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EEB REVIEW

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TYPE PRODUCT(S) Herbicide

DATA ACCESSION NOS. 412769-01,02,03,04,05,06

PRODUCT MANAGER NO. J. Miller (23)

PRODUCT NAME(S) Super Whip, Super Acclaim

COMPANY NAME Hoechst Celanese Corp.

SUBMISSION PURPOSE Registrant response with data to EEB review dated 7/12/89.

SHAUGHNESSEY NO.	CHEMICAL AND FORMULATION	% AI
	Fenoxaprop-P-ethyl	

EEB Review

Chemical: Super Whip and Super Acclaim Herbicides

100 Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

Submission of green algae (Selenastnum capricornutum mysid shrimp (Mysidopsis bahia), Tier I non-target plant phytotoxicity studies (vegetative vigor and seed germination/seedling) and Tier II non-target plant phytotoxicity studies (vegetative vigor and seed germination/seedling emergence) in response to a previous EEB review. Proposed Super Whip use sites are rice, soybeans, and set-aside conservation reserve acres. The proposed Super Acclaim use sites are sod farms, commercial and residential turf, ornamental (deciduous and evergreen trees and shrubs, herbaceous and flowering plants), and rights-of-way (all).

100.2 Formulation Information (Super Whip and Super Acclaim

ACTIVE INGREDIENTS:

fenoxaprop-P-ethyl: (+)-ethyl 2-[4[(6-chloro-2-benzoxazolyl) oxy] phenoxy] propanoate...6.27%*

INERT INGREDIENTS:

.....93.73%**

* Equivalent to 0.55# ai/gallon

** Contains petroleum distillates

100.3 Application Methods, Directions, Rates

Super Whip/Super Acclaim are selective postemergence herbicides used for control of annual and perennial grassy weeds. The weeds turn yellow 4-10 days after application and die in 12-21 days. The label cautions "Since many grass crops are sensitive to Super Whip herbicide including sorghum and corn, avoid all direct or indirect contact to neighboring fields." Super Whip/Super Acclaim herbicides do not control broadleaf/weeds or sedges.

Super Whip can be applied with ground or aerial application equipment. Air application recommendations such as using a minimum spray pressure of 20 psi, the use of D-9 spray nozzles that give 150-300 micron droplets, the recommendation not to use raindrop nozzles, and the recommendation to fly more than 10 feet above the crop are all factors that may lead to increased off-target drift during application. The label prohibits application by air if wind speed exceeds 8 MPH.

A maximum of 2.0 pints/A (0.138#ai) Super Whip is allowed per season in soybeans. Each application can range from 0.75 to 1.0 pint per acre; no more than 2 treatment per growing season. In rice a maximum of 2.4 pints per acre (0.165# ai) are allowed per season, a maximum of 2 treatments ranging from 0.9 to 1.2 pints per acre per application (0.062 to 0.0825# ai/A) per treatment. On set aside acres, 0.9 to 1.4 pints per acre are recommended with no limitation or maximum number of treatments per year (0.062 to 0.096# ai/A treatment).

The Super Acclaim label recommends an initial application of 21 oz/Acre to control Johnsongrass or common bermudagrass, followed by repeat application of 10-42 oz/A every 28 - 35 days as needed to control regrowth. Assuming 4 applications (theoretical- April - 21 oz; (+) May 42 oz; (+) June-42 oz; (+) July 42 oz), the total per acre per year would be 147 oz/A/yr(0.632 # ai/A/yr). This total/A/yr of course, could be more or less. For rhizone johnsongrass control on highway rights-of-way the Super Acclaim label recommends up to 42 oz./A for the first application and up to 42 oz/A for each repeat application (No Limit). The total number of treatments would be dependent on efficacy of Super Acclaim infestation level, time of application, and cost of each treatment. Assuming 4 treatments are made the total would be 168 oz/acre/year (0.72 #ai/A/yr).

See attached labels for more complete information.

100.4 **Target Organisms**

Control of emerged annual and perennial grassy weeds (foxtail, volunteer corn, wild sorghum/millet species, panicum, wild oats, crabgrass, rhizome johnsongrass). No broadleaf weeds are listed on the proposed labels. Super Whip and Super Acclaim will be used on grass species (rice, turf) to selectively control grassy weeds.

100.5 **Precautionary Labeling**

"This pesticide is toxic to fish. Do not apply directly to a body of water outside of the treated rice field. Do not apply when weather conditions favor drift. Do not contaminate arable land and/or water when disposing of equipment washwaters. Since many grass species are sensitive to Super Whip Herbicide, including sorghum and corn, avoid all direct or indirect contact to neighboring fields. Do not apply by aircraft when wind speeds exceed 8 mph."

"Do not plant any rotational crop in treated fields for 30 days after application (120 days for small grains). Do not apply Super Whip in areas where catfish and crayfish are commercially cultivated. Do not use rice irrigation water to irrigate crops not registered for use with Super Whip Herbicide within 14 days of last application of this product. Do not apply less than 65 days before harvesting rice. Do not apply within 14 days after activation of fertilizer. Do not tank mix Blazer, Propanil, Ordram, phenoxy herbicides, or liquid fertilizer. Do not apply within 7 days of Furadan. Do not use on the rice varieties Mars or Lear as damage to these varieties may occur. Do not harvest or graze cover crops protected with Super Whip. Do not apply this product through any type of irrigation system.

The rice label directions restrict use in areas of Arkansas inhabited by the fat pocketbook pearly mussel (Potanilus Capax).

101. **Hazard Assessment**

101.1 **Discussion**

Super Whip/Super Acclaim products contain the same active ingredient as the current registered rice herbicide Whip, but the mixture of active enantiomers is different. The Super Whip formulation contains a higher percentage of the d enantiomer than Whip, making it more biologically active. The ratios are: Whip, 50:50, d to 1; Super Whip 85:15, d to 1. To compensate for the higher level of activity the Super Whip product is formulated as 0.55# active ingredient per gallon vs 1.0# active ingredient per gallon for the Whip product. The maximum Super Whip use rate in rice per application has been reduced from 0.2# active ingredient per acre for Whip to 0.0825#

active ingredient per acre for Super Whip; a 2.4 x reduction.
When compared with Whip formulation studies, Super Whip formulation studies for rainbow trout, bluegill, and Daphnia indicate that Super Whip is approximately twice as toxic as Whip in LC/LD 50 tests.

101.2 **Likelihood of Adverse Effects on Ontarget Organisms**

Terrestrial Organisms

Acute contact LD50 data previously submitted for Whip herbicide indicates that fenoxaprop-P-ethyl at Super Whip label rates should pose no hazard to honey bees.

Fenoxyprop-p-ethyl was classified as "practically nontoxic" to birds as follows:

Bird Study	Formulation	LD/LC50
mallard duck dietary	96.6% tech	>5620 ppm
bobwhite quail "	96.6% tech	>5620 ppm
bobwhite acute oral	96.6% tech	>2510 ppm

From a previous review (proposed registration of Whip 1EC, 5/03/89), the mammalian LD50 is: >2000 mg/kg. Assuming a maximum application rate of 0.0825 # active ingredient per acre, (one rice treatment at maximum rate), the following residues could be expected immediately after application:

Long grass	<10.0 ppm
Short grass	<20.0 ppm
leaves, leafy crops	<10.0 ppm
forage	< 6.0 ppm
pod crops, legumes	< 1.0 ppm
tree fruits	< 0.8 ppm

These values are well below the LC_{50} values for mallard duck, bobwhite quail, and mammalian species. In a previous EAB review (Study 12- Review dated 12/02/86 for fenoxaprop-P-ethyl), the turfgrass perennial ryegrass was sprayed with 0.5# active ingredient per acre of Whip 1EC (approximately 6x the Super Whip rate). In this study, dislodgeable residues dissipated with a half-life of < 3 hours (from 11 to 1.5 ppm). The half-life of total extractable residues was 1 to 3 days.

Based on these data, the hazard from use of repeat applications of Super Whip or Super Acclaim is expected to be minimal to birds, mammals, and insects.

Aquatic Organisms

Past EEB reviews have addressed adverse effects to aquatic organisms from the use of Super Whip on rice.

Based on LC_{50} tests conducted on the Whip formulation, and the limited tests conducted on the Super Whip formulation the following comparisons were made:

Whip	Super Whip
Bluegill - LC_{50} = 3.4 ppm	LC_{50} = 4.7 ppm
Rainbow trout - LC_{50} = 3.4 ppm	LC_{50} = 2.4 ppm
Daphnia magna - LC_{50} = 11.5 ppm	LC_{50} = 6.0 ppm
Mysid Shrimp - LC_{50} = 1.7 ppm	NO DATA

Based on the Daphnia magna comparison the EEB concluded that the Super Whip formulation may be approximately twice as toxic as the Whip formulation to aquatic invertebrates; and that the most sensitive aquatic species is most likely the Mysid shrimp. Because of the absence of a Super Whip Mysid shrimp study, one was requested of the registrant in July 1988 and received 10/89. The Super Whip Mysid shrimp study was reviewed and classified as INVALID due to the inability to maintain 70% of the test material in solution for the duration of the study (See DER attached).

A Selanastrum capricornutum (green algae) Tier II study was submitted by the registrant in 10/89 and reviewed. This study was classified as SUPPLEMENTAL. The 120 hour EC_{50} was 34 ppm; with a no-effect level approximately 10 ppm (See DER attached).

NON-CROP AREAS: (Super Acclaim)

Of both labels (Super Whip and Super Acclaim) the highest recommended label rate is 42 oz./Acre for turf areas and highway-rights-of-way at 42 oz per Acre. This totals 2.63 pints per acre (0.18# ai/Acre) per application. The maximum number of applications allowed per year are not specified on the Super Acclaim label.

RIGHTS-OF-WAY:

If one application of Super Acclaim is made, the following amount would run-off:

0.18# ai/Acre X 1% runoff X 10 Acres = 0.018#ai runoff

EEC

6' water body = 1.098 ppb (0.0011 ppm)
6" water body = 13.212 ppb (0.0130 ppm)

TURF:

If Super Acclaim were used on turf, the maximum amount per acre per application is 0.1788# ai.

Runoff would total:

0.17888# ai/A x 1% x 10 A = 0.0179# ai

EEC

6' body of water = 1.092 ppb (0.00109 ppm)
6" body of water = 13.139 ppb (0.01314 ppm)

RICE : (Super Whip)

The Super Whip label recommends a maximum per acre per application rate of 0.0825# ai in rice. The total maximum amount per season on rice is 0.164# ai/Acre.

Based on a 3 year rice field monitoring study for Whip 1 EC herbicide, aproximately 1% was found in an adjacent drainage ditch and 0.5% in a nearby river.

0.0825# ai/A x 1% = 0.0008# ai off-target

EEC

6' water body = 0.05 ppb (0.00005 ppm)
6" water body = 0.60 ppb (0.00061 ppm)

SOYBEANS: (Super Whip)

The Super Whip label recommends a maximum per acre application rate of 0.069# ai in soybeans. The total maximum amount allowed per season on soybeans is 0.138 #ai/Acre.

Aerial Drift 0.069 # ai/A x 5% drift = 0.00345 # ai

Ground runoff 0.069 #ai/A x 0.06 x 0.01 x 10A = 0.000414# ai

Total = 0.00386 # ai

EEC

6' body of water = 0.236 ppb (0.00027 ppm)
6" body of water = 2.833 ppb (0.00283 ppm)

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SET-ASIDE ACRES: (Super Whip)

The Super Whip label recommends a maximum per acre application rate of 1.4 pints/Acre (0.09625#ai/Acre). The total number of applications allowed per acre per year is not specified on the label.

Ground runoff 0.096# ai/A x 0.06 x 0.01 x 10Acres = 0.00058#ai

EEC

6' body of water = 0.035 ppb (0.000035 ppm)
6" body of water = 0.426 ppb (0.000426 ppm)

ONE-TENTH LC50 VALUES:

Bluegill	0.47 ppm
Rainbow trout	0.24 ppm
Daphnia magna	0.60 ppm
Mysid shrimp	NONE AVAILABLE

Based on the maximum label rates Super Whip and Super Acclaim are not expected to adversely affect non-target freshwater fish, aquatic invertebrates, or algae. Effects on non-target estuarine organisms cannot be determined until a valid Mysid shrimp study is available for use in a risk assessment.

Chronic effects from use of repeat applications of Super Whip or Super Acclaim on non-target freshwater fish, aquatic invertebrates, and algae are not expected, however, the maximum total number of Super Acclaim applications per year are not specified. A theoretical 4 treatments to rights-of-way per year are not expected to cause adverse effects to these species. Chronic effects to estuarine organisms cannot be determined at this time.

Plants

Based on Tier II vegetative vigor and seed germination studies submitted to EEB in October 1989, the Gramineae family of plants are the most sensitive to Super Whip herbicide. These tests are summarized as follows:

Lowest EC_{25} values

	SGSE	VV
Corn -	0.0020#ai/A (RL)	0.0025 #ai/a (H)
Oat -	0.0096#ai/A (RL)	0.0780 #ai/A (W)
Ryegrass -	0.0578#ai/A (H)	0.0817 #ai/A (H)

Lowest EC_{50} Values

	SGSE	VV
Corn -	0.0090 (RL)	0.0110 (H)
Oat -	0.0270 (RL)	0.0986 (W)
Ryegrass -	0.0910 (H)	0.1370 (H)

RL = radicle length
H = Height
W = Weight

Based on the previous EEC calculations, the following amounts of drift/runoff in # ai/Acre from each site are given:

Rights-of-way	-	0.0180#ai/Acre drift
Turf	-	0.0179#ai/Acre runoff
Rice	-	0.0083#ai/Acre runoff and drift
Soybeans	-	0.0035#ai/Acre drift
		0.0004#ai/Acre runoff
		0.0039#ai/Acre total for soybeans
Set-aside	-	0.0006#ai/Acre runoff

Based on these data, off-target movement of Super Acclaim herbicide via runoff or drift from a treated rights-of-way or turf areas, or Super Whip via runoff and drift from rice and soybean fields is expected to adversely affect terrestrial plants in the Gramineae family. Based on EC50 values listed above for vegetative vigor height measurements, off-target movement of Super Acclaim (labeled noncrop areas) is expected to adversely affect aquatic grass macrophytes. No data are available for effects on aquatic plant species. EEB has tried to extimate the hazard to aquatic plants by using EC50 values for the most sensitive terrestrial test species, corn.

Tier II non-target plant studies plus EEC estimates have triggered the need for a Tier III non-target terrestrial field study. The use of Super Whip on set aside acres is not expected to adversely affect non-target plants via drift or runoff.

101.3 Endangered Species Considerations

The precautionary statements that this pesticide is toxic to fish, do not apply directly to a body of water outside the treated rice field, do not apply when weather conditions favor drift or runoff, and do not apply in areas where catfish and crayfish are commercially cultivated instruct the user of the importance of accurate application and the potential for

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adverse effects to aquatic organisms. However, aerial application label instructions may result in increased off-target movement above that predicted by EEB.

Super Whip and Super Acclaim are not expected to adversely affect endangered birds, mammals, insect species, freshwater fish, Daphnia magna, or algae.

AQUATIC ONE-TWENTIETH LC50 VALUES:

Bluegill	-	0.235 ppm
Rainbow trout	-	0.120 ppm
Daphnia magna	-	0.300 ppm
Mysid shrimp	-	NO DATA AVAILABLE

A risk assessment for endangered estuarine organisms cannot be conducted until a valid Mysid shrimp study is available.

Use of Super Whip on rice and soybeans and the use of Super Acclaim on non-crop areas is expected to adversely affect non-target endangered plants via drift and runoff. Because fenoxyprop-P-ethyl is highly specific in it's mode-of-action, only endangered grass species are considered at risk.

The following endangered grass species are listed by the Fish And Wildlife Service and may be potentially at risk in non-agricultural areas:

Solanograss in California (counties of Colusa, Contra Costa, Fresno, Glenn, Madera, Merced, San Jaquin, Solano, Stanislaus, Tehama)

Eureka Valley Dunegrass in California (county of Inyo)

Carters Panicgrass in Hawaii (Island of Oahu)

Texas Wild Rice in Texas (county of Hays)

Non-target endangered estuarine organisms may be at risk from the proposed use of Super Whip and Super Acclaim. A risk assesment for estuarine organisms cannot be conducted until a valid Mysid shrimp study is available.

101.4 Adequacy of Toxicity Data

In response to a previous EEB review (July 12, 1988) regarding the registration of Super Whip on rice, the following studies were requested and received by EPA on Oct 25, 1989:

1) 96-hour acute Mysidopsis bahia,
2) Tier I algae, Selenastrum capricornutum,
3) Tier I nontarget plant seed germinating, seedling emergence,
4) Tier II nontarget plant seed germination, seedling emergence,
5) Tier I nontarget plant vegetative vigor,
6) Tier II nontarget plant vegetative vigor,

These studies have been reviewed by EEB and their adequacy was determined as follows:

1) invalid
2) supplemental
3-6) core

101.5 Adequacy of Labeling

1) Endangered Plant Species
The proposed Super Acclaim and Super Whip labels must list those endangered grass species and state/county locations (specified in section 101.3 above) to restrict herbicide use in these areas.

2) Endangered Estuarine Organisms
The proposed Super Acclaim and Super Whip labels currently have warnings regarding fish and shrimp however, they must indicate that off-target estuarine organisms may be at risk. Super Acclaim and Super Whip use must be restricted from use near estuarine areas or on fields that may drain into estuarine areas.

3) The proposed Super Acclaim label must specify the total maximum number of applications allowed per year. The Super Whip label must specify the total maximum number of applications on set-aside areas allowed per year.

103 **Conclusions**

Data currently available indicate that the Super Whip/Super Acclaim hazard to avian, mammalian, beneficial insect, freshwater fish, aquatic invetebrate, and algae species is expected to be minimal. No adverse effects to non-target plants are expected to occur from use of Super Whip on set-aside areas, however, adverse effects to non-target and endangered grass species are expected to occur from use of Super Whip on soybeans and rice and from use of Super Acclaim on the proposed non-crop areas.

A risk assessment for estuarine organisms could not be conducted.

The following studies are outstanding:

1.) 72-3, acute Mysid shrimp LC50;

2.) Tier II non-target aquatic plant growth using
Lemna gibba
Sleletonema costatum
Anabaena flos-aquae
a freshwater diatom

These studies are required for any aerial application of an herbicide.

3.) Tier III non-target plant terrestrial field study.

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