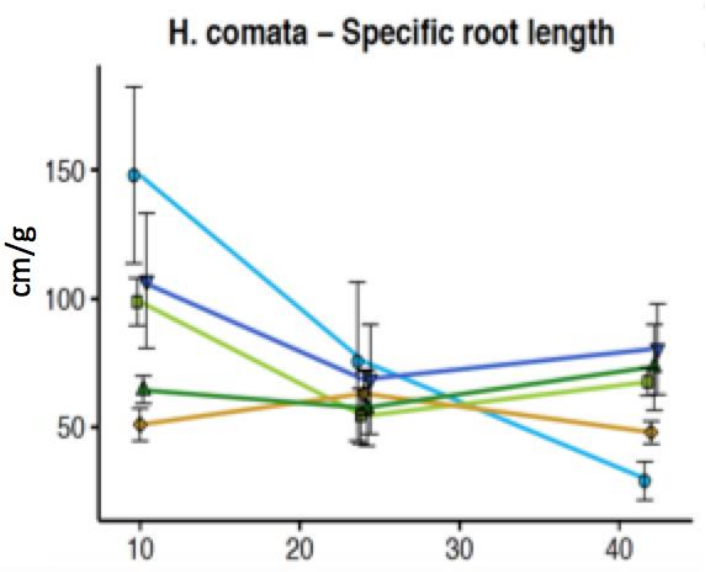

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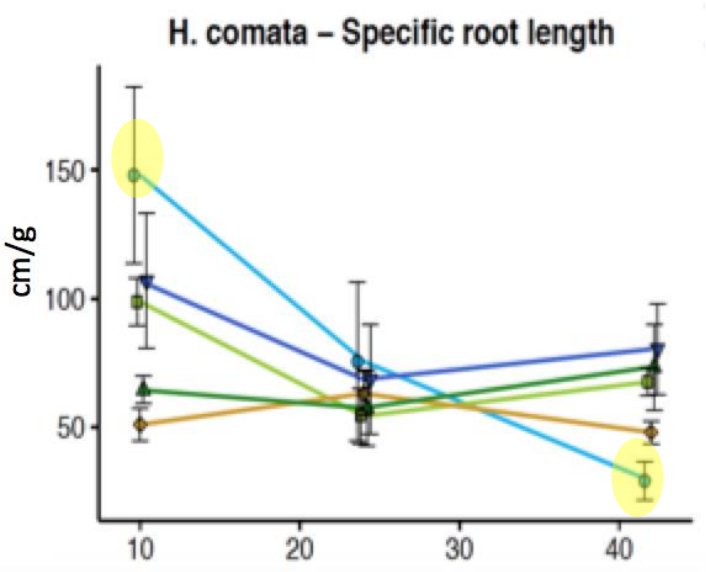

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