

Table 1

## Anatomical Data for Species by Site

Site/species	Family	PM cell area ( $\mu\text{m}^2$ )	SM cell area ( $\mu\text{m}^2$ )	PM cell density	SM cell density	PM % cell contact	SM % cell contact	Leaf thickness ( $\mu\text{m}$ )	$A_{\text{mes}}/A$	PM/SM	%IAS
<b>Meadow:</b>											
<i>Caltha leptosepala</i>	Ranunculaceae	953 ± 75	851 ± 65	137 ± 11	52 ± 9	58 ± 10	23 ± 5	344 ± 13	6.6 ± 1.4	0.50 ± 0.03	14 ± 2
<i>Deschampsia cespitosa</i>	Poaceae	na	403 ± 43	na	129 ± 26	na	55 ± 7	222 ± 14	19.8 ± 2.5	0	13 ± 2
<i>Erigeron melanocephalus</i>	Asteraceae	516 ± 79	510 ± 47	207 ± 190	315 ± 47	58 ± 9	39 ± 10	258 ± 6	10.7 ± 3.3	0.74 ± 0.09	14 ± 4
<i>Erigeron peregrinus</i>	Asteraceae	584 ± 18	506 ± 81	128 ± 23	76 ± 9	60 ± 7	38 ± 5	233 ± 5	16.2 ± 1.1	0.42 ± 0.04	25 ± 4
<i>Erythronium grandiflorum</i>	Liliaceae	na	1085 ± 205	na	22 ± 4	na	43 ± 7	331 ± 17	19.1 ± 2.3	0	23 ± 4
<i>Gentiana parryi</i>	Gentianaceae	888 ± 71	531 ± 38	61 ± 11	52 ± 12	45 ± 6	15 ± 3	375 ± 10	7.9 ± 1.9	0.43 ± 0.04	16 ± 2
<i>Gentiana amarella</i>	Gentianaceae	978 ± 108	517 ± 63	64 ± 10	26 ± 2	67 ± 5	31 ± 7	194 ± 8	2.1 ± 0.1	0.05 ± 0.02	4 ± 1
<i>Kalmia microphylla</i>	Ericaceae	400 ± 27	398 ± 33	143 ± 16	65 ± 12	70 ± 8	45 ± 4	179 ± 4	10.9 ± 2.0	0.81 ± 0.04	17 ± 2
<i>Mertensia ciliata</i>	Boraginaceae	626 ± 74	475 ± 94	165 ± 19	33 ± 7	58 ± 9	36 ± 4	218 ± 6	10.3 ± 1.5	0.50 ± 0.02	13 ± 2
<i>Pedicularis groenlandica</i>	Scrophulariaceae	1320 ± 105	527 ± 50	56 ± 9	84 ± 9	68 ± 5	50 ± 5	246 ± 9	5.1 ± 0.9	0.70 ± 0.06	7 ± 2
<i>Pheum alpinum</i>	Poaceae	na	402 ± 55	na	126 ± 13	na	38 ± 7	161 ± 6	13.4 ± 2.6	0	19 ± 3
<i>Ranunculus alismaefolius</i>	Ranunculaceae	1213 ± 169	1059 ± 164	50 ± 2	51 ± 10	53 ± 8	47 ± 8	275 ± 8	9.8 ± 2.3	0.23 ± 0.02	20 ± 5
<i>Senecio dimorphophyllus</i>	Asteraceae	1306 ± 135	1062 ± 95	38 ± 2	21 ± 4	63 ± 8	44 ± 4	417 ± 40	15.3 ± 2.6	0.47 ± 0.04	23 ± 2
<i>Trollius laxus</i>	Ranunculaceae	559 ± 57	683 ± 127	70 ± 10	17 ± 4	35 ± 4	18 ± 4	220 ± 5	21.6 ± 1.4	0.25 ± 0.06	35 ± 1
<i>Veronica wormskjoldii</i>	Scrophulariaceae	613 ± 47	535 ± 78	101 ± 7	23 ± 5	41 ± 5	30 ± 5	183 ± 4	13.1 ± 1.8	0.40 ± 0.03	18 ± 3
<i>Viola adunca</i>	Violaceae	340 ± 32	226 ± 26	535 ± 14	140 ± 14	53 ± 10	47 ± 7	155 ± 4	7.7 ± 2.0	0.55 ± 0.02	9 ± 2
<b>Slope:</b>											
<i>Aquilegia caerulea</i>	Ranunculaceae	3480 ± 34	270 ± 47	349 ± 29	211 ± 27	77 ± 7	31 ± 6	207 ± 6	9.9 ± 1.5	1.42 ± 0.11	11 ± 3
<i>Besseyia alpina</i>	Scrophulariaceae	1186 ± 174	929 ± 187	81 ± 11	25 ± 5	71 ± 8	45 ± 4	389 ± 15	6.4 ± 1.0	0.69 ± 0.05	15 ± 3
<i>Carex nova</i>	Cyperaceae	na	296 ± 32	na	97 ± 21	na	79 ± 7	201 ± 4	8.0 ± 0.3	0	26 ± 2
<i>Cerastium beeringianum</i>	Caryophyllaceae	433 ± 67	306 ± 46	249 ± 38	91 ± 13	46 ± 8	37 ± 4	222 ± 7	34.3 ± 1.3	0.38 ± 0.04	51 ± 8
<i>Erigeron compositus</i>	Asteraceae	727 ± 65	586 ± 45	80 ± 12	43 ± 7	42 ± 9	52 ± 6	407 ± 15	2.0 ± 1.3	0.56 ± 0.07	4 ± 2
<i>Erysimum nivale</i>	Brassicaceae	901 ± 108	499 ± 90	57 ± 10	40 ± 7	25 ± 9	16 ± 4	367 ± 10	18.4 ± 4.5	0.68 ± 0.06	20 ± 8
<i>Gentiana algida</i>	Gentianaceae	1132 ± 108	1583 ± 886	84 ± 17	33 ± 4	49 ± 6	20 ± 8	294 ± 5	15.2 ± 1.7	0.63 ± 0.03	18 ± 3
<i>Mertensia viridis</i>	Boraginaceae	736 ± 58	598 ± 168	88 ± 17	49 ± 11	64 ± 14	33 ± 8	366 ± 13	17.1 ± 1.7	0.85 ± 0.08	18 ± 2
<i>Oxyria digyna</i>	Polygonaceae	4385 ± 799	1418 ± 279	9 ± 1	11 ± 2	63 ± 6	36 ± 5	370 ± 13	11.7 ± 2.4	0.75 ± 0.05	14 ± 4
<i>Senecio fremontii</i>	Asteraceae	1389 ± 97	852 ± 106	24 ± 3	38 ± 8	28 ± 8	31 ± 6	397 ± 10	21.4 ± 3.5	1.32 ± 0.18	25 ± 2
<i>Silene acaulis</i>	Caryophyllaceae	849 ± 116	904 ± 153	65 ± 11	45 ± 6	30 ± 3	36 ± 6	336 ± 7	9.0 ± 0.8	0.33 ± 0.03	8 ± 1
<i>Trifolium dasyphyllum</i>	Fabaceae	564 ± 41	204 ± 21	134 ± 18	199 ± 23	57 ± 8	34 ± 6	233 ± 7	14.8 ± 3.6	1.07 ± 0.08	18 ± 9
<b>Ridge:</b>											
<i>Antennaria umbrinella</i>	Asteraceae	488 ± 60	642 ± 64	128 ± 11	74 ± 5	71 ± 10	58 ± 4	214 ± 9	4.7 ± 1.2	0.59 ± 0.03	6 ± 3
<i>Arctostaphylos uva-ursi</i>	Ericaceae	1250 ± 139	755 ± 40	51 ± 8	24 ± 5	77 ± 6	32 ± 5	475 ± 18	15.3 ± 2.6	0.46 ± 0.03	15 ± 2
<i>Arenaria congesta</i>	Caryophyllaceae	482 ± 49	315 ± 44	128 ± 13	97 ± 11	76 ± 4	47 ± 8	267 ± 7	12.0 ± 2.7	0.29 ± 0.04	16 ± 4
<i>Bistorta bistortoides</i>	Polygonaceae	444 ± 26	317 ± 27	319 ± 21	210 ± 30	70 ± 9	43 ± 8	237 ± 8	9.5 ± 3.5	0.86 ± 0.05	3 ± 0
<i>Bistorta viviparum</i>	Polygonaceae	803 ± 58	557 ± 52	125 ± 4	56 ± 10	73 ± 8	29 ± 3	254 ± 8	16.0 ± 1.0	0.67 ± 0.04	25 ± 2
<i>Campánula uniflora</i>	Campulaceae	714 ± 62	448 ± 57	62 ± 1	63 ± 0	47 ± 12	70 ± 17	221 ± 6	12.8 ± 2.6	0.27 ± 0.05	8 ± 1
<i>Chionophila jamesii</i>	Scrophulariaceae	1452 ± 125	1005 ± 100	19 ± 4	11 ± 1	42 ± 4	36 ± 6	598 ± 16	31.7 ± 9.5	0.65 ± 0.07	30 ± 3
<i>Geum rossii</i>	Rosaceae	587 ± 142	353 ± 44	62 ± 8	45 ± 7	50 ± 5	31 ± 2	259 ± 4	18.5 ± 1.1	1.00 ± 0.06	23 ± 5
<i>Haplopappus lyalli</i>	Asteraceae	523 ± 38	387 ± 37	84 ± 17	102 ± 25	58 ± 7	39 ± 6	288 ± 24	12.5 ± 4.0	2.14 ± 0.17	18 ± 4
<i>Hymenoxys grandiflora</i>	Asteraceae	1139 ± 93	716 ± 108	66 ± 9	53 ± 5	65 ± 9	54 ± 6	530 ± 23	14.4 ± 2.5	0.66 ± 0.12	14 ± 4
<i>Lewisia pygmaea</i>	Portulacaceae	4156 ± 373	2124 ± 209	13 ± 2	9 ± 1	73 ± 5	62 ± 6	619 ± 14	4.4 ± 1.8	1.83 ± 0.39	5 ± 1
<i>Pedicularis parryi</i>	Scrophulariaceae	1336 ± 221	435 ± 90	190 ± 9	57 ± 5	79 ± 5	35 ± 5	212 ± 5	3.4 ± 0.9	0.86 ± 0.04	4 ± 1
<i>Penstemon whippleanus</i>	Scrophulariaceae	787 ± 293	452 ± 53	153 ± 15	101 ± 8	80 ± 9	52 ± 8	231 ± 11	4.9 ± 0.4	0.89 ± 0.09	6 ± 0
<i>Poa nervosa</i>	Poaceae	na	622 ± 59	na	55 ± 10	na	55 ± 8	199 ± 6	6.2 ± 1.7	0	14 ± 5
<i>Potentilla concinna</i>	Rosaceae	527 ± 87	364 ± 57	153 ± 22	56 ± 16	65 ± 9	83 ± 42	202 ± 5	9.9 ± 1.5	0.92 ± 0.04	13 ± 1
<i>Salix glauca</i>	Salicaceae	740 ± 48	406 ± 35	111 ± 15	141 ± 18	88 ± 6	51 ± 6	204 ± 4	6.7 ± 1.7	1.80 ± 0.24	7 ± 2
<i>Sibbaldia procumbens</i>	Rosaceae	326 ± 24	238 ± 23	500 ± 46	321 ± 38	64 ± 11	37 ± 6	169 ± 3	5.3 ± 1.2	0.95	7 ± 1
<i>Solidago simplex</i>	Asteraceae	341 ± 28	306 ± 22	297 ± 20	159 ± 33	58 ± 7	38 ± 7	270 ± 6	12.8 ± 1.4	1.02 ± 0.14	18 ± 2
<i>Thlaspi montanum</i>	Brassicaceae	540 ± 35	296 ± 37	204 ± 12	259 ± 26	71 ± 10	62 ± 7	255 ± 20	14.2 ± 4.4	0.21 ± 0.06	14 ± 4
<i>Vaccinium cespitosum</i>	Ericaceae	214 ± 18	117 ± 19	592 ± 47	623 ± 52	52 ± 4	48 ± 6	113 ± 5	7.4 ± 1.8	0.78 ± 0.07	9 ± 3
<b>Desert:</b>											
<i>Ambrosia dumosa</i>	Asteraceae	332 ± 21	222 ± 15	304 ± 29	49 ± 0	95 ± 5	72 ± 10	265 ± 8	3.9 ± 0.6	3.31 ± 0.83	4 ± 1
<i>Baileya multiradiata</i>	Asteraceae	2163 ± 231	1180 ± 80	34 ± 3	28 ± 5	63 ± 9	83 ± 7	421 ± 16	20.0 ± 1.4	1.86 ± 0.51	14 ± 1
<i>Eriogonum inflatum</i>	Polygonaceae	678 ± 63	...	311 ± 146	...	35 ± 7	...	301 ± 15	13.0 ± 1.9	...	13 ± 2
<i>Larrea tridentata</i>	Zygophyllaceae	538 ± 48	395 ± 38	123 ± 3	97 ± 0	71 ± 9	74 ± 9	328 ± 18	19.2 ± 2.8	1.74 ± 0.26	15 ± 2
<b>Forest:</b>											
<i>Ilex opaca</i>	Aquifoliaceae	347 ± 24	396 ± 55	237 ± 9	17 ± 7	94 ± 4	30 ± 4	264 ± 5	9.1 ± 1.5	0.26 ± 0.01	35 ± 3
<i>Lonicera japonica</i>	Caprifoliaceae	234 ± 95	336 ± 69	129 ± 11	52 ± 12	56 ± 5	29 ± 5	123 ± 3	5.8 ± 0.3	0.31 ± 0.03	34 ± 2
<i>Prunus serotina</i>	Rosaceae	234 ± 7	145 ± 10	231 ± 12	49 ± 14	64 ± 5	19 ± 6	121 ± 3	5.9 ± 0.4	0.24 ± 0.02	48 ± 3
<i>Rubus flagellaris</i>	Rosaceae	298 ± 16	196 ± 26	164 ± 11	125 ± 9	53 ± 5	27 ± 8	107 ± 6	5.1 ± 0.4	0.46 ± 0.06	37 ± 3

Note. Values are means ± SE. Units for cell densities are number of cells per 1,000,000  $\mu\text{m}^2$ ; PM = palisade mesophyll; SM = spongy mesophyll;  $A_{\text{mes}}/A$  = leaf mesophyll architecture expressed per unit leaf area; IAS = intercellular air space; na = not applicable. Authorities follow Radford et al. (1968), Dorn (1992), and Hickman (1993).