

US EPA ARCHIVE DOCUMENT

1/12/89

DATA EVALUATION RECORD

- 1. Chemical: Ignite; Hoe 39866
- 2. Test Material: 98.4% (Technical ai)
- 3. Study Type: Avian Reproduction

Species Tested: Bobwhite quail
(Colinus virginianus)

- 4. Study ID: Roberts, N.L., Phillips, C.N.K., and Chanter, D.O. (1986) The Effects of Dietary Inclusion of Hoe 39866 Active Ingredient Technical (Code: Hoe 39866 OH ZC98 0002) on Reproduction in the Bobwhite Quail; Report No. A33114; Prepared by Huntingdon Research Centre Ltd. for Hoechst Celanese Corporation, Route 202-206 North, Somerville, New Jersey 08876.

- 5. Reviewed By:

Curtis E. Laird
Fishery Biologist
EEB/HED

Signature: Curtis E. Laird

Date: 9-30-88

- 6. Approved By:

Norman J. Cook
Supervisory Biologist
EEB/HED

Signature: Norman J. Cook

Date: 1-12-89

- 7. Conclusions:

Based on the submitted data, it appears that Ignite does not cause reproductive impairment for the number of eggs laid, eggs set, eggs cracked, food consumption, 14-day survival, egg shell thickness, 14-day body weights, and number hatched. This study indicates the NOEL was > 400 ppm for Ignite. This study, however, does not fulfill the requirement in support of registration for an avian reproduction study because the residue analysis data require clarification. Also, said study would only support those uses resulting in EECs in/on avian food items of 400 ppm or less.

- 8. Recommendations: N/A

9. Background:

This study was submitted to support Ignite (Hoe 39866) registration.

10. Discussion of Individual Test: N/A

11. Material and Methods

A. Test Animals - Young adult bobwhite quail that were approaching their first breeding season were obtained from Mr. Wise, Monkfield, Bourne, Cambridgeshire. The birds were approximately 4 months old on arrival and 5 months old when the test was initiated. A total of 80 males and 80 females, with an additional 16 males and 16 females for use as replacement birds, were used.

B. Test System - Adult birds were housed in treatment replicate groups each consisting of one male and one female. The groups were housed in tiered cages of polythene-coated steel wire, each measuring approximately 31.5 cm x 38.5 cm x 24 cm. Each cage contained a nipple drinker and had an externally-attached stainless steel food hopper. There was a sloping floor with a 10 cm egg catcher. The maximum and minimum temperature and the relative humidity were recorded once daily throughout the study, with the following results:

	<u>Mean</u>	<u>Standard Deviation</u>
Maximum temperature	22 °C	+ 3 °C
Minimum temperature	18 °C	+ 3 °C
Relative humidity	60%	+ 14%

C. Dose - Fourteen days prior to the start of the treatment period the birds were allocated randomly to cages, with one male and one female in each cage. There was a total of four treatment groups, with 20 replicates of each treatment as shown below:

<u>Group</u>	<u>Treatment</u>	<u>Number of Replicates</u>	<u>Birds per Replicate</u>		<u>Birds per Treatment</u>	
			<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
A	Control	20	1	1	20	20
B	Hoe 39866 25 ppm	20	1	1	20	20
C	Hoe 39866 100 ppm	20	1	1	20	20
D	Hoe 39866 400 ppm	20	1	1	20	20

In addition to the above birds, four replicates per treatment were maintained for use as replacements if

necessary during the pre-egg production period.

- D. Statistics - No statistical analysis method was mentioned in this report.

Feeding - The adult birds were given basic diet only or basic diet with test compound incorporated, depending on treatment group, throughout the 24-week test period. The basic diet was quail layer diet manufactured by Special Diet Services Limited, Witham, Essex, and contained no antibiotics or other growth promoters. Water was available at all times from automatic cup drinkers.

Diet Preparation - A weighed amount of test material was added to untreated diet to give a premix of 20,000 ppm (3000 ppm in preliminary study), which was mixed by being shaken in an inflated polythene bag for a minimum of 3 minutes prior to incorporation in the diets. Aliquots of premix were used to prepare the final inclusion levels. The diets were prepared weekly in batches of 30 to 40 kg (12 kg in preliminary study) and were blended in a double-cone blender for a minimum of 7 minutes.

Samples were taken from all diets at the time of the week 1 mix of the preliminary study as follows:

- 2 x 200 g from the first kg discharged;
- 2 x 200 g from the approximate center of the discharge; and
- 2 x 200 g from the final kg discharged.

The above samples were analyzed for homogeneity and stability by the sponsor.

Egg Collection, Storage, and Incubation

Egg Collection - All eggs laid were collected over a 12-week period from the beginning of week 13 until the end of week 24. The eggs were labeled with the study schedule number, treatment and replicate number, and the date collected, and were then stored on plastic egg trays according to replicate at a temperature of approximately 16 °C and mean relative humidity of 84 percent. Eggs were allowed to stand at room temperature (20 °C) for at least 12 hours prior to incubation. At the end of each 7-day period the eggs were weighed and replicate group mean weights recorded. Each egg was then candled and any broken or cracked eggs were recorded and discarded. The remaining eggs, with the exception of those taken for shell thickness determination, were placed on setting trays in an incubator.

Egg Shell Thickness - The first egg laid in each replicate during weeks 13, 15, 17, 19, 21, and 23 in the egg production period were taken to be examined for shell thickness. The eggs were cracked open at the widest point and the contents washed out with tap water. The shells were then left to dry out at room temperature for at least 48 hours. The shell thickness of each egg

was measured at four points around the circumference of the shell using a micrometer calibrated to 0.01 mm.

Incubation - Eggs were placed in a Sologne 36 incubator at weekly intervals. The incubator was set to run at a temperature of 37.7 °C and a humidity of 57 percent. The eggs were turned automatically once every 60 minutes through an angle of 90° (45° each side of the horizontal) throughout the incubation period. After 21 days the eggs were transferred to hatchers, where hatching occurred within a few days.

Candling - In addition to being candled prior to incubation for cracks, all eggs were candled on days 11 and 18 of the incubation period. At day 11 all infertile eggs and eggs showing early embryonic deaths were recorded and removed. At day 18 late embryonic deaths were recorded and removed. Early and late embryonic deaths were determined on the basis of candling only and the eggs were not cracked open unless the candling result was difficult to assess.

Hatching - On day 21 of the incubation period the eggs were transferred from one incubator to the hatcher. Each hatcher tray was divided into sections using hard-board partitions so that the chicks could be kept separate according to replicate on hatching. The temperature of the hatchers was checked daily. The hatchers used were sill-air Bristol incubator models PH 90 and PH 150 and were designed to run at a temperature of 37.5 °C (99.5 °F). All chicks were removed from the hatcher within 24 hours of hatching and were weighed, tagged, and placed in floor pens.

Chicks

Identification - After hatching, the chicks were individually identified by means of colored plastic leg bands. The following color coding system was used:

Group A	Control	-	White
Group B	Hoe 39866 25 ppm	-	Yellow
Group C	Hoe 39866 100 ppm	-	Green

Group D Hoe 39866 400 ppm - Red

Accommodation - The chicks were housed in wooden pens with concrete floors. Each pen contained two drinkers and two food hoppers. Wood shavings supplied by the Sawdust Marketing Company Limited, were used as bedding. Each pen contained two 300-watt infrared lamps placed at bird level to supply additional heat to the chicks. Maximum and minimum temperatures and relative humidity were recorded once daily throughout the study with the following mean values:

	<u>Mean</u>	<u>Standard Deviation</u>
Maximum temperature	26 °C	+ 2 °C
Minimum temperature	22 °C	+ 2 °C
Relative humidity	53%	+ 7%

A continuous lighting pattern was adopted for the chicks.

Feeding - The chicks were given standard HRC chick diet made by Joseph Odam Limited, Petersborough, Cambridge-shire, which had the following composition:

<u>Ingredient</u>	<u>Percent w/w</u>
Ground wheat	30.0
Ground maize	25.0
Ground barley	10.0
Provimi 66 fish meal	15.0
Soya bean meal	13.75
Weatings	5.0
Pantoribin 537*	1.25

*Mineral, vitamin, and trace element supplement (BP Nutrition (UK) Ltd.)

The diet contained no antibiotic or other growth promoter.

Observations

Adult birds

Mortalities	Daily
Bird Health	Assessed daily
Bodyweights	Individual bodyweights were recorded on days -14, 0, 14, 28, 42, 56, 70, 4, and 168.

Food Consumption

Replicate group mean food consumption was recorded once weekly throughout the study.

Macroscopic
post mortem
examination

All birds which died during the study and all birds surviving at termination of the study were examined post mortem.

Eggs

Egg collection

Eggs were collected daily throughout the 12-week egg production period.

Egg weights

Eggs were weighed at the end of each 7-day collection period.

Cracked and broken
eggs

Recorded and removed at time of weighing.

Egg shell thickness

The first egg laid in each replicate in weeks 13, 15, 17, 19, 21, and 23 was taken for egg shell thickness examination.

Infertile eggs

Eggs were candled on day 11 of the incubation period and infertile eggs removed.

Early embryonic
deaths

Eggs were candled on day 11 of the incubation period and eggs showing early embryonic death were removed.

Late embryonic
deaths

Eggs were candled on day 18 of the incubation period and eggs showing late embryonic death were removed.

Chicks

Number of chicks hatched alive	Weekly
Chick health	Assessed daily
Bodyweights	Individual bodyweights were recorded within 24 hours of hatching and on day 14 after hatching.
Mortalities	Daily
Macroscopic post mortem examination	All chicks which died during the 14-day observation period were examined for gross abnormalities.

Summary of Study Duration

Adults - 12-week pre-egg production period.

Incubation - 12-week egg production period.

The total study duration from the start of the adult observation period to the final chick observation was 24 weeks.

Statistical Analysis

The following parameters were analyzed statistically:

1. Adult food consumption;
2. Adult bodyweight;
3. Number of eggs laid and mean egg weight;
4. Proportion of eggs damaged;
5. Egg shell thickness;
6. Numbers of infertilities, embryonic deaths and hatchings;
7. Numbers of 14-day-old surviving chicks; and
8. Chick bodyweights at hatching and 14 days later.

12. Reported Results

1. Mortalities and Bird Health - The following mortalities occurred during weeks -1 to 12 (pre-egg production period):

<u>Replicate/ Group</u>	<u>Bird Number</u>	<u>Day of Death</u>	<u>Replacement</u>
14A	2/8F	-1*	82A (163M, 164F)
3A	5M	56	81A (161M, 162F)
18A	36F	74	83A (165M, 166F)
35B	70F	52	85B (169M, 170F)
54C	107M	-1*	90C (179M, 180F)
48C	95M	56*	89C (177M, 178F)
51C	102F	76*	92C (183M, 184F)
67D	134F	77	93D (185M, 186F)

*Sacrificed

Where one bird in a replicate group died or was sacrificed, the replicate was replaced by a spare replicate. Two birds (Nos. 28F and 107M) showed marked body-weight losses during the pretreatment period (week -1) and replicates 14A and 54C were, therefore, discarded.

The following mortalities occurred during weeks 13 to 24 (egg production period).

<u>Replicate/ Group</u>	<u>Bird Number</u>	<u>Day of Death</u>
83A+	166F	100
4A	7M	126
85B+	170F	160
41C	82F	98
41C	81M	112
43C	85M	117
53C	105M	133*
77D	154F	147

+Replacement replicate

*Sacrificed

In general, bird health was good throughout the study. Individual bird observations are given in Appendix 4.

The majority of observations made were of physical injuries and were not considered to be related to treatment.

Adult Bodyweight - There were no treatment-related effects on body weight during the study. Statistical analysis of the results confirmed that there were no significant differences between groups (see Table 3 for more detail).

Food Consumption - Food consumption was similar in all groups, tending to be generally higher during the egg production period (weeks 13 to 24). Statistical analysis of the results showed no significant differences between treatments (see Table 4 for more detail).

Postmortem Examination - Sporadic mortalities. One bird was found hanging by the neck at the back of the cage, swollen foot, wound on the top of the head, etc. None of the above observations was considered to be related to treatment.

Postexamination Finding - All birds surviving the 24-week study period were also examined. No abnormalities were detected in any of the birds.

2. Eggs

Eggs Laid - The total number of eggs laid was higher in Group B (25 ppm) and Group D (400 ppm). The number of eggs laid in Group A (control) and Group C (100 ppm) were similar. The statistical analysis of the results shows no significant difference between treatments (see Table 5).

Broken and Cracked Eggs - The percentage of eggs laid which were cracked or broken varied considerably from week to week, but did not appear to be due to treatment-related effects. Statistical analysis of the results shows no significant differences between treatments (see Table 6 for more detail).

Egg Weight - The total egg weight (mass) was directly related to the number of eggs laid. Statistical analysis showed that there were no significant differences in mean egg weights between treatments.

Egg Shell Thickness - Egg shell thickness was similar in all groups and statistical analysis shows no significant difference between treatments (see Table 8 for more detail).

Infertile Eggs - The proportions of infertile eggs varied considerably from week to week within treatment groups, but there was no evidence of any treatment-related effect. Statistical analysis of the results showed no significant differences between treatments (see Tables 9 and 10).

Early Embryonic Deaths - The proportions of fertile eggs which showed early embryonic death at day 11 candling were generally small and no significant treatment differences were detected during statistical analysis (see Tables 9 and 10).

Late Embryonic Deaths - The incidence of late embryonic death recorded at day 18 candling was low and no statistically significant treatment differences were found (see Tables 9 and 10).

Hatching - The proportions of fertile eggs which subsequently hatched (hatchability) were generally high and statistical analysis of the results showed no significant differences between treatments. No significant differences in numbers of dead in shell were found between treatments (see Table 11).

3. Chicks

Chick Health and Mortalities The majority of chicks were in good health at time of hatching and remained so for the duration of the 14-day observation period. During week 22 of the study two infrared lamps failed overnight and a number of chicks from the week 165 hatch died as a result. A small number of birds which died during the 14-day observation period were found to have been pecked on or around the beak. This may have occurred after death or may have been caused by "bullying," leading to death. Details of mortalities and abnormalities observed (curled toes, twisted necks) are given in Appendix 10.

Bodyweight - All mean chick bodyweights at hatching and after 14 days were similar overall. Statistical analysis showed no significant differences between treatments (see Table 12).

Numbers of 14-Day Survivors - The proportion of chicks surviving to day 14 was within normal limits and no statistically significant differences were found between treatments. There was no evidence of treatment-related differences in the percentage of 14-day survivors/number of eggs set.

13. Study Author's Conclusion/QA Measures

Under the conditions of this study there was no evidence that dietary administration of Hoe 39866 technical at dose levels of 25, 100, and 400 ppm had any adverse effects on reproduction in the bobwhite quail.

To the best of the author's knowledge and belief, the study was conducted in compliance with Good Laboratory Practice Regulations as set forth in "Part 158 of Title 21 of the U.S. Code of Federal Regulations."

To the best of the author's knowledge and belief the study described in this report was conducted in compliance with the following Good Laboratory Practice Standard: U.S. Environmental Protection Agency, FEDERAL REGISTER, Part 160 of Title 40 of the Code of Federal Regulations, November 29, 1983 (Signed by Nicholas L. Roberts, N.D.A., Study Director).

14. Reviewer's Discussion and Interpretation of the Study:

- A. Test Procedures - The test procedure complied with the recommended EPA protocol of October 1982 except it was not reported if the adult diet was available ad libitum. Also, neither corn oil nor any other diluent were used for the test compound during diet preparation.
- B. Statistical Analysis - The following parameters were verified using an ANOVA program and Duncan's Multiple Range Test: Eggs laid, eggs set, eggs cracked, and food consumption.

The results are as follows:

Eggs laid = NOEL > 400 ppm
Eggs set = NOEL > 400 ppm
Eggs cracked = NOEL > 400 ppm
Food consumption = NOEL > 400 ppm

Number of 14-day Survivors - *No significant difference from control*

The statistics were not verified for the following parameters: Number of 14-day survivors and bodyweight, egg shell thickness, and number hatched due to lack of replicates in the raw data. There did not appear to be a significant difference between treatment groups and the control group.

- C. Discussion/Results - During week 22 of the study two infrared lamps malfunctioned overnight. A number of chicks from the week 16 hatch died as a result. A small number of birds died during the 14-day observation period. They were found pecked on or around the beak.

It is not clear to the reviewer whether pecking occurred before or after death.

The statistical analysis indicates no significant differences between treatments and control group for the following: Eggs laid, eggs set, eggs cracked, and food consumption (see attached printout). Also, postmortem examination of birds dying during the study and of those sacrificed at the end of the study showed no treatment-related effects. Therefore, the NOEL value is greater than 400 ppm.

Relative to the residue analysis data for avian feed, it is unclear, as presented in Appendix 2, what is being shown in the tables. Are these analyses of avian premix? Or are they representative samples taken from test diets during the test? When were these samples taken? Also, where are the analyses of samples taken for each dose level during weeks 1, 12, and 22 of the main study?

D. Adequacy of the Study

1. Category - Supplemental
2. Rationale - The residue analysis data need to be clarified as discussed above under the Discussion/Results section.
3. Reparability - With adequate clarification of the residue analysis data this study could be upgraded to Core. However, said study--since it did not produce an effect level, but only a no-effect level--can only be used to support label uses resulting in EEC's in/on avian food items of 400 ppm or less.

Attachments

A33114

8(239)

HST/247

SUMMARY

In order to investigate the dietary effects of Hoe 039866 technical on reproduction in the Bobwhite quail, 3 groups of 20 replicates were given the test substance at dose levels of 25 ppm, 100 ppm and 400 ppm. A further group of 20 replicates received untreated diet throughout the same period for control purposes. The diets were given over a 24-week period, 12 weeks prior to the start of egg production and 12 weeks during egg production.

The findings in the study can be summarised as follows:

At all dietary concentrations general behaviour, health, bodyweights and food consumption remained unaffected and were not impaired by treatment with Hoe 039866 technical. None of the mortalities was considered to be associated with treatment and post mortem examination of birds which died during the study, and of those sacrificed at termination, indicated no treatment-related effects.

After feeding at 25 ppm, 100 ppm and 400 ppm the results of all reproductive parameters, including number of eggs laid, broken and cracked eggs, egg weights, egg shell thickness, number of infertile eggs, early and late embryonic death, hatching, chick health, chick bodyweights and number of 14-day survivors, gave no indication of any reproductive impairment.

The reproductive data are summarised below:

	Control	Hoe 039866 - Substance Technical		
		25 ppm	100 ppm	400 ppm
Eggs laid	957	1088	874	1033
Eggs cracked or broken	177	153	91	138
Eggs set	673	843	660	802
Viable embryos	561	771	535	720
Live 18-day embryos	544	742	516	706
Normal hatchlings	464	668	438	599
14-day survivors	358	573	351	491
Eggs laid per hen in 12 weeks	48	54	44	52
Eggs cracked or broken of eggs laid (%)	18	14	10	13
Viable embryos of eggs set (%)	83	91	81	90
Live 18-day embryos of viable embryos (%)	97	96	96	98
Normal hatchlings of live 18-day embryos (%)	85	90	85	85
14-day survivors of normal hatchlings (%)	77	86	80	82
14-day survivors per hen	18	29	18	25

Conclusion

Under the conditions of this test, and taking the results as a whole, there was no evidence that dietary administration of Hoe 039866 technical at dose levels of 25 ppm, 100 ppm and 400 ppm had any adverse effects on the reproduction of the Bobwhite quail. The high dose level of 400 ppm of Hoe 039866 is equivalent to an estimated intake of approximately 40 mg/kg/day.

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	OBS	TRT	EL	EC	ES	VE	LE	NH
481								
482								
483								
484								
485	1	A	46	1	40	15	15	11
486	2	A	64	15	46	45	44	31
487	3	A	30	4	23	22	22	17
488	4	A	73	17	26	21	20	15
489	5	A	54	10	39	37	37	34
490	6	A	57	12	42	38	37	29
491	7	A	57	5	47	46	46	44
492	8	A	62	14	44	42	42	38
493	9	A	56	10	42	36	36	35
494	10	A	44	0	38	29	29	28
495	11	A	46	1	40	1	1	0
496	12	A	29	7	17	17	16	8
497	13	A	47	4	38	36	36	30
498	14	A	75	51	20	22	17	10
499	15	A	31	6	22	22	21	12
500	16	A	64	3	55	55	55	44
501	17	A	27	1	22	16	16	13
502	18	A	0	0	0	0	0	0
503	19	A	25	4	18	18	18	18
504	20	A	70	11	54	48	48	47
505	21	B	67	14	48	47	45	36
506	22	B	68	8	55	41	41	41
507	23	B	55	4	46	33	33	20
508	24	B	0	0	0	0	0	0
509	25	B	64	8	55	55	55	49
510	26	B	79	19	55	54	54	50
511	27	B	54	9	40	36	36	32
512	28	B	73	16	51	49	49	29
513	29	B	47	1	41	35	35	26
514	30	B	30	3	25	17	17	16
515	31	B	43	5	33	30	30	28
516	32	B	76	9	61	61	61	52
517	33	B	74	2	66	67	67	59
518	34	B	76	12	58	57	57	58
519	35	B	59	9	45	37	37	36
520	36	B	23	2	19	19	19	15
521	37	B	45	2	36	31	31	25
522	38	B	42	4	35	29	29	28
523	39	B	52	13	30	29	28	28
524	40	B	61	13	44	44	44	42
525	41	C	0	0	0	0	0	0
526	42	C	62	14	42	32	32	29
527	43	C	66	0	25	15	15	13
528	44	C	83	6	72	50	50	52
529	45	C	2	0	1	5	5	0
530	46	C	2	1	0	0	0	0
531	47	C	74	4	64	56	56	56
532	48	C	17	4	11	15	15	8
533	49	C	63	5	52	44	44	39
534	50	C	44	12	30	33	33	24
535	51	C	35	2	29	29	29	22
536	52	C	64	3	56	49	49	46
537	53	C	21	2	2	7	7	.
538	54	C	79	5	69	65	65	49
539	55	C	55	4	46	48	47	35

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543									
544	56	C	48	6	38	37	37	18	
545	57	C	55	11	40	34	34	30	
546	58	C	15	1	11	11	11	10	
547	59	C	68	6	57	0	0	0	
548	60	D	57	2	49	49	49	46	
549	61	D	67	11	50	33	33	28	
550	62	D	14	0	11	0	0	0	
551	63	D	58	2	50	36	36	21	
552	64	D	46	11	30	29	29	26	
553	65	D	77	29	43	43	43	30	
554	66	D	60	1	53	52	52	49	
555	67	D	75	15	54	50	50	48	
556	68	D	52	4	53	49	49	43	
557	69	D	69	3	59	60	60	40	
558	70	D	71	3	62		50	36	
559	71	D	36	3	29	23	23	19	
560	72	D	74	17	50	50	50	45	
561	73	D	52	3	45	45	45	42	
562	74	D	33	3	26	26	26	22	
563	75	D	1	0	0	0	0	0	
564	76	D	26	5	18	18	18	18	
565	77	D	22	3	14	4	4	4	
566	78	D	56	4	47	44	44	42	
567	79	D	76	4	59	59	59	40	

1. ANALYSIS OF EL DATA

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GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS LEVELS VALUES

TRT 4 A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 79

1. ANALYSIS OF EL DATA

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GENERAL LINEAR MODELS PROCEDURE

586 DEPENDENT VARIABLE: RESP

587									
588	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.	
589									
590	MODEL	3	1020.99723518	340.33241173	0.67	0.5732	0.026097	45.3083	
591									
592	ERROR	75	38101.93947368	508.02585965		ROOT MSE		RESP MEAN	
593									
594	CORRECTED TOTAL	78	39122.93670886			22.53942900		49.74683544	
595									
596									
597	SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
598									
599	TRT	3	1020.99723518	0.67	0.5732	3	1020.99723518	0.67	0.5732

1. ANALYSIS OF EL DATA

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GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP

15

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WARNING: CELL SIZES ARE NOT EQUAL.
HARMONIC MEAN OF CELL SIZES=19.7403

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	14.3059	15.0431	15.5233

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	54.400	20	B
	A			
	A	51.600	20	D
	A			
	A	47.850	20	A
	A			
	A	44.895	19	C

2. ANALYSIS OF EC DATA

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GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 79

2. ANALYSIS OF EC DATA

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GENERAL LINEAR MODELS PROCEDURE

646 DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	201.11505663	67.03835221	1.18	0.3215	0.045234	110.4727
ERROR	75	4245.03684211	56.60049123		ROOT MSE		RESP MEAN
CORRECTED TOTAL	78	4446.15189873			7.52332980		6.81012658

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	201.11505663	1.18	0.3215	3	201.11505663	1.18	0.3215

2. ANALYSIS OF EC DATA

14:54 TUESDAY, NOVEMBER 15, 1988 8

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

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WARNING: CELL SIZES ARE NOT EQUAL.
HARMONIC MEAN OF CELL SIZES=19.7403

NUMBER OF MEANS 2 3 4
CRITICAL RANGE 4.77511 5.02115 5.18145

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	8.800	20	A
	A			
	A	7.650	20	B
	A			
	A	6.150	20	D
	A			
	A	4.526	19	C

3. ANALYSIS OF ES DATA

14:54 TUESDAY, NOVEMBER 15, 1988 9

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 79

3. ANALYSIS OF ES DATA

14:54 TUESDAY, NOVEMBER 15, 1988 10

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	1103.89946702	367.96648901	1.08	0.3639	0.041317	49.2722
ERROR	75	25613.84736842	341.51796491		ROOT MSE		RESP MEAN
CORRECTED TOTAL	78	26717.74683544			18.48020468		37.50632911

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	1103.89946702	1.08	0.3639	3	1103.89946702	1.08	0.3639

3. ANALYSIS OF ES DATA

14:54 TUESDAY, NOVEMBER 15, 1988 11

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=75 MSE=341.518

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NUMBER OF MEANS 2 3 4
CRITICAL RANGE 11.7295 12.3339 12.727

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	42.150	20	B
	A			
	A	40.100	20	D
	A			
	A	33.947	19	C
	A			
	A	33.650	20	A

4. ANALYSIS OF VE DATA

14:54 TUESDAY, NOVEMBER 15, 1988 12

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 79

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 78 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

4. ANALYSIS OF VE DATA

14:54 TUESDAY, NOVEMBER 15, 1988 13

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	1632.82503374	544.27501125	1.68	0.1777	0.063923	55.2655
ERROR	74	23910.62368421	323.11653627		ROOT MSE		RESP MEAN
CORRECTED TOTAL	77	25543.44871795			17.97544259		32.52564103

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	1632.82503374	1.68	0.1777	3	1632.82503374	1.68	0.1777

4. ANALYSIS OF VE DATA

14:54 TUESDAY, NOVEMBER 15, 1988 14

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP

NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=74 MSE=323.117

WARNING: CELL SIZES ARE NOT EQUAL.

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

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DUNCAN	GROUPING	MEAN	N	TRT
	A	38.550	20	B
	A			
	A	35.263	19	D
	A			
	A	28.300	20	A
	A			
	A	27.895	19	C

14:54 TUESDAY, NOVEMBER 15, 1988 15

5. ANALYSIS OF LE DATA

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 79

5. ANALYSIS OF LE DATA

14:54 TUESDAY, NOVEMBER 15, 1988 16

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	1794.84077282	598.28025761	1.86	0.1440	0.069172	55.0983
ERROR	75	24152.52631579	322.03368421		ROOT MSE		RESP MEAN
CORRECTED TOTAL	78	25947.36708861			17.94529699		32.56962025

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	1794.84077282	1.86	0.1440	3	1794.84077282	1.86	0.1440

5. ANALYSIS OF LE DATA

14:54 TUESDAY, NOVEMBER 15, 1988 17

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP

NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=75 MSE=322.034

WARNING: CELL SIZES ARE NOT EQUAL.

HARMONIC MEAN OF CELL SIZES=19.7403

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	11.39	11.9769	12.3592

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

865 A 38.400 20 B
 866 A
 867 A 36.000 20 D
 868 A
 869 A 27.842 19 C
 870 A
 871 A 27.800 20 A

6. ANALYSIS OF NH DATA

14:54 TUESDAY, NOVEMBER 15, 1988 18

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 79

887 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
 888 ONLY 78 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

6. ANALYSIS OF NH DATA

14:54 TUESDAY, NOVEMBER 15, 1988 19

GENERAL LINEAR MODELS PROCEDURE

894 DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
898 MODEL	3	1432.77735043	477.59245014	1.81	0.1525	0.068414	58.5263
900 ERROR	74	19510.09444444	263.64992492		ROOT MSE		RESP MEAN
902 CORRECTED TOTAL	77	20942.87179487			16.23730042		27.74358974

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
907 TRT	3	1432.77735043	1.81	0.1525	3	1432.77735043	1.81	0.1525

6. ANALYSIS OF NH DATA

14:54 TUESDAY, NOVEMBER 15, 1988 20

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP

NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=74 MSE=263.65

WARNING: CELL SIZES ARE NOT EQUAL.

HARMONIC MEAN OF CELL SIZES=19.4595

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	10.3822	10.9171	11.2658

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
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931 A 29.950 20 D
 932 A
 933 A 23.944 18 C
 934 A
 935 A 23.200 20 A

7. ANALYSIS OF ES/EL DATA

14:54 TUESDAY, NOVEMBER 15, 1988 21

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS LEVELS VALUES

TRT 4 A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 79

951 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
 952 ONLY 76 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

7. ANALYSIS OF ES/EL DATA

14:54 TUESDAY, NOVEMBER 15, 1988 22

GENERAL LINEAR MODELS PROCEDURE

958 DEPENDENT VARIABLE: RESPONSE

959 WEIGHT: WT

961 SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
962 MODEL	3	13643.84596828	4547.94865609	1.07	0.3658	0.042815	107.1019
965 ERROR	72	305022.43252909	4236.42267402		ROOT MSE		RESPONSE MEAN
967 CORRECTED TOTAL	75	318666.27849737			65.08780741		60.77182901

970 SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
972 TRT	3	13643.84596828	1.07	0.3658	3	13643.84596828	1.07	0.3658

7. ANALYSIS OF ES/EL DATA

14:54 TUESDAY, NOVEMBER 15, 1988 23

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE

NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=72 MSE=4236.42

WARNING: CELL SIZES ARE NOT EQUAL.

HARMONIC MEAN OF CELL SIZES=18.9736

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	42.1647	44.3369	45.7548

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN GROUPING MEAN N TRT

997 A
 998 A 58.72 19 A
 999 A
 1000 A 54.68 18 C
 1001 7. ANALYSIS OF ES/EL DATA 14:54 TUESDAY, NOVEMBER 15, 1988 24
 1002 *****
 1003

1004 VARIABLE N MEAN STANDARD MINIMUM MAXIMUM STD ERROR SUM VARIANCE C.V.
 1005 DEVIATION VALUE VALUE OF MEAN
 1006

1007 ----- TRT=A -----

1008										
1009 EL	20	47.85000000	19.30441727	0.00000000	75.00000000	4.31659893	957.0000000	372.66052632	40.344	
1010 ES	20	33.65000000	14.28755439	0.00000000	55.00000000	3.19479429	673.0000000	204.13421053	42.459	
1011 WT	20	47.85000000	19.30441727	0.00000000	75.00000000	4.31659893	957.0000000	372.66052632	40.344	
1012 Z	19	0.72233321	0.16235488	0.26666667	0.86956522	0.03724676	13.7243310	0.02635911	22.476	
1013 ARS	19	1.02529827	0.17617556	0.54263910	1.20128739	0.04041744	19.4806671	0.03103783	17.183	
1014 RESPONSE	19	58.72162799	10.09005463	31.07842131	68.80100491	2.31481729	1115.7109318	101.80920243	17.183	

1015
 1016 ----- TRT=B -----

1017										
1018 EL	20	54.40000000	20.18702032	0.00000000	79.00000000	4.51395497	1088.0000000	407.51578947	37.108	
1019 ES	20	42.15000000	15.79898398	0.00000000	66.00000000	3.53276022	843.0000000	249.60789474	37.483	
1020 WT	20	54.40000000	20.18702032	0.00000000	79.00000000	4.51395497	1088.0000000	407.51578947	37.108	
1021 Z	19	0.77935354	0.07627567	0.57692308	0.89189189	0.01749884	14.8077172	0.00581798	9.787	
1022 ARS	19	1.08688535	0.09086766	0.86262796	1.23576583	0.02084647	20.6508217	0.00825693	8.360	
1023 RESPONSE	19	62.24888842	5.20423872	49.40505604	70.77567915	1.19393425	1182.7288799	27.08410070	8.360	

1024
 1025 ----- TRT=C -----

1026										
1027 EL	19	44.89473684	27.56587007	0	83.00000000	6.32404431	853.0000000	759.87719298	61.401	
1028 ES	19	33.94736842	24.46192889	0	72.00000000	5.61195137	645.0000000	598.38596491	72.058	
1029 WT	19	44.89473684	27.56587007	0	83.00000000	6.32404431	853.0000000	759.87719298	61.401	
1030 Z	18	0.66899526	0.26361694	0	0.87500000	0.06213511	12.04191471	0.06949389	39.405	
1031 ARS	18	0.95473163	0.33103932	0	1.20942920	0.07802672	17.18516935	0.10958703	34.674	
1032 RESPONSE	18	54.68008431	18.95952457	0	69.26730889	4.46880280	984.24151750	359.46357173	34.674	

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 1034 ----- TRT=D -----

1035										
1036 EL	20	51.60000000	22.47899604	1.00000000	77.00000000	5.02645632	1032.0000000	505.30526316	43.564	
1037 ES	20	40.10000000	18.09594313	0.00000000	62.00000000	4.04637590	802.0000000	327.46315789	45.127	
1038 WT	20	51.60000000	22.47899604	1.00000000	77.00000000	5.02645632	1032.0000000	505.30526316	43.564	
1039 Z	20	0.73647840	0.19670200	0.00000000	0.88333333	0.04398390	14.7295679	0.03869168	26.708	
1040 ARS	20	1.03024744	0.26615292	0.00000000	1.22221476	0.05951360	20.6049488	0.07083737	25.834	
1041 RESPONSE	20	59.00508066	15.24330340	0.00000000	69.99957262	3.40850626	1180.1016132	232.35829841	25.834	

1042 8. ANALYSIS OF VE/ES DATA 14:54 TUESDAY, NOVEMBER 15, 1988 25
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1044
 1045 GENERAL LINEAR MODELS PROCEDURE

1046
 1047 CLASS LEVEL INFORMATION

1048										
1049	CLASS	LEVELS	VALUES							
1050										
1051	TRT	4	A B C D							

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 1054 NUMBER OF OBSERVATIONS IN DATA SET = 79

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 1057 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
 1058 ONLY 65 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

1059 8. ANALYSIS OF VE/ES DATA 14:54 TUESDAY, NOVEMBER 15, 1988 26

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1064 DEPENDENT VARIABLE: RESPONSE

1065 WEIGHT: WT

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SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
1069 MODEL	3	85572.60246902	28524.20082301	2.06	0.1149	0.091991	164.4321
1071 ERROR	61	844653.04947163	13846.77130281				
1073 CORRECTED TOTAL	64	930225.65194065					

1074

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
1078 TRT	3	85572.60246902	2.06	0.1149	3	85572.60246902	2.06	0.1149

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8. ANALYSIS OF VE/ES DATA

14:54 TUESDAY, NOVEMBER 15, 1988 27

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GENERAL LINEAR MODELS PROCEDURE

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DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE

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NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

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ALPHA=0.05 DF=61 MSE=13846.8

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WARNING: CELL SIZES ARE NOT EQUAL.

1090

HARMONIC MEAN OF CELL SIZES=15.7935

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1092

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	83.7918	88.1053	90.9441

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MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

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DUNCAN	GROUPING	MEAN	N	TRT
	A	74.85	18	B
	A	71.90	17	D
	A	70.70	18	A
	A	64.76	12	C

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8. ANALYSIS OF VE/ES DATA

14:54 TUESDAY, NOVEMBER 15, 1988 28

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V.
1110									
1111									
1112									
----- TRT=A -----									
1114									
1115 ES	20	33.65000000	14.28755439	0.00000000	55.00000000	3.19479429	673.0000000	204.13421053	42.459
1116 VE	20	28.30000000	15.30428217	0.00000000	55.00000000	3.42214153	566.0000000	234.22105263	54.079
1117 WT	20	33.65000000	14.28755439	0.00000000	55.00000000	3.19479429	673.0000000	204.13421053	42.459
1118 Z	19	0.85331865	0.25407998	0.02500000	1.10000000	0.05828995	16.2130544	0.06455664	29.776
1119 ARS	18	1.23436298	0.35624975	0.15878021	1.57079633	0.08396887	22.2185336	0.12691389	28.861
1120 RESPONSE	18	70.69533417	20.40339484	9.09377593	89.96378963	4.80912628	1272.5160151	416.29852088	28.861

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----- TRT=B -----

1123

1124 ES

1125 VE

1129	RESPONSE	18	74.85035166	11.62931528	55.52774812	89.96378963	2.74105590	1347.3063299	135.24097391	15.537
1130										
1131	----- TRT=C -----									
1132										
1133	ES	19	33.94736842	24.46192889	0	72.00000000	5.61195137	645.00000000	598.38596491	72.058
1134	VE	19	27.89473684	20.87234943	0	65.00000000	4.78844536	530.00000000	435.65497076	74.825
1135	WT	19	33.94736842	24.46192889	0	72.00000000	5.61195137	645.00000000	598.38596491	72.058
1136	Z	17	1.26031358	1.18937151	0	5.00000000	0.28846496	21.42533087	1.41460459	94.371
1137	ARS	12	1.13075184	0.41373060	0	1.57079633	0.11943374	13.56902208	0.17117301	36.589
1138	RESPONSE	12	64.76124177	23.69548007	0	89.96378963	6.84029590	777.13490119	561.47577569	36.589

1139										
1140	----- TRT=D -----									
1141										
1142	ES	20	40.10000000	18.09594313	0	62.00000000	4.04637590	802.00000000	327.46315789	45.127
1143	VE	19	35.26315789	19.06375883	0	60.00000000	4.37352622	670.00000000	363.42690058	54.061
1144	WT	20	40.10000000	18.09594313	0	62.00000000	4.04637590	802.00000000	327.46315789	45.127
1145	Z	18	0.84501056	0.27987715	0	1.01694915	0.06596768	15.2101901	0.07833122	33.121
1146	ARS	17	1.25545796	0.43182163	0	1.57079633	0.10473213	21.3427854	0.18646992	34.396
1147	RESPONSE	17	71.90350146	24.73160219	0	89.96378963	5.99829459	1222.3595249	611.65214677	34.396

9. ANALYSIS OF LE/VE DATA 14:54 TUESDAY, NOVEMBER 15, 1988 29

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 79

1163 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
 1164 ONLY 71 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

9. ANALYSIS OF LE/VE DATA 14:54 TUESDAY, NOVEMBER 15, 1988 30

GENERAL LINEAR MODELS PROCEDURE

1170 DEPENDENT VARIABLE: RESPONSE

1171 WEIGHT: WT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
1175 MODEL	3	4794.71082889	1598.23694296	2.79	0.0470	0.111130	26.9969
1177 ERROR	67	38350.43881841	572.39460923		ROOT MSE		RESPONSE MEAN
1179 CORRECTED TOTAL	70	43145.14964730			23.92476978		88.62050516

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
1184 TRT	3	4794.71082889	2.79	0.0470	3	4794.71082889	2.79	0.0470

9. ANALYSIS OF LE/VE DATA 14:54 TUESDAY, NOVEMBER 15, 1988 31

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE
 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,

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WARNING: CELL SIZES ARE NOT EQUAL.
HARMONIC MEAN OF CELL SIZES=17.6533

NUMBER OF MEANS 2 3 4
CRITICAL RANGE 16.0869 16.9154 17.4581

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	89.964	17	D
	A			
	A	89.445	16	C
	A			
	A	88.774	19	B
	A			
	A	85.474	19	A

9. ANALYSIS OF LE/VE DATA

14:54 TUESDAY, NOVEMBER 15, 1988 32

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V.
----- TRT=A -----									
VE	20	28.30000000	15.30428217	0.00000000	55.00000000	3.42214153	566.0000000	234.22105263	54.079
LE	20	27.80000000	15.44974876	0.00000000	55.00000000	3.45466885	556.0000000	238.69473684	55.575
WT	20	28.30000000	15.30428217	0.00000000	55.00000000	3.42214153	566.0000000	234.22105263	54.079
Z	19	0.97748906	0.05323169	0.77272727	1.00000000	0.01221219	18.5722921	0.00283361	5.446
ARS	19	1.49241110	0.13615957	1.07386384	1.57079633	0.03123715	28.3558109	0.01853943	9.123
RESPONSE	19	85.47445378	7.79822981	61.50311061	89.96378963	1.78903662	1624.0146218	60.81238823	9.123
----- TRT=B -----									
VE	20	38.55000000	16.34649488	0.00000000	67.00000000	3.65518737	771.0000000	267.20789474	42.403
LE	20	38.40000000	16.33014648	0.00000000	67.00000000	3.65153176	768.0000000	266.67368421	42.526
WT	20	38.55000000	16.34649488	0.00000000	67.00000000	3.65518737	771.0000000	267.20789474	42.403
Z	19	0.99594548	0.01221904	0.95744681	1.00000000	0.00280324	18.9229640	0.00014931	1.227
ARS	19	1.55003025	0.06230038	1.36302032	1.57079633	0.01429269	29.4505747	0.00388134	4.019
RESPONSE	19	88.77445975	3.56811251	78.06389122	89.96378963	0.81858115	1686.7147353	12.73142685	4.019
----- TRT=C -----									
VE	19	27.89473684	20.87234943	0.00000000	65.00000000	4.78844536	530.0000000	435.65497076	74.825
LE	19	27.84210526	20.82003084	0.00000000	65.00000000	4.77644265	529.0000000	433.47368421	74.779
WT	19	27.89473684	20.87234943	0.00000000	65.00000000	4.78844536	530.0000000	435.65497076	74.825
Z	16	0.99869792	0.00520833	0.97916667	1.00000000	0.00130208	15.9791667	0.00002713	0.522
ARS	16	1.56174361	0.03621087	1.42595283	1.57079633	0.00905272	24.9878977	0.00131123	2.319
RESPONSE	16	89.44531574	2.07389553	81.66820752	89.96378963	0.51847388	1431.1250519	4.30104265	2.319
----- TRT=D -----									
VE	19	35.26315789	19.06375883	0.00000000	60.00000000	4.37352622	670.0000000	363.42690058	54.061
LE	20	36.00000000	18.84563331	0.00000000	60.00000000	4.21401172	720.0000000	355.15789474	52.349
WT	19	35.26315789	19.06375883	0.00000000	60.00000000	4.37352622	670.0000000	363.42690058	54.061
Z	17	1.00000000	0.00000000	1.00000000	1.00000000	0.00000000	17.0000000	0.00000000	0.000
ARS	17	1.57079633	0.00000000	1.57079633	1.57079633	0.00000000	26.7035376	0.00000000	0.000
RESPONSE	17	89.96378963	0.00000000	89.96378963	89.96378963	0.00000000	1529.3844236	0.00000000	0.000

10 ANALYSIS OF NH/LE DATA

14:54 TUESDAY, NOVEMBER 15, 1988 33

25

1261 CLASS LEVELS VALUES
 1262
 1263 TRT 4 A B C D
 1264
 1265

1266 NUMBER OF OBSERVATIONS IN DATA SET = 79
 1267
 1268

1269 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
 1270 ONLY 69 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

1271 10 ANALYSIS OF NH/LE DATA 14:54 TUESDAY, NOVEMBER 15, 1988 34
 1272 *****

1273
 1274 GENERAL LINEAR MODELS PROCEDURE
 1275

1276 DEPENDENT VARIABLE: RESPONSE

1277 WEIGHT: WT

1278

1279 SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
1280							
1281 MODEL	3	5841.53071143	1947.17690381	0.41	0.7498	0.018354	101.8788
1282							
1283 ERROR	65	312429.49747146	4806.60765341		ROOT MSE		RESPONSE MEAN
1284							
1285 CORRECTED TOTAL	68	318271.02818289			69.32970253		68.05117859
1286							
1287							

1288 SOURCE DF TYPE I SS F VALUE PR > F DF TYPE III SS F VALUE PR > F

1289							
1290 TRT	3	5841.53071143	0.41	0.7498	3	5841.53071143	0.41 0.7498

1291 10 ANALYSIS OF NH/LE DATA 14:54 TUESDAY, NOVEMBER 15, 1988 35
 1292 *****

1293
 1294 GENERAL LINEAR MODELS PROCEDURE
 1295

1296 DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE
 1297 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 1298 NOT THE EXPERIMENTWISE ERROR RATE

1299
 1300 ALPHA=0.05 DF=65 MSE=4806.61

1301
 1302 WARNING: CELL SIZES ARE NOT EQUAL.
 1303 HARMONIC MEAN OF CELL SIZES=17.0089

1304

1305 NUMBER OF MEANS	2	3	4
1306 CRITICAL RANGE	47.5168	49.9637	51.5689

1307
 1308 MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

1309

1310 DUNCAN	GROUPING	MEAN	N	TRT
1311				
1312	A	70.65	18	B
1313	A			
1314	A	69.38	18	D
1315	A			
1316	A	62.74	19	A
1317	A			
1318	A	60.64	14	C

1319 10 ANALYSIS OF NH/LE DATA 14:54 TUESDAY, NOVEMBER 15, 1988 36
 1320 *****

1321

1322 VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V.
1323									

1327	LE	20	27.80000000	15.44974876	0	55.00000000	3.45466885	556.0000000	238.69473684	55.575
1328	NH	20	23.20000000	14.62370102	0	47.00000000	3.26995896	464.0000000	213.85263158	63.033
1329	WT	20	27.80000000	15.44974876	0	55.00000000	3.45466885	556.0000000	238.69473684	55.575
1330	Z	19	0.76563135	0.23590834	0	1.00000000	0.05412109	14.5469957	0.05565275	30.812
1331	ARS	19	1.09544407	0.33892780	0	1.57079633	0.07775537	20.8134374	0.11487205	30.940
1332	RESPONSE	19	62.73906960	19.41131929	0	89.96378963	4.45326206	1192.0423225	376.79931645	30.940

1333
1334 ----- TRT=B -----

1335										
1336	LE	20	38.40000000	16.33014648	0.00000000	67.00000000	3.65153176	768.0000000	266.67368421	42.526
1337	NH	20	33.50000000	15.28845454	0.00000000	59.00000000	3.41860236	670.0000000	233.73684211	45.637
1338	WT	20	38.40000000	16.33014648	0.00000000	67.00000000	3.65153176	768.0000000	266.67368421	42.526
1339	Z	19	0.87160784	0.12347759	0.59183673	1.01754386	0.02832770	16.5605491	0.01524571	14.167
1340	ARS	18	1.23350180	0.19503075	0.87775926	1.57079633	0.04596919	22.2030325	0.0380699	15.811
1341	RESPONSE	18	70.64601244	11.16994293	50.27166698	89.96378963	2.63278080	1271.6282238	124.76762608	15.811

1342
1343 ----- TRT=C -----

1344										
1345	LE	19	27.84210526	20.82003084	0	65.00000000	4.77644265	529.0000000	433.47368421	74.779
1346	NH	18	23.94444444	1raE322910	0	56.00000000	4.51610931	431.0000000	367.11437908	80.020
1347	WT	19	27.84210526	20.82003084	0	65.00000000	4.77644265	529.0000000	433.47368421	74.779
1348	Z	15	0.76224933	0.26171832	0	1.04000000	0.06757538	11.43373991	0.06849648	34.335
1349	ARS	14	1.05873235	0.36687555	0	1.57079633	0.09805161	14.82225296	0.13459767	34.652
1350	RESPONSE	14	60.63648937	21.01196306	0	89.96378963	5.61568334	848.91085124	441.50259152	34.652

1351
1352 ----- TRT=D -----

1353										
1354	LE	20	36.00000000	18.84563331	0.00000000	60.00000000	4.21401172	720.0000000	355.15789474	52.349
1355	NH	20	29.95000000	15.83625089	0.00000000	49.00000000	3.54109335	599.0000000	250.78684211	52.876
1356	WT	20	36.00000000	18.84563331	0.00000000	60.00000000	4.21401172	720.0000000	355.15789474	52.349
1357	Z	18	0.84830172	0.12643531	0.58333333	1.00000000	0.02980109	15.2694309	0.01598589	14.905
1358	ARS	18	1.21134759	0.20024375	0.86912220	1.57079633	0.04719790	21.8042566	0.04009756	16.531
1359	RESPONSE	18	69.37718009	11.46850566	49.77699890	89.96378963	2.70315271	1248.7892416	131.52662199	16.531

1360 11 ANALYSIS OF NH/EL DATA 14:54 TUESDAY, NOVEMBER 15, 1988 37
1361 *****

1362
1363 GENERAL LINEAR MODELS PROCEDURE

1364
1365 CLASS LEVEL INFORMATION

1366										
1367										
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1379										
1380										
1381										

1375 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
1376 ONLY 75 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

1377 11 ANALYSIS OF NH/EL DATA 14:54 TUESDAY, NOVEMBER 15, 1988 38
1378 *****

1379
1380 GENERAL LINEAR MODELS PROCEDURE

1381
1382 DEPENDENT VARIABLE: RESPONSE

1383 WEIGHT: WT

1384

1385	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
1386								
1387	MODEL	3	50613.96094842	16871.32031614	1.94	0.1314	0.075662	196.1198
1388								
1389	ERROR	71	618335.19506982	8708.94640943			ROOT MSE	RESPONSE MEAN

1393
 1394 SOURCE DF TYPE I SS F VALUE PR > F DF TYPE III SS F VALUE PR > F
 1395
 1396 TRT 3 50613.96094842 1.94 0.1314 3 50613.96094842 1.94 0.1314
 1397 11 ANALYSIS OF NH/EL DATA
 1398 *****
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GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE
 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=71 MSE=8708.95

WARNING: CELL SIZES ARE NOT EQUAL.
 HARMONIC MEAN OF CELL SIZES=18.684

NUMBER OF MEANS 2 3 4
 CRITICAL RANGE 60.9353 64.0744 66.1248

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	51.48	19	B
	A	45.10	20	D
	A	43.30	19	A
	A	40.01	17	C

11 ANALYSIS OF NH/EL DATA 14:54 TUESDAY, NOVEMBER 15, 1988 40

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V.
----- TRT=A -----									
1433 EL	20	47.85000000	19.30441727	0	75.00000000	4.31659893	957.00000000	372.66052632	40.344
1434 NH	20	23.20000000	14.62370102	0	47.00000000	3.26995896	464.00000000	213.85263158	63.033
1435 WT	20	47.85000000	19.30441727	0	75.00000000	4.31659893	957.00000000	372.66052632	40.344
1436 Z	19	0.48817105	0.22041145	0	0.77192982	0.05056585	9.27524990	0.04858121	45.150
1437 ARS	19	0.75597094	0.26909264	0	1.07291297	0.06173409	14.36344786	0.07241085	35.596
1438 RESPONSE	19	43.29651747	15.41166938	0	61.44865217	3.53567944	822.63383189	237.51955295	35.596
----- TRT=B -----									
1442 EL	20	54.40000000	20.18702032	0.00000000	79.00000000	4.51395497	1088.00000000	407.51578947	37.108
1443 NH	20	33.50000000	15.28845454	0.00000000	59.00000000	3.41860236	670.00000000	233.73684211	45.637
1444 WT	20	54.40000000	20.18702032	0.00000000	79.00000000	4.51395497	1088.00000000	407.51578947	37.108
1445 Z	19	0.60979923	0.11314070	0.36363636	0.79729730	0.02595626	11.5861853	0.01280082	18.554
1446 ARS	19	0.89879924	0.11812097	0.64728485	1.10377883	0.02709881	17.0771855	0.01395256	13.142
1447 RESPONSE	19	51.47668356	6.76510996	37.07176857	63.21642396	1.55202267	978.0569877	45.76671274	13.142
----- TRT=C -----									
1451 EL	19	44.89473684	27.56587007	0	83.00000000	6.32404431	853.00000000	759.87719298	61.401
1452 NH	18	23.94444444	19.16022910	0	56.00000000	4.51610931	431.00000000	367.11437908	80.020
1453 WT	19	44.89473684	27.56587007	0	83.00000000	6.32404431	853.00000000	759.87719298	61.401
1454 Z	17	0.46318378	0.25760481	0	0.75675676	0.06247834	7.87412425	0.06636024	55.616
1455 ARS	17	0.69862717	0.36098180	0	1.05503537	0.08755095	11.87666193	0.13030786	51.670

1459										
1460 EL	20	51.60000000	22.47899604	1.00000000	77.00000000	5.02645632	1032.00000000	505.30526316		43.564
1461 NH	20	29.95000000	15.83625089	0.00000000	49.00000000	3.54109335	599.00000000	250.78684211		52.876
1462 WT	20	51.60000000	22.47899604	1.00000000	77.00000000	5.02645632	1032.00000000	505.30526316		43.564
1463 Z	20	0.52697394	0.24300515	0.00000000	0.81666667	0.05433760	10.5394787	0.05905150		46.113
1464 ARS	20	0.78745245	0.32020537	0.00000000	1.12832465	0.07160010	15.7490490	0.10253148		40.663
1465 RESPONSE	20	45.09954939	18.33903469	0.00000000	64.62222971	4.10073282	901.9909878	336.32019332		40.663

QUEUE

CHEMICAL: Ignite

TOTAL NUMBER OF LEVELS 4

NUMBER OF CONTROL REPLICATES: 20

CONTROL MEAN: 47.85

TOTAL NUMBER OF REPLICATES: 80

MEAN SQUARE ERROR: 508.026

ERROR DEGREES OF FREEDOM: 76

V1 used for this calculation: 3

V2 used for this calculation: 100

PHI value used for calculation of D 1.64

MEAN 1
47.85
NUMBER OF REPLICATES: 20

MEAN 2
54.40
NUMBER OF REPLICATES: 20

MEAN 3
44.90
NUMBER OF REPLICATES: 20

MEAN 4
51.60
NUMBER OF REPLICATES: 20

GRAND MEAN: 49.68625

=====

Calculated PHI value for the Power Test .716833

PERCENT CHANGE DETECTION LIMIT = 35.82436

CHEMICAL: Ignite

TOTAL NUMBER OF LEVELS 4

NUMBER OF CONTROL REPLICATES: 20

CONTROL MEAN: 8.8

TOTAL NUMBER OF REPLICATES: 80

MEAN SQUARE ERROR: 56.6005

ERROR DEGREES OF FREEDOM: 76

V1 used for this calculation: 3

V2 used for this calculation: 60

PHI value used for calculation of D 1.7

MEAN 1
8.80
NUMBER OF REPLICATES: 20

MEAN 2
7.65
NUMBER OF REPLICATES: 20

MEAN 3
6.15
NUMBER OF REPLICATES: 20

MEAN 4
4.26
NUMBER OF REPLICATES: 20

GRAND MEAN: 6.714

=====

Calculated PHI value for the Power Test 1.011735

PERCENT CHANGE DETECTION LIMIT = 117.3878

.35

B w a
E S

CHEMICAL: Ignite

TOTAL NUMBER OF LEVELS 4

NUMBER OF CONTROL REPLICATES: 20

CONTROL MEAN: 33.65

TOTAL NUMBER OF REPLICATES: 80

MEAN SQUARE ERROR: 341.158

ERROR DEGREES OF FREEDOM: 76

V1 used for this calculation: 3

V2 used for this calculation: 60

PHI value used for calculation of D 1.7

MEAN 1
33.65
NUMBER OF REPLICATES: 20

MEAN 2
42.15
NUMBER OF REPLICATES: 20

MEAN 3
33.95
NUMBER OF REPLICATES: 20

MEAN 4
40.10
NUMBER OF REPLICATES: 20

GRAND MEAN: 37.46175

=====

Calculated PHI value for the Power Test .9045106

PERCENT CHANGE DETECTION LIMIT = 59.01625

5.35

CHEMICAL: Ignite

TOTAL NUMBER OF LEVELS 4

NUMBER OF CONTROL REPLICATES: 20

CONTROL MEAN: 28.3

TOTAL NUMBER OF REPLICATES: 80

MEAN SQUARE ERROR: 323.117

ERROR DEGREES OF FREEDOM: 76

V1 used for this calculation: 3

V2 used for this calculation: 60

PHI value used for calculation of D 1.7

MEAN 1
28.30
NUMBER OF REPLICATES: 20

MEAN 2
38.55
NUMBER OF REPLICATES: 20

MEAN 3
27.90
NUMBER OF REPLICATES: 20

MEAN 4
35.26
NUMBER OF REPLICATES: 20

GRAND MEAN: 32.502

=====

Calculated PHI value for the Power Test 1.133862

PERCENT CHANGE DETECTION LIMIT = 56.44675

0.40

CHEMICAL: Ignite

TOTAL NUMBER OF LEVELS 4

NUMBER OF CONTROL REPLICATES: 12

CONTROL MEAN: 27

TOTAL NUMBER OF REPLICATES: 80

MEAN SQUARE ERROR: 322.034

ERROR DEGREES OF FREEDOM: 76

V1 used for this calculation: 3

V2 used for this calculation: 100

PHI value used for calculation of D 1.64

MEAN 1
27.40
NUMBER OF REPLICATES: 20

MEAN 2
38.40
NUMBER OF REPLICATES: 20

MEAN 3
27.84
NUMBER OF REPLICATES: 20

MEAN 4
36.00
NUMBER OF REPLICATES: 20

GRAND MEAN: 32.4105

=====

Calculated PHI value for the Power Test 1.2128

PERCENT CHANGE DETECTION LIMIT = 61.41517

0.49

CHEMICAL: Ignite

TOTAL NUMBER OF LEVELS 4

NUMBER OF CONTROL REPLICATES: 12

CONTROL MEAN: 23.2

TOTAL NUMBER OF REPLICATES: 80

MEAN SQUARE ERROR: 263.65

ERROR DEGREES OF FREEDOM: 76

V1 used for this calculation: 3

V2 used for this calculation: 100

PHI value used for calculation of D 1.64

MEAN 1
23.20
NUMBER OF REPLICATES: 20

MEAN 2
33.50
NUMBER OF REPLICATES: 20

MEAN 3
23.94
NUMBER OF REPLICATES: 20

MEAN 4
23.20
NUMBER OF REPLICATES: 20

GRAND MEAN: 25.961

=====

Calculated PHI value for the Power Test 1.201736

0.49

PERCENT CHANGE DETECTION LIMIT = 68.06503

Eggs Laid (BWA)

(211)

fetch 6751
 Q0A01 JOBNAME MUST BEGIN WITH USERID
 QUEUE
 fetch 6571

JES2 JOB LOG -- SYSTEM EPA2 -- NODE NCCIBM1

1
 QUEUE
 1 227 999
 227 SAS 9:02 MONDAY, JUNE 6, 1988 1

Line	Job	Time	Day	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
228																							
229																							
230				R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
231				E	E	E	E	E	E	E	E	E	E	S	S	S	S	S	S	S	S	S	S
232	0	T		S	S	S	S	S	S	S	S	S	S	P	P	P	P	P	P	P	P	P	P
233	B	R		P	P	P	P	P	P	P	P	P	P	1	1	1	1	1	1	1	1	1	2
234	S	T		1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
235																							
236	1	A		46	64	30	73	54	57	57	62	56	44	46	29	48	69	31	62	27	0	25	70
237	2	B		67	68	55	0	64	79	54	76	48	34	42	73	74	76	66	17	45	42	52	61
238	3	C		0	62	66	83	2	2	74	17	63	44	35	64	21	21	78	55	48	55	15	66
239	4	D		57	67	14	58	46	77	60	75	62	69	71	36	74	52	33	1	26	22	56	75

240 SAS 9:02 MONDAY, JUNE 6, 1988 2

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS LEVELS VALUES

TRT 4 A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 80

251 SAS 9:02 MONDAY, JUNE 6, 1988 3

GENERAL LINEAR MODELS PROCEDURE

256 DEPENDENT VARIABLE: RESP

Line	Source	DF	Sum of Squares	Mean Square	F Value	Pr > F	R-Square	C.V.
260	MODEL	3	1399.73750000	466.57916667	0.92	0.4341	0.035138	45.6039
262	ERROR	76	38435.45000000	505.72960526			ROOT MSE	RESP MEAN
264	CORRECTED TOTAL	79	39835.18750000			22.48843270		49.31250000

Line	Source	DF	Type I SS	F Value	Pr > F	DF	Type III SS	F Value	Pr > F
269	TRT	3	1399.73750000	0.92	0.4341	3	1399.73750000	0.92	0.4341

270 SAS 9:02 MONDAY, JUNE 6, 1988 4

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=76 MSE=505.73

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NUMBER OF MEANS 2 3 4
CRITICAL RANGE 14.1778 14.9083 15.384

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	54.650	20	B
	A			
	A	51.550	20	D
	A			
	A	47.500	20	A
	A			
	A	43.550	20	C

QUEUE

Eggs Set (BWA)

1 227 999

											SAS										8:20 WEDNESDAY, JUNE 8, 1988										1										
											R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
227												E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
228												S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
229												P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
230		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
231		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
232	D	T	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
233	B	R	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
234	S	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	
235																																									
236	1	A	40	46	23	26	39	42	47	44	42	38	40	17	38	23	22	55	22	0	18	54																			
237	2	B	48	55	46	0	55	55	49	51	41	25	33	61	66	58	45	19	36	35	30	44																			
238	3	C	0	42	25	72	1	0	64	11	52	30	29	56	2	15	69	47	38	40	11	59																			
239	4	D	49	50	11	50	30	43	53	54	54	59	61	29	50	46	26	0	18	14	47	59																			

240 SAS 8:20 WEDNESDAY, JUNE 8, 1988 2

241

242 GENERAL LINEAR MODELS PROCEDURE

243

244 CLASS LEVEL INFORMATION

245

CLASS	LEVELS	VALUES
TRT	4	A B C D

246

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251 NUMBER OF OBSERVATIONS IN DATA SET = 80

252 SAS 8:20 WEDNESDAY, JUNE 8, 1988 3

253

254 GENERAL LINEAR MODELS PROCEDURE

255

256 DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
258 MODEL	3	1312.45000000	437.48333333	1.28	0.2884	0.047981	49.4608
262 ERROR	76	26041.10000000	342.64605263		ROOT MSE		RESP MEAN
264 CORRECTED TOTAL	79	27353.55000000			18.51070103		37.42500000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
267 TRT	3	1312.45000000	1.28	0.2884	3	1312.45000000	1.28	0.2884

270 SAS 8:20 WEDNESDAY, JUNE 8, 1988 4

271

272 GENERAL LINEAR MODELS PROCEDURE

273

274 DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP

275 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,

276 NOT THE EXPERIMENTWISE ERROR RATE

277

278 ALPHA=0.05 DF=76 MSE=342.646

279

NUMBER OF MEANS	2	3	4
281 CRITICAL RANGE	11.67	12.2713	12.6629

282

283 MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

284

286			
287	A	42.600	20 B
288	A		
289	A	40.150	20 D
290	A		
291	A	33.800	20 A
292	A		
293	A	33.150	20 C

QUEUE

Eggs Cracked (BWA)

CL13

1 227 999

											SAS											8:52 WEDNESDAY, JUNE 8, 1988											1								
											R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
227												E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
228												S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
229	0	T	S	S	S	S	S	S	S	S	S	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P								
230	B	R	P	P	P	P	P	P	P	P	P	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2									
231	S	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0									
232	1	A	1	13	4	14	10	10	5	11	9	0	1	7	3	47	4	3	1	0	4	11																			
233	2	B	12	8	4	0	7	17	8	16	1	3	4	9	2	12	8	2	2	4	11	12																			
234	3	C	0	14	0	5	0	1	4	4	5	10	1	2	2	4	4	4	5	11	1	5																			
235	4	D	2	11	0	2	11	29	1	15	4	3	3	3	17	3	3	0	5	3	4	11																			

240 SAS 8:52 WEDNESDAY, JUNE 8, 1988 2

241
242 GENERAL LINEAR MODELS PROCEDURE

243
244 CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

245
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250
251 NUMBER OF OBSERVATIONS IN DATA SET = 80

252 SAS 8:52 WEDNESDAY, JUNE 8, 1988 3

253
254 GENERAL LINEAR MODELS PROCEDURE

255
256 DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	160.80000000	53.60000000	1.09	0.3587	0.041239	109.5863
ERROR	76	3738.40000000	49.18947368		ROOT MSE		RESP MEAN
CORRECTED TOTAL	79	3899.20000000			7.01352078		6.40000000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	160.80000000	1.09	0.3587	3	160.80000000	1.09	0.3587

270 SAS 8:52 WEDNESDAY, JUNE 8, 1988 4

271
272 GENERAL LINEAR MODELS PROCEDURE

273
274 DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
275 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
276 NOT THE EXPERIMENTWISE ERROR RATE

277
278 ALPHA=0.05 DF=76 MSE=49.1895

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	4.42165	4.64949	4.79783

281
282 MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

	DUNCAN	GROUPING	MEAN	N	IRI
285					
286					
287		A	7.500	20	A
288		A			
289		A	7.100	20	B
290		A			
291		A	6.500	20	D
292		A			
293		A	4.100	20	C

QUEUE

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CRITICAL RANGE 95.5139 100.305 103.617

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	1061.33	6	A
	A			
	A	1013.17	6	D
	A			
	A	1010.67	6	B
	A			
	A	960.67	6	C

QUEUE

GLUFOSINATE

128850

Page _____ is not included in this copy.

Pages 44 through 55 are not included.

The material not included contains the following type of information:

- Identity of product inert ingredients.
 - Identity of product impurities.
 - Description of the product manufacturing process.
 - Description of quality control procedures.
 - Identity of the source of product ingredients.
 - Sales or other commercial/financial information.
 - A draft product label.
 - The product confidential statement of formula.
 - Information about a pending registration action.
 - FIFRA registration data.
 - The document is a duplicate of page(s) _____.
 - The document is not responsive to the request.
-

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

GLUFOSINATE

128850

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Pages 58 through 68 are not included.

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 - ___ Identity of product impurities.
 - ___ Description of the product manufacturing process.
 - ___ Description of quality control procedures.
 - ___ Identity of the source of product ingredients.
 - ___ Sales or other commercial/financial information.
 - ___ A draft product label.
 - ___ The product confidential statement of formula.
 - ___ Information about a pending registration action.
 - ___ FIFRA registration data.
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-

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