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Liite L4

Pakkasenkestävyyden estimointi SAS NLMIXED proseduurilla ja Waldin testin arvot LP-kokeessa

Taulukko L4.1. Alkuperien DT₅₀ estimaattien tilastolliset erot Waldin testin mukaan käsittelemättömillä ja lyhytpäiväkäsittelyillä taimilla kasvinosittain ja testikerroittain. Taulukossa on Waldin testin arvo (Wald) ja sen tilastollinen merkitsevyys (p-arvo) laskettuna j3.0-ohjelmalla.

Käsittely	Kasvinosa	Testikerta	Wald	p-arvo
Käsittelemätön	Neulaset	8.9.	327,747	<0,001
		29.9.	273,402	<0,001
		20.10.	160,614	<0,001
Lyhytpäiväkäsittely	Neulaset	8.9.	331,712	<0,001
		29.9.	182,788	<0,001
		20.10.	75,507	<0,001
Käsittelemätön	Ranka	8.9.	141,453	<0,001
		29.9.	55,113	<0,001
		20.10.	158,398	<0,001
Lyhytpäiväkäsittely	Ranka	8.9.	136,686	<0,001
		29.9.	30,752	<0,001
		20.10.	132,609	<0,001
Käsittelemätön	Silmut	8.9.	215,918	<0,001
		29.9.	30,792	<0,001
		20.10.	65,302	<0,001
Lyhytpäiväkäsittely	Silmut	8.9.	407,204	<0,001
		29.9.	19,609	<0,001
		20.10.	63,242	<0,001

Tulosteissa KE = Larch Hills, VA = Valemount. OR = Salmon River, SI = Kouvola, LP = lyhytpäiväkäsittely, KO = käsittelemätön kontrolli. Parametrit c ja b erotettu eri alkuperille ja käsittelyille numeroin seuraavasti: 1 Larch Hills LP, 2 Larch Hills LP, 3 Salmon River KO, 4 Salmon River LP, 5 Kouvola KO, 6 Kouvola LP, 7 Valemount KO ja 8 Valemount LP.

Tulosteissa esitetään ensin parametrien estimaatit kullekin kasvin osalle testikerroittain. Testikerran sisällä parametrien jälkeen on SAS:ia apuna käyttäen verrattu c-parametrejä (= DT50 estimaatit) pareittain eri käsittelyissä.

SAS syntaksi kaikille testeille noudatti samaa kaavaa, josta esimerkkinä 8.9.2021 testikerran neulasten kaava.

```

title 'Kertal neulaset alkuperille ja käsittelyille';
proc nlmixed data=work.dougDATA;
where kerta=1;
parms c1=-6 c2=-12 c3=-8 C4=-13 c5=-9 c6=-14 c7=-5 c8=-13
b1=-1 b2=-0.5 b3=-1 b4=-0.5 b5=-1 b6=-0.5 b7=-1 b8=-0.5;
mu = (((1)/(1+exp(b1*(c1-temp)))))*KEKO
+ (((1)/(1+exp(b2*(c2-temp)))))*KELP+ (((1)/(1+exp(b3*(c3-
temp)))))*ORKO
+ (((1)/(1+exp(b4*(c4-temp)))))*ORLP+ (((1)/(1+exp(b5*(c5-
temp)))))*SIKO
+ (((1)/(1+exp(b6*(c6-temp)))))*SILP+ (((1)/(1+exp(b7*(c7-
temp)))))*VAKO
+ (((1)/(1+exp(b8*(c8-temp)))))*VALP;
l = mu**needle * (1-mu)**(1-needle);

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ql = log(1);
model needle ~ general(ql);
predict mu out=out1;
ods output parameterestimates=pe;
run;

proc sql noprint;
  select count(Parameter) into :nparm from pe;
quit;
title "Scale parameter";
title2 "Pearson Chi-square / DF";
proc sql;
  select sum(phi_i) format=best12. as Scale into :phi from
  (select (needle-pred)**2/(max(pred,0.001)*(1-
min(pred,0.999))*(count(needle)-&nparm)) as phi_i from out1);
quit;
title;

proc nlmixed data=work.dougDATA;
where kerta=1;
parms c1=-6 c2=-12 c3=-8 c4=-13 c5=-9 c6=-14 c7=-5 c8=-13
b1=-1 b2=-0.5 b3=-1 b4=-0.5 b5=-1 b6=-0.5 b7=-1 b8=-0.5;
mu = (((1)/(1+exp(b1*(c1-temp)))))*KEKO
+(((1)/(1+exp(b2*(c2-temp)))))*KELP+(((1)/(1+exp(b3*(c3-
temp)))))*ORKO
+(((1)/(1+exp(b4*(c4-temp)))))*ORLP+(((1)/(1+exp(b5*(c5-
temp)))))*SIKO
+(((1)/(1+exp(b6*(c6-temp)))))*SILP
+(((1)/(1+exp(b7*(c7-temp)))))*VAKO
+(((1)/(1+exp(b8*(c8-temp)))))*VALP;
l = mu**needle * (1-mu)**(1-needle);
ql = (1/&phi)*log(l);
model needle ~ general(ql);
predict mu out=needle1;
estimate 'KEKO' c1;
estimate 'KELP' c2;
estimate 'ORKO' c3;
estimate 'ORLP' c4;
estimate 'SIKO' c5;
estimate 'SILP' c6;
estimate 'VAKO' c7;
estimate 'VALP' c8;
estimate 'KEKO-KELP' c1-c2;
estimate 'ORKO-ORLP' c3-c4;
estimate 'SIKO-SILP' c5-c6;
estimate 'VAKO-VALP' c7-c8;
Estimate 'KEKO-ORKO' c1-c3;
estimate 'KEKO-SIKO' c1-c5;
estimate 'KEKO-VAKO' c1-c7;
estimate 'ORKO-SIKO' c3-c5;
estimate 'ORKO-VAKO' c3-c7;
estimate 'SIKO-VAKO' c5-c7;
Estimate 'KELP-ORLP' c2-c4;
estimate 'KELP-SILP' c2-c6;
estimate 'KELP-VALP' c2-c8;
estimate 'ORLP-SILP' c4-c6;
estimate 'ORLP-VALP' c4-c8;
estimate 'SILP-VALP' c6-c8;
run;

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Laskennan tulokset

8.9.2021 Parametrien estimaatit neulasille

Parameter Estimates								
Parameter	Estimate	Standard Error	DF	t Value	Pr > t	95% Confidence Limits		Gradient
c1	-6.3094	0.3270	635	-19.30	<.0001	-6.9515	-5.6674	-0.00676
c2	-11.4044	0.5503	635	-20.72	<.0001	-12.4850	-10.3238	-0.00922
c3	-7.1738	0.3593	635	-19.96	<.0001	-7.8794	-6.4681	-0.00233
C4	-12.9681	0.7619	635	-17.02	<.0001	-14.4642	-11.4719	-0.00266
c5	-7.2346	0.3669	635	-19.72	<.0001	-7.9551	-6.5141	0.005038
c6	-13.2015	0.6378	635	-20.70	<.0001	-14.4540	-11.9491	-0.00062
c7	-5.8656	0.3312	635	-17.71	<.0001	-6.5161	-5.2152	-0.00435
c8	-12.7480	0.8247	635	-15.46	<.0001	-14.3674	-11.1286	-0.02249
b1	-0.6111	0.07761	635	-7.87	<.0001	-0.7636	-0.4587	-0.02409
b2	-0.3404	0.04771	635	-7.14	<.0001	-0.4341	-0.2467	0.007057
b3	-0.5153	0.06365	635	-8.10	<.0001	-0.6403	-0.3903	0.024517
b4	-0.2814	0.04456	635	-6.32	<.0001	-0.3689	-0.1939	-0.07199
b5	-0.4977	0.06142	635	-8.10	<.0001	-0.6183	-0.3771	-0.04353
b6	-0.3585	0.05534	635	-6.48	<.0001	-0.4672	-0.2498	-0.00699
b7	-0.6047	0.07777	635	-7.78	<.0001	-0.7574	-0.4519	0.033452
b8	-0.2535	0.04145	635	-6.12	<.0001	-0.3349	-0.1721	0.063059

Additional Estimates								
Label	Estimate	Standard Error	DF	t Value	Pr > t	Alpha	Lower	Upper
KEKO	-6.3094	0.3270	635	-19.30	<.0001	0.05	-6.9515	-5.6674
KELP	-11.4044	0.5503	635	-20.72	<.0001	0.05	-12.4850	-10.3238
ORKO	-7.1738	0.3593	635	-19.96	<.0001	0.05	-7.8794	-6.4681
ORLP	-12.9681	0.7619	635	-17.02	<.0001	0.05	-14.4642	-11.4719
SIKO	-7.2346	0.3669	635	-19.72	<.0001	0.05	-7.9551	-6.5141
SILP	-13.2015	0.6378	635	-20.70	<.0001	0.05	-14.4540	-11.9491
VAKO	-5.8656	0.3312	635	-17.71	<.0001	0.05	-6.5161	-5.2152
VALP	-12.7480	0.8247	635	-15.46	<.0001	0.05	-14.3674	-11.1286
KEKO-KELP	5.0950	0.6401	635	7.96	<.0001	0.05	3.8380	6.3519
ORKO-ORLP	5.7943	0.8424	635	6.88	<.0001	0.05	4.1401	7.4485
SIKO-SILP	5.9669	0.7358	635	8.11	<.0001	0.05	4.5221	7.4118

Additional Estimates								
Label	Estimate	Standard Error	DF	t Value	Pr > t	Alpha	Lower	Upper
VAKO-VALP	6.8824	0.8887	635	7.74	<.0001	0.05	5.1373	8.6275
KEKO-ORKO	0.8643	0.4858	635	1.78	0.0757	0.05	-0.08972	1.8183
KEKO-SIKO	0.9252	0.4915	635	1.88	0.0602	0.05	-0.03990	1.8903
KEKO-VAKO	-0.4438	0.4654	635	-0.95	0.3407	0.05	-1.3578	0.4702
ORKO-SIKO	0.06087	0.5136	635	0.12	0.9057	0.05	-0.9476	1.0694
ORKO-VAKO	-1.3081	0.4887	635	-2.68	0.0076	0.05	-2.2678	-0.3484
SIKO-VAKO	-1.3690	0.4943	635	-2.77	0.0058	0.05	-2.3397	-0.3983
KELP-ORLP	1.5636	0.9398	635	1.66	0.0967	0.05	-0.2819	3.4092
KELP-SILP	1.7971	0.8424	635	2.13	0.0333	0.05	0.1430	3.4513
KELP-VALP	1.3436	0.9914	635	1.36	0.1758	0.05	-0.6032	3.2904
ORLP-SILP	0.2335	0.9936	635	0.23	0.8143	0.05	-1.7177	2.1846
ORLP-VALP	-0.2201	1.1227	635	-0.20	0.8447	0.05	-2.4248	1.9847
SILP-VALP	-0.4535	1.0425	635	-0.44	0.6637	0.05	-2.5007	1.5937

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Parameter Estimates								
Parameter	Estimate	Standard Error	DF	t Value	Pr > t	95% Confidence Limits		Gradient
c1	-5.9251	0.4701	635	-12.60	<.0001	-6.8483	-5.0020	-0.00006
c2	-9.9087	0.8747	635	-11.33	<.0001	-11.6263	-8.1911	-0.00016
c3	-6.3868	0.6078	635	-10.51	<.0001	-7.5804	-5.1932	0.000448
C4	-12.0408	0.9331	635	-12.90	<.0001	-13.8732	-10.2083	0.000202
c5	-7.7488	0.6691	635	-11.58	<.0001	-9.0627	-6.4350	0.000259
c6	-13.0384	0.8479	635	-15.38	<.0001	-14.7034	-11.3734	-0.00005
c7	-5.0913	0.5381	635	-9.46	<.0001	-6.1479	-4.0347	-0.00010
c8	-10.9026	0.9552	635	-11.41	<.0001	-12.7784	-9.0269	-0.00004
b1	-1.0184	0.2802	635	-3.63	0.0003	-1.5686	-0.4682	0.000024
b2	-0.3784	0.09340	635	-4.05	<.0001	-0.5618	-0.1950	-0.00057
b3	-0.6326	0.1529	635	-4.14	<.0001	-0.9328	-0.3325	-0.00142
b4	-0.4209	0.1125	635	-3.74	0.0002	-0.6418	-0.2000	-0.00005
b5	-0.5320	0.1245	635	-4.27	<.0001	-0.7765	-0.2875	-0.00073
b6	-0.5426	0.1555	635	-3.49	0.0005	-0.8479	-0.2372	-0.00060

Parameter Estimates								
Parameter	Estimate	Standard			Pr > t	95% Confidence		Gradient
		Error	DF	t Value		Limits		
b7	-0.8066	0.2142	635	-3.77	0.0002	-1.2272	-0.3860	0.001046
b8	-0.3741	0.09664	635	-3.87	0.0001	-0.5638	-0.1843	0.000651

Additional Estimates								
Label	Estimate	Standard			Pr > t	Alpha	Lower	Upper
		Error	DF	t Value				
KEKO	-5.9251	0.4701	635	-12.60	<.0001	0.05	-6.8483	-5.0020
KELP	-9.9087	0.8747	635	-11.33	<.0001	0.05	-11.6263	-8.1911
ORKO	-6.3868	0.6078	635	-10.51	<.0001	0.05	-7.5804	-5.1932
ORLP	-12.0408	0.9331	635	-12.90	<.0001	0.05	-13.8732	-10.2083
SIKO	-7.7488	0.6691	635	-11.58	<.0001	0.05	-9.0627	-6.4350
SILP	-13.0384	0.8479	635	-15.38	<.0001	0.05	-14.7034	-11.3734
VAKO	-5.0913	0.5381	635	-9.46	<.0001	0.05	-6.1479	-4.0347
VALP	-10.9026	0.9552	635	-11.41	<.0001	0.05	-12.7784	-9.0269
KEKO-KELP	3.9836	0.9930	635	4.01	<.0001	0.05	2.0336	5.9336
ORKO-ORLP	5.6539	1.1137	635	5.08	<.0001	0.05	3.4670	7.8408
SIKO-SILP	5.2896	1.0801	635	4.90	<.0001	0.05	3.1687	7.4105
VAKO-VALP	5.8114	1.0963	635	5.30	<.0001	0.05	3.6585	7.9642
KEKO-ORKO	0.4617	0.7684	635	0.60	0.5482	0.05	-1.0473	1.9706
KEKO-SIKO	1.8237	0.8177	635	2.23	0.0261	0.05	0.2180	3.4294
KEKO-VAKO	-0.8339	0.7145	635	-1.17	0.2436	0.05	-2.2369	0.5692
ORKO-SIKO	1.3620	0.9039	635	1.51	0.1324	0.05	-0.4131	3.1371
ORKO-VAKO	-1.2955	0.8118	635	-1.60	0.1110	0.05	-2.8896	0.2986
SIKO-VAKO	-2.6576	0.8586	635	-3.10	0.0021	0.05	-4.3435	-0.9716
KELP-ORLP	2.1321	1.2790	635	1.67	0.0960	0.05	-0.3795	4.6436
KELP-SILP	3.1297	1.2182	635	2.57	0.0104	0.05	0.7376	5.5219
KELP-VALP	0.9939	1.2952	635	0.77	0.4431	0.05	-1.5494	3.5373
ORLP-SILP	0.9977	1.2608	635	0.79	0.4291	0.05	-1.4782	3.4736
ORLP-VALP	-1.1381	1.3353	635	-0.85	0.3944	0.05	-3.7603	1.4841
SILP-VALP	-2.1358	1.2772	635	-1.67	0.0950	0.05	-4.6439	0.3723

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Parameter Estimates									
Parameter	Estimate	Standard			t Value	Pr > t	95% Confidence		Gradient
		Error	DF				Limits		
c1	-5.0378	0.3130	630	-16.10	<.0001	-5.6524	-4.4232	0.000976	
c2	-8.8044	0.4237	630	-20.78	<.0001	-9.6364	-7.9724	-0.00202	
c3	-4.9298	0.3774	630	-13.06	<.0001	-5.6708	-4.1888	-0.00049	
C4	-8.6370	0.4618	630	-18.70	<.0001	-9.5439	-7.7301	0.003947	
c5	-5.9957	0.3656	630	-16.40	<.0001	-6.7137	-5.2777	-0.00074	
c6	-12.3005	0.6871	630	-17.90	<.0001	-13.6497	-10.9512	0.002765	
c7	-4.7927	0.3162	630	-15.16	<.0001	-5.4135	-4.1718	0.000460	
c8	-9.2169	0.4943	630	-18.65	<.0001	-10.1876	-8.2462	-0.00221	
b1	-1.5313	0.3814	630	-4.01	<.0001	-2.2803	-0.7823	0.001699	
b2	-0.7905	0.1576	630	-5.02	<.0001	-1.0999	-0.4811	-0.00028	
b3	-1.0244	0.2285	630	-4.48	<.0001	-1.4731	-0.5758	0.002852	
b4	-0.6662	0.1257	630	-5.30	<.0001	-0.9131	-0.4193	0.007881	
b5	-1.0254	0.2205	630	-4.65	<.0001	-1.4583	-0.5924	-0.00181	
b6	-0.4837	0.1043	630	-4.64	<.0001	-0.6884	-0.2789	0.010773	
b7	-1.3994	0.3394	630	-4.12	<.0001	-2.0658	-0.7330	-0.00069	
b8	-0.6508	0.1248	630	-5.21	<.0001	-0.8959	-0.4057	0.005048	

Additional Estimates									
Label	Estimate	Standard			t Value	Pr > t	Alpha	Lower	Upper
		Error	DF						
KEKO	-5.0378	0.3130	630	-16.10	<.0001	0.05	-5.6524	-4.4232	
KELP	-8.8044	0.4237	630	-20.78	<.0001	0.05	-9.6364	-7.9724	
ORKO	-4.9298	0.3774	630	-13.06	<.0001	0.05	-5.6708	-4.1888	
ORLP	-8.6370	0.4618	630	-18.70	<.0001	0.05	-9.5439	-7.7301	
SIKO	-5.9957	0.3656	630	-16.40	<.0001	0.05	-6.7137	-5.2777	
SILP	-12.3005	0.6871	630	-17.90	<.0001	0.05	-13.6497	-10.9512	
VAKO	-4.7927	0.3162	630	-15.16	<.0001	0.05	-5.4135	-4.1718	
VALP	-9.2169	0.4943	630	-18.65	<.0001	0.05	-10.1876	-8.2462	
KEKO-KELP	3.7666	0.5267	630	7.15	<.0001	0.05	2.7322	4.8009	
ORKO-ORLP	3.7072	0.5964	630	6.22	<.0001	0.05	2.5361	4.8783	
SIKO-SILP	6.3048	0.7783	630	8.10	<.0001	0.05	4.7764	7.8332	
VAKO-VALP	4.4243	0.5868	630	7.54	<.0001	0.05	3.2720	5.5765	

Additional Estimates								
Label	Estimate	Standard Error	DF	t Value	Pr > t	Alpha	Lower	Upper
KEKO-ORKO	-0.1080	0.4903	630	-0.22	0.8257	0.05	-1.0707	0.8547
KEKO-SIKO	0.9579	0.4813	630	1.99	0.0470	0.05	0.01273	1.9030
KEKO-VAKO	-0.2451	0.4449	630	-0.55	0.5818	0.05	-1.1187	0.6285
ORKO-SIKO	1.0659	0.5254	630	2.03	0.0429	0.05	0.03403	2.0977
ORKO-VAKO	-0.1372	0.4923	630	-0.28	0.7806	0.05	-1.1039	0.8296
SIKO-VAKO	-1.2030	0.4834	630	-2.49	0.0131	0.05	-2.1522	-0.2538
KELP-ORLP	-0.1674	0.6267	630	-0.27	0.7895	0.05	-1.3981	1.0633
KELP-SILP	3.4961	0.8072	630	4.33	<.0001	0.05	1.9110	5.0812
KELP-VALP	0.4125	0.6510	630	0.63	0.5265	0.05	-0.8659	1.6910
ORLP-SILP	3.6635	0.8279	630	4.43	<.0001	0.05	2.0378	5.2891
ORLP-VALP	0.5799	0.6765	630	0.86	0.3916	0.05	-0.7485	1.9083
SILP-VALP	-3.0835	0.8464	630	-3.64	0.0003	0.05	-4.7457	-1.4214

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Parameter Estimates								
Parameter	Estimate	Standard Error	DF	t Value	Pr > t	95% Confidence Limits		Gradient
c1	-12.4991	0.5898	390	-21.19	<.0001	-13.6586	-11.3396	0.000145
c2	-16.5693	1.0302	390	-16.08	<.0001	-18.5948	-14.5438	0.009542
c3	-14.6934	0.7880	390	-18.65	<.0001	-16.2427	-13.1440	-0.00543
C4	-18.1423	1.1563	390	-15.69	<.0001	-20.4156	-15.8689	0.002096
c5	-16.1894	0.8400	390	-19.27	<.0001	-17.8408	-14.5379	-0.00353
c6	-20.1881	1.0577	390	-19.09	<.0001	-22.2676	-18.1085	-0.00338
b1	-0.4032	0.05898	390	-6.84	<.0001	-0.5191	-0.2872	-0.00455
b2	-0.2041	0.02651	390	-7.70	<.0001	-0.2562	-0.1519	-0.00190
b3	-0.2534	0.03151	390	-8.04	<.0001	-0.3153	-0.1914	-0.00213
b4	-0.1797	0.02483	390	-7.24	<.0001	-0.2285	-0.1309	-0.00192
b5	-0.2420	0.02985	390	-8.11	<.0001	-0.3006	-0.1833	0.005384
b6	-0.2153	0.03095	390	-6.96	<.0001	-0.2762	-0.1544	0.000674

Additional Estimates								
Label	Estimate	Standard Error	DF	t Value	Pr > t	Alpha	Lower	Upper
KEKO	-12.4991	0.5898	390	-21.19	<.0001	0.05	-13.6586	-11.3396
KELP	-16.5693	1.0302	390	-16.08	<.0001	0.05	-18.5948	-14.5438
ORKO	-14.6934	0.7880	390	-18.65	<.0001	0.05	-16.2427	-13.1440
ORLP	-18.1423	1.1563	390	-15.69	<.0001	0.05	-20.4156	-15.8689
SIKO	-16.1894	0.8400	390	-19.27	<.0001	0.05	-17.8408	-14.5379
SILP	-20.1881	1.0577	390	-19.09	<.0001	0.05	-22.2676	-18.1085
KEKO-KELP	4.0702	1.1871	390	3.43	0.0007	0.05	1.7363	6.4040
ORKO-ORLP	3.4489	1.3993	390	2.46	0.0141	0.05	0.6977	6.2000
SIKO-SILP	3.9987	1.3507	390	2.96	0.0033	0.05	1.3432	6.6542
KEKO-ORKO	2.1942	0.9843	390	2.23	0.0264	0.05	0.2591	4.1294
KEKO-SIKO	3.6902	1.0263	390	3.60	0.0004	0.05	1.6724	5.7081
ORKO-SIKO	1.4960	1.1518	390	1.30	0.1948	0.05	-0.7685	3.7605
KELP-ORLP	1.5729	1.5487	390	1.02	0.3104	0.05	-1.4719	4.6178
KELP-SILP	3.6188	1.4765	390	2.45	0.0147	0.05	0.7158	6.5217
ORLP-SILP	2.0458	1.5671	390	1.31	0.1925	0.05	-1.0352	5.1269

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Parameter Estimates								
Parameter	Estimate	Standard Error	DF	t Value	Pr > t	95% Confidence Limits		Gradient
c1	-12.9920	1.3665	390	-9.51	<.0001	-15.6787	-10.3053	0.000091
c2	-12.7874	1.9649	390	-6.51	<.0001	-16.6505	-8.9244	-0.00092
c3	-13.2631	1.5382	390	-8.62	<.0001	-16.2874	-10.2388	0.000622
c4	-13.3430	1.9850	390	-6.72	<.0001	-17.2456	-9.4403	0.001560
c5	-15.8832	1.6366	390	-9.70	<.0001	-19.1009	-12.6655	-0.00013
c6	-18.8886	1.7484	390	-10.80	<.0001	-22.3261	-15.4511	-0.00143
b1	-0.5557	0.2347	390	-2.37	0.0184	-1.0172	-0.09422	0.000116
b2	-0.3166	0.1030	390	-3.07	0.0023	-0.5191	-0.1142	-0.00026
b3	-0.3759	0.1245	390	-3.02	0.0027	-0.6207	-0.1311	0.000289
b4	-0.3240	0.1028	390	-3.15	0.0018	-0.5261	-0.1218	-0.00022
b5	-0.4264	0.1293	390	-3.30	0.0011	-0.6807	-0.1722	-0.00017
b6	-0.4288	0.1802	390	-2.38	0.0178	-0.7831	-0.07442	0.000059

Additional Estimates								
Label	Estimate	Standard Error	DF	t Value	Pr > t	Alpha	Lower	Upper
KEKO	-12.9920	1.3665	390	-9.51	<.0001	0.05	-15.6787	-10.3053
KELP	-12.7874	1.9649	390	-6.51	<.0001	0.05	-16.6505	-8.9244
ORKO	-13.2631	1.5382	390	-8.62	<.0001	0.05	-16.2874	-10.2388
ORLP	-13.3430	1.9850	390	-6.72	<.0001	0.05	-17.2456	-9.4403
SIKO	-15.8832	1.6366	390	-9.70	<.0001	0.05	-19.1009	-12.6655
SILP	-18.8886	1.7484	390	-10.80	<.0001	0.05	-22.3261	-15.4511
KEKO-KELP	-0.2046	2.3933	390	-0.09	0.9319	0.05	-4.9101	4.5009
ORKO-ORLP	0.07990	2.5113	390	0.03	0.9746	0.05	-4.8574	5.0172
SIKO-SILP	3.0054	2.3949	390	1.25	0.2103	0.05	-1.7031	7.7139
KEKO-ORKO	0.2711	2.0576	390	0.13	0.8953	0.05	-3.7743	4.3164
KEKO-SIKO	2.8912	2.1321	390	1.36	0.1759	0.05	-1.3007	7.0831
ORKO-SIKO	2.6201	2.2461	390	1.17	0.2441	0.05	-1.7958	7.0360
KELP-ORLP	0.5555	2.7930	390	0.20	0.8424	0.05	-4.9357	6.0468
KELP-SILP	6.1012	2.6301	390	2.32	0.0209	0.05	0.9302	11.2722
ORLP-SILP	5.5457	2.6452	390	2.10	0.0367	0.05	0.3450	10.7463

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Parameter Estimates								
Parameter	Estimate	Standard Error	DF	t Value	Pr > t	95% Confidence Limits		Gradient
c1	-12.8915	1.7850	390	-7.22	<.0001	-16.4009	-9.3821	-0.00083
c2	-12.8627	2.4400	390	-5.27	<.0001	-17.6600	-8.0655	0.000143
c3	-11.8708	2.0023	390	-5.93	<.0001	-15.8074	-7.9342	-0.00046
C4	-13.2744	2.4121	390	-5.50	<.0001	-18.0169	-8.5320	-0.00049
c5	-13.3806	1.7774	390	-7.53	<.0001	-16.8750	-9.8862	0.000168
c6	-17.9008	2.3035	390	-7.77	<.0001	-22.4295	-13.3721	0.000029
b1	-0.4161	0.1801	390	-2.31	0.0214	-0.7702	-0.06197	-0.00091
b2	-0.3045	0.1200	390	-2.54	0.0116	-0.5405	-0.06850	-0.00091
b3	-0.2832	0.1136	390	-2.49	0.0131	-0.5065	-0.05984	0.000904
b4	-0.3419	0.1355	390	-2.52	0.0120	-0.6082	-0.07549	0.002337
b5	-0.5070	0.2394	390	-2.12	0.0348	-0.9776	-0.03631	0.001775
b6	-0.3920	0.1724	390	-2.27	0.0235	-0.7310	-0.05305	0.000487

Additional Estimates								
Label	Estimate	Standard		t Value	Pr > t	Alpha	Lower	Upper
		Error	DF					
KEKO	-12.8915	1.7850	390	-7.22	<.0001	0.05	-16.4009	-9.3821
KELP	-12.8627	2.4400	390	-5.27	<.0001	0.05	-17.6600	-8.0655
ORKO	-11.8708	2.0023	390	-5.93	<.0001	0.05	-15.8074	-7.9342
ORLP	-13.2744	2.4121	390	-5.50	<.0001	0.05	-18.0169	-8.5320
SIKO	-13.3806	1.7774	390	-7.53	<.0001	0.05	-16.8750	-9.8862
SILP	-17.9008	2.3035	390	-7.77	<.0001	0.05	-22.4295	-13.3721
KEKO-KELP	-0.02879	3.0232	390	-0.01	0.9924	0.05	-5.9727	5.9151
ORKO-ORLP	1.4036	3.1349	390	0.45	0.6546	0.05	-4.7598	7.5671
SIKO-SILP	4.5202	2.9094	390	1.55	0.1211	0.05	-1.2000	10.2404
KEKO-ORKO	-1.0208	2.6824	390	-0.38	0.7038	0.05	-6.2945	4.2530
KEKO-SIKO	0.4891	2.5190	390	0.19	0.8462	0.05	-4.4634	5.4415
ORKO-SIKO	1.5098	2.6773	390	0.56	0.5731	0.05	-3.7540	6.7736
KELP-ORLP	0.4117	3.4311	390	0.12	0.9046	0.05	-6.3340	7.1574
KELP-SILP	5.0381	3.3555	390	1.50	0.1341	0.05	-1.5591	11.6353
ORLP-SILP	4.6264	3.3353	390	1.39	0.1662	0.05	-1.9311	11.1838

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Parameter Estimates								
Parameter	Estimate	Standard		t Value	Pr > t	95% Confidence		Gradient
		Error	DF			Limits		
c1	-19.5998	1.5943	641	-12.29	<.0001	-22.7305	-16.4690	-0.01271
c2	-28.4474	3.2438	641	-8.77	<.0001	-34.8171	-22.0777	-0.02289
c3	-24.2400	1.4720	641	-16.47	<.0001	-27.1305	-21.3496	-0.00324
C4	-28.9271	3.5759	641	-8.09	<.0001	-35.9489	-21.9053	-0.03762
c5	-31.3594	4.2026	641	-7.46	<.0001	-39.6120	-23.1068	0.017769
c6	-36.9190	5.8670	641	-6.29	<.0001	-48.4399	-25.3980	0.068455
c7	-24.2575	2.1563	641	-11.25	<.0001	-28.4917	-20.0233	0.043669
c8	-27.8662	2.9749	641	-9.37	<.0001	-33.7079	-22.0244	0.003328
b1	-0.09678	0.01750	641	-5.53	<.0001	-0.1311	-0.06241	0.041180
b2	-0.07151	0.01765	641	-4.05	<.0001	-0.1062	-0.03685	0.071508
b3	-0.1253	0.02185	641	-5.74	<.0001	-0.1682	-0.08240	-0.22638
b4	-0.06717	0.01751	641	-3.84	0.0001	-0.1016	-0.03280	-0.11510

Parameter Estimates								
Parameter	Estimate	Standard			Pr > t	95% Confidence		Gradient
		Error	DF	t Value		Limits		
b5	-0.06285	0.01690	641	-3.72	0.0002	-0.09604	-0.02966	0.26744
b6	-0.05451	0.01561	641	-3.49	0.0005	-0.08517	-0.02386	0.76282
b7	-0.08329	0.01727	641	-4.82	<.0001	-0.1172	-0.04937	0.038651
b8	-0.07442	0.01754	641	-4.24	<.0001	-0.1089	-0.03997	-0.61888

Additional Estimates								
Label	Estimate	Standard			Pr > t	Alpha	Lower	Upper
		Error	DF	t Value				
KEKO	-19.5998	1.5943	641	-12.29	<.0001	0.05	-22.7305	-16.4690
KELP	-28.4474	3.2438	641	-8.77	<.0001	0.05	-34.8171	-22.0777
ORKO	-24.2400	1.4720	641	-16.47	<.0001	0.05	-27.1305	-21.3496
ORLP	-28.9271	3.5759	641	-8.09	<.0001	0.05	-35.9489	-21.9053
SIKO	-31.3594	4.2026	641	-7.46	<.0001	0.05	-39.6120	-23.1068
SILP	-36.9190	5.8670	641	-6.29	<.0001	0.05	-48.4399	-25.3980
VAKO	-24.2575	2.1563	641	-11.25	<.0001	0.05	-28.4917	-20.0233
VALP	-27.8662	2.9749	641	-9.37	<.0001	0.05	-33.7079	-22.0244
KEKO-KELP	8.8476	3.6144	641	2.45	0.0146	0.05	1.7501	15.9452
ORKO-ORLP	4.6871	3.8670	641	1.21	0.2259	0.05	-2.9064	12.2805
SIKO-SILP	5.5595	7.2169	641	0.77	0.4414	0.05	-8.6122	19.7312
VAKO-VALP	3.6086	3.6742	641	0.98	0.3264	0.05	-3.6063	10.8235
KEKO-ORKO	4.6403	2.1699	641	2.14	0.0329	0.05	0.3792	8.9013
KEKO-SIKO	11.7597	4.4949	641	2.62	0.0091	0.05	2.9332	20.5861
KEKO-VAKO	4.6578	2.6817	641	1.74	0.0829	0.05	-0.6082	9.9237
ORKO-SIKO	7.1194	4.4530	641	1.60	0.1104	0.05	-1.6247	15.8635
ORKO-VAKO	0.01751	2.6108	641	0.01	0.9947	0.05	-5.1092	5.1442
SIKO-VAKO	-7.1019	4.7235	641	-1.50	0.1332	0.05	-16.3773	2.1735
KELP-ORLP	0.4797	4.8279	641	0.10	0.9209	0.05	-9.0008	9.9602
KELP-SILP	8.4715	6.7040	641	1.26	0.2068	0.05	-4.6930	21.6361
KELP-VALP	-0.5813	4.4014	641	-0.13	0.8950	0.05	-9.2241	8.0616
ORLP-SILP	7.9919	6.8709	641	1.16	0.2452	0.05	-5.5003	21.4840
ORLP-VALP	-1.0609	4.6515	641	-0.23	0.8197	0.05	-10.1951	8.0732
SILP-VALP	-9.0528	6.5782	641	-1.38	0.1692	0.05	-21.9702	3.8646

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Parameter Estimates									
Parameter	Estimate	Standard			t Value	Pr > t	95% Confidence		Gradient
		Error	DF				Limits		
c1	-17.4931	1.4888	641	-11.75	<.0001	-20.4167	-14.5695	0.008582	
c2	-24.7319	2.0877	641	-11.85	<.0001	-28.8314	-20.6323	0.002814	
c3	-22.8711	1.2167	641	-18.80	<.0001	-25.2602	-20.4819	-0.00479	
C4	-23.2255	1.7222	641	-13.49	<.0001	-26.6074	-19.8436	-0.02576	
c5	-24.7383	1.9945	641	-12.40	<.0001	-28.6549	-20.8217	0.000971	
c6	-33.3449	4.6230	641	-7.21	<.0001	-42.4229	-24.2669	0.001609	
c7	-21.5232	1.5918	641	-13.52	<.0001	-24.6490	-18.3973	-0.00773	
c8	-24.4774	2.3240	641	-10.53	<.0001	-29.0409	-19.9139	-0.02909	
b1	-0.1221	0.02222	641	-5.50	<.0001	-0.1657	-0.07847	-0.05315	
b2	-0.1048	0.02295	641	-4.56	<.0001	-0.1498	-0.05969	0.058054	
b3	-0.1710	0.03049	641	-5.61	<.0001	-0.2309	-0.1111	-0.00192	
b4	-0.1194	0.02413	641	-4.95	<.0001	-0.1668	-0.07199	-0.01300	
b5	-0.1102	0.02366	641	-4.66	<.0001	-0.1566	-0.06370	0.003507	
b6	-0.08050	0.02372	641	-3.39	0.0007	-0.1271	-0.03392	-0.21610	
b7	-0.1208	0.02342	641	-5.16	<.0001	-0.1668	-0.07482	-0.01255	
b8	-0.09289	0.02158	641	-4.31	<.0001	-0.1353	-0.05052	-0.01216	

Additional Estimates									
Label	Estimate	Standard			t Value	Pr > t	Alpha	Lower	Upper
		Error	DF						
KEKO	-17.4931	1.4888	641	-11.75	<.0001	0.05	-20.4167	-14.5695	
KELP	-24.7319	2.0877	641	-11.85	<.0001	0.05	-28.8314	-20.6323	
ORKO	-22.8711	1.2167	641	-18.80	<.0001	0.05	-25.2602	-20.4819	
ORLP	-23.2255	1.7222	641	-13.49	<.0001	0.05	-26.6074	-19.8436	
SIKO	-24.7383	1.9945	641	-12.40	<.0001	0.05	-28.6549	-20.8217	
SILP	-33.3449	4.6230	641	-7.21	<.0001	0.05	-42.4229	-24.2669	
VAKO	-21.5232	1.5918	641	-13.52	<.0001	0.05	-24.6490	-18.3973	
VALP	-24.4774	2.3240	641	-10.53	<.0001	0.05	-29.0409	-19.9139	
KEKO-KELP	7.2388	2.5642	641	2.82	0.0049	0.05	2.2035	12.2740	
ORKO-ORLP	0.3544	2.1086	641	0.17	0.8666	0.05	-3.7862	4.4951	
SIKO-SILP	8.6066	5.0349	641	1.71	0.0879	0.05	-1.2803	18.4935	
VAKO-VALP	2.9542	2.8169	641	1.05	0.2947	0.05	-2.5772	8.4856	

Additional Estimates								
Label	Estimate	Standard Error	DF	t Value	Pr > t	Alpha	Lower	Upper
KEKO-ORKO	5.3780	1.9227	641	2.80	0.0053	0.05	1.6023	9.1536
KEKO-SIKO	7.2452	2.4889	641	2.91	0.0037	0.05	2.3578	12.1327
KEKO-VAKO	4.0301	2.1796	641	1.85	0.0649	0.05	-0.2499	8.3101
ORKO-SIKO	1.8673	2.3363	641	0.80	0.4245	0.05	-2.7205	6.4550
ORKO-VAKO	-1.3479	2.0036	641	-0.67	0.5014	0.05	-5.2822	2.5865
SIKO-VAKO	-3.2151	2.5519	641	-1.26	0.2082	0.05	-8.2262	1.7959
KELP-ORLP	-1.5063	2.7064	641	-0.56	0.5780	0.05	-6.8208	3.8081
KELP-SILP	8.6130	5.0725	641	1.70	0.0900	0.05	-1.3477	18.5738
KELP-VALP	-0.2545	3.1240	641	-0.08	0.9351	0.05	-6.3889	5.8800
ORLP-SILP	10.1194	4.9334	641	2.05	0.0407	0.05	0.4319	19.8069
ORLP-VALP	1.2519	2.8925	641	0.43	0.6653	0.05	-4.4281	6.9319
SILP-VALP	-8.8675	5.1742	641	-1.71	0.0871	0.05	-19.0280	1.2930

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Parameter Estimates								
Parameter	Estimate	Standard Error	DF	t Value	Pr > t	95% Confidence Limits		Gradient
c1	-13.7214	1.9567	638	-7.01	<.0001	-17.5638	-9.8791	0.003412
c2	-16.8148	1.8375	638	-9.15	<.0001	-20.4232	-13.2065	-0.00122
c3	-17.1197	1.3427	638	-12.75	<.0001	-19.7563	-14.4831	-0.00265
C4	-16.5835	2.2531	638	-7.36	<.0001	-21.0079	-12.1590	-0.00199
c5	-19.0947	1.4065	638	-13.58	<.0001	-21.8567	-16.3328	0.006106
c6	-18.4088	2.1068	638	-8.74	<.0001	-22.5458	-14.2718	0.002495
c7	-16.4866	1.6750	638	-9.84	<.0001	-19.7758	-13.1975	-0.00697
c8	-15.9282	1.8966	638	-8.40	<.0001	-19.6526	-12.2038	0.000200
b1	-0.2271	0.06717	638	-3.38	0.0008	-0.3589	-0.09516	-0.01647
b2	-0.2346	0.06796	638	-3.45	0.0006	-0.3681	-0.1012	-0.01367
b3	-0.4768	0.1490	638	-3.20	0.0014	-0.7695	-0.1841	0.002950
b4	-0.1710	0.05279	638	-3.24	0.0013	-0.2747	-0.06738	-0.00842
b5	-0.3688	0.1122	638	-3.29	0.0011	-0.5891	-0.1485	-0.00482
b6	-0.1852	0.05699	638	-3.25	0.0012	-0.2971	-0.07327	0.023103
b7	-0.2838	0.08185	638	-3.47	0.0006	-0.4446	-0.1231	0.018343
b8	-0.2264	0.06579	638	-3.44	0.0006	-0.3556	-0.09720	0.028128

Additional Estimates								
Label	Estimate	Standard Error	DF	t Value	Pr > t	Alpha	Lower	Upper
KEKO	-13.7214	1.9567	638	-7.01	<.0001	0.05	-17.5638	-9.8791
KELP	-16.8148	1.8375	638	-9.15	<.0001	0.05	-20.4232	-13.2065
ORKO	-17.1197	1.3427	638	-12.75	<.0001	0.05	-19.7563	-14.4831
ORLP	-16.5835	2.2531	638	-7.36	<.0001	0.05	-21.0079	-12.1590
SIKO	-19.0947	1.4065	638	-13.58	<.0001	0.05	-21.8567	-16.3328
SILP	-18.4088	2.1068	638	-8.74	<.0001	0.05	-22.5458	-14.2718
VAKO	-16.4866	1.6750	638	-9.84	<.0001	0.05	-19.7758	-13.1975
VALP	-15.9282	1.8966	638	-8.40	<.0001	0.05	-19.6526	-12.2038
KEKO-KELP	3.0934	2.6843	638	1.15	0.2496	0.05	-2.1776	8.3645
ORKO-ORLP	-0.5362	2.6228	638	-0.20	0.8381	0.05	-5.6867	4.6142
SIKO-SILP	-0.6860	2.5331	638	-0.27	0.7866	0.05	-5.6602	4.2883
VAKO-VALP	-0.5584	2.5304	638	-0.22	0.8254	0.05	-5.5273	4.4105
KEKO-ORKO	3.3983	2.3731	638	1.43	0.1526	0.05	-1.2617	8.0582
KEKO-SIKO	5.3733	2.4098	638	2.23	0.0261	0.05	0.6413	10.1053
KEKO-VAKO	2.7652	2.5757	638	1.07	0.2834	0.05	-2.2927	7.8231
ORKO-SIKO	1.9750	1.9445	638	1.02	0.3101	0.05	-1.8433	5.7934
ORKO-VAKO	-0.6331	2.1467	638	-0.29	0.7682	0.05	-4.8485	3.5824
SIKO-VAKO	-2.6081	2.1872	638	-1.19	0.2335	0.05	-6.9031	1.6869
KELP-ORLP	-0.2314	2.9074	638	-0.08	0.9366	0.05	-5.9407	5.4779
KELP-SILP	1.5939	2.7955	638	0.57	0.5688	0.05	-3.8956	7.0835
KELP-VALP	-0.8866	2.6408	638	-0.34	0.7372	0.05	-6.0723	4.2991
ORLP-SILP	1.8253	3.0846	638	0.59	0.5542	0.05	-4.2319	7.8826
ORLP-VALP	-0.6553	2.9451	638	-0.22	0.8240	0.05	-6.4386	5.1280
SILP-VALP	-2.4806	2.8347	638	-0.88	0.3819	0.05	-8.0471	3.0859