

Supplementary Materials

Table S1. Range of values per index measured by the ground camera (after preprocessing) for all 12 species during 57 dates (mean index value per date).

Vegetation index	Min	Max
ExG	0.028	98.973
GRVI	-0.004	0.134
NDVI	0.141	0.509
R Blue	0.245	0.344
R Green	0.333	0.423
R Red	0.300	0.358

Table S2. Pearson correlation coefficients of the ExG index mean values for each species per date (11 dates), between values derived from the ground camera data (after pre-processing), and those from the UAV data after resampling to different pixel sizes of 14, 30, 125, and 500 cm. The asterisks indicate the statistical significance as follows: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Spatial Resolution (cm)	<i>Pinus halepensis</i>	<i>Pistacia palaestina</i>	<i>Quercus calliprinos</i>	<i>Pistacia lentiscus</i>	<i>Rhamnus lycioides</i>	<i>Olea europaea</i>	<i>Ceratonia siliqua</i>	<i>Annual Herbaceous</i>	<i>Anagyris foetida</i>	<i>Calicotome villosa</i>	<i>Prunus dulcis</i>	<i>Sarcopoterium spinosum</i>
14	0.65*	0.95***	0.88***	0.87***	0.91***	0.72*	0.76	0.93***	0.87***	0.91***	0.92***	0.91***
30	0.64*	0.95***	0.87***	0.86***	0.90***	0.70*	0.75	0.93***	0.87***	0.91***	0.92***	0.91***
125	0.63*	0.93***	0.87***	0.87***	0.85***	0.67*	0.72*	0.94***	0.86***	0.90***	0.89***	0.89***
500	0.42	-0.15	0.81**	0.55	0.30	0.19	0.47	0.94***	0.71*	0.89***	0.39	0.83**

Table S3. Pearson correlation coefficients of the GRVI index mean values for each species per date (11 dates), between values derived from the ground camera data (after pre-processing), and those from the UAV data after resampling to different pixel sizes of 14, 30, 125, and 500 cm. The asterisks indicate the statistical significance as follows: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Spatial Resolution (cm)	<i>Pinus halepensis</i>	<i>Pistacia palaestina</i>	<i>Quercus calliprinos</i>	<i>Pistacia lentiscus</i>	<i>Rhamnus lycioides</i>	<i>Olea europaea</i>	<i>Ceratonia siliqua</i>	<i>Annual Herbaceous</i>	<i>Anagyris foetida</i>	<i>Calicotome villosa</i>	<i>Prunus dulcis</i>	<i>Sarcopoterium spinosum</i>
14	-0.19	0.49	-0.08	-0.13	0.55	0.31	-0.15	0.95***	0.70**	0.85***	0.90***	0.96***
30	-0.20	0.47	-0.08	-0.13	0.53	0.31	-0.15	0.95***	0.69**	0.85***	0.90***	0.96***
125	-0.19	0.29	-0.1	-0.14	0.42	0.28	-0.17	0.95***	0.68**	0.85***	0.81***	0.96***
500	-0.10	-0.65**	-0.24	-0.21	0.09	0.26	-0.30	0.94***	0.57	0.85***	0.08	0.94***

Table S4. Pearson correlation coefficients of the NDVI index mean values for each species per date (11 dates), between values derived from the ground camera data (after pre-processing), and those from the UAV data after resampling to different pixel sizes of 14, 30, 125, and 500 cm. The asterisks indicate the statistical significance as follows: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Spatial Resolution (cm)	<i>Pinus halepensis</i>	<i>Pistacia palaestina</i>	<i>Quercus calliprinos</i>	<i>Pistacia lentiscus</i>	<i>Rhamnus lycioides</i>	<i>Olea europaea</i>	<i>Ceratonia siliqua</i>	<i>Annual Herbaceous</i>	<i>Anagyris foetida</i>	<i>Calicotome villosa</i>	<i>Prunus dulcis</i>	<i>Sarcopoterium spinosum</i>
14	0.31	0.47	0.83**	0.72**	0.23	0.27	0.47	0.96***	0.80**	0.79**	0.77**	0.86***
30	0.30	0.44	0.84**	0.73**	0.22	0.27	0.47	0.96***	0.80**	0.79**	0.76**	0.86***
125	0.30	0.25	0.83**	0.74**	0.13	0.27	0.48	0.96***	0.78**	0.78**	0.64*	0.87***
500	0.33	-0.68*	0.77**	0.83**	-0.10	0.40	0.54	0.95***	0.67*	0.78**	-0.10	0.89***

Table S5. Pearson correlation coefficients of the relative blue index mean values for each species per date (11 dates), between values derived from the ground camera data (after pre-processing), and those from the UAV data after resampling to different pixel sizes of 14, 30, 125, and 500 cm. The asterisks indicate the statistical significance as follows: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Spatial Resolution (cm)	<i>Pinus halepensis</i>	<i>Pistacia palaestina</i>	<i>Quercus calliprinos</i>	<i>Pistacia lentiscus</i>	<i>Rhamnus lycioides</i>	<i>Olea europaea</i>	<i>Ceratonia siliqua</i>	<i>Annual Herbaceous</i>	<i>Anagyris foetida</i>	<i>Calicotome villosa</i>	<i>Prunus dulcis</i>	<i>Sarcopoterium spinosum</i>
14	0.70*	0.54	0.63*	0.40	0.82**	0.39	0.64*	0.71*	0.74**	0.61*	0.92***	0.62*
30	0.70*	0.52	0.62*	0.39	0.81**	0.39	0.63*	0.70*	0.73*	0.62*	0.91***	0.61*
125	0.66*	0.39	0.61*	0.39	0.74**	0.37	0.62*	0.71*	0.72**	0.56	0.89***	0.59
500	0.35	-0.09	0.48	0.41	0.31	0.28	0.47	0.73**	0.60*	0.51	0.59	0.52

Table S6. Pearson correlation coefficients of the relative green index mean values for each species per date (11 dates), between values derived from the ground camera data (after pre-processing), and those from the UAV data after resampling to different pixel sizes of 14, 30, 125, and 500 cm. The asterisks indicate the statistical significance as follows: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Spatial Resolution (cm)	<i>Pinus halepensis</i>	<i>Pistacia palaestina</i>	<i>Quercus calliprinos</i>	<i>Pistacia lentiscus</i>	<i>Rhamnus lycioides</i>	<i>Olea europaea</i>	<i>Ceratonia siliqua</i>	<i>Annual Herbaceous</i>	<i>Anagyris foetida</i>	<i>Calicotome villosa</i>	<i>Prunus dulcis</i>	<i>Sarcopoterium spinosum</i>
14	0.51	0.58	0.16	-0.14	0.61*	-0.13	0.33	0.88***	0.70*	0.63*	0.91***	0.80**
30	0.51	0.56	0.16	-0.15	0.59	-0.13	0.32	0.88***	0.69*	0.63**	0.90***	0.79**
125	0.50	0.39	0.16	-0.14	0.46	-0.15	0.32	0.88***	0.68*	0.60*	0.83**	0.78**
500	0.52	-0.51	0.17	-0.10	0.003	-0.15	0.32	0.88***	0.52	0.58	0.03	0.73*

Table S7. Pearson correlation coefficients of the relative red index mean values for each species per date (11 dates), between values derived from the ground camera data (after pre-processing), and those from the UAV data after resampling to different pixel sizes of 14, 30, 125, and 500 cm. The asterisks indicate the statistical significance as follows: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Spatial Resolution (cm)	<i>Pinus halepensis</i>	<i>Pistacia palaestina</i>	<i>Quercus calliprinos</i>	<i>Pistacia lentiscus</i>	<i>Rhamnus lycioides</i>	<i>Olea europaea</i>	<i>Ceratonia siliqua</i>	<i>Annual Herbaceous</i>	<i>Anagyris foetida</i>	<i>Calicotome villosa</i>	<i>Prunus dulcis</i>	<i>Sarcopoterium spinosum</i>
14	-0.51	0.24	0.06	0.19	0.82**	0.75**	-0.36	0.86***	0.50	0.68*	0.38	0.81
30	-0.51	0.22	0.06	0.19	0.82**	0.75**	-0.36	0.85***	0.50	0.68*	0.39	0.81**
125	-0.50	0.04	0.01	0.15	0.81**	0.73**	-0.39	0.85***	0.49	0.69*	0.51	0.83**
500	-0.382	-0.71*	-0.25	-0.03	0.73**	0.68*	-0.58	0.84**	0.54	0.72*	0.70*	0.84**

Table S8. Pearson correlation coefficients of six spectral indices mean value for each species per date (35 dates), between values derived from the ground camera data (after pre-processing), and those from VENμS. The asterisks indicate the statistical significance as follows: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Vegetation index	<i>Pinus halepensis</i>	<i>Pistacia palaestina</i>	<i>Quercus calliprinos</i>	<i>Pistacia lentiscus</i>	<i>Rhamnus lycioides</i>	<i>Olea europaea</i>	<i>Ceratonia siliqua</i>	<i>Annual Herbaceous</i>	<i>Anagyris foetida</i>	<i>Calicotome villosa</i>	<i>Prunus dulcis</i>	<i>Sarcopoterium spinosum</i>
ExG	-0.31	-0.37*	0.40*	-0.00	0.31	0.15	-0.19	0.97***	0.64***	0.68***	-0.00	0.78***
GRVI	0.23	-0.60***	-0.28	-0.09	0.30	0.43**	-0.44**	0.95***	0.70***	0.91***	0.06	0.95***
NDVI	0.79***	-0.59***	0.42*	0.82***	0.35*	0.70***	0.64***	0.92***	0.82***	0.94***	0.13	0.94***
R Blue	-0.28	0.46**	-0.26	0.02	0.31	0.75***	-0.65***	-0.53***	-0.12	0.20	0.63***	0.18
R Green	0.14	-0.30	0.61***	0.33	0.45**	0.35*	0.34*	0.96***	0.73***	0.81***	0.13	0.86***
R Red	-0.01	-0.50**	-0.55***	-0.20	0.71***	0.62***	-0.74***	0.69***	0.62***	0.74***	0.76***	0.81***

Table S9. Confusion matrix of the average results of ten MLC iterations, of the UAV ExG time series (11 dates) after resampling to 30 cm pixel size. After the classification smoothing and removal of small areas was conducted.

Species	<i>Pinus halepensis</i>	<i>Pistacia palaestina</i>	<i>Quercus calliprinos</i>	<i>Pistacia lentiscus</i>	<i>Rhamnus lycioides</i>	<i>Olea europaea</i>	<i>Ceratonia siliqua</i>	<i>Cistus salviiifolius/creticus</i>	<i>Sarcopoterium spinosum</i>	Annual Herbaceous	<i>Anagyris foetida</i>	<i>Calicotome villosa</i>	<i>Prunus dulcis</i>	total individuals	User's Accuracy (mean)
<i>Pinus halepensis</i>	77%	0%	1%	2%	2%	0%	25%	0%	0%	0%	0%	0%	0%	11	72%
<i>Pistacia palaestina</i>	0%	50%	1%	3%	1%	0%	1%	0%	0%	0%	0%	0%	1%	30	90%
<i>Quercus calliprinos</i>	1%	2%	73%	3%	0%	0%	12%	2%	0%	0%	13%	4%	0%	248	68%
<i>Pistacia lentiscus</i>	3%	8%	12%	72%	8%	5%	13%	1%	0%	0%	2%	10%	0%	291	55%
<i>Rhamnus lycioides</i>	1%	10%	1%	2%	53%	2%	0%	1%	0%	1%	1%	1%	10%	110	65%
<i>Olea europaea</i>	1%	2%	6%	9%	2%	78%	0%	3%	0%	0%	0%	0%	3%	43	76%
<i>Ceratonia siliqua</i>	16%	8%	1%	1%	4%	0%	42%	0%	0%	1%	0%	1%	0%	47	64%
<i>Cistus salviiifolius/creticus</i>	0%	7%	4%	3%	5%	4%	1%	73%	2%	0%	4%	5%	1%	67	69%
<i>Sarcopoterium spinosum</i>	0%	0%	1%	0%	3%	1%	0%	8%	90%	1%	9%	30%	0%	126	65%
Annual Herbaceous	0%	3%	0%	0%	2%	1%	0%	0%	2%	97%	0%	1%	0%	50	92%
<i>Anagyris foetida</i>	0%	7%	0%	0%	4%	4%	2%	0%	1%	0%	66%	0%	5%	22	75%
<i>Calicotome villosa</i>	0%	2%	0%	5%	9%	4%	3%	12%	5%	0%	0%	47%	0%	35	57%
<i>Prunus dulcis</i>	1%	1%	0%	0%	7%	1%	1%	0%	0%	0%	5%	1%	80%	73	84%
total individuals (N=1153)	11	30	248	291	110	43	47	67	126	50	22	35	73	69%	Overall Accuracy

Producer's Accuracy (mean)	77%	50%	73%	72%	53%	78%	42%	73%	90%	97%	66%	47%	80%	0.67	Kappa Coefficient
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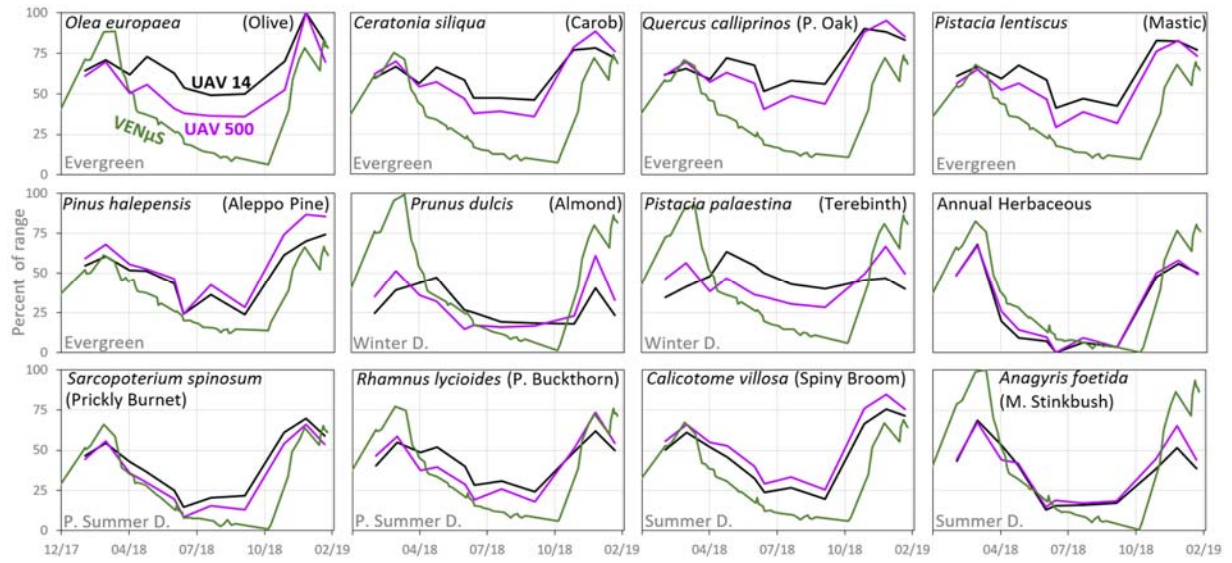


Figure S1. Standardize mean NDVIre values of the 12 species based on the ground photos after preprocessing (57 dates), UAV data (11 dates, 14 and 500 cm), and VENμS acquisitions (47 dates, nominal resolution of 5.3 m at nadir, effective resolution of about 6.1 m due to the off-nadir acquisition angle of 29.7°). The y-axis represents the index mean value as a percent of the possible range of values.

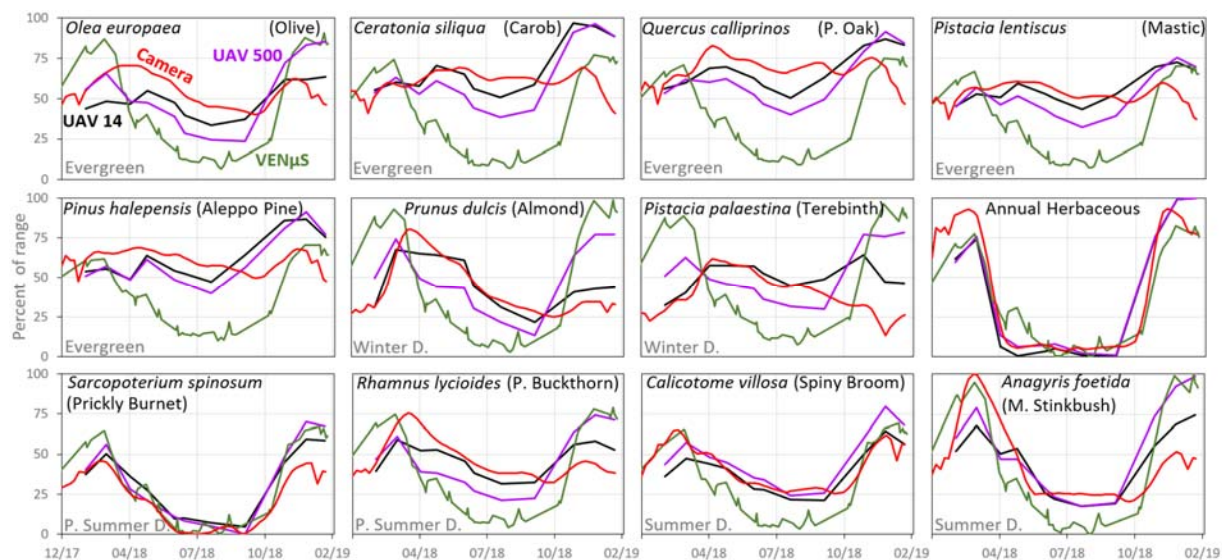


Figure S2. Standardize mean GRVI values of the 12 species based on the ground photos after preprocessing (57 dates), UAV data (11 dates, 14 and 500 cm), and VENμS acquisitions (47 dates, nominal resolution of 5.3 m at nadir, effective resolution of about 6.1 m due to the off-nadir acquisition angle of 29.7°). The y-axis represents the index mean value as a percent of the possible range of values.

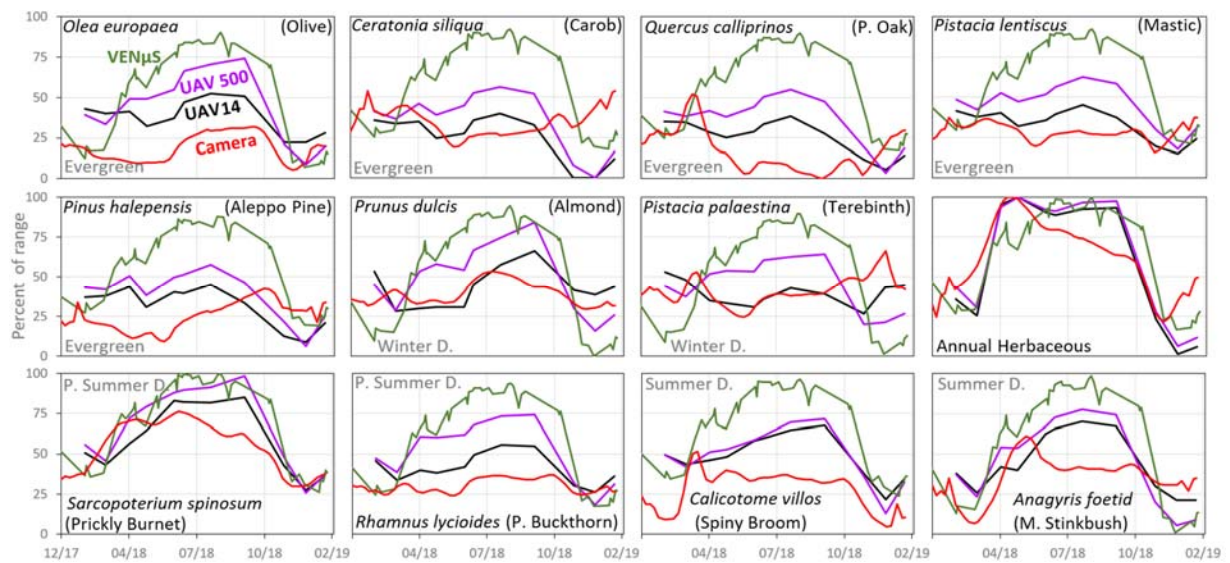


Figure S3. Standardize mean Relative Red values of the 12 species based on the ground photos after preprocessing (57 dates), UAV data (11 dates, 14 and 500 cm), and VEN μ S acquisitions (47 dates, nominal resolution of 5.3 m at nadir, effective resolution of about 6.1 m due to the off-nadir acquisition angle of 29.7°). The y-axis represents the index mean value as a percent of the possible range of values.

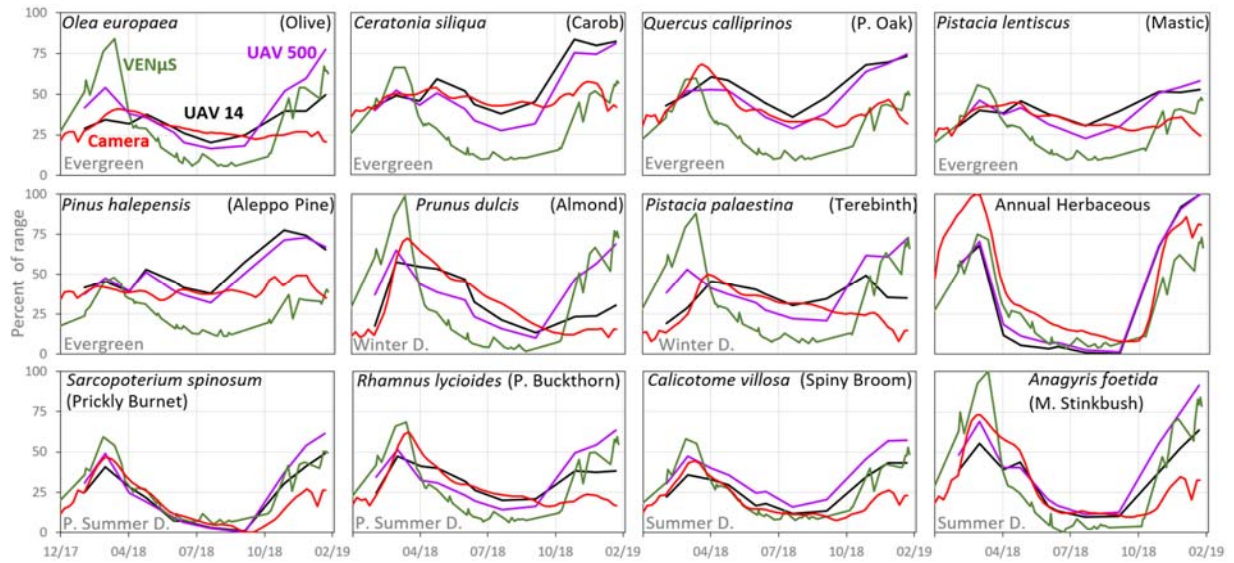


Figure S4. Standardize mean Relative Green values for the 12 species based on the ground photos after preprocessing (57 dates), UAV data (11 dates, 14 and 500 cm), and VEN μ S acquisitions (47 dates, nominal resolution of 5.3 m at nadir, effective resolution of about 6.1 m due to the off-nadir acquisition angle of 29.7°). The y-axis represents the index mean value as a percent of the possible range of values.

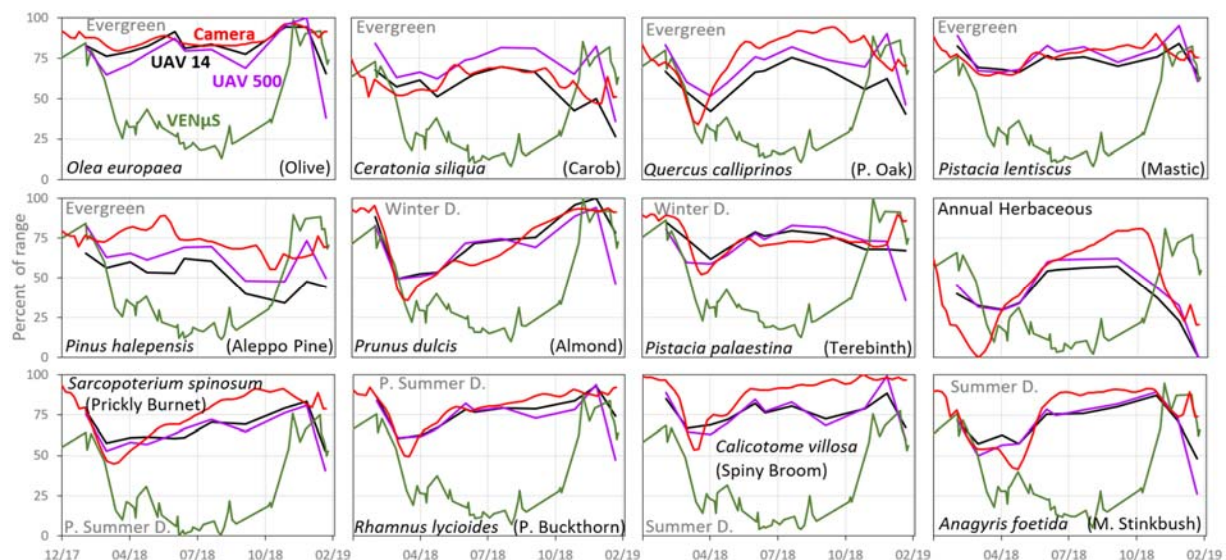


Figure S5. Standardize mean Relative Blue for the 12 species based on the ground photos after preprocessing (57 dates), UAV data (11 dates, 14 and 500 cm), and VENμS acquisitions (47 dates, nominal resolution of 5.3 m at nadir, effective resolution of about 6.1 m due to the off-nadir acquisition angle of 29.7°). The y-axis represents the index mean value as a percent of the possible range of values.

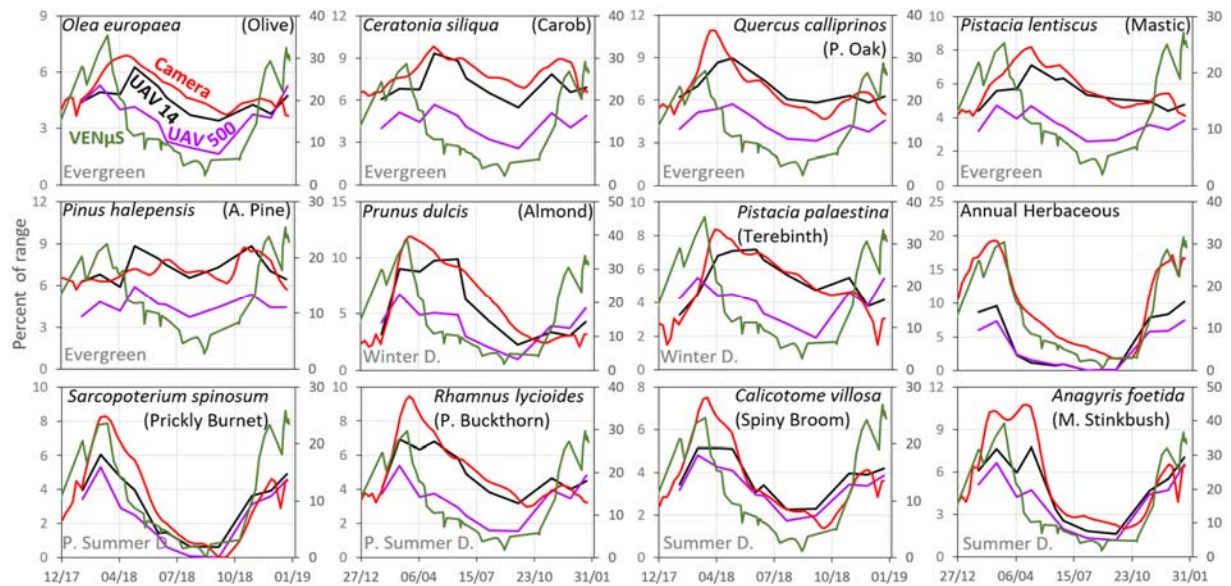


Figure S6. Standardize mean ExG of 12 species based on the ground photos after preprocessing (57 dates), UAV data (11 dates, 14 and 500 cm), and VEN μ S acquisitions (47 dates, nominal resolution of 5.3 m at nadir, effective resolution of about 6.1 m due to the off-nadir acquisition angle of 29.7°). The y-axis represents the index mean value as a percent of the possible range of values. The left y-axis displays the camera (ground photos) and UAV values; the right y-axis displays the VEN μ S values. The right y-axis represents the index mean value as a percent of the range of the possible values for each sensor.