Supplemental Materials

FIGURES

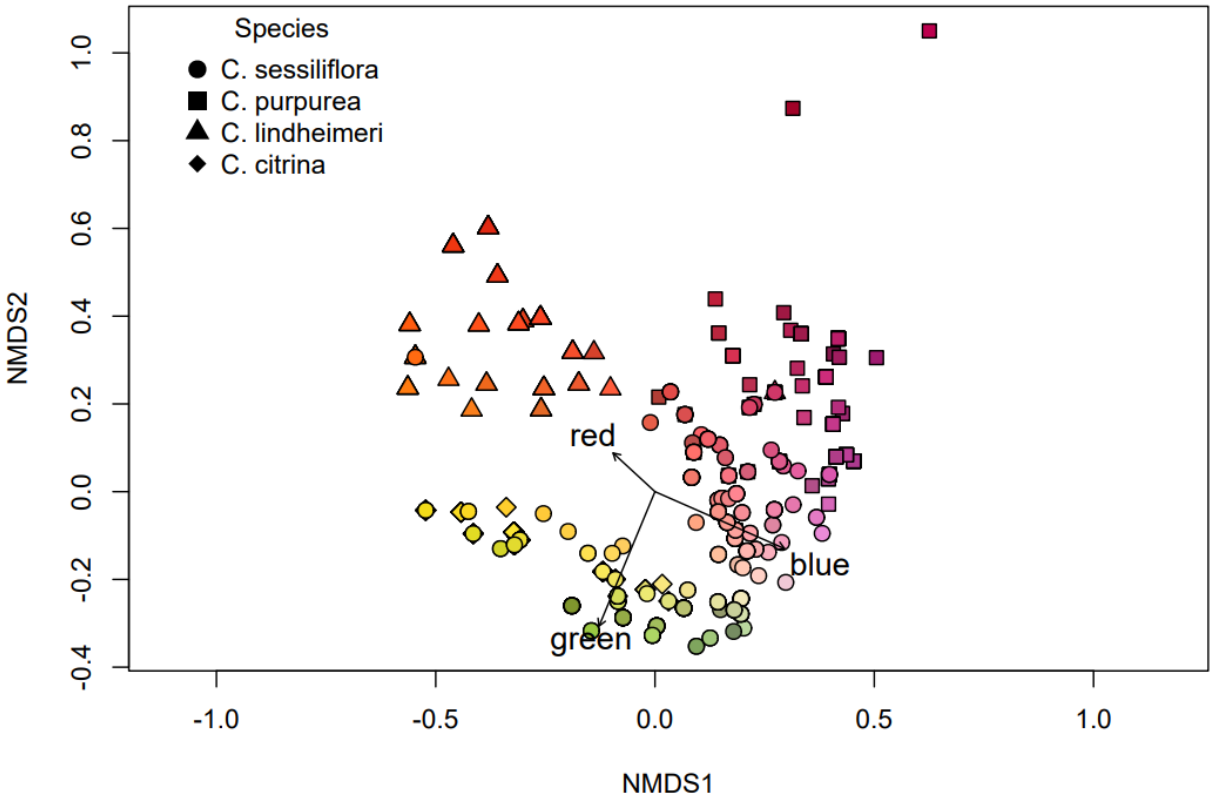

Figure S1. NMDS ordination of Red, Green, Blue color values of measured individuals (N=684), showing recorded inflorescence color (RGB values). Axes NMDS1 and NMDS2 reflect color variation and are used as proxies of such in analyses. Note that individual points may overlap when matched to the same color code/ RGB values.

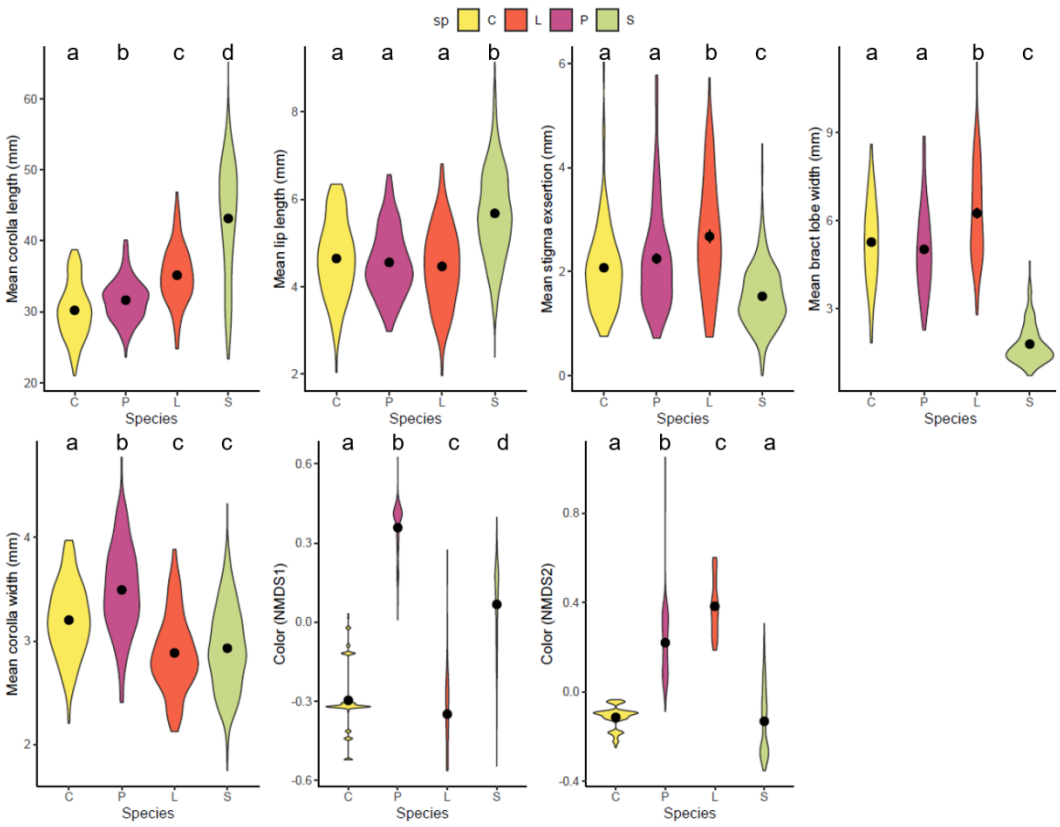

Figure S2. Violin plots of floral trait measurements by species (sp: C = *citrina*, L = *lindheimeri*, P = *purpurea*, S = *sessiliflora*). Central points show mean, and error bars are +/- SE. Different letters denote significant variation among species in pairwise comparison Tukey HSD tests (detailed statistics in Table S3 and S4).

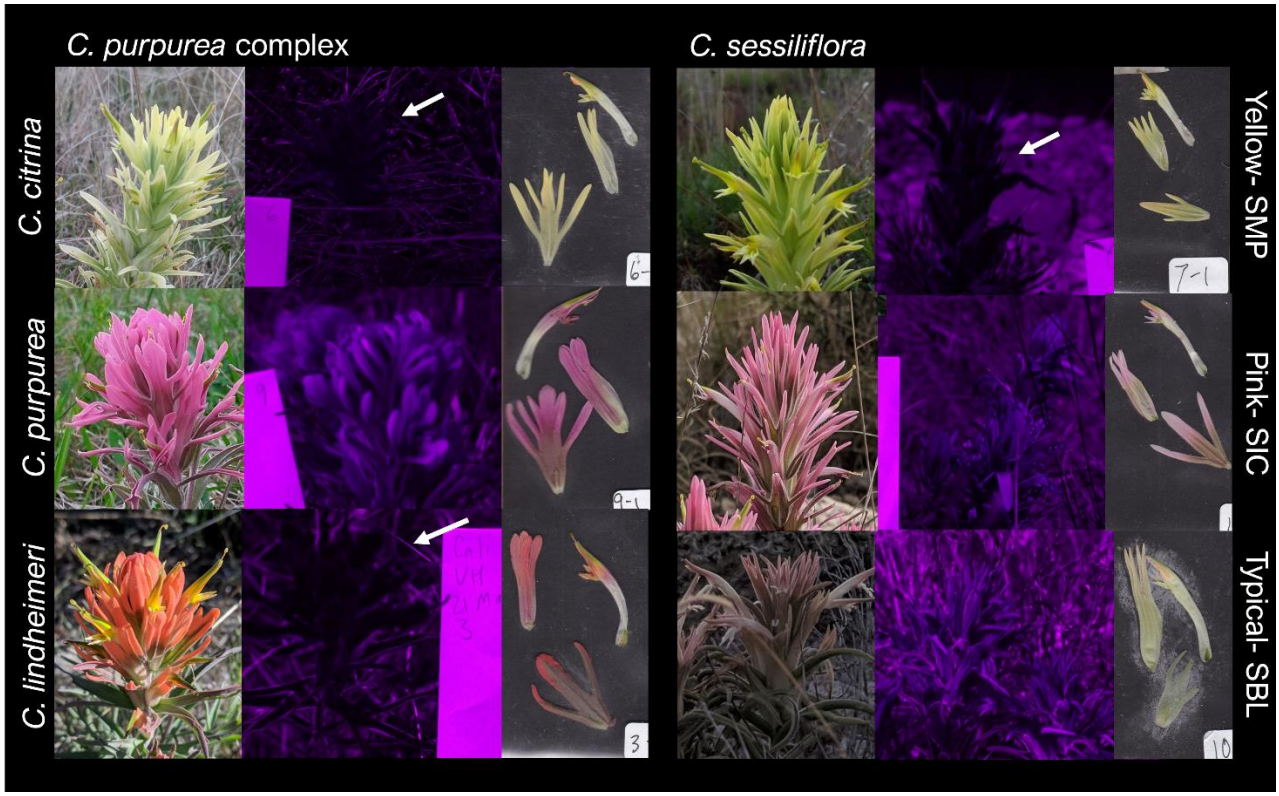

Figure S3. Photographs of inflorescences in human-visible wavelengths (left columns) and in UV light (center columns), along with scans of flower tissues (corolla, calyx, and bract tissues; right columns) taken from the same plants shown in UV photos. Human-visible wavelength photographs show different individuals from the same population as UV photos. Arrows point to difficult-to-see inflorescences in UV photos. Sampled populations: CMSC (*C. citrina*), PSD (*C. purpurea*, not sampled for pollinators, see Wenzell et al., 2021); LVH (*C. lindheimeri*); SMP (yellow morph *C. sessiliflora*); SIC (pink morph *C. sessiliflora*); SBL (typical morph *C. sessiliflora*). Photos not to scale.

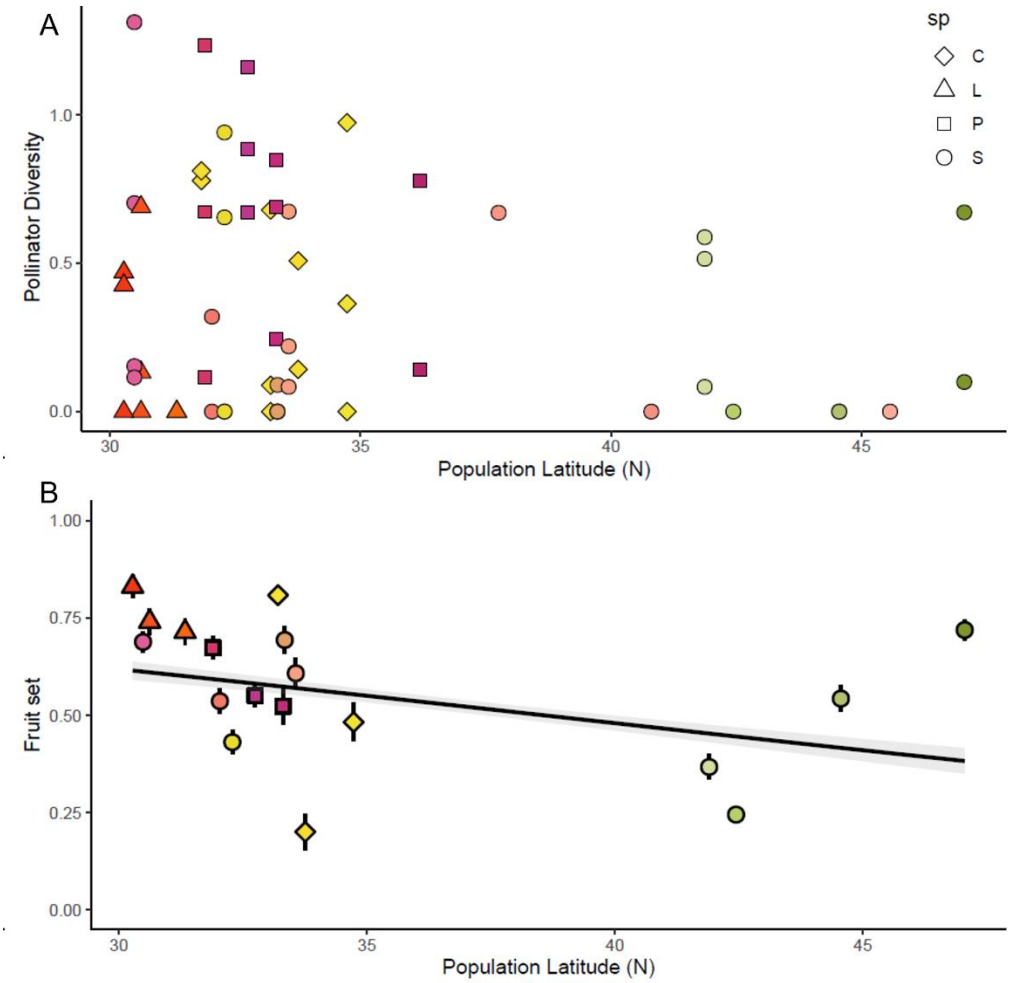

Figure S4. Pollinator Diversity Index (A) and population average fruit set (B) by population latitude. Species coded by shape (sp: C = *C. citrina*, L = *C. lindheimeri*, P = *C. purpurea*, S = *C. sessiliflora*), and fill color shows population median floral color, with error bars showing SE for population-average fruit set data. Solid trend lines denote a significant relationship ($p < 0.05$) based on GLMM.

TABLES

Table S1. Focal populations and their location, approximate floral color (Wenzell et al., 2021, see Fig. 2), and years sampled for pollinator observations. County location is provided in place of precise coordinates for populations of conservation concern and/or in accordance with permitting regulations. Asterisks (*) denote populations sampled using the wide-view observation method, which was only utilized in 2019 (in addition to the narrow-view method used in all years). Daggers (†) denote populations and years sampled for fruit set; double daggers (‡) denote population-year datapoints included in analyses of fruit set and pollinator visitation (Fig. 6).

Population Code	Population Name	Species	State	Latitude	Longitude	Years sampled	Floral color
CHCL	Hords Creek Lake	*C. citrina*	TX	31.84946	-99.58669	2019*	yellow
CLA	Lake Arrowhead	*C. citrina*	TX	33.75562	-98.3829	2018, 2019*†‡	yellow
CMSC	Mt Scott Canyon	*C. citrina*	OK	34.7308	-98.56952	2018, 2019*†‡	yellow
CQL	Quarry Lake	*C. citrina*	TX	33.20647	-98.15727	2018, 2019*†‡	yellow
LMN	Mother Neff	*C. lindheimeri*	TX	31.33262	-97.46821	2019*†‡	red-orange
LRR	Rimrock	*C. lindheimeri*	TX	30.61922	-98.07169	2018, 2019*†‡	red-orange
LVH	Vireo Hill	*C. lindheimeri*	TX	30.276778	-97.8942907	2018, 2019*†‡	red-orange
PCM	Clymer Meadow	*C. purpurea*	TX	33.31087	-96.24411	2018, 2019*†‡	purple

PMT	Meridian Triangle	*C. purpurea*	TX	31.88892	-97.69912	2018, 2019*†‡	purple
PTMS	Tulsa Mulch Site	*C. purpurea*	OK	36.1815	-95.8168383	2019*	purple
PTH	Tandy Hills	*C. purpurea*	TX	32.74596	-97.27286	2018, 2019*†‡	purple
SFP	Felton Prairie	*C. sessiliflora*	MN	47.05174	-96.42735	2018†‡, 2019*	white-green
SILB	Illinois Beach	*C. sessiliflora*	IL	Lake County	-	2017†‡, 2018†‡	white-green
SNG	Nachusa Grasslands	*C. sessiliflora*	IL	Lee and Ogle Counties	-	2017† (floral trait and fruit set data only), 2018†‡, 2019*	white-green
SRS	Red Shale	*C. sessiliflora*	MT	45.57049	-106.14787	2017	pale pink
SSC	Spring Creek	*C. sessiliflora*	MN	44.55531	-92.59422	2017, 2018†‡	white-green
SIC	Indepen-dence Creek	*C. sessiliflora*	TX	30.486035	-101.788252	2017, 2018, 2019*†‡	pink (divergent morph)
SMP	Maddin Prairie	*C. sessiliflora*	TX	Mitchell County	-	2017, 2018, 2019*†‡	yellow (divergent morph)
SYH	Yeso Hills	*C. sessiliflora*	NM	32.03468	-104.4479	2018, 2019*†‡	pale pink
SBL	Bottomless Lakes	*C. sessiliflora*	NM	33.34243	-104.33299	2017, 2018, 2019*†‡	pale pink
SCL	Canyon Lake	*C. sessiliflora*	TX	33.5655	-101.80032	2018, 2019*†‡	pale pink

SDC	David Canyon Road	*C. sessiliflora*	CO	37.75643	-103.59391	2017	pale pink
SPB	Pawnee Buttes	*C. sessiliflora*	CO	40.80505	-104.01325	2017	pale pink

Table S2. Floral visitation data by species, population (Pop.), observation method (Dataset), and year. Data are presented as counts (number of visits), visitation rates (Rate; number of visits/ flower/ hour) and proportion of visits (Prop.; visits by each pollinator group divided by total visits) for each population-year-dataset datapoint by pollinator functional group, along with total number of visits, number of available flowers recorded (Total flrs), and Pollinator Diversity Index (Div. Index; log-transformed inverse Simpson's Diversity Index). Note that number of available flowers is an estimated value for Wide-view dataset observations (number of flowering stems in wide view multiplied by average number of flowers per stem recorded on narrow-view plants; see text for details). (See attached Excel file.)

Table S3. ANOVA results of floral traits by species and population nested within species. N = 684. Residual degrees of freedom for all models = 661.

Trait	Variable	Degrees of Freedom	F	p
Corolla length	Species	3	559.98	**<0.0001**
	Sp:pop	19	74.08	**<0.0001**
Corolla width	Species	3	97.27	**<0.0001**
	Sp:pop	19	14.74	**<0.0001**
Lip length	Species	3	121.03	**<0.0001**
	Sp:pop	19	21.15	**<0.0001**
Stigma	Species	3	68.329	**<0.0001**
	Sp:pop	19	4.558	**<0.0001**
Bract Lobe Width	Species	3	790.94	**<0.0001**
	Sp:pop	19	12.94	**<0.0001**
NMDS 1 (RGB)	Species	3	1232.93	**<0.0001**
	Sp:pop	19	42.18	**<0.0001**
NMDS 2 (RGB)	Species	3	736.49	**<0.0001**
	Sp:pop	19	20.94	**<0.0001**

Table S4. Tukey HSD pairwise comparisons of floral traits by species. Contrasts show pairwise comparisons between pairs of species (S = *C. sessiliflora*, C = *C. citrina*, L = *C. lindheimeri*, P = *C. purpurea*).

	Species contrast	Mean difference	95% CI Lower	Upper	Adjusted p
Corolla length	**L-C**	**4.95**	**3.63**	**6.26**	**<0.0001**
	P-C	**1.43**	**0.22**	**2.65**	**0.013**
	S-C	**12.95**	**11.96**	**13.94**	**<0.0001**
	P-L	**-3.51**	**-4.83**	**-2.20**	**<0.0001**
	S-L	**8.01**	**6.89**	**9.12**	**<0.0001**
	S-P	**11.52**	**10.53**	**12.51**	**<0.0001**
Corolla width	**L-C**	**-0.32**	**-0.44**	**-0.20**	**<0.0001**
	P-C	**0.29**	**0.18**	**0.40**	**<0.0001**
	S-C	**-0.27**	**-0.36**	**-0.18**	**<0.0001**
	P-L	**0.61**	**0.49**	**0.73**	**<0.0001**
	S-L	0.05	-0.06	0.15	0.665
	S-P	**-0.56**	**-0.66**	**-0.47**	**<0.0001**
Lip length	L-C	-0.18	-0.46	0.09	0.328
	P-C	-0.09	-0.34	0.17	0.804
	S-C	**1.03**	**0.82**	**1.24**	**<0.0001**
	P-L	0.09	-0.18	0.37	0.825
	S-L	**1.21**	**0.98**	**1.45**	**<0.0001**
	S-P	**1.12**	**0.91**	**1.33**	**<0.0001**
Stigma	**L-C**	**0.60**	**0.32**	**0.88**	**<0.0001**
	P-C	0.17	-0.08	0.43	0.299
	S-C	**-0.55**	**-0.76**	**-0.34**	**<0.0001**
	P-L	**-0.43**	**-0.70**	**-0.15**	**<0.001**
	S-L	**-1.15**	**-1.39**	**-0.92**	**<0.0001**
	S-P	**-0.72**	**-0.93**	**-0.51**	**<0.0001**
Bract lobe width	**L-C**	**0.98**	**0.62**	**1.34**	**<0.0001**
	P-C	-0.25	-0.58	0.09	0.225
	S-C	**-3.48**	**-3.75**	**-3.20**	**<0.0001**

	P-L	**-1.23**	**-1.59**	**-0.87**	**<0.0001**
	S-L	**-4.46**	**-4.76**	**-4.15**	**<0.0001**
	S-P	**-3.23**	**-3.50**	**-2.96**	**<0.0001**
NMDS1 (RGB)	**L-C**	**-0.05**	**-0.09**	**-0.02**	**0.002**
	P-C	**0.66**	**0.62**	**0.69**	**<0.0001**
	S-C	**0.36**	**0.34**	**0.39**	**<0.0001**
	P-L	**0.71**	**0.67**	**0.74**	**<0.0001**
	S-L	**0.42**	**0.39**	**0.45**	**<0.0001**
	S-P	**-0.29**	**-0.32**	**-0.26**	**<0.0001**
NMDS2 (RGB)	**L-C**	**0.50**	**0.46**	**0.54**	**<0.0001**
	P-C	**0.33**	**0.30**	**0.37**	**<0.0001**
	S-C	-0.02	-0.05	0.01	0.422
	P-L	**-0.16**	**-0.20**	**-0.12**	**<0.0001**
	S-L	**-0.51**	**-0.55**	**-0.48**	**<0.0001**
	S-P	**-0.35**	**-0.38**	**-0.32**	**<0.0001**

Table S5. Variation in floral visitors by species. Model output for GLMMs of proportion and count data assessing visitation by each pollinator functional group to species, with dataset type as fixed effect and year as random effect. Proportion data models were run with a betabinomial error distribution and count models used a negative binomial distribution. Note that the count model for hummingbirds was run excluding *C. sessiliflora* due to model convergence issues expected from *C. sessiliflora* having zero hummingbird visits and accounting for about half the datapoints in the model. Residual degrees of freedom for all models = 54 (except for hummingbird count model, where residual Df = 24).

Proportion	**Variable**	**χ^2**	**Df**	**p**
Hawkmoth	Species	2.48	3	0.479
	dataset	0.43	1	0.511
Small-med bee	Species	7.05	3	0.070
	dataset	16.68	1	**<0.0001**
Bumblebee	Species	4.06	3	0.255
	dataset	6.41	1	**0.011**
Hummingbird	**Species**	16.35	3	**0.001**
	dataset	6.25	1	**0.012**
Butterfly	**Species**	12.49	3	**0.006**
	dataset	6.55	1	**0.011**
Other	Species	5.87	3	0.118
	dataset	0.53	1	0.467

Count	**Variable**	**χ^2**	**Df**	**p**
Hawkmoth	Species	6.33	3	0.097
	dataset	0.68	1	0.409
Small-med bee	**Species**	8.09	3	**0.044**
	dataset	6.85	1	**0.009**

Bumblebee	Species	2.57	3	0.463
	dataset	4.25	1	**0.039**
Hummingbird	**Species**	20.99	2,24	**<0.0001**
	dataset	17.04	1,24	**<0.0001**
Butterfly	**Species**	13.86	3	**0.003**
	dataset	5.94	1	**0.015**
Other	Species	7.76	3	0.051
	dataset	0.01	1	0.906

Table S6. Pairwise multiple comparisons of proportion and number of visits (count) by pollinator group among species, presented only for pollinator functional groups with significant variation among species in our GLMM. Contrasts show pairwise comparisons between pairs of species (S = *C. sessiliflora*, C = *C. citrina*, L = *C. lindheimeri*, P = *C. purpurea*) averaged over year and dataset. Note that p = 1.0 results from comparisons to groups with all zeroes for the response variable (resulting in zero variance and high SE). Contrasts in bold are significantly different ($p < 0.05$). Note that the count model for hummingbirds was run excluding *C. sessiliflora* due to model convergence issues due to large number of zeroes.

Hummingbirds: proportion

contrast	Estimate	SE	Df	t ratio	p
C-L	**-3.84**	**1.07**	**54**	**-3.58**	**0.004**
C-P	-0.56	0.94	54	-0.59	0.934
C-S	20.70	11300.00	54	0.00	1.000
L-P	**3.28**	**0.92**	**54**	**3.56**	**0.004**
L-S	24.54	11300.00	54	0.00	1.000
P-S	21.26	11300.00	54	0.00	1.000

Butterflies: proportion

contrast	Estimate	SE	Df	t ratio	p
C-L	0.14	0.93	54	0.15	0.999

C-P	-1.14	0.70	54	-1.62	0.375
C-S	1.20	0.84	54	1.43	0.486
L-P	-1.28	0.81	54	-1.59	0.393
L-S	1.06	0.93	54	1.14	0.667
P-S	**2.34**	**0.69**	**54**	**3.39**	**0.007**

Small/med bees: proportion

contrast	Estimate	SE	Df	t ratio	p
C-L	1.58	0.80	54	1.97	0.213
C-P	0.06	0.63	54	0.10	1.000
C-S	-0.30	0.55	54	-0.54	0.949
L-P	-1.52	0.77	54	-1.98	0.208
L-S	-1.88	0.71	54	-2.65	0.050
P-S	-0.36	0.50	54	-0.72	0.889

Hummingbirds: count (*C. purpurea* complex only)

contrast	Estimate	SE	Df	t ratio	p
C-L	**-2.76**	**0.76**	**24**	**-3.66**	**0.004**
C-P	-0.83	0.84	24	-0.98	0.596
L-P	**1.94**	**0.56**	**24**	**3.46**	**0.006**

Butterflies: count

contrast	Estimate	SE	Df	t ratio	p
C-L	-0.16	0.91	54	-0.18	0.998
C-P	-1.36	0.67	54	-2.03	0.190
C-S	0.97	0.82	54	1.19	0.637
L-P	-1.19	0.77	54	-1.54	0.419
L-S	1.13	0.91	54	1.25	0.598
P-S	**2.33**	**0.67**	**54**	**3.47**	**0.006**

Small/med bees: count

contrast	Estimate	SE	Df	t ratio	p
C-L	0.97	0.68	54	1.42	0.495
C-P	-0.78	0.47	54	-1.66	0.352
C-S	-0.27	0.45	54	-0.60	0.931
L-P	**-1.74**	**0.65**	**54**	**-2.69**	**0.046**
L-S	-1.24	0.63	54	-1.97	0.211
P-S	0.51	0.38	54	1.33	0.547

Table S7. Latitudinal variation in floral visitors within *C. sessiliflora*. Model output for GLMMs of proportion of visitation against population latitude for each pollinator group, with dataset type as fixed effect. Models used a betabinomial distribution, residual degrees of freedom for all models = 26, N =31.

Group	Variable	χ^2	Df	p
Hawkmoth	**Latitude**	**11.102**	**1**	**0.001**
	dataset	0.000	1	0.983
Small-med bee	**Latitude**	**14.899**	**1**	**< 0.001**
	dataset	**12.398**	**1**	**< 0.001**
Bumblebee	Latitude	1.698	1	0.193
	dataset	**7.430**	**1**	**0.006**
Other	Latitude	0.383	1	0.536
	dataset	0.464	1	0.496

Table S8. Pairwise multiple comparisons of Pollinator Diversity Index among species, based on GLMM. Contrasts show pairwise comparisons between pairs of species (S = *C. sessiliflora*, C = *C. citrina*, L = *C. lindheimeri*, P = *C. purpurea*) averaged over dataset.

Pollinator Diversity by Species

contrast	Estimate	SE	Df	t ratio	p
C-L	0.22	0.16	50	1.37	0.522
C-P	-0.24	0.15	50	-1.61	0.384
C-S	0.15	0.13	50	1.19	0.637
L-P	**-0.46**	**0.16**	**50**	**-2.92**	**0.026**
L-S	-0.07	0.14	50	-0.53	0.952
P-S	**0.39**	**0.12**	**50**	**3.19**	**0.013**

Table S9. GLMM results of population average fruit set in relation to proportion visitation by each pollinator functional group, pollinator diversity, and total number of visits. Dataset type was included as a fixed effect. Coefficient estimate (Estimate, in logit scale), standard error (SE), z-value (z) and p-value (p) are presented for each variable, along with χ^2 and degrees of freedom (Df, with residual Df). $P < 0.05$ and associated variables are in bold. Note no hummingbird visits were recorded to *C. sessiliflora*.

Focal Group	Variable	Estimate	SE	z	χ^2	Df	p
C. sessiliflora	**Hawkmoth**	**0.744**	**0.343**	**2.169**	**4.706**	**1,11**	**0.030**
	dataset	0.263	0.341	0.772	0.595	1,11	0.440
C. purpurea complex	Hawkmoth	-0.820	0.650	-1.263	1.594	1,13	0.207
	dataset	-0.071	0.314	-0.226	0.051	1,13	0.821
C. sessiliflora	Hummingbird	NA					
	dataset	NA					
C. purpurea complex	**Hummingbird**	**1.058**	**0.363**	**2.916**	**8.504**	**1,13**	**0.004**
	dataset	-0.149	0.291	-0.511	0.261	1,13	0.609
C. sessiliflora	Small/medium bee	-0.446	0.439	-1.015	1.031	1,11	0.310

	dataset	0.208	0.410	0.509	0.259	1,11	0.611
C. purpurea complex	Small/medium bee	-0.025	0.850	-0.029	0.001	1,13	0.977
	dataset	-0.008	0.421	-0.019	0.000	1,13	0.985
C. sessiliflora	Large bee	-0.788	0.724	-1.088	1.184	1,11	0.276
	dataset	0.595	0.405	1.468	2.156	1,11	0.142
C. purpurea complex	Large bee	0.911	0.863	1.055	1.113	1,13	0.291
	dataset	-0.132	0.322	-0.409	0.167	1,13	0.683
C. sessiliflora	Butterfly	13.592	12.942	1.050	1.103	1,11	0.294
	dataset	0.292	0.371	0.787	0.620	1,11	0.431
C. purpurea complex	Butterfly	-0.472	1.162	-0.407	0.166	1,13	0.684
	dataset	0.058	0.343	0.168	0.028	1,13	0.866
C. sessiliflora	Other visitors	3.074	8.986	0.342	0.117	1,11	0.732
	dataset	0.428	0.381	1.126	1.267	1,11	0.260
C. purpurea complex	Other visitors	0.563	1.242	0.454	0.206	1,13	0.650
	dataset	0.043	0.324	0.133	0.018	1,13	0.894
C. sessiliflora	Pollinator Diversity	1.194	0.877	1.362	1.856	1,8	0.173
	dataset	0.407	0.330	1.234	1.523	1,8	0.217
C. purpurea complex	Pollinator Diversity	-0.207	0.455	-0.454	0.206	1,12	0.650
	dataset	0.203	0.290	0.702	0.493	1,12	0.483
C. sessiliflora	Total visits	0.002	0.006	0.339	0.115	1,11	0.735
	dataset	0.351	0.393	0.893	0.798	1,11	0.372
C. purpurea complex	Total visits	0.002	0.003	0.715	0.511	1,13	0.475
	dataset	-0.226	0.444	-0.509	0.259	1,13	0.611

Supplemental Methods:

Details on methods for classifying pollinator functional groups and recording floral visits:

Pollinator functional groups included: hawkmoths (exclusively *Hyles lineata*, Sphingidae, based on individuals that could be identified on the wing or in photographs), hummingbirds (Trochilidae), bumblebees (*Bombus* sp.), other large bees (approximately 2.5 cm or larger in body length, such as carpenter bees), medium bees (approximately 1.5 cm in length), small bees (approximately <1 cm in length, including sweat bees such as *Lassioglossum* sp., and other pollen-collecting bees), bee flies (Bombyliidae), large butterflies (approximately > 4 cm in wing height, including swallowtail butterflies such as *Battus philenor* and others), small butterflies (approximately < 3 cm), non-Sphingid moths, and flies.

Methods for count data models of floral visitation among species:

Models of visit counts used number of floral visits per pollinator group as the response term and plant species as the predictor, with a negative binomial error distribution. The model of hummingbird visit count data was run on only the species of *C. purpurea* complex (due to zero hummingbird visits recorded to *C. sessiliflora*). To assess potential overdispersion in the data, we ran models using both a Poisson and a negative binomial error distribution and used package DHARMa (Hartig, 2016) to examine residuals as described for proportion models. The count models with Poisson distributions showed greater evidence of overdispersion than those using negative binomial distributions, and therefore negative binomial error distributions were chosen for count models.