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EEB BRANCH REVIEW

DATE: IN 12/10/75 OUT 2/19/76 IN _____ OUT _____ IN _____ OUT _____

FISH & WILDLIFE ENVIRONMENTAL CHEMISTRY EFFICACY

FILE OR REG. NO. 241-243

PETITION OR EXP. PERMIT NO. 6F1704

DATE DIV. RECEIVED November 14, 1975

DATE OF SUBMISSION _____

DATE SUBMISSION ACCEPTED _____

TYPE PRODUCT(S): I, D, (H,) F, N, R, S Herbicide

PRODUCT MGR. NO. Taylor

PRODUCT NAME(S) Prowl(R) Herbicide

COMPANY NAME American Cyanamid Co.

SUBMISSION PURPOSE Registration of use in soybeans

CHEMICAL & FORMULATION _____

[N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine]... 43.8%
(contains 4# ai/gal.)

[redacted]

1

ENVIRONMENTAL SAFETY

100.0 Pesticidal Use

100.1 Application Methods/Rates/Directions

GENERAL INFORMATION

PROWL herbicide controls most annual grasses and certain broadleaf weeds in soybeans. PROWL controls weeds as the seeds germinate, but will not control established weeds. Cultivate to destroy existing weeds before PROWL application.

Apply with ground equipment only.

PROWL can be applied as a preplant soil-incorporated treatment in soybeans grown in the United States. PROWL may be used as a tank-mix combination treatment with SENCOR™ 50W herbicide in either preplant soil-incorporated or preemergence applications to obtain control of a greater number of broadleaf weeds than possible with PROWL alone.

To obtain effective weed control with PROWL, the seed bed should be firm and free of clods and trash. Previous crop residues should be thoroughly mixed into the soil to a depth of 4 to 6 inches by plowing or disking before applying PROWL uniformly as a broadcast treatment to the prepared seed bed.

Livestock can graze or be fed forage from PROWL-treated fields.

In the event of a crop loss due to adverse weather conditions, soybeans or cotton can be replanted the same year into soil treated with PROWL alone. PROWL-treated land can be planted to other crops the following year.

Observe all cautions and limitations on this label and the labels of products used in combination with PROWL. The use of this product not consistent with this label may result in injury to crops, animals, or persons. Keep container closed to avoid spills and contamination.

Mixing and Spraying Instructions

Mix PROWL herbicide or PROWL tank mixtures as specified on this label with water as follows:

1. Fill tank one-half to three-quarters full with clean water.

2. When using PROWL alone, add PROWL to partially-filled tank while agitating and then fill the remainder of the tank with water.

3. (a) When using PROWL with a wettable powder herbicide, make a slurry of the wettable powder in water (1 part WP + 2 parts water). Add the slurry slowly into the partially-filled tank while agitating.

   (b) When the slurry is properly mixed, add PROWL to the tank. Fill the remainder of the tank with water

4. Maintain good agitation at all times until spraying is completed. If the spray mixture is allowed to settle for any period of time, thorough agitation is essential to resuspend the mixture before spraying is resumed. Continue agitation while spraying

Use a properly calibrated low-pressur (20 to 40 psi) sprayer equipped with 8003 or larger size Tee-Jet or comparable nozzles to achieve uniform spray distribution and minimize drift. Keep the by-pass line on or near the bottom of the tank to minimize foaming. Nozzle screens must be no finer than 50 mesh.

Application Instructions

Broadcast Treatment - Apply in 10 or more gallons of water. Do not apply during periods of gusty winds in excess of 10 mph.

Band Treatments - Apply a broadcast equivalent rate and volume per acre. To determine these:

$$\frac{\text{Band width in inches}}{\text{Row width in inches}} \times \text{Broadcast RATE per acre} = \text{Band RATE per acre}$$

$$\frac{\text{Band width in inches}}{\text{Row width in inches}} \times \text{Broadcast VOLUME per acre} = \text{Band VOLUME per acre}$$

CULTIVATION INSTRUCTIONS

PROWL treatments do not require mechanical incorporation if a rain of more than one-quarter inch occurs within 7 days of application. If PROWL-treatment has not been incorporated and if weed seedlings have emerged, shallow cultivation with a rotary hoe or similar equipment will be required, within 14 days.

Insert - see next page

Recommendations

SOUTHERN STATES AND EASTERN COASTAL PLAINS

For use only in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Southeastern Missouri "Bootheel Region", and Coastal Plains of Delaware, Maryland, New Jersey, and Virginia.

Preplant Incorporated[1/] Broadcast Rate Per Acre of PROWL in Soybeans

Soil Texture	PROWL
LIGHT Sands, loamy sands, sandy loams	1.0 to 1.5 pints
MEDIUM Sandy clay loams, loams, silts, silt loams	1 5 to 2.0 pints
HEAVY clay loams, silty clay loams, clays	1.5 to 3.0 pints

1/ Mechanical incorporation is not required if a one-quarter inch rain occurs within 7 days of application. See Cultivation Instructions.

NOTE: The high rate for each soil texture above should be used if heavy weed populations are anticipated. Use the 3 pint rate for heavy clay soils.

(Insert)

DIRECTIONS FOR USE

Incorporation

PROWL is an effective preplant incorporated herbicide for soybeans. Thoroughly mix the previous crop residues into the soil to a depth of 4 to 6 inches by plowing or disking prior to application. Uniformly apply PROWL in 10 or more gallons of water per acre as a broadcast spray.

1. PROWL may be applied immediately before planting soybeans or up to 60 days prior to planting. DO NOT APPLY PROWL AS A POSTEMERGENCE SPRAY.

2. Thoroughly incorporate PROWL into the top 1 to 2 inches of soil within 7 days after application. Mechanical incorporation is not required if a rain of more than one-quarter inch occurs within this 7 day period. (See directions below for listing or bedding.) Incorporation can be achieved by the following methods:

   (a) Disk harrow set to cut 3 to 4 inches deep.
   (b) Bed conditioners set to cut 2 to 3 inches deep.
   (c) PTO-driven equipment (tillers, cultivators, hoes) set to cut 2 inches deep.
   (d) Rolling cultivators set to cut 2 to 3 inches deep.

When PROWL is applied to flat land prior to listing or bedding, incorporation should be of sufficient depth (4 to 6 inches) so that listing does not bring up untreated soil. During planting, or if beds must be reshaped prior to planting, avoid tillage that will bring untreated soil to the surface or expose untreated soil in the furrow. Rotary-hoeing, shallow cultivation, or hand-hoeing can be practiced after application without reducing weed control. When mechanically incorporated, PROWL is not dependent upon rainfall for effective weed control.

NORTHEASTERN AND NORTH CENTRAL STATES

For use only in Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Nebraska, New York, North Dakota, Ohio, Pennsylvania, South Dakota, Wisconsin, Missouri (except the "Bootheel Region"), and all areas of Delaware, Maryland, New Jersey, and Virginia (except the Eastern Coastal Plains).

Preplant Incorporated[1/] Broadcast Rate Per Acre of PROWL in Soybeans

Soil Texture	Up to 3% Organic Matter	More than 3% Organic Matter
Loamy sands and sandy loams	1.0 to 2.0 pints	2.0 pints
Loams, Silt loams, silts, sandy clays, sandy clay loams	1.5 to 2.5 pints	2.5 to 3.0 pints
Silty clays, silty clay loams, clay loams and clays	2.0 to 3.0 pints	3.0 pints

1/ Mechanical incorporation is not required if a one-quarter inch rain occurs within 7 days of application. See Cultivation Instructions.

DO NOT USE on peat or muck soils.

NOTE: The high rate for each soil texture above, where listed, should be used if heavy weed populations are anticipated.

TANK MIXES

Preplant Incorporated and Preemergence Applications

PROWL plus SENCOR 50W tank mixtures are recommended for use as Preemergence or Preplant Incorporated treatments for the control of the following broadleaf weeds that are not controlled by PROWL alone.

Velvetleaf (*Abutilon theophrasti*)
Smartweed (*Polygonum* spp.)
Common Ragweed (*Ambrosia* spp.)
Jimsonweed (*Datura stramonium*)
Mustards (*Brassica* spp.)
Venice Mallow (*Hibiscus trionum*)
Prickly Sida (*Sida spinosa*)
Sicklepod (*Cassia obtusifolia*)

Hemp Sesbania (Sesbania exaltata)

NOTE: Acceptable control of cocklebur (Xanthium pensylvanicum) will not be obtained in all cases. Use a preplant incorporated application of PROWL followed by a preemergence application of SENCOR where severe cocklebur infestations are anticipated.

SOUTHERN STATES AND EASTERN COASTAL PLAINS
(see above listing of states)

Preplant Incorporated or Preemergence Broadcast Rate Per Acre in Soybeans

Soil Texture	PROWL + SENCOR 50W
LIGHT Sandy loams, loamy sands	1.0 to 1.5 pts. + 0.5 lb.
MEDIUM Loams, silt loams, silts sandy clays, sandy clay loams	1.5 pts + 0.75 lb.
HEAVY Silty clays, silty clay loams, clay loams, clays	1.5 to 2.0 pts + 1.0 lb

DO NOT USE on sands. DO NOT USE on loamy sands, or sandy loams that contain less than 1% organic matter.

NOTE: The high rates of PROWL and SENCOR for each soil texture above, where listed, should be used if heavy weed populations are anticipated.

NORTHEASTERN AND NORTH CENTRAL STATES
(see above listing of states)

Preplant Incorporated or Preemergence Broadcast Rate Per Acre in Soybeans

Soil Texture	Up to 3% Organic Matter	More than 3% Organic Matter
Loamy sands and loamy sands	1.0 pt. + 0.5 to 0.75 lb.	1.5 pts. + 0.75 lb.
Loams, silt loams, silts, sandy clays, sandy clay loams	1.5 to 2.0 pts. + 0.75 lb.	1.5 to 2 0 pts. + 0.75 to 0.5 lb.
Silty clays, silty clay loams, clay loams and clays	1.5 to 2.0 pts. + 0.75 to 1.0 lb.	2.0 to 2.5 pts. + 1.0 lb.

DO NOT USE on sands. DO NOT USE on loamy sands, or sandy loams that contain less than 1% organic matter. DO NOT USE on peat or muck soils.

NOTE: The high rates or PROWL and SENCOR for each soil texture above, where listed, should be used if heavy weed populations are anticipated.

Special Precautions for PROWL + SENCOR Combinations:

PROWL + SENCOR will not reduce soybean yields if applied according to label directions and under normal growing conditions. Over-application can result in crop stand loss, crop injury or soil residues. Uneven application or imporper soil incorporation can decrease weed control or cause crop injury. Soybean seed should be planted at least 1 1/2 inches below soil surface. Application should not be made to soils having a calcareous surface area or a pH of 7.5 or higher. Soil incorporation deeper than recommended will reduce weed control and can result in crop injury.

Seedling diseases, cold weather, excessive moisture, deep planting, high soil pH, high soil salt concentration, or drought can weaken soybean seedlings and plants, and increase the possibility of crop damage from the tank-mix combination treatment. Under these conditions, crop yields can be reduced.

Do not use treated soybean foliage for forage or feed.

If the first soybean stand is not satisfactory, fields treated with PROWL + SENCOR may be replanted to soybeans. If replanting is necessary, do not rework the soil. Follow cropping restrictions on SENCOR labels.

The PROWL + SENCOR treatment can be applied only once per cropping season. Do not use on sensitive soybean varieties - Tracy, Semmes, Altona, Vansoy or Coker 102.

Preplant Application of PROWL Followed by Preemergence SENCOR Application

SENCOR may be applied as an overlay preemergence application following a preplant incorporated application of PROWL. Consult the SENCOR label for specific directions for use, for cropping restrictions, and for weeds that may be controlled by SENCOR applications in addition to weeds controlled by PROWL.

100.2 Precautions

WARNING!

Keep Out Of Reach Of Children

See Side Panel For Other Warnings

WARNING! FLAMMABLE LIQUID AND VAPOR

Do not store near food or feed products. Do not use, pour, spill or store near heat or open flame.

WARNING! HARMFUL IF SWALLOWED OR INHALED, CAUSES EYE AND SKIN IRRITATION.

Avoid contact with eyes, skin and clothing. Avoid breathing spray mist. Wash thoroughly after handling. Use with adequate ventilation. Keep container closed.

FIRST AID

If swallowed, do NOT induce vomiting. Call a physician immediately.

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Flush skin with water. Call physician.

This product is toxic to fish. Keep out of lakes, streams or ponds. Do not contaminate water by cleaning of equipment or disposal of wastes. Apply this product only as specified on this label.

RINSE/DRAIN AND DISPOSAL PROCEDURE:

(1) Drain container into spray tank (after normal emptying) in a vertical position for 30 seconds. (2) Rinse carefully 3 times with 1 quart of water for each rinse for a 1 gallon container and drain into spray tank after each rinse. (3) Do not reuse container. (4) Bury deeply in an isolated location away from water supplies with at least 18 inches of cover.

101.0 Chemical & Physical Properties

101.1 [N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine]

102.0 Behavior in The Environment

(See Previous Reviews).

103.0 Toxicological Properties

	LD_{50}'s or LC_{50}'s				
	Rat			(96-hr LC_{50}'s)	
Chemical	(Acute Oral)	Mallard	Bobwhite	Rainbow	Bluegill
PROWL	1250 mg/kg	10,388 ppm	4187 ppm	0.138 ppm	0.199 ppm
SENCOR		>460 <680 mg/kg	164 mg/kg	76 ppm	80 ppm

104.0 Hazard Assessment

104.1 Discussion

104.1.1 The toxicity data submitted so far appears acceptable.

104.1.2 Prior to consideration of registration on soybeans, the following data must be submitted as per new Sec. 3 Regulations and the proposed Guidelines: an acute oral LD_{50} for either mallard duck or bobwhite quail and an acute 48-hr LC_{50} for an aquatic invertebrate (daphnia, usually).

104.1.3 The proposed use pattern provides for minimal hazards to non-target organisms. Application rates are not high (max. of 1.5# ai/A of PROWL alone and max. of 1.25# ai/A PROWL + 0.5# ai/A SENCOR in a tank-mix), and applications are at times (preplant and/or preemergence) when a minimum of wildlife should be present. Further, applications appear to be by ground only, and neither PROWL nor SENCOR are severely toxic to animals. Note that PROWL is toxic to aquatic organisms, but labeling cautions should handle this. Also, the concern with PROWL's persistence in soil and water is being addressed: a chronic fish bioassay is in progress and the results will be submitted upon completion.

105.0 Conclusions

Prior to consideration of registration of the proposed use, the following data must be submitted as per the new Sec. 3 Regulations and the proposed Guidelines: an acute oral LD_{50} for either mallard duck or bobwhite quail and an acute 48-hr LC_{50} for an aquatic invertebrate (daphnia).

Insert the statement "Do not apply when weather conditions favor drift from target areas." between "..... streams or ponds." and Do not ... disposal of wastes."

Norman J. Cook NJC
Environmental Safety Section
Efficacy & Ecological Effects Branch
February 19, 1976

11

Recok EC Review -2- S. Creeger 2/18/76

4.0 CONCLUSIONS

PROWL

4.1 Soil metabolism - anaerobic metabolism of parent is more rapid than aerobic metabolism but breakdown products are more rapidly metabolized aerobically than anaerobically.

4.2 Soil persistence - halflife of Prowl is 12-16 months.

4.3 Hydrolysis - Prowl is stable at pH 5, 7 and 9 at 25°C in dark.

4.4 Photolysis - Soil TLC - 33-56% of applied activity lost in 8 weeks, while 87% of applied activity is lost from glass slides in 24 hours. No volatilization from water solution but all parent is degraded in 1 week. Prowl volatizes under photolysis.

4.5 Leaching - not significant.

4.6 Microbial - microbes do not degrade parent nor does Prowl affect microbe activities.

4.7 Catfish accumulation - 1450X in edibles, 2040X in viscera but edible residues declined during withdrawl.

4.8 Rotational crops - no significant residues found.

4.9 Disposal - label disposal information suffices.

SENCOR

4.10 Soil metabolism and persistence - no significant differences between aerobic and anaerobic degradation (that followed a 30 day aerobic aging period). Soil persistence of parent is less than 2 months but multi-year applications increase persistence to 2-6 months.

4.11 Hydrolysis - More stable at pH 5 and 6 in the lab (halflife greater than 3 mos.) than at pH 7-9 in the lab at 30°C in the dark. However, in ponds exposed to sunlight halflife of the parent is less than a week.

4.12 Photolysis - photolysis under artificial light is rapid in water (2-3 hour halflife) and slower on soil (halflife greater than 256 hours).

4.13 Leaching - leaching is significant except in very high organic soils.

4.14 Microbial - no significant effect.

4.15 Fish accumulation - no accumulation noted.

4.16 Rotational crops - data has not been submitted.

Prowl/Sencor tank mix

4.17 Persistence - the use of the tank mix does not significantly affect the halflife of the 2 active ingredients.

5.0 RECOMMENDATIONS

5.1 We concur with the proposed use of Prowl (only) on soybeans.

5.2 Since we do not have rotational crop data for Sencor, we do not concur with the Prowl/Sencor portion of the proposed use.

5.3 A suggested radiolabeled rotational crop study is below.

5.3.1 For crops rotated immediately after harvest of a crop in the treated area, the pesticide is to be aged in a sandy loam soil under aerobic conditions for about 120 days, then the soil planted to a root crop, small grain, and a vegetable. The root crop is required; however, crops in two other crop groupings may be substituted for the small grain and vegetable.

5.3.2 For crops rotated the following year after treatment, the pesticide is to be aged in the soil for one year prior to planting. Crops should be as above.

5.3.3 If significant residues are found, then actual field studies using non-labeled pesticide will be required. Such data must be obtained under actual agricultural practice.

5.3.4 If residues are found in rotational and/or subsequent crops in the field, then a labeling restriction will be needed. This restriction will take the form of a time interval from application to planting of rotational crops such that illegal residues will not occur in the rotational crop. A restriction longer than 18 months is not acceptable.

5.3.5 Cover crops can be rotated if label restrictions are such that the cover crop is plowed under and not grazed.

5.3.6 If the agricultural practice is such that a treated crop area is rotated with another crop that will result in another treatment of the pesticide to the same area, residue data will be required on the second crop. The rotational crop is to be grown under actual use conditions.