Supplementary Table 1: Summary of *ahFAD2* genotypes detected in each population (Crosses 17, 19, 21, 25, 27 & 28), as well as the number of individuals detected per genotype, and the mean percentage of each fatty acid detected per genotype are included. The following fatty acids were collected for each individual palmitic C16:0, stearic C18:0, oleic C18:1, linoleic C18:2, arachidic C20:0, gadoleic C20:1, behenic C22:0, and lignoceric acid C24:0. The standard deviations are also listed below.

F2 Population	**Count**	***ahFAD2* Genotype**	**16:0**	**18:0**	**18:1**	**18:2**	**20:0**	**20:1**	**22:0**	**24:0**	**O/L**
17	09	$Ol_1Ol_1Ol_2Ol_2$	13.20 ±1.52	2.25 ±0.62	40.47 ±4.77	37.72 ±2.91	1.19 ±0.22	1.13 ±0.28	2.71 ±0.66	1.34 ±0.39	1.09 ±0.21
17	22	$Ol_1Ol_1Ol_2ol_2$	11.63 ±1.02	2.61 ±0.89	45.68 ±3.49	33.24 ±2.91	1.31 ±0.22	1.20 ±0.30	2.92 ±0.47	1.42 ±0.33	1.39 ±0.23
17	13	$Ol_1ol_1Ol_2Ol_2$	12.08 ±0.93	2.88 ±0.82	47.14 ±5.08	32.42 ±4.54	1.26 ±0.20	0.89 ±0.29	2.30 ±0.49	1.04 ±0.25	1.50 ±0.37
17	15	$ol_1ol_1Ol_2Ol_2$	11.83 ±1.38	2.55 ±0.61	49.26 ±6.01	29.97 ±4.64	1.26 ±0.21	1.12 ±0.37	2.74 ±0.89	1.27 ±0.62	1.72 ±0.55
17	26	$Ol_1ol_1Ol_2ol_2$	10.87 ±1.41	2.78 ±1.17	52.64 ±4.98	27.39 ±4.49	1.32 ±0.37	1.12 ±0.42	2.61 ±0.82	1.26 ±0.45	2.01 ±0.54
17	11	$Ol_1Ol_1ol_2ol_2$	10.84 ±1.31	2.56 ±0.90	53.74 ±4.18	25.99 ±3.45	1.27 ±0.22	1.33 ±0.39	2.79 ±0.37	1.47 ±0.33	2.11 ±0.40
17	12	$ol_1ol_1Ol_2ol_2$	9.35 ±1.52	2.45 ±0.74	62.59 ±5.43	18.41 ±4.38	1.28 ±0.29	1.46 ±0.48	2.91 ±0.96	1.54 ±0.46	3.65 ±1.22
17	09	$Ol_1ol_1ol_2ol_2$	9.34 ±0.60	2.74 ±0.75	64.28 ±2.63	17.83 ±1.90	1.22 ±0.20	1.13 ±0.30	2.29 ±0.62	1.17 ±0.44	3.66 ±0.54
17	04	$ol_1ol_1ol_2ol_2$	7.07 ±1.32	2.17 ±0.67	79.74 ±5.69	4.64 ±4.22	1.12 ±0.23	1.55 ±0.43	2.40 ±0.40	1.33 ±0.25	27.97 ±17.07
			11.08 ±1.76	2.61 ±0.86	52.13 ±9.49	27.72 ±8.00	1.27 ±0.26	1.18 ±0.39	2.69 ±0.70	1.33 ±0.43	2.85 ±5.39
19	09	$Ol_1Ol_1Ol_2Ol_2$	11.57 ±1.32	2.45 ±0.88	43.67 ±5.85	34.96 ±5.42	1.25 ±0.21	1.20 ±0.26	3.40 ±0.50	1.50 ±0.31	1.31 ±0.42
19	17	$Ol_1ol_1Ol_2Ol_2$	10.79 ±1.60	2.68 ±1.17	49.10 ±6.72	30.27 ±5.51	1.26 ±0.27	1.25 ±0.37	3.25 ±0.71	1.41 ±0.35	1.74 ±0.68
19	07	$Ol_1Ol_1Ol_2ol_2$	10.26 ±1.00	2.51 ±0.63	51.16 ±5.60	28.66 ±4.36	1.28 ±0.24	1.30 ±0.30	3.35 ±0.60	1.49 ±0.23	1.85 ±0.51
19	09	$Ol_1ol_1Ol_2ol_2$	9.85 ±1.22	2.63 ±0.87	54.69 ±5.12	25.38 ±4.33	1.30 ±0.29	1.31 ±0.26	3.37 ±0.45	1.47 ±0.18	2.25 ±0.60
19	27	$ol_1ol_1Ol_2Ol_2$	9.13 ±0.90	2.54 ±0.82	55.86 ±4.07	25.21 ±3.27	1.25 ±0.24	1.38 ±0.36	3.17 ±0.69	1.47 ±0.16	2.27 ±0.44
19	12	$Ol_1Ol_1ol_2ol_2$	9.73 ±1.86	2.16 ±0.57	56.82 ±6.24	23.34 ±4.72	1.18 ±0.26	1.51 ±0.23	3.64 ±0.44	1.62 ±0.18	2.56 ±0.71
19	13	$Ol_1ol_1ol_2ol_2$	8.63 ±1.06	1.95 ±0.50	64.32 ±3.88	17.68 ±2.68	1.06 ±0.18	1.74 ±0.33	3.09 ±0.52	1.55 ±0.24	3.74 ±0.75
19	19	$ol_1ol_1Ol_2ol_2$	8.36 ±0.94	2.43 ±1.13	65.46 ±5.58	15.97 ±4.29	1.20 ±0.29	1.67 ±0.48	3.30 ±0.92	1.62 ±0.35	4.69 ±2.68
19	11	$ol_1ol_1ol_2ol_2$	6.84 ±0.62	2.52 ±1.55	79.19 ±1.87	3.66 ±1.27	1.16 ±0.30	2.01 ±0.54	3.12 ±0.75	1.50 ±0.34	25.47 ±13.46
			9.46 ±1.70	2.43 ±0.95	57.80 ±10.44	22.82 ±8.98	1.22 ±0.26	1.48 ±0.43	3.28 ±0.62	1.51 ±0.27	4.62 ±7.67
21	1	$Ol_1Ol_1Ol_2Ol_2$	11.16 ±0.00	3.33 ±0.00	41.84 ±0.00	36.80 ±0.00	1.74 ±0.00	0.75 ±0.00	3.09 ±0.00	1.30 ±0.00	1.14 ±0.00
21	3	$Ol_1ol_1Ol_2Ol_2$	11.62 ±1.48	2.02 ±0.96	40.78 ±6.45	38.38 ±5.29	1.08 ±0.30	1.35 ±0.43	2.94 ±0.15	1.85 ±0.38	1.09 ±0.34
21	1	$Ol_1Ol_1Ol_2ol_2$	11.64 ±0.00	2.25 ±0.00	41.55 ±0.00	38.17 ±0.00	1.11 ±0.00	1.01 ±0.00	2.85 ±0.00	1.43 ±0.00	1.09 ±0.00
21	5	$Ol_1ol_1Ol_2ol_2$	10.98 ±0.58	2.01 ±0.22	50.83 ±4.64	29.96 ±4.45	1.06 ±0.09	1.17 ±0.09	2.58 ±0.23	1.42 ±0.13	1.74 ±0.41
21	2	$ol_1ol_1Ol_2Ol_2$	10.28 ±1.00	1.74 ±0.12	55.58 ±7.31	25.81 ±7.25	0.98 ±0.00	1.43 ±0.28	2.76 ±0.52	1.45 ±0.26	2.28 ±0.93
21	1	$Ol_1Ol_1ol_2ol_2$	10.96 0.00	2.36 0.00	49.46 0.00	30.29 0.00	1.23 0.00	1.21 0.00	3.01 0.00	1.48 0.00	1.63 0.00
21	5	$Ol_1ol_1ol_2ol_2$	8.61 ±0.68	2.31 ±0.78	64.15 ±3.04	18.19 ±2.62	1.19 ±0.22	1.31 ±0.16	2.82 ±0.26	1.41 ±0.15	3.61 ±0.72
			10.40 ±1.40	2.17 ±0.62	52.29 ±9.78	28.49 ±8.50	1.14 ±0.23	1.24 ±0.24	2.79 ±0.27	1.49 ±0.24	2.14 ±1.11

25	24	$ol_1ol_1Ol_2Ol_2$	9.91 ±0.61	2.76 ±0.61	48.22 ±2.78	31.66 ±2.61	1.40 ±0.22	1.27 ±0.26	3.23 ±0.32	1.55 ±0.24	1.54 ±0.22
25	60	$ol_1ol_1Ol_2ol_2$	8.06 ±0.74	2.86 ±0.84	61.51 ±3.96	20.00 ±3.82	1.39 ±0.27	1.46 ±0.24	3.13 ±0.41	1.59 ±0.20	3.23 ±0.83
25	41	$ol_1ol_1ol_2ol_2$	5.75 ±0.37	2.63 ±0.84	80.02 ±1.66	3.53 ±0.99	1.28 ±0.24	2.03 ±0.42	3.03 ±0.51	1.73 ±0.28	24.32 ±6.39
			7.66 ±1.62	2.76 ±0.80	65.03 ±12.03	16.84 ±10.70	1.36 ±0.25	1.61 ±0.43	3.12 ±0.43	1.63 ±0.24	9.82 ±10.83
27	1	$Ol_1Ol_1Ol_2Ol_2$	10.66 ±0.00	2.45 ±0.00	40.97 ±0.00	38.54 ±0.00	1.44 ±0.00	1.07 ±0.00	3.24 ±0.00	1.63 ±0.00	1.06 ±0.00
27	4	$Ol_1ol_1Ol_2Ol_2$	11.37 ±1.05	2.68 ±1.28	40.92 ±3.11	37.40 ±3.00	1.43 ±0.62	1.12 ±0.41	3.27 ±0.42	1.83 ±0.20	1.10 ±0.17
27	4	$Ol_1ol_1Ol_2ol_2$	10.54 ±1.35	3.04 ±1.57	44.81 ±1.99	33.49 ±2.90	1.59 ±0.63	1.15 ±0.45	3.64 ±0.53	1.76 ±0.46	1.35 ±0.17
27	2	$Ol_1Ol_1ol_2ol_2$	10.08 ±0.61	2.69 ±0.43	49.41 ±3.20	31.35 ±2.52	1.30 ±0.03	1.03 ±0.04	2.74 ±0.40	1.41 ±0.10	1.59 ±0.23
27	4	$ol_1ol_1Ol_2Ol_2$	9.47 ±0.82	3.27 ±1.14	49.58 ±2.47	29.87 ±2.26	1.52 ±0.40	1.17 ±0.38	3.49 ±0.57	1.64 ±0.33	1.67 ±0.21
27	2	$Ol_1ol_1ol_2ol_2$	8.93 ±0.30	3.13 ±0.74	58.60 ±4.90	21.26 ±2.69	1.60 ±0.28	1.23 ±0.08	3.64 ±0.98	1.63 ±0.01	2.79 ±0.58
27	3	$ol_1ol_1Ol_2ol_2$	9.04 ±1.36	3.25 ±0.88	57.87 ±4.81	21.06 ±2.63	1.68 ±0.43	1.19 ±0.19	3.90 ±0.62	2.01 ±0.32	2.80 ±0.58
27	1	$ol_1ol_1ol_2ol_2$	5.38 ±0.00	3.52 ±0.00	78.40 ±0.00	3.34 ±0.00	1.95 ±0.00	1.33 ±0.00	4.15 ±0.00	1.92 ±0.00	23.47 ±0.00
			9.84 ±1.60	3.02 ±1.01	50.01 ±9.49	29.20 ±8.74	1.54 ±0.43	1.15 ±0.29	3.50 ±0.58	1.74 ±0.31	2.77 ±4.79
28	11	$Ol_1Ol_1Ol_2Ol_2$	11.20 ±1.13	3.94 ±0.82	42.08 ±6.20	35.28 ±5.38	1.72 ±0.24	0.91 ±0.16	3.48 ±0.73	1.39 ±0.23	1.27 ±0.58
28	15	$Ol_1Ol_1Ol_2ol_2$	11.21 ±0.69	3.62 ±0.80	42.95 ±3.10	34.35 ±2.49	1.67 ±0.23	1.02 ±0.22	3.66 ±0.53	1.52 ±0.21	1.26 ±0.19
28	20	$Ol_1ol_1Ol_2Ol_2$	11.03 ±0.82	3.76 ±1.35	43.31 ±2.99	34.21 ±2.63	1.67 ±0.41	1.01 ±0.24	3.53 ±0.77	1.48 ±0.29	1.28 ±0.18
28	31	$Ol_1ol_1Ol_2ol_2$	10.18 ±0.71	3.52 ±0.78	48.52 ±4.21	29.70 ±3.20	1.65 ±0.23	1.14 ±0.20	3.75 ±0.88	1.54 ±0.29	1.67 ±0.33
28	04	$Ol_1Ol_1ol_2ol_2$	10.07 ±0.75	3.88 ±0.30	48.71 ±4.47	29.93 ±4.47	1.72 ±0.14	1.05 ±0.06	3.25 ±0.56	1.39 ±0.10	1.68 ±0.44
28	11	$ol_1ol_1Ol_2Ol_2$	9.72 ±0.53	3.69 ±0.72	51.32 ±3.22	27.29 ±2.53	1.64 ±0.21	1.14 ±0.26	3.62 ±0.82	1.57 ±0.34	1.90 ±0.29
28	13	$Ol_1ol_1ol_2ol_2$	8.87 ±0.82	3.24 ±0.92	59.32 ±3.82	20.74 ±2.63	1.50 ±0.18	1.31 ±0.24	3.44 ±0.82	1.58 ±0.37	2.93 ±0.59
28	11	$ol_1ol_1Ol_2ol_2$	8.39 ±0.81	2.85 ±0.65	62.33 ±2.75	18.51 ±2.30	1.41 ±0.18	1.42 ±0.21	3.45 ±0.56	1.64 ±0.20	3.43 ±0.53
28	09	$ol_1ol_1ol_2ol_2$	6.77 ±0.50	3.33 ±0.85	77.06 ±1.78	4.35 ±1.37	1.55 ±0.22	1.76 ±0.41	3.48 ±0.64	1.71 ±0.32	19.99 ±8.61
			9.95 ±1.47	3.53 ±0.89	51.08 ±10.38	27.53 ±8.97	1.62 ±0.26	1.17 ±0.31	3.58 ±0.73	1.54 ±0.28	3.15 ±5.25
Total	539	All genotypes	9.51 ±2.03	2.86 ±1.00	56.60 ±11.95	23.67 ±10.18	1.32 ±0.47	1.32 ±0.50	3.18 ±0.75	1.51 ±0.51	5.11 ±8.14