



**US Environmental Protection Agency
Office of Pesticide Programs**

**Extension of the Protection
Period for Mesotrione
Exclusive Use Data
(Part 3 of 4)**

January 15, 2009

Table 1: FIFRA Exclusive Use Extension Criterion 1: There Are Insufficient Efficacious Alternatives To Mesotrione on Flax

		Mesotrione HRAC Group F2 (WSSA Group 28)	C3 / (6)	C3 / (6)	O / (4)	O / (4)	
Flax		Callisto 3.0 fl. oz/A Plus Adjuvant*	Bentazon	Bromoxynil	MCPA	Clopyralid in premix** with MCPA	Count of Als controlling species. S, PC, Est., or Resistance not included.
Common Name	Scientific Name	Apply to weeds <5"					
Weeds Controlled With Postemergence Application							
Amaranth, palmer	<i>Amaranthus palmeri</i>	C			Est		0
Amaranth, Powell	<i>Amaranthus powellii</i>	C			Est		0
Amaranth, spiny	<i>Amaranthus spinosus</i>	C		C	Est		1
Atriplex	<i>Chenopodium orach</i>	C					0
Broadleaf signalgrass	<i>Brachiaria platphylla</i>	C					0
Buckwheat, wild	<i>Polygonum convolvulus</i>	PC	C	C		C	3
Buffalobur	<i>Solanum rostratum</i>	C		C			1
Burcucumber	<i>Sicyos angulatus</i>	PC					0
Carpetweed	<i>Mollugo verticillata</i>	C					0
Carrot, wild	<i>Daucus carota</i>	C					0
Chickweed, common	<i>Stellaria media</i>	C					0
Cocklebur, common	<i>Xanthium strumarium</i>	C	C	C	C	C	4
Crabgrass, large	<i>Digitaria sanguinalis</i>	C					0
Dock, curly	<i>Rumex crispus</i>	PC				C	1
Galinsoga	<i>Galinsoga parviflora</i>	C	C				1
Hemp	<i>Cannabis sativa</i>	C					0
Horse nettle	<i>Solanum carolinense</i>	C					0
Horseweed/Marestail	<i>Coryza canadensis</i>	PC				C	1
Jimsonweed	<i>Datura stramonium</i>	C	C	C		C	3
Knotweed, prostrate	<i>Polygonum aviculare</i>	PC		C			1
Kochia	<i>Kochia scoparia</i>	PC		C	C	C	1
Lambsquarters, common	<i>Chenopodium album</i>	C		C	C	C	3
Morningglory, entirleaf; ivyleaf	<i>Ipomoea spp.</i>	PC		C			1
Morningglory, pitted	<i>Ipomoea lacunosa</i>	PC		C			1
Mustard, wild	<i>Brassica kaber</i>	C	C	C	C	C	4
Nightshade, black	<i>Solanum nigrum</i>	C		C		C	2
Nightshade, eastern black	<i>Solanum ptycanthum</i>	C		C		C	2
Nightshade, hairy	<i>Solanum sarrachoides</i>	C		C		C	2
Nutsedge, yellow	<i>Cyperus esculentus</i>	PC	C				1
Pigweed, redroot	<i>Amaranthus retroflexus</i>	C		C	C	C	3
Pigweed, smooth	<i>Amaranthus hybridus</i>	C			Est		0
Pigweed, tumble	<i>Amaranthus albus</i>	C			Est		0
Pokeweed, common	<i>Phytolacca americana</i>	PC					0
Potatoes, volunteer	<i>Solanum spp.</i>	C					0
Pusley, Florida	<i>Richardia scabra</i>	C					0
Ragweed, common	<i>Ambrosia artemisiifolia</i>	PC	C	C	C	C	4
Ragweed, giant	<i>Ambrosia trifida</i>	C	C	C	Est	C	3
Sesbania, hemp	<i>Sesbania exaltata</i>	C	C	C			2
Smartweed, ladythumb	<i>Polygonum persicaria</i>	C	C	C		C	3
Smartweed, pale	<i>Polygonum lapathifolium</i>	C					0
Smartweed, Pennsylvania	<i>Polygonum pennsylvanicum</i>	C	C	C		C	3
Sunflower, common	<i>Helianthus annuus</i>	C	C	C	C	C	4
Velvetleaf	<i>Abutilon theophrasti</i>	C	C	C		C	3
Waterhemp, common	<i>Amaranthus rudis</i>	C			Est		0
Waterhemp, tall	<i>Amaranthus tuberculatus</i>	C		C	Est		1

† Apply before weed exceeds 2 inches in height.

* Adjuvant COC plus UAN or AMS

** Premix included because clopyralid only used with MCPA

Weeds Controlled With Preemergence Applications of Callisto							
Common Name	Scientific Name	Preemergence at 6.0 oz./A					
Amaranth, palmer	<i>Amaranthus palmeri</i>	C					0
Amaranth, Powell	<i>Amaranthus powellii</i>	C					0
Amaranth, spiny	<i>Amaranthus spinosus</i>	C					0
Broadleaf signalgrass	<i>Brachiaria platyphylla</i>	C ¹					0
Buffalobur	<i>Solanum rostratum</i>	C					0
Carpetweed	<i>Mollugo verticillata</i>	C					0
Chickweed, common	<i>Stellaria media</i>	C					0
Cocklebur, common	<i>Xanthium strumarium</i>	PC					0
Crabgrass, large	<i>Digitaria sanguinalis</i>	C ¹					0
Galinsoga	<i>Galinsoga parviflora</i>	C					0
Jimsonweed	<i>Datura stramonium</i>	C					0
Kochia	<i>Kochia scoparia</i>	PC					0
Lambsquarters, common	<i>Chenopodium album</i>	C					0
Morningglory, entireleaf; ivyleaf	<i>Ipomoea spp.</i>	PC					0
Morningglory, pitted	<i>Ipomoea lacunosa</i>	PC					0
Nightshade, eastern black	<i>Solanum ptycanthum</i>	C					0
Nightshade, hairy	<i>Solanum sarrachoides</i>	C					0
Pigweed, redroot	<i>Amaranthus retroflexus</i>	C					0
Pigweed, smooth	<i>Amaranthus hybridus</i>	C					0
Pigweed, tumble	<i>Amaranthus albus</i>	C					0
Ragweed, common	<i>Ambrosia artemisiifolia</i>	C					0
Ragweed, giant	<i>Ambrosia trifida</i>	PC					0
Smartweed, ladysthumb	<i>Polygonum persicaria</i>	C					0
Smartweed, pale	<i>Polygonum lapathifolium</i>	C					0
Smartweed, Pennsylvania	<i>Polygonum pennsylvanicum</i>	C					0
Sunflower, common	<i>Helianthus annuus</i>	C					0
Velvetleaf	<i>Abitilon theophrasti</i>	C					0
Waterhemp, common	<i>Amaranthus rudis</i>	C					0
Waterhemp, tall	<i>Amaranthus tuberculatus</i>	C					0
Count of Species Controlled		58	13	23	6	17	
Criterion 1: Insufficient Efficacious Alternative to Mesotrione			Yes	Yes	Yes	Yes	
Species not controlled by any alternative	Resistant biotypes per chemical class that controlled or partially controlled by mesotrione. A "C" within a pink shaded cell indicates that weed has resistant biotypes and is therefore not counted as controlled by that product.						
C = Control PC = Partial Control S = Suppression							

Table 2: FIFRA Exclusive Use Extension Criterion II: Alternative Registered Pesticides Pose Greater Risks To The Environment Or Human Health Than Mesotrione On Flax

Characteristic	Mesotrione Reduced Risk AI	Bentazon	Bromoxynil	MCPA	Clopyralid
EPA Reg. No	100-1131	7969-45-51036	9779-346	42750-14	62719-86
Reduced Risk by EPA	Yes	No	No	No	No
Label Signal Word	Caution	Danger or Caution	Warning	Danger	Caution
Gene Toxicity	Negative	Negative	Positive	Negative	Negative
Teratogenicity	Negative	Negative	Positive	Negative	Negative
Reproductive Toxicity	Negative	Negative	Negative	Negative	Negative
Carcinogenic Potential	Not Likely	E	C	Not likely	Not likely
Acute Neurotoxicity	Negative	Unlikely (ND)	Unlikely (ND)	Positive	ND
Subchronic/Chronic Neurotoxicity	Negative	Unlikely (ND)	Unlikely (ND)	Positive	ND
REI in Hours*	12	48	24	48	12
PHI in Days*	NL	45	NL	7	72 for Curtail
**PPE*	Chem resist gloves	0	3	3	2
Applic. Method (Pre)	Pre	NL	NL	NL	NL
Pre lbs ai/A	0.188	NL	NL	NL	NL
Applic. Method (Post)	NL	Post	Post	Post	Yes
Post lbs ai/A	NL	1.0	0.25	0.12-0.23	0.07-0.09
No. Applic. / year	1	2	1	1	1
Max. AI lbs./yr	0.188	2.0	0.25	0.35	0.09
US or Regional label	US	US	US	US	US
**Environmental Hazard	Surface Water Advisory, runoff	0	2	3	2
Alternative Poses Greater Human or Environmental Risk		Yes	Yes	Yes	Yes

Other registered active ingredients that are not considered as viable mesotrione alternatives: Glyphosate, diethodim, selthoxydim, and trifluralin. Refer to Attachment "Active Ingredients Within The Analyses Across Crops That Are Not Considered Viable Alternatives To Mesotrione".

* REI = Restricted Entry Interval. PHI = Pre Harvest Interval. PPE = Personal Protective Equipment

** = Ranking into 4 Classes: 0 = Better than mesotrione, 1 = similar to mesotrione, 2 = worse than mesotrione, 3 = much worse than mesotrione.

NL = None listed or not mentioned, or application method is not labeled for a specific active ingredient.

¹ Refers to the prepack of clopyralid + MCPA. No label exists for clopyralid as an alone product. Data, except of application rates, are for an alone clopyralid product.

Table 3: FIFRA Exclusive Use Extension Criterion III: Mesotrione Plays Or Will Play A Significant Part In Managing Pest Resistance on Flax

Characteristic EPA. Reg. No.	Mesotrione Reduced Risk AI 100-1131	Bentazon 7969-45-50036	Bromoxynil 9779-346	MCPA 42750-14	Clopyralid 62719-86
HRAC / WSSA Classification of Active Ingredient Chemistry Class by Mode of Action	F 2 / (28)*	C3 / (6)	C3 / (6)	O / (4)	O / (4)
Total No. Weed Species With Resistant Biotypes Per Chemistry Class in US	0	1	1	8	8
No. of biotypes Controlled or Partially Controlled by Mesotrione		0	0	2	2
Criterion III: Mesotrione will play role in managing Pest Resistance to this Active		No	No	Yes	Yes
Criterion III: Mesotrione will play a role in managing pest resistance in Flax	YES				
* Active Ingredient classification based on HRAC / WSSA. Mesotrione is WSSA 28 compared to the original classification of 27 used by EPA and currently on Syngenta's EPA labels.					

Table 4: Flax: Mesotrione Meets FIFRA Section 3(c)(1)(F)(ii) Criteria I, II, and III.

Active Ingredient	EPA Classified As Reduced Risk	Criterion I: Insufficient Efficacious Alternative To Mesotrione	Criterion II: Alternative Poses Greater Human Or Environmental Risk*	Criterion III: Mesotrione Will Play Role In Managing Pest Resistance To This Active
Mesotrione	Yes			
Bentazon	No	Yes	Yes	No
Bromoxynil	No	Yes	Yes	No
MCPA	No	Yes	Yes	Yes
Clopyralid	No	Yes	Yes	Yes

*Combined evaluation of human safety, application rate, and environmental impact.

Oats

US oat production in 2005 was estimated by USDA/NASS to be 3,600,000 acres. Although this estimate exceeds the standard number of acres for a minor crop classification under FIFRA Section 2(II), Syngenta is requesting classification of mesotrione as a minor use in oats because, as provided by FIFRA Section 2(II)(2)(C) the use does not provide sufficient economic incentive to support the continuing registration of oats and mesotrione is needed for its weed spectrum and as an alternative mode of action to use in weed resistance management. Mesotrione was registered on oats March 17, 2008, which is within the first 7 years after the initial June 4, 2001 registration of mesotrione. On May 20, 2008, EPA granted mesotrione Reduced Risk status on oats. The primary broadleaf products used in oats provide non-residual postemergence control after oat and weed emergence. Mesotrione is labeled for preemergence or postemergence application, providing application flexibility. Preemergence application is not a common application in oats, but with the current use patterns of alternatives, the preemergence application of mesotrione's mode of action can provide control of weed biotypes, such as kochia, that have developed resistance to the more commonly use ALS herbicides. Also, the preemergence application would have to occur within a narrow window which will limit widespread geographical adoption. The use of mesotrione as an alone postemergence application is expected to be relative minor because of the risk of potential temporary oat injury in the form of leaf bleaching, leaf burn and in extreme conditions, stunting. Thus, mesotrione use will be limited when considering the entire oat crop.

Conclusion:

Mesotrione fulfils FIFRA Criteria I, II, and/or III compared to each registered alternative.

Criterion I: Mesotrione provides low rate (0.188 lbs. ai/A) preemergence or (0.094 lbs. ai/A) postemergence control of a large number of broadleaf weeds. Of the nine potential alternatives, none provide as broad a spectrum of weed control. As to the weeds included on mesotrione's label, some are not controlled by any other product; most are controlled by only 1 to 3 other products, and only a few by multiple products. No one product provides a broad spectrum of weed control comparable to mesotrione. Only one other product can be applied preemergence to oats.

Criterion II: Mesotrione is safer across the human safety, environmental impact and application criteria than any other alternative. As noted, some alternatives, carfentrazone (a reduced risk product in cereals), chlorsulfuron, or tribenuron, are better than mesotrione in one or more criteria, but not across all criteria.

Criterion III: No weeds have developed resistant biotypes to the mesotrione family of chemistry. Thus, mesotrione will manage resistance that has developed for most of the alternative families of chemistry. The exception is bromoxynil whose one resistant biotype is not controlled by mesotrione. Also, in the 2005 NASS report of herbicide use in oats, the major actives, (2,4-D, MCPA, dicamba, and clopyralid) treating 26% of the acres grown, all have the O / (4) mode of action. There are only two other modes of action that treat significant acreage, and each of these only treats 5% or the acres. One of these, B / (2) has resistant biotypes for many species, which mesotrione controls. Thus, there is a clear need for another mode of action for broadleaf weed control.

Oats: Mesotrione Meets FIFRA Section 3(c)(1)(F)(ii) Criteria I, II, and III.

Active Ingredient	EPA Classified As Reduced Risk	Criterion I: Insufficient Efficacious Alternative To Mesotrione	Criterion II: Alternative Poses Greater Human Or Environmental Risk*	Criterion III: Mesotrione Will Play Role In Managing Pest Resistance To This Active
Mesotrione	Yes			
2, 4 - D	No	Yes	Yes	Yes
Bromoxynil	No	Yes	Yes	No
Carfentrazone	Yes	Yes	Yes	Yes
Chlorsulfuron	No	Yes	Yes	Yes
Clopyralid	No	Yes	Yes	Yes
Dicamba	No	Yes	Yes	Yes
MCPA	No	Yes	Yes	Yes
Thifensulfuron	No	Yes	Yes	Yes
Tribenuron	No	Yes	Yes	Yes

*Combined evaluation of human safety, application rate, and environmental impact.

Table 1: FIFRA Exclusive Use Extension Criterion I: There Are Insufficient Efficacious Alternatives To Mesotrione on Oats

		Mesotrione HRAC Group F2 / (WSSA Group 28)	O / (4)	C3 / (6)	E / (14)	B / (2)	O / (4)	O / (4)	O / (4)	B / (2)	B / (2)	Count of AIs Controlling species, S, PC, Est, or Resistance not included.
		Mesotrione 3.0 fl. oz/A Plus Adjuvant*	2, 4-D	Bromoxynil	Carfentrazone	Chlorsulfuron	Clopyralid	Dicamba	MCPA	Thifensulfuron	Tribenuron	
Oats		Apply to weeds <5"										
Common Name	Scientific Name											
Weeds Controlled With Postemergence Applications												
Amaranth, palmer	<i>Amaranthus palmeri</i>	C	PC		Est			C	Est			1
Amaranth, Powell	<i>Amaranthus powellii</i>	C	PC		Est			C	Est			1
Amaranth, spiny	<i>Amaranthus spinosus</i>	C	PC	C	Est			C	Est			2
Airplex	<i>Chenopodium orach</i>	C										0
Broadleaf signalgrass	<i>Brachiaria platyphyla</i>	C										0
Buckwheat, wild	<i>Polygonum convolvulus</i>	PC		C	C	PC	C	C		C		5
Buffalobur	<i>Solanum rostratum</i>	C		C			S	C				2
Burcucumber	<i>Sicyos angulatus</i>	PC						C			C	2
Carpetweed	<i>Mollugo verticillata</i>	C	C					C				2
Carrot, wild	<i>Daucus carota</i>	C	PC			C		C				1
Chickweed, common	<i>Stellaria media</i>	C	C			C		C		C		4
Cocklebur, common	<i>Xanthium strumarium</i>	C	C	C			C	C	C	PC		5
Crabgrass, large	<i>Digitaria sanguinalis</i>	C										0
Dock, curly	<i>Rumex crispus</i>	PC	PC			C		C		C		4
Galinsoga	<i>Galinsoga parviflora</i>	C	C					C				2
Hemp	<i>Cannabis sativa</i>	C	C									1
Horse nettle	<i>Solanum carolinense</i>	C										0
Horseweed/Marestail	<i>Conyza canadensis</i>	PC					C	C				2
Jimsonweed	<i>Datura stramonium</i>	C	C	C								4
Knotweed, prostrate	<i>Polygonum aviculare</i>	PC		C		PC		C		C		3
Kochia	<i>Kochia scoparia</i>	PC		C	C	PC		C	C	PC		2
Lambsquarters, common	<i>Chenopodium album</i>	C	C	C	C	C		C	C	C		5
Morningglory, entrelleaf, ivyleaf	<i>Ipomoea hederacea</i>	PC	C	C				C				3
Morningglory, pitted	<i>Ipomoea lacunosa</i>	PC	Est									1
Mustard, wild	<i>Brassica kaber</i>	C	C	C	C	C		C	C	C		7
Nightshade, black	<i>Solanum nigrum</i>	C	C	C			C	C				4
Nightshade, eastern black	<i>Solanum ptycanthum</i>	C	C	C			C	C				2
Nightshade, hairy	<i>Solanum sarachoides</i>	C	C	C			C					3
Nutsedge, yellow	<i>Cyperus esculentus</i>	PC										0
Pigweed, redroot	<i>Amaranthus retroflexus</i>	C	PC	C	C	C		C	C	C		4
Pigweed, smooth	<i>Amaranthus hybridus</i>	C	PC		Est	C		C	Est			1
Pigweed, tumble	<i>Amaranthus albus</i>	C	PC		Est			C	Est			1
Pokeweed, common	<i>Phytolacca americana</i>	PC	C					C				2
Potatoes, volunteer	<i>Solanum spp.</i>	C										0
Pusley, Florida	<i>Richardia scabra</i>	C						C				1
Ragweed, common	<i>Ambrosia artemisiifolia</i>	PC	C	C			C	C	C			5
Ragweed, giant	<i>Ambrosia trifida</i>	C	C	C			C	C	Est			4
Sesbania, hemp	<i>Sesbania exaltata</i>	C		C				C				2
Smartweed, ladythumb	<i>Polygonum persicaria</i>	C	PC	C		C	S	C		C		4
Smartweed, pale	<i>Polygonum lapathifolium</i>	C	PC									0
Smartweed, Pennsylvania	<i>Polygonum pennsylvanicum</i>	C	PC	C		PC		C		C		3
Sunflower, common	<i>Helianthus annuus</i>	C	C	C		PC	C	C	C	PC	C	5
Velvetleaf	<i>Abutilon theophrasti</i>	C	C	C	C			C				4
Waterhemp, common	<i>Amaranthus rudis</i>	C	PC		Est			C	Est			1
Waterhemp, tall	<i>Amaranthus tuberculatus</i>	C	PC	C	Est			C	Est			2

*Apply before weed exceeds 2 inches in height.

*Adjuvant = COC or NIS plus UAN or AMS

Weeds Controlled With Preemergence Applications of Callisto														
Common Name	Scientific Name	6.0 fl. oz./A												
Amaranth, palmer	<i>Amaranthus palmeri</i>	C												0
Amaranth, Powell	<i>Amaranthus powellii</i>	C												0
Amaranth, spiny	<i>Amaranthus spinosus</i>	C												0
Broadleaf signalgrass	<i>Brachiaria platyphylla</i>	C												0
Buffalobur	<i>Solanum rostratum</i>	C												0
Carpetweed	<i>Mollugo verticillata</i>	C												0
Chickweed, common	<i>Stellaria media</i>	C												0
Cocklebur, common	<i>Xanthium strumarium</i>	PC												0
Crabgrass, large	<i>Digitaria sanguinalis</i>	C												0
Gallinsoga	<i>Gallinsoga parviflora</i>	C												0
Jimsonweed	<i>Delatura stramonium</i>	C												0
Kochia	<i>Kochia scoparia</i>	PC												0
Lambsquarters, common	<i>Chenopodium album</i>	C												0
Morningglory, entireleaf, ivyleaf	<i>Ipomoea hederacea</i>	PC												0
Morningglory, pitted	<i>Ipomoea lacunosa</i>	PC												0
Nightshade, eastern black	<i>Solanum ptycanthum</i>	C												0
Nightshade, hairy	<i>Solanum sarachoides</i>	C												0
Pigweed, redroot	<i>Amaranthus retroflexus</i>	C												0
Pigweed, smooth	<i>Amaranthus hybridus</i>	C												0
Pigweed, tumble	<i>Amaranthus albus</i>	C												0
Ragweed, common	<i>Ambrosia artemisiifolia</i>	C												0
Ragweed, giant	<i>Ambrosia trifida</i>	PC												0
Smartweed, ladythumb	<i>Polygonum persicaria</i>	C												0
Smartweed, pale	<i>Polygonum lapathifolium</i>	C												0
Smartweed, Pennsylvania	<i>Polygonum pennsylvanicum</i>	C												0
Sunflower, common	<i>Helianthus annuus</i>	C												0
Velvetleaf	<i>Abutilon theophrasti</i>	C												0
Waterhemp, common	<i>Amaranthus rudis</i>	C												0
Waterhemp, tall	<i>Amaranthus tuberculatus</i>	C												0
Count of Species Controlled in Oats		58	14	23	8	5	12	31	6	7	1			
Criteria 1: Insufficient Efficacious Alternative to Mesotrione			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Species not controlled by any alternative	Resistant biotypes per chemical class that controlled or partially controlled by mesotrione. A "C" within a pink shaded cell indicated that weed has resistant biotypes and is therefore not counted as controlled by that product.													
	C = Control PC = Partial Control S = Suppressed Est = Estimated													

Table 2: FIFRA Exclusive Use Extension Criterion II: Alternative Registered Pesticides Pose Greater Risks To The Environment Or Human Health Than Mesotrione on Oats.

Characteristic	Mesotrione Reduced Risk AI	2,4-D	Bromoxynil	Carfentrazone AI Reduced Risk	Chlorosulfuron	Clopyralid	Dicamba	MCPA	Thifensulfuron	Tribenuron in Prepack with Thifensulfuron*
EPA Reg. No.	100-1131	5905-529	9779-346	279-3241	352-653	34704-885	7969-137	42750-14	352-633	352-611
Reduced Risk by EPA	Yes	No	No	Yes	No	No	No	No	No	No
Label Signal Word	Caution	Caution	Warning	Caution	Caution	Caution	Warning	Danger	Caution	Caution
Gene Toxicity	Negative	Negative	Positive	Negative	Negative	Negative	Positive	Negative	Negative	Negative
Teratogenicity	Negative	Negative	Positive	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Reproductive Toxicity	Negative	Negative	Negative	Negative	Positive	Negative	Negative	Negative	Negative	Negative
Carcinogenic Potential	Not Likely	D	C	Not Likely	E	Not Likely	D	Not Likely	No Evidence	C
Acute Neurotoxicity	Negative	Positive	Unlikely (ND)	Positive	Negative	ND	Positive	Positive	ND	Negative
Subchronic/Chronic Neurotoxicity	Negative	Positive	Unlikely (ND)	ND	Negative	ND	Positive	Positive	ND	Negative
REI in Hours*	12	12	24	12	4	12	24	48	4	12
PHI in Days*	30 / 50	NL	45	7	NL	7	40 / 70	7	No grazing / feeding	45
**PPE*	Chem resist gloves	3	3	0	0	2	2	3	0	1
Applic. Method (Pre)	Pre	NL	NL	NL	Pre	No	NL	NL	NL	NL
Pre lbs ai/A	0.188	NL	NL	NL	0.015-0.023	NL	NL	NL	NL	NL
Applic. Method (Post)	Post	Post	Post	Post	Post	Yes	Post	Post	Post	Post
Post lbs ai/A	0.094	0.22-0.96	0.25-0.5	0.008-.031	0.008-0.016	0.094-0.123	0.063-0.125	0.23-0.46	0.014-0.187	0.005-0.006
No. Applic. / year	1	1	NL	2	1	1	1	1	1	1
Max. AI lbs./yr	0.188	0.95	0.5	0.031	0.023	0.123	0.1	1.38	0.019	0.006
US or Regional label	US	US	US	US	US	US	US	US	US	US
**Environmental Hazard	Surface Water Advisory, runoff	3	2	1	0	1	2	3	0	0
Criterion II: Alternative Poses Greater Human or Environmental Risk	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Tribenuron not available as an alone product in oats is included because use information indicates relative common use.

Other registered active ingredients that are not considered as viable mesotrione alternatives: Glyphosate, Pelargonic acid, Diuron, Fluroxypyr, Prosulfuron, and Pyrasulfotole. Refer to Attachment "Active Ingredients Within The Analyses Across Crops That Are Not Considered Viable Alternatives To Mesotrione"

*REI = Restricted Entry Interval. PHI = Pre Harvest Interval. PPE = Personal Protective Equipment

** = Ranking into 4 Classes: 0 = Better than mesotrione, 1 = similar to mesotrione, 2 = worse than mesotrione, 3 = much worse than mesotrione

NL = None listed or not mentioned, or the application method is not labeled for a specific active ingredient.

Table 3: FIFRA Exclusive Use Extension Criterion III: Mesotrione Plays Or Will Play A Significant Part In Managing Pest Resistance In Oats

Characteristic	Mesotrione Reduced Risk AI	2,4-D	Bromoxynil	Carfentrazone ² Reduced Risk	Chlorisulfuron	Clopyralid	Dicamba	MCPA	Thifensulfuron	Thifensulfuron in prepack with Tribenuron
EPA. Reg. No.	100-1131	5905-529	9779-346	279-3241	352-653	34704-885	7969-137	42750-14	352-633	352-611
HRAC / WSSA Classification of Active Ingredient Chemistry Class by Mode of Action	F 2 / (28)*	O / (4)	C 3 / (6)	E / (14)	B / (2)	O / (4)	O / (4)	O / (4)	B / (2)	B / (2)
Total No. Biotypes Resistant in US Per Class	0	8	1	2	38	8	8	8	38	38
Total No. Weed Species With Resistant Biotypes Per Chemistry Class in US	2	2	0	2	14	2	2	2	14	14
Criterion III: Mesotrione will play role in managing Pest Resistance to this Active	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Criterion III: Mesotrione will play a role in managing pest resistance in Oats	YES									
* Active Ingredient classification based on HRAC / WSSA. Mesotrione is WSSA 28 compared to the original classification of 27 used by EPA and currently on Syngenta's EPA labels.										

Oats Table 4: Mesotrione Meets FIFRA Section 3(c)(1)(F)(ii) Criteria I, II, and III.

Active Ingredient	EPA Classified As Reduced Risk	Criterion I: Insufficient Efficacious Alternative To Mesotrione	Criterion II: Alternative Poses Greater Human Or Environmental Risk*	Criterion III: Mesotrione Will Play Role In Managing Pest Resistance To This Active
Mesotrione	Yes			
2, 4 - D	No	Yes	Yes	Yes
Bromoxynil	No	Yes	Yes	No
Carfentrazone	Yes	Yes	Yes	Yes
Chlorsulfuron	No	Yes	Yes	Yes
Clopyralid	No	Yes	Yes	Yes
Dicamba	No	Yes	Yes	Yes
MCPA	No	Yes	Yes	Yes
Thifensulfuron	No	Yes	Yes	Yes
Tribenuron	No	Yes	Yes	Yes

*Combined evaluation of human safety, application rate, and environmental impact.

Grain Sorghum

US grain sorghum production is estimated to be 7,470,000 acres in Doane AgroTrak in 2007 and 7,034,996 in 2008. Mesotrione was registered on grain sorghum on March 17, 2008, which is within the first 7 years after the initial June 4, 2001 registration of mesotrione. Lumax, a prepack product containing mesotrione, was granted a Section 18 Specific Exemption on May 12, 2006 in KS and again in KS and NE during 2007. The key reason was the control of Kochia and Amaranthus weed biotypes resistant to triazines, glyphosate, and / or ALS herbicides with Lumax. On July 15, 2008 EPA granted mesotrione Reduced Risk status on grain sorghum. While not a minor crop, mesotrione is needed for its weed control spectrum and as another mode of action to use in management of weed resistance to triazines, glyphosate, and ALS herbicides.

Grain sorghum is not a minor crop based on acres grown. Syngenta will demonstrate that the registration of mesotrione products will fit a minor use profile within the sorghum crop. The initial registration on grain sorghum is minor as a result of being limited to use in KS and NE on less than 3% of US acres in 2008. Texas, which is a major sorghum production state, will be added to the label in 2009. For broad-spectrum weed control, Syngenta expects mesotrione to be used in conjunction with the grass herbicide S-metolachlor. S-metolachlor can be used only if the sorghum seed has to been treated with the safener - Concep III. Thus, the upper limit of mesotrione use is the number of S-metolachlor acres. The acres treated with S-metolachlor has remained constant over several years at 22% of the US sorghum acres or approximately 1.5 million acres of the 3 state total. The highest percentage of S-metolachlor acres receiving mesotrione in 2008 was 10.9 % or 172,000 acres (from KS and NE). Projecting this percent to the 3 state total (KS, NE and TX) S-metolachlor acres would be applied on approximately 167,000 acres. In TX due to potential crop injury on coarse soils, mesotrione will only be labelled for use north of I-20 and west of route 277. The number of acres of sorghum grown in this specific area (TX CRD 48011, 48012, and 48021), as determined by dmrkynetec, is 830,000 acres which accounted for less than 33% of the 2.6 million acres of sorghum grown in TX during 2008. According to dmrkynetec, only 122,000 of these CRD acres (14.7%) received S-metolachlor. Further, mesotrione would be expected to be used only if there were mesotrione controlled weed biotypes resistant to triazines, ALS herbicides or other modes of action. Thus, the acres in these three CRDs can be conservatively reduced by ~75% to a reasonable potential of about 200,000 acres or 7% of the acres grown in TX. As a result, this would be considered a minor use in KS, NE and TX. Estimating the use in these three states would be approximately 300,000 acres. This analysis clearly demonstrates that mesotrione use will be very limited in comparison to the total number of sorghum acres grown.

From another perspective, a comparison can be made between what the actual sales of mesotrione in sorghum compared to the revenue from each of the other herbicide active ingredients used in sorghum. In 2008, approximately \$94 million were spent on sorghum herbicides (dmrkynetec). The mesotrione value is less than 2% of that figure, and this is after the Section 18's described above and Section 3 approval for 2008. These factors, and others, can be considered to show that while grain sorghum is not a minor crop, based on acreage, the mesotrione use is projected to be minor. The use patterns labeled on sorghum contain several limitations that despite being a critical tool in some areas, will further prevent it from becoming a major factor in the sorghum market.

Conclusion:

Mesotrione fulfils FIFRA Criteria I, II, and/or III compared to each registered alternative.

Criterion I: Mesotrione provides low rate (0.188-0.2 lbs. ai/A) preemergence and postemergence control of a large number of broadleaf weeds. Of the ten potential alternatives, none provide as broad a spectrum of weed control. As to the weeds included on mesotrione's label, some are not controlled by any other product; most are controlled by only 1 to 3 other products, and only a few by multiple products. No one product provides a broad spectrum of weed control comparable to mesotrione.

Criterion II: Mesotrione is safer across the human safety, environmental impact and application criteria than any other alternative. As noted, some alternatives, carfentrazone, halosulfuron, metsulfuron-methyl, and prosulfuron are better than mesotrione in one or more criteria, but not across all criteria.

Criterion III: No weeds have developed resistant biotypes to the mesotrione family of chemistry. Thus, mesotrione will continue to manage resistance as it did in the two years of Section 18 labels that has developed for most of the alternative families of chemistry. The exception is bromoxynil whose resistant biotype is not controlled by mesotrione.

Grain Sorghum: Mesotrione Meets FIFRA Section 3(c)(1)(F)(ii) Criteria I, II, and III.

Active Ingredient	EPA Classified As Reduced Risk	Criterion I: Insufficient Efficacious Alternative To Mesotrione	Criterion II: Alternative Poses Greater Human Or Environmental Risk*	Criterion III: Mesotrione Will Play Role In Managing Pest Resistance To This Active
Mesotrione	Yes			
2, 4 - D	No	Yes	Yes	Yes
Atrazine	No	Yes	Yes	Yes
Bromoxynil	No	Yes	Yes	No
Carfentrazone	Yes	Yes	Yes	Yes
Dicamba	No	Yes	Yes	Yes
Halosulfuron	No	Yes	Yes	Yes
Linuron	No	Yes	Yes	Yes
Metsulfuron-methyl	No	Yes	Yes	Yes
Prosulfuron	No	Yes	Yes	Yes
Quinclorac	No	Yes	Yes	Yes

*Combined evaluation of human safety, application rate, and environmental impact.

Table 1: FIFRA Exclusive Use Extension Criterion I: There Are Insufficient Efficacious Alternatives To Mesotrione on Grain Sorghum

		Mesotrione HRAC Group F2 / (WSSA Group 28)	O / (4)	C1 / (5)	C3 / (6)	E (14)	O / (4)	B / (2)	C2 / (7)	Metsulfuron-methyl B / (2)	B / (2)	O / (4)	
Grain Sorghum		Callisto 3.0 fl. oz/A Plus Adjuvant	2, 4-D	Atrazine	Bromoxynil	Carfentrazone	Dicamba	Halosulfuron	Linuron	Metsulfuron-methyl B / (2)	Prosulfuron	Quinclorac	Count of AI Controlling species. S, PC, Est. or Resistance not
Common Name	Scientific Name	Apply to weeds <5"											
Weeds Controlled With Postemergence Applications													
Amaranth, palmer	<i>Amaranthus palmeri</i>	C		C							Est	C	1
Amaranth, Powell	<i>Amaranthus powellii</i>	C		C							Est		1
Amaranth, spiny	<i>Amaranthus spinosus</i>	C		C	C		C	C			Est		5
Atriplex	<i>Chenopodium orach</i>	C											0
Broadleaf signalgrass	<i>Brachiaria platyphylla</i>	C										C	1
Buckwheat, wild	<i>Polygonum convolvulus</i>	PC		C	C		C				C		4
Buffalobur	<i>Solanum rostratum</i>	C			C			S			C		3
Burcucumber	<i>Sicyos angulatus</i>	PC					C						1
Carpetweed	<i>Mollugo verticillata</i>	C							C				2
Carrot, wild	<i>Daucus carota</i>	C	C				C						0
Chickweed, common	<i>Stellaria media</i>	C					C				PC		1
Cocklebur, common	<i>Xanthium strumarium</i>	C	C	PC	C		C	C	PC		C		3
Crabgrass, large	<i>Digitaria sanguinalis</i>	C		PC					C			C	2
Dock, curly	<i>Rumex crispus</i>	PC	C				C						2
Galinsoga	<i>Galinsoga parviflora</i>	C						C	C				2
Hemp	<i>Cannabis sativa</i>	C											0
Horse nettle	<i>Solanum carolinense</i>	C						C					1
Horseweed/Marestail	<i>Conyza canadensis</i>	PC									C		0
Jimsonweed	<i>Datura stramonium</i>	C	C	C	C		C				C		4
Knotweed, prostrate	<i>Polygonum aviculare</i>	PC			C		C						2
Kochia	<i>Kochia scoparia</i>	PC		C	C		C	S			C	S	1
Lambsquarters, common	<i>Chenopodium album</i>	C	C	C	C	C	C	S	C		C	S	5
Momingglory, entireleaf; ivyleaf	<i>Ipomoea hederacea</i>	PC	C	C	C	C	C	S	PC		PC	Est	5
Momingglory, pitted	<i>Ipomoea lacunosa</i>	PC		C	C	C			Est			Est	3
Mustard, wild	<i>Brassica kaber</i>	C	C	C	C		C	C	C		PC	Est	6
Nightshade, black	<i>Solanum nigrum</i>	C		C	C		C						3
Nightshade, eastern black	<i>Solanum ptycanthum</i>	C		C	C				PC				2
Nightshade, hairy	<i>Solanum sarrachoides</i>	C		C	C								3
Nutsedge, yellow	<i>Cyperus esculentus</i>	PC											0
Pigweed, redroot	<i>Amaranthus retroflexus</i>	C	C	C	C	C	C		C	Est	C		5
Pigweed, smooth	<i>Amaranthus hybridus</i>	C	C	C	C	C			Est	Est	C		3
Pigweed, tumble	<i>Amaranthus albus</i>	C	C	C		C				Est	C		4
Pokeweed, common	<i>Phytolacca americana</i>	PC											0
Potatoes, volunteer	<i>Solanum spp.</i>	C											0
Pusley, Florida	<i>Richardia scabra</i>	C					C				C		2
Ragweed, common	<i>Ambrosia artemisiifolia</i>	PC	C	C	C		C		C		C	S	4
Ragweed, giant	<i>Ambrosia trifida</i>	C	C	C	C		C				C	S	4
Sesbania, hemp	<i>Sesbania exaltata</i>	C			C	C	C				C		4
Smartweed, ladythumb	<i>Polygonum persicaria</i>	C	C	C	C		C				C		5
Smartweed, pale	<i>Polygonum lapathifolium</i>	C	C	C									2
Smartweed, Pennsylvania	<i>Polygonum pennsylvanicum</i>	C	C	C	C				C		C		5
Sunflower, common	<i>Helianthus annuus</i>	C	C								C	S	2
Velvetleaf	<i>Abutilon theophrasti</i>	C		PC	C	C	C		PC	Est	C	S	4
Waterhemp, common	<i>Amaranthus rudis</i>	C	C	C	C				PC	Est	C		1
Waterhemp, tall	<i>Amaranthus tuberculatus</i>	C	C	C	C					Est	PC		4

*Adjuvant = COC or NS plus UAN or AMS

† Apply before weed exceeds 2 inches in height.

Weeds Controlled With Preemergence Applications of Callisto												
Common Name	Scientific Name	6.0-6.4 fl. oz./A										
Amaranth, palmer	<i>Amaranthus palmeri</i>	C	C							C	0	
Amarath, Powell	<i>Amaranthus powellii</i>	C	C								0	
Amaranth, spiny	<i>Amaranthus spinosus</i>	C	C								1	
Broadleaf signalgrass	<i>Brachiaria platyphylla</i>	C								C	1	
Buffalobur	<i>Solanum rostratum</i>	C								C	1	
Carpetweed	<i>Mollugo verticillata</i>	C						C		C	2	
Chickweed, common	<i>Stellaria media</i>	C						C			1	
Cocklebur, common	<i>Xanthium strumarium</i>	PC	PC							PC	0	
Crabgrass, large	<i>Digitaria sanguinalis</i>	C	PC					C		C	2	
Gallinsoga	<i>Gallinsoga parviflora</i>	C						C			1	
Jimsonweed	<i>Datura stramonium</i>	C	C								0	
Kochia	<i>Kochia scoparia</i>	PC	C							C	S	1
Lambsquarters, common	<i>Chenopodium album</i>	C	C					C		C	S	2
Morningglory, entrelaf, ivyleaf	<i>Ipomoea hederacea</i>	PC	C					PC		PC	Est	1
Morningglory, pitted	<i>Ipomoea lacunosa</i>	PC	C							PC	Est	1
Nightshade, eastern black	<i>Solanum ptycanthum</i>	C	C					PC				0
Nightshade, hairy	<i>Solanum sarrachoides</i>	C	C									1
Pigweed, redroot	<i>Amaranthus retroflexus</i>	C	C					C		C		0
Pigweed, smooth	<i>Amaranthus hybridus</i>	C	C					Est		C		0
Pigweed, tumble	<i>Amaranthus albus</i>	C	C									1
Ragweed, common	<i>Ambrosia artemisiifolia</i>	C	C					C		C	S	1
Ragweed, giant	<i>Ambrosia trifida</i>	PC	C							C	S	1
Smartweed, ladysthumb	<i>Polygonum persicaria</i>	C	C									0
Smartweed, pale	<i>Polygonum lapathifolium</i>	C	C									1
Smartweed, Pennsylvania	<i>Polygonum pennsylvanicum</i>	C	C					C		C		2
Sunflower, common	<i>Helianthus annuus</i>	C								C	S	0
Velvetleaf	<i>Abutilon theophrasti</i>	C	PC					PC		PC	S	0
Waterhemp, common	<i>Amaranthus rudis</i>	C	C							C		0
Waterhemp, tall	<i>Amaranthus tuberculatus</i>	C	C							C		1
Count of Species Controlled		58	20	19	23	11	23	5	15	0	14	4
Criteria 1: Insufficient Efficacious Alternative to Mesotrione			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Species not controlled by any alternative	Resistant biotypes per chemical class that controlled or partially controlled by mesotrione. A "C" within a pink shaded cell indicated that weed has resistant biotypes and is therefore not counted as controlled by that product.											
	C = Control PC = Partial Control S = Suppression Est. = Estimated											

Table 2: FIFRA Exclusive Use Extension Criterion II: Alternative Registered Pesticides Pose Greater Risks To The Environment Or Human Health Than Mesotrione on Grain Sorghum

Characteristic	Mesotrione Reduced Risk AI	Atrazine	Bromoxynil	Carfentrazone in Cereal Grains	Dicamba	Halosulfuron	Linuron	Metsulfuron-methyl	Prosulfuron	Quinclorac
EPA Reg. No.	100-1131	100-497	9779-346	279-3241	66330-276	10163-254	352-686	352-435	100-763	42750-131
Reduced Risk by EPA	Yes	No	No	Yes	No	No	No	No	No	No
Label Signal Word	Caution	Danger	Warning	Caution	Warning	Caution	Caution	Caution	Caution	Caution
Gene Toxicity	Negative	Negative	Positive	Negative	Positive	Negative	Negative	Negative	Negative	Negative
Teratogenicity	Negative	Negative	Positive	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Reproductive Toxicity	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Carcinogenic Potential	Not Likely	Danger	C	Not Likely	D	Not Likely	C	Not likely	Negative	Negative
Acute Neurotoxicity	Negative	Positive	Unlikely (ND)	Positive	Positive	Negative	ND	ND	Inadequate data	D
Subchronic/Chronic Neurotoxicity	Negative	Positive	Unlikely (ND)	ND	Positive	Negative	ND	ND	Positive	ND
REI in Hours*	12	48	24	12	24	12	24	4	12	12
PHI in Days*	30	7	NL	6 leaf collars	Do not graze	30	90/75	NL	30,40,60	NL
**PPE*	Chem resist gloves	3	3	0	2	1	2	0	1	1
Applic. Method (Pre)	Pre	NL	NL	NL	NL	NL	Pre	NL	Pre	Pre
Pre lbs ai/A	0.188-0.2	NL	NL	NL	NL	NL	0.25-1.0	NL	0.027-0.036	0.25-0.375
Applic. Method (Post)	NL	Post	Post	Post	Post	Post	Post-Direct	Post	Post	Post
Post lbs ai/A	NL	0.48	0.25-0.38	0.008-0.016	0.25	0.031-0.047	0.5-1.0	0.0019	0.027-0.036	0.25-0.375
No. Applic. / year	1	1	1	2	1	1	1	1	1	1
Max. AI lbs./yr	0.2	0.48	0.38	0.016	0.3	0.047	1.0	0.0019	0.036	0.375
US or Regional label	RL	US	US	US	US	US	US	RL	US	RL
**Environmental Hazard	Surface Water Advisory, runoff	2	2	1	2	1	1	0	2	3
Criterion II: Alternative Poses Greater Human or Environmental Risk	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Other registered active ingredients that are not considered as viable mesotrione alternatives: Alachlor, bentazon, dimethenamid, dimethenamid-P, diquat, diuron, glyphosate, metamsodium, metolachlor, paraquat, pendimethalin, propachlor, S-metolachlor, and trifluralin Refer to Attachment "Active Ingredients Within The Analyses Across Crops That Are Not Considered Viable Alternatives To Mesotrione".

*REI = Restricted Entry Interval. PHI = Pre Harvest Interval. PPE = Personal Protective Equipment

** = Ranking into 4 Classes: 0 = Better than Mesotrione, 1 = similar to mesotrione, 2 = worse than mesotrione, 3 = much worse than mesotrione.

NL = None listed or mentioned, or the application method is not labeled for a specific active ingredient.

Table 3: FIFRA Exclusive Use Extension Criterion III: Mesotrione Plays Or Will Play A Significant Part In Managing Pest Resistance In Grain Sorghum											
Characteristic	Mesotrione Reduced Risk AI	2,4-D	Atrazine	Bromoxynil	Carfentrazone Reduced Risk AI in Cereal Grains	Dicamba	Halosulfuron	Linuron	Metsulfuron-methyl	Prosulfuron	Quinclorac
EPA Reg. No.	100-1131	71368-1	100-497	9779-346	279-3241	66330-276	10163-254	352-686	352-435	100-763	42750-131
HRAC / WSSA Classification of Active Ingredient Chemistry Class by Mode of Action											
Total No. Weed Species With Resistant Biotypes Per Chemistry Class In US	F 2 / (28)*	O / (4)	C 1 / (5)	C 3 / (6)	E / (14)	O / (4)	B / (2)	C 2 / (7)	B / (2)	B / (2)	B / (2)
No. of Biotypes Controlled or Partially Controlled by Mesotrione	0	8	23	1	2	8	38	7	38	38	38
Criterion III: Mesotrione will play role in managing Pest Resistance to this Active		2	14	0	2	2	14	3	14	14	14
Criterion III: Mesotrione will play a role in managing pest resistance in Grain Sorghum	YES	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* Active Ingredient classification based on HRAC / WSSA. Mesotrione is WSSA 28 compared to the original classification of 27 used by EPA and currently on Syngenta's EPA labels.

Grain Sorghum Table 4: Mesotrione Meets FIFRA Section 3(c)(1)(F)(ii) Criteria I, II, and III.

Active Ingredient	EPA Classified As Reduced Risk	Criterion I: Insufficient Efficacious Alternative To Mesotrione	Criterion II: Alternative Poses Greater Human Or Environmental Risk*	Criterion III: Mesotrione Will Play Role In Managing Pest Resistance To This Active
Mesotrione	Yes			
2, 4 - D	No	Yes	Yes	Yes
Atrazine	No	Yes	Yes	Yes
Bromoxynil	No	Yes	Yes	No
Carfentrazone	Yes	Yes	Yes	Yes
Dicamba	No	Yes	Yes	Yes
Halosulfuron	No	Yes	Yes	Yes
Linuron	No	Yes	Yes	Yes
Metsulfuron-methyl	No	Yes	Yes	Yes
Prosulfuron	No	Yes	Yes	Yes
Quinclorac	No	Yes	Yes	Yes

*Combined evaluation of human safety, application rate, and environmental impact.

Sweet Sorghum

US sweet sorghum production is estimated to be 50,000 acres by M. Bitzer at Univ. of KY, qualifying it as a minor crop. Mesotrione was registered on sweet sorghum on March 17, 2008, which is within the first 7 years after the initial June 4, 2001 registration of mesotrione. EPA did not grant reduced risk status to sweet sorghum, only because there is no other herbicide currently registered for this specific type of sorghum and therefore, EPA concluded that the risk could not be reduced. This is clear evidence that sweet sorghum meets the "insufficient efficacious alternative registered pesticides criterion (criterion I) of FIFRA Section 3(c)(1)(F)(ii).

Conclusion:

Mesotrione fulfils FIFRA Criterion I.

Criterion I: Mesotrione provides low rate (0.188-0.2 lbs ai/A) preemergence and postemergence control of a large number of broadleaf weeds. An NPIRS / PPLS search found no labels that specifically mention sweet sorghum, showing insufficient alternatives exist.

Sweet Sorghum: Mesotrione Meets FIFRA Section 3(c)(1)(F)(ii) Criteria I

Active Ingredient	EPA Classified As Reduced Risk	Criterion I: Insufficient Efficacious Alternative To Mesotrione
Mesotrione	No	
No Other Active Ingredients Currently Registered	No Other Active Ingredients Currently Registered	Yes. Since there are no alternatives registered, there are, by definition, insufficient efficacious alternatives.

*combined evaluation of human safety, application rate, and environmental impact.

Table 1: FIFRA Exclusive Use Extension Criterion I: There Are Insufficient Efficacious Alternatives To Mesotrione On Sweet Sorghum

		Mesotrione HRAC Group F2 / (WSSA Group 28)		
Sweet Sorghum		Callisto 3.0 fl. oz/A Plus Adjuvant*	Based On An NPIRS Search - No Herbicide Labels in EPA's Pesticide Product Label System Specify Sweet Sorghum	Count of AI Controlling species, S, PC, or Resistance not included.
Common Name	Scientific Name	Apply to weeds <5"		
Weeds Controlled With Postemergence Applications				
Amaranth, palmer	<i>Amaranthus palmeri</i>	C		0
Amaranth, Powell	<i>Amaranthus powellii</i>	C		0
Amaranth, spiny	<i>Amaranthus spinosus</i>	C		0
Atriplex	<i>Chenopodium crach</i>	C		0
Broadleaf signalgrass	<i>Brachiaria platphylla</i>	C		0
Buckwheat, wild	<i>Polygonum convolvulus</i>	PC		0
Buffalobur	<i>Solanum rostratum</i>	C		0
Burcucumber	<i>Sicyos angulatus</i>	PC		0
Carpetweed	<i>Mollugo verticillata</i>	C		0
Carrot, wild	<i>Daucus carota</i>	C		0
Chickweed, common	<i>Stellaria media</i>	C		0
Cocklebur, common	<i>Xanthium strumarium</i>	C		0
Crabgrass, large	<i>Digitaria sanguinalis</i>	C		0
Dock, curly	<i>Rumex crispus</i>	PC		0
Galinsoga	<i>Galinsoga parviflora</i>	C		0
Hemp	<i>Cannabis sativa</i>	C		0
Horse nettle	<i>Solanum carolinense</i>	C		0
Horseweed/Marestail	<i>Conyza canadensis</i>	PC		0
Jimsonweed	<i>Datura stramonium</i>	C		0
Knotweed, prostrate	<i>Polygonum aviculare</i>	PC		0
Kochia	<i>Kochia scoparia</i>	PC		0
Lambsquarters, common	<i>Chenopodium album</i>	C		0
Morningglory, entireleaf, ivyleaf	<i>Ipomoea hederacea</i>	PC		0
Morningglory, pitted	<i>Ipomoea lacunosa</i>	PC		0
Mustard, wild	<i>Brassica kaber</i>	C		0
Nightshade, black	<i>Solanum nigrum</i>	C		0
Nightshade, eastern black	<i>Solanum ptycanthum</i>	C		0
Nightshade, hairy	<i>Solanum sarrachoides</i>	C		0
Nutsedge, yellow	<i>Cyperus esculentus</i>	PC		0
Pigweed, redroot	<i>Amaranthus retroflexus</i>	C		0
Pigweed, smooth	<i>Amaranthus hybridus</i>	C		0
Pigweed, tumble	<i>Amaranthus albus</i>	C		0
Pokeweed, common	<i>Phytolacca americana</i>	PC		0
Potatoes, volunteer	<i>Solanum spp.</i>	C		0
Pusley, Florida	<i>Richardia scabra</i>	C		0
Ragweed, common	<i>Ambrosia artemisiifolia</i>	PC		0
Ragweed, giant	<i>Ambrosia trifida</i>	C		0
Sesbania, hemp	<i>Sesbania exaltata</i>	C		0
Smartweed, ladythumb	<i>Polygonum persicaria</i>	C		0
Smartweed, pale	<i>Polygonum lapathifolium</i>	C		0
Smartweed, Pennsylvania	<i>Polygonum pensylvanicum</i>	C		0
Sunflower, common	<i>Helianthus annuus</i>	C		0
Velvetleaf	<i>Abutilon theophrasti</i>	C		0
Waterhemp, common	<i>Amaranthus rudis</i>	C		0
Waterhemp, tall	<i>Amaranthus tuberculatus</i>	C		0
*Adjuvant = COC or NIS plus UNA or AMS				
† Apply before weed exceeds 2 inches in height.				

Weeds Controlled With Preemergence Applications of Callisto				
Common Name	Scientific Name	6.0-6.4 fl. oz./A		
Amaranth, palmer	<i>Amaranthus palmeri</i>	C		0
Amaranth, Powell	<i>Amaranthus powellii</i>	C		0
Amaranth, spiny	<i>Amaranthus spinosus</i>	C		0
Broadleaf signalgrass	<i>Brachiaria platyphylla</i>	C		0
Buffalobur	<i>Solanum rostratum</i>	C		0
Carpetweed	<i>Mollugo verticillata</i>	C		0
Chickweed, common	<i>Stellaria media</i>	C		0
Cocklebur, common	<i>Xanthium strumarium</i>	PC		0
Crabgrass, large	<i>Digitaria sanguinalis</i>	C		0
Galinsoga	<i>Galinsoga parviflora</i>	C		0
Jimsonweed	<i>Datura stramonium</i>	C		0
Kochia	<i>Kochia scoparia</i>	PC		0
Lambsquarters, common	<i>Chenopodium album</i>	C		0
Morningglory, entireleaf, ivyleaf	<i>Ipomoea hederacea</i>	PC		0
Morningglory, pitted	<i>Ipomoea lacunosa</i>	PC		0
Nightshade, eastern black	<i>Solanum ptycanthum</i>	C		0
Nightshade, hairy	<i>Solanum sarrachoides</i>	C		0
Pigweed, redroot	<i>Amaranthus retroflexus</i>	C		0
Pigweed, smooth	<i>Amaranthus hybridus</i>	C		0
Pigweed, tumble	<i>Amaranthus albus</i>	C		0
Ragweed, common	<i>Ambrosia artemisiifolia</i>	C		0
Ragweed, giant	<i>Ambrosia trifida</i>	PC		0
Smartweed, ladysthumb	<i>Polygonum persicaria</i>	C		0
Smartweed, pale	<i>Polygonum lapathifolium</i>	C		0
Smartweed, Pennsylvania	<i>Polygonum pennsylvanicum</i>	C		0
Sunflower, common	<i>Helianthus annuus</i>	C		0
Velvetleaf	<i>Abutilon theophrasti</i>	C		0
Waterhemp, common	<i>Amaranthus rudis</i>	C		0
Waterhemp, tall	<i>Amaranthus tuberculatus</i>	C		0
Count of Spp. Controlled		58	0	
Criteria 1: Insufficient Efficacious Alternative to Mesotrione			Yes	
Species not controlled by any alternative	Resistant biotypes per chemical class that controlled or partially controlled by mesotrione. A "C" within a pink shaded cell indicated that weed has resistant biotypes and is therefore not counted as controlled by that product.			
C = Control PC = Partial Control				

Table 2: FIFRA Exclusive Use Extension Criterion II: Alternative Registered Pesticides Pose Greater Risks To The Environment Or Human Health Than Mesotrione on Sweet Sorghum

	Based On An NPIRS Search - No Herbicide Labels in EPA's Pesticide Product Label System Specify Sweet Sorghum	
Characteristic	Mesotrione (Reduced Risk AI)	
EPA Reg. No.	100-1131	
Reduced Risk by EPA	Yes	
Label Signal Word	Caution	
Gene Toxicity	Negative	
Teratogenicity	Negative	
Reproductive Toxicity	Negative	
Carcinogenic Potential	Not Likely	
Acute Neurotoxicity	Negative	
Subchronic/Chronic Neurotoxicity	Negative	
REI in Hours*	12	
PHI in Days*	30	
**PPE*	Chem resist gloves	
Applic. Method (Pre)	Pre	
Pre lbs ai./A	0.188-0.2	
Applic. Method (Post)	NL	
Post lbs ai./A	NL	
No. Applic. / year	1	
Max. AI lbs./yr	0.2	
US or Regional label	US	
***Environmental Hazard	Surface Water Advisory, runoff	
Criterion I: Alternative Poses Greater Human or Environmental Risk	There are no registered alternatives. Data Extension is justified to extend protection on this very minor crop.	
Other registered active ingredients that are not considered as viable mesotrione alternatives: There are no alternatives in NPIRS or the PPLS.		
*REI = Restricted Entry Interval. PHI = Pre Harvest Interval. PPE = Personal Protective Equipment		
NL = None listed or not mentioned, or method is not labeled for a specific active ingredient.		

Table 3: FIFRA Exclusive Use Extension Criterion III: Mesotrione Plays Or Will Play A Significant Part In Managing Pest Resistance In Sweet Sorghum

Characteristic EPA Reg. No.	Mesotrione Reduced Risk AI 100-1131	Based On An NPIRS Search - No Herbicide Labels in EPA's Pesticide Product Label System Specify Sweet Sorghum
HRAC / WSSA Classification of Active Ingredient Chemistry Class by Mode of Action	F 2 / (28*)	
Total No. Weed Species With Resistant Biotypes Per Chemistry Class in US	0	
No. of Biotypes Controlled or Partially Controlled by Mesotrione		
Criterion III: Mesotrione will play role in managing Pest Resistance to this Active		There are no registered alternatives. Based on grain sorghum where there are ten alternatives, mesotrione plays a role in resistance management. The only scenario where mesotrione would not, would be if an active ingredient was registered and in a chemistry class that has no species controlled by mesotrione. Data Extension Protection is justified on this very minor crop.
Criterion III: Mesotrione will play a role in managing pest resistance in Sweet Sorghum	YES	
* Active Ingredient classification based on HRAC / WSSA. Mesotrione is WSSA 28 compared to the original classification of 27 used by EPA and currently on Syngenta's EPA labels.		

Sweet Sorghum Table 4: Mesotrione Meets FIFRA Section (3)(c)(1)(F)(ii) Criteria I		
Active Ingredient	EPA Classified As Reduced Risk	Criterion I: Insufficient Efficacious Alternative to Mesotrione
Mesotrione	Yes	
No Active Ingredients Currently Registered	No Active Ingredients Currently Registered	Yes. Since there are no alternatives registered, there is, by definition, insufficient efficacious alternatives
*Combined evaluation of human safety, application rate, and environmental impact.		

GROUP 27 HERBICIDE

PULL HERE TO OPEN ►



Callisto®

Herbicide

A Postemergence and Preemergence Herbicide for Control of Annual Broadleaf Weeds in Field Corn, Production Seed Field Corn, Field Corn Grown for Silage, Yellow Popcorn, Sweet Corn, and Other Listed Crops

Active Ingredient:

Mesotrione: (CAS No. 104206-82-8) 40.0%

Other Ingredients: 60.0%

Total: 100.0%

Contains 4 lbs. of active ingredient mesotrione per gallon.

KEEP OUT OF REACH OF CHILDREN.

CAUTION

See additional precautionary statements and directions for use inside booklet.

EPA Reg. No. 100-1131 EPA Est. 100-NE-001

SCP 1131A-L1H 0308

258939

 Callisto Plant Technology®

1 gallon

Net Contents

syngenta®

FIRST AID	
If in eyes	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If on skin or clothing	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
If inhaled	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
If swallowed	<ul style="list-style-type: none"> • Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center or doctor. • Do not give anything by mouth to an unconscious person.
Have the product container or label with you when calling a poison control center or doctor, or going for treatment.	
<p>HOTLINE NUMBER For 24-Hour Medical Emergency Assistance (Human or Animal), or Chemical Emergency Assistance (Spill, Leak, Fire, or Accident) Call 1-800-888-8372</p>	

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

CAUTION

Harmful if absorbed through skin. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Avoid contact with skin, eyes, or clothing.

continued...

PRECAUTIONARY STATEMENTS (continued)

Personal Protective Equipment (PPE)

Some materials that are chemical resistant to this product are listed below. If you want more options, follow the instructions for Category A on an EPA chemical resistance category selection chart.

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks
- Chemical-resistant gloves - Category A (e.g. barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene, polyvinyl chloride (PVC), or viton)

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Control Statements

When handlers use closed systems or enclosed cabs in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Environmental Hazards

Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment wash water or rinsate.

Surface Water Advisory

This product may contaminate water through drift of spray in wind. This product has a high potential for runoff for several weeks after application. Poorly draining soils and soils with shallow water tables are more prone to produce runoff that contains this product. A level, well maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential for contamination of water from runoff. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours. Sound erosion control practices will reduce this product's contribution to surface water contamination.

Physical and Chemical Hazards

Do not use or store near heat or open flame.

CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

NOTICE: Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

The Directions for Use of this product must be followed carefully. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as manner of use or application, weather or crop conditions, presence of other materials or other influencing factors in the use of the product, which are beyond the control of SYNGENTA CROP PROTECTION, Inc. or Seller. To the extent permitted by applicable law, Buyer and User agree to hold SYNGENTA and Seller harmless for any claims relating to such factors.

SYNGENTA warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated in the Directions for Use, subject to the inherent risks referred to above, when used in accordance with directions under normal use conditions. To the extent permitted by applicable law: (1) this warranty does not extend to the use of the product contrary to label instructions, or under conditions not reasonably foreseeable to or beyond the control of Seller or SYNGENTA, and, (2) Buyer and User assume the risk of any such use. **TO THE EXTENT PERMITTED BY APPLICABLE LAW, SYNGENTA MAKES NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS WARRANTED BY THIS LABEL.**

To the extent permitted by applicable law, in no event shall SYNGENTA be liable for any incidental, consequential or special damages resulting from the use or handling of this product. **TO THE EXTENT PERMITTED BY APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF SYNGENTA AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF SYNGENTA OR SELLER, THE REPLACEMENT OF THE PRODUCT.**

SYNGENTA and Seller offer this product, and Buyer and User accept it, subject to the foregoing Conditions of Sale and Limitation of Warranty and Liability, which may not be modified except by written agreement signed by a duly authorized representative of SYNGENTA.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Callisto should be used only in accordance with recommendations on this label or in separately published Syngenta supplemental labeling recommendations for this product.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours. Exception: If the product is soil-injected or soil-incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Shoes plus socks
- Chemical-resistant gloves – Category A (e.g., barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene, polyvinyl chloride (PVC), or viton)

GENERAL INFORMATION

Callisto is a systemic preemergence and postemergence herbicide for the selective contact and residual control of broadleaf weeds in field corn, production seed field corn, field corn grown for silage, yellow popcorn, sweet corn, and other listed crops. When used preemergence, weeds take up the product through the soil during emergence. Dry conditions following application may reduce the preemergence activity of Callisto. If an activating rain (0.25 inches) is not received within 7-10 days after a preemergence application, rotary hoeing is suggested to activate the herbicide. When used postemergence, susceptible weeds take up the herbicide through the treated foliage and cease growth soon after application. Complete death of the weeds may take up to 2 weeks. The product is absorbed through the soil and/or by the foliage of emerged weeds.

Callisto is not effective for the control of most grass weeds. Preemergence grass herbicides or postemergence grass herbicides can be tank mixed with Callisto to provide broad spectrum weed control in corn (see appropriate section of label for this information). Callisto can be applied postemergence following a preemergence grass herbicide application. Callisto can also be used in combination with a burndown herbicide, prior to planting, to provide added burndown and residual weed control in field corn, production seed field corn, field corn grown for silage, yellow popcorn, and sweet corn.

WEEDS CONTROLLED

Table 1. Weeds Controlled with Postemergence Applications of Callisto

Common Name	Scientific Name	3.0 fl. oz./A + COC + UAN or AMS		3.0 fl. oz./A + 1/2 pt. (0.25 lb. a.i./A) Atrazine 4L/A or Equivalent + COC + UAN or AMS	3.0 fl. oz./A + 1/2 pt. (0.25 lb. a.i./A) Atrazine 4L/A or Equivalent + COC + UAN or AMS
		Apply to Weeds <5 inches Tall			Apply to Weeds 5-10 inches Tall
Amaranth, palmer	<i>Amaranthus palmeri</i>	C	C	C	C
Amaranth, Powell	<i>Amaranthus powellii</i>	C	C	C	C
Amaranth, spiny	<i>Amaranthus spinosus</i>	C	C	C	C
Atriplex	<i>Chenopodium orach</i>	C	C	C	C
Broadleaf signalgrass	<i>Bracharia platphylla</i>	C ¹	C ¹	PC	PC
Buckwheat, wild	<i>Polygonum convolvulus</i>	PC	PC	PC	PC
Buffalobur	<i>Solanum rostratum</i>	C	C	C	C
Burcucumber	<i>Sicyos angulatus</i>	PC	C	C	C
Carpetweed	<i>Mollugo verticillata</i>	C	C	C	C
Carrot, wild	<i>Daucus carota</i>	C	C	C	C
Chickweed, common	<i>Stellaria media</i>	C	C	C	C
Cocklebur, common	<i>Xanthium strumarium</i>	C	C	C	C
Crabgrass, large	<i>Digitaria sanguinalis</i>	C ¹	C ¹	PC	PC
Dandelion	<i>Taraxacum officinale</i>	NC	PC	PC	PC
Dock, curly	<i>Rumex crispus</i>	PC	PC	PC	PC