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**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Data Requirement:	PMRA Data Code	{.....}
	EPA DP Barcode	D319377
	OECD Data Point	{.....}
	EPA MRID	465789-49
	EPA Guideline	§71-4b

Test material:	IR5878 Technical	Purity: 98.56%
Common name:	Orthosulfamuron	
Chemical name:	IUPAC: Not reported	
	CAS name: Not reported	
	CAS No.: 213464-77-8	
	Synonyms: None reported	

Primary Reviewer: Christie E. Padova
Staff Scientist, Dynamac Corporation

Signature: *Christie E. Padova*
Date: 2/27/06

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Date: 7/28/06 *Christopher Salice*

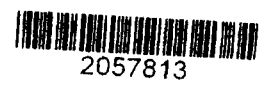
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EPA PC Code	108209	

Date Evaluation Completed: 31-07-2006

CITATION: Frey, L.T., *et al.* 2003. IR5878: A Reproduction Study with the Mallard. Unpublished study performed by Wildlife International Ltd., Easton, MD. Laboratory Project No. 544-109. Study submitted by Isagro S.p.A., Milano, Italy. Study initiated July 24, 2002 and submitted May 29, 2003.

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.



Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

EXECUTIVE SUMMARY

The one-generation reproductive toxicity of IR5878 Technical (Orthosulfamuron) to groups (16 pens/treatment level) of 1 male and 1 female, 21-week-old mallard duck was assessed over approximately 21 weeks. IR5878 Technical was administered to the birds in the diet at nominal concentrations of 0 (vehicle control), 200, 500, and 1250 mg ai/kg diet. Mean-measured concentrations were <50 (<LOD, control), 195, 500, and 1280 mg ai/kg diet, respectively.

There were no significant treatment-related effects on any parameter and therefore, the NOAEC for this study is 1280 mg ai/kg diet. Although there were no statistically significant effects, there were reductions in several parameters including the proportion of number hatched to eggs set, the proportion of hatchling survival to eggs set, and hatchling weight at the highest treatment level. Reductions for these parameters were 9, 10, and 6% respectively.

This toxicity study is scientifically sound and satisfies the guideline requirement for a mallard duck reproductive toxicity study. This study is classified ACCEPTABLE.

Results Synopsis

Test Organism Size/Age(mean Weight): 21-weeks old; 923-1377 g (combined sexes)

NOAEC: 1280 mg ai/kg diet

LOAEC: >1280 mg ai/kg diet

Endpoint(s) Affected: None

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(*Anas platyrhynchos*)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: The study protocol was based on procedures of the U.S. EPA Pesticide Assessment Guidelines, §71-4 (1982). Deviations from §71-4 include:

1. Mortality of the ducks during acclimation was not reported.
2. The pre-egg laying exposure duration was (only) 9 weeks, whereas at least 10 weeks is required.
3. The expected field residue level was not reported. As no treatment-related effects were observed during the study, it is unknown if the highest level tested represents the maximum expected field residue level.
4. The average egg storage temperature (prior to setting for incubation) was 14.0°C, slightly lower than the recommended level of 16°C.
5. The average hatching temperature was 37.2°C, slightly lower than the recommended level of 39°C.

These deviations did not affect the scientific soundness of the study.

COMPLIANCE: Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided.

A. MATERIALS:

1. Test Material IR5878 Technical

Description: White powder

Lot No./Batch No. : G009/02

Purity: 98.56%

Stability of compound under test conditions: Verified. Samples of feed from all treatment levels were collected on Day 0 of Week 1 and again on Day 7 of Week 1, following 7 days of open bin ambient storage. Recoveries ranged from 91-96% of initial values.

Storage conditions of test chemicals: Ambient conditions in locked storage

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(*Anas platyrhynchos*)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Physicochemical properties of IR5878 Technical.

Parameter	Values	Comments
Water solubility at 20EC	Not reported	
Vapor pressure	Not reported	
UV absorption	Not reported	
pKa	Not reported	
Kow	Not reported	

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

2. Test organism:

Table 1: Test organism.

Parameter	Details	Remarks
		Criteria
Species (common and scientific names):	Mallard duck (<i>Anas platyrhynchos</i>)	Birds were from the same hatch, and were phenotypically indistinguishable from wild birds. <i>Recommended species include a wild waterfowl species, preferably the mallard (<i>Anas platyrhynchos</i>) or an upland game species, preferably the northern bobwhite (<i>Colinus virginianus</i>)</i>
Age at Study Initiation:	21 weeks	It was stated that birds were approaching their first breeding season. <i>Birds approaching their first breeding season should be used.</i>
Body Weight: (mean and range)	Males: Overall range (n=64) 1006 to 1377 g, with group means of 1173 to 1182 g. Females: Overall range (n=64) 923 to 1216 g, with group means of 1053 to 1064 g.	Individual body weights were recorded at Weeks 0, 2, 4, 6, 8 and 21 (test termination). <i>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.</i>
Source:	Whistling Wings, Inc. Hanover, IL	<i>All birds should be from the same source.</i>

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

B. STUDY DESIGN:

1. Experimental Conditions

a. Range-finding study: The test concentrations were selected in consultation with the Sponsor, based upon the results of a pilot reproduction study (Wildlife International Project No. 544-105; not provided) and additional toxicity information provided by the Sponsor.

b. Definitive Study

Table 2: Experimental Parameters.

Parameter	Details	Remarks
		Criteria
<u>Acclimation</u> Period: Conditions: (same as test or not) Feeding: Health: (any mortality observed)	4 weeks Same as test Water and feed were provided <i>ad libitum</i> . Pre-test mortality was not reported.	The study author reported that at test initiation, all birds were examined for physical injuries and general health, and birds that did not appear healthy or were outside the desired weight range were excluded from the study. Ducks were fed a basal diet formulated by Agway Inc., to meet laboratory specifications, and provided public tap water from the city of Easton. <i>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 <u>ad libitum</u>, and sickness, injuries or mortality should be noted.</i>
<u>Test duration</u> pre-laying exposure: egg-laying exposure: withdrawal period, if used:	8 weeks 13 weeks None	<i><u>Recommended pre-laying exposure duration:</u> At least 10 weeks prior to the onset of egg-laying. <u>Recommended exposure duration with egg-laying:</u> At least 10 weeks. <u>Recommended withdrawal period:</u> If reduced reproduction is evident, a withdrawal period of up to 3 weeks should be added to the test phase.</i>

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Parameter	Details	Remarks <i>Criteria</i>
<p><u>Pen (for parental and offspring) size:</u></p> <p>construction materials:</p> <p>number:</p>	<p>Parents (one pair) were housed in battery cages measuring 75 x 90 x 45 cm high. Offspring (by set and group) were housed in 62 x 92 x 25.5 cm high battery brooders.</p> <p>Parental and offspring pens were constructed of vinyl-coated wire mesh.</p> <p>16 parental pens/treatment level. Hatchlings were group-housed according to the appropriate parental concentration.</p>	<p><u>Pens</u> <i>Pens should have adequate room and be arranged to prevent cross-contamination.</i></p> <p><u>Materials</u> <i>Recommended materials include nontoxic material and nonbinding material, such as galvanized steel.</i></p> <p><u>Number</u> <i>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.</i></p>
<p>Number of birds per pen (male:female)</p>	<p>2 birds/pen (1 male:1 female)</p>	<p><i>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.</i></p>
<p><u>Number of pens per group/treatment</u></p> <p>negative control:</p> <p>solvent control:</p> <p>treated:</p>	<p>N/A</p> <p>16 pens</p> <p>16 pens/treatment</p>	<p><i>At least 12-16 pens should be used, but considerably more if birds are kept in pairs.</i></p>

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Parameter	Details	Remarks
		<i>Criteria</i>
<p><u>Test concentrations (mg ai/kg diet)</u> nominal: measured:</p>	<p>0 (vehicle control), 200, 500, and 1250 mg ai/kg diet <50 (<LOD, control), 195, 500, and 1280 mg ai/kg diet</p>	<p><i>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.</i></p>
<p>Maximum labeled field residue anticipated and source of information:</p>	<p>Not specified</p>	<p><i>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]</i></p>
<p>Solvent/vehicle, if used type: amount:</p>	<p>Corn oil Approx. 0.08% by weight</p>	<p>Percent of corn oil in the final test diets was the same for all levels and was calculated by the reviewer on a weight basis (using the general assumption that 1 g ≈ 1 mL): $\{[(180 \text{ g corn oil}/8118 \text{ g total premix weight}) \times 2000 \text{ g subsample of premix}] / 55000 \text{ total final diet weight}\} \times 100$.</p> <p><i>Recommended solvents include corn oil or other appropriate vehicle not more than 2% of diet by weight</i></p>
<p>Was detailed description and nutrient analysis of the basal diet provided (Yes/No)</p>	<p>Yes. Parental diets contained at least 27% protein and 2.5% fat, and no more than 5% fiber. In addition, supplemental limestone was added to the diets to increase the final calcium level to approximately 3%. Offspring received basal diet without the addition of limestone.</p>	<p><i>A commercial breeder feed or an equivalent that is appropriate for the test species is recommended.</i></p>

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(*Anas platyrhynchos*)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Parameter	Details	Remarks
		Criteria
Preparation of test diet	<p>The appropriate amount of test substance was blended with a portion of basal diet for at least 1 minute in a Waring blender. The test substance was weighed out and blended in batches as necessary for each level. Following the final blending sequence, the blender was rinsed with retained ration, and all remaining ration, blended (treated) feed, and corn oil were mixed for approximately 5 minutes on a Hobart mixer. Separate pre-mixes were prepared weekly for each concentration level and were stored frozen until needed.</p> <p>Final diets were prepared weekly. Portions of pre-mix were combined with additional basal ration and limestone and mixed for approximately 20 minutes in a Patterson-Kelly Twin Shell blender prior to offering.</p>	<p><i>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.</i></p>
Indicate whether stability and homogeneity of test material in diet determined (Yes/No)	Yes	
Were concentrations in diet verified by chemical analysis?	Yes	<p>Samples were analyzed from feed prepared during Weeks 1, 4, 8, 12, 16, and 20. Recoveries for all treatment levels ranged from 93-106% of nominal concentrations.</p>

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Parameter	Details	Remarks
		Criteria
Egg Collection and Incubation		
<u>Egg collection and storage</u> collection interval: storage temperature: storage humidity:	Daily 14.0 ± 0.3°C 85 ± 7%	To prevent pathogen contamination, the collected eggs were washed in a commercial egg washer with a chlorine-based detergent at 45°C for approximately 3 minutes. <i>Eggs should be collected daily; recommended egg storage temperature is approximately 16EC (61 EF); recommended humidity is approximately 65%. Recommended collection interval: daily</i>
Were eggs candled for cracks prior to setting for incubation?	Yes	<i>Eggs should be candled on day 0</i>
Were eggs set weekly?	Yes	
When candling was done for fertility?	Days 13-14	<i>Quail: approx. day 11 Ducks: approx. day 14</i>
When the eggs were transferred to the hatcher?	Day 24	Eggs were candled again on Days 20-21 to determine embryo survival. <i>Bobwhite: usually day 21 Mallard: usually day 23</i>
<u>Hatching conditions</u> temperature: humidity: photoperiod:	37.2 ± 0.0°C Approximately 77% 16 hours light/8 hours dark (hatchlings)	<i>Recommended temperature is 39EC (102 EF) Recommended humidity is 70%</i>
Day the hatched eggs were removed and counted	Day 27 or 28	<i>Eggs for bobwhite should be removed on day 24; for mallard on day 27</i>
Were egg shells washed and dried for at least 48 hrs before measuring?	Yes	

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Parameter	Details	Remarks
		Criteria
<u>Egg shell thickness</u> no. of eggs used: intervals: mode of measurement:	One egg was collected (when available) from each odd numbered cage during odd numbered weeks and from each even numbered cage during the even numbered weeks. Once weekly throughout the egg laying period. Five points around the equatorial circumference were measured to the nearest 0.002 mm.	<i>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.</i>
Reference chemical, if used	N/A	

2. Observations:

Table 3: Observations.

Parameter	Details	Remarks
Parameters measured		
<u>Parental</u> (mortality, body weight, mean feed consumption)	- mortality - body weight - food consumption - signs of toxicity - necropsy	<i>Recommended endpoints measured include:</i> <ul style="list-style-type: none"> • 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)
<u>Egg collection and subsequent development</u> (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)	- eggs laid - eggs cracked - eggshell thickness - eggs set - viable embryos - live 3-week embryos - number of hatchlings - hatchling body weight - number of 14-day-old survivors - 14-day-old survivor body weight - signs of toxicity of hatchlings	
Indicate if the test material was regurgitated	No indications of dietary regurgitation.	

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(*Anas platyrhynchos*)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Parameter	Details	Remarks
Observation intervals (for various parameters)	Parental and hatchling mortality and signs of toxicity were recorded once daily. Parental body weights were recorded at the start of acclimation, at Weeks 0, 2, 4, 6, 8 and at test termination (Week 21). Parental food consumption was measured weekly throughout the test.	<i>Body weights and food consumption should be measured at least biweekly</i>
Were raw data included?	Yes	

II. RESULTS AND DISCUSSION:

A. MORTALITY:

No treatment-related mortality was observed during the study; however, three incidental mortalities occurred, two in the 200 mg ai/kg group and one in the 1250 mg ai/kg group.

The first mortality at the 200 mg ai/kg level was a female that was euthanized on Day 0 of Week 2, when the bird was noted in a debilitated condition with dyspnea. No external abnormalities were observed upon necropsy. Internally, mucopurulent exudates were noted in the upper portions of the lungs, and the spleen was slightly pale. As the mortality occurred at the beginning of the test, the hen was replaced with an extra bird that was from the same lot of birds and had acclimated with the test birds. The second mortality at the 200 mg ai/kg level was also a female that was found dead on Day 5 of Week 3, without exhibiting prior clinical signs. Internally, mucopurulent exudates in the upper portions of the lungs, fluid in the pericardium, and slightly pale kidneys were noted. Necropsy of the pen-mate was unremarkable.

The single mortality in the 1250 mg ai/kg group was a female that was euthanized on Day 0 of Week 20 due to her debilitated condition. The hen had been noted with a distended abdomen beginning on Day of Week 19. Externally, the bird was noted to have foot lesions and a distended abdomen. Internally, the spleen was enlarged and mottled, the liver was firm, and the ovary was regressed. In the abdominal cavity, egg yolk peritonitis was noted along with approximately 450 mL of a brownish fluid. Necropsy of the pen-mate was unremarkable.

No other mortalities were observed during the study, and due to the nature of lesions observed at necropsy, none of the mortalities that occurred were considered to be related to treatment. The LOAEC for adult survival was >1280 mg ai/kg.

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Table 4: Effect of IR5878 Technical on Mortality of Mallard Duck (*Anas platyrhynchos*).

Treatment (mg ai/kg diet) Mean-measured (and Nominal) Concentrations	Observation Period					
	Week 7		Week 14		Week 21	
	No. Dead Male	No. Dead Female	No. Dead Male	No. Dead Female	No. Dead Male	No. Dead Female
Control	0	0	0	0	0	0
195 (200)	0	2	0	2	0	2
500 (500)	0	0	0	0	0	0
1280 (1250)	0	0	0	0	0	1

B. REPRODUCTIVE AND OTHER ENDPOINTS:

Abnormal Effects/Behavior: No overt signs of toxicity were observed in any treatment group, and except for incidental clinical findings, all birds appeared normal throughout the study. Incidental clinical observations normally associated with pen wear and/or interactions among pen mates included feather loss, a head lesion, abdominal swelling, and foot lesions with occasional associated lameness. Additional effects included dyspnea, coughing, and wheezing observed in 7/128 birds during the first 6 weeks of the test, one bird during Week 10, and one bird during Week 17. In addition, one female from the 500 mg ai/kg diet level was noted with a thin appearance. The LOAEC for clinical signs of toxicity was >1280 mg ai/kg.

Food Consumption: No apparent treatment-related effects on feed consumption were observed (with no statistically-significant differences). Consumption generally increased over time, with overall feed consumption averaging 131-142 g/bird/day for all treatment and control groups (reviewer-calculated). The LOAEC for food consumption was >1280 mg ai/kg.

Body Weight: No treatment-related effects on body weight were observed (with no statistically-significant differences). The LOAEC for adult body weight was >1280 mg ai/kg.

Necropsy: There were no findings at necropsy that were related to treatment. The LOAEC for post-mortem findings was >1280 mg ai/kg.

Reproductive Effects: No treatment-related effects were observed on egg production or quality, fertility, embryonic development, hatchability, or survival of hatchlings at any treatment level. Furthermore, no overt signs of toxicity were reported in hatchlings, and no treatment-related effect on offspring body weights were observed at any treatment level. The LOAEC for effects on reproduction was >1280 mg ai/kg.

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

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

Parameter	Control	200 mg ai/kg	500 mg ai/kg	1250 mg ai/kg	NOAEC/ LOAEC
Eggs laid/pen	50	48	47	46	1250 mg ai/kg >1250 mg ai/kg
Eggs laid/hen/day	0.55	0.53	0.52	0.52	1250 mg ai/kg >1250 mg ai/kg
Eggs cracked	17	10	11	5	N/A
Eggs set	700	634	670	622	N/A
Shell thickness (mm \checkmark SD)	0.349 \pm 0.022	0.387 \pm 0.026	0.387 \pm 0.015	0.399 \pm 0.024	1250 mg ai/kg >1250 mg ai/kg
Viable embryos	666	597	618	580	N/A
Live 3-week embryos	656	593	613	578	N/A
No. of hatchling/hen ¹	36	36	33	31	N/A
No. of normal hatchlings	568	540	528	468	N/A
Hatchling weight (g \pm SD)	36 \pm 3	35 \pm 2	34 \pm 3	34 \pm 3	1250 mg ai/kg >1250 mg ai/kg
14-day old survivors	563	539	523	463	N/A
14-day old survivors weight (g \pm SD)	303 \pm 17	318 \pm 17	309 \pm 22	307 \pm 25	1250 mg ai/kg >1250 mg ai/kg
Mean food consumption ¹	141	131	142	139	1250 mg ai/kg >1250 mg ai/kg
Weight of females (parent) at test initiation: at onset of egg laying: at test termination:	1060 1049 1181	1064 1050 1131	1061 1043 1094	1053 1038 1184	1250 mg ai/kg >1250 mg ai/kg
Weight of males (parent) at test initiation: at onset of egg laying: at test termination:	1178 1144 1185	1178 1140 1211	1182 1142 1163	1173 1152 1152	1250 mg ai/kg >1250 mg ai/kg
Gross pathology	No treatment-related abnormalities observed.				1250 mg ai/kg >1250 mg ai/kg
Others, if any					

N/A = Not analyzed or not statistically-analyzed (as applicable).

¹ Reviewer-calculated.

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

C. REPORTED STATISTICS:

The following variables were statistically analyzed: adult body weight, adult feed consumption, eggs laid of maximum laid, eggs cracked of eggs laid, viable embryos of eggs set, live 3-week embryos of viable embryos, hatchlings of 3-week embryos, 14-day old survivors of hatchlings, hatchlings of eggs set, 14-day old survivors of eggs set, hatchlings of maximum set, 14-day old survivors of maximum set, egg shell thickness, and offsprings' body weight.

An analysis of variance (ANOVA) was performed to determine statistically-significant differences between groups. Dunnett's multiple comparison procedure was then used to compare the treatment means with the control group mean. Sample units were the individual pens within each experimental group, except adult body weights, where the sample unit was the individual bird. Percentage data were examined using Dunnett's method following arcsine square root transformation. Nominal 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 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 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: 500 mg ai/kg

LOAEC: 1280 mg ai/kg

Most Sensitive Endpoint(s): Number hatched to eggs set, hatchling survival to eggs set, and hatchling weight

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

Parameter	Control	195 mg ai/kg	500 mg ai/kg	1280 mg ai/kg	NOAEC/ LOAEC
Eggs laid/pen	49.9	47.6	47.2	46.5	1280 mg ai/kg/ >1280 mg ai/kg
Eggs cracked/pen	1.06	0.67	0.69	0.33	1280 mg ai/kg/ >1280 mg ai/kg
Eggs not cracked/eggs laid (%)	97.8	98.6	98.7	99.3	1280 mg ai/kg/ >1280 mg ai/kg
Eggs set/pen	43.8	42.3	41.9	41.5	1280 mg ai/kg/ >1280 mg ai/kg
Shell thickness	0.39	0.39	0.39	0.40	1280 mg ai/kg/ >1280 mg ai/kg

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Eggs set/eggs laid (%)	86.9	86.3	88.2	86.9	1280 mg ai/kg/ >1280 mg ai/kg
Viable embryos/pen	41.6	39.8	38.6	38.7	1280 mg ai/kg/ >1280 mg ai/kg
Viable embryos/eggs set (%)	94.7	94.3	92.4	92.0	1280 mg ai/kg/ >1280 mg ai/kg
Live embryos/pen	41.0	39.5	38.3	38.6	1280 mg ai/kg/ >1280 mg ai/kg
Live embryos/viable embryos (%)	98.3	99.4	99.3	99.9	1280 mg ai/kg/ >1280 mg ai/kg
No. of hatchlings/pen	35.5	36.0	33.0	31.2	1280 mg ai/kg/ >1280 mg ai/kg
No. of hatchlings/eggs laid (%)	69.5	73.4	69.6	63.4	1280 mg ai/kg/ >1280 mg ai/kg
No. of hatchlings/eggs set (%)	79.2	85.6	78.9	71.8	1280 mg ai/kg/ >1280 mg ai/kg
No. of hatchlings/live embryos (%)	84.1	91.3	86.1	77.7	1280 mg ai/kg/ >1280 mg ai/kg
Hatchling survival/pen	35.2	35.9	32.7	30.9	1280 mg ai/kg/ >1280 mg ai/kg
Hatchling survival/eggs set (%)	78.5	85.4	77.7	70.8	1280 mg ai/kg/ >1280 mg ai/kg
Hatchling survival/no. of hatchlings (%)	99.3	99.8	98.4	98.7	1280 mg ai/kg/ >1280 mg ai/kg
Hatchling weight (g)	35.8	35.1	34.5	33.7	1280 mg ai/kg/ >1280 mg ai/kg
Survivor weight (g)	302.9	318.5	309.3	306.9	1280 mg ai/kg/ >1280 mg ai/kg
Mean food consumption (g/bird/day)	141.0	131.3	141.9	138.7	1280 mg ai/kg/ >1280 mg ai/kg
Male weight gain (g)	7.1	25.6	-19.4	-18.4	1280 mg ai/kg/ >1280 mg ai/kg
Female weight gain (g)	120.6	71.3	33.8	135.5	1280 mg ai/kg/ >1280 mg ai/kg

*Significantly different from control ($p < 0.05$).

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(*Anas platyrhynchos*)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

E. STUDY DEFICIENCIES:

There were no study deficiencies that affected the scientific soundness of this study. All observed deviations were considered minor, and should have no impact on the results of the study.

F. REVIEWER'S COMMENTS:

The reviewer's statistical verification were identical to the study authors'. The reviewer's results are based on the mean measured treatment concentrations, so they are reported in the Executive Summary and Conclusions sections.

Estimated test substance intakes were calculated by treatment group for the pre-egg production period, the egg production period, and the overall adult period using the group mean feed consumption and group mean body weight data. Overall (Weeks 1-21) test substance intake was 23.6, 64.5, and 156 mg ai/kg bw/day for the nominal 200, 500, and 1250 mg ai/kg treatment levels, respectively.

Procedural recoveries were determined at every sampling interval at all test levels. Recoveries ranged from 93-100%. Analytical results were not corrected for the mean procedural recoveries.

G. CONCLUSIONS:

This study is scientifically sound and satisfies the guideline requirements for an avian reproduction study using mallard duck (§71-4b); this study is classified ACCEPTABLE. There were no significant treatment-related effects on any parameter therefore the NOAEC for this study was 1280 mg ai/kg diet. There were, however, some reductions in the proportion of number hatched to eggs set, the proportion of hatchling survival to eggs set, and hatchling weight at the highest treatment level. Reductions for these parameters were 9, 10, and 6% respectively.

NOAEC: 1280 mg ai/kg

LOAEC: >1280 mg ai/kg

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(*Anas platyrhynchos*)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

III. REFERENCES:

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**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(*Anas platyrhynchos*)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

APPENDIX I. OUTPUT OF REVIEWER'S STATISTICAL VERIFICATION:

Mallard repro, Orthosulfamuron, MRID 465789-49

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	60	0	100.00	56	93.33	55	98.21	55	100.00	51	85.00	91.07
2	Ctrl	59	2	96.61	51	86.44	50	98.04	49	98.00	47	79.66	92.16
3	Ctrl	56	0	100.00	50	89.29	42	84.00	41	97.62	31	55.36	62.00
4	Ctrl	55	2	96.36	38	69.09	29	76.32	29	100.00	20	36.36	52.63
5	Ctrl	49	4	91.84	40	81.63	38	95.00	38	100.00	37	75.51	92.50
6	Ctrl	11	0	100.00	9	81.82	9	100.00	9	100.00	8	72.73	88.89
7	Ctrl	63	4	93.65	54	85.71	53	98.15	53	100.00	52	82.54	96.30
8	Ctrl	30	1	96.67	27	90.00	26	96.30	26	100.00	24	80.00	88.89
9	Ctrl	46	0	100.00	42	91.30	40	95.24	39	97.50	37	80.43	88.10
10	Ctrl	27	2	92.59	20	74.07	18	90.00	16	88.89	5	18.52	25.00
11	Ctrl	63	0	100.00	58	92.06	58	100.00	57	98.28	47	74.60	81.03
12	Ctrl	46	0	100.00	42	91.30	38	90.48	38	100.00	29	63.04	69.05
13	Ctrl	55	0	100.00	51	92.73	50	98.04	50	100.00	41	74.55	80.39
14	Ctrl	57	0	100.00	52	91.23	52	100.00	51	98.08	45	78.95	86.54
15	Ctrl	53	0	100.00	48	90.57	46	95.83	45	97.83	43	81.13	89.58
16	Ctrl	69	2	97.10	62	89.86	62	100.00	60	96.77	51	73.91	82.26
17	Dose1	61	1	98.36	55	90.16	50	90.91	49	98.00	44	72.13	80.00
18	Dose1	47	0	100.00	43	91.49	41	95.35	40	97.56	39	82.98	90.70
19	Dose1	60	0	100.00	56	93.33	52	92.86	52	100.00	46	76.67	82.14
20	Dose1	55	0	100.00	49	89.09	45	91.84	45	100.00	36	65.45	73.47
21	Dose1	41	2	95.12	35	85.37	34	97.14	34	100.00	29	70.73	82.86
22	Dose1	9	0	100.00	4	44.44	4	100.00	4	100.00	4	44.44	100.00
23	Dose1	53	0	100.00	48	90.57	47	97.92	47	100.00	45	84.91	93.75
24	Dose1	61	0	100.00	54	88.52	54	100.00	54	100.00	49	80.33	90.74
25	Dose1	.	.	.	.	.	.	.	.	.	.	.	.
26	Dose1	48	0	100.00	44	91.67	43	97.73	42	97.67	41	85.42	93.18
27	Dose1	50	4	92.00	40	80.00	37	92.50	37	100.00	33	66.00	82.50
28	Dose1	37	0	100.00	34	91.89	27	79.41	27	100.00	27	72.97	79.41
29	Dose1	58	0	100.00	53	91.38	49	92.45	49	100.00	48	82.76	90.57
30	Dose1	53	0	100.00	48	90.57	48	100.00	48	100.00	46	86.79	95.83
31	Dose1	47	2	95.74	41	87.23	38	92.68	37	97.37	32	68.09	78.05
32	Dose1	34	1	97.06	30	88.24	28	93.33	28	100.00	21	61.76	70.00
33	Dose2	70	0	100.00	64	91.43	58	90.63	56	96.55	56	80.00	87.50
34	Dose2	19	0	100.00	17	89.47	17	100.00	17	100.00	16	84.21	94.12
35	Dose2	11	0	100.00	9	81.82	8	88.89	8	100.00	7	63.64	77.78
36	Dose2	56	0	100.00	51	91.07	48	94.12	48	100.00	41	73.21	80.39
37	Dose2	51	0	100.00	46	90.20	43	93.48	43	100.00	39	76.47	84.78
38	Dose2	52	0	100.00	48	92.31	38	79.17	38	100.00	37	71.15	77.08
39	Dose2	38	1	97.37	33	86.84	30	90.91	29	96.67	29	76.32	87.88
40	Dose2	53	0	100.00	48	90.57	43	89.58	43	100.00	38	71.70	79.17
41	Dose2	54	8	85.19	42	77.78	41	97.62	40	97.56	35	64.81	83.33
42	Dose2	37	0	100.00	32	86.49	31	96.88	31	100.00	24	64.86	75.00
43	Dose2	59	0	100.00	53	89.83	51	96.23	51	100.00	39	66.10	73.58
44	Dose2	52	1	98.08	46	88.46	35	76.09	35	100.00	24	46.15	52.17
45	Dose2	31	0	100.00	28	90.32	27	96.43	27	100.00	19	61.29	67.86
46	Dose2	55	1	98.18	49	89.09	49	100.00	48	97.96	37	67.27	75.51
47	Dose2	65	0	100.00	58	89.23	58	100.00	58	100.00	50	76.92	86.21
48	Dose2	53	0	100.00	46	86.79	41	89.13	41	100.00	37	69.81	80.43
49	Dose3	.	.	.	.	.	.	.	.	.	.	.	.
50	Dose3	63	0	100.00	58	92.06	56	96.55	56	100.00	52	82.54	89.66
51	Dose3	56	0	100.00	51	91.07	34	66.67	34	100.00	34	60.71	66.67
52	Dose3	62	0	100.00	57	91.94	56	98.25	56	100.00	52	83.87	91.23
53	Dose3	60	0	100.00	55	91.67	52	94.55	52	100.00	50	83.33	90.91
54	Dose3	52	1	98.08	47	90.38	46	97.87	45	97.83	24	46.15	51.06
55	Dose3	49	0	100.00	45	91.84	44	97.78	44	100.00	23	46.94	51.11
56	Dose3	61	0	100.00	55	90.16	51	92.73	51	100.00	49	80.33	89.09
57	Dose3	52	0	100.00	48	92.31	47	97.92	47	100.00	26	50.00	54.17
58	Dose3	46	0	100.00	42	91.30	40	95.24	40	100.00	36	78.26	85.71

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

59	Dose3	47	4	91.49	39	82.98	38	97.44	38	100.00	25	53.19	64.10
60	Dose3	33	0	100.00	28	84.85	28	100.00	28	100.00	24	72.73	85.71
61	Dose3	48	0	100.00	44	91.67	40	90.91	40	100.00	33	68.75	75.00
62	Dose3	10	0	100.00	6	60.00	4	66.67	4	100.00	1	10.00	16.67
63	Dose3	30	0	100.00	26	86.67	25	96.15	25	100.00	22	73.33	84.62
64	Dose3	28	0	100.00	21	75.00	19	90.48	19	100.00	17	60.71	80.95

Mallard repro, Orthosulfamuron, MRID 465789-49

PRINTOUT OF RAW DATA (continued)

Obs	TRT	NH_LE	HS	HS_ES	HS_NH	THICK	HATWT	SURVWT	FOOD	WTGAINM	WTGAINF
1	Ctrl	92.73	51	91.07	100.00	0.40	35	278	143	19	82
2	Ctrl	95.92	46	90.20	97.87	0.39	38	320	127	21	276
3	Ctrl	75.61	31	62.00	100.00	0.42	40	310	127	-40	87
4	Ctrl	68.97	20	52.63	100.00	0.39	40	316	167	80	602
5	Ctrl	97.37	36	90.00	97.30	0.41	39	304	137	122	44
6	Ctrl	88.89	8	88.89	100.00	0.36	31	312	121	7	-7
7	Ctrl	98.11	52	96.30	100.00	0.39	35	339	125	-46	266
8	Ctrl	92.31	24	88.89	100.00	0.38	32	302	132	21	75
9	Ctrl	94.87	37	88.10	100.00	0.36	32	272	192	-46	19
10	Ctrl	31.25	5	25.00	100.00	0.41	36	308	123	266	-73
11	Ctrl	82.46	46	79.31	97.87	0.37	35	284	123	-44	66
12	Ctrl	76.32	29	69.05	100.00	0.43	32	286	129	-18	164
13	Ctrl	82.00	40	78.43	97.56	0.39	39	310	164	-49	164
14	Ctrl	88.24	45	86.54	100.00	0.38	34	302	120	-78	40
15	Ctrl	95.56	42	87.50	97.67	0.41	39	309	141	0	-40
16	Ctrl	85.00	51	82.26	100.00	0.43	35	294	185	-101	164
17	Dose1	89.80	44	80.00	100.00	0.40	36	335	126	37	301
18	Dose1	97.50	38	88.37	97.44	0.41	34	335	126	23	177
19	Dose1	88.46	46	82.14	100.00	0.40	32	297	122	98	232
20	Dose1	80.00	36	73.47	100.00	0.41	38	335	143	155	35
21	Dose1	85.29	29	82.86	100.00	0.36	39	325	118	36	72
22	Dose1	100.00	4	100.00	100.00	0.38	33	301	96	187	57
23	Dose1	95.74	45	93.75	100.00	0.42	37	345	126	142	172
24	Dose1	90.74	49	90.74	100.00	0.40	36	320	187	25	180
25	Dose1	.	.	.	.	.	.	.	.	.	.
26	Dose1	97.62	41	93.18	100.00	0.37	32	326	145	-72	-282
27	Dose1	89.19	33	82.50	100.00	0.34	35	315	147	-93	153
28	Dose1	100.00	27	79.41	100.00	0.39	34	316	111	-132	49
29	Dose1	97.96	48	90.57	100.00	0.35	38	288	162	-10	-12
30	Dose1	95.83	46	95.83	100.00	0.39	35	327	99	5	12
31	Dose1	86.49	32	78.05	100.00	0.42	32	295	138	-63	-34
32	Dose1	75.00	21	70.00	100.00	0.37	36	317	124	46	-42
33	Dose2	100.00	56	87.50	100.00	0.39	37	329	130	-8	-16
34	Dose2	94.12	16	94.12	100.00	0.36	33	307	192	34	224
35	Dose2	87.50	6	66.67	85.71	0.39	30	294	125	53	-155
36	Dose2	85.42	40	78.43	97.56	0.38	39	324	134	5	10
37	Dose2	90.70	39	84.78	100.00	0.40	40	357	121	61	-3
38	Dose2	97.37	37	77.08	100.00	0.37	35	317	127	-111	176
39	Dose2	100.00	29	87.88	100.00	0.39	31	269	167	16	-199
40	Dose2	88.37	37	77.08	97.37	0.39	34	302	137	78	76
41	Dose2	87.50	35	83.33	100.00	0.40	35	302	140	-88	140
42	Dose2	77.42	24	75.00	100.00	0.40	30	309	182	34	109
43	Dose2	76.47	39	73.58	100.00	0.39	36	317	150	-173	2
44	Dose2	68.57	23	50.00	95.83	0.41	35	298	154	-69	126
45	Dose2	70.37	19	67.86	100.00	0.37	34	327	142	-117	-76
46	Dose2	77.08	37	75.51	100.00	0.41	34	319	123	8	-18
47	Dose2	86.21	50	86.21	100.00	0.38	34	272	110	-16	24
48	Dose2	90.24	36	78.26	97.30	0.37	35	305	137	-17	120
49	Dose3	.	.	.	.	.	.	.	.	.	.
50	Dose3	92.86	52	89.66	100.00	0.41	35	314	135	0	157
51	Dose3	100.00	33	64.71	97.06	0.41	38	331	135	-34	162
52	Dose3	92.86	51	89.47	98.08	0.37	34	311	167	-91	178
53	Dose3	96.15	50	90.91	100.00	0.40	35	292	131	5	178
54	Dose3	53.33	23	48.94	95.83	0.37	32	297	187	2	177

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(*Anas platyrhynchos*)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

55	Dose3	52.27	23	51.11	100.00	0.40	34	288	146	-23	166
56	Dose3	96.08	49	89.09	100.00	0.36	36	343	156	169	54
57	Dose3	55.32	26	54.17	100.00	0.41	36	335	111	-98	125
58	Dose3	90.00	36	85.71	100.00	0.41	34	298	122	47	29
59	Dose3	65.79	25	64.10	100.00	0.40	36	334	159	77	308
60	Dose3	85.71	23	82.14	95.83	0.42	33	305	111	106	201
61	Dose3	82.50	33	75.00	100.00	0.42	32	291	155	-119	220
62	Dose3	25.00	1	16.67	100.00	0.45	26	243	123	-114	76
63	Dose3	88.00	22	84.62	100.00	0.37	32	326	128	-243	-95
64	Dose3	89.47	16	76.19	94.12	0.40	32	296	114	40	97

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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
0.887	<.001	0.282	0.838	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	49.94	15.29	3.82	30.62	41.79,	58.09
Dose1	15	47.60	13.55	3.50	28.47	40.09,	55.11
Dose2	16	47.25	16.01	4.00	33.88	38.72,	55.78
Dose3	15	46.47	15.10	3.90	32.50	38.10,	54.83

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	55.00	11.00	69.00	.	.
Dose1	50.00	9.00	61.00	95.32	4.68
Dose2	52.50	11.00	70.00	94.62	5.38
Dose3	49.00	10.00	63.00	93.05	6.95

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 0.95 0.813

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	55.00	.	.
Dose1	50.00	0.687	0.220
Dose2	52.50	0.718	0.247
Dose3	49.00	0.704	0.200

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

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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
0.648	<.001	0.922	0.436	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	1.06	1.44	0.36	135.17	0.30,	1.83
Dose1	15	0.67	1.18	0.30	176.27	0.02,	1.32
Dose2	16	0.69	1.99	0.50	289.54	0.00,	1.75
Dose3	15	0.33	1.05	0.27	313.96	0.00,	0.91

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	0.00	0.00	4.00	.	.
Dose1	0.00	0.00	4.00	62.75	37.25
Dose2	0.00	0.00	8.00	64.71	35.29
Dose3	0.00	0.00	4.00	31.37	68.63

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	4.10	0.251

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	0.779
Dose2	0.00	1.000	0.913
Dose3	0.00	1.000	0.980

SUMMARY

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

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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 Shapiro-Wilks Levenes Levenes Conclusion
Test Stat P-value Test Stat P-value
0.682 <.001 0.976 0.410 USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	97.80	2.93	0.73	3.00	96.24,	99.36
Dose1	15	98.55	2.48	0.64	2.51	97.18,	99.92
Dose2	16	98.68	3.70	0.93	3.75	96.70,	100.00
Dose3	15	99.30	2.22	0.57	2.23	98.08,	100.00

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	100.00	91.84	100.00	.	.
Dose1	100.00	92.00	100.00	100.77	-0.77
Dose2	100.00	85.19	100.00	100.89	-0.89
Dose3	100.00	91.49	100.00	101.54	-1.54

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 4.03 0.258

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	0.750
Dose2	100.00	1.000	0.910
Dose3	100.00	1.000	0.979

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

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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
0.905	<.001	0.209	0.890	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	43.75	14.44	3.61	33.00	36.06,	51.44
Dose1	15	42.27	13.26	3.42	31.37	34.92,	49.61
Dose2	16	41.88	14.61	3.65	34.89	34.09,	49.66
Dose3	15	41.47	15.04	3.88	36.28	33.14,	49.80

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	49.00	9.00	62.00	.	.
Dose1	44.00	4.00	56.00	96.61	3.39
Dose2	46.00	9.00	64.00	95.71	4.29
Dose3	45.00	6.00	58.00	94.78	5.22

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	0.39	0.943

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	49.00	.	.
Dose1	44.00	0.916	0.297
Dose2	46.00	0.882	0.276
Dose3	45.00	1.000	0.301

SUMMARY

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

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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 Shapiro-Wilks Levenes Levenes Conclusion
Test Stat P-value Test Stat P-value
0.655 <.001 1.153 0.335 USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	86.90	6.99	1.75	8.05	83.18,	90.63
Dose1	15	86.26	12.02	3.10	13.94	79.61,	92.92
Dose2	16	88.23	3.76	0.94	4.26	86.23,	90.23
Dose3	15	86.93	8.85	2.28	10.18	82.03,	91.83

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	89.93	69.09	93.33	.	.
Dose1	90.16	44.44	93.33	99.26	0.74
Dose2	89.35	77.78	92.31	101.53	-1.53
Dose3	91.07	60.00	92.31	100.03	-0.03

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 1.15 0.766

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	89.93	.	.
Dose1	90.16	1.000	0.586
Dose2	89.35	1.000	0.363
Dose3	91.07	1.000	0.677

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

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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 Shapiro-Wilks Levenes Levenes Conclusion
Test Stat P-value Test Stat P-value
0.933 0.002 0.194 0.900 USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	41.63	14.86	3.72	35.71	33.70,	49.55
Dose1	15	39.80	12.89	3.33	32.39	32.66,	46.94
Dose2	16	38.63	13.75	3.44	35.60	31.30,	45.95
Dose3	15	38.67	14.63	3.78	37.84	30.56,	46.77

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	44.00	9.00	62.00	.	.
Dose1	43.00	4.00	54.00	95.62	4.38
Dose2	41.00	8.00	58.00	92.79	7.21
Dose3	40.00	4.00	56.00	92.89	7.11

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 0.71 0.871

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	43.00	0.797	0.257
Dose2	41.00	0.736	0.198
Dose3	40.00	0.856	0.221

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

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.791	<.001	1.075	0.367	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	94.73	6.61	1.65	6.98	91.20,	98.25
Dose1	15	94.27	5.23	1.35	5.55	91.38,	97.17
Dose2	16	92.45	6.99	1.75	7.56	88.72,	96.17
Dose3	15	91.95	10.62	2.74	11.55	86.07,	97.82

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	97.17	76.32	100.00	.	.
Dose1	93.33	79.41	100.00	99.52	0.48
Dose2	93.80	76.09	100.00	97.59	2.41
Dose3	96.15	66.67	100.00	97.07	2.93

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 2.07 0.558

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	97.17	.	.
Dose1	93.33	0.702	0.225
Dose2	93.80	0.363	0.079
Dose3	96.15	0.481	0.145

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

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.929	0.002	0.186	0.906	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	41.00	14.74	3.68	35.95	33.15,	48.85
Dose1	15	39.53	12.83	3.31	32.45	32.43,	46.64
Dose2	16	38.31	13.55	3.39	35.38	31.09,	45.53
Dose3	15	38.60	14.60	3.77	37.82	30.52,	46.68

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	43.00	9.00	60.00	.	.
Dose1	42.00	4.00	54.00	96.42	3.58
Dose2	40.50	8.00	58.00	93.45	6.55
Dose3	40.00	4.00	56.00	94.15	5.85

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	0.61	0.894

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	43.00	.	.
Dose1	42.00	0.797	0.257
Dose2	40.50	0.789	0.212
Dose3	40.00	0.937	0.250

SUMMARY

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

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.684	<.001	3.616	0.018	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	98.31	2.77	0.69	2.82	96.83,	99.79
Dose1	15	99.37	1.08	0.28	1.09	98.77,	99.97
Dose2	16	99.30	1.30	0.32	1.31	98.61,	99.99
Dose3	15	99.86	0.56	0.14	0.56	99.54,	100.00

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	99.14	88.89	100.00	.	.
Dose1	100.00	97.37	100.00	101.08	-1.08
Dose2	100.00	96.55	100.00	101.00	-1.00
Dose3	100.00	97.83	100.00	101.57	-1.57

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 6.68 0.083

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	99.14	.	.
Dose1	100.00	1.000	0.884
Dose2	100.00	1.000	0.881
Dose3	100.00	1.000	0.992

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

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
 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
0.962	0.051	0.434	0.729	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	35.50	14.88	3.72	41.91	27.57,	43.43
Dose1	15	36.00	12.24	3.16	33.99	29.22,	42.78
Dose2	16	33.00	12.57	3.14	38.09	26.30,	39.70
Dose3	15	31.20	14.65	3.78	46.95	23.09,	39.31

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	39.00	5.00	52.00	.	.
Dose1	39.00	4.00	49.00	101.41	-1.41
Dose2	37.00	7.00	56.00	92.96	7.04
Dose3	26.00	1.00	52.00	87.89	12.11

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	58	0.41	0.746

Dunnnett - 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	Dunnnett p-value	Isotonic mean	Williams p-value	Dose1	Dose2	Tukey p-values		
							Dose3	Dose4	Dose5
Ctrl	35.50	.	35.74	.	1.000	0.954	0.817	.	.
Dose1	36.00	0.788	35.74	0.604	.	0.928	0.770	.	.
Dose2	33.00	0.537	33.00	0.386	.	.	0.983	.	.
Dose3	31.20	0.378	31.20	0.254	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnnett	Dose3	>highest dose
Williams	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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
0.871	<.001	2.636	0.058	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	69.52	18.30	4.58	26.33	59.77,	79.27
Dose1	15	73.43	11.41	2.95	15.54	67.11,	79.75
Dose2	16	69.62	8.96	2.24	12.87	64.85,	74.40
Dose3	15	63.39	20.04	5.17	31.61	52.29,	74.49

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	75.06	18.52	85.00		
Dose1	72.97	44.44	86.79	105.62	-5.62
Dose2	70.48	46.15	84.21	100.15	-0.15
Dose3	68.75	10.00	83.87	91.18	8.82

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 3.31 0.347

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	75.06		
Dose1	72.97	1.000	0.624
Dose2	70.48	0.355	0.131
Dose3	68.75	0.455	0.050

SUMMARY

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

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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 Shapiro-Wilks Levenes Levenes Conclusion
Test Stat P-value Test Stat P-value
0.866 <.001 4.077 0.011
USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	79.15	18.73	4.68	23.67	69.17,	89.13
Dose1	15	85.55	8.70	2.25	10.17	80.73,	90.36
Dose2	16	78.93	9.64	2.41	12.22	73.79,	84.06
Dose3	15	71.78	21.21	5.48	29.55	60.03,	83.52

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	87.32	25.00	96.30	.	.
Dose1	82.86	70.00	100.00	108.08	-8.08
Dose2	79.78	52.17	94.12	99.72	0.28
Dose3	80.95	16.67	91.23	90.69	9.31

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 5.28 0.152

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	87.32	.	.
Dose1	82.86	0.779	0.749
Dose2	79.78	0.243	0.100
Dose3	80.95	0.334	0.030

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

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49

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	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.873	<.001	5.461	0.002	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	84.10	16.54	4.14	19.67	75.29,	92.91
Dose1	15	91.31	7.47	1.93	8.19	87.17,	95.45
Dose2	16	86.08	9.76	2.44	11.34	80.88,	91.29
Dose3	15	77.69	22.00	5.68	28.32	65.50,	89.88

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	88.56	31.25	98.11	.	.
Dose1	90.74	75.00	100.00	108.57	-8.57
Dose2	87.50	68.57	100.00	102.36	-2.36
Dose3	88.00	25.00	100.00	92.38	7.62

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	4.00	0.261

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	88.56	.	.
Dose1	90.74	1.000	0.933
Dose2	87.50	1.000	0.481
Dose3	88.00	0.979	0.189

SUMMARY

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

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.963	0.061	0.397	0.756	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	35.19	14.72	3.68	41.82	27.35,	43.03
Dose1	15	35.93	12.22	3.16	34.01	29.17,	42.70
Dose2	16	32.69	12.67	3.17	38.77	25.93,	39.44
Dose3	15	30.87	14.68	3.79	47.56	22.74,	39.00

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	38.50	5.00	52.00	.	.
Dose1	38.00	4.00	49.00	102.12	-2.12
Dose2	36.50	6.00	56.00	92.90	7.10
Dose3	26.00	1.00	52.00	87.72	12.28

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	58	0.44	0.723

Dunnnett - 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	Dunnnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	35.19	.	35.55	.	0.999	0.954	0.814	.	.
Dose1	35.93	0.805	35.55	0.615	.	0.911	0.739	.	.
Dose2	32.69	0.537	32.69	0.386	.	.	0.982	.	.
Dose3	30.87	0.376	30.87	0.252	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnnett	Dose3	>highest dose
Williams	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49

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	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.876	<.001	3.555	0.020	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	78.51	18.45	4.61	23.50	68.68,	88.34
Dose1	15	85.39	8.62	2.23	10.10	80.62,	90.17
Dose2	16	77.71	10.46	2.61	13.46	72.13,	83.28
Dose3	15	70.83	21.02	5.43	29.68	59.19,	82.47

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	87.02	25.00	96.30	.	.
Dose1	82.86	70.00	100.00	108.77	-8.77
Dose2	77.67	50.00	94.12	98.98	1.02
Dose3	76.19	16.67	90.91	90.22	9.78

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	6.49	0.090

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	87.02	.	.
Dose1	82.86	0.571	0.818
Dose2	77.67	0.235	0.095
Dose3	76.19	0.334	0.022

SUMMARY

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

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49

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
0.651	<.001	4.538	0.006	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	99.27	1.13	0.28	1.14	98.67,	99.87
Dose1	15	99.83	0.66	0.17	0.66	99.46,	100.00
Dose2	16	98.36	3.64	0.91	3.70	96.42,	100.00
Dose3	15	98.73	2.02	0.52	2.05	97.61,	99.85

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	100.00	97.30	100.00	.	.
Dose1	100.00	97.44	100.00	100.57	-0.57
Dose2	100.00	85.71	100.00	99.09	0.91
Dose3	100.00	94.12	100.00	99.46	0.54

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	4.01	0.261

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	0.946
Dose2	100.00	1.000	0.371
Dose3	100.00	1.000	0.171

SUMMARY

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

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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
0.984	0.615	1.150	0.337	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	0.39	0.02	0.01	5.69	0.38,	0.41
Dose1	15	0.39	0.03	0.01	6.62	0.37,	0.40
Dose2	16	0.39	0.02	0.00	3.95	0.38,	0.40
Dose3	15	0.40	0.02	0.01	5.93	0.39,	0.41

Level	Median	Min	Max	% of Control (means)	% Reduction (means)
Ctrl	0.39	0.36	0.43	.	.
Dose1	0.39	0.34	0.42	98.12	1.88
Dose2	0.39	0.36	0.41	98.21	1.79
Dose3	0.40	0.36	0.45	101.37	-1.37

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	58	1.19	0.322

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	0.39	.	0.39	.	0.785	0.800	0.903	.	.
Dose1	0.39	0.353	0.39	0.413	.	1.000	0.390	.	.
Dose2	0.39	0.365	0.39	0.438	.	.	0.400	.	.
Dose3	0.40	0.929	0.39	0.456	.	.	.	.	.

SUMMARY

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

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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
0.985	0.627	0.605	0.614	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	35.75	3.09	0.77	8.64	34.10,	37.40
Dose1	15	35.13	2.29	0.59	6.53	33.86,	36.40
Dose2	16	34.50	2.78	0.70	8.06	33.02,	35.98
Dose3	15	33.67	2.79	0.72	8.30	32.12,	35.21

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	35.00	31.00	40.00	.	.
Dose1	35.00	32.00	39.00	98.28	1.72
Dose2	34.50	30.00	40.00	96.50	3.50
Dose3	34.00	26.00	38.00	94.17	5.83

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	58	1.61	0.197

Dunnnett - 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	Dunnnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	35.75	.	35.75	.	0.925	0.579	0.165	.	.
Dose1	35.13	0.491	35.13	0.321	.	0.919	0.471	.	.
Dose2	34.50	0.224	34.50	0.130	.	.	0.835	.	.
Dose3	33.67	0.051	33.67	0.024	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnnett	Dose3	>highest dose
Williams	Dose2	Dose3

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(*Anas platyrhynchos*)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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
0.985	0.652	0.849	0.473	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	302.88	16.96	4.24	5.60	293.84,	311.91
Dose1	15	318.47	16.83	4.34	5.28	309.15,	327.78
Dose2	16	309.25	21.47	5.37	6.94	297.81,	320.69
Dose3	15	306.93	25.43	6.57	8.29	292.85,	321.02

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	306.00	272.00	339.00	.	.
Dose1	320.00	288.00	345.00	105.15	-5.15
Dose2	308.00	269.00	357.00	102.10	-2.10
Dose3	305.00	243.00	343.00	101.34	-1.34

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	58	1.60	0.200

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	302.88	.	310.42	.	0.158	0.814	0.946	.	.
Dose1	318.47	0.999	310.42	0.910	.	0.595	0.418	.	.
Dose2	309.25	0.955	309.25	0.905	.	.	0.989	.	.
Dose3	306.93	0.906	306.93	0.841	.	.	.	.	.

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

Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro. Orthosulfamuron, MRID 465789-49
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	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.928	0.001	0.038	0.990	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval	
Ctrl	16	141.00	23.27	5.82	16.51	128.60	153.40
Dose1	15	131.33	23.55	6.08	17.93	118.29	144.37
Dose2	16	141.94	22.41	5.60	15.79	129.99	153.88
Dose3	15	138.67	22.42	5.79	16.17	126.25	151.08

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	130.50	120.00	192.00	.	.
Dose1	126.00	96.00	187.00	93.14	6.86
Dose2	137.00	110.00	192.00	100.66	-0.66
Dose3	135.00	111.00	187.00	98.35	1.65

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	1.84	0.606

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	130.50	.	.
Dose1	126.00	0.468	0.147
Dose2	137.00	1.000	0.619
Dose3	135.00	1.000	0.607

SUMMARY

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

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(*Anas platyrhynchos*)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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
0.987	0.773	0.439	0.726	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval	
Ctrl	16	7.13	89.18	22.30	1251.66	-40.40,	54.65
Dose1	15	25.60	92.67	23.93	361.98	-25.72,	76.92
Dose2	16	-19.38	72.26	18.06	-372.94	-57.88,	19.13
Dose3	15	-18.40	103.60	26.75	-563.04	-75.77,	38.97

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	-9.00	-101.00	266.00	.	.
Dose1	25.00	-132.00	187.00	359.30	-259.30
Dose2	-1.50	-173.00	78.00	-271.93	371.93
Dose3	0.00	-243.00	169.00	-258.25	358.25

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	58	0.89	0.451

Dunnnett - 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	Dunnnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	7.13	.	16.06	.	0.940	0.838	0.858	.	.
Dose1	25.60	0.910	16.06	0.697	.	0.509	0.541	.	.
Dose2	-19.38	0.396	-18.90	0.266	.	.	1.000	.	.
Dose3	-18.40	0.415	-18.90	0.280	.	.	.	.	.

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

**Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck
(Anas platyrhynchos)**

PMRA Submission Number {.....}

EPA MRID Number 465789-49

Mallard repro, Orthosulfamuron, MRID 465789-49
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
0.960	0.043	0.774	0.513	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	16	120.56	161.78	40.45	134.19	34.35, 206.77
Dose1	15	71.33	141.32	36.49	198.12	-6.93, 149.60
Dose2	16	33.75	115.80	28.95	343.10	-27.95, 95.45
Dose3	15	135.53	94.44	24.38	69.68	83.23, 187.83

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	78.50	-73.00	602.00	.	.
Dose1	57.00	-282.00	301.00	59.17	40.83
Dose2	17.00	-199.00	224.00	27.99	72.01
Dose3	162.00	-95.00	308.00	112.42	-12.42

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	58	1.97	0.128

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	120.56	.	120.56	.	0.724	0.251	0.989	.	.
Dose1	71.33	0.309	79.20	0.230	.	0.855	0.542	.	.
Dose2	33.75	0.081	79.20	0.240	.	.	0.147	.	.
Dose3	135.53	0.853	79.20	0.254	.	.	.	.	.

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

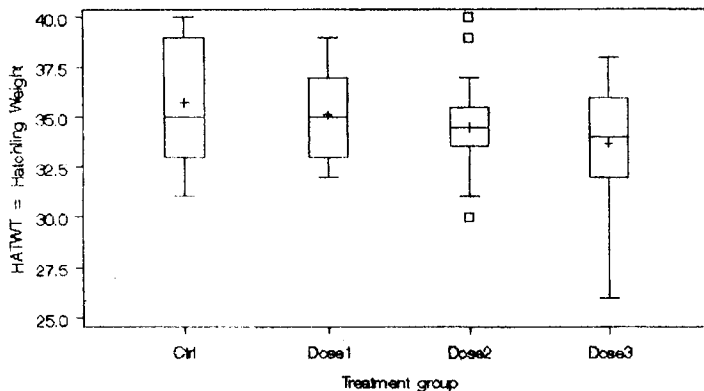
Data Evaluation Report on the Reproductive Effects of Orthosulfamuron on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

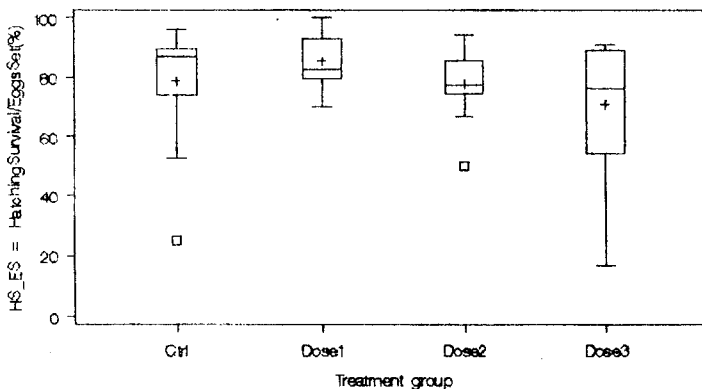
EPA MRID Number 465789-49

Box Plots

Mallard repro, Orthosulfamuron, MRID 465789-49



Mallard repro, Orthosulfamuron, MRID 465789-49



Mallard repro, Orthosulfamuron, MRID 465789-49

