Appendices

Appendix I. Definition of floral unit per plant species

Plant species	Description of floral unit
Bellis perennis	1 inflorescence
Glechoma hederaceae	1 individual flower head
Hyacinthoides non-scripta	1 individual flower head
Lotus corniculatus	1 inflorescence
Pilosella officinarum	1 inflorescence
Ranunculus bulbosus	1 inflorescence
Salix repens	1 inflorescence
Taraxacum agg.	1 inflorescence
Ulex europeaus	1 flower head
Vicia sativa	1 flower head
Viola lutea	1 flower head
Viola riviniana	1 flower head

Appendix II. Mean and standard error (SE) sugar concentrations per plant species (n=6)

	Glucose (µg/ml)		**Fructose (µg/ml)**		**Sucrose (µg/ml)**	
	mean	SE	mean	SE	mean	SE
Bellis perennis	N/A	N/A	N/A	N/A	N/A	N/A
Glechoma hederaceae	13.47	0.69	97.35	16.00	40.80	7.61
Hyacinthoides non-scripta	35.75	6.19	124.53	23.34	4.52	3.42
Lotus corniculatus	16.37	0.74	71.05	2.66	45.70	5.55
Pilosella officinarum	16.95	3.92	42.72	7.42	1.03	0.47
Ranunculus bulbosus	8.39	0.98	38.00	5.26	76.18	10.85
Salix repens (F)	32.85	3.53	122.70	10.42	5.91	2.22
Salix repens (M)	43.92	4.82	179.83	15.91	20.42	3.98
Taraxacum agg.	22.03	3.21	55.17	8.47	0.73	0.25
Ulex europeaus	0	N/A	0	N/A	0	N/A
Vicia sativa	20.55	2.80	169.50	19.99	20.85	11.12
Viola lutea	17.50	2.57	136.00	7.87	44.53	14.16
Viola riviniana	30.72	4.67	129.62	18.30	0.15	0.02

Appendix III. Protocol for the analysis of nectar sugar composition and concentration

Chromatography was performed on an Agilent 1200 HPLC system (Agilent Technologies, Boeblingen, Germany). Separation was achieved on an apHera NH2 Polymer column (150 x 4.6mm, 5µm, Supelco, Germany). Water and acetonitrile were employed as mobile phases A and B respectively. The elution profile was: 0-0.5min, 80%B; 0.5-9.5min, 80-62%B; 9.5-10min 62-80% B and 10-15min 80% B. The mobile phase flow rate was 1 ml/min. The column temperature was maintained at 25°C. The liquid chromatography was coupled to an API 3200 tandem mass spectrometer (Applied Biosystems, Darmstadt, Germany) equipped with a Turbospray ion source operated in negative ionization mode. The instrument parameters were optimized by infusion experiments with pure standards (glucose, fructose, and sucrose, all from Sigma, Germany). The ionspray voltage was maintained at at -4500 eV. The turbo gas temperature was set at 600 °C. Nebulizing gas was set at 50psi, curtain gas at 20psi, heating gas at 60psi and collision gas at 5psi. Multiple reaction monitoring (MRM) was used to monitor analyte parent ion → product ion: glucose (m/z 178.8 →89), fructose (m/z 178.8 →89), and sucrose (m/z 340.9 →59). Both Q1 and Q3 quadrupoles were maintained at unit resolution. Analyst 1.5 software (Applied Biosystems, Darmstadt, Germany) was used for data acquisition and processing. Linearity in ionization efficiencies were verified by analysing dilution series of standard mixtures. Individual sugars in the sample were quantified by external calibration curves (Jander et al. 2004).

Appendix IV. Relative abundance of amino acids in pollen per plant species

Plants	**Amino acid composition (% abundance per plant species)**																	
	Val	Ile	Leu	Thr	Phe	Arg	Lys	Met	His	Trp	Ala	Ser	Pro	Asp	Glu	Tyr	Asn	Gln
Bel per	1.93	2.82	2.69	5.24	1.50	1.17	2.64	0.27	6.49	0.72	18.16	27.70	9.59	4.97	4.52	1.35	1.01	7.23
Gle hed	3.42	1.89	2.47	1.98	0.82	0.87	0.85	0.10	6.97	0.57	9.57	8.40	1.80	5.48	11.29	0.50	7.52	35.50
Hya non	4.98	4.73	5.25	3.03	5.78	0.54	0.58	0.18	2.61	1.90	25.48	7.62	6.18	1.39	6.33	2.18	3.53	17.69
Lot cor	2.23	2.00	2.42	2.05	1.43	0.42	0.57	0.44	1.10	0.38	32.44	6.11	30.93	0.98	3.33	0.96	5.19	7.01
Pil off	1.52	1.52	1.44	1.36	0.67	0.46	1.12	0.62	12.13	0.33	40.29	5.37	17.71	1.82	1.07	0.57	0.83	11.16
Ran bul	1.10	0.70	0.86	1.14	0.64	0.21	0.15	0.10	2.02	0.67	6.99	9.35	59.24	1.14	0.82	0.39	1.93	12.53
Sal rep	5.23	3.43	3.54	4.53	1.59	1.12	1.22	0.26	2.10	0.98	14.71	8.60	4.59	6.81	11.02	1.01	9.17	20.07
Tar agg.	0.92	0.56	0.75	0.77	0.32	0.24	0.77	0.15	18.92	0.33	13.94	3.22	41.42	1.47	7.35	0.15	0.60	8.11
Ule eur	2.03	1.76	2.26	1.70	1.08	0.35	0.70	0.21	1.29	0.28	14.17	6.65	37.93	1.40	2.26	0.74	9.21	15.98
Vic sat	1.71	1.92	1.40	3.23	1.02	0.44	0.64	0.15	1.30	0.54	16.61	7.10	40.53	2.93	3.92	0.51	2.81	13.25
Vio lut	1.74	2.59	2.34	2.69	1.03	1.43	1.93	0.18	3.99	0.83	14.52	7.25	18.00	5.88	12.65	0.74	2.57	19.63
Vio riv	1.59	2.06	2.67	4.21	1.10	1.81	2.13	0.11	3.09	1.26	9.03	7.49	4.16	6.91	18.32	0.70	1.36	32.00

Abbreviations legend: *Bel per= Bellis perennis*, *Gle hed= Glechoma hederacea*, *Hya non= Hyacinthoides non-scripta*, *Lot cor= Lotus corniculatus*, *Pil off= Pilosella officinarum*, *Ran bul= Ranunculus bulbosus*, *Sal rep= Salix repens*, *Tar* agg.= *Taraxacum* aggregate, *Ule eur= Ulex europeaus*, *Vic sat= Vicia sativa*, *Vio lut= Viola lutea*, *Vio riv= Viola riviniana*. Val= Valine, Ile= Isoleucine, Leu= Leucine, Thr= Threonine, Phe= Phenylalanine, Arg= Arginine, Lys= Lysine, Met= Metionine, His= Histidine, Trp= Tryptophan, Ala= Alanine, Ser= Serine, Pro= Proline, Asp= Aspartic acid, Glu= Glutamic acid, Tyr=Tyrosine, Asn= Asparagine, Gln= Glutamine

Appendix V. Protocol for the analysis of pollen amino acid composition and relative abundance (%)

Chromatography was performed on an Agilent 1200 HPLC system (Agilent Technologies, Boeblingen, Germany). Separation was achieved on a Zorbax Eclipse XDB-C18 column (50 x 4.6mm, 1.8µm, Agilent Technologies, Germany). Formic acid (0.05%) in water and acetonitrile were employed as mobile phases A and B respectively. The elution profile was: 0-1min, 97%A; 1-2.7min, 3-100%B in A; 2.7-3min 100% B and 3.1-6min 97% A. The mobile phase flow rate was 1.1 ml/min. The column temperature was maintained at 25°C. The liquid chromatography was coupled to an API 5000 tandem mass spectrometer (Applied Biosystems, Darmstadt, Germany) equipped with a Turbospray ion source operated in positive ionization mode. The instrument parameters were optimized by infusion experiments with pure standards (amino acid standard mix, Fluka, St. Louis, USA). The ionspray voltage was maintained at 5500 eV. The turbo gas temperature was set at 700 °C. Nebulizing gas was set at 70psi, curtain gas at 35psi, heating gas at 70psi and collision gas at 2psi. Multiple reaction monitoring (MRM) was used to monitor analyte parent ion → product ion: MRMs were chosen as in Jander et.al. (2004) except for Arg (m/z 175 →70), and Lys (m/z 147 →84). Both Q1 and Q3 quadrupoles were maintained at unit resolution. Analyst 1.5 software (Applied Biosystems, Darmstadt, Germany) was used for data acquisition and processing. Linearity in ionization efficiencies were verified by analysing dilution series of standard mixtures (amino acid standard mix, Fluka plus Gln, Asn and Trp, also Fluka). All samples were spiked with 13C, 15N labeled amino acids (algal amino acids 13C, 15N, Isotec, Miamisburg, US) at a concentration of 10ug of the mix per ml. The concentration of the individual labeled amino acids in the mix had been determined by classical HPLC-fluorescence detection analysis after pre-column derivatisation with ortho-phthaldialdehyde-mercaptoethanol using external standard curves made from standard mixtures (amino acid standard mix, Fluka plus Gln, Asn and Trp, also Fluka). Individual amino acids in the sample were quantified by the respective 13C, 15N labeled amino acid internal standard, except for tryptophan, and asparagin: tryptophan was quantified using 13C, 15N-Phe applying a response

factor of 0.42, asparagin was quantified using 13C, 15N-Asp applying a response factor of 1.0 (Jander et al. 2004).

Appendix VI. Insect species recorded using transect walk and pan-trap sampling methods

Guild	Species name
Apidae (Honey bee)	*Apis mellifera*
Apidae (Bumblebees)	*Bombus muscorum*
	Bombus terrestris
	Bombus pratorum
	Bombus lucorum agg.
	Bombus pascuorum
	Bombus bohemicus
	Bombus jonellus
	Bombus hortorum
	Bombus sylvestris
Apidae (Solitary bees)	*Andrena barbilabris*
	Andrena bicolor
	Andrena cineraria
	Andrena nigroenea
	Halictus rubicundus
	Colletes similis
	Lasioglossum punctatissimum
	Nomada goodeniana
	Nomada leucophthalma
	Nomada marshamella
	Nomada ruficornis

	Osmia aurulenta
Syrphidae	*Cheilosia albipila*
	Cheilosia albitarsus
	Eristalis arbustorum
	Rhingia campestris
	Eupeodes corollae
	Eristalis horticola
	Eristalis interruptus
	Eristalis intricarius
	Cheilosia latifrons
	Neoascia meticulosa
	Helophilus pendulus
	Eristalis pertinax
	Cheilosia psilophthalma
	Syrphus ribesii
	Melanostoma scalare
	Sphaerophoria scripta
	Eristalis tenax