

US EPA ARCHIVE DOCUMENT

DATA EVALUATION REPORT

- 1. Chemical: (methyl 2-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]-carbonyl]-amino]sulfonyl]benzoate)
- 2. Test Material: Metsulfuron methyl - Technical 99% ai
- Ally® Escort® 60% ai
- 3. Study Type: Nontarget Plant Phytotoxicity - Terrestrial Plants - Tiers I, II, and III
- 4. Study ID: Tier Testing Evaluation of Metsulfuron Methyl on Plants Grown Under Greenhouse and Field Conditions. Prepared by E.I. du Pont de Nemours & Company, Inc., March 8, 1988 (unpublished study received May 24, 1988, submitted by E.I. du Pont de Nemours & Company under Accession No. 406393-01)

5. Reviewed By: Charles R. Lewis
EEB/EFEB

Signature: *Charles R. Lewis*
Date: *October 25, 1988*

6. Approved By: Douglas J. Urban
Section Head
EEB/EFEB

Signature: *Douglas J. Urban*
Date: *12/15/88*

7. Conclusion

The studies appear to be scientifically sound but insufficient information was included with the documents to determine if the Guidelines requirements for Tiers I and II have been satisfied.

Among the additional information required are: Number of seeds planted/container, percent germination, number of replicates, size of containers used, number of plants per container in the postemergent test, age of plants in weeks or days at treatment and evaluation, lighting regimen, cultivars tested, and pH of soil used.

Tier III studies did not address nontarget plant issues. The data provides supplemental information on target area phytotoxicity.

Based on data currently available, Ally or Escort applied aurally at 70 grams active ingredient/hectare (g ai/ha) for broom snakeweed control would be expected to adversely affect nontarget plants, primarily broadleaf species. Results of drift studies may require Tier III testing.

AM/11

8. Recommendation: N/A

9. Background

This study was submitted to support the registration of Escort and Ally for use on pasture and rangeland.

10. Discussion of Individual Tests or Studies: N/A

11. Materials and Methods

Tiers I and II

Technical metsulfuron methyl was applied pre- and postemergence at 0.25, 1.0, 4.0, 16.0, 50.0, and 125 g ai/ha to soybean, cocklebur, cotton, morningglory, wild buckwheat, sugar beet, corn, barnyardgrass, rice, and nutsedge.

Seeds were planted in plastic-lined pans filled with a 1 percent organic matter sandy loam soil. Plants were watered as necessary. Testing was conducted at 70 to 80 °F.

A computer-controlled automatic sprayer was used to apply the chemical. Spray volumes were 45 gpa for Tier I testing and 40 gpa for Tier II.

Preemergence treatments were applied after planting and before emergence. Postemergence treatments were applied at the following growth stages: soybean, unifoliolate; cocklebur, 2 leaves; cotton, 1 to 2 leaves; morningglory, 2 leaves; wild buckwheat, 1 to 2 leaves; sugar beet, 1 to 2 leaves; corn, 3 leaves; barnyardgrass, 3 leaves; rice, 3 leaves; and nutsedge, 5 to 6 leaves. Evaluations were made according to the table below:

<u>Plant</u>	<u>Preemergence (No. Leaves)</u>	<u>Postemergence (No. Leaves)</u>
Soybean	1	3
Cocklebur	3-4	6
Cotton	2	4
Morningglory	3-4	7-10
Wild buckwheat	2-3	8
Sugar beet	2	4-5
Corn	4	6
Barnyardgrass	4	5
Rice	3-4	4-5
Nutsedge	5-7	7-8

Tier III

Field tests using Ally or Escort (60% ai) were conducted on a variety of species in several geographic areas. Applications were made by hydraulic sprayers on small plots during the growing season before, during, or shortly after emergence of test species. Plots were not irrigated.

12. Reported Results

"Tier I: Preemergence and Postemergence - At 50 grams ai per hectare preemergence or postemergence, metsulfuron methyl was toxic to all of the test plants. Symptoms 16 days after application included growth reduction and hormonal (twisted, malformed plants) following preemergence treatment while postemergence treatment produced largely chlorotic (yellowing), and stunted plants.

"Tier II: Preemergence - At 4 gms/ha, the four monocots showed some tolerance to the herbicide while broadleaf plants were highly susceptible. At 1 gms/ha cocklebur and grasses showed tolerances while all plants, except morningglory were tolerant to 0.25 gms/ha."

Phytotoxicity of Metsulfuron Methyl Applied Preemergence
to 6 Dicots and 4 Monocots in the Greenhouse - Tiers 1 and 2

Crop	Family	Gms ai/ha								
		50 ¹	16 ²	4	1	.25	16 ³	.8	4	
Dicots	Soybean	Leguminosea	9H	95	90	70	0	90	90	90
	Cocklebur	Compositae	9H	95	80	20	20	85	80	70
	Cotton	Malvaceae	9G	100	95	95	0	90	85	80
	Morningglory	Convolvulaceae	9G	100	90	90	70	85	80	75
	Wild buckwheat	Polygonaceae	--	95	90	80	0	85	80	70
	Sugar beet	Chenopodiaceae	9C	90	90	80	40	100	95	90
Monocot	Corn	Gramineae	9H	90	70	30	0	60	30	0
	Barnyardgrass	Gramineae	3C,9H	80	30	20	0	70	50	30
	Rice	Gramineae	9H	90	40	20	20	90	80	70
	Nutsedge	Cyperaceae	3C,8G	50	30	20	0	60	30	0

¹Tier I: 0-10 where 10 = plant kill; C = Chlorosis; G = Growth; H = Hormonal; U = Unusual pigmentation (reddening).

²Tier II: Percent growth inhibition, December 1986.

³Tier II: Percent growth inhibition, March 1987.

Phytotoxicity of Metsulfuron Methyl Applied ^e Postmergence
to 6 Dicots and 4 Monocots in the Greenhouse

<u>Crop</u>	<u>Family</u>	Gms ai/ha							
		50 ¹	16 ²	4	1	.25	16 ³	8	4
Soybean	Leguminosea	9C	100	100	90	80	100	100	100
Cocklebur	Compositae	10	100	100	50	50	100	100	100
Cotton	Malvaceae	10	100	80	60	0	100	100	100
Morningglory	Convolvulaceae	9C	100	90	50	20	100	100	100
Wild buckwheat	Polygonaceae	--	100	100	90	--	100	100	100
Sugar beet	Chenopodiaceae	9C	100	100	100	--	100	100	100
Corn	Gramineae	8U,9C	100	60	0	0	--	--	--
Barnyardgrass	Gramineae	9H	70	20	0	--	60	60	20
Rice	Gramineae	9G	50	--	--	--	70	60	60
Nutsedge	Cyperaceae	4G,9G	50	40	40	20	40	40	30

¹Tier I: 0-10 where 10 = plant kill; C = Chlorosis; G = Growth; H = Hormonal; U = Unusual pigmentation (reddening).

²Tier II: Percent growth inhibition, December 1986.

³Tier II: Percent growth inhibition, March 1987.

Tier III

The following information was copied directly from the submitted study.

"Soybean (Dicot)

"Soybeans planted 103 days after application of 17.5 and 35 grams active per hectare (0.25 and 0.50 oz ai/a) were severely affected.

"Cocklebur (Dicot), Yellow Nutsedge (Monocot)

"Treatments of 21 and 84 grams active per hectare preemergence gave complete kill of yellow nutsedge and cocklebur. Rates of 17.5 and 35 grams active per hectare gave total kill of cocklebur when applied postemergence.

"Rice (Monocot), Barnyardgrass (Monocot)

"Twenty-eight grams active per hectare postemergence was only slightly toxic to rice; 10 grams per hectare was not toxic to rice and only slightly toxic to barnyardgrass.

"Nutsedge (Monocot)

"An infestation of nutsedge was severely reduced (80%) by treatment of 84 grams active per hectare.

"Ferns (Ferns and Allies)

"'Ally' at a high rate of 140 grams active per hectare postemergence gave significant effects on bracken fern (family Polypodiaceae), and was toxic to fishtail fern at 20 grams per hectare (plus surfactant) in Malaysia.

"Horsetail (Ferns and Allies)

"'Ally' at the high rate of 140 grams active per hectare was toxic to horsetail (family Equisetaceae); it was relatively non-toxic at 42 and 84 grams per hectare in a second test.

"Pines (Conifers)

"Loblolly pine shows considerable tolerance to 'Ally' where 69 grams per hectare postemergence produced only slight temporary effects.

"Four year old ponderosa pines, treated over-the-top with 70 grams active per hectare plus 1% (high rate) of surfactant, resulted in toxic effects to all terminals but older leaves (needles) were unaffected."

In addition, labeling for Ally®/Escort® list a number of species controlled or tolerant over a range of rates. The following is a summary based on the registrant's submission. The terms control and tolerant were not defined:

Control @ 12 g ai/ha

<u>Family</u>	<u>Species</u>
Ranunculaceae	Bur buttercup (testiculate)
Caryophyllaceae	Chickweed (common)
Portulacaceae	Purslane (common)
	Miners lettuce
Caryophyllaceae	Conical catchfly
	Cow cockle
	Chickweed (common)
Composite	False chamomile
	Sunflower
	Groundsel (common)
	Mayweed
	Prickly lettuce
	Snow speedwell

Control @ 12 g ai/ha (cont'd)

<u>Family</u>	<u>Species</u>
Cruciferae	Field pennycress (fanweed) Shepherdspurse Smallseed falseflax Tumble mustard Wild mustard
Geraniaceae	Filaree
Labiatae	Henbit
Amaranthaceae	Pigweeds (redroot, smooth, tumble)
Polygonaceae	Smartweeds (green, ladythumb, pale)
Hydrophyllaceae	Waterpod

Control @ 42 g ai/ha

<u>Family</u>	<u>Species</u>
Caryophyllaceae	Chickweed
Compositae	Aster Canada thistle Chicory Common yarrow Dandelion Goldenrod Wild lettuce
Chenopodiaceae	Kochia
Gramineae	Bahiagrass
Leguminosae	Clover Crown vetch Kudzu Sweet clover White clover
Plantaginaceae	Buckhorn plantain
Oleaceae	Plantain Ash
Oxalidaceae	Wood sorrell
Polygonaceae	Curly dock

Control @ 42 g ai/ha (cont'd)

<u>Family</u>	<u>Species</u>
Rosaceae	Multiflora rose, cherry
Salicaceae	Aspen
Scrophulariaceae	Common mullein
Ulmaceae	Elm
Umbelliferae	Wild carrot

Tolerance @ 42 g ai/ha

Species

Crested wheatgrass
Smooth brome grass

Tolerance @ 70 g ai/ha

Species

Fescue
Hooded windmill
Purple threeawn
Sideoats grama
Halls panicum
Tumblegrass
Buffalograss
Western wheatgrass
Orchardgrass
Ryegrass
Bluestem
Tall wheatgrass
Crested wheatgrass
Bluegrass

Tolerance @ 84 g ai/ha

Species

Bermudagrass

13. Study Author's Conclusions/Quality Assurance Measures

The application rate for Ally for use on pasture and rangeland throughout the United States ranges from 14 to 70 g ai/ha.

Most dicots in treated areas would be expected to be severely affected or killed.

Monocots exhibited tolerance over a range of rates. Rice and barnyardgrass show low-level tolerance, nutsedge intermediate tolerance, while native range grasses and small grains are tolerant at proposed application rates. Conifers also show tolerance.

The registrant reported that "the requirements of 40 CFR Part 160 do not apply to this study at the time of submission." No quality assurance statement was provided.

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

- a. Test Procedures - In general, the Tier I and Tier II tests follow the Subdivision J Guidelines; however, insufficient data have been provided with the submitted studies. Among the additional information required: the number of seeds planted per pan and percent germination of the seeds for both preemergence and postemergence tests; number of replicates; size of pans; number of plants per pan in the postemergent tests; age of plants (weeks or days) at treatment (postemergent) and evaluation; lighting regime in growth chamber/greenhouse; cultivars of tested species; and pH of soil used.

Insufficient low doses were utilized, for those plants expected to be highly susceptible to metsulfuron methyl, to better define the EC₂₅ values.

- b. Statistical Analysis - Using the Stephens Program the following preliminary values were calculated using the December 1986 Tier II data EC₅₀ and EC₂₅ values where sufficient data were provided:

	<u>Preemergence</u>	
<u>Plant</u>	<u>EC₂₅ g ai/ha</u>	<u>EC₅₀ g ai/ha</u>
Soybean	0.46	0.99
Cocklebur	0.54	1.69
Cotton	0.41	0.62
Morningglory	0.01	0.06
Wild buckwheat	0.39	0.87
Sugar beet	0.05	0.27
Corn	1.02	2.38
Barnyardgrass	2.09	5.62
Rice	0.79	3.18
Nutsedge	2.88	13.49

Postemergence

<u>Plant</u>	<u>EC₂₅ g ai/ha</u>	<u>EC₅₀ g ai/ha</u>
Soybean	0.02 .0003	0.06
Cocklebur	0.14 .002	0.40
Cotton	0.60 .009	1.19
Morningglory	0.36 .005	0.83
Barnyardgrass	3.75* .05	9.08*
Nutsedge	0.29 .004	13.09

*March 1987 data.

- c. Discussion/Results - The Tier I and II tests provide dose response information for 10 species of plants. For the preemergence data the EC₂₅ values range from approximately 0.01 to 0.54 g ai/ha for dicots and 0.79 to 2.88 g ai/ha for monocots. Postemergent data indicate EC₂₅ values range from 0.02 to 0.60 g ai/ha for dicots and 0.29 to 3.25 g ai/ha for monocots.

Assuming 1 percent drift of Ally or Escort applied aerially at 70 g ai/ha, 0.7 g ai/ha would be deposited approximately 60 meters* from the site of application. This value exceeds the preemergent and postemergent EC₂₅ values for dicots. For monocots, the value can be both above and below the EC₂₅ depending on species.

Based on data currently available, if Ally or Escort were used for broom snakeweed control at 70 g ai/ha using aerial equipment, primarily broadleaf nontarget plants would be adversely effected. This phytotoxic response, based on drift tables rather than actual field tests, could extend at least 60 meters from the site of application.

Tier III data provide target area phytotoxicity data at less than the proposed use rate on a broad spectrum of plant species. Nontarget phytotoxicity has not been addressed by these tests. In general, at the rates tested most species exhibited phytotoxic symptoms.

Information on the tolerance of several monocot plants to levels of metsulfuron methyl above the concentrations that would probably occur outside the treatment area, was also provided.

*Akesson, N.B.; Yates, W.E. (1984) Physical parameters affecting aircraft spray application. Chemical and Biological Controls in Forestry, pages 95-115

d. Adequacy of Study

- 1) Classification - Tier I: Supplemental
Tier II: Supplemental
Tier III: Supplemental
- 2) Rationale - Refer to Section 14a.
- 3) Reparability - Tier I and Tier II may be upgraded to core with submission of information outlined in Section 14a.

Tier III not reparable. Nontarget plant damage has not been addressed.

15. Completion of One-Liner: One-liner form completed.
16. CBI Appendix: N/A

Du Pont Report No. DCD-88-1
Supplement 6/1/89

TRADE SECRET

Study Title

Tier Testing Evaluation of Metsulfuron Methyl on Plants
Grown Under Greenhouse and Field Conditions

Data Requirement

Guideline Reference No. 122-1, 123-1, 124-1

Author

D. C. Drake

Study Completed

Supplement Dated: June 1, 1989

Performing Laboratory

E. I. du Pont de Nemours and Company, Inc.
Agricultural Products Department

Laboratory Project ID

DCD-88-1
Supplement

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METSULFURON-METHYL

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