

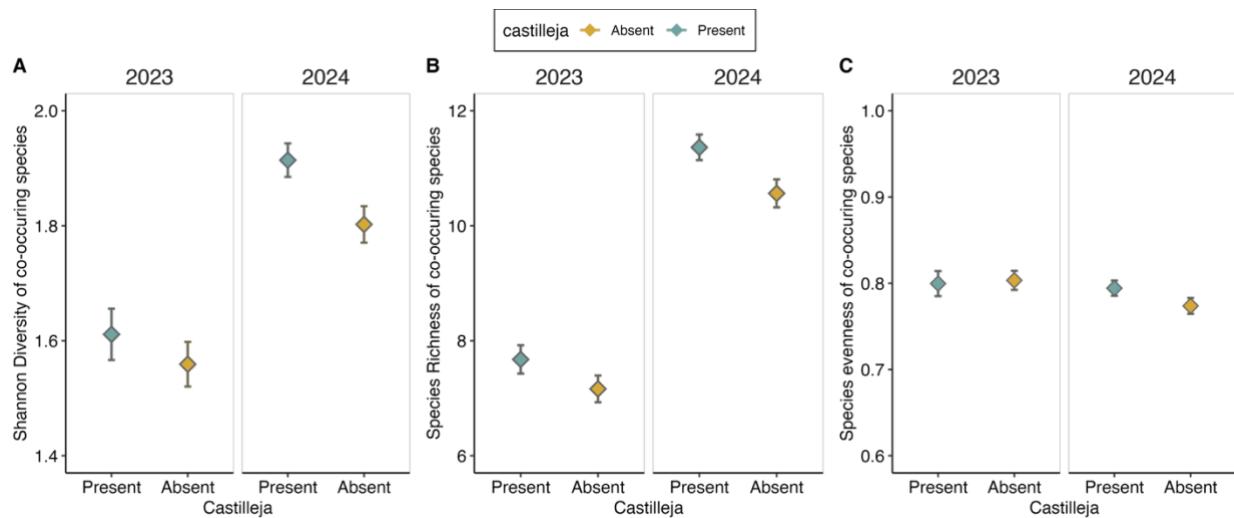
## Main figures

**Table I.** Site and *Castilleja* species for observational paired plots.

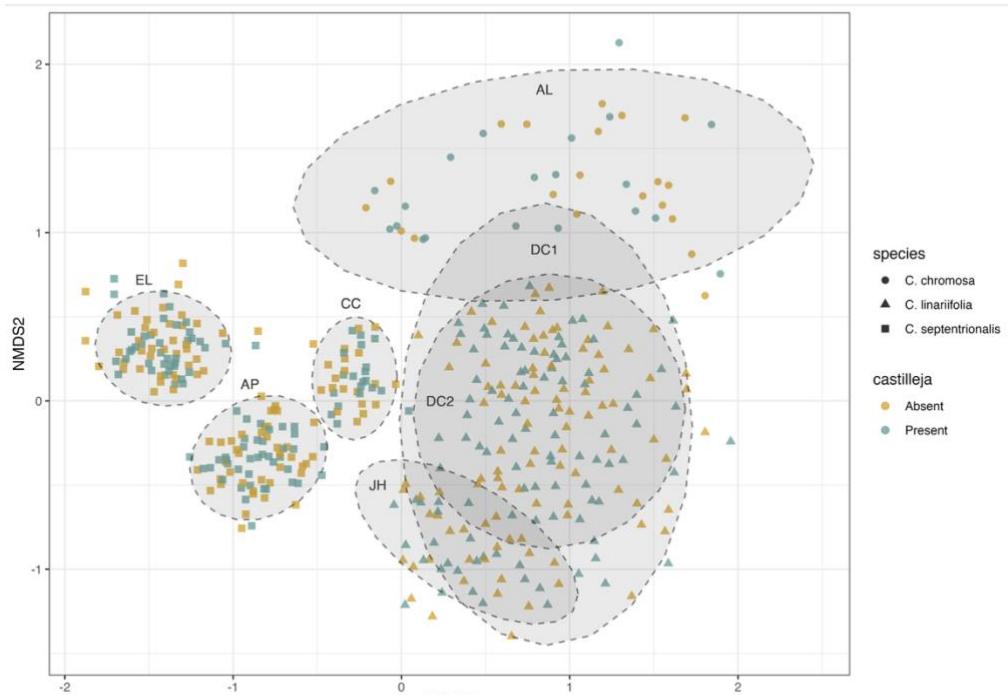
Castilleja species	Site	Latitude	Longitude	Elevation (m)	Sampling Year
<i>Castilleja septentrionalis</i>	Avery Picnic	38.977	-106.975	2,939	2023, 2024
	Copper Creek	38.968	-106.968	3,090	2024
	Emerald Lake	39.009	-107.041	3,191	2023, 2024
<i>Castilleja linariifolia</i>	Johnson Hill	38.960	-106.987	2,925	2024
	Deer Creek 1	38.953	-106.974	3,000	2023, 2024
	Deer Creek 2	38.953	-106.975	3,016	2023, 2024
<i>Castilleja chromosa</i>	Almont	38.722	-106.816	2,673	2024

**Table II.** Results of site-level indicator species analysis for all species with alpha < 0.1. P-values for statistically significant species (< 0.05) are bolded.

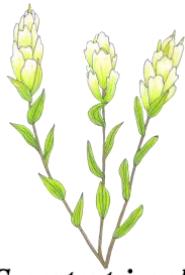
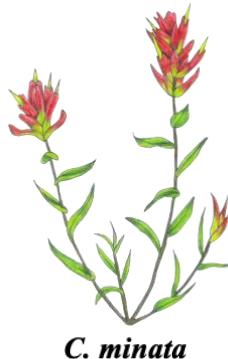
Castilleja species	Site	Castilleja	Indicator species	Indicator Value	P-value
<i>C. septentrionalis</i>	Emerald Lake	Present	<i>Fragaria virginiana</i>	0.228	<b>0.042</b>
		Present	<i>Erigeron coulteri</i>	0.210	0.055
	Copper Creek	Present	<i>Thalictrum fendleri</i>	0.298	0.064
		Present	<i>Campanula petiolata</i>	0.276	0.085
		Absent	<i>Cymopterus lemmontii</i>	0.270	0.089
<i>C. linariifolia</i>	Deer Creek 1	Present	<i>Delphinium nuttallianum</i>	0.263	<b>0.005</b>
		Present	<i>Heterotheca sp.</i>	0.185	0.084
		Absent	<i>Ipomopsis aggregata</i>	0.220	0.055
		Absent	<i>Elymus elymoides</i>	0.206	0.086
	Deer Creek 2	Present	<i>Koeleria macrantha</i>	0.228	<b>0.044</b>
		Absent	<i>Gayophytum sp.</i>	0.241	0.051
		Absent	<i>Erigeron speciosus</i>	0.207	0.066



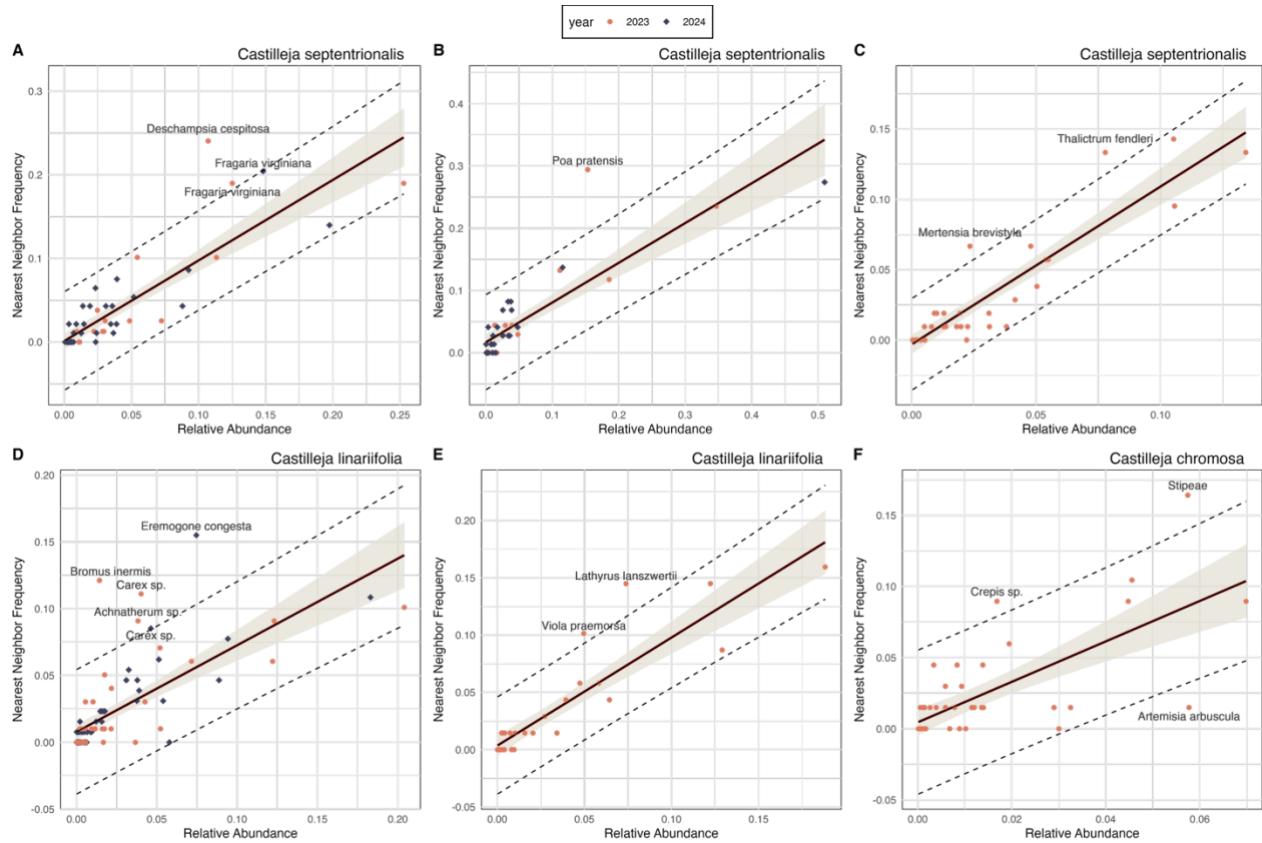
**Figure 1.** A) Shannon Diversity, B) Species richness, and C) Species evenness of the underlying plant community across seven sites and three species. *Castilleja* cover values are removed, and indices are separated by year. Points represent the mean and standard error for *Castilleja*-present plots in blue and *Castilleja*-absent plots in yellow.



**Figure 2.** Non-metric multidimensional scaling (NMDS) plot based on Bray-Curtis dissimilarities. Points represent individual plots, with *Castilleja* presence plots in green and *Castilleja* absence plots in brown. *Castilleja* species are represented by shape. The stress for this ordination solution is 0.15. Sites are denoted by ellipses and short codes. Almont (AL), Deer Creek 1 (DC1), Deer Creek 2 (DC2), Johnson Hill (JH), Emerald Lake (EL), Avery Picnic (AP), and Copper Creek (CC).

Castilleja species	Host	Functional Group	Source	Average Cover		Occurrence		
				NN	HA	IS	Presence	Absence
	<i>Mertensia brevistyla</i>		+	1.6%	1.6%		32	21
	<i>Thalictrum fendleri</i>		+	9.3%	8.0%		31	33
	<i>Viola adunca</i>		+	2.8%	2.3%		35	27
	<i>Fragaria virginiana</i>		++ +	9.5%	7.7%		48	45
	<i>Deschampsia cespitosa</i>		+	7.0%	7.1%		40	37
	<i>Poa pratensis</i>		+	6.9%	7.1%		74	73
	<i>Eremogone congesta</i>		++	4.9%	3.7%		73	73
	<i>Viola praemorsa</i>		++	3.6%	3.5%		33	28
	<i>Delphinium nuttallianum</i>		+	0.9%	0.6%		24	12
	<i>Achnatherum sp.</i>		+	3.4%	4.8%		45	36
	<i>Bromus inermis</i>		+	4.0%	5.6%		15	11
	<i>Koeleria macrantha</i>		++	3.7%	3.8%		17	9
	<i>Lathyrus lanszwertii</i>		+	6.6%	7.3%		70	65
	<i>Carex sp.</i>		+	4.4%	5.6%		62	50
	<i>Paxistima myrsinoides</i>		+	4.1%	5.8%		20	16
	<i>Achillea millefolium</i>		+	4.4%	3.9%		51	50
	<i>Antennaria parviflora</i>		+	6.7%	6.5%		13	15
	<i>Crepis sp.</i>		+	2.1%	4.9%		20	8
	<i>Achnatherum pinetorum</i>		+	N/A	N/A	N/A	N/A	N/A
	<i>Stipeae</i>		+	6.8%	6.3%		15	15
	<i>Chrysothamnus vaseyi</i>		+	11.9%	7.9%		10	7
	<i>Eremogone congesta</i>		+	N/A	N/A	N/A	N/A	N/A
	<i>Fragaria virginiana</i>		+	N/A	N/A	N/A	N/A	N/A
	<i>Geranium richardsonii</i>		+	N/A	N/A	N/A	N/A	N/A
	<i>Packera neomexicana</i>		+	N/A	N/A	N/A	N/A	N/A
	<i>Potentilla pulcherrima</i>		+	N/A	N/A	N/A	N/A	N/A
	<i>Poa sp.</i>		+	N/A	N/A	N/A	N/A	N/A
	<i>Carex aurea</i>		+	N/A	N/A	N/A	N/A	N/A

**Figure 3.** Figure table of host species and functional groups for Rocky Mountain *Castilleja* species. The methods of host identification, including Nearest Neighbor (NN), Observed Haustoria (HA), and Indicator Species Analysis (ISA), are presented as positive (+) symbols in the Source column. Average Cover and occurrence data for host species are broken down by presence and absence plots for all species that occurred within the study sites for each



**Figure 4.** Nearest Neighbor (NN) plots for all sites and *Castilleja* species in 2023 (yellow circles) and 2024 (green diamonds). **A)** *Castilleja septentrionalis* at Emerald Lake, **B)** *Castilleja septentrionalis* at Avery Picnic **C)** *Castilleja septentrionalis* at Copper Creek, **D)** *Castilleja linariifolia* at Deer Creek 1 & 2, **E)** *Castilleja linariifolia* at Johnson Hill, and **F)** *Castilleja chromosa* at Almont. Points are colored by year. Points that fall above or below the predictive intervals (dashed blue lines) represent species that were significantly more (or less) abundant as a NN than expected by chance alone. The brown line represents the linear model out and standard