

Jul 29 1995

James A. Armbruster, Ph.D.
PBI Gordon Corporation
P.O. Box 4090
Kansas City, MO 64101

Dear Dr. Armbruster:

Subject: Revised Labeling
Embark 2-S Plant Growth Regulator
EPA Registration No. 2217-759
Your Submission Dated April 14, 1995

The amendment referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), as amended is acceptable provided that you:

1. Make the labeling changes listed below before you release the product for shipment bearing the amended labeling:

a. In the Environmental Hazards Section delete "For terrestrial uses,". Refer to PR Notice 93-8.

b. Delete "Option II". The statement "It is a with its labeling" must appear immediately below the heading "Directions for Use". Also, it is confusing since there is no Option I on the labeling.

2. Submit one (1) copy of your final printed labeling before you release the product for shipment.

A stamped copy of the labeling is enclosed for your records.

Sincerely yours,

James M. Stone
Acting Product Manager (22)
Fungicide-Herbicide Branch
Registration Division (7505C)

Enclosure

EMBARK® 2-S PLANT GROWTH REGULATOR

ACTIVE INGREDIENT:

Diethanolamine salt of mefluidide*(N-[2,4-dimethyl-5- [[[(trifluoromethyl)-sulfonyl]amino]phenyl]acetamide)	28.0% **
INERT INGREDIENTS	<u>72.0%</u>
TOTAL 100.00%	

*U.S. Patent Nos. 3,639,474; 3,894,078; 4,013,444.

**Equivalent to 2.0 lbs. (21% by weight) (N-[2,4-dimethyl-5-[[[(trifluoromethyl)sulfonyl]amino]phenyl]acetamide) per gallon.

KEEP OUT OF REACH OF CHILDREN

ACCEPTED
with COMMENTS
In EPA Letter Dated:

JUN 29 1995

CAUTION

See other panels for Precautionary Statements
and Statement of Practical Treatment

General Insecticide
FIFRA Act
Pesticide
EPA Reg. No.

2217-759

NET CONTENTS 1, 2.5, 5, 15, 30, and 55 GALLONS

686 APXXXXXX
EPA REG. NO. 2217-759
EPA EST. NO. 2217-KS-2
Mfd. BY PBI/GORDON CORPORATION
KANSAS CITY, MISSOURI 64101

STOP! READ THE ENTIRE LABEL FIRST. OBSERVE ALL PRECAUTIONS AND FOLLOW DIRECTIONS CAREFULLY.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

CAUTION: Harmful if swallowed or absorbed through the skin. Avoid breathing spray mist. Avoid contact with skin, eyes or clothing. Wear protective clothing including rubber gloves when handling.

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED: Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. Get medical attention.

IF IN EYES: Flush with plenty of water and get medical attention if irritation persists.

IF INHALED: Remove victim to fresh air.

IF ON SKIN: Wash with plenty of soap and water.

Environmental Hazards: For terrestrial uses, 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 washwaters. Do not allow spray to drift onto non-target crops or vegetation.

OPTION II

DIRECTIONS FOR USE

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

Not for use on turf being grown for sale or other commercial use as sod, or for commercial seed production, or for research purposes.

STORAGE AND DISPOSAL

STORAGE: Do not contaminate water, food, or feed by storage or disposal.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Embark 2-S PGR can be incorporated into highway vegetation management programs to eliminate seedhead production and to reduce the mowing requirements. Embark 2-S PGR may be applied to six species of established cool season grasses in noncropland sites. Embark 2-S PGR may be useful in the following noncropland areas:

- Highway rights-of-way (principal, interstate, state, and county highways), interchange ramps, waysides, service areas, and unpaved roads
- Municipal, state, and federal lands such as airports, military installations, schools/universities, libraries, and hospitals
- Commercial/Industrial areas including industrial parks, tank farms, plant sites, storage areas, fencerows, and utility rights-of-way.

Embark 2-S PGR inhibits the growth of tall fescue, Kentucky bluegrass, perennial ryegrass, smooth brome grass, orchardgrass, and reed canarygrass. Mixed stands of these coarse textured species may respond unevenly to applications of Embark 2-S PGR and the tank mixtures. All established perennial grasses should be at least one year old.

4" !!
f

- Spray Equipment and Mixing Instructions -

Spray Equipment:

Use conventional power spray equipment with bypass or mechanical agitation and fitted with a spray boom, off-center nozzles, or a spray gun.

It is essential that spray equipment is properly adjusted and calibrated to assure proper dosage and uniform spray coverage. Follow the spray equipment manufacturer's directions for cleaning, adjusting pressure and selecting appropriate nozzles.

Spray Volumes:

Spray volumes of 15 to 150 gallons per acre are recommended. Uniform application is essential. Avoid spray overlaps that will increase the dosage above those recommended.

Surfactants and Spray Colorants:

The use of a nonionic surfactant is recommended to increase the extent and consistency of the growth regulation. The suggested surfactant rate is 0.25 to 0.50% v/v or 1 to 2 quarts per 100 gallons of spray solution. Temporary, slight discoloration of the turf may increase with the use of a surfactant.

The use of Gordon's Spray Colorant is recommended to allow the applicator to make uniform applications.

Spray Preparation for Embark 2-S PGR alone:

1. Pour the required amount of EMBARK 2-S PGR into the spray tank containing approximately 1/2 the required amount of water.
2. When thoroughly mixed, add the measured amount of nonionic surfactant.
3. Add Gordon's Professional Spray Colorant to the spray tank to ensure the uniformity of the application. Refer to instructions of this colorant for the proper concentration.
4. Fill the tank as required with water and spray as recommended.

Spray Preparation for Tank Mixtures:

Embark 2-S PGR may be applied in combination with one or more of the specified herbicides or plant growth regulators. These tank mixtures must be used according to the most restrictive label limitations and precautions. No label dosage rate should be exceeded. Follow the labeling of each companion product for precautionary statements, directions for use, dosage rates, and application schedules. Tank mixture recommendations are for use only in states where the companion products and application site are registered.

Follow these guidelines and refer to the labeling of the companion product for further instructions.

1. Add 1/2 - 2/3 of the required amount of water into the spray tank.
2. Add the appropriate amount of the companion product (dispersible granules, ammonium salt formulations, or dimethylamine salt formulations) into the spray tank with agitation.
3. Pour the appropriate amount of Embark 2-S PGR into the spray tank.
4. Continue agitation while adding the remainder of water and add the measured amounts of nonionic surfactant and spray colorant.
5. Continue agitation throughout the spraying operation.

Seedhead Suppression

The application window or timing is critical for the optimum seedhead control.

Generally the application window for the best results will range from 2 - 3 weeks. The beginning of the application window for Embark 2-S PGR occurs in the spring after full green-up with rapid vertical growth. The end of the application window occurs approximately 2 weeks prior to the seedhead appearance or when the seedhead can be felt at the base of the stem. Applications of Embark 2-S PGR after the optimum window will result in reduced seedhead suppression.

Embark 2-S PGR must be applied prior to the seedhead appearance at the stem apex. Application of Embark 2-S PGR after the seedhead emergence will suppress only the later forming seedheads.

Inconsistencies of seedhead suppression may occur with mixed stands. Different grass species may vary in the inflorescence development and in their responses to the plant growth regulators.

Refer to Table 1 for the application rates for seedhead suppression and refer to Table 2 for recommendations appropriate for California.

Vegetative Growth Suppression

Embark 2-S PGR will provide growth inhibition for 6-8 weeks under favorable growing conditions. Apply Embark 2-S PGR with a non-ionic surfactant after full green-up of turfgrass in the spring. At the time of treatment, turf should have developed the desired appearance, the desired height, and sufficient leaf area for uptake.

Apply 24-32 fl. oz. (1 1/2 - 2.0 pints) of Embark 2-S PGR per acre with a nonionic surfactant to actively growing turf for growth suppression up to 8 weeks. If temporary discoloration of the turfgrass occurs and is objectionable, reduce the 2 pints of product rate to 1 1/2 pints of product per acre. Refer to Table 1 for the recommended rates for tank mixtures applied to low maintenance turf. Refer to Table 2 for the recommendations appropriate for California.

Embark 2-S PGR may be applied more than once per season, however follow an application interval of at least 6 weeks between applications.

- Cultural Recommendations -

Mowing

1. **Mowing before application:** Grass may be mowed up to two days before applying Embark 2-S PGR. Clippings and other debris should be removed before spraying. If mowing removes most of the green leaf tissue, spraying should be delayed until sufficient new growth develops to assure product absorption into green leaves.
2. **Mowing after application:** For an evenly trimmed appearance grass may be mowed 3-7 days after Embark 2-S PGR is applied.
3. **When mowing is not desired or practical:** Apply Embark 2-S PGR after full green-up in the spring, but before mowing is necessary.

Irrigation and Rainfall

Optimum results may not be obtained if rainfall or overhead irrigation occurs within 8 hours following application.

Stresses

Applications of Embark 2-S PGR to turfgrass that is stressed because of high air temperatures, drought, excessive soil water, diseases, or insects may cause temporary discoloration. Management practices to promote the health and vigor of the turfgrass should be continued on the treated areas.

- Precautions and Limitations -

1. Do not apply this product through any irrigation system.
2. Turf treated with Embark 2-S PGR may appear less dense and temporarily discolored when compared with untreated, actively-growing turf.
3. Do not allow animals to graze on treated areas.
4. In turfgrass renovation programs, areas treated with Embark 2-S PGR may be reseeded 3 days following application (except California where reseeded may not occur within 2 weeks).
5. Do not apply to any body of water such as lakes, streams, rivers, canals, ponds, reservoirs, or bays. Also, do not apply to areas where water is present on the soil surface such as swamps, bogs, potholes, or marshes. However, it is allowable to treat seasonally dry swamps, bogs, potholes, or marshes, berms of ditches, and road shoulders.

Table 1. Application Rate Recommendations for Embark 2-S PGR and tank mixtures for six cool season grasses established in noncropland sites.

Product Name	Amount of Product		Nonionic Surfactant, % vol/vol	Comments
	fl. oz./acre	ounces/acre		
A. TALL FESCUE				
1. Embark	24-32	-----	0.25-0.50	Applications of 2 pints of product per acre will provide seedhead suppression and will provide green-up suppression for up to 8 weeks. If turf discoloration occurs, reduce the application rate to 1 1/2 pints of product per acre.
2. Embark plus Event Grass Growth Regulator	8 4	----- -----	0.25	Apply after grasses are at 100 percent green-up and two inches of vertical growth. On finer turfs, uniform quality is desired, apply after two months of green-up suppression, apply prior to the time of seed sowing. Event may be used prior to or sequential to other herbicides EXCEPT there must be a three month green-up growth between applications of Event and imidazolinone herbicide applications.
3. Embark plus Telar [®] Herbicide Dispersible Granule plus Hi-Dep Broadleaf Herbicide, 4.0#/gal	12-16 ----- 64	----- 0.25 -----	0.25-0.50	For the Northeast and Midwest regions: Apply this mixture to turf that is under stress from drought, cold temperatures or poor fertility, as injury may result to turf less than 1 year old. Do not exceed 1/2 ounce Telar per acre within a 12 month period.
4. Embark plus Telar [®] Herbicide Dispersible Granule	8-16 -----	----- 0.5	0.25	For the Pacific Northwest region: Do not apply to turf that is under stress from drought, cold temperatures or poor fertility, as injury may result to turf less than 1 year old. Do not exceed 1/2 ounce Telar per acre within a 12 month period.
5. Embark plus Telar [®] Herbicide Dispersible Granule Banyel [®] Herbicide	12-16 ----- 8	----- 0.25 -----	0.25	Do not apply this combination to turf that is under stress from drought, insects, disease, cold temperatures or poor fertility, as injury may result. Do not apply to turf less than 1 year old. Do not exceed 1/2 ounce Telar per acre within a 12 month period.

6

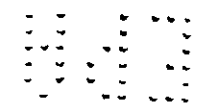


Table 1. Application Rate Recommendations for Embark 2-S PGR and tank mixtures for six cool season turfgrasses established in noncropland sites.

Product Name	Amount of Product		Nonionic Surfactant, % vol/vol	Comments
	fl. oz./acre	ounces/acre		
B. KENTUCKY BLUEGRASS				
1. Embark	24-32	-----	0.25-0.50	Applications of 2 pints of product per acre will provide season long seedhead suppression and will provide vegetative growth suppression for up to 8 weeks. If turf discoloration is objectionable, reduce the application rate to 1 1/2 pints of product per acre.
2. Embark plus Event Grass Growth Regulator	8 4	----- -----	0.25	Apply after grasses are at 100 percent greenup and have at least two inches of vertical growth. On finer turfgrass areas where more uniform quality is desired, apply after two mowings. For seedhead suppression, apply prior to the time of seed stalk elongation. Event may be used prior to or sequential to all currently registered herbicides EXCEPT there must be a three month interval of grass growth between applications of Event and sulfonylurea and imidazolinone herbicide applications.
C. MIXTURES OF ESTABLISHED KENTUCKY BLUEGRASS AND TALL FESCUE				
1. Embark	24-32	-----	0.25-0.50	Applications of 2 pints of product per acre will provide season long seedhead suppression and will provide vegetative growth suppression for up to 8 weeks. If turf discoloration is objectionable, reduce the application rate to 1 1/2 pints of product per acre.
2. Embark plus Event Grass Growth Regulator	8 4	----- -----	0.25	Apply after grasses are at 100 percent greenup and have at least two inches of vertical growth. On finer turfgrass areas where more uniform quality is desired, apply after two mowings. For seedhead suppression, apply prior to the time of seed stalk elongation. Event may be used prior to or sequential to all currently registered herbicides EXCEPT there must be a three month interval of grass growth between applications of Event and sulfonylurea and imidazolinone herbicide applications.

Table 1. Application Rate Recommendations for Embark 2-S PGR and tank mixtures for six cool season turfgrasses established in noncropland sites.

Product Name	Amount of Product		Nonionic Surfactant, % vol/vol	Comments
	fl. oz./acre	ounces/acre		
3. Embark plus Telar® Herbicide Dispersible Granules plus Hi-Dep® Broadleaf Herbicide, 4.0#/gal	12-16 ----- 64	----- 0.25 -----	0.25-0.50	For the Northeast and Midwest regions: Do not apply this tank mixture to turf that is under stress from drought, insects, disease, cold temperatures or poor fertility, as injury may result. Do not apply to turf less than 1 year old. Do not exceed 1/2 ounce Telar per acre within a 12 month period.
4. Embark plus Telar® Herbicide Dispersible Granule	4-8 -----	----- 0.25	0.25	Do not apply Telar plus Embark to turf that is under stress from drought, insects, disease, cold temperatures or poor fertility, as injury may result. Do not apply to turf less than 1 year old. Do not exceed 1/2 ounce Telar per acre within a 12 month period.
5. Embark plus Escort Herbicide Dry Flowable	8-8 -----	----- 0.125-0.25	0.25	For growth suppression and seedhead inhibition of well established turf, apply this combination after at least 2-3 inches of new growth has emerged in the spring until seed stalk (boot) appearance.
D. PERENNIAL RYEGRASS				
1. Embark	24-32	-----	0.25-0.50	Applications of 2 pints of product per acre will provide season long seedhead suppression and will provide vegetative growth suppression for up to 8 weeks. If turf discoloration is objectionable, reduce the application rate to 1 1/2 pints of product per acre.
2. Embark plus Event Grass Growth Regulator	8 4	----- -----	0.25	Apply after grasses are at 100 percent greenup and have at least two inches of vertical growth. On finer turfgrass areas where more uniform quality is desired, apply after two mowings. For seedhead suppression, apply prior to the time of seed stalk elongation. Event may be used prior to or sequential to all currently registered herbicides EXCEPT there must be a three month interval of grass growth between applications of Event and sulfonylurea and imidazolinone herbicide applications.

Table 1. Application Rate Recommendations for Embark 2-S PGR and tank mixtures for six cool season turfgrasses established in noncropland sites.

Product Name	Amount of Product		Nonionic Surfactant, % vol/vol	Comments
	fl. oz./acre	ounces/acre		
3. Embark plus Telar® Herbicide Dispersible Granule	8-12 -----	----- 0.25	0.25	For the Northeast region: Do not apply Telar plus Embark to turf that is under stress from drought, insects, disease, cold temperatures or poor fertility, as injury may result. Do not apply to turf less than 1 year old. Do not exceed 1/2 ounce Telar per acre within a 12 month period.
4. Embark plus Telar® Herbicide Dispersible Granule	8-16 -----	----- 0.5	0.25	For the Pacific Northwest region: Do not apply Telar plus Embark to turf that is under stress from drought, insects, disease, cold temperatures or poor fertility, as injury may result. Do not apply to turf less than 1 year old. Do not exceed 1/2 ounce Telar per acre within a 12 month period.
E. SMOOTH BROMEGRASS				
1. Embark	24-32	-----	0.25-0.50	Applications of 2 pints of product per acre will provide season long seedhead suppression and will provide vegetative growth suppression for up to 8 weeks. If turf discoloration is objectionable, reduce the application rate to 1 1/2 pints of product per acre.
2. Embark plus Event Grass Growth Regulator plus Arsenal® Herbicide	8 4 1.5	----- -----	0.25	Apply after grasses are at 100 percent greenup and have at least two inches of vertical growth. On finer turfgrass areas where more uniform quality is desired, apply after two mowings. For seedhead suppression, apply prior to the time of seed stalk elongation. Event may be used prior to or sequential to all currently registered herbicides EXCEPT there must be a three month interval of grass growth between applications of Event and sulfonylurea and imidazolinone herbicide applications.
3. Embark plus Telar® Herbicide Dispersible Granule	8-16 -----	----- 0.5	0.25	For the Pacific Northwest region: Do not apply Telar plus Embark to turf that is under stress from drought, insects, disease, cold temperatures or poor fertility, as injury may result. Do not apply to turf less than 1 year old. Do not exceed 1/2 ounce Telar per acre within a 12 month period.

Table 1. Application Rate Recommendations for Embark 2-S PGR and tank mixtures for six cool season turfgrasses established in noncropland sites.

Product Name	Amount of Product		Nonionic Surfactant, % vol/vol	Comments
	fl. oz./acre	ounces/acre		
F. ORCHARDGRASS				
1. Embark	24-32	-----	0.25-0.50	Applications of 2 pints of product per acre will provide season long seedhead suppression and will provide vegetative growth suppression for up to 8 weeks. If turf discoloration is objectionable, reduce the application rate to 1 1/2 pints of product per acre.
2. Embark plus Event Grass Growth Regulator plus Arsenal® Herbicide	8 4 1.5	----- -----	0.25	Apply after grasses are at 100 percent greenup and have at least two inches of vertical growth. On finer turfgrass areas where more uniform quality is desired, apply after two mowings. For seedhead suppression, apply prior to the time of seed stalk elongation. Event may be used prior to or sequential to all currently registered herbicides EXCEPT there must be a three month interval of grass growth between applications of Event and sulfonylurea and imidazolinone herbicide applications.
3. Embark plus Telar® Herbicide Dispersible Granule	8-16 -----	----- 0.5	0.25	For the Pacific Northwest region: Do not apply Telar plus Embark to turf that is under stress from drought, insects, disease, cold temperatures or poor fertility, as injury may result. Do not apply to turf less than 1 year old. Do not exceed 1/2 ounce Telar per acre within a 12 month period.
G. REED CANARYGRASS				
1. Embark	24-32	-----	0.25-0.50	Applications of 2 pints of product per acre will provide season long seedhead suppression and will provide vegetative growth suppression for up to 8 weeks. If turf discoloration is objectionable, reduce the application rate to 1 1/2 pints of product per acre.
2. Embark plus Telar® Herbicide Dispersible Granule	8-16 -----	----- 0.5	0.25	For the Pacific Northwest region: Do not apply Telar plus Embark to turf that is under stress from drought, insects, disease, cold temperatures or poor fertility, as injury may result. Do not apply to turf less than 1 year old. Do not exceed 1/2 ounce Telar per acre within a 12 month period.

