

IRB BRANCH REVIEW - TSS

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162578 (383)  
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12/16/85 1/14/86

EFFICACY

FILE OR REG. NO. 400-383 400-UEO

PETITION OR EXP. PERMIT NO. \_\_\_\_\_

DATE DIV. RECEIVED 11/4/85, 11/29/85

DATE OF SUBMISSION 10/25/85, 11/11/85

DATE SUBMISSION ACCEPTED 12/16/85, 1/10/86

TYPE PRODUCTS(S): I, D, H, F, N, R, S \_\_\_\_\_

DATA ACCESSION NO(S) 260279, 260535

PRODUCT MGR. NO. 16

PRODUCT NAME(S) HINDER -H RABBIT AND DEER REPELLENT

COMPANY NAME Uniroyal, Inc.

SUBMISSION PURPOSE Amend label, registration, support claims

CHEMICAL & FORMULATION 15% "Ammonium Soaps of Higher Fatty Acids" (Liquid)

Efficacy Review: HINDER REPELLENT, 400-383  
HINDER-H RABBIT AND DEER REPELLENT, 400-UEO  
Uniroyal, Inc.  
Bethany, CT 06525

## 200.0 INTRODUCTION

### 200.1 Uses

15% "Ammonium Soaps of Higher Fatty Acids" liquid formulations.

400-383 is currently registered to repel deer and rabbits from feeding upon fruit trees and vines, vegetable and field crops, forage and grain crops, nursery stock, and ornamentals, and from non-crop areas. It is also sold as "A SPREADER AND DEPOSIT BUILDER FOR ALL TYPES OF FOLIAGE". The label bears claims for enhancement of the performance of insecticides and acaricides and "For Neutral Minor Element Sprays, Sunburn Treatments, and Whitewash Applications (Including Whitewash for Leafhopper Control on Citrus)".

400-UEO is proposed for registration to be used to protect "fruit trees, vegetables, vine crops, flowers, roses, ornamental, shrubs, trees and nursery stock" from "feeding damage by deer and rabbits".

### 200.2 Background Information

400-UEO has been used for many years as a "spreader/sticker" to help provide coverage and adhesion for pesticides to plant materials. It was registered as a pesticide on 10/6/61 with non-animal repellent claims much as they are today. Over time, it was discovered that plants covered with this material were less subject to damage by deer and rabbits for a time after treatment. This finding led to many years of unofficial use of the product as a deer and rabbit repellent. It was registered on 4/7/82, although use under 24c registrations had been authorized earlier in some states. See efficacy review of 11/9/79. During the history of this product, its basic producer, Leffingwell, has been acquired first by Thompson-Hayward and then by Uniroyal.

For 400-UEO, see efficacy review of 10/22/84. In the review, I required two minor label changes and noted that little information was available relating to product efficacy. In its letter of 1/16/85, PM Team 16 asked for "information that indicates your product will perform as claimed. This product would be sold to homeowners. It is similar in formulation to 400-383.

In response to the request for efficacy data, Uniroyal has provided accounts of tests dating back to 1966. The first submission, dated 10/25/85, includes fairly recent tests, dating from 1982 on. The submission dated 11/11/85 includes primarily older, incompletely reported, studies and testimonials.

## 201.0 DATA SUMMARY

This review concentrates on the newer studies for two reasons: (1) many of the older reports, and other studies like them were examined in 1979 (see efficacy review of 11/9/79); (2) the product formula seems to have been changed slightly over the years.

The efficacy data submission of 10/25/85 includes seven reports relating to the effectiveness 15% Ammonium Soaps of Higher Fatty Acids in repelling deer, elk, rabbits, and hares. These studies are briefly summarized in Table 1. In all tests, an effect that could be construed as feeding suppression was seen. In many cases, however, the effect was short-lived. In all tests lasting more than a week, a point was reached after which the animals seemed not to be affected by the product even when retreatments were made. All studies except Thurlow (1982) featured application rates which are mentioned on the label proposed for this product.

In some of the test reports, there were discussions of the practical value of short-term repellency and the factors which might influence the duration of the effect. Such factors include the continued presence of product on the treated surfaces and the degree to which the target population is stressed through high populations and/or shortages of alternate food sources. It appears that the product suppresses feeding as long as it is present at a concentration high enough to affect the animals' senses until environmental pressures force the animals to feed upon the treated materials. I suspect that once this feeding gets beyond initial sampling, the animals ignore the product. This probably means that any toxic properties of the product are very mild. Short-term repellency may have value in delaying damage until a growth stage is reached where some feeding by deer or rabbits can be tolerated or until a longer-term solution (fencing or animal management) can be affected.

The reports and testimonials included in the submission of 11/11/85 suggested longer periods of effectiveness than did the more recent studies, but the older tests did not appear to have involved many instances of high animal pressure and sometimes lacked control areas (or had control plants interspersed with treated plants). In a recent study (Ellingwood and McAninch, 1984) included in the submission of 11/11/85, several candidate deer repellents (including Hinder) were tested in a research design which included interspersed treated and untreated ("Inner Controls") trees in central areas in orchard blocks and untreated trees ("Outer Controls") on the periphery of these central areas. In these tests, higher damage to the Outer Controls than to inner controls and all treated trees was "responsible" for the significant main effect in the analysis of variance. This was not surprising since deer move into orchards to browse (as opposed to "living" there) and tend to hit peripheral trees most heavily.

Instances in which heavy rains or irrigation seemed to curtail product efficacy also were noted in some of the reports contained in the submission of 11/11/85. These reports concentrated upon deer and lagomorphs, but there were some trials with other types of animals. Application rates varied considerably from one test to another. Many were run at 3 gal product/100 gal water.

In the course of preparing this review, I consulted with Wildlife Biologists from Virginia, North Carolina, and Wisconsin who were familiar with the literature on and the practice of discouraging feeding by deer and rabbits. These people were in agreement that the efficacy of this type of product was variable and not permanent. Their perceptions were consistent with the results of the studies submitted by Uniroyal. I also obtained a copy of the study:

Table 1. Summary of results of tests of Hinder formula for repelling certain cervids and lagomorphs.

<u>Study</u>	<u>Animal Type</u>	<u>Site Type</u>	<u>Application Method(s)</u>	<u>Dilution Rate</u>	<u>Duration of Effect</u>	<u>Discussion of Results</u>
Thurlow, 1982	deer, elk	Airport (area repellent)	Spray Soaked Rags	1:3 w/H <sub>2</sub> O undiluted	about 1 month	First treatment appeared to be effective (with other factors possibly helping) for one month. Later treatments in Winter and Spring did not seem to be effective.
Yamamoto & Shitanishi, 1985	deer	Black Oak (1'-3' tall)	Spray	5.3 fl oz/ gal H <sub>2</sub> O	12 weeks	3 treatments made over 12 weeks. Plants showed 30% growth -- better than with a Thiram and a "rotten egg" product and better than untreated. Repeat treatments may have been of value.
Nelson & Wohler, 1984	<u>Sylvil.</u> rabbits	Peas (garden flats)	Spray	5.3 fl oz/ gal H <sub>2</sub> O	1 week	3 treatments (repeats were after rains). 60% less damage to treated flats than to untreated. Test only lasted 1 week.
Nelson & Wohler, 1985	<u>Sylvil.</u> rabbits	Peas (garden flats)	Spray	5.3 fl oz/ gal H <sub>2</sub> O	0-11 days	Six applications over 14 days. Feeding damage suppressed 32-67% (32% at end) compared to controls but results were "unacceptable" based on 70% suppression criterion established before test.
Mahoney & Jedrzejek, 1984	<u>Sylvil.</u> rabbits	Flowering crabapple (5'-7' tall)	Paint applied to trunks	1:1 w/H <sub>2</sub> O	18 weeks (?)	Claim "acceptable rabbit repellency through 18 weeks" based upon mean damage ratings but no statistical significance. 2-3 replications depending upon plot.
Woolf & Lepitzki, 1984	<u>Sylvil.</u> rabbits	Bush beans (3' x 5' tilled plots)	Spray	5.3 fl oz/ gal H <sub>2</sub> O	1-2 days	Minor initial feeding suppression but rabbit density was very high and animals were captive
Lindsey, Campbell & Evans, 1985	Snowshoe Hare	Peas (garden flats)	Spray	5.3 fl oz/ gal H <sub>2</sub> O	1 day	"Acceptable" feeding reduction for 1 day. Retreatments made for half of the four captive animals used.

Tanner, G., and Dimmick, R. (1983) An evaluation of a method for reducing white-tailed deer depredations on soybeans in western Tennessee. Paper Presented at First Eastern Wildlife Damage Control Conference, Ithaca, NY.

In this study, use of Hinder at a 1:4 dilution in 1-gal plastic jugs and the spraying of an unspecified dilution of hinder appeared to suppress feeding on soybeans for 3 weeks in 1982 and for 2 weeks in 1983. However, all plants eventually were destroyed by deer in both years within a month following the last treatment. This study was done in the Land Between the Lakes area of Tennessee, a place where deer populations are excessive.

400-383 is the only registered deer repellent that can be used on a large variety of plants grown for food. Although its effectiveness is far from absolute, its continued registration appears to be in the public interest.

Uniroyal has modified the label for 400-UEO as requested. The proposed label is reasonably consistent with the results obtained with this product in the field, except that users are not told that a point beyond which treatment is ineffective will be reached. Evidence of adaptation to the product was found in the studies reviewed. Such adaptation is consistent with expectations for (relatively) non-toxic olfactory repellents (which is basically what Hinder is). I believe that adding language regarding fading of efficacy would not be fair to Uniroyal since manufacturers of competing repellents (some of which were out-performed by Hinder in the studies reviewed) would not be required to make the change. For this reason, I am not objecting to this registration, even though homeowners would be better advised to spend their money on fencing in most cases. (One study in the 11/11/85 submission compared costs for using a repellent vs. fencing. The authors concluded that the costs of fencing would be offset by the costs of treatment with repellents in 1-5 years, depending upon the type of fencing selected and the size of the area to be protected. It took longer to offset costs for larger areas.)

## 202.0 CONCLUSIONS

No adverse comments on either product.

William W. Jacobs  
Biologist  
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January 14, 1985