

US EPA ARCHIVE DOCUMENT

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Date out of EFGWB: MAR 28 1991

TO: R. Taylor/C. Giles  
Product Manager #25  
Registration Division (H7507C)

FROM: Emil Regelman, Supervisory Chemist  
Chemistry Review Section #2  
Environmental Fate and Ground Water Branch

THRU: Hank Jacoby, Chief  
Environmental Fate and Ground Water Branch  
Environmental Fate and Effects Division (H7507C)

Attached, please find the EFGWB review of ...

Reg./File #: 10182-EAT

Chemical Name: Paclobutrazol

Type Product: Systemic plant growth regulator

Common Name: Clipper

Company Name: ICI Americas, Inc.

Purpose: Registrant's comments to addendum to registration  
(WGM:03/26/91)

Date Received: March 4, 1991

Date Completed: March 28, 1991

Action Code: 360

EFGWB #(s): 91-0431

Total Reviewing Time: 1.0 days

Deferrals to: Ecological Effects Branch, EFED

Science Integration and Policy Staff, EFED

Non-Dietary Exposure Branch, HED

Dietary Exposure Branch, HED

Toxicology Branch

23197

1. CHEMICAL:

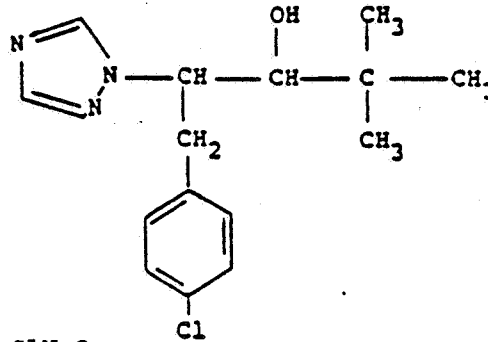
Chemical name: (+)-(R\*,R\*)-B-[(4-chlorophenyl)methyl]-a-(1,1-dimethyl-ethyl)-1H-1,2,4-triazole-1-ethanol

CAS no.: 76738-62-0

Common name: Paclobutrazol, PP333

Trade name: Clipper

Chemical structure:



Molecular formula: C<sub>15</sub>H<sub>20</sub>ClN<sub>3</sub>O

Molecular weight: 293.5

Formulation: Paclobutrazol .....21.8%  
Inert ingredients .....78.2%

Physical/Chemical properties of active ingredient:

Physical characteristics: White crystalline solid

Melting point: 165°C

Solubility: 35 ppm in water

Log octanol/water partition coefficient: 3.2

Vapor pressure: 7.5 x 10<sup>-9</sup> mm Hg at 20°C

2. STUDY/ACTION TYPE:

Registrant's comments to review of addendum to registration (WGM;03/26/90).

3. TEST MATERIAL:

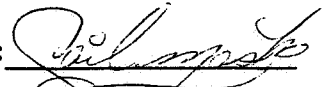
N/A

4. STUDY IDENTIFICATION:

Hawk, R.E. CORRESPONDENCE TO R. TAYLOR; CLIPPER 2SC TREE GROWTH  
REGULATOR EPA REGISTRATION NO. 10182-267 - REVIEW OF ENVIRON-  
MENTAL FATE DATA. Submitted by ICI Americas, Inc., Wilmington,  
DE; Written January 10, 1991; Received by EPA 21 January 1991.

5. REVIEWED BY:

Gail Maske  
Chemist, Review section #2  
OPP/EFED/EEGWB

Signature: 

Date: 

6. APPROVED BY:

Emil Regelman  
Supervisory Chemist  
Review section #2  
OPP/EFED/EEGWB

Signature: 

MAR 28 1991

Date: \_\_\_\_\_

7. CONCLUSIONS:

The registrant is responding to the March 26, 1990 review of environ-  
mental fate studies (fish accumulation and terrestrial field dissipation)  
and on the status of environmental fate data requirements. EFGWB's  
answer to each of the registrant's responses are as follows:

a. Volatility-lab (163-2)

Based on the low vapor pressure ( $7.5 \times 10^{-9}$  mm Hg) and toxicological  
classification for acute dermal, acute oral, and acute inhalation of  
> 3, EFGWB concurs with the registrants request for waiver of vola-  
tility data.

b. Fish accumulation (165-4)

The fish accumulation study was submitted as part of the addendum to  
registration and must meet present Subdivision N guidelines. A new  
fish accumulation study for paclobutrazol (with residues present at  
> 0.05 ppm characterized) is required to fulfill the data requirement.

c. EFGWB concurs with the registrant's request for a two month extension  
to submit the storage stability data for the terrestrial field dissi-  
pation studies (MRID Nos. 40685006, 40685007, 40685009, 40686010,  
40685011, 40685012). The data is presently being collated and should  
be submitted by March 10, 1991.

8. RECOMMENDATIONS:

The registrant should be informed of the following:

- a. There is sufficient data to support the request for waiver of the volatility studies.
- b. A new fish accumulation study is required to fulfill the data requirement.
- c. EFGWB concurs with the registrant's request for a two month extension for submitting the field dissipation storage stability data.
- d. The status of Environmental Fate Data Requirements for use of paclobutrazol on terrestrial food crops and terrestrial nonfood crops is summarized below:

<u>Environmental Fate Data Requirements</u>	<u>Status of Data Requirement</u>	<u>MRID No.</u>
<b>Degradation Studies-lab</b>		
161-1 Hydrolysis	Fulfilled (WGM;03/26/90)	00132698
161-2 Photodegradation in water	Fulfilled (WGM;03/26/90)	00132699
161-3 Photodegradation on soil	Fulfilled (WGM;03/26/90)	40685002
161-4 Photodegradation in air	Waived (WGM;03/26/91)	
<b>Metabolism Studies-lab</b>		
162-1 Aerobic soil	Fulfilled (WGM;03/26/90)	40685003
162-2 Anaerobic soil	Not required (no field and vegetable crop use)	40685003
<b>Mobility Studies</b>		
163-1 Leaching, Adsorption/Desorption	Fulfilled (WGM;03/26/90)	40685005
163-2 Volatility-Lab	Waived (WGM;03/26/91)	
163-3 Volatility-field	Waived (WGM;03/26/91)	
<b>Dissipation Studies-field</b>		
164-1 Soil	Not Fulfilled (WGM;03/26/90)	
164-5 Soil, long-term	Deferred pending results of 164-1	

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<u>Environmental Fate Data Requirements</u>	<u>Status of Data Requirement</u>	<u>MRID No.</u>
<u>Accumulation Studies</u>		
165-1 Rotational crops-confined	Not required (has no field and vegetable crop, aquatic crop, and rotated food crop uses)	
165-2 Rotational crops-field	Not required (has no field and vegetable crop, aquatic crop, and rotated food crop uses)	
165-4 in Fish	Not Fulfilled (WGM; 03/26/90) (WGM; 03/26/91)	00133560

9. BACKGROUND:

Paclobutrazol is a systemic plant growth regulator that inhibits the formation of gibberellins, resulting in compact plants and enhanced production of flower and fruit buds. Paclobutrazol was developed for use on terrestrial nonfood (turf and trees in nonfood areas) sites. The maximum annual application rate for turf is 2 lbs. ai/acre. The use rate for trees depends on the tree size and number of trees per area. An estimation of 4.5 to 5.0 lbs ai/area is reported by the registrant. Paclobutrazol may be applied by ground spray to foliage or by injection to the growing media. Paclobutrazol is also used on container-grown ornamental plants in greenhouses which is applied at a maximum rate of 0.5 mg ai/6" pot.

10. DISCUSSION:

Volatility studies

Based on physical properties (vapor pressure, solubility in water, Henry's Law constant, inhalation toxicity of paclobutrazol) of paclobutrazol, the registrant felt there was no reasonable justification for requiring a laboratory volatility study with paclobutrazol. Under the worst conditions theoretically possible the registrant calculated that an adult human could not be exposed to more than 0.5% of the RfD (ADI) via inhalation. EFGWB's trigger values for normally requiring the volatility studies is a vapor pressure of  $< 10^{-6}$  mm Hg and a toxicological classification of <3.

Fish accumulation study

The fish accumulation study which was reviewed in February 1990 was completed in October 1982. Therefore, the registrant believes the acceptability of the study should not be based on current guidelines and furnishes sufficient data on fish accumulation of paclobutrazol and its residues. The study is scientifically valid. However, the study may not reflect data

obtained from a study carried out using current guidelines. Decline and formation patterns of the parent material and residues could be significantly different. The depuration rate of residues in fish could be significantly different, as well. Residues  $\geq 0.05$  ppm would be characterized under current guidelines.

11: COMPLETION OF ONE-LINER:

See attached one-liner.

12: CBI APPENDIX:

N/A

Environmental Fate & Effects Division  
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY

PACLOBUTRAZOL

Last Update on March 26, 1991

[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Common Name: PACLOBUTRAZOL

Smiles Code:

PC Code # :125601

CAS #:76738-62-0

Caswell #:

Chem. Name : (2RS,3RD)-1-(4-CHLOROPHENYL)-4,4-DIMETHYL-2-(1H-1,2,4-TRIAZOL-1-YL)PENTAN-3-OL

Action Type: PLANT GROWTH REGULATOR (INHIBITS FORMATION OF GIBBERELLINS)

Trade Names: BONZI; CLIPPER; CULTAR; PARLAY

(Formul'tn): 4G/L SUSP. CONC.; 20 G/L FOR TRUNK INJUNCTION; 250 G/L CONC.

Physical State:

Use : FOR ORNAMENTAL CROPS (BONZI); AMENITY TREE AND BUSH CONTROL  
Patterns : (CLIPPER); APPLE AND PEAR ORCHARD (CULTAR).  
(% Usage) :

z

Empirical Form:  $C_{15}H_{20}ClN_3O$   
Molecular Wgt.: 293.79 Vapor Pressure: 7.50E -9 Torr  
Melting Point : °C Boiling Point: °C  
Log Kow : 3.2 pKa: e °C  
Henry's : E Atm. M3/Mol (Measured)

Solubility in ...

Comments

Water	E 35	ppm	@20.0	°C
Acetone	E	ppm	@	°C
Acetonitrile	E	ppm	@	°C
Benzene	E	ppm	@	°C
Chloroform	E	ppm	@	°C
Ethanol	E	ppm	@	°C
Methanol	E	ppm	@	°C
Toluene	E	ppm	@	°C
Xylene	E	ppm	@	°C
	E	ppm	@	°C
	E	ppm	@	°C

Hydrolysis (161-1)

[V] pH 5.0: STABLE  
[V] pH 7.0: STABLE  
[V] pH 9.0: STABLE  
[ ] pH :  
[ ] pH :  
[ ] pH :



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Photolysis (161-2, -3, -4)

- [ ] Air :
- [V] Soil :140 DAYS WITH XENON ARC
- [V] Water:NO DEGRADATION IN 10 DAYS
- [ ] :IRRADIATION WITH ARTIFICIAL
- [ ] :LIGHT
- [ ] :

Aerobic Soil Metabolism (162-1)

- [V] APPROXIMATELY 1 YEAR IN AEROB-
- [ ] IC LOAM SOIL AT 20 C.
- [V] 9.1 WEEKS IN CLAY LOAM SOIL
- [ ] AND 30.5 WEEKS IN SANDY LOAM
- [ ] SOIL AT 25 C.
- [ ]
- [ ]

Anaerobic Soil Metabolism (162-2)

- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]

Anaerobic Aquatic Metabolism (162-3)

- [S] >1 year
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]

Aerobic Aquatic Metabolism (162-4)

- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
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Soil Partition Coefficient (Kd) (163-1)

[S]	Sd	Si	Cl	%OM	pH	Kd
[ ]	28	47	25	3.9	4.9	21.3
[ ]	55	28	18	5.2	6.0	10.2
[ ]	37	22	41	11.4	8.0	9.5
[ ]	21	39	40	5.6	6.4	7.6
[ ]	88	4	8	1.6	5.5	2.4

Soil Rf Factors (163-1)

[S] RESIDUES CONTAINING THE METH-  
[ ] INE MOIETY WERE RELATIVELY  
[ ] IMMOBILE IN Sd, SdLm, LmSd,  
[ ] AND ClLm SOILS.  
[ ]  
[ ]

Laboratory Volatility (163-2)

[ ]  
[ ]

Field Volatility (163-3)

[ ]  
[ ]

Terrestrial Field Dissipation (164-1)

[S] T1/2 = 450 - 973 DAYS IN ORCHARD SOIL FROM CA, WVA, AND FLOR  
[ ] IDA.  
[S] T1/2 = 95-190 DAYS IN LmSd (NC); 123-189 DAYS IN SiLm (MISS)  
[ ] 123-337 DAYS IN SiClLm (IL); 7-14 DAYS IN SdLm (CA).  
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Aquatic Dissipation (164-2)

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Forestry Dissipation (164-3)

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Long-Term Soil Dissipation (164-5)

[ ]  
[ ]

Accumulation in Rotational Crops, Confined (165-1)

[ ]  
[ ]

Accumulation in Rotational Crops, Field (165-2)

[ ]  
[ ]

Accumulation in Irrigated Crops (165-3)

[ ]  
[ ]

Bioaccumulation in Fish (165-4)

[S] BLUEGILL SUNFISH BCF: 44 X WHOLE FISH; 20 X MUSCLE;  
[ ] 248 X VISCERA.

Bioaccumulation in Non-Target Organisms (165-5)

[ ]  
[ ]

Ground Water Monitoring, Prospective (166-1)

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Ground Water Monitoring, Small Scale Retrospective (166-2)

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Ground Water Monitoring, Large Scale Retrospective (166-3)

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[ ]  
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Ground Water Monitoring, Miscellaneous Data (158.75)

[ ]  
[ ]  
[ ]

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PACLOBUTRAZOL

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Field Runoff (167-1)

[ ]  
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Surface Water Monitoring (167-2)

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Spray Drift, Droplet Spectrum (201-1)

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Spray Drift, Field Evaluation (202-1)

[ ]  
[ ]  
[ ]  
[ ]

Degradation Products

Ketone analogue - [2RS]-1-(4-chlorophenyl)-4,4-dimethyl-2-(1,2,4-triazol-1-yl)-pentan-3-one

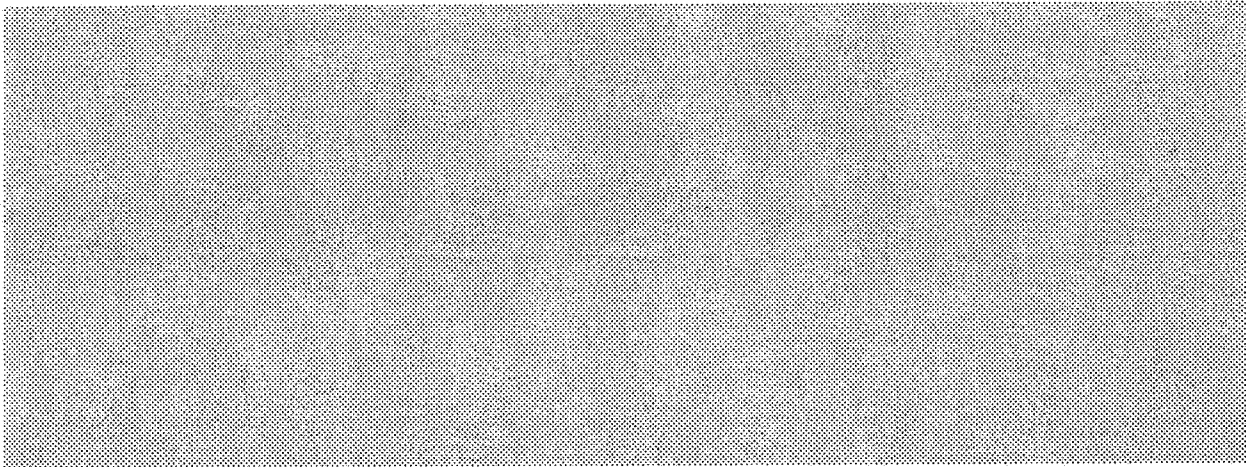
1H-1,2,4-triazole

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**PACLOBUTRAZOL**

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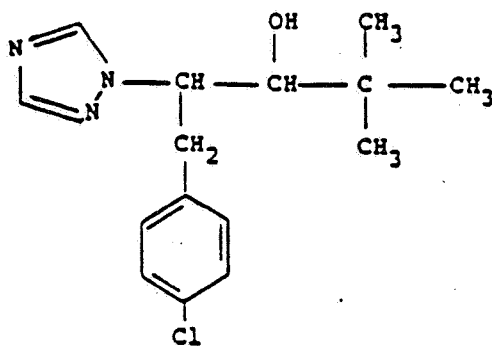
Comments



References: FARM CHEMICALS HANDBOOK; EPA DATA

Writer : WGM

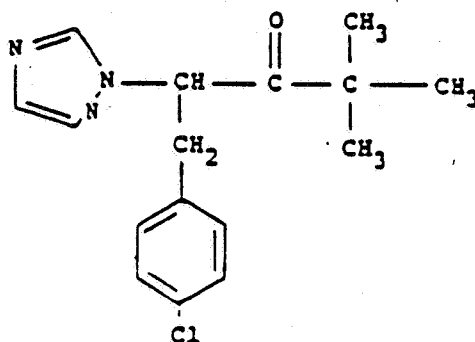
12



Paclobutrazol

(2RS, 3RS)-1-(4-Chlorophenyl)-4,4-dimethyl-2-(1,2,4-triazol-1-yl)pentan-3-ol.

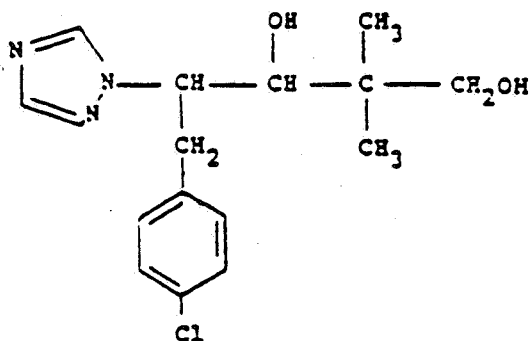
(PP333)



Ketone analogue of paclobutrazol

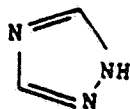
(2RS)-1-(4-Chlorophenyl)-4,4-dimethyl-2-(1,2,4-triazol-1-yl)pentan-3-one.

Compound II



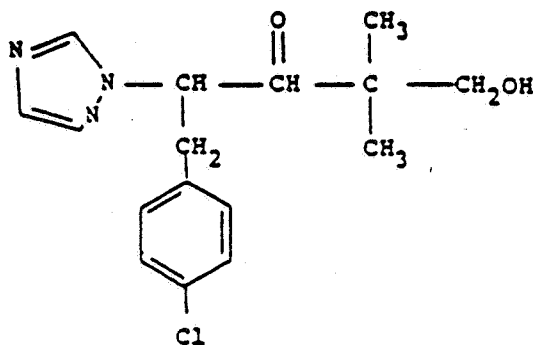
5-(4-Chlorophenyl)-2,2-dimethyl-4-(1,2,4-triazol-1-yl)pentan-1,3-diol.

Compound III



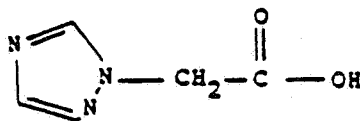
1,2,4-Triazole

Compound V



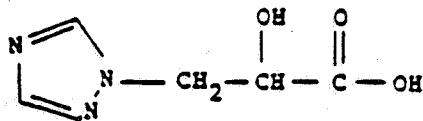
5-(4-Chlorophenyl)-2,2-dimethyl-3-oxo-4-(1,2,4-triazol-1-yl)pentanol

Compound VI



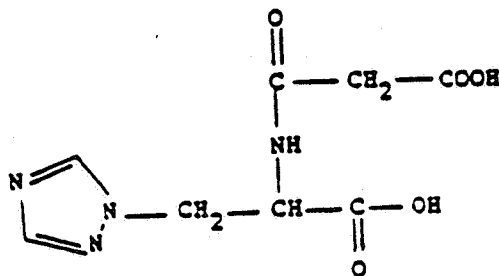
2-(1,2,4-Triazol-1-yl)acetic acid

Compound VII



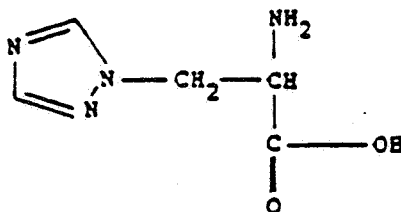
3-(1,2,4-Triazol-1-yl) lactic acid

Compound VIII



2-Malonyl-3(1,2,4-triazol-1-yl)alanine

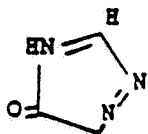
Compound IX



3-(1,2,4-Triazol-1-yl)alanine

Compound X





4,5-Dihydrotriazol-3-one

Compound XI