



## COMMONWEALTH OF AUSTRALIA

## PATENTS ACT 1952

FORM 8

REGULATION 12(2)

DECLARATION IN SUPPORT OF A CONVENTION APPLICATION  
~~XXXXXXXXXXXXXXXXXXXX~~ FOR A PATENT OR PATENT OF ADDITION.

In support of the Convention Application made ~~XXXXXXXXXXXXXXXXXXXX~~  
~~1982~~ by MONSANTO COMPANY for a patent for an invention entitled:

HERBICIDES FOR TURF USE

I, William Harry Duffey, General Patent Counsel, Monsanto Company, of 800 North Lindbergh Boulevard, St. Louis, 63167, in the State of Missouri, United States of America, do solemnly and sincerely declare as follows:


1. I am authorized by MONSANTO COMPANY, the applicant for the Patent to make this declaration on its behalf.

2. The basic application as defined by Section 141 of the Act was made at the Patent Office, Washington, District of Columbia, in the United States of America on the 24th of September 1987, by Lawrence Douglas Bridge; Thomas Bernard Klevorn; Scott K Parrish; Randy John Thompson; and Dane R Williamson.

3. LAWRENCE DOUGLAS BRIDGE; 315 Woodland Hill Court, Manchester, Missouri 63011, U.S.A.; THOMAS BERNARD KLEVORN, Steenweg op Terhulpen 9 - Hoielaart, B-1990, Belgium; SCOTT K PARRISH, 1170 Field Avenue, Ellisville, Missouri 63011 U.S.A.; RANDY JOHN THOMPSON, 12 Oakshire Court, St. Peters, Missouri 63376, U.S.A.; DANE R WILLIAMSON, 266 Pine Tree Lane, Ballwin, Missouri 63011, U.S.A.,  
are the actual inventor(s) of the invention, and the facts upon which the MONSANTO COMPANY is entitled to make the application are as follows:  
The Company is the assignee of the actual inventor(s).

4. The basic application referred to in paragraph 2 of this declaration was the first application made in a Convention country in respect of the invention, the subject of the application.

DECLARED at St. Louis, Missouri, aforesaid this 20th day of  
July, 1988.

  
WILLIAM HARRY DUFFEY

To Commissioner of Patents  
COMMONWEALTH OF AUSTRALIA

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**(12) PATENT ABRIDGMENT (11) Document No. AU-B-22736/88**  
**(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 604355**

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HERBICIDES FOR CONTROLLING CRABGRASS IN TURF
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- (56) Prior Art Documents  
US 4692184
- (57) Claim
1. A method of selectively controlling crabgrass in turf which comprises applying to the turf locus an effective amount of S,S-dimethyl-2-(difluoromethyl)-4-(2-methylpropyl)-6-(trifluoromethyl)-3,5-pyridinecarbo-dithioate.



This invention relates to herbicides for use in turf grasses for selective preemergence and post-emergence of crabgrass as well as preemergence control of other weed species. These herbicides contain a derivative of a pyridine-3,5-dicarboxylic acid.

Pyridine herbicides are known in the art. Specifically, U. S. Patent No. 4,692,184 issued September 8, 1987 discloses pyridine-3,5-dicarboxylate derivatives of the type of the present invention. The disclosure of this U. S. Patent is hereby incorporated herein by reference.

Brief Description of the Invention

It is an object of this invention to provide a herbicidal method and compositions for selectively controlling grassy weeds such as crabgrass (*Digitaria* spp), and goosegrass (*Eleusine indica*) preemergence, as well as to control crabgrass after it has become established, in a broad spectrum of turf grasses without substantial injury to the turf grass. Another object is to provide a method of controlling some other turf weeds, including some broadleaf weeds, preemergence.

These objects are achieved by using the compound S,S-dimethyl-2-(difluoromethyl)-4-(2-methylpropyl)-6-trifluoromethyl-3,5-pyridinecarbodithioate, or herbicidal compositions containing that compound as an active ingredient. The compositions may be liquid (e.g., emulsifiable concentrates), solids (e.g., granules) or mixed liquid and solid phases (e.g., wettable powders, water dispersible granules or microencapsulations).

Detailed Description of the Invention

The compound which is the active ingredient of this invention may be prepared as shown in Example



146 of U. S. Patent 4,692,184 which is specifically incorporated herein by reference.

Compositions containing the above compound may be liquids, solids, or mixed solid and liquid phases as has been stated above. Preparation of these compositions is well within the skill of the art. Herbicidal compositions for practicing this invention, including concentrates which require dilution prior to application, may contain the active ingredient and an adjuvant in liquid or solid form. The compositions are prepared by admixing the active ingredient with an adjuvant including diluents, extenders, carriers and conditioning agents to provide compositions in the form of finely-divided particulate solids, granules, pellets, solutions, dispersions, microcapsules or emulsions. Thus, it is believed that the active ingredient could be used with an adjuvant such as a finely-divided solid, a liquid of organic origin, water, a wetting agent, a dispersing agent, an emulsifying agent or any suitable combination of these.

Suitable wetting agents are believed to include alkyl benzene and alkyl naphthalene sulfonates, sulfated fatty alcohols, amines or acid amides, long chain acid esters of sodium isothionate, esters of sodium sulfosuccinate, sulfated or sulfonated fatty acid esters, petroleum sulfonates, sulfonated vegetable oils, ditertiary acetylenic glycols, polyoxyethylene derivatives of alkylphenols (particularly isooctylphenol and nonylphenol) and polyoxyethylene derivatives of the mono-higher fatty acid esters of hexitol anhydrides (e.g., sorbitan) and polyoxyethylene derivatives of castor oil. Preferred dispersants are methyl cellulose, polyoxyethylene/polyoxypropylene block copolymers, polyvinyl alcohol, sodium lignin sulfonates, polymeric alkyl naphthalene

sulfonates, sodium naphthalene sulfonate, and polymethylene bisnaphthalene sulfonate.

Wettable powders are water-dispersible compositions containing the active ingredient, an inert solid extender and one or more wetting and dispersing agents. The inert solid extenders are usually of mineral origin such as the natural clays, diatomaceous earth and synthetic minerals derived from silica and the like. Examples of such extenders include kaolinites, bentonite, attapulgite clay and synthetic magnesium silicate. The wettable powder compositions of this invention usually contain from about 0.5 to 60 parts (preferably from 5-20 parts) of active ingredient, from about 0.25 to 25 parts (preferably 1-15 parts) of wetting agent, from about 0.25 to 25 parts (preferably 1.0-15 parts) of dispersant and from 5 to about 95 parts (preferably 5-50 parts) of inert solid extender, all parts being by weight of the total composition. Where required, from about 0.1 to 2.0 parts of the solid inert extender can be replaced by a corrosion inhibitor or anti-foaming agent or both.

Other formulations include dust concentrates comprising from 0.1 to 60% by weight of the active ingredient on a suitable extender; these dusts may be diluted for application at concentrations within the range of from about 0.1-10% by weight.

Aqueous suspensions or emulsions may be prepared by stirring a nonaqueous solution of the water-insoluble active ingredient and an emulsification agent with water until uniform and then homogenizing to give stable emulsion of very finely-divided particles. The resulting concentrated aqueous suspension is characterized by its extremely small particle size, so that when diluted and sprayed, coverage is very uniform. Suitable concentrations of

active ingredients in these formulations are from about 0.1-60%, preferably 5-50%, by weight of active ingredient, the upper limit being determined by the solubility limit of active ingredient in the solvent.

5 Concentrates are usually solutions of active ingredient in water-immiscible or partially water-immiscible solvents together with a surface active agent. Suitable solvents for the active ingredient of this invention include dimethylformamide, chlorinated  
10 solvents, dimethylsulfoxide, N-methyl-pyrrolidone, hydrocarbons and water-immiscible ethers, esters or ketones. However, other high strength liquid concentrates may be formulated by dissolving the active ingredient in a solvent then diluting, e.g., with  
15 kerosene, to spray concentration. The concentrate compositions herein generally contain from about 0.1 to 95 parts (preferably 5-60 parts) active ingredient, about 0.25 to 50 parts (preferably 1-25 parts) surface active agent and where required about 4 to 94 parts  
20 solvent, all parts being by weight based on the total weight of emulsifiable concentrate.

Granules are physically stable particulate compositions comprising active ingredient adhering to or distributed through a basic matrix of an inert,  
25 finely-divided particulate extender. In order to aid leaching of the active ingredient from the particulate, a surface active agent such as those listed hereinbefore can be present in the composition. Natural clays, pyrophyllites, illite, gypsum, sand,  
30 and vermiculite are examples of operable classes of particulate mineral extenders. The preferred extenders are the porous, absorptive, preformed particles such as preformed and screened particulate attapulgite or heat expanded, particulate vermiculite and the  
35 finely-divided clays such as kaolin clays, hydrated attapulgite or bentonitic clays. These extenders are

sprayed or blended with the active ingredient to form the herbicidal granules. The granular compositions of this invention may contain from about 0.1 to about 30 parts by weight of active ingredient per 100 parts by weight of clay and 0 to about 5 parts by weight of surface active agent per 100 parts by weight of particulate clay.

Microencapsulated formulations containing the compound of this invention are conveniently prepared using the methods disclosed in the U.S. Patents 4,280,833 and 4,417,916, the disclosures of which are incorporated herein by reference.

The compositions of this invention can also contain other additaments, for example, fertilizers, other herbicides, pesticides, plant growth regulators, safeners and the like used as adjuvants or in combination with any of the above-described adjuvants. Chemicals useful in combination with the active ingredient of this invention will be selected for the spectrum of weeds which they control and will quite often be broadleaf-specific herbicides such as 2,4-(dichlorophenoxy)-acetic acid salts or esters, 2-methoxy-3,6-dichlorobenzoic acid salts or esters, or like herbicides which are not phytotoxic to the turf grass present.

The compound of this invention may also be used in combination with other known crabgrass control agents, such as monosodium methanearsonate. Preferably, the application of the active compound of this invention is such as to provide the active ingredient at a rate of about 0.14 to 3.36 Kg/ha, such as from 0.42 to 1.12 Kg/ha, and particularly about 0.56 to 0.84 Kg/ha.

Turf grasses in which the compositions of this invention may safely be used to control preemergent or established crabgrass include both cool-season grasses such as Kentucky bluegrass (*Poa pratensis*),

Tall fescue (*Festuca arundinacea*), creeping red fescue (*Festuca rubra*), fine fescue (*Festuca ovina*), Bentgrass (*Agrostis palustris*), and Perennial Ryegrass (*Lolium perenne*) and warm-season grasses such as St. Augustine (*Stenotaphrum secundatum*), Bermuda (*Cynodon dactylon*), Centipedegrass (*Eremochloa ophiuroides*), Zoysiagrass (*Zoysia japonica*), Bahiagrass (*Paspalum notatum*), Kikuyugrass (*Pennisetum clandestinum*), and Carpetgrass (*Axonopus affinis*, *Axonopus compressus*).

5

10 Compositions according to this invention have been tested and found to be effective for control of crabgrass under a variety of climatic conditions in various locations around the United States, including St. Charles, Missouri; Detroit and Lansing, Michigan;

15 Memphis and Cordova, Tennessee; Peoria, Illinois; Loxley, Alabama; Pensacola and Zellwood, Florida; and Cincinnati, Ohio.

Herbicidal Data

20 The efficacy of compositions and method of this invention is shown in the following tables. As used in these tables, the following terms have the following meanings:

	<u>Symbol</u>	<u>Meaning</u>
25	DAT	Days after treatment when the observation is made.
	% Control	Degree (percent) of control of the indicated weed or turf species.
30	% Injury	Degree (percent) of injury (or control) of the turf grass species present
	EC	Emulsifiable concentrate
	G	Granular composition
	ME	Microencapsulated composition.

In the following tables, the weed preemer-  
gence tests are presented first in Tables 1 through 5,  
followed by the weed postemergence tests in Tables 6  
through 8. In some tests, percent control of other  
weed or turf species are reported also. The applica-  
5 tion rate ("Rate" column) of active ingredient is  
shown in Kg/ha. In most instances readings are shown  
for each of three plots in each test where readings  
were available. Where no reading was made, a dash (-)  
10 appears in the tables.

PREEMERGENCE CRABGRASS TESTS

TABLE 1

Location: Memphis, Tennessee

Turf Type: Bermudagrass

5	Formulation	Rate	Crabgrass % Control				Goosegrass % Control	
			31DAT	68DAT	89DAT	110DAT	89DAT	110DAT
10	3 lb/gal EC (0.36 Kg/L)	0.42	-	75	70	55	65	0
			45	79	72	45	74	60
		0.56	-	65	50	58	-	-
			-	80	75	66	70	35
15	0.84	0.84	55	-	-	100	-	-
			25	-	60	82	-	30
			45	90	80	76	80	45
		1.12	45	100	100	100	-	-
			50	100	100	100	-	90
			45	100	97	89	84	55
20	1.68	1.12	-	96	-	100	80	78
			35	96	100	100	-	-
		1.68	30	100	100	100	84	60
			35	-	-	100	-	100
			40	100	-	95	-	-

TABLE 1 (cont.)

5	Formulation	Rate	Crabgrass % Control				Goosegrass % Control	
			31DAT	68DAT	89DAT	110DAT	89DAT	110DAT
10	0.5% G	2.24	20	100	95	97	90	80
			45	100	100	100	-	-
			35	100	100	100	90	100
	4 lb/gal ME (0.48 Kg/L)	0.42	45	83	82	76	100	46
			45	100	70	69	-	-
			45	100	100	87	-	-
15	0.56	0.56	45	84	78	81	75	55
			37	100	89	100	60	48
			-	100	100	100	65	0
	0.84	0.84	45	95	87	100	75	60
			55	100	-	100	-	-
			35	-	-	84	-	-
20	1.12	1.12	35	100	100	100	100	100
			45	100	100	95	100	90
			30	90	90	87	100	95
	1.68	1.68	30	100	100	100	-	100
			20	88	80	72	95	70
			25	100	87	100	65	68

TABLE i (cont.)

5	<u>Formulation</u>	<u>Rate</u>	<u>Crabgrass % Control</u>				<u>Goosegrass % Control</u>	
			<u>31DAT</u>	<u>68DAT</u>	<u>89DAT</u>	<u>110DAT</u>	<u>89DAT</u>	<u>110DAT</u>
	4 lb/gal ME	2.24	25	100	95	100	100	100
	(0.48 Kg/L)		-	100	100	100	34	40
			-	100	100	82	-	40

TABLE 1 (cont.)

5	Formulation	Rate	Crabgrass % Control				Goosegrass % Control		
			31DAT	68DAT	89DAT	110DAT	89DAT	110DAT	
10	3 lb/gal EC (0.36 Kg/L)	2.24	30	100	100	92	90	95	
			-	100	100	100	-	100	
	0.5% G	0.42	25	100	100	100	-	-	
			65	100	100	98	100	-	
			-	70	75	72	0	0	
			45	100	-	99	50	0	
			0.56	60	100	90	80	90	80
			48	-	-	100	50	35	
			-	85	100	80	50	35	
			0.84	45	100	89	75	100	85
15	1.12	-	-	85	99	75	20		
		35	100	-	85	-	70		
		30	100	90	88	100	88		
		40	85	80	78	-	-		
		20	35	100	96	100	70	50	
		1.68	30	100	90	89	90	84	
20	1.68	35	100	100	85	75	60		
		35	-	100	100	-	-		

TABLE 2

Location: St. Charles, Missouri

Turf Type: Kentucky Bluegrass

5	<u>Formulation</u>	<u>Rate</u>	Crabgrass	Bluegrass
			<u>% Control</u> <u>119 DAT</u>	<u>% Injury</u> <u>119 DAT</u>
10	3 lb/gal EC (0.36 Kg/L)	0.28	68	10
			76	0
			93	0
		0.42	75	0
			74	0
			84	0
15	0.56	0.56	85	20
			100	0
			100	0
		0.84	95	0
			89	0
			86	0
20	1.12	1.12	100	10
			100	0
			100	0
		0.28	83	0
			50	0
			20	0
25	0.42	0.42	80	0
			80	0
			80	0
		0.56	100	0
			100	0
			100	10
30	0.84	0.84	100	0
			79	10
			100	0

TABLE 2 (cont.)

			Crabgrass % Control <u>119 DAT</u>	Bluegrass % Injury <u>119 DAT</u>
5	<u>Formulation</u>	<u>Rate</u>		
	0.5% G	1.12	100	0
			100	0
			100	0
	4 lb/gal ME	0.28	86	0
10	(0.48 Kg/L)		40	0
			100	0
		0.42	78	0
			58	0
			85	0
15		0.56	100	0
			80	0
			100	0
		0.84	100	0
			100	5
20			100	0
		1.12	100	0
			100	20
			98	0



TABLE 3 (cont.)

5	<u>Formulation</u>	<u>Rate</u>	Crabgrass	Bluegrass
			<u>% Control</u> <u>87 DAT</u>	<u>% Injury</u> <u>87 DAT</u>
	4 lb/gal ME (0.48 Kg/L)	1.12	100	0
			100	0
			100	0
10	0.5% G	0.28	90	20
			100	0
			65	0
		0.42	93	0
			90	0
			100	0
15		0.56	100	0
			100	0
			100	0
		0.84	100	0
			100	15
			100	0
20		1.12	100	0
			100	0
			100	0

TABLE 4

Location: Cordova, Tennessee

Turf Type: Bermudagrass

5	<u>Formulation</u>	<u>Rate</u>	<u>Crabgrass % Control</u>		
			<u>70 DAT</u>	<u>90 DAT</u>	<u>110 DAT</u>
	3 lb/gal EC (0.36 Kg/L)	0.42	77	69	75
			75	68	38
			50	72	55
10		0.56	80	79	78
			-	100	100
			96	73	65
		0.84	95	86	88
			65	60	68
			100	100	100
15		1.12	100	100	90
			100	100	100
			100	100	100
		1.68	100	100	100
			100	100	100
			100	100	100
20	0.5% G	0.42	87	79	83
			100	100	100
			60	65	78
		0.56	87	89	84
			83	82	72
			100	100	87
		0.84	100	100	95
			100	100	84
			100	95	100
30		1.12	100	100	100
			100	100	100
			100	100	100

TABLE 4 (cont.)

	<u>Formulation</u>	<u>Rate</u>	<u>Crabgrass % Control</u>		
			<u>70 DAT</u>	<u>90 DAT</u>	<u>110 DAT</u>
5	0.5% G	1.68	100	100	100
			100	100	100
			100	100	98
10	4 lb/gal ME (0.48 Kg/L)	0.42	75	72	83
			78	74	62
		0.56	100	100	75
			100	100	87
			81	85	74
			65	65	62
15		0.84	100	95	82
			100	83	82
		-	100	76	
		1.12	100	100	85
			83	85	60
20		1.68	100	100	100
			100	100	99
			100	100	90
			100	100	100

TABLE 5

Location: St. Charles, Missouri

Turf Type: Kentucky Bluegrass

5	<u>Formulation</u>	<u>Rate</u>	<u>Goosegrass</u> <u>% Control</u>	
			<u>31 DAT</u>	<u>84 DAT</u>
10	3 lb/gal EC (0.36 Kg/L)	0.56	100	100
			82	40
		0.84	100	79
			100	92
			-	-
			100	100
15	3 lb/gal EC (0.36 Kg/L)	1.12	100	100
			100	85
		1.68	100	100
			100	96
			100	100
			90	86

POSTEMERGENCE TESTS

TABLE 6

Location: Cincinnati, Ohio  
 Turf Type: Kentucky Bluegrass

5	<u>Formulation</u>	<u>Rate</u>	<u>Crabgrass % Control</u>	
			<u>34 DAT</u>	<u>80 DAT</u>
10	3 lb/gal EC (0.36 Kg/L)	0.28	89	78
			95	77
			100	80
		0.42	95	72
			89	100
			-	76
15		0.56	95	84
			99	100
			96	100
		0.84	100	95
			-	100
			100	95
20		1.12	100	100
			100	100
			100	100
		0.28	100	98
			-	89
			84	83
25	4 lb/gal ME (0.48 Kg/L)	0.42	100	100
			96	100
			79	78
		0.56	100	100
			100	100
			78	99
30		0.84	100	100
			-	100
			86	98

TABLE 6 (cont.)

5	<u>Formulation</u>	<u>Rate</u>	<u>Crabgrass % Control</u>	
			<u>34 DAT</u>	<u>80 DAT</u>
	4 lb/gal EC (0.48 Kg/L)	1.12	98	100
			100	100
			100	100
10	0.5% G	0.28	100	90
			100	96
			75	76
			0.42	100
15		0.56	-	100
			91	92
			100	100
			89	80
			100	100
20		0.84	100	100
			100	100
			100	100
			1.12	100
			100	100
			100	95

TABLE 7

Location: St. Charles, Missouri  
Turf Type: Kentucky Bluegrass

	<u>Formulation</u>	<u>Rate</u>	Crabgrass % Control <u>24 DAT</u>
5	3 lb/gal EC (0.36 Kg/L)	0.56	55
			65
		65	
10		1.12	55
			63
			56
		60	
		54	
15		2.24	62
			75
			50
			68
20	0.5% G	0.56	80
			74
			53
		1.12	80
			53
			78
25		1.68	75
			75
			82
		2.24	80
			57
30			82

TABLE 8

Location: Cordova, Tennessee

Turf Type: Bermudagrass

5	<u>Formulation</u>	<u>Rate</u>	<u>Crabgrass % Control</u>					<u>Lespedeza % Control</u>		
			<u>10</u> <u>DAT</u>	<u>19</u> <u>DAT</u>	<u>27</u> <u>DAT</u>	<u>47</u> <u>DAT</u>	<u>67</u> <u>DAT</u>	<u>27</u> <u>DAT</u>	<u>47</u> <u>DAT</u>	<u>67</u> <u>DAT</u>
10	3 lb/gal EC (0.36 Kg/L)	0.56	0	65	55	76	65	25	30	20
			0	50	75	75	45	30	30	15
		1.12	0	60	93	72	72	-	-	-
			0	74	70	88	75	50	100	45
			0	35	57	85	86	30	30	30
			0	35	70	100	83	20	-	60
15	1.68	0	73	70	95	90	50	100	58	
		0	65	86	100	95	-	100	-	
		0	65	90	100	95	50	100	30	
		2.24	0	70	85	99	98	35	90	75
20	0.5% G	0.56	0	65	95	100	90	-	-	-
			0	55	88	100	94	50	100	100
			0	35	25	25	65	5	0	0
			0	0	30	0	0	-	-	-
			0	0	10	0	28	0	0	

TABLE 8 (cont.)

	Formulation	Rate	Crabgrass % Control					Lespedeza % Control		
			10 DAT	19 DAT	27 DAT	47 DAT	67 DAT	27 DAT	47 DAT	67 DAT
5	0.5% G	1.12	0	45	55	75	75	10	0	10
			0	50	95	78	85	0	0	-
			0	40	83	78	68	0	0	0
		1.68	0	55	70	100	90	10	20	30
			0	65	80	90	78	10	0	0
			0	45	87	100	92	0	0	0
10	4 lb/gal ME (0.48 Kg/L)	2.24	0	75	85	100	99	45	20	40
			0	45	55	100	89	0	0	10
			0	60	85	100	88	20	0	10
		0.56	0	45	70	40	60	20	35	20
			0	45	89	78	65	15	0	15
			0	50	89	75	65	5	0	-
15	4 lb/gal ME (0.48 Kg/L)	1.12	0	50	75	90	80	25	85	-
			0	50	90	100	87	-	-	-
			0	65	89	92	89	0	20	0
		1.68	0	50	85	95	90	35	20	-
			0	35	68	98	97	20	75	0
			0	40	65	100	95	20	100	-
20	4 lb/gal ME (0.48 Kg/L)	1.68	0	40	65	100	95	20	100	-

TABLE 8 (cont.)

5	<u>Formulation</u>	<u>Rate</u>	<u>Crabgrass % Control</u>					<u>Lespedeza % Control</u>		
			<u>10</u> <u>DAT</u>	<u>19</u> <u>DAT</u>	<u>27</u> <u>DAT</u>	<u>47</u> <u>DAT</u>	<u>67</u> <u>DAT</u>	<u>27</u> <u>DAT</u>	<u>47</u> <u>DAT</u>	<u>67</u> <u>DAT</u>
	4 lb/gal ME	2.24	0	65	85	100	99	40	30	30
	(0.48 Kg/L)		0	65	78	100	95	40	82	40
			0	70	80	100	99	30	-	75

The matter contained in each of the following claims is to be read as part of the general description of the present invention.

The claims defining the invention are as follows:

1. A method of selectively controlling crabgrass in turf which comprises applying to the turf locus an effective amount of S,S-dimethyl-2-(difluoromethyl)-4-(2-methylpropyl)-6-(trifluoromethyl)-3,5-pyridinecarbo-  
5 dithioate.
2. A method according to Claim 1 wherein the active ingredient is applied at a rate of 0.14 to 3.36 Kg/ha.
3. A method according to Claim 1 or 2 wherein the composition is in the liquid phase or solid phase or mixed liquid and solid phases.
4. A method according to Claim 3 wherein the composition is a granular solid.
5. A method according to Claim 3 wherein the composition is an emulsifiable concentrate.
6. A method according to Claim 3 wherein the composition is microencapsulated.
7. A method according to any one of Claims 1 to 6 wherein the composition contains one or more additaments or adjuvants selected from surface active agents, fertilizers, plant growth regulators, safeners,  
5 other crabgrass control agents, pesticides or other herbicides non-phytotoxic to turf grass.
8. A composition for selectively controlling crabgrass in turf containing an adjuvant and an effective amount of S,S-dimethyl-2-(difluoromethyl)-4-(2-methylpropyl)-6-(trifluoromethyl)-3,5-pyridinecarbodithioate as an active ingredient.  
5



9. A composition according to Claim 8 which is in the liquid phase or solid phase or mixed liquid and solid phases.

10. A composition according to Claim 9 which is a granular solid.

11. A composition according to Claim 9 which is an emulsifiable concentrate.

12. A composition according to Claim 9 which is microencapsulated.

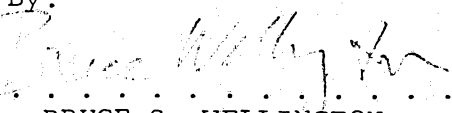
13. A composition according to any one of Claims 8 to 12 which contains the active ingredient in an amount from 0.1-60% by weight for application of the active ingredient at a rate of 0.14 to 3.36 Kg/ha.

14. A composition according to any one of Claims 8 to 13 which contains one or more additaments or adjuvants selected from surface active agents, fertilizers, plant growth regulators, safeners, other crabgrass control agents, pesticides or other herbicides non-  
5 phytotoxic to turf grass.

DATED this 23rd day of September, A.D. 1988

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By its Patent Attorneys,  
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By:

  
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