Data Evaluation Report on the Reproductive Effects of AE 0317309 Technical (Pyrasulfotole) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number 2006-2445 EPA MRID Number 468017-32

Data Requirement:	PMRA Data Code	9.6.3.1
	EPA DP Barcode	D328639
	OECD Data Point	IIA 8.1.4
	EPA MRID	468017-32
	EPA Guideline	850.2300

Test material: AE 0317309 Technical **Purity:** 95.4% ai
Common name Pyrasulfotole
Chemical name: IUPAC: (5-Hydroxy-1,3-dimethylpyrazol-4-yl)(α,α,α-trifluoro-2-mesyl-*p*-tolyl)methanone
CAS name: (5-Hydroxy-1,3-dimethyl-1*H*-pyrazol-4-yl)[2-(methylsulfonyl)-4-(trifluoromethyl)phenyl]methanone
CAS No.: 365400-11-9
Synonyms: None reported

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Australian Government Department of the Environment and Heritage (DEH).

Reference/Submission No.: {.....}

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CITATION: Sabbert, T.J. 2004. Effect of Technical AE 0317309 on Northern Bobwhite Reproduction. Unpublished study performed by Bayer CropScience, Stilwell, KS. Laboratory Study No. EBAIX016. Study submitted by Bayer CropScience, Research Triangle Park, NC. Study initiated July 8, 2004 and submitted February 20, 2006.

DISCLAIMER: This document provides guidance for EPA and PMRA reviewers on how to complete a data evaluation record after reviewing a scientific study concerning the reproductive effects of a pesticide on avian species. It is not intended to prescribe conditions to any external party for conducting this study nor to establish absolute criteria regarding the assessment of whether the study is scientifically sound and whether the study satisfies any applicable data requirements. Reviewers are expected to review and to determine for each study, on a case-by-case basis, whether it is scientifically sound and provides sufficient information to satisfy applicable data requirements. Studies that fail to meet any of the conditions may be accepted, if appropriate; similarly, studies that

meet all of the conditions may be rejected, if appropriate. In sum, the reviewer is to take into account the totality of factors related to the test methodology and results in determining the acceptability of the study.

EXECUTIVE SUMMARY

The one-generation reproductive toxicity of AE 0317309 Technical to groups (18 pen/level) pairs of 16-week old northern bobwhite quail (*Colinus virginianus*) was assessed over 22 weeks. AE 0317309 Technical was administered to the birds in the diet at nominal concentrations of 0 (negative control), 67, 200, or 600 mg ai/kg diet. Mean-measured concentrations were <30 (<LOQ, control), 64, 205, and 594 mg ai/kg diet, respectively (96-103% of nominal). The daily dietary dose was 0, 6, 19 and 54 mg a.i./kg bw/day.

There were no significant treatment-related effects on any adult parameter. There were slight, but significant reductions (3-9%) in the proportions of eggs set to eggs laid, number hatched to eggs laid, hatchling weight and number hatched to live 3-week embryos at the highest treatment level. Based on these findings, the NOAEC and LOAEC levels were 205 and 594 mg ai/kg diet, respectively.

This toxicity study is classified as **ACCEPTABLE**, is scientifically sound and does satisfy the guideline requirement for a Northern bobwhite quail reproductive toxicity study

Results Synopsis

Test Organism Size/Age(mean Weight): 16 weeks old; 174-222 g (combined sexes)

NOAEC: 205 mg a.i./kg diet
LOAEC: 594 mg a.i./kg diet

Endpoint(s) Affected: ratios of eggs set to eggs laid, number hatched to eggs laid, number hatched to live 3-week embryos, and hatchling weights

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: The study protocol was based on procedures outlined in the U.S. EPA Pesticide Assessment Guidelines, Series 71-4. Deviations from OPPTS Guideline No. 850.2300 included:

1. Cage size was significantly smaller than recommended. OPPTS recommends at least 5000 cm^2 per bird. In this study, the floor space was only 784 cm^2 per bird. Cage sizes smaller than recommended should be shown to not adversely affect the health or reproduction of the quail.

2. The maximum labeled field residue was not reported, so it is unknown if the highest level tested was an appropriate level to approximate field exposure. However, the proposed use rate for AE0317309 SE 06 A2 (Sub. No. 2006-2446), allows a single application at a maximum rate of 50 g a.i./ha per year. Based on this use rate, the predicted concentration in bobwhite field diet is 8.75 mg a.i./kg diet.

3. Measured concentrations of AE 0317309 Technical in the avian diet were relatively variable, with reviewer-calculated coefficients of variation (CVs) of 12-17% for all treatment levels.

4. The stability of AE 0317309 Technical for 7 days in treated feed maintained under open-trough, ambient conditions (representing actual use) was not assessed.

5. The duration of both the pre-egg-laying and egg-laying phases were not clearly reported. Based on body weight recordings, the pre-egg laying phase was at least 9 weeks long.

These deviations do not affect the acceptability of this study.

COMPLIANCE: Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. This study was conducted in compliance with 40 CFR Part 160 with the exception of feed analysis.

A. MATERIALS:

1. Test Material AE 0317309 Technical

Description: Light brown crystalline powder

Lot No./Batch No. : OP 1-4

Purity: 95.4%

Stability of compound under test conditions: The stability of AE 0317309 Technical was verified in treated feed prepared at initial concentrations of 72 and 710 mg ai/kg diet and stored frozen (temperature not reported) for apparently up to 5 months (actual length of frozen storage was not reported, but reviewer-derived from Sample ID numbers and dates of analyses). After 5 weeks of frozen storage, recoveries of 83% of initial values were obtained (both levels).

Feeder storage stability (at ambient temperature) was not assessed. As diets were replaced weekly, the stability of AE 0317309 Technical in treated feed under ambient conditions needs to be provided.

(OECD recommends water solubility, stability in water and light, pKa, Pow, and vapor pressure of test compound)

Storage conditions of test chemicals: Ambient conditions (approx. 23°C)

Physicochemical properties of AE 0317309 Technical.

Parameter	Value	Comment
Molecular weight	362.3 g/mol	
Water Solubility (g/L) at 20°C	4.2 at pH 4 69.1 at pH 7 49.0 at pH 9	Very soluble
Vapor Pressure/Volatility	2.7×10^{-7} Pa at 20°C 6.8×10^{-7} Pa at 25°C	Non-volatile
UV Absorption	water $\lambda_{max} = 264$ 0.1M HCl $\lambda_{max} = 241$ 0.1M NaOH $\lambda_{max} = 216$	Not likely to undergo photolysis.
Pka	4.2 ± 0.15	
log K_{ow} at 23°C	0.276 at pH 4 -1.362 at pH 7 -1.58 at pH 9	Not likely to bioaccumulate
Stability of compound at room temperature, if provided		No significant degradation over 12 months at ambient temperatures.

Data obtained from pyrasulfatole chemistry review of Submission 2006-2445.

2. Test organism:

Table 1: Test organism.

Parameter	Details	Remarks *Criteria*
Species (common and scientific names):	Northern Bobwhite quail (*Colinus virginianus*)	*Recommended species include a wild waterfowl species, preferably the mallard (Anas platyrhynchos) or an upland game species, preferably the northern bobwhite (Colinus virginianus)*

Parameter	Details	Remarks *Criteria*
Age at Study Initiation:	Approximately 16 weeks old and approaching their first breeding season.	*Birds approaching their first breeding season should be used.*
Body Weight: (mean and range)	Males: Overall range (n=72) 174-222 g, with group means of 195.5-197.4 g. Females: Overall range (n=72) 176-212 g, with group means of 195.0-195.5 g.	Individual body weights were recorded at Weeks 1 (test initiation), 3, 5, 7, 9, and 22 (test termination). *Body weights should be recorded at test initiation and at biweekly intervals up to week eight or up to the onset of egg laying and at termination.*
Source:	Stevenson Game Bird Farm Riverside, TX	Birds were from the same hatch, and were phenotypically indistinguishable from wild birds. *All birds should be from the same source.*

B. STUDY DESIGN:

1. Experimental Conditions

a. Range-finding study – None reported.

b. Definitive Study

Table 2: Experimental Parameters.

Parameter	Details	Remarks *Criteria*
Acclimation period: Conditions (same as test or not): Feeding: Health (any mortality observed):	3 weeks Same as test Teklad Bayer Game Bird ration (batch no. 12-05041) and local tap water were provided *ad libitum*. Good health (mortality not	Upon arrival, five birds/sex were sacrificed and necropsied. Swab samples for microbiological examination were also performed. No remarkable findings were noted on the gross necropsy and the microbiological tests. Any birds that were injured or did not appear healthy were excluded from the study.

Parameter	Details	Remarks *Criteria*
	reported)	*Recommended observation period includes a 2-3 week health observation period prior to selection of birds for treatment. Generally, birds should be healthy without excess mortality. Feeding should be ad libitum, and sickness, injuries or mortality should be noted.*
Test duration pre-laying exposure: egg-laying exposure: withdrawal period, if used:	9-10 weeks 12-13 weeks N/A	***Recommended pre-laying exposure duration:*** *At least 10 weeks prior to the onset of egg-laying.* ***Recommended exposure duration with egg-laying:*** *At least 10 weeks.* ***Recommended withdrawal period:*** *If reduced reproduction is evident, a withdrawal period of up to 3 weeks should be added to the test phase.*
Pen (for parental and offspring) size: construction materials: number:	Parents (one pair) were housed in cages measuring 56 x 28 x 27 cm (with sloping floors). Offspring (by set and group) were housed in 91 x 81 x 25 cm brooding cages. Parental pens were constructed of stainless steel wire grid and stainless steel sheeting. Offspring pens were constructed of galvanized wire mesh and galvanized sheeting. 18 parental pens/treatment level. Hatchlings were group-housed according to the appropriate parental concentration and hatch day.	Cage size was significantly smaller than recommended. OPPTS recommends at least 5000 cm^2 per bird. In this study, the floor space was only 784 cm^2 per bird. Cage sizes smaller than recommended should be shown to not adversely affect the health or reproduction of the quail. *Pens* *Pens should have adequate room and be arranged to prevent cross-contamination.* *Materials* *Recommended materials include nontoxic material and nonbinding material, such as galvanized steel.* *Number* *At least 5 replicate pens should be used for mallards housed in groups of 7. For other arrangements, at least 12 pens should be used, but considerably more may be used if birds are kept in pairs. Chicks should be housed according to parental grouping.*
Number of birds per pen (male:female)	2 birds/pen (1 male:1 female)	

Parameter	Details	Remarks *Criteria*
		One male and one female per pen should be used. For quail, one male and two females should be used. For ducks, two males and five females should be used.
Number of pens per group/treatment negative control: solvent control: treated:	18 18/level	*At least 12-16 pens should be used, but considerably more if birds are kept in pairs.*
Test concentrations (mg ai/kg diet) nominal: measured:	0 (negative control), 67, 200, and 600 mg ai/kg diet <30 (<LOQ, control), 64, 205, and 594 mg ai/kg diet	Mean-measured concentrations were determined from treated feed from Weeks 1, 5, 10, 15, and 20. *Recommended test concentrations include at least two concentrations other than the control; three or more will provide a better statistical analysis. The highest test concentrations should show a significant effect or be at or above the actual or expected field residue level.*
Maximum labeled field residue anticipated and source of information:	Not specified	Based on proposed use rate for AE0317309 SE 06 A2 (Sub. No. 2006-2446), a maximum single application at a rate of 50 g a.i./ha per year is permitted. Based on this use rate, the predicted concentration in bobwhite field diet is 8.75 mg a.i./kg diet. *The highest test concentrations should show a significant effect or be at or above the actual or expected field residue level. The source (i.e., maximum label rate in lb ai/A and ppm), label registration no., label date, and site should be cited]*
Solvent/vehicle, if used type: amount:	N/A	*Recommended solvents include corn oil or other appropriate vehicle not more than 2% of diet by weight*

Parameter	Details	Remarks *Criteria*
Was detailed description and nutrient analysis of the basal diet provided (Yes/No)	Yes. Basal diets contained 29.1% protein, 4.1% fat, 4.1% crude fiber, and 31600 ppm calcium.	Offspring received Teklad Bayer Starter ration (batch no. 13-07041) without the addition of test substance. *A commercial breeder feed or an equivalent that is appropriate for the test species is recommended.*
Preparation of test diet	The appropriate amount of test chemical was mixed with approx. 1 kg of basal diet for at least 5 minutes with a Kitchen Aid mixer. This premix was then quantitatively transferred to a Hobart mixer which contained approximately half of the basal diet, and mixed for at least 10 minutes. The remaining half of basal diet was added, and mixed again for at least 10 minutes. Treated diets were prepared weekly, and were stored in a walk-in freezer (-10°C) until needed. Two batch sizes were prepared: prior to the egg-laying phase, 8-kg batches were prepared, and during the egg-laying phase, 11-kg batches were prepared.	The amount of AE 0317309 Technical was adjusted to reflect 100% ai. Fresh treated feed was added to feed pans on Thursday of each week. *A premixed diet containing the test substance should be mechanically mixed with basal diet. If an evaporative vehicle is used, it should be completely evaporated prior to feeding.*
Indicate whether stability and homogeneity of test material in diet determined (Yes/No)	Yes	
Were concentrations in diet verified by chemical analysis?	Yes. Samples from all treatment levels and control were collected from feed prepared on Weeks 1, 5, 10, 15, and 20. Samples were stored frozen for up to 5 weeks prior to analysis (reviewer-determined). Recoveries were generally >80% (one exception – 76% recovery in the 67 mg ai/kg diet sample from Week 5).	

Parameter	Details	Remarks *Criteria*
Did chemical analysis confirm that diet was stable and homogeneous?	No. The freezer storage stability of AE0317309 Technical in treated feed was provided for two samples with initial concentrations of 72 and 710 mg ai/kg diet. The actual length of storage was not reported. However, based on Sample ID numbers and dates of analysis, it appeared that samples were obtained from Week 1 and analyzed approximately after 5 weeks of frozen storage. Recoveries were 83% of initial concentrations at both levels. Although this confirms relative stability under the maximum length of frozen storage, feeder storage stability (at ambient temperature) was not assessed. As diets were replaced weekly, the stability of AE 0317309 Technical in treated feed under ambient conditions needs to be provided. Yes. Nine samples of treated feed prepared at 67 mg ai/kg diet were analyzed. The RSD was 6%.	
Feeding and husbandry	Feeding and husbandry conditions appeared to be adequate, given guideline recommendations.	

Parameter	Details	Remarks *Criteria*
Test conditions (pre-laying) temperature: relative humidity: photoperiod:	Average of 22°C Average of 56% 7 hours light/day up through Week 8. The photoperiod was then increased to 17 hours light/day thereafter. A 30-minute dawn/dusk cycle was used for transition.	An average light intensity of 3.0-11.3 foot-candles was maintained; a low light intensity was utilized to calm the birds and reduce stress. Average air change in the adult room was 13.16 air changes per hour. *Recommended temperature: about 21EC (70EF)* *Recommended relative humidity: about 55%* *Recommended lighting* *First 8 weeks: 7 h per day.* *Thereafter: 16-17 h per day.* *At least 6 foot-candles are recommended at bird level.*
Egg Collection and Incubation		
Egg collection and storage collection interval: storage temperature: storage humidity:	Twice daily Average of 15°C Average of 55%	*Eggs should be collected daily; recommended egg storage temperature is approximately 16EC (61EF); recommended humidity is approximately 65%.* *Recommended collection interval: daily*
Were eggs candled for cracks prior to setting for incubation?	Yes	*Eggs should be candled on day 0*
Were eggs set weekly?	Yes	To prevent pathogen contamination, eggs were fumigated with formaldehyde gas prior to setting.
When was candling done for fertility?	Day 11	*Quail: approx. day 11* *Ducks: approx. day 14*
When were the eggs transferred to the hatcher?	Day 21	*Bobwhite: usually day 21* *Mallard: usually day 23*

Parameter	Details	Remarks *Criteria*
Hatching conditions temperature: humidity: photoperiod:	 Averaged 37°C Averaged 76% 14-hours light/day (hatchlings)	 *Recommended temperature is 39EC (102EF)* *Recommended humidity is 70%*
Day the hatched eggs were removed and counted	Days 24 and 25	*Eggs for bobwhite should be removed on day 24; for mallard on day 27*
Were egg shells washed and dried for at least 48 hrs before measuring?	Yes	
Egg shell thickness no. of eggs used: intervals: mode of measurement:	 All eggs laid in 1 day Every other week Three points around the equatorial circumference were measured to the nearest 0.001 mm.	 *Newly hatched eggs should be collected at least once every two weeks. Thickness of the shell plus membrane should be measured to the nearest 0.01 mm* with 3 - *4 measurements per shell.*
Reference chemical, if used	None used	

2. Observations:

Table 3: Observations.

Parameter	Details	Remarks
Parameters measured		
Parental (mortality, body weight, mean feed consumption) Egg collection and subsequent development (no. of eggs laid, no. of eggs cracked, shell thickness, no. of eggs set, no. of viable embryos, no. of live 3 week embryos, no. hatched, no. of 14-day survivors, average weight of 14-d old survivors, mortality, gross pathology, others)	- mortality - signs of toxicity, injury, or illness - body weight - food consumption - necropsy - eggs laid - eggs broken, cracked, small, and soft shelled, etc. - egg shell thickness - egg shell strength - eggs set - fertile 11-day embryos - live 18-day embryos - number of hatchlings - hatchling body weight - signs of toxicity and physical defects of hatchlings - number of 14-day-old survivors - 14-day-old survivor body weight	In addition to egg shell thickness, egg shell strength (the force needed to penetrate the shell and membrane) was measured at one point on the waist to the nearest 0.01 kg. *Recommended endpoints measured include:* • *Eggs laid/pen* • *Eggs cracked/pen* • *Eggs set/pen* • *Viable embryos/pen* • *Live 3-week embryos/pen* • *Normal hatchlings/pen* • *14-day-old survivors/pen* • *14-day-old survivors/pen* • *Weights of 14-day-old* • *survivors (mean per pen)* • *Egg shell thickness* • *Food consumption (mean per pen)* • *Initial and final body weight (mean per pen)*
Indicate if the test material was regurgitated	No indications of dietary regurgitation.	
Observation intervals (for various parameters)	Mortality and signs of toxicity were observed at least once daily for adults and hatchlings. Parental body weights were recorded at Weeks 1 (test initiation), 3, 5, 7, 9, and 22 (test termination), and food consumption was determined weekly.	*Body weights and food consumption should be measured at least biweekly*
Were raw data included?	Yes, sufficient	

II. RESULTS AND DISCUSSION:

A. MORTALITY:

There was no significant difference in adult mortality as compared to the control at any treatment level. However, 8 incidental mortalities occurred: two females each from the control, 64, and 205 mg ai/kg groups, and one bird/sex from the 594 mg ai/kg group.

One control female (pen 009) was found dead during Week 11, and the other female (pen 004) during Week 16. Necropsy of both hens revealed feather loss and skin abrasions of the head, neck, back and/or tail, and regressed ovaries. Necropsy of the pen-mates was unremarkable. The first female from the 64 mg ai/kg group (pen 105) was found dead during Week 1, with skin abrasions of the neck and wing. No other gross lesions were observed at necropsy, and necropsy of the pen-mate was unremarkable. Another female from the 64 mg ai/kg group (pen 114) was found dead during Week 10. No remarkable findings were observed in either this bird or its pen-mate at necropsy. The first female from the 205 mg ai/kg group (pen 205) was found dead during Week 14, with feather loss and skin abrasions of the head. The second female from this group (pen 216) was found dead during Week 22, with feather loss of the head, wing, legs, and breast, and skin abrasions of the legs. Necropsy also revealed emaciation and regressed ovaries. Necropsy of both pen-mates was unremarkable. At the 594 mg ai/kg diet level, one male (pen 308) was found dead during Week 13; necropsy revealed skin abrasions of the legs and emaciation. A female (pen 316) was also found dead at the start of Week 17; necropsy revealed emaciation and regressed ovaries. Necropsy of the pen-mates was unremarkable.

Based on the nature and incidence of mortalities observed, all deaths were considered unrelated to treatment. The NOAEC for adult mortality was 594 mg ai/kg diet.

Table 4: Effect of AE 0317309 Technical on Mortality of Northern Bobwhite Quail.

Treatment (mg a.i./kg diet) [record measured and nominal conc. used]	Observation Period					
	Week 7		Week 14		Week 22	
	No. Dead		No. Dead		No. Dead	
	Male	Female	Male	Female	Male	Female
Control	0	0	0	1	0	2
64 (67)	0	1	0	2	0	2
205 (200)	0	0	0	1	0	2
594 (600)	0	0	1	0	1	1

B. REPRODUCTIVE AND OTHER ENDPOINTS:

Abnormal Effects/Behavior: No treatment-related signs of toxicity were apparent. Effects such as feather loss and abrasions were associated with normal laboratory cage housing, and were observed at comparable levels among all groups. Additional effects incidental to treatment included hyporeactivity and diarrhea. The NOAEC for adult clinical signs of toxicity was 594 mg ai/kg diet.

Food Consumption: No statistically-significant differences on overall food consumption were observed between the treatment and control groups. Overall feed consumption averaged 19.1-20.4 g/bird/day for all levels. The NOAEC for adult food consumption was 594 mg ai/kg diet.

Body Weight: No statistically-significant differences in overall adult body weight changes were observed between the treatment and control groups. The mean weight gain in the males was 28, 34, 32, and 31 g and in the females was 62, 59, 53, and 60 g for the control, 64, 205, and 594 mg ai/kg diet levels, respectively. The NOAEC for adult body weight was 594 mg ai/kg diet.

Necropsy: No treatment-related findings were observed at necropsy. The NOAEC for post-mortem findings was 594 mg ai/kg diet.

Reproductive Effects: No treatment-related effects on egg production or quality, fertility, embryonic development, hatchability, or chick survival were observed at any test level. In addition, no treatment-related clinical signs of toxicity or effects on hatchling or 14-day survivor body weights were observed. The NOAEC for all reproductive parameters was 594 mg ai/kg diet.

Table 5: Reproductive and Other Parameters (nominal concentrations; study author-reported).

Parameter	Control	64 mg ai/kg	205 mg ai/kg	594 mg ai/kg	NOAEC/ LOAEC
Eggs laid/pen	46	53	45	41	594 mg ai/kg >594 mg ai/kg
Eggs laid/hen/day	Not reported	Not reported	Not reported	Not reported	N/A
Eggs cracked	3	8	11	8	N/A
Eggs set	719	766	723	666	N/A
Shell thickness (mm ∀ SD)	0.208 ± 0.01	0.203 ± 0.01	0.199 ± 0.01	0.205 ± 0.01	594 mg ai/kg >594 mg ai/kg
Viable 11-day embryos	689	728	653	623	N/A
Live 18-day embryos	685	723	651	619	N/A
No. of hatchling/hen	38	43	34	31	594 mg ai/kg >594 mg ai/kg
No. of normal hatchlings	653	688	616	564	N/A
Hatchling weight (g ± SD)	7.2 ± 0.73	7.2 ± 0.76	7.0 ± 0.69	7.0 ± 0.68	594 mg ai/kg >594 mg ai/kg
14-day old survivors	649	682	610	562	N/A
14-day old survivors weight (g ± SD)	35.6 ± 3.22	34.7 ± 3.23	34.7 ± 3.88	35.5 ± 3.40	594 mg ai/kg >594 mg ai/kg
Mean food consumption	19.1	20.3	20.4	20.1	594 mg ai/kg >594 mg ai/kg

Parameter	Control	64 mg ai/kg	205 mg ai/kg	594 mg ai/kg	NOAEC/ LOAEC
Weight of females (parent) at test initiation: at onset of egg laying: at test termination:	 196 210 258	 195 207 255	 195 206 248	 195 206 255	 594 mg ai/kg >594 mg ai/kg
Weight of males (parent) at test initiation: at onset of egg laying: at test termination:	 197 207 225	 196 207 231	 196 208 227	 197 207 229	 594 mg ai/kg >594 mg ai/kg
Gross pathology	No treatment-related abnormalities observed.				594 mg ai/kg >594 mg ai/kg
Eggshell strength (kg ± SD)	0.75 ± 0.16	0.74 ± 0.23	0.74 ± 0.26	0.78 ± 0.18	594 mg ai/kg >594 mg ai/kg

N/A = Not statistically analyzed.

C. REPORTED STATISTICS:

The following variables were statistically analyzed: adult body weight change from initiation to termination, overall mean feed consumption, eggs laid/hen, eggs cracked/hen, eggs set/hen, viable (11-day) embryos/hen, live (18-day) embryos/hen, eggs not cracked/laid (%), eggs set/laid (%), viable embryos/eggs set (%), live embryos/viable embryos (%), hatchlings/hen, 14-day old survivors/hen, hatchlings/eggs laid (%), hatchlings/eggs set (%), hatchlings/live embryos (%), 14-day old survivors/eggs set (%), 14-day old survivors/hatchlings (%), hatchling body weights, 14-day old survivors body weights, egg shell strength, and egg shell thickness.

Data were assessed for normality using the Shapiro-Wilk's test and for homogeneity of variance using Levene's test. If the data set passed the tests for normality and homogeneity, an analysis of variance (ANOVA) was performed to determine statistically-significant differences between groups, followed by Dunnett's or William's test. If the data set did not pass the tests for normality and homogeneity, the data were analyzed by the Jonckheere or Mann-Whitney non-parametric test.

All variables were analyzed using SAS statistical software. Mean-measured concentrations were used for all estimations.

D. VERIFICATION OF STATISTICAL RESULTS:

Statistical Method: Analysis was conducted using "chicks.sas" (Ver. 3; March 2002), a SAS program provided by EFED/OPP/USEPA. Data for all endpoints were examined graphically using box plots to determine if they exhibited a dose-dependent response, which was ultimately used to select the multiple comparison test to detect the LOAEC and NOAEC. Data for each endpoint were tested to determine if their distributions were normal and if their variances were homogeneous using Shapiro-Wilk's and Levene's tests, respectively. Data that satisfied these assumptions were subjected to Dunnett's and William's tests and data that did not satisfy these assumptions were subjected to the non-parametric MannWhitney-U (with a Bonferroni adjustment) and Jonckheere's tests. Data for dead birds were excluded from the analyses. See Appendix I for output of the reviewer's statistical verification and graphs for affected endpoints to support any reviewer-generated conclusions that may differ from those reported in the study.

NOAEC: 205 mg a.i./kg diet
LOAEC: 594 mg a.i./kg diet

Most Sensitive Endpoint(s): ratios of eggs set to eggs laid, number hatched to eggs laid, number hatched to live 3-week embryos, and hatchling weights

Table 6: Reproductive and Other Parameters (mean-measured concentrations; reviewer-reported).

Parameter	Control	64 mg ai/kg	205 mg ai/kg	594 mg ai/kg	NOAEC/ LOAEC
Eggs laid/pen	43.4	46.9	44.5	41.1	594 mg ai/kg >594 mg ai/kg
Eggs cracked/pen	0.17	0.44	0.61	0.44	594 mg ai/kg >594 mg ai/kg
Eggs not cracked/eggs laid (%)	99.7	99.1	98.8	99.0	594 mg ai/kg >594 mg ai/kg
Eggs set/pen	39.9	42.6	40.2	37.0	594 mg ai/kg >594 mg ai/kg
Shell thickness	0.21	0.20	0.20	0.21	594 mg ai/kg >594 mg ai/kg
Eggs set/eggs laid (%)	92.4	90.8	90.9	89.6*	205 mg ai/kg 594 mg ai/kg
Viable embryos/pen	38.3	40.4	36.3	34.6	594 mg ai/kg >594 mg ai/kg
Viable embryos/eggs set (%)	96.4	95.1	87.9	92.7	594 mg ai/kg >594 mg ai/kg
Live embryos/pen	38.1	40.2	36.2	34.4	594 mg ai/kg >594 mg ai/kg
Live embryos/viable embryos (%)	99.3	99.3	99.8	99.5	594 mg ai/kg >594 mg ai/kg
No. of hatchlings/pen	36.3	38.2	34.2	31.3	594 mg ai/kg >594 mg ai/kg
No. of hatchlings/eggs laid (%)	81.9	81.7	75.6	74.3*	205 mg ai/kg 594 mg ai/kg
No. of hatchlings/eggs set (%)	88.8	90.0	82.8	82.9	594 mg ai/kg >594 mg ai/kg
No. of hatchlings/live embryos (%)	92.9	95.3	94.5	87.2*	205 mg ai/kg >594 mg ai/kg
Hatchling survival/pen	38.2	42.6	35.9	35.1	594 mg ai/kg >594 mg ai/kg

Hatchling survival/eggs set (%)	88.2	89.2	86.8	82.7	594 mg ai/kg >594 mg ai/kg
Hatchling survival/no. of hatchlings (%)	99.3	99.1	99.1	99.7	594 mg ai/kg >594 mg ai/kg
Hatchling weight (g)	7.2	7.2	6.9*	7.0	64 mg ai/kg 205 mg ai/kg
Survivor weight (g)	35.3	34.8	34.6	35.3	594 mg ai/kg >594 mg ai/kg
Mean food consumption (g/bird/day)	20.6	20.8	22.0	20.9	594 mg ai/kg >594 mg ai/kg
Male weight gain (g)	28.1	34.1	31.9	31.4	594 mg ai/kg >594 mg ai/kg
Female weight gain (g)	62.4	58.8	53.2	59.8	594 mg ai/kg >594 mg ai/kg

*Statistically significant at $p<0.05$.

E. STUDY DEFICIENCIES:

The stability of AE 0317309 Technical for 7 days in treated feed maintained under open-trough, ambient conditions (representing actual use) was not assessed.

F. REVIEWERS' COMMENTS:

Results of the reviewers' statistical verification were broadly similar to the study author's. Both the reviewers and study author detected slight (3-9%), but significant adverse effects on the ratios of eggs set to eggs laid, number hatched to eggs laid, and number hatched to live 3-week embryos at the highest treatment level. The study author's analysis detected a significant reduction in hatchling weight at the highest treatment level, while the reviewers' analysis detected a statistically significant reduction in this endpoint at the penultimate treatment level. The slight reduction in hatchling weights (5%) at the 205 mg ac/kg diet level, however, may not be dose related as there was no statistical difference when the highest test exposure was compared to the control. Additionally, although there was a slight reduction in hatchling weight at the two highest treatment levels, 14-d survivor weights were not different from those in control pens. This suggests that there is little risk of adverse effects on longer-term juvenile growth.

The study author dismissed all effects on the basis that they were slight and biologically irrelevant. The secondary reviewers agree that there appears to be a slight decreasing trend in hatchling viability with dose, however, recommend a NOAEC of 205 mg a.i./kg based on the slight but statistically significant reductions (3-9%) in the proportions of eggs set to eggs laid, number hatched to eggs laid, and number hatched to live 3-week embryos at the highest treatment level (594 mg ac/kg) compared to the control. Note that the PMRA generally does not use the ratio of eggs set to eggs laid to establish a LOAEC as the number of eggs removed due to cracking and for eggshell thickness measurement can differ between treatment levels. However, PMRA, agrees with a NOAEC of 205mg a.i./kg based on the reductions in the other study endpoints.

The mean test article intake was calculated to be 6, 19, and 54 mg ai/kg bw/day for the 64, 205, and 594 mg ai/kg diet levels, respectively.

A method validation study was conducted on June 16, 2003 (Study No. A9720801). Control feed (presumably Teklad Game Bird Ration) was spiked with AE 0317309 Technical at 0 (control), 30.0, 300, 2503, and 5005 mg ai/kg. Recoveries ranged from 78-96%, and averaged 90 ± 7% of nominal concentrations.

Upon removal from the hatching compartments, all hatchlings were de-beaked (clipped the tip of the upper beak) to reduce pecking injuries.

In-life dates for the definitive study were July 8, 2004 – January 17, 2005.

G. CONCLUSIONS:

This study is classified as **ACCEPTABLE**, is scientifically sound, and does satisfy the guideline requirements for an avian reproduction study using northern bobwhite quail. There were slight, but significant reductions (3-9%) in the proportions of eggs set to eggs laid, number hatched to eggs laid, hatchling weight, and number hatched to live 3-week embryos at the highest treatment level. Based on these findings, the NOAEC and LOAEC levels were 205 and 594 mg ai/kg diet, respectively.

Endpoint(s) Affected: ratios of eggs set to eggs laid, number hatched to eggs laid, number hatched to live 3-week embryos, and hatchling weights

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APPENDIX I. OUTPUT OF REVIEWER=S STATISTICAL VERIFICATION:

Bobwhite repro, Pyrasulfotole, MRID 468017-32
PRINTOUT OF RAW DATA

Obs	TRT	EL	EC	ENC_EL	ES	ES_EL	VE	VE_ES	LE	LE_VE	NH	NH_EL	NH_ES
1	Ctrl	50	2	96.00	45	90.00	45	100.00	44	97.78	41	82.00	91.11
2	Ctrl	48	0	100.00	45	93.75	43	95.56	43	100.00	33	68.75	73.33
3	Ctrl	52	0	100.00	48	92.31	48	100.00	48	100.00	46	88.46	95.83
4	Ctrl	2	0	100.00	2	100.00	2	100.00	2	100.00	1	50.00	50.00
5	Ctrl	47	0	100.00	45	95.74	44	97.78	44	100.00	39	82.98	86.67
6	Ctrl	52	0	100.00	47	90.38	42	89.36	42	100.00	41	78.85	87.23
7	Ctrl	53	0	100.00	48	90.57	42	87.50	42	100.00	41	77.36	85.42
8	Ctrl	59	0	100.00	54	91.53	53	98.15	53	100.00	53	89.83	98.15
9	Ctrl	0	0	.	0	.	0	.	0	.	0	.	.
10	Ctrl	23	0	100.00	21	91.30	21	100.00	20	95.24	20	86.96	95.24
11	Ctrl	52	0	100.00	47	90.38	46	97.87	45	97.83	42	80.77	89.36
12	Ctrl	51	1	98.04	46	90.20	46	100.00	45	97.83	44	86.27	95.65
13	Ctrl	55	0	100.00	51	92.73	50	98.04	50	100.00	50	90.91	98.04
14	Ctrl	54	0	100.00	51	94.44	50	98.04	50	100.00	50	92.59	98.04
15	Ctrl	51	0	100.00	47	92.16	46	97.87	46	100.00	44	86.27	93.62
16	Ctrl	52	0	100.00	47	90.38	47	100.00	47	100.00	46	88.46	97.87
17	Ctrl	55	0	100.00	51	92.73	40	78.43	40	100.00	38	69.09	74.51
18	Ctrl	26	0	100.00	24	92.31	24	100.00	24	100.00	24	92.31	100.00
19	Dose1	52	2	96.15	45	86.54	37	82.22	35	94.59	34	65.38	75.56
20	Dose1	49	0	100.00	46	93.88	45	97.83	45	100.00	43	87.76	93.48
21	Dose1	66	0	100.00	62	93.94	52	83.87	52	100.00	50	75.76	80.65
22	Dose1	50	0	100.00	45	90.00	45	100.00	45	100.00	44	88.00	97.78
23	Dose1	0	0	.	0	.	0	.	0	.	0	.	.
24	Dose1	53	0	100.00	48	90.57	46	95.83	46	100.00	43	81.13	89.58
25	Dose1	39	0	100.00	36	92.31	35	97.22	35	100.00	34	87.18	94.44
26	Dose1	57	2	96.49	50	87.72	48	96.00	48	100.00	46	80.70	92.00

27	Dose1	55	0	100.00	50	90.91	49	98.00	49	100.00	48	87.27
96.00												
28	Dose1	49	0	100.00	46	93.88	46	100.00	45	97.83	41	83.67
89.13												
29	Dose1	58	1	98.28	52	89.66	51	98.08	50	98.04	46	79.31
88.46												
30	Dose1	54	2	96.30	47	87.04	46	97.87	45	97.83	42	77.78
89.36												
31	Dose1	44	0	100.00	40	90.91	34	85.00	34	100.00	33	75.00
82.50												
32	Dose1	0	0	.	0	.	0	.	0	.	0	.
.												
33	Dose1	52	0	100.00	47	90.38	46	97.87	46	100.00	46	88.46
97.87												
34	Dose1	57	1	98.25	51	89.47	50	98.04	50	100.00	45	78.95
88.24												
35	Dose1	57	0	100.00	53	92.98	50	94.34	50	100.00	46	80.70
86.79												
36	Dose1	52	0	100.00	48	92.31	48	100.00	48	100.00	47	90.38
97.92												
37	Dose2	43	1	97.67	37	86.05	32	86.49	32	100.00	30	69.77
81.08												
38	Dose2	54	4	92.59	44	81.48	0	0.00	0	.	0	0.00
0.00												
39	Dose2	59	0	100.00	55	93.22	54	98.18	54	100.00	54	91.53
98.18												
40	Dose2	48	0	100.00	45	93.75	45	100.00	45	100.00	44	91.67
97.78												
41	Dose2	5	0	100.00	5	100.00	3	60.00	3	100.00	3	60.00
60.00												
42	Dose2	30	0	100.00	28	93.33	28	100.00	28	100.00	25	83.33
89.29												
43	Dose2	45	1	97.78	39	86.67	39	100.00	39	100.00	39	86.67
100.00												
44	Dose2	49	0	100.00	45	91.84	45	100.00	45	100.00	43	87.76
95.56												
45	Dose2	52	1	98.08	47	90.38	46	97.87	46	100.00	41	78.85
87.23												
46	Dose2	60	3	95.00	52	86.67	48	92.31	48	100.00	47	78.33
90.38												
47	Dose2	55	0	100.00	50	90.91	49	98.00	47	95.92	43	78.18
86.00												
48	Dose2	50	0	100.00	46	92.00	43	93.48	43	100.00	43	86.00
93.48												
49	Dose2	48	0	100.00	44	91.67	43	97.73	43	100.00	39	81.25
88.64												
50	Dose2	48	0	100.00	45	93.75	45	100.00	45	100.00	38	79.17
84.44												
51	Dose2	32	0	100.00	29	90.63	26	89.66	26	100.00	25	78.13
86.21												
52	Dose2	12	0	100.00	11	91.67	8	72.73	8	100.00	7	58.33
63.64												
53	Dose2	60	0	100.00	55	91.67	54	98.18	54	100.00	51	85.00
92.73												
54	Dose2	51	1	98.04	46	90.20	45	97.83	45	100.00	44	86.27
95.65												

55 Dose3 51 1 98.04 46 90.20 44 95.65 43 97.73 41 80.39
89.13
56 Dose3 45 0 100.00 40 88.89 39 97.50 39 100.00 35 77.78
87.50
57 Dose3 54 5 90.74 44 81.48 44 100.00 44 100.00 39 72.22
88.64
58 Dose3 46 0 100.00 40 86.96 37 92.50 37 100.00 28 60.87
70.00
59 Dose3 47 0 100.00 44 93.62 43 97.73 43 100.00 43 91.49
97.73
60 Dose3 29 0 100.00 25 86.21 24 96.00 24 100.00 21 72.41
84.00
61 Dose3 44 0 100.00 41 93.18 41 100.00 41 100.00 39 88.64
95.12
62 Dose3 0 0 . 0 . 0 . 0 . 0 . .

63 Dose3 39 1 97.44 32 82.05 31 96.88 31 100.00 29 74.36
90.63
64 Dose3 50 0 100.00 46 92.00 46 100.00 44 95.65 42 84.00
91.30
65 Dose3 56 0 100.00 52 92.86 51 98.08 51 100.00 51 91.07
98.08
66 Dose3 60 0 100.00 55 91.67 54 98.18 54 100.00 54 90.00
98.18
67 Dose3 58 1 98.28 52 89.66 51 98.08 51 100.00 48 82.76
92.31
68 Dose3 61 0 100.00 58 95.08 57 98.28 56 98.25 52 85.25
89.66
69 Dose3 40 0 100.00 37 92.50 10 27.03 10 100.00 3 7.50
8.11
70 Dose3 0 0 . 0 . 0 . 0 . 0 . .

71 Dose3 14 0 100.00 12 85.71 11 91.67 11 100.00 9 64.29
75.00
72 Dose3 46 0 100.00 42 91.30 40 95.24 40 100.00 30 65.22
71.43

Bobwhite repro, Pyrasulfotole, MRID 468017-32
PRINTOUT OF RAW DATA (continued)

Obs	TRT	NH_LE	HS	HS_ES	HS_NH	THICK	HATWT	SURVWT	FOOD	WTGAINM	WTGAINF
1	Ctrl	93.18	41	91.11	100.00	0.23	7	33	18	35	66
2	Ctrl	76.74	33	73.33	100.00	0.22	8	35	24	17	69
3	Ctrl	95.83	45	93.75	97.83	0.21	8	37	26	15	45
4	Ctrl	50.00	1	50.00	100.00	.	6	33	16	.	.
5	Ctrl	88.64	39	86.67	100.00	0.23	8	37	18	19	85
6	Ctrl	97.62	41	87.23	100.00	0.22	7	36	19	46	74
7	Ctrl	97.62	41	85.42	100.00	0.21	7	36	21	48	73
8	Ctrl	100.00	53	98.15	100.00	0.21	7	35	23	42	75
9	Ctrl	.	.	.	.	.	.	.	15	.	.
10	Ctrl	100.00	19	90.48	95.00	0.19	6	30	19	9	0
11	Ctrl	93.33	42	89.36	100.00	0.19	7	37	19	29	57
12	Ctrl	97.78	44	95.65	100.00	0.20	7	37	22	20	89
13	Ctrl	100.00	49	96.08	98.00	0.20	7	35	25	30	54
14	Ctrl	100.00	50	98.04	100.00	0.21	7	34	20	47	63
15	Ctrl	95.65	43	91.49	97.73	0.21	8	36	19	28	43
16	Ctrl	97.87	46	97.87	100.00	0.20	8	38	20	15	75
17	Ctrl	95.00	38	74.51	100.00	0.20	7	36	25	14	70

18	Ctrl	100.00	24	100.00	100.00	0.19	8	36	18	35	61
19	Dose1	97.14	33	73.33	97.06	0.19	7	34	24	45	41
20	Dose1	95.56	43	93.48	100.00	0.20	8	38	18	30	60
21	Dose1	96.15	50	80.65	100.00	0.20	8	35	29	23	69
22	Dose1	97.78	44	97.78	100.00	0.20	7	34	25	49	75
23	Dose1	.	.	.	.	.	.	.	16	.	.
24	Dose1	93.48	42	87.50	97.67	0.20	7	34	18	15	70
25	Dose1	97.14	34	94.44	100.00	0.21	7	35	22	27	17
26	Dose1	95.83	46	92.00	100.00	0.19	8	34	24	24	66
27	Dose1	97.96	48	96.00	100.00	0.21	7	33	16	31	49
28	Dose1	91.11	41	89.13	100.00	0.19	7	34	17	33	56
29	Dose1	92.00	45	86.54	97.83	0.21	7	34	23	11	75
30	Dose1	93.33	42	89.36	100.00	0.21	7	35	19	46	57
31	Dose1	97.06	33	82.50	100.00	0.18	8	35	23	42	58
32	Dose1	.	.	.	.	.	.	.	17	.	.
33	Dose1	100.00	45	95.74	97.83	0.22	6	35	18	58	63
34	Dose1	90.00	45	88.24	100.00	0.22	7	37	19	17	54
35	Dose1	92.00	45	84.91	97.83	0.21	7	32	21	48	70
36	Dose1	97.92	46	95.83	97.87	0.20	7	37	25	47	61
37	Dose2	93.75	30	81.08	100.00	0.19	6	33	22	41	3
38	Dose2	.	.	.	.	0.23	.	.	23	39	44
39	Dose2	100.00	54	98.18	100.00	0.21	7	33	26	43	51
40	Dose2	97.78	44	97.78	100.00	0.19	7	33	23	19	72
41	Dose2	100.00	3	60.00	100.00	.	6	37	18	.	.
42	Dose2	89.29	24	85.71	96.00	0.19	7	32	16	20	54
43	Dose2	100.00	39	100.00	100.00	0.20	7	37	19	21	61
44	Dose2	95.56	41	91.11	95.35	0.20	8	37	25	37	56
45	Dose2	89.13	41	87.23	100.00	0.19	7	36	19	29	73
46	Dose2	97.92	47	90.38	100.00	0.20	8	35	24	29	58
47	Dose2	91.49	43	86.00	100.00	0.20	7	36	20	29	71
48	Dose2	100.00	43	93.48	100.00	0.21	6	30	23	18	57
49	Dose2	90.70	37	84.09	94.87	0.17	7	34	19	25	59
50	Dose2	84.44	38	84.44	100.00	0.20	7	36	23	39	42
51	Dose2	96.15	25	86.21	100.00	0.21	7	37	24	61	33
52	Dose2	87.50	7	63.64	100.00	0.23	6	31	20	.	.
53	Dose2	94.44	50	90.91	98.04	0.19	7	36	27	29	59
54	Dose2	97.78	44	95.65	100.00	0.20	7	35	25	31	58
55	Dose3	95.35	41	89.13	100.00	0.22	7	35	25	32	66
56	Dose3	89.74	34	85.00	97.14	0.20	7	39	23	46	43
57	Dose3	88.64	39	88.64	100.00	0.19	7	36	20	36	78
58	Dose3	75.68	28	70.00	100.00	0.20	7	35	21	29	77
59	Dose3	100.00	43	97.73	100.00	0.21	7	33	19	20	50
60	Dose3	87.50	21	84.00	100.00	0.20	7	33	18	21	37
61	Dose3	95.12	39	95.12	100.00	0.20	6	35	22	30	74
62	Dose3	.	.	.	.	.	.	.	15	.	.
63	Dose3	93.55	29	90.63	100.00	0.21	7	38	21	29	18
64	Dose3	95.45	42	91.30	100.00	0.21	7	35	29	26	73
65	Dose3	100.00	51	98.08	100.00	0.22	7	35	19	23	79
66	Dose3	100.00	53	96.36	98.15	0.21	7	36	20	50	62
67	Dose3	94.12	48	92.31	100.00	0.21	7	34	22	22	58
68	Dose3	92.86	52	89.66	100.00	0.21	7	37	21	36	65
69	Dose3	30.00	3	8.11	100.00	0.21	7	37	23	35	74
70	Dose3	.	.	.	.	.	.	.	17	.	.
71	Dose3	81.82	9	75.00	100.00	0.19	7	30	18	33	34
72	Dose3	75.00	30	71.43	100.00	0.21	7	36	25	34	68

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE EL (Eggs Laid)
TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.770	<.001	0.241	0.867	USE NON-PARAMETRIC TESTS

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BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	18	43.44	18.02	4.25	41.49	34.48,	52.41
Dose1	18	46.89	18.01	4.24	38.41	37.93,	55.84
Dose2	18	44.50	15.46	3.64	34.74	36.81,	52.19
Dose3	18	41.11	18.75	4.42	45.61	31.79,	50.43

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	51.50	0.00	59.00	.	.
Dose1	52.00	0.00	66.00	107.93	-7.93
Dose2	48.50	5.00	60.00	102.43	-2.43
Dose3	46.00	0.00	61.00	94.63	5.37

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.50	0.475

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	51.50	.	.
Dose1	52.00	1.000	0.818
Dose2	48.50	1.000	0.409
Dose3	46.00	0.597	0.144

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE NEG_EC (Eggs Cracked)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.625	<.001	1.880	0.141	USE NON-PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.	Interval
Ctrl	18	0.17	0.51	0.12	308.70	0.00,	0.42
Dose1	18	0.44	0.78	0.18	176.36	0.05,	0.83
Dose2	18	0.61	1.14	0.27	187.32	0.04,	1.18
Dose3	18	0.44	1.20	0.28	269.80	0.00,	1.04

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	0.00	0.00	2.00	.	.
Dose1	0.00	0.00	2.00	266.67	-166.67
Dose2	0.00	0.00	4.00	366.67	-266.67
Dose3	0.00	0.00	5.00	266.67	-166.67

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.64	0.451

MannWhit(Bon) - testing each trt median signif. greater than control
Jonckheere - test assumes dose-response relationship, testing positive trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	0.00	.	.
Dose1	0.00	1.000	0.104
Dose2	0.00	1.000	0.064
Dose3	0.00	1.000	0.208

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE ENC_EL ((EL-EC)/EL (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.654	<.001	1.855	0.146	USE NON-PARAMETRIC TESTS

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BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	17	99.65	1.05	0.26	1.06	99.11,	100.00
Dose1	16	99.09	1.50	0.37	1.51	98.29,	99.89
Dose2	18	98.84	2.08	0.49	2.11	97.81,	99.88
Dose3	16	99.03	2.37	0.59	2.39	97.77,	100.00

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	100.00	96.00	100.00	.	.
Dose1	100.00	96.15	100.00	99.44	0.56
Dose2	100.00	92.59	100.00	99.19	0.81
Dose3	100.00	90.74	100.00	99.38	0.62

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.40	0.494

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	100.00	.	.
Dose1	100.00	1.000	0.109
Dose2	100.00	1.000	0.074
Dose3	100.00	1.000	0.187

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE ES (Eggs Set)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.783	<.001	0.294	0.829	USE NON-PARAMETRIC TESTS

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BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	18	39.94	16.55	3.90	41.43	31.72, 48.17
Dose1	18	42.56	16.39	3.86	38.50	34.41, 50.70
Dose2	18	40.17	13.85	3.27	34.49	33.28, 47.06
Dose3	18	37.00	17.26	4.07	46.66	28.42, 45.58

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	47.00	0.00	54.00	.	.
Dose1	47.00	0.00	62.00	106.54	-6.54
Dose2	45.00	5.00	55.00	100.56	-0.56
Dose3	41.50	0.00	58.00	92.63	7.37

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	3.40	0.334

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	47.00	.	.
Dose1	47.00	1.000	0.678
Dose2	45.00	0.649	0.211
Dose3	41.50	0.364	0.054

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE ES_EL (EggsSet/EggsLaid (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.971	0.122	1.835	0.150	USE PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.	Interval
Ctrl	17	92.41	2.54	0.62	2.75	91.10,	93.71
Dose1	16	90.78	2.36	0.59	2.60	89.52,	92.04
Dose2	18	90.88	3.93	0.93	4.33	88.92,	92.84
Dose3	16	89.58	4.07	1.02	4.54	87.42,	91.75

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	92.16	90.00	100.00	.	.
Dose1	90.74	86.54	93.94	98.24	1.76
Dose2	91.67	81.48	100.00	98.35	1.65
Dose3	90.75	81.48	95.08	96.95	3.05

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PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	63	2.00	0.124

Dunnett - testing each trt mean signif. less than control
Williams - test assumes dose-response relationship, testing negative trend
Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	92.41	.	92.41	.	0.503	0.533	0.081	.	.
Dose1	90.78	0.185	90.83	0.106	.	1.000	0.741	.	.
Dose2	90.88	0.200	90.83	0.105	.	.	0.671	.	.
Dose3	89.58	0.024	89.58	0.010	.	.	.	.	.

SUMMARY	NOEC	LOEC
Dunnett	Dose2	Dose3
Williams	**Dose2**	**Dose3**

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE VE (Viable Embryo(d14))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.806	<.001	0.517	0.672	USE NON-PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	18	38.28	15.82	3.73	41.33	30.41,	46.15
Dose1	18	40.44	15.59	3.68	38.56	32.69,	48.20
Dose2	18	36.28	16.87	3.98	46.51	27.89,	44.67
Dose3	18	34.61	18.10	4.27	52.30	25.61,	43.61

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	44.50	0.00	53.00	.	.
Dose1	46.00	0.00	52.00	105.66	-5.66
Dose2	44.00	0.00	54.00	94.78	5.22
Dose3	40.50	0.00	57.00	90.42	9.58

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.47	0.480

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	44.50	.	.
Dose1	46.00	1.000	0.796
Dose2	44.00	1.000	0.334
Dose3	40.50	0.637	0.141

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE VE_ES (ViableEmbryo/EggsSet (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.540	<.001	2.619	0.059	USE NON-PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	17	96.39	5.90	1.43	6.13	93.35, 99.42
Dose1	16	95.14	5.89	1.47	6.20	92.00, 98.28
Dose2	18	87.91	24.41	5.75	27.77	75.77, 100.00
Dose3	16	92.67	17.67	4.42	19.07	83.26, 100.00

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	98.04	78.43	100.00	.	.
Dose1	97.85	82.22	100.00	98.70	1.30
Dose2	97.85	0.00	100.00	91.21	8.79
Dose3	97.61	27.03	100.00	96.15	3.85

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.11	0.551

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	98.04	.	.
Dose1	97.85	0.296	0.091
Dose2	97.85	0.411	0.112
Dose3	97.61	0.471	0.160

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE LE (Live Embryo(d21))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.804	<.001	0.469	0.705	USE NON-PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.	Interval
Ctrl	18	38.06	15.81	3.73	41.54	30.19,	45.92
Dose1	18	40.17	15.55	3.67	38.71	32.43,	47.90
Dose2	18	36.17	16.79	3.96	46.42	27.82,	44.52
Dose3	18	34.39	17.93	4.23	52.14	25.47,	43.31

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	44.00	0.00	53.00	.	.
Dose1	45.50	0.00	52.00	105.55	-5.55
Dose2	44.00	0.00	54.00	95.04	4.96
Dose3	40.50	0.00	56.00	90.36	9.64

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.67	0.445

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	44.00	.	.
Dose1	45.50	1.000	0.822
Dose2	44.00	1.000	0.399
Dose3	40.50	0.559	0.141

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE LE_VE (LiveEmbryo/ViableEmbryo (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.599	<.001	1.727	0.171	USE NON-PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	17	99.33	1.36	0.33	1.37	98.64, 100.00
Dose1	16	99.27	1.50	0.38	1.52	98.47, 100.00
Dose2	17	99.76	0.99	0.24	0.99	99.25, 100.00
Dose3	16	99.48	1.23	0.31	1.24	98.82, 100.00

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	100.00	95.24	100.00	.	.
Dose1	100.00	94.59	100.00	99.93	0.07
Dose2	100.00	95.92	100.00	100.43	-0.43
Dose3	100.00	95.65	100.00	100.14	-0.14

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.31	0.510

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	100.00	.	.
Dose1	100.00	1.000	0.500
Dose2	100.00	1.000	0.906
Dose3	100.00	1.000	0.789

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE NH (Number Hatched)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.846	<.001	0.670	0.573	USE NON-PARAMETRIC TESTS

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BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.	Interval
Ctrl	18	36.28	15.46	3.64	42.61	28.59,	43.96
Dose1	18	38.22	14.72	3.47	38.52	30.90,	45.54
Dose2	18	34.22	16.16	3.81	47.22	26.19,	42.26
Dose3	18	31.33	17.94	4.23	57.25	22.41,	40.25

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	41.00	0.00	53.00	.	.
Dose1	43.50	0.00	50.00	105.36	-5.36
Dose2	40.00	0.00	54.00	94.33	5.67
Dose3	37.00	0.00	54.00	86.37	13.63

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.39	0.495

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	41.00	.	.
Dose1	43.50	1.000	0.753
Dose2	40.00	1.000	0.340
Dose3	37.00	0.610	0.126

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE NH_EL (NumberHatched/EggsLaid (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.711	<.001	1.641	0.189	USE NON-PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.	Interval
Ctrl	17	81.87	10.91	2.65	13.32	76.27,	87.48
Dose1	16	81.72	6.53	1.63	7.99	78.23,	85.20
Dose2	18	75.57	21.03	4.96	27.83	65.11,	86.03
Dose3	16	74.26	20.33	5.08	27.37	63.43,	85.10

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	86.27	50.00	92.59	.	.
Dose1	80.92	65.38	90.38	99.81	0.19
Dose2	80.21	0.00	91.67	92.30	7.70
Dose3	79.08	7.50	91.49	90.71	9.29

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.54	0.468

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	86.27	.	.
Dose1	80.92	0.698	0.225
Dose2	80.21	0.364	0.091
Dose3	79.08	0.334	0.048

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	**Dose2**	**Dose3**

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE NH_ES (NumberHatched/EggsSet (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.669	<.001	1.647	0.187	USE NON-PARAMETRIC TESTS

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BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.	Interval
Ctrl	17	88.83	12.75	3.09	14.35	82.27,	95.38
Dose1	16	89.98	6.46	1.62	7.18	86.54,	93.43
Dose2	18	82.79	23.29	5.49	28.13	71.21,	94.38
Dose3	16	82.93	21.83	5.46	26.32	71.29,	94.56

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	93.62	50.00	100.00	.	.
Dose1	89.47	75.56	97.92	101.30	-1.30
Dose2	88.96	0.00	100.00	93.21	6.79
Dose3	89.39	8.11	98.18	93.36	6.64

****
**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.56	0.667

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	93.62	.	.
Dose1	89.47	0.871	0.282
Dose2	88.96	0.470	0.132
Dose3	89.39	0.494	0.113

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE NH_LE (NumberHatched/LiveEmbryo (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.668	<.001	3.227	0.028	USE NON-PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.	Interval
Ctrl	17	92.90	12.46	3.02	13.42	86.49,	99.31
Dose1	16	95.28	2.92	0.73	3.06	93.72,	96.83
Dose2	17	94.47	4.93	1.19	5.21	91.93,	97.00
Dose3	16	87.18	17.13	4.28	19.65	78.05,	96.30

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	97.62	50.00	100.00	.	.
Dose1	95.99	90.00	100.00	102.56	-2.56
Dose2	95.56	84.44	100.00	101.69	-1.69
Dose3	93.20	30.00	100.00	93.84	6.16

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	4.64	0.200

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	97.62	.	.
Dose1	95.99	0.729	0.235
Dose2	95.56	0.981	0.243
Dose3	93.20	0.123	0.021

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	**Dose2**	**Dose3**

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE HS (Hatching Survival(d14))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.886	<.001	3.065	0.034	USE NON-PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	17	38.18	12.89	3.13	33.76	31.55, 44.80
Dose1	16	42.63	5.12	1.28	12.02	39.89, 45.36
Dose2	17	35.88	14.06	3.41	39.18	28.65, 43.11
Dose3	16	35.13	14.66	3.67	41.75	27.31, 42.94

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	41.00	1.00	53.00	.	.
Dose1	44.50	33.00	50.00	111.65	-11.65
Dose2	41.00	3.00	54.00	93.99	6.01
Dose3	39.00	3.00	53.00	92.01	7.99

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	3.62	0.306

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	41.00	.	.
Dose1	44.50	1.000	0.861
Dose2	41.00	1.000	0.290
Dose3	39.00	0.799	0.133

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE HS_ES (HatchingSurvival/EggsSet (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.736	<.001	1.735	0.169	USE NON-PARAMETRIC TESTS

****
**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.	Interval
Ctrl	17	88.18	12.45	3.02	14.12	81.78,	94.59
Dose1	16	89.21	6.63	1.66	7.43	85.68,	92.75
Dose2	17	86.82	10.89	2.64	12.55	81.22,	92.42
Dose3	16	82.66	21.72	5.43	26.28	71.08,	94.23

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	91.11	50.00	100.00	.	.
Dose1	89.25	73.33	97.78	101.17	-1.17
Dose2	87.23	60.00	100.00	98.45	1.55
Dose3	89.39	8.11	98.08	93.73	6.27

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.28	0.735

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	91.11	.	.
Dose1	89.25	0.835	0.270
Dose2	87.23	0.593	0.157
Dose3	89.39	0.520	0.128

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE HS_NH (HatchingSurvival/NumberHatched (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.705	<.001	3.526	0.020	USE NON-PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	17	99.33	1.40	0.34	1.41	98.61, 100.00
Dose1	16	99.13	1.17	0.29	1.18	98.50, 99.76
Dose2	17	99.07	1.82	0.44	1.84	98.14, 100.00
Dose3	16	99.71	0.82	0.21	0.83	99.27, 100.00

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	100.00	95.00	100.00	.	.
Dose1	100.00	97.06	100.00	99.80	0.20
Dose2	100.00	94.87	100.00	99.75	0.25
Dose3	100.00	97.14	100.00	100.38	-0.38

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.62	0.455

MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	100.00	.	.
Dose1	100.00	1.000	0.206
Dose2	100.00	1.000	0.433
Dose3	100.00	1.000	0.818

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE THICK (Eggshell thickness)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.979	0.335	0.669	0.574	USE PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.	Interval
Ctrl	16	0.21	0.01	0.00	6.51	0.20,	0.21
Dose1	16	0.20	0.01	0.00	5.74	0.20,	0.21
Dose2	17	0.20	0.01	0.00	7.03	0.19,	0.21
Dose3	16	0.21	0.01	0.00	4.36	0.20,	0.21

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	0.21	0.19	0.23	.	.
Dose1	0.20	0.18	0.22	97.77	2.23
Dose2	0.20	0.17	0.23	95.70	4.30
Dose3	0.21	0.19	0.22	98.77	1.23

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**
PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	61	1.58	0.204

Dunnett - testing each trt mean signif. less than control
Williams - test assumes dose-response relationship, testing negative trend
Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	0.21	.	0.21	.	0.708	0.165	0.934	.	.
Dose1	0.20	0.296	0.20	0.172	.	0.744	0.964	.	.
Dose2	0.20	0.050	0.20	0.110	.	.	0.447	.	.
Dose3	0.21	0.499	0.20	0.117	.	.	.	.	.

SUMMARY	NOEC	LOEC
Dunnett	Dose3	>highest dose
Williams	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE HATWT (Hatchling Weight)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.982	0.441	1.398	0.252	USE PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	17	7.18	0.48	0.12	6.75	6.93, 7.43
Dose1	16	7.16	0.42	0.10	5.85	6.94, 7.39
Dose2	17	6.85	0.44	0.11	6.38	6.63, 7.08
Dose3	16	7.03	0.27	0.07	3.91	6.88, 7.17

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	7.20	6.10	7.90	.	.
Dose1	7.10	6.40	8.20	99.81	0.19
Dose2	6.90	6.00	7.50	95.49	4.51
Dose3	7.10	6.40	7.40	97.89	2.11

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**
PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	62	2.23	0.093

Dunnett - testing each trt mean signif. less than control
Williams - test assumes dose-response relationship, testing negative trend
Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	7.18	.	7.18	.	1.000	0.113	0.719	.	.
Dose1	7.16	0.716	7.16	0.541	.	0.149	0.783	.	.
Dose2	6.85	0.034	6.94	0.058	.	.	0.632	.	.
Dose3	7.03	0.306	6.94	0.063	.	.	.	.	.

SUMMARY	NOEC	LOEC
Dunnett	**Dose1**	**Dose2**
Williams	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE SURVWT (Survivor Wt (d14))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.952	0.013	0.991	0.403	USE PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	17	35.26	1.98	0.48	5.63	34.24,	36.28
Dose1	16	34.75	1.44	0.36	4.15	33.98,	35.52
Dose2	17	34.56	2.20	0.53	6.36	33.43,	35.69
Dose3	16	35.29	2.09	0.52	5.93	34.18,	36.41

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	35.80	29.50	37.70	.	.
Dose1	34.40	32.40	37.90	98.54	1.46
Dose2	35.10	29.90	37.00	98.00	2.00
Dose3	35.20	29.80	38.80	100.08	-0.08

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**
PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	62	0.59	0.622

Dunnett - testing each trt mean signif. less than control
Williams - test assumes dose-response relationship, testing negative trend
Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	35.26	.	35.26	.	0.874	0.720	1.000	.	.
Dose1	34.75	0.430	34.86	0.332	.	0.992	0.860	.	.
Dose2	34.56	0.306	34.86	0.351	.	.	0.704	.	.
Dose3	35.29	0.768	34.86	0.368	.	.	.	.	.

SUMMARY	NOEC	LOEC
Dunnett	Dose3	>highest dose
Williams	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE FOOD (Food Consumption)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.980	0.291	0.417	0.741	USE PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.	Interval
Ctrl	18	20.58	3.20	0.75	15.57	18.98,	22.17
Dose1	18	20.80	3.56	0.84	17.10	19.03,	22.57
Dose2	18	21.97	3.08	0.73	14.01	20.44,	23.50
Dose3	18	20.94	3.33	0.78	15.89	19.28,	22.59

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	19.77	15.38	26.45	.	.
Dose1	20.28	16.28	28.65	101.09	-1.09
Dose2	22.61	16.39	27.31	106.80	-6.80
Dose3	20.69	14.85	29.05	101.76	-1.76

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**
PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	68	0.64	0.594

Dunnett - testing each trt mean signif. less than control
Williams - test assumes dose-response relationship, testing negative trend
Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	20.58	.	21.12	.	0.997	0.583	0.988	.	.
Dose1	20.80	0.818	21.12	0.774	.	0.709	0.999	.	.
Dose2	21.97	0.983	21.12	0.807	.	.	0.781	.	.
Dose3	20.94	0.853	20.94	0.770	.	.	.	.	.

SUMMARY	NOEC	LOEC
Dunnett	Dose3	>highest dose
Williams	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE WTGAINM (Male wt gain)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.982	0.468	2.526	0.066	USE PARAMETRIC TESTS

****
**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.	Interval
Ctrl	16	28.06	13.03	3.26	46.42	21.12,	35.00
Dose1	16	34.13	14.07	3.52	41.23	26.63,	41.62
Dose2	16	31.88	11.20	2.80	35.14	25.91,	37.84
Dose3	16	31.38	8.42	2.11	26.84	26.89,	35.86

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	28.50	9.00	48.00	.	.
Dose1	32.00	11.00	58.00	121.60	-21.60
Dose2	29.00	18.00	61.00	113.59	-13.59
Dose3	31.00	20.00	50.00	111.80	-11.80

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**
PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	60	0.71	0.550

Dunnett - testing each trt mean signif. less than control
Williams - test assumes dose-response relationship, testing negative trend
Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	28.06	.	31.36	.	0.477	0.801	0.859	.	.
Dose1	34.13	0.990	31.36	0.859	.	0.950	0.913	.	.
Dose2	31.88	0.956	31.36	0.885	.	.	0.999	.	.
Dose3	31.38	0.942	31.36	0.899	.	.	.	.	.

SUMMARY	NOEC	LOEC
Dunnett	Dose3	>highest dose
Williams	Dose3	>highest dose

Bobwhite repro, Pyrasulfotole, MRID 468017-32
ANALYSIS RESULTS FOR VARIABLE WTGAINF (Female wt gain)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS
Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.883	<.001	0.587	0.626	USE NON-PARAMETRIC TESTS

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**
BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	16	62.44	20.93	5.23	33.52	51.28, 73.59
Dose1	16	58.81	14.49	3.62	24.64	51.09, 66.53
Dose2	16	53.19	17.13	4.28	32.21	44.06, 62.32
Dose3	16	59.75	18.30	4.58	30.63	50.00, 69.50

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	67.50	0.00	89.00	.	.
Dose1	60.50	17.00	75.00	94.19	5.81
Dose2	57.50	3.00	73.00	85.19	14.81
Dose3	65.50	18.00	79.00	95.70	4.30

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**
NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests
Kruskal-Wallis test - equality among treatment groups

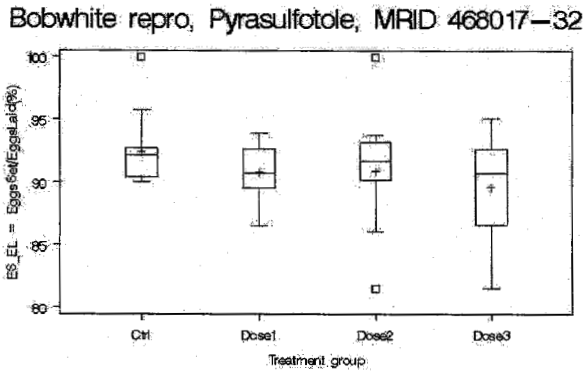
Degrees of Freedom	TestStat	P-value
3	4.60	0.203

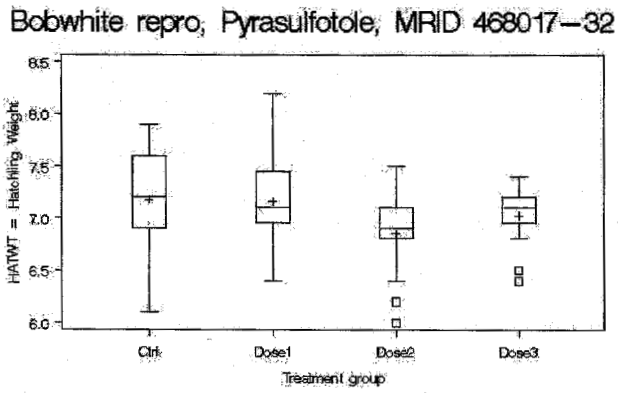
MannWhit(Bon) - testing each trt median signif. less than control
Jonckheere - test assumes dose-response relationship, testing negative trend

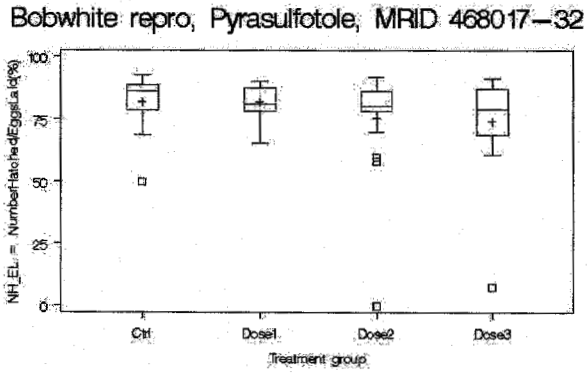
Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	67.50	.	.
Dose1	60.50	0.461	0.145
Dose2	57.50	0.092	0.020
Dose3	65.50	1.000	0.225

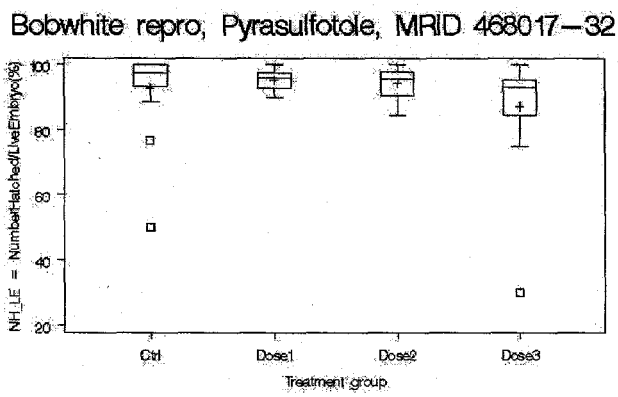
SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Box Plots:









	B	52	2	45	37	35	34	
33		0.190	7.0	34.2	23.87	191	236	209
250								
	B	49	0	46	45	45	43	
43		0.201	7.5	37.9	17.65	207	237	189
249								
	B	66	0	62	52	52	50	
50		0.203	7.5	35.0	28.65	208	231	176
245								
	B	50	0	45	45	45	44	
44		0.198	7.1	34.2	24.87	193	242	203
278								
	B	0	0	0	0	0	0	
.		.	.	.	16.28	203	.	193
.								
	B	53	0	48	46	46	43	
42		0.200	7.0	34.1	18.38	201	216	202
272								
	B	39	0	36	35	35	34	
34		0.211	6.9	35.4	21.97	201	228	199
216								
	B	57	2	50	48	48	46	
46		0.188	7.5	33.6	23.93	182	206	195
261								
	B	55	0	50	49	49	48	
48		0.206	6.7	33.4	16.49	201	232	182
231								
	B	49	0	46	46	45	41	
41		0.187	7.2	34.0	17.11	204	237	190
246								
	B	58	1	52	51	50	46	
45		0.211	7.1	33.5	22.50	204	215	211
286								
	B	54	2	47	46	45	42	
42		0.210	7.3	34.6	19.24	184	230	199
256								
	B	44	0	40	34	34	33	
33		0.184	8.2	35.4	22.95	189	231	195
253								
	B	0	0	0	0	0	0	
.		.	.	.	17.25	183	.	186
.								
	B	52	0	47	46	46	46	
45		0.219	6.4	34.7	18.27	210	268	188
251								
	B	57	1	51	50	50	45	
45		0.224	7.1	36.5	18.96	201	218	205
259								
	B	57	0	53	50	50	46	
45		0.213	6.7	32.4	21.31	185	233	192
262								
	B	52	0	48	48	48	47	
46		0.202	7.4	37.1	24.69	184	231	196
257								

	C	43	1	37	32	32	30	
30		0.188	6.2	33.3	21.87	199	240	195
198								
	C	54	4	44	0	0	0	
.		0.225	.	.	23.10	192	231	193
237								
	C	59	0	55	54	54	54	
54		0.208	6.9	33.1	26.31	198	241	210
261								
	C	48	0	45	45	45	44	
44		0.186	6.9	33.2	22.62	202	221	205
277								
	C	5	0	5	3	3	3	
3		.	6.0	36.6	17.57	174	.	197
.								
	C	30	0	28	28	28	25	
24		0.186	6.9	31.6	16.39	185	205	188
242								
	C	45	1	39	39	39	39	
39		0.201	7.3	37.0	19.23	204	225	202
263								
	C	49	0	45	45	45	43	
41		0.199	7.5	37.0	24.57	205	242	203
259								
	C	52	1	47	46	46	41	
41		0.194	6.8	36.1	19.37	187	216	211
284								
	C	60	3	52	48	48	47	
47		0.198	7.5	35.1	24.22	187	216	189
247								
	C	55	0	50	49	47	43	
43		0.199	7.0	35.9	19.72	188	217	183
254								
	C	50	0	46	43	43	43	
43		0.209	6.4	29.9	22.60	198	216	178
235								
	C	48	0	44	43	43	39	
37		0.169	7.2	34.2	18.62	200	225	197
256								
	C	48	0	45	45	45	38	
38		0.196	6.8	35.7	22.99	180	219	186
228								
	C	32	0	29	26	26	25	
25		0.206	6.8	36.6	23.72	204	265	200
233								
	C	12	0	11	8	8	7	
7		0.226	6.2	31.1	20.05	217	.	195
.								
	C	60	0	55	54	54	51	
50		0.190	7.1	36.3	27.31	209	238	190
249								
	C	51	1	46	45	45	44	
44		0.197	7.0	34.8	25.27	190	221	191
249								

	D	51	1	46	44	43	41	
41		0.219	6.5	35.0	24.73	197	229	192
258								
	D	45	0	40	39	39	35	
34		0.200	7.0	38.8	23.07	222	268	186
229								
	D	54	5	44	44	44	39	
39		0.186	7.2	36.4	20.34	196	232	190
268								
	D	46	0	40	37	37	28	
28		0.199	7.1	34.8	20.77	183	212	190
267								
	D	47	0	44	43	43	43	
43		0.205	6.8	33.4	18.83	201	221	210
260								
	D	29	0	25	24	24	21	
21		0.201	7.0	33.2	18.31	196	217	198
235								
	D	44	0	41	41	41	39	
39		0.198	6.4	34.8	21.66	219	249	184
258								
	D	0	0	0	0	0	0	
.		.	.	.	14.85	184	.	203
.								
	D	39	1	32	31	31	29	
29		0.207	7.0	37.7	21.24	186	215	212
230								
	D	50	0	46	46	44	42	
42		0.210	7.2	35.4	29.05	201	227	196
269								
	D	56	0	52	51	51	51	
51		0.215	7.1	35.0	19.42	188	211	193
272								
	D	60	0	55	54	54	54	
53		0.210	7.1	35.8	19.65	191	241	205
267								
	D	58	1	52	51	51	48	
48		0.206	7.2	34.4	21.76	196	218	195
253								
	D	61	0	58	57	56	52	
52		0.214	7.4	36.8	20.60	205	241	179
244								
	D	40	0	37	10	10	3	
3		0.211	6.9	37.1	22.51	185	220	200
274								
	D	0	0	0	0	0	0	
.		.	.	.	16.56	203	.	197
.								
	D	14	0	12	11	11	9	
9		0.190	7.4	29.8	18.14	211	244	184
218								
	D	46	0	42	40	40	30	
30		0.209	7.1	36.3	25.38	189	223	202
270								

A	50	2	45	45	44	41	41	0.234	7.2	32.9	18.11	213	248	199	265
A	48	0	45	43	43	33	33	0.218	7.7	35.1	24.46	197	214	211	280
A	52	0	48	48	48	46	45	0.205	7.9	36.5	26.45	202	217	193	238
A	2	0	2	2	2	1	1	.	6.1	33.4	16.17	202	.	189	.
A	47	0	45	44	44	39	39	0.233	7.6	36.8	18.36	185	204	195	280
A	52	0	47	42	42	41	41	0.220	7.1	35.9	19.49	183	229	208	282
A	53	0	48	42	42	41	41	0.214	7.1	35.8	20.53	216	264	181	254
A	59	0	54	53	53	53	53	0.206	7.0	35.0	23.06	192	234	186	261
A	0	0	0	0	0	0	.	.	.	.	15.38	199	.	202	.
A	23	0	21	21	20	20	19	0.192	6.4	29.5	18.93	190	199	188	188
A	52	0	47	46	45	42	42	0.190	6.8	36.5	19.26	188	217	214	271
A	51	1	46	46	45	44	44	0.199	7.2	37.4	22.06	207	227	195	284
A	55	0	51	50	50	50	49	0.195	7.4	35.4	25.42	186	216	192	246
A	54	0	51	50	50	50	50	0.211	6.9	33.7	20.36	192	239	176	239
A	51	0	47	46	46	44	43	0.205	7.7	35.8	18.91	212	240	204	247
A	52	0	47	47	47	46	46	0.203	7.5	37.7	20.05	205	220	191	266
A	55	0	51	40	40	38	38	0.204	6.8	36.1	25.17	186	200	196	266
A	26	0	24	24	24	24	24	0.192	7.6	36.0	18.18	199	234	199	260

TRT	EL	EC	ES	VE	LE	NH
A	50	2	45	45	44	41
A	48	0	45	43	43	33
A	52	0	48	48	48	46
A	2	0	2	2	2	1
A	47	0	45	44	44	39
A	52	0	47	42	42	41
A	53	0	48	42	42	41
A	59	0	54	53	53	53
A	0	0	0	0	0	0
A	23	0	21	21	20	20
A	52	0	47	46	45	42
A	51	1	46	46	45	44
A	55	0	51	50	50	50
A	54	0	51	50	50	50
A	51	0	47	46	46	44
A	52	0	47	47	47	46
A	55	0	51	40	40	38
A	26	0	24	24	24	24
	782	**3**	**719**	**689**	**685**	**653**
B	52	2	45	37	35	34
B	49	0	46	45	45	43
B	66	0	62	52	52	50
B	50	0	45	45	45	44
B	0	0	0	0	0	0
B	53	0	48	46	46	43
B	39	0	36	35	35	34
B	57	2	50	48	48	46
B	55	0	50	49	49	48
B	49	0	46	46	45	41
B	58	1	52	51	50	46
B	54	2	47	46	45	42
B	44	0	40	34	34	33
B	0	0	0	0	0	0
B	52	0	47	46	46	46
B	57	1	51	50	50	45
B	57	0	53	50	50	46
B	52	0	48	48	48	47
	844	**8**	**766**	**728**	**723**	**688**
C	43	1	37	32	32	30
C	54	4	44	0	0	0
C	59	0	55	54	54	54
C	48	0	45	45	45	44
C	5	0	5	3	3	3
C	30	0	28	28	28	25
C	45	1	39	39	39	39
C	49	0	45	45	45	43
C	52	1	47	46	46	41
C	60	3	52	48	48	47
C	55	0	50	49	47	43
C	50	0	46	43	43	43

C	48	0	44	43	43	39
C	48	0	45	45	45	38
C	32	0	29	26	26	25
C	12	0	11	8	8	7
C	60	0	55	54	54	51
C	51	1	46	45	45	44
	801	**11**	**723**	**653**	**651**	**616**
D	51	1	46	44	43	41
D	45	0	40	39	39	35
D	54	5	44	44	44	39
D	46	0	40	37	37	28
D	47	0	44	43	43	43
D	29	0	25	24	24	21
D	44	0	41	41	41	39
D	0	0	0	0	0	0
D	39	1	32	31	31	29
D	50	0	46	46	44	42
D	56	0	52	51	51	51
D	60	0	55	54	54	54
D	58	1	52	51	51	48
D	61	0	58	57	56	52
D	40	0	37	10	10	3
D	0	0	0	0	0	0
D	14	0	12	11	11	9
D	46	0	42	40	40	30
	740	**8**	**666**	**623**	**619**	**564**

HS	THICK	HATWT	SURVWT	FOOD	PREM	POSTM
41	0.234	7.2	32.9	18.11	213	248
33	0.218	7.7	35.1	24.46	197	214
45	0.205	7.9	36.5	26.45	202	217
1	.	6.1	33.4	16.17	202	.
39	0.233	7.6	36.8	18.36	185	204
41	0.220	7.1	35.9	19.49	183	229
41	0.214	7.1	35.8	20.53	216	264
53	0.206	7.0	35.0	23.06	192	234
.	.	.	.	15.38	199	.
19	0.192	6.4	29.5	18.93	190	199
42	0.190	6.8	36.5	19.26	188	217
44	0.199	7.2	37.4	22.06	207	227
49	0.195	7.4	35.4	25.42	186	216
50	0.211	6.9	33.7	20.36	192	239
43	0.205	7.7	35.8	18.91	212	240
46	0.203	7.5	37.7	20.05	205	220
38	0.204	6.8	36.1	25.17	186	200
24	0.192	7.6	36.0	18.18	199	234
649	**0.208**	**7.2**	**35.3**	**20.58**	**197**	**225.1**
33	0.190	7.0	34.2	23.87	191	236
43	0.201	7.5	37.9	17.65	207	237
50	0.203	7.5	35.0	28.65	208	231
44	0.198	7.1	34.2	24.87	193	242
.	.	.	.	16.28	203	.
42	0.200	7.0	34.1	18.38	201	216
34	0.211	6.9	35.4	21.97	201	228
46	0.188	7.5	33.6	23.93	182	206
48	0.206	6.7	33.4	16.49	201	232
41	0.187	7.2	34.0	17.11	204	237
45	0.211	7.1	33.5	22.50	204	215
42	0.210	7.3	34.6	19.24	184	230
33	0.184	8.2	35.4	22.95	189	231
.	.	.	.	17.25	183	.
45	0.219	6.4	34.7	18.27	210	268
45	0.224	7.1	36.5	18.96	201	218
45	0.213	6.7	32.4	21.31	185	233
46	0.202	7.4	37.1	24.69	184	231
682	**0.203**	**7.2**	**34.8**	**20.8**	**196.2**	**230.7**
30	0.188	6.2	33.3	21.87	199	240
.	0.225	.	.	23.10	192	231
54	0.208	6.9	33.1	26.31	198	241
44	0.186	6.9	33.2	22.62	202	221
3	.	6.0	36.6	17.57	174	.
24	0.186	6.9	31.6	16.39	185	205
39	0.201	7.3	37.0	19.23	204	225
41	0.199	7.5	37.0	24.57	205	242
41	0.194	6.8	36.1	19.37	187	216
47	0.198	7.5	35.1	24.22	187	216
43	0.199	7.0	35.9	19.72	188	217
43	0.209	6.4	29.9	22.60	198	216

37	0.169	7.2	34.2	18.62	200	225
38	0.196	6.8	35.7	22.99	180	219
25	0.206	6.8	36.6	23.72	204	265
7	0.226	6.2	31.1	20.05	217	.
50	0.190	7.1	36.3	27.31	209	238
44	0.197	7.0	34.8	25.27	190	221
610	**0.199**	**6.9**	**34.6**	**22.0**	**195.5**	**227.4**
41	0.219	6.5	35.0	24.73	197	229
34	0.200	7.0	38.8	23.07	222	268
39	0.186	7.2	36.4	20.34	196	232
28	0.199	7.1	34.8	20.77	183	212
43	0.205	6.8	33.4	18.83	201	221
21	0.201	7.0	33.2	18.31	196	217
39	0.198	6.4	34.8	21.66	219	249
.	.	.	.	14.85	184	.
29	0.207	7.0	37.7	21.24	186	215
42	0.210	7.2	35.4	29.05	201	227
51	0.215	7.1	35.0	19.42	188	211
53	0.210	7.1	35.8	19.65	191	241
48	0.206	7.2	34.4	21.76	196	218
52	0.214	7.4	36.8	20.60	205	241
3	0.211	6.9	37.1	22.51	185	220
.	.	.	.	16.56	203	.
9	0.190	7.4	29.8	18.14	211	244
30	0.209	7.1	36.3	25.38	189	223
562	**0.205**	**7.0**	**35.3**	**20.9**	**197.4**	**229.3**

PREF	POSTF
199	265
211	280
193	238
189	.
195	280
208	282
181	254
186	261
202	.
188	188
214	271
195	284
192	246
176	239
204	247
191	266
196	266
199	260
195.5	**257.9**
209	250
189	249
176	245
203	278
193	.
202	272
199	216
195	261
182	231
190	246
211	286
199	256
195	253
186	.
188	251
205	259
192	262
196	257
195.0	**254.5**
195	198
193	237
210	261
205	277
197	.
188	242
202	263
203	259
211	284
189	247
183	254
178	235

197	256
186	228
200	233
195	.
190	249
191	249
195.2	**248.3**
192	258
186	229
190	268
190	267
210	260
198	235
184	258
203	.
212	230
196	269
193	272
205	267
195	253
179	244
200	274
197	.
184	218
202	270
195.3	**254.5**