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Appendix A

Table 1: Means and standard deviations of weight (mg) of both sexes of Generation 0.

	Mean	**Standard deviation**	**n**
FEMALE	1.6586	0.1919	50
MALE	1.4508	0.2482	50

Table 2: Means and standard deviations of time to pupation (days) of both sexes of Generation 1.

	Mean	**Standard deviation**	**n**
FEMALE	22.5844	1.8008	794
MALE	22.4856	1.7898	799

Table 3: Means and standard deviations of time to adult emergence (days) of both sexes of Generation 1.

	Mean	**Standard deviation**	**n**
FEMALE	26.9756	1.8743	779
MALE	26.8535	1.8422	785

Table 4: Average duration of pupation (days) and mortality during the pupal stage of Generation 1.

	Duration of Pupation	**Mortality %**	**Survival %**
FEMALE	4.3912	1.89	98.11
MALE	4.3679	1.75	98.25

Table 5: Means and standard deviations of weight (mg) of both sexes of Generation 1.

	Mean	**Standard deviation**	**n**
FEMALE	1.7136	0.2032	50
MALE	1.5900	0.1893	50

Appendix B

Table 1: Means and standard deviations of time to pupation (days) of beetles in Generation 2.

	Mean	**Standard deviation**	**n**
FEMALE	19.4051	1.6109	1296
MALE	19.2555	1.6428	1323

Table 2: Means and standard deviations of time to adult emergence (days) of beetles in Generation 2.

	Mean	**Standard deviation**	**n**
FEMALE	24.2529	1.6902	1289
MALE	24.1223	1.7472	1317

Table 3: Average duration of pupation (days) and mortality during the pupal stage of Generation 1.

	Duration of Pupation	**Mortality %**	**Survival %**
FEMALE	4.8478	0.54	99.46
MALE	4.8668	0.45	99.55

Table 4: Means and standard deviations of weight (mg) of beetles from which parents of diallel were selected.

	Mean	**Standard deviation**	**n**
FEMALE	1.6700	0.2300	180
MALE	1.5491	0.2179	180

Table 5: Means and standard deviations of the four egg collections from Generation 2: EGG1, EGG2, EGG3 and EGG4.

	Mean	**Standard deviation**	**n**
EGG1	11.8571	3.2069	175
EGG2	12.5943	3.4141	175
EGG3	13.6038	3.3114	106
EGG4	13.0286	2.9563	105

Fmax-tests were performed to compare the variances of the egg collections EGG1, EGG2, EGG3 and EGG4:

	F
EGG1-EGG2	1.1334
EGG1-EGG3	1.0662
EGG1-EGG4	1.1767
EGG2-EGG3	1.0630
EGG2-EGG4	1.3337
EGG3-EGG4	1.2547

$F_{0.025}(\infty, \infty) = 1.00$ (Sokal and Rohlf 1981b). Therefore, all variances were significantly different from each other, but not by much. In this case the use of an approximate t-test to test the equality of means was appropriate:

$$t = \frac{(\overline{Y}_1 - \overline{Y}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{n_2} + \frac{S_2^2}{n_1}}}$$

(Sokal and Rohlf 1981a).

t-tests showed that the means of EGG2 and EGG4, and EGG3 and EGG4 were equal but all other comparisons between means showed significant differences. EGG1 may have been less than EGG2, EGG3 and EGG4 because the overall reproductive schedule of the population may have not achieved its platykutic peak at the time of EGG1. The large value of EGG3 may have been due to the stimulus of fresh medium.

Appendix C

This experiment was composed of two replicates per block and four blocks. For each replicate, 100 eggs from the Echarina population were seeded into 200 grams of media *en masse*. All replicates were set up on the one day.

Each block, numbered 1 to 4, was placed in the same position in the incubator as the correspondingly numbered block in the diallel design. From day 15 onwards all replicates were checked for pupae, and the number of individuals pupating each day recorded. Pupae were removed and discarded.

Table 1: Analysis of variance on time to pupation.

Source	d.f.	Mean Square	F	P
MAIN EFFECTS	4	4.164	4.910	***
BLOCK	3	5.080	5.990	***
REP	1	1.368	1.613	NS
BLOCK x REP	3	0.891	1.051	NS
ERROR	676	0.848		
TOTAL	683	0.868		

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$, NS = non-significant

Table 2: The means and standard deviations for time to pupation (day) for each block (BLOCK) and replicate (REP) of each block.

	Mean	**Standard deviation**	**n**
BLOCK1	18.4444	1.0960	171
REP1	18.3012	0.8935	83
REP2	18.5795	1.2477	88
BLOCK2	18.0988	0.8830	172
REP1	18.0602	0.8315	83
REP2	18.1348	0.9317	89
BLOCK3	18.1371	0.8260	175
REP1	18.1000	0.8875	90
REP2	18.1765	0.7587	85
BLOCK4	18.0723	0.8568	166
REP1	18.1111	0.9618	81
REP2	18.0353	0.7472	85
TOTAL	18.1886	0.9315	684

The analysis of variance showed that there was a significant difference between blocks for time to pupation. The least significant differences between means of the blocks were calculated to determine which blocks differed from each other.

Table 3: The least significant differences (lsd) between means of blocks.

Blocks	**lsd**	**P**
BLOCK1–BLOCK2	0.2109	*
BLOCK1–BLOCK3	0.2044	*
BLOCK1–BLOCK4	0.2107	*
BLOCK2–BLOCK3	0.1808	NS
BLOCK2–BLOCK4	0.1865	NS
BLOCK3–BLOCK4	0.1796	NS

* $P \leq 0.05$, NS = non-significant

Block 1's mean was significantly different from all other blocks' means, however all other blocks' means did not significantly differ from each other. The aberration of block 1's results may have been due to possibly unequal sex ratios within blocks. The sexes do slightly differ in their developmental rates and this would have affected results.

There appear to be no environmental trends across or between shelves and it should be safe to assume that the significant difference between block 1's mean and the other blocks' means was an experimental artifact.

Appendix D

Table 1: Means and standard deviations for time to adult emergence for each sex of Generation 3.

	Mean	**Standard deviation**	**n**
MALE	25.0757	1.5103	608
FEMALE	25.2869	1.5071	603

Table 2: Means and standard deviations for time to adult emergence for each sex of Generation 4.

	Mean	**Standard deviation**	**n**
MALE	26.5583	1.4717	618
FEMALE	26.5095	1.4969	630

Table 3: Means and standard deviations for time to adult emergence for each sex of Generation 5.

	Mean	**Standard deviation**	**n**
MALE	23.4380	1.3473	548
FEMALE	23.5073	1.3901	548

Appendix E

Table 1: Total number of eggs laid per line per generation (Blocks combined).

Generation	Fast	Control	Slow
1	1564	1456	1495
2	1459	1432	1394
3	1424	1299	1375
4	1495	1215	1359
5	1692	1706	1576
6	1741	1730	1491
7	1547	1573	1341

Table 2: The number of eggs laid per generation per line (Fast, Slow and Control) of each block by 20 males and 40 females.

Generation	Block	Fast	Control	Slow
1	1	496	514	493
	2	538	489	495
	3	530	453	507
2	1	460	480	456
	2	487	480	481
	3	512	472	457
3	1	444	462	419
	2	445	433	512
	3	535	404	444
4	1	459	389	468
	2	548	436	445
	3	488	390	446
5	1	547	642	556
	2	681	591	552
	3	464	473	468
6	1	563	559	519
	2	606	600	508
	3	572	571	464
7	1	440	547	472
	2	561	542	458
	3	546	484	411

Appendix F

Table 1: Means, standard deviations (SD) and coefficients of variation (CV) of length of development of females in Generation 7 of the selection experiment.

Line	Block	Mean	SD	CV %
FAST	1	25.0247	1.7084	6.8269
	2	25.7027	1.4608	5.6834
	3	24.5363	1.5516	6.3237
CONTROL	1	23.9882	1.5802	6.5874
	2	24.5749	1.9861	8.0818
	3	23.3253	1.3037	5.5892
SLOW	1	30.6259	3.0749	10.0402
	2	29.8750	2.8601	9.5736
	3	28.5731	2.5110	8.7880

Table 2: Means, standard deviations (SD) and coefficients of variation (CV) of length of development of males in Generation 7 of the selection experiment.

Line	Block	Mean	SD	CV %
FAST	1	24.9947	2.0254	8.1033
	2	25.7660	2.1201	8.2283
	3	24.5116	1.9300	7.8738
CONTROL	1	23.7735	1.4827	6.2368
	2	24.3425	1.9102	7.8472
	3	23.4920	1.3254	5.6419
SLOW	1	31.1667	3.2449	10.4114
	2	29.8794	2.9215	9.7776
	3	28.3440	2.2353	7.8863

Appendix G

Table 1: Analysis of variance and variance components for PUPN of *T. castaneum* males.

Source	d.f.	Mean Square	Component of Variance
P	3	25.87565***	
S(U)	52	3.11166***	0.16114
D(U)	51	6.39730***	0.48970
ERROR	892	1.50026	1.50026

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 2: Analysis of variance and variance components for ADULT of *T. castaneum* males.

Source	d.f.	Mean Square	Component of Variance
P	3	32.84492***	
S(U)	52	2.88087**	0.13983
D(U)	51	6.46345***	0.49809
ERROR	892	1.48256	1.48256

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 3: Analysis of variance and variance components for WT70 of *T. castaneum* males.

Source	d.f.	Mean Square	Component of Variance
P	3	0.10825*	
S(U)	52	0.08953***	0.00559
D(U)	51	0.10699***	0.00734
ERROR	892	0.03359	0.03359

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 4: Analysis of variance and variance components for GR of *T. castaneum* males.

Source	d.f.	Mean Square	Component of Variance
P	3	6.75572***	
S(U)	52	1.16591***	0.07848
D(U)	51	1.43859***	0.10575
ERROR	892	0.38109	0.38109

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 5: Analysis of variance and variance components for ALS of *T. castaneum* males.

Source	d.f.	Mean Square	Component of Variance
P	3	12420.65333	
S(U)	52	9928.22500**	229.28364
D(U)	51	12319.10784***	468.37181
SxD(U)	47	7635.38936	475.89599
ERROR	845	5255.90885	5255.90885

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 6: Analysis of variance and variance components for DEATH of *T. castaneum* males.

Source	d.f.	Mean Square	Component of Variance
P	3	11292.01667	
S(U)	52	9957.87115**	229.50774
D(U)	51	12207.83333***	454.50401
SxD(U)	47	7662.79362*	481.04203
ERROR	845	5257.58313	5257.58313

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Appendix H

Table 1: Analysis of variance and variance components for PUPN of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	39.48677***	
S(U)	52	3.64620***	0.15455
D(U)	51	7.02261***	0.49219
SxD(U)	47	2.10072	0.05989
ERROR	879	1.80127	1.80127

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 2: Analysis of variance and variance components for ADULT of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	46.95917***	
S(U)	52	3.29976**	0.13978
D(U)	51	6.75330***	0.48514
SxD(U)	47	1.90192	0.01944
ERROR	879	1.80474	1.80474

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 3: Analysis of variance and variance components for WT70 of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	0.07611	
S(U)	52	0.12261***	0.00785
D(U)	51	0.12822***	0.00841
SxD(U)	47	0.04411	0.00004
ERROR	879	0.04392	0.04392

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 4: Analysis of variance and variance components for GR of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	8.44684***	
S(U)	52	1.47390***	0.09578
D(U)	51	2.13688***	0.16207
SxD(U)	47	0.51613	0.00943
ERROR	879	0.46896	0.46896

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 5: Analysis of variance and variance components for ALS of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	0.55089	
S(U)	52	0.40083	-0.00457
D(U)	51	0.60155***	0.01550
SxD(U)	47	0.44652*	0.03123
ERROR	879	0.29035	0.29035

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 6: Analysis of variance and variance components for DEATH of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	0.60035	
S(U)	52	0.40265	-0.00480
D(U)	51	0.60628***	0.01556
SxD(U)	47	0.45066*	0.03184
ERROR	879	0.29144	0.29144

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 7: Analysis of variance and variance components for EGGTOT of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	10.42104	
S(U)	52	49.80894***	1.50997
D(U)	51	50.91539***	1.62062
SxD(U)	47	34.70923	2.00664
ERROR	879	24.67605	24.67605

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 8: Analysis of variance and variance components for MAXEGG of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	11.49797	
S(U)	52	12.48908***	0.60884
D(U)	51	15.42396***	0.90232
SxD(U)	47	6.40071	0.23877
ERROR	879	5.20687	5.20687

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 9: Analysis of variance and variance components for MAXDAY of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	28.81568***	
S(U)	52	3.17715	-0.09717
D(U)	51	2.41084	-0.17380
SxD(U)	47	4.14880**	0.38104
ERROR	879	2.24363	2.24363

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 10: Analysis of variance and variance components for LASEGG of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	0.17750	
S(U)	52	0.36554*	0.00593
D(U)	51	0.52522***	0.02190
SxD(U)	47	0.30620	0.01509
ERROR	879	0.23075	0.23075

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 11: Analysis of variance and variance components for RLS of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	0.15540	
S(U)	52	0.36414*	0.00596
D(U)	51	0.51800***	0.02134
SxD(U)	47	0.30455	0.01483
ERROR	879	0.23038	0.23038

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 12: Analysis of variance and variance components for DAY011 of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	4878.33333***	
S(U)	52	896.55135***	39.33378
D(U)	51	786.09961**	28.28861
SxD(U)	47	503.21362	15.83569
ERROR	879	424.03511	424.03511

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 13: Analysis of variance and variance components for DAY711 of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	1215.66600***	
S(U)	52	267.41712***	13.41696
D(U)	51	275.30137***	14.20540
SxD(U)	47	133.24743	3.36687
ERROR	879	116.41306	116.41306

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 14: Analysis of variance and variance components for EGG54 of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	19.34668	
S(U)	52	16.67027**	0.61828
D(U)	51	19.67571***	0.91882
SxD(U)	47	10.48747	0.40574
ERROR	879	8.45877	8.45877

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 15: Analysis of variance and variance components for Q1R of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	2.33208	
S(U)	52	4.28830	0.03933
D(U)	51	6.41880***	0.25238
SxD(U)	47	3.89502	0.17457
ERROR	879	3.02217	3.02217

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 16: Analysis of variance and variance components for Q2R of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	1.63839	
S(U)	52	5.08913**	0.10859
D(U)	51	5.36020***	0.13570
SxD(U)	47	4.00324*	0.27020
ERROR	879	2.65225	2.65225

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 17: Analysis of variance and variance components for Q3R of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	0.16309	
S(U)	52	4.01907***	0.10514
D(U)	51	3.34019**	0.03725
SxD(U)	47	2.96769*	0.20641
ERROR	879	1.93563	1.93563

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 18: Analysis of variance and variance components for Q4R of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	9.06254	
S(U)	52	21.63423*	0.39095
D(U)	51	17.63459	-0.00902
SxD(U)	47	17.72475	0.89575
ERROR	879	13.24601	13.24601

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 19: Analysis of variance and variance components for ADFR of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	6.72900	
S(U)	52	8.55067***	0.46449
D(U)	51	6.83478***	0.29291
SxD(U)	47	3.90573	0.14657
ERROR	879	3.17288	3.17288

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 20: Analysis of variance and variance components for ADFQ1R of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	2.62386	
S(U)	52	9.38426***	0.35872
D(U)	51	10.81896***	0.50219
SxD(U)	47	5.79710	0.30772
ERROR	879	4.25848	4.25848

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 21: Analysis of variance and variance components for ADFQ2R of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	15.37039*	
S(U)	52	13.48199***	0.68813
D(U)	51	11.04578***	0.44451
SxD(U)	47	6.60069	0.30577
ERROR	879	5.07182	5.07182

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 22: Analysis of variance and variance components for ADFQ3R of T. *castaneum females*.

Source	d.f.	Mean Square	Component of Variance
P	3	15.51725	
S(U)	52	14.94409***	0.60515
D(U)	51	11.47901*	0.25864
SxD(U)	47	8.89263	0.35128
ERROR	879	7.13625	7.13625

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 23: Analysis of variance and variance components for ADFQ4R of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	0.38169	
S(U)	52	0.34691	-0.00501
D(U)	51	0.32440	-0.00726
SxD(U)	47	0.39699	0.01893
ERROR	879	0.30234	0.30234

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 24: Analysis of variance and variance components for Q1L of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	7.02069	
S(U)	52	4.69247	-0.04098
D(U)	51	7.33066**	0.22284
SxD(U)	47	5.10230	0.28040
ERROR	879	3.70031	3.70031

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 25: Analysis of variance and variance components for Q2L of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	1.23643	
S(U)	52	5.91834**	0.06010
D(U)	51	6.44256***	0.11252
SxD(U)	47	5.31738*	0.43833
ERROR	879	3.12573	3.12573

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 26: Analysis of variance and variance components for Q3L of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	0.51355	
S(U)	52	6.18914***	0.27991
D(U)	51	4.57020*	0.11801
SxD(U)	47	3.39006	0.11028
ERROR	879	2.83867	2.83867

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 27: Analysis of variance and variance components for Q4L of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	0.72282	
S(U)	52	1.79698*	0.02227
D(U)	51	1.67159	0.00973
SxD(U)	47	1.57427	0.07787
ERROR	879	1.18494	1.18494

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 28: Analysis of variance and variance components for ADFL of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	7.18620	
S(U)	52	10.14504***	0.47939
D(U)	51	7.74880**	0.23977
SxD(U)	47	5.35113	0.16813
ERROR	879	4.51047	4.51047

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 29: Analysis of variance and variance components for ADFQ1L of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	3.24994	
S(U)	52	9.49312***	0.38729
D(U)	51	11.02478***	0.54045
SxD(U)	47	5.62026	0.27149
ERROR	879	4.26284	4.26284

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 30: Analysis of variance and variance components for ADFQ2L of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	13.46135	
S(U)	52	16.09603***	0.80936
D(U)	51	12.29549**	0.42931
SxD(U)	47	8.00243	0.15135
ERROR	879	7.24568	7.24568

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 31: Analysis of variance and variance components for ADFQ3L of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	22.23024	
S(U)	52	24.17698**	0.86286
D(U)	51	17.75239	0.22040
SxD(U)	47	15.54842	0.49800
ERROR	879	13.05844	13.05844

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 32: Analysis of variance and variance components for ADFQ4L of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	6.03388	
S(U)	52	7.98262	-0.15983
D(U)	51	7.15008	-0.24309
SxD(U)	47	9.58096	0.59151
ERROR	879	6.62342	6.62342

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 33: Analysis of variance and variance components for MED1 of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	6.37103*	
S(U)	52	5.43104***	0.22658
D(U)	51	6.02131***	0.28561
SxD(U)	47	3.16522*	0.20704
ERROR	888	2.13000	2.13000

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Table 34: Analysis of variance and variance components for MED2 of *T. castaneum* females.

Source	d.f.	Mean Square	Component of Variance
P	3	35.59991	
S(U)	52	38.75733***	1.05872
D(U)	51	40.97726***	1.28071
SxD(U)	47	28.17017*	1.76202
ERROR	888	19.36007	19.36007

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$

Appendix I

Table 1: Analysis of Variance on male WT.

Source	d.f.	Mean Square	F	P
BLOCK	2	0.7474		
LINE	2	0.4927	1.3604	NS
EXPERIMENTAL ERROR	4	0.3622		
SAMPLING ERROR	844	0.0408		
TOTAL	852			

NS = non-significant

Table 2: Analysis of Variance on male ADULT.

Source	d.f.	Mean Square	F	P
BLOCK	2	13.5090		
LINE	2	1773.1043	103.0025	***
EXPERIMENTAL ERROR	4	17.2142		
SAMPLING ERROR	844	3.1646		
TOTAL	852			

*** $P \leq 0.001$

Table 3: Analysis of Variance on male GR (values for growth rate were multiplied by 100).

Source	**d.f.**	**Mean Square**	**F**	**P**
BLOCK	2	18.3871		
LINE	2	115.4755	18.4555	**
EXPERIMENTAL ERROR	4	6.2570		
SAMPLING ERROR	844	0.8084		
TOTAL	852			

** $p \leq 0.01$

Appendix J

Table 1: Analysis of variance on female WT.

Source	d.f.	Mean Square	F	P
BLOCK	2	1.1233		
LINE	2	0.2824	0.4133	NS
EXPERIMENTAL ERROR	4	0.6833		
SAMPLING ERROR	831	0.0434		
TOTAL	839			

NS = non-significant

Table 2: Analysis of Variance on female ADULT.

Source	d.f.	Mean Square	F	P
BLOCK	2	0.5039		
LINE	2	1564.8175	460.2675	***
EXPERIMENTAL ERROR	4	3.3998		
SAMPLING ERROR	831	2.5540		
TOTAL	839			

*** $P \leq 0.001$

Table 3: Analysis of Variance on female GR (x 100).

Source	d.f.	Mean Square	F	P
BLOCK	2	23.7781		
LINE	2	134.6859	11.1092	*
EXPERIMENTAL ERROR	4	12.1238		
SAMPLING ERROR	831	0.7898		
TOTAL	839			

* $P \leq 0.05$

Table 4: Analysis of Variance on female DEATH.

Source	d.f.	Mean Square	F	P
BLOCK	2	4782.1563		
LINE	2	130.8438	0.0331	NS
EXPERIMENTAL ERROR	4	3949.1016		
SAMPLING ERROR	831	3480.4667		
TOTAL	839			

NS = non-significant

Table 5: Analysis of Variance on female ALS.

Source	d.f.	Mean Square	F	P
BLOCK	2	4765.9531		
LINE	2	989.3906	0.2474	NS
EXPERIMENTAL ERROR	4	3999.6953		
SAMPLING ERROR	831	3499.2772		
TOTAL	839			

NS = non-significant

Table 6: Analysis of Variance on EGGTOT (x 0.01).

Source	d.f.	Mean Square	F	P
BLOCK	2	95.2766		
LINE	2	184.1387	1.1204	NS
EXPERIMENTAL ERROR	4	164.3436		
SAMPLING ERROR	831	43.9000		
TOTAL	839			

NS = non-significant

Table 7: Analysis of Variance on MAXEGG.

Source	d.f.	Mean Square	F	P
BLOCK	2	209.6249		
LINE	2	97.2656	0.5265	NS
EXPERIMENTAL ERROR	4	184.7479		
SAMPLING ERROR	831	28.2834		
TOTAL	839			

NS = non-significant

Table 8: Analysis of Variance on MAXDAY (square root transformed).

Source	d.f.	Mean Square	F	P
BLOCK	2	2.7159		
LINE	2	0.9344	0.6804	NS
EXPERIMENTAL ERROR	4	1.3733		
SAMPLING ERROR	831	3.4363		
TOTAL	839			

NS = non-significant

Table 9: Analysis of Variance on LASEGG.

Source	d.f.	Mean Square	F	P
BLOCK	2	1028.9788		
LINE	2	2459.1875	0.6032	NS
EXPERIMENTAL ERROR	4	4076.8203		
SAMPLING ERROR	831	2974.4360		
TOTAL	839			

NS = non-significant

Table 10: Analysis of Variance on RLS.

Source	d.f.	Mean Square	F	P
BLOCK	2	1049.4219		
LINE	2	1468.0625	0.3660	NS
EXPERIMENTAL ERROR	4	4011.4141		
SAMPLING ERROR	831	2991.7398		
TOTAL	839			

NS = non-significant

Table 11: Analysis of Variance on DAY711.

Source	d.f.	Mean Square	F	P
BLOCK	2	3536.9668		
LINE	2	1007.1621	0.4079	NS
EXPERIMENTAL ERROR	4	2469.4131		
SAMPLING ERROR	831	465.1437		
TOTAL	839			

NS = non-significant

Table 12: Analysis of Variance on EGG54.

Source	d.f.	Mean Square	F	P
BLOCK	2	375.3965		
LINE	2	41.0125	0.2540	NS
EXPERIMENTAL ERROR	4	161.4531		
SAMPLING ERROR	831	33.0283		
TOTAL	839			

NS = non-significant

Table 13: Analysis of Variance on Q1R (x 0.01).

Source	d.f.	Mean Square	F	P
BLOCK	2	3.8641		
LINE	2	2.2562	0.1167	NS
EXPERIMENTAL ERROR	4	19.3270		
SAMPLING ERROR	831	5.0781		
TOTAL	839			

NS = non-significant

Table 14: Analysis of Variance on Q2R (x 0.01).

Source	d.f.	Mean Square	F	P
BLOCK	2	8.3040		
LINE	2	10.3745	0.6494	NS
EXPERIMENTAL ERROR	4	15.9746		
SAMPLING ERROR	831	4.2831		
TOTAL	839			

NS = non-significant

Table 15: Analysis of Variance on Q3R (x 0.01).

Source	d.f.	Mean Square	F	P
BLOCK	2	10.7268		
LINE	2	30.7576	3.3832	NS
EXPERIMENTAL ERROR	4	9.0912		
SAMPLING ERROR	831	3.2447		
TOTAL	839			

NS = non-significant

Table 16: Analysis of Variance on Q4R (square root transformed).

Source	d.f.	Mean Square	F	P
BLOCK	2	89.9475		
LINE	2	180.0017		
EXPERIMENTAL ERROR	4	54.0837	3.3282	NS
SAMPLING ERROR	831	25.3569		
TOTAL	839			

NS = non-significant

Table 17: Analysis of Variance on ADFR.

Source	d.f.	Mean Square	F	P
BLOCK	2	139.4922		
LINE	2	119.6098	2.2874	NS
EXPERIMENTAL ERROR	4	52.2896		
SAMPLING ERROR	831	13.8067		
TOTAL	839			

NS = non-significant

Table 18: Analysis of Variance on ADFQ1R.

Source	d.f.	Mean Square	F	P
BLOCK	2	117.2582		
LINE	2	16.8644	0.2006	NS
EXPERIMENTAL ERROR	4	84.0883		
SAMPLING ERROR	831	19.4899		
TOTAL	839			

NS = non-significant

Table 19: Analysis of Variance on ADFQ2R.

Source	d.f.	Mean Square	F	P
BLOCK	2	189.6151		
LINE	2	114.5894	1.5310	NS
EXPERIMENTAL ERROR	4	74.8473		
SAMPLING ERROR	831	22.7616		
TOTAL	839			

NS = non-significant

Table 20: Analysis of Variance on ADFQ3R.

Source	d.f.	Mean Square	F	P
BLOCK	2	229.0660		
LINE	2	327.5581	5.7151	NS
EXPERIMENTAL ERROR	4	57.3146		
SAMPLING ERROR	831	20.6909		
TOTAL	839			

NS = non-significant

Table 21: Analysis of Variance on ADFQ4R (square root transformed).

Source	d.f.	Mean Square	F	P
BLOCK	2	4.2959		
LINE	2	5.6480	3.5165	NS
EXPERIMENTAL ERROR	4	1.6062		
SAMPLING ERROR	831	0.7174		
TOTAL	839			

NS = non-significant

Table 22: Analysis of Variance on Q1L (x 0.01).

Source	d.f.	Mean Square	F	P
BLOCK	2	2.4466		
LINE	2	3.0235	0.1684	NS
EXPERIMENTAL ERROR	4	17.9529		
SAMPLING ERROR	831	5.8233		
TOTAL	839			

NS = non-significant

Table 23: Analysis of Variance on Q2L (x 0.01).

Source	d.f.	Mean Square	F	P
BLOCK	2	9.6662		
LINE	2	14.7409	0.9502	NS
EXPERIMENTAL ERROR	4	15.5140		
SAMPLING ERROR	831	4.7952		
TOTAL	839			

NS = non-significant

Table 24: Analysis of Variance on Q3L (x 0.01).

Source	d.f.	Mean Square	F	P
BLOCK	2	10.9213		
LINE	2	26.0929	2.1038	NS
EXPERIMENTAL ERROR	4	12.4030		
SAMPLING ERROR	831	3.7229		
TOTAL	839			

NS = non-significant

Table 25: Analysis of Variance on Q4L (x 0.01).

Source	d.f.	Mean Square	F	P
BLOCK	2	3.2766		
LINE	2	10.7070	5.1336	NS
EXPERIMENTAL ERROR	4	2.0857		
SAMPLING ERROR	831	1.3308		
TOTAL	839			

NS = non-significant

Table 26: Analysis of Variance on ADFL.

Source	d.f.	Mean Square	F	P
BLOCK	2	158.4481		
LINE	2	96.2172	1.4890	NS
EXPERIMENTAL ERROR	4	64.6192		
SAMPLING ERROR	831	14.8214		
TOTAL	839			

NS = non-significant

Table 27: Analysis of Variance on ADFQ1L.

Source	d.f.	Mean Square	F	P
BLOCK	2	120.2263		
LINE	2	14.0729	0.1592	NS
EXPERIMENTAL ERROR	4	88.4131		
SAMPLING ERROR	831	19.6176		
TOTAL	839			

NS = non-significant

Table 28: Analysis of Variance on ADFQ2L.

Source	d.f.	Mean Square	F	P
BLOCK	2	249.2819		
LINE	2	121.8882	1.2952	NS
EXPERIMENTAL ERROR	4	94.1050		
SAMPLING ERROR	831	24.6577		
TOTAL	839			

NS = non-significant

Table 29: Analysis of Variance on ADFQ3L.

Source	d.f.	Mean Square	F	P
BLOCK	2	251.7809		
LINE	2	239.9586	2.4394	NS
EXPERIMENTAL ERROR	4	98.3674		
SAMPLING ERROR	831	26.4691		
TOTAL	839			

NS = non-significant

Table 30: Analysis of Variance on ADFQ4L.

Source	d.f.	Mean Square	F	P
BLOCK	2	64.4541		
LINE	2	92.0044	5.7501	NS
EXPERIMENTAL ERROR	4	16.0005		
SAMPLING ERROR	831	11.9707		
TOTAL	839			

NS = non-significant

Table 31: Analysis of Variance on PROD/100 (inverse sine transformed).

Source	d.f.	Mean Square	F	P
BLOCK	2	1.4523		
LINE	2	0.0531	0.0695	NS
EXPERIMENTAL ERROR	4	0.7641		
SAMPLING ERROR	831	0.2164		
TOTAL	839			

NS = non-significant