ENVIROMENTAL SAFETY
REVIEW SUMMARY
100601

A N M

(3)

J.W. Akerman
Ecological Effects Br.
Review Summary

Chemical trade Nemacur

common

chemical Ethyl 3-methyl-4-(methylthio)phenyl (1-methylethyl) phosphoramidate

Company Chemagro

Submission TEMP PERMIT 3125-EXP PETITION ____ REGISTRATION ____

Date submitted 1/9/74 Date reviewed 3/13/74

Type of chemical Nematicide

Use Non-bearing deciduous fruit trees.

2 applications
1) 15G 3,740 lbs
2) EC (35%) 187 gallons

Data submitted for review

Environmental safety:

Mammal LD_{50} ____

Mammal chronic ____

Fish ____ No new data

Bird ____

Shrimp, crab, oyster ____

Other ____

Environmental chemistry (70-15)

Fish residue ____ No new data

Other ____

17 pages

Chemical Nemacur

Conclusions

1. This is an extremely toxic pesticide to both birds and mammals.
2. We have objected to uses on general crops (3125 - EIL, EIG, EIA) because of need for field monitoring studies.
3. The proposed use under this permit is non-bearing deciduous fruit trees at up to 20 lb/A a.i. w thorough soil incorporation.
4. No data are available to support the safety to birds and other wildlife, esp. at high rates. Simulated field tests with birds — bird mortality.
5. Field monitoring during permit is needed. Plan should be submit for review.
6. See attached scratch sheets. These sheets illustrate part of our concern.

Recommendations

1. Field monitoring data are needed to determine possible environmental hazards of Nemacur to birds and other wildlife (See our comments on 3125 - EIL, EIG, EIA). It will not be necessary to monitor ~~all proposed uses or~~ all sites, but sites that are utilized by wildlife and receive high rates of the chemical should be considered. A plan for gathering such data must be submitted for the permit before the proposed uses on non-bearing deciduous fruit trees is acceptable.

3/13/74

NEMACUR

EXP PERMITS

3,740 lbs Nemacur 15% Granular
187 gallons EC (35% a.i.) 3 lb ai/gal EC

15% granular Label

For control of Nematodes in non-bearing deciduous fruit trees.

1) 66.7 – 133.3 lbs (15G) /A — broadcast application thoroughly incorporate into soil by cross-disking.

133.3 × .15 = 6665 + 1333 = 19.995 ≅ 20 #/A

2) Single tree application — ½ – 4 oz (15G) per tree IN band 2½ – 5 ft thoroughly incorporate granules into the soil.

Nemacur 3 (35% E.C.) 3 lb ai/gal

For control of [illegible] per non-bearing deciduous fruit trees.

1) 3½ – 6⅞ [illegible]/A — broadcast to soil surface thoroughly incorporate into soil by cross-disking.

2) Single tree application — .2 – 1.6 fl oz per tree thoroughly

Theoretical acute effects

Single tree application (maximum application)

.60 oz a.i./tree = 17 g/tree = 17,000 mg/tree

Toxicity	LD_{50}	est. body weight	toxicant/bird
quail	0.8 mg/kg	.25 kg	.2 mg
mallard	1 mg/kg	1.0 kg	1.0 mg

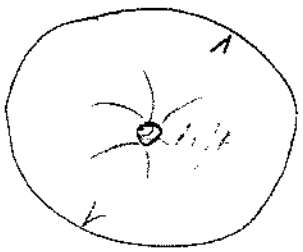
17,000 mg toxicant is sufficient to kill 50% of a)

a) quail population of:

$$\frac{17{,}000 \text{ mg toxicant}}{.2 \text{ mg/quail}} = 85{,}000$$

b) duck population of:

$$\frac{17{,}000 \text{ mg toxicant}}{1 \text{ mg/duck}} = 17{,}000$$



$A = \pi r^2 = \frac{22 \times 5^2}{7} = \frac{550}{7} \cong 80 \text{ ft}^2$

$\therefore$ 17,000 mg/80 ft^2 = 212 mg/ft^2

22 / 25 / 110 / 44 / 550

7 | 550 (71, 49, 00)

$\frac{80}{4.35 \times 10^4} = \frac{.6 \text{ oz}}{X}$ ~ OK

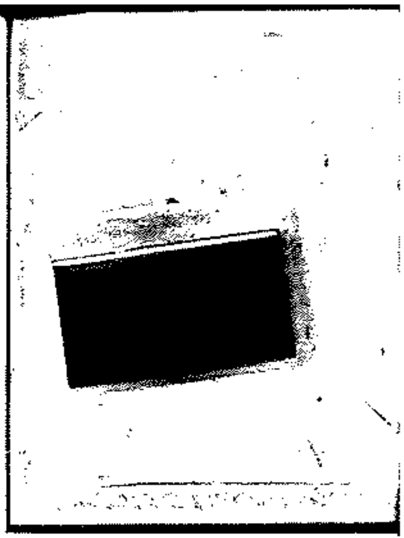
$\frac{80 \text{ ft}^2}{4.35 \times 10^4} = \frac{.6 \text{ oz}}{X}$

$80X = 4.35 \times 10^4 \times .6 \text{ oz}$

$X = \frac{4.35 \times 10^4 \times .6 \text{ oz}}{80}$

$X = \frac{.6(4.35 \times 10^4)}{80} = 326.2 \text{ oz} \cong 200 \text{ lb/A a.i.}$

$\cong 208 \text{ mg/ft}^2$



100601-

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

1396

67,000 mg / 48 ft²

1396 mg/ft²

1396 mg/ft²
.2 mg/[illegible]

6980 birds/ft²

.8 mg/kg
x.25 kg/bird

6980 bird/ft²

100601

(3)

Nemacur 3E + 15G (Bay 68138)

1. 3125-EXP-124G and 125G - Chemagro
2. systemic nematicide
3. Label "Toxic fish, birds & other wildlife ... Keep pets ... birds may be killed ... do not contaminate H₂O ..."
4.

	species	mortality irrigated	mortality nonirrigated	rate/acre	residual
15G	sparrow	— (50%)	— (69%)		
15G	bobwhite		3/12		
15G	rabbits	0	0		
3E	pheasant			0.25 lbs ai/A	
15G	pheasant				20%
15G	mallard				10%
3E	" "				25%

*5. see letter dated 4/24/74

Total birds

Before	After
Bluejay 1 ~~++++~~	~~Bluejay~~ Bluejay 6
Crow 5	
Dove 3	Dove 10
	Downy Woodpecker 2
Grackle 32	Grackle 49
	Great Blue heron 1
Meadowlark 3	Meadowlark 24
Mockingbird 2	Mockingbird 2
Nighthawk 2	Nighthawk 4
quail 1	
~~[redacted]~~	
red-head woodpeck 10	red belly woodpeck 4
	red head woodpeck 5
redwing 21	red wing 8
robin 5	robin 7
shrike 1	
sparrow 17	[illegible] 10
starling 4	[illegible] 37
swallow 10	[illegible] 15
thrush 1	
unknown 6	

$\chi^2 = 665.856$

16 species

6 unk.

signif 19.05 30.14

15 species

Total

$$\chi^2 = \sum \frac{(O-E)^2}{E} = \frac{(6-1)^2}{1} + \frac{(0-5)^2}{5} + \frac{(10-3)^2}{3} + \frac{(2-0)^2}{0} + \frac{(49-32)^2}{32} + \frac{(1-0)^2}{0} + \frac{(24-8)^2}{8} +$$
$$\frac{(2-2)^2}{2} + \frac{(4-2)^2}{2} + \frac{(0-1)^2}{1} + \frac{(4-0)^2}{0} + \frac{(51-10)^2}{10} + \frac{(2-1)^2}{21} + \frac{(7-5)^2}{5} +$$
$$\frac{(0-1)^2}{1} + \frac{(10-17)^2}{17} + \frac{(37-4)^2}{4} + \frac{(15-10)^2}{10} + \frac{(0-1)^2}{1} + \frac{(6-6)^2}{6}$$

$$= 25 + 5 + \frac{49}{3} + \frac{17^2}{32} + \frac{21^2}{3} + 2 + 1 + \frac{41^2}{10} + \frac{13^2}{21} + \frac{4}{5} + 1 +$$
$$\frac{49}{17} + \frac{33^2}{4} + \frac{25}{10} + 1 + 6$$

$$= 41 + \frac{49}{3} + 9 + \frac{1}{32} + 147 + 168 + \frac{1}{10} + 8 + \frac{1}{21} + \frac{4}{5} + 28 + \frac{14}{17} +$$
$$272 + \frac{1}{4} + 2 + \frac{1}{2}$$

$$= 647 + 16 + \frac{1}{3} + \frac{1}{32} + \frac{1}{10} + \frac{1}{21} + \frac{4}{5} + \frac{14}{17} + \frac{1}{4} + \frac{1}{2}$$

$$= 663 + 2.886$$

$$= 665.886$$

$\chi^2_{17,.05} = 30.14$

in plot or land

	Before	after
~~Jay~~	1	6
crow	4	0
dove	3	3
downy	0	2
goldfinch	13	33
meadow	3	11
mock	1	1
hawk	2	0
great	1	0
red bellied	0	1
redhead	8	22
redwing	19	6
robin	3	2
shrike	1	0
sparrow	3	2
starling	0	7
[illegible]	1	2
[illegible]	1	0
UNK	6	0

in plot or hand

$$\chi^2 \cdot \left(\sum \frac{(O-E)^2}{E}\right) = \frac{(6-1)^2}{1} + \frac{(0-1)^2}{1} + 0 + 0 + \frac{(33-13)^2}{13} + \frac{(1-3)^2}{3} + 0 +$$

$$\frac{(0-2)^2}{2} + 1 + 1 + \frac{22-8)^2}{8} + \frac{5-1)^2}{1} + 1 + 1 + 1 + 0 + 1 + 1 + \frac{(0-6)^2}{6}$$

$$= 25 + 4 + 0 + 0 + 30\tfrac{10}{13} + 21\tfrac{1}{3} + 0 + 2 + 1 + 1 + 24\tfrac{1}{2} + 8\tfrac{1}{21} +$$

$$1 + 1 + 1 + 0 + 1 + 1 + 6$$

$$= 127 + \frac{10}{13} + \frac{1}{3} + \frac{1}{2} + \frac{1}{21}$$

$$= 128.65$$

$\chi^2_{crit}(18, .05) = 28.87$

NW Plot

	before	after
jay	1	0
crow	1	0
dove	2	1
downy	0	2
grackle	7	31
meadow	1	9
mock	0	1
hawk	2	0
redbelly	0	1
redhead	6	20
redwing	14	3
robin	3	2
shrike	1	0
sparrow	3	2
starling	0	7
swallow	1	2
thrush	1	0
UNK	6	0

IN Plot

	before	after
jay	1	0
cow	1	0
dove	2	1
downy	0	2
grackle	7	31
meadow	1	9
mock	0	1
hawk	2	0
redbelly	0	1
redhead	6	20
redwing	14	3
robin	3	2
shrike	1	0
sparrow	3	2
starling	0	7
swallow	1	2
thrush	1	0
UNK	6	0

$$\chi^2 = \sum \left(\frac{(O-E)^2}{E}\right) = 1+1+1+0+\frac{(31-7)^2}{7}+\frac{(9-1)^2}{1}+0+2+0+\frac{(20-6)^2}{6}+$$
$$\frac{(3-14)^2}{14}+1+1+1+0+1+1+6$$
$$= 1+1+1+0+82\tfrac{2}{7}+64+0+2+0+32\tfrac{2}{3}+8\tfrac{9}{14}+1+1+1+0+1+1+6$$
$$= 202+\tfrac{2}{7}+\tfrac{2}{3}+\tfrac{9}{14}$$
$$= 202+1.596$$
$$= 203.596$$

$\text{signif}_{17,05} = 27.59$

air-insects
swallows
night hawk

insects-foliage
(robin)
mockingbird
thrush

insects-bark
downy woodpecker
redbellied "
redhead "

insects ground
(meadowlark) (quail [illegible]
crow
([illegible])
(sparrow)
(bl[illegible])

weed
(sparrow) quail
(meadowlark) dove
(bla[illegible])
grackle

jay
~~crow~~
dove
~~starling~~
~~grackle~~
heron
~~meadowlark~~
~~mock~~
~~hawk~~
quail
~~redbelly~~
~~redhead~~
~~redwing~~
~~robin~~
shrike
~~sparrow~~
~~[illegible]~~
~~[illegible]~~
~~thrush~~
owl

jay
~~crow~~
~~hawk~~
~~grackle~~
shrike

[illegible] tile
heron

	total		in field		in plot	
	before	after	before	after	before	after
meadowlark	3	24	3	11	1	9
crow	5	0	4	0	1	0
quail	1	0	1	0		
robin	5	7	3	2	3	2
sparrow	17	10	3	2	3	2
redwing	21	8	19	6	14	3
grackle	32	49	13	33	7	31
dove	3	10	3	3	2	1
starling	4	37	0	7	0	7

$\chi^2 = \sum \left(\frac{(O-E)^2}{E}\right) = \frac{(24-3)^2}{3} + 5 + 1 + \frac{4}{5} + \frac{49}{17} + \frac{(8-3)^2}{21} + \frac{13^2}{32} + \frac{49}{3} + \frac{33^2}{4}$

$= 147 + 5 + 1 + \frac{4}{5} + 2\frac{15}{17} + 8\frac{1}{21} + 9\frac{1}{32} + 16\frac{1}{3} + 70\frac{3}{4} = 278 + \frac{4}{5} + \frac{15}{17} + \frac{1}{21} + \ldots$

$= 280.844$

total: significance = 15.51

in field: $= \frac{8^2}{3} + 4 + 1 + 1 + 1 + \frac{13^2}{13} + \frac{40^2}{13} + 2 + 0$

$= 21\frac{1}{3} + 4 + 1 + 1 + 1 + 8\frac{12}{13} + 30\frac{12}{13} + 2 + 2 = 66 + \frac{1}{3} + \frac{12}{13} + \frac{10}{13} = \ldots$

significance = 15.51

in plot: $= 64 + 1 + 1 + 1 + \frac{12-1}{12} + \frac{(2-4)^2}{7} + 1 + 0$

$= 64 + 1 + 1 + 1 + 7\frac{9}{14} + 9\frac{2}{3} + 1 + 0 = 158 + \frac{7}{14} + \frac{2}{3} = 158.929$

significance = 14.07

1 3 2 3

Tot.

grackle
redhead
redwing
starling
dove

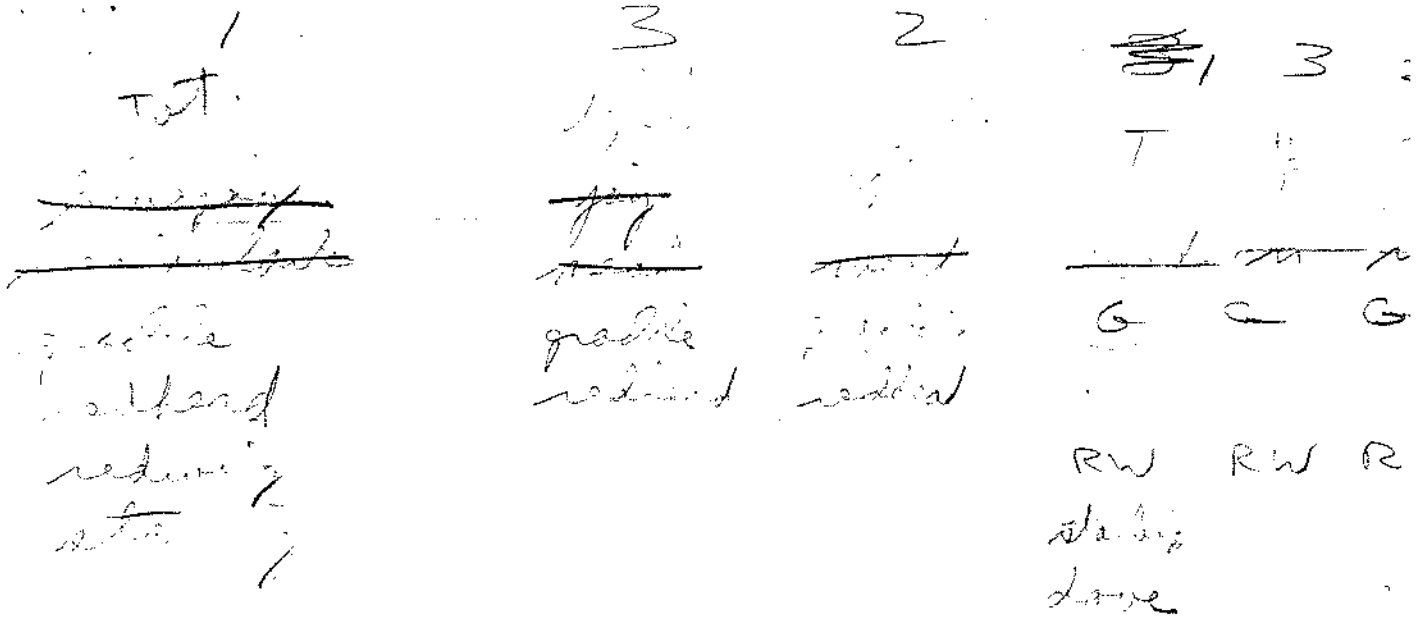
grackle
redhead

RW RW RW

G G G

jay	4
hawk	12
grack	11½
redhead	6
redwing	4
starling	2
dove	1

meadowlark
grackle
redhead woodpecker



meadowlark
grackle
redhead woodpecker

jay	4
lark	12
grack	11½
redhead	6
redwing	4
robin	2
dove	1