New York State Flower Growers

INCORPORATED

BULLETIN 257 Secretary, Charles Wilton, Prattsburg, Steuben Co., N. Y. 14873 APRIL 1967

Naphthalenes Disbudding Agents for Chrysanthemums

Anton M. Kofranek[2] and Leszek Markiewicz[3]

Department of Floriculture

Cornell University

In a previous paper Kofranek and Criley (1) reported that the results of chemical disbudding of Princess Anne and Shoesmith chrysanthemums with emulsifiable concentrates were highly variable. The success or failure of the disbudding was dependent on the temperature, the morphological stage of bud development at the time of application, the material used and quantity applied and degree of coverage. These experiments were continued at Cornell University while the senior author was on sabbatical leave. The following is a report of some of these experiments.

In the initial experiments some of the same emulsifiable concentrates used at UCLA were tried again at like strengths, however, the concentration of Tween 20 was varied. With Princess Anne a 2% and ½% of the wetting agent was used, and with the American cultivars such as Indianapolis Pink, Good News and Albatross, a 5% was compared to the usual ½% concentration. The high concentration was attempted on the American cultivars to determine whether the lack of wetting was the reason for the poor results which had been experienced to date. At all concentrations of Tween 20, in combination with kerosene, Amsco 75 (naphtha) or xylene type emulsifiable concentrates resulted in unstable emulsions which required agitation during the spraying operation.

The naphtha product killed the most axillary flower buds on Princess Anne, but there were no differences observed when comparing the ½% and 2% concentrations of Tween 20. Results with the American cultivars were poor even when the 5% Tween 20 concentration was used. When *some* axillary bud kill was noted resulting from the use of 4% naphtha or 2% xylene, the young leaves and the terminal flower buds were also destroyed.

This experiment showed that the concentration of the surfactant (wetting agent) had little effect on the resultant bud kill. A recent review (2) on the use of surfactants stated that the concentration of these wetting agents used in treating plants very often exceeded the concentration necessary to reduce the surface tension of the plant material to effectively wet the surface.

(continued on page 2)

[1] The authors wish to thank: Dr. John G. Seeley, Floriculture and Ornamental Horticulture Department, Cornell University for making it possible to conduct this study; Dr. R. L. Wain, University of London, for his consultation and aid in selecting some compounds; and Yoder Brothers, Barberton, Ohio, for kindly donating the many chrysanthemum cuttings.

[2] Dr. Kofranek is a Professor in the Department of Agricultural Science, UCLA, and is currently on sabbatical leave at Cornell University, Ithaca, New York.

[3] Dr. Markiewicz is a Research Associate from the University of Krakow, Poland, and is currently conducting research at Cornell University and studying new floricultural methods in the United States.

Horticulture-Past to Present

Part II Greek Horticulture*

Philip Kozel

Department of Floriculture

Cornell University

Horticulture and the other sciences developed rapidly in Greece primarily because of the failure of religion to become a rational institution as it had in Egypt, Palestine, and Assyria. In Greece, free thought was allowed to develop unhampered by the dogmas of the priesthood.

Hesiod (8th century B. C.) wrote what for centuries was thought to be the first farmers' almanac. He described various horticultural practices such as the seeding and harvesting of crops in terms of phases of the moon. He was also a philosopher. Concerning the state of the world in his time he said: "The world is getting worse every day, it must certainly soon come to an end." Such social pessimism may strike us as extremely contemporary.

Socrates (470-399 B. C.) formulated ideas that were basic to the future progress of all sciences. He insisted upon clear definition and classification to avoid misunderstanding, stating that the healthy growth of sciences required moral purity, truthfulness, and individual and social discipline.

Theophrastus (372-288 B. C.) was perhaps the greatest botanical writer prior to the 16th century. His knowledge of foreign plants was outstanding. Alexander the Great sent him plants from as far away as India. Theophrastus' greatest asset was his power of observation which is illustrated best in two of his books, *"The History of Plants"* and *"The Causes of Plants"*.

He was apparently the first to classify roots of plants

(continued on page 5)

**Note*: In the first article of his series, Mr. Kozel traces man's earliest horticultural efforts. In the following discussion, he reviews the contributions of the Greeks to the art and science of horticulture.

Carl Gortzig

Naphthalenes Disbudding Agents

(continued from page 1)

The emulsifiable concentrates used up to that date resulted in the extreme variability in disbudding. Not only were they difficult to emulsify, but the purity and the concentration of the active ingredients was not known. When producing these concentrates in commerce, it is difficult to obtain accurate and reproducible mixtures and at best are a composite of many aromatics. A mass spectrographic analysis of the naphtha product revealed nearly 40 chemical compounds. Many of these aromatic chemical compounds, because of their complexity, had to be grouped together as alkyl benzenes, indans, indenes, naphthalenes, acenaphthenes and acenaphthylenes. The largest group was the naphthalenes (about 34%) followed by the alkyl benzenes and indans containing about 22 and 23%, respectively, of the total mixture.

The first thought, after noting a preponderance of naphthalene (a common moth repellant) in the material, was to place naphthalene flakes in a polyethylene bag with a chrysanthemum which was ready for disbudding (14 short days). The results with Fred Shoesmith were encouraging after an exposure of 8 or 24 hours at room temperature (70°F) to the naphthalene gas. Some plants were dissected and showed between 8 and 10 axillary buds killed a few hours after removing the plants from the bags. Some of the terminal buds were killed, however, and all of the young leaves which were still unfolded at the time of treatment were severely crinkled and distorted a few weeks later.

This initial experiment with a pure chemical served to demonstrate that naphthalene was one of the active agents in selectively killing the axillary buds. The next logical step was to sample some of the aromatic ring compounds and those closely related to naphthalene to determine their effectiveness in killing the buds.

The survey of materials included the following over a series of three experiments: Acenaphthene, Naphthalene, 1-Methylnaphthalene, 2-Methylnapthalene, Alpha Naphthol, Fluorene, Phenanthrene, Biphenyl and Para Dichlorobenzene. All but one of these materials are solid at room temperature and not soluble in water which posed somewhat of a problem concerned with their application. Acetone-water mixtures in moderate ratios are not considered phytotoxic to many plants, and the acetone is an excellent solvent for the above noted ring compounds. Therefore, mixtures were sprayed on Fred Shoesmith and Princess Anne in ratios of 6:4, 5:5, 4:6, 3:7, 2:8, and 1:9 of acetone: water by volume to determine the plant tolerance. The highest concentration did not injure either cultivar even when applied on an overcast day when one would expect the acetone to linger because of poor evaporation conditions. Only the mixture having a 4:6 ratio of acetone:water was chosen for the experiments that followed in order to keep the experiments within limited bounds. It should be pointed out that although acetone is an excellent "non phytotoxic" solvent for the above mentioned compounds, it has disadvantages of being inflamable and can cause headaches if inhalation is excessive.

The simplest method of preparing the desired concentrated stock solution of the compound desired was to make a saturated solution of the chemical in the 4:6 acetone: water mixture. The stock solution was filtered after saturation was complete. This method of preparing the stock solution was done at room temperature (70°F). The distilled water used in the mixture contained ½% Tween 20. These stock solutions were accurate and reproduceable. In previous experiments when the emulsifiable concentrates were used, there were many doubts concerning the reproductability of results because of the impurity, instability of emulsions, etc. These doubts were no longer a variable factor when using these pure compounds in a mixture that could be duplicated with confidence.

The dilution of the stock solutions were always made with a 4:6 mixture of acetone:water. For purposes of clarity the saturated stock solution will be called "stock," and the 4:6 dilution mixture will be called "diluent," and the resulting "—% of (chemical) stock."

The following are some we used:

A saturated solution of Acenaphthene in 4:6 mixture= 100% Acenaphthene stock

2 parts Acenaphthene stock + 1 part diluent = Ca 67% of Acenaphthene stock

1 part Acenaphthene stock + 1 part diluent = Ca 50% of Acenaphthene stock

1 part Acenaphthene stock + 2 parts diluent = Ca 33% of Acenaphthene stock

1 part Acenaphthene stock + 3 parts diluent = Ca 25% of Acenaphthene stock

Similar dilutions were made with Naphthalene, Alpha Naphthol, Fluorene, Phenanthrene, Biphenyl and Para Dichlorobenzene.

The compound 1-methylnaphthlene is liquid at room temperature and a stock emulsion was made up by volume as follows: One milliliter (ml) of the compound was added to 99ml of the 4:6 diluent which made a 1% stable stock emulsion. This stock was diluted further with ½% Tween 20 aqueous solution (not the 4:6 acetone:water mixture). The final dilutions used experimentally were: (percentage-wise) 0.5, 0.25, 0.2, 0.125, 0.1 and 0.05 1-methylnaphthalene (1-MNA). The 2-methylnaphthalene (2-MNA) being a solid material was prepared on a weight basis in similar concentrations. The resultant emulsions at all concentrations were very stable and didn't require constant agitation.

Results and Discussion

Perhaps it is best to dispense with those compounds which were not effective disbudding agents or were extremely phytotoxic. In this preliminary screening experiment only Fred Shoesmith was used. Biphenyl and phenathrene were not effective whatsoever and fluorene was only slightly effective at the "100% stock" rate. Alpha naphthol killed the apical region at the lowest level, "25% stock." Para dichlorobenzene has a highly aromatic quality and eliminated axillary buds but was soon discarded because it caused severe injury to the young foliage and terminal bud. Concentrations of 0.5 and 0.25% of 2-methylnaphthalene killed the young leaves but did not affect the lateral buds. The lowest concentration

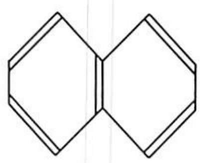
(continued on page 3)

Naphthalenes Disbudding Agents

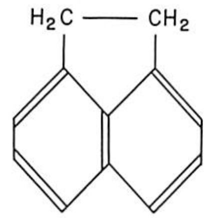
(continued from page 2)

(0.125%) did not injure leaves or buds.

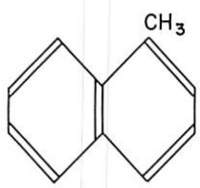
The aromatic compound that were tried and are promising disbudding agents are: acenaphthene, naphthalene, and 1-methylnaphthalene. The structural formula of these compounds are shown with their schematic diagrams in figure 1. It can be seen that they are very closely related, differing only in the position of the side chains. It is interesting to note that the position of the methyl group (CH_3) as shown in 1-MNA and 2-MNA alters the biological activity of that compound. The former is a very effective disbudding agent, and the latter is ineffective.



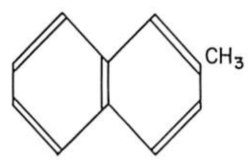
NAPHTHALENE



ACENAPHTHENE



1-METHYLNAPHTHALENE



2-METHYLNAPHTHALENE

FIGURE 1—The structural formulas of some of the compounds used.

Both Fred Shoesmith and Princess Anne were used in the subsequent experiments. A preliminary trial revealed that the 0.5% concentration of 1-methylnaphthalene was injurious to Princess Anne, and the data in Table 1 report two lower concentrations which more nearly approach the correct range for treatment. Figure 2 illustrates a typical plant treated with 0.25% 1-methylnapthalene. None of the terminal flowers were damaged, and disbudding was complete to be within a few flowers of the top (Figure 2). This material is very promising at least for Princess Anne. Experiments are now being conducted on Fred Shoesmith as well; however, much lower concentrations are being used because of extreme sensitivity of this cultivar.

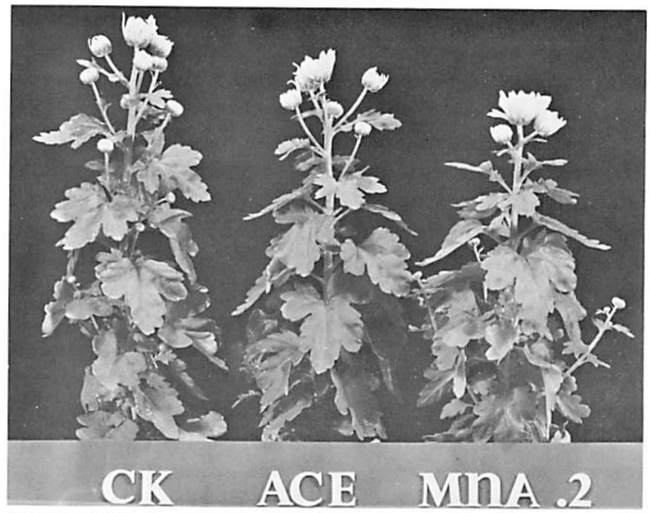


FIGURE 2 (left to right): Control plant sprayed with 4:6 acetone-water mixture, plants sprayed with a "100% acenaphthene stock solution," and plants sprayed with a 0.25% 1-methylnaphthalene emulsion. The number should read ".25" rather than ".2" as shown.

Table 1 shows the results of spraying with Acenaphthene, Naphthalene and Fluorene. Acenaphthene is effective at the high concentration, but there was leaf injury and the terminal bud was killed also on 2 of 5 Shoesmith plants. The same high concentration "Ace 100% stock"

(continued on page 4)

Table 1. Numbers of buds killed per stem and comments concerning condition of plants after treatment with Acenaphthene (Ace), Naphthalene (Na), Fluorene (Fl) and 1-methylnaphthalene (1-MNa). Dilutions explained in text. Plants were sprayed after 17 short days except for 1-MNa which were treated after 19 SD. The numbers represent average for 5 Shoesmith and 6 Princess Anne. Spraying took place on an overcast day in early December in both instances.

	Fred Shoesmith			Princess Anne		
Concentration of Compound	Buds Killed Per Stem	Leaf Injury	Comments	Buds Killed Per Stem	Leaf Injury	Comments
Ace 100% stock	10	Severe	TBK	6.5	Slight	Look OK
Ace 67% stock	8	Slight	....	5.5	Slight	Look OK
Ace 50% stock	7	Slight	....	3.1	None	RC
Na 100% stock	....	Severe	TBK	3.5	None	RC
Na 67% stock	....	Severe	TBK	3.5	None	RC
Na 50% stock	....	None	RC	1.1	None	RC
Fl 100% stock	4	None	....	....	None	RC
Fl 67% stock	....	None	RC	....	None	RC
Fl 50% stock	....	None	RC	....	None	RC
Control 6:4 stock	....	None	Normal	....	None	Normal
Control 4:6 stock	....	None	Normal	....	None	Normal
0.25% 1-MNa	Not	used	here	9.2	Moderate	Passable
0.125% 1-MNa	Not	used	here	5.2	Slight	Look OK

*Fluorene stock was a saturated "solution" in 6:4 ratio of acetone: water
The dilutions were with the 6:4 ratio
TBK equals terminal bud killed *and* RC equals resembles controls

Naphthalenes Disbudding Agents

(continued from page 3)

for Princess Anne, however, did an excellent job of disbudding the lateral buds and caused only slight leaf injury. This is shown in Figure 2. The results from naphthalene were not nearly as good as those from Acenaphthene. Injury from napthalene was severe with Fred Shoesmith but non-damaging to Princess Anne. Disbudding of the latter cultivar was less effective with naphthalene than with acenaphthlene. Although a higher concentration of acetone was used to dissolve the fluorene, the results were not encouraging. Plants treated with a 6:4 acetone: water mixture alone were not injured whatsoever.

Early experiments showed that the lateral buds of Shoesmith plants exposed to naphthalene gas were killed but injury to leaves and the terminal flower bud were also very evident. Because Princess Anne proved to be more tolerant to higher concentrations of aromatic compound sprays than Shoesmith cultivars, it followed that exposure of Princess Anne to aromatic compound vapors might be effective method of disbudding. Plants were placed in polythylene tubes lined with wire netting to prevent their collapse. A slow but constant flow of air was maintained during the 15 hours treatment time. Five plants were treated at one time with either one gram of naphthalene *or* 1 milliliter of 1-methylnapthalene placed on a petri dish within the tube.

The results are shown in table 2 and photographs of typical plants appear in figure 3. The 1-methylnaphthalene was very effective in killing the lateral buds that only caused very slight damage to the young leaves. Naphthalene resulted in less lateral bud kill but caused a moderate amount of leaf distortion. It is interesting to note that both materials killed lateral buds within 3 from the terminal when used at this late date (23 short days). These vapors were also very effective in retarding the elongation of the upper one-third of the stem. This upper stem region elongates rapidly soon after the flower bud has initiated florets. This occurs sometimes between 21 and 28 short days with most cultivars. Probably the naphthalene vapors interfered with the action of the growth substances responsible for elongation of the peduncle (that portion below the flower). This retardation seems to be a distinct disadvantage in producing pot plant chrysanthemums.

Table 2. Number of axillary buds killed and comments concerning the condition of leaves. Princess Anne plants were treated for a 15-hour period after 23 short days. The numbers represent averages for 5 single stem plants.

Treatment	Buds Killed Per Stem	Leaf Injury
Naphthalene	5.6	Moderate
1-methylnaphthalene	7.1	Slight
Control (air only)	0	None

One can readily see that these "naphthalenes" used as vapors show promise and might have commercial application by placing the materials under the black cloth at a time when the chrysanthemums are in the correct stage for disbudding. A hasty experiment was set up by saturating paper toweling with naphthalene and placing it under black cloth with Shoesmith for 16 hours. This sensitive cultivar was disbudded very effectively, but the concentration of vapors also severely distorted the young leaves. The terminal bud was killed on those plants in close proximity to the paper. The ideal chemical, the amount to apply, the mode of application and the time interval of treatment must still be determined before this method is applied in the trade. Some experiments are now in progress in an attempt to find answers to these questions.

FIGURE 3 (left to right): Control plant, plant treated with naphthalene vapors (Na) and plant treated with 1-methylnaphthalene vapors (MNa). Plants were exposed to vapors for a period of 15 hours after the 23rd short day. Note the retardation of the growth of the two treated plants. No injury to the terminal flowers was observed.

Summary and Conclusions

Pure aromatic compounds, namely, naphthalene, acenaphthene and 1-methylnaphthalene dissolved in acetone-water mixtures were effective disbudding agents for the chrysanthemums cultivars, Princess Anne and Shoesmith. The latter cultivar is much more susceptible to leaf distortion from these chemicals than is Princess Anne. The most promising material used as emulsion is 1-methylnaphthalene at concentrations between 0.25 and 0.125% for Princess Anne. This chemical was also very effective when used as a vapor.

It was noted that treated plants were always slightly shorter than untreated plants. The retardation was in that portion of the stem just below the terminal flower.

The optimum time for the disbudding treatment is not well defined. It depends not only upon the number of inductive short days given but also upon the weather conditions which prevail during the early period of lateral bud development. Further investigations are necessary to determine the correct morphological stage for treatment.

Literature Cited

1. Kofranek, Anton M. and Richard A. Criley. Emulsifiable oils used as disbudding agents for chrysanthemums. (in press)
2. Parr, J. F. and A. G. Norman. Considerations in the use of surfactants in plant systems: A review. Bot. Gaz. 126(2) 86-96. 1965

Horticulture—Past to Present

(continued from page 1)

as being lignous, fiberous, or fleshy and his hypothesis was that they functioned by absorbing nourishment for the plants. He emphasized that grains such as wheat and barley germinated with a single leaf and that the subsequent leaves of the plants were parallel veined. He noted that beans and peas on the other hand germinated with two leaves, the subsequent leaves being net veined. It is incredible that such a fundamental difference between plants (monocotyledons vs. dicotyledons) was overlooked for so many centuries after Theophrastus.

He also developed one of the first systems of plant classification which was based on leaf characteristics. In his writing he described how root pruning and girdling enhanced the flowering and fruiting of plants. He was the first to describe in writing the process of cross pollination which is of such great importance in present day horticulture.

Despite all of his remarkable horticultural contributions Theophrastus was a believer in many of the superstitions and exotic plant remedies which existed during his life-time. He devoted part of his books to the "cures" for various human illnesses. For example, he advised a person with a cold to kiss a mule's nostrils in order to be cured. This may not have cured the person's cold but it certainly must have made them forget it for a while!

The next article will discuss Roman horticulture in that the Roman Empire quickly succeeded Greece as the center of intellectual accomplishment.

Review of Papers

Forcing of Tulips and Hyacinths

FROM THE MICHIGAN FLORIST—JAN., 1967

A. deHertogh and L. Aung

To have tulips and hyacinths in the proper stages of development at the desired time requires that growers consider several important points:

1. Before bulbs are forced in the greenhouse they must have a fully developed root system.
2. Bulbs must be given the proper length of cold treatment in rooting rooms or beds before being brought into the greenhouse.
3. Only those cultivars (varieties) suitable for forcing at the desired period should be selected.
4. Hyacinths should be forced at a night temperature of 70-75°F. If the flower is not yet out of the bulb, cover with black plastic until it emerges.
5. Tulips should be forced at 65°F night temperature. Avoid higher night temperatures and day temperatures over 70°F. At 60°F nights, tulips will generally flower in 3 weeks. Tulips may also be covered with black plastic to bring flowers out of the bulb.
6. Good greenhouse procedures and sanitation aids in producing a quality crop.
7. Remove and sell plants in the bud stage. Buds are less easily damaged in transit to the point of sale and consumers will receive maximum enjoyment from plants purchased in the bud stage.

C. F. Gortzig

Introduction of Dieffenbachia Humilis Poepp*

George S. Bunting

For several years, *Dieffenbachia humilis* has been cultivated in the conservatory at Cornell University, where it develops into lush specimens of good form and appearance. Plants grown in several homes for two years have proved *D. humilis* to be a good house plant, and one that offers a combination of features not found in any other plant. Cuttings of this species have recently been distributed to several growers of tropical foliage plants.

This species is unique among cultivated dieffenbachias, and is suggestive of some *Aglaonema* species. It has bright green, lanceolate-oblong leaves of relatively small size (for the genus) that persist for a long time; the stem is, consequently, leafy throughout most of its length. In time, branches are developed naturally at various points along the stem. *Dieffenbachia humilis* grows well in a moist soil high in humis. It also does very well simply in water, even under the reduced light conditions of the home or apartment.

Dieffenbachia humilis is a native of the upper Amazon valley. Our material was grown from seeds collected in the wild at Soledad on the Rio Itaya, Province of Maynas, Department of Loreto, Peru, in 1960 (*H. E. Moore et al. 8638*), and it first flowered in July, 1962. Our plants have grown to a height of 45 cm. The stems have short internodes, remain green, and lack the ugly brown dried cataphylls such as persist on the stems of *Aglaonema modestum.* Leaves are leathery, oblong to lanceolate-oblong, somewhat inequilateral and subfalcate, apically long-acuminate and basally usually acute. The upper surface is bright medium green and semiglossy, with six to seven impressed lateral veins on each side of the convex midrib. The lower surface is paler green, with the midrib strong and elevated. Leaf blades vary from 15-29 cm. long and 4-6.7 cm. wide, and the somewhat shorter petioles are vaginate to within 1-4 cm. of the base of the blade. Leaves subtending inflorescences may be even smaller. The cut tissue of this species emits an acrid, skunky odor typical of the genus, and the juice is somewhat caustic.

Inflorescenses are produced solitarily near the tips of the shoots, on short peduncles totally hidden by the petiolar sheath of the subtending leaf. The spathe is lime-green, about 9 cm. long at anthesis, and convolute about

(continued on page 6)

*Reprinted from Baileya Vol. 14 No. 3 Sept., 1966.

the shorter spadix; it increases to 16 or more cm. long during development of the infructescence. At anthesis, the apical portion of the spathe expands to expose for a brief period the cream-colored staminate part of the spadix. As is typical for members of this genus, the lower part of the spadix is adnate to the spathe, and bears the sparse pistillate flowers, each *with its whorl of* clavate staminodes.

Film Available on Care of Flowers in the Home

Herbert E. Forbach, Sr. has asked us to remind members that the New York State Flower Growers, Inc. owns a copy of the film "Arranging Flowers in Your Home" which is available for use by members for the cost of mailing and insurance (approximately $1.00) The film is a 25-minute sound and full-color production. It shows how flowers should be treated before arranging them, which holders and vases should be used, and where the arrangements should be placed for the most effective and attractive display. Viewers are shown step-by-step procedures for making several basic arrangements. The picture was produced, planned and filmed by Richard G. Turner of the Department of Communication Arts and Dr. Raymond T. Fox of the Department of Floriculture and Ornamental Horticulture, Cornell University. If you are interested in using the film, write directly to Mr. Forbach at Forbach's Flower Shop, 933 Kensington Ave., Buffalo, New York 14215.

While we are on the subject of films, we remind you that the New York State College of Agriculture Film Library has a wide selection of films on horticultural and other topics including some on flower arrangement and home gardening topics. The film "Budget Flower Arrangement", may be of particular interest for use as a companion film to "Arranging Flowers in Your Home". Some films are available free of charge (except for mailing and insurance costs), others are available for a small rental fee. For a catalog of films available, write to: Film Library, New York State College of Agriculture, Roberts Hall, Cornell University, Ithaca, New York 14850.

Offering to provide films for community organizations can serve as an effective part of your public relations program.

Cornell to Establish Station to Monitor Air Pollutants

A monitoring station to measure crop-damaging air pollutants will be established at the College of Agriculture this spring, as part of a regional air pollution research project that has been established in the Northeast with several states and universities cooperating.

Prof. Bernard E. Dethier, Agricultural Climatologist, will be in charge of the College's station. He said it will be equipped initially with a device capable of detecting ozone, one of the know pollutants causing plant damage.

"Indicator Crops"

In addition, two "indicator crops," tobacco and white petunias, will be planted in greenhouses using only clean, filtered air.

Since these crops are sensitive to certain air pollutants, they will serve as additional monitors of the extent of pollution damage, Prof. Dethier said.

To find out what effects pollutants have on these crops, the test crops will be exposed periodically to the natural air outside the greenhouses throughout the growing season.

Pridham Honored

Dr. Alfred M. S. Pridham, professor in the department of floriculture and ornamental horticulture in the New York State College of Agriculture at Cornell University, was honored by the New York State Arborists' Association during the organization's annual conference at the Concord Hotel, in Kiamesha Lake.

Cited for his continuing efforts in behalf of the organization from the time of its chartering and for his 16 years of devoted service as editor of the Association's publication "Shade Tree Notes", Professor Pridham was honored with a Life Membership in the Association and with the naming of the Association's scholarship fund "The Alfred M. S. Pridham Scholarship Fund". The organization also has planted an oak tree on the lawn of Malott Hall on the Cornell campus to commemorate Dr. Pridham's contributions to the industry and to the Association. Both Dr. and Mrs. Pridham received gifts at the Awards Banquet.

In This Issue

Bul. 257, April '67

- Naphthalenes Disbudding Agents For Chrysanthemums
- Horticulture—Past to Present, Part II
- Review of Papers
- Film Available on Care of Flowers in the Home
- Cornell To Establish Station To Monitor Air Pollutants
- Pridham Honored

YOUR EDITOR,

Bob Langhans