ANCYMIDOL applications retard plant growth of WOODY ORNAMENTALS

Ancymidol was found to be effective in retarding growth of many plant species and cultivars. It was effective on woody and herbaceous species. It appears that this new chemical has a wide latitude of safety on most plants. However, some objectionable effects were observed—which may be partly the result of the high dosages used for this series of experiments. Ancymidol is not registered for use at this time, and is not recommended by the University of California.

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Pyracantha plant to right flowered and set fruit following treatment with large amounts of Ancymidol, as compared with untreated control to left.

ANCYMIDOL HAS BEEN reported to reduce internode elongation, to be effective on a wide range of plant species, and to be effective when applied as a soil drench or as a foliar spray. Also reported was that slight delay in flowering might be expected when it is used with some plants. During 1971, experiments were conducted, primarily at the UC South Coast Field Station and also at some commercial nurseries, to evaluate the effect of Ancymidol on many plant species and cultivars.

Ancymidol is the proposed generic name for α-cyclopropyl-α-(4 methoryphenyl)-5-pyrimidinemethanol, a product of the Elanco Products Co., a division of Eli Lilly Co. The compound was also known as EL-531.

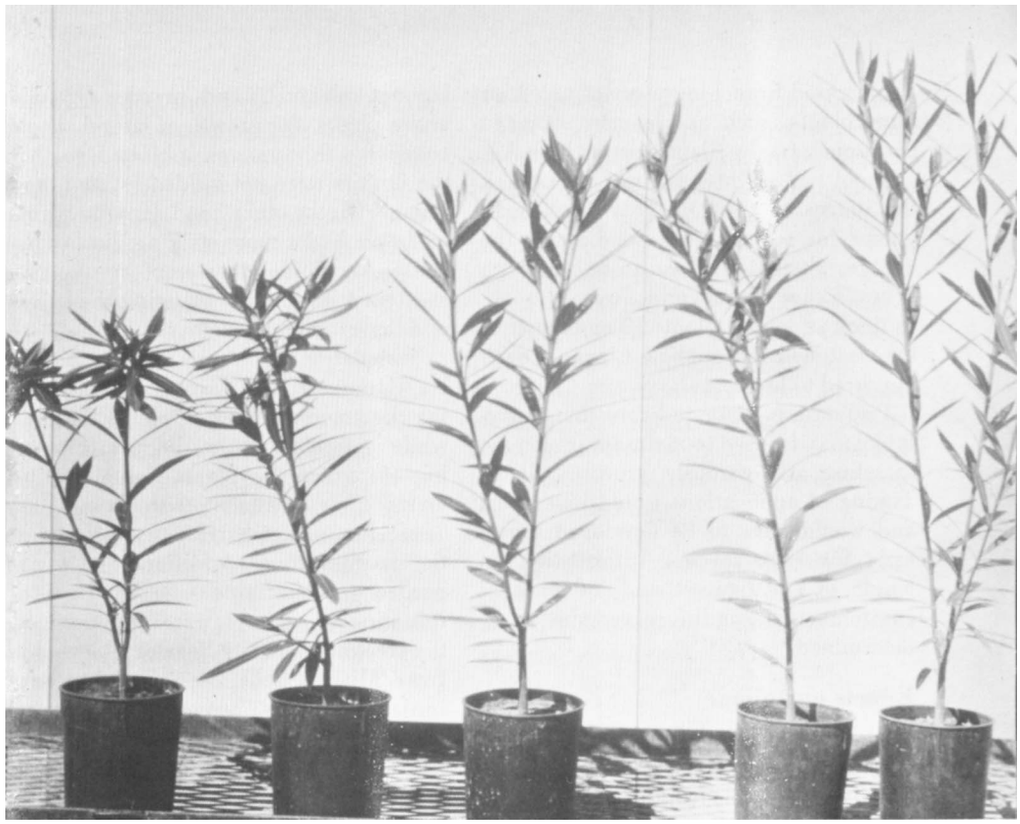
Species and cultivars

Plant response to application of the chemical was defined as observable reduction in internode, leaf blade, petiole, or flower stalk elongation. A total of 49 species and cultivars were treated long enough to observe responses. Soil and foliar applications were tested on most of the plants, though in some cases only one of the treatment methods was used. Generally an emulsified concentrate was used, especially in the early tests. Foliar applications were made as a wetting spray until drip occurred. Enough liquid was used to wet the entire root zone in soil applications.

Applications of Ancymidol caused no adverse effects in most of the species. Several species did not respond at all under the conditions of the test. Stem elongation

of Canary Island Pine (*Pinus canariensis*) plants was not retarded following foliar spray with 900 ppm of Ancymidol, or soil application of 0.73 mg per 100 cc of soil. Seedling variation may have obscured the effect of the chemical. Plants of the Toyon cultivar of Zonal Geranium also failed to respond under the conditions of the test when 0.20 mg per 100 cc of soil was used. Both plants were treated during the summer and were grown outdoors under full sunlight.

Plants of three other species—*Juniperus chinensis* 'San Jose,' *Juniperus horizontalis* 'prostrata,' and *Pyracantha* 'Santa Cruz' (in one case)—did not respond to soil applications. These plants had been pruned, both top and roots, and transplanted into "bonsai" pots. Treatment was applied soon after transplanting. It is possible that the root system had not regenerated sufficiently to absorb the chemical. This is likely because in another study, *Pyracantha* 'Santa Cruz' did show response to soil applications of Ancymidol.



Oleander plants treated with various dosages of Ancymidol as a foliar treatment. Increased dosages, toward left, resulted in greater retardation of growth.

Dosage and varietal response

These experiments were not conducted to establish minimum dosage or to establish optimum dosage. Consequently, a wide range of dosages was applied to each plant species using rather large steps—foliar application from 50 to 900 ppm, and soil applications from 0.01 to 1.3 mg per 100 cc of soil mix. As expected, the amount of chemical needed for plant response varied with the species and cultivar. A partial explanation may be the amount of chemical absorbed by the plant. A comparison of plants of *Coprosma baueri* and *Eucalyptus globulus* for example reveals different responses to similar dosages applied to the foliage, but not when applied to the soil.

Another measure of the influence of variety on response is the degree of retardation from a given dosage. Reduction of petiole length and leaf size varied with the cultivar of *Caladium* when the same dosage of 0.08 mg per 100 cc of soil was used. After obtaining response, increasing the dosage on any given plant species resulted in more severe retardation of internodal length, or the other responses noted. Increasing the dosage also resulted in fewer number of nodes forming. In one case—*Rhamnus alaternus*—terminal growth ceased completely while the chemical was effective. Normal growth resumed when the effect of the chemical was dissipated.

The lasting effectiveness of the chemical varied with the plant species, and with the dosage—from one to two weeks for pyracantha plants to over three months for *Eucalyptus viminalis* plants. Applying stronger dosages resulted not only in greater retardation of plant growth, but also in increased duration of effectiveness.

Even when the plant received the same amount of Ancymidol, splitting the foliar application into two sprayings seven days apart was more effective in most cases in retarding internodal elongation than applying all the chemical at once. The duration of effectiveness of the chemical seemed to be the same for the two spray treatments. For soil applications, the results were not as clear-cut. Two applications were more effective than one, for two of the three species tested.

In this study, less of the chemical was applied to the soil than to the foliage. It was evident that soil applications were more effective on two of the three species. The effect of the soil application persisted for a longer period of time, as well.

Using *Lantana camara* as the test plant, a comparison of formulations of Ancymidol was made using an emulsified (EC40) and a wettable powder (25WP) formulation. Each plant received the same amount of chemical as a wetting spray. Concentrations of 450 and 900 ppm were used.

Results showed the emulsified formulation to be more effective than the wettable powder. Slight effect was noted when the wettable powder was used at 450 ppm. Moderate effect was noted when the emulsion was used at 450 ppm, and when the wettable powder was used at 900 ppm. Severe retardation occurred when the emulsion was used at 900 ppm. In all likelihood, more chemical absorption occurred when the emulsified formulation was used. The experiment was terminated after 12 weeks before the effect of the chemical wore off.

When the effect of the chemical wore off, the test plants resumed normal growth. Internodal length, leaf size and leaf shape were normal in all respects. As previously noted, Ancymidol treatments may cause a reduced number of nodes. In one case—*Rhamnus alaternus*—terminal growth ceased completely. No other effect was noted. After a period of time, normal growth resumed on all test plants—the period depending on the dosage. Throughout the experiment, control plants grew normally and continuously. Quantitive data on branching or growth of lateral buds following treatment with Ancymidol were not recorded. However, stimulation of lateral bud growth was noted on some plants, such as pyracantha. Many of the plant species tested normally branch freely.

Increased branching was not noted on some plants, such as oleander, that do not branch freely. Plants treated with Ancymidol had slightly thinner stems than the untreated control. This effect may persist for some time depending on the dosage. Stems of pyracantha given a heavy dosage of Ancymidol were ½ to ⅔ as thick as control plants 10 months after the treatment was applied. Linear growth appeared to be normal.

Preliminary data indicate that Ancymidol may be used to maintain prolonged dwarfing of vigorously growing plants. Timing of applications would be critical and would have to be developed separately for each species. Information on length of effectiveness and influence of environmental conditions remains to be determined.

Effects on foliage

The effect of Ancymidol on uniform decreasing of leaf size, and on the retardation in petiole length was previously observed on caladium and gerbera. Because the entire plant was uniformly dwarfed, these effects were not objectionable. Woody plants often grow more small leaves after treatment with Ancymidol and some become somewhat unsightly. Plants treated with Ancymidol turned darker green color, and in some cases their leaves appeared thicker. Quantitive data were not obtained on either attribute. In some plants such as oleander and eucalyptus, the new leaves twisted after treatment. This effect was temporary and disappeared as the leaf developed.

Ancymidol was also observed to have a differential effect on the width and length of the leaves. In *Eucalyptus viminalis,* the growth in width was more severely affected than growth in length, resulting in leaves that, although generally smaller than normal, were narrower in relation to the width than the length.

In plants with leaf coloration other than green, such as caladium, treated plants often had more green coloration than normal. This was true especially of the variety, Miss Chicago, a variety with predominantly red foliage (center of blade red with a green margin and speckled with white).

Effect on flowering

Some delay in the flowering of some plants was noted, as was the reduced size of the flowers. Also noted was a shortening of the peduncle of some species such as gerbera. The flowering display was improved in many cases, such as lantana, oleander and myrtle. On oleander plants, the growth of lateral shoots below the flowers was inhibited so that the flowers were not hidden by stem and foliage. On the other hand, lantana plants in flower had a more striking display because Ancymidol treatment resulted in shortened internodes, bringing the leaves and flowers closer together.

Stimulation of flowers on bougainvillea, 'Orange King,' plants occurred during the summer. Treated plants flowered while untreated plants did not. Flowering of pyracantha plants was also stimulated after treatment with Ancymidol. These flowers set berries that colored at the normal time. Additional tests are needed to determine whether time of initiation of flowers was influenced by the treatment. Treated azalea plants, cultivar 'Mission Bells,' were found to have initiated flowers sooner than control plants. On untreated plants, approximately 20 to 22 nodes formed before the flower bud initiated. On treated plants, only 10 to 12 nodes formed before flower buds initiated.

Plant injury

Soil drenches of Ancymidol, especially at the high rates of application, caused roots to become coarse, stunted and enenlarged. The foliage of ivy and several other plant species developed necrotic spots following foliar application of the emulsified formulation. This appears similar to "spray burn" observed from the use of many chemicals, and could be due to the emulsifier and carrier in the formulation.

Following treatment with high rates of the chemical, some species of annual flowering plants developed necrotic areas on the older leaves. Yellowing of the new leaves was also noted. These plants died before recovery. Irregular chlorosis or yellowing of newly developing leaves occurred on some plants treated with high rates. These symptoms occurred after use of both the emulsion and wettable powder. The dosages at which these symptoms occurred were generally many times that needed to obtain growth retardation.

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EXPERIMENTAL EUROPEAN PACIFIC

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LEAF-FEEDING MITES are one of the most severe pest problems for growers of deciduous fruits and nuts in California. The mites primarily responsible for these problems include the European red mite, *Panonychus ulmi* (Koch), the two-spotted mite, *Tetranychus urticae* Koch, and the Pacific mite, *T. pacificus* McGregor. Control of these and other species of mite pests has depended upon the use of pesticides that may be harmful to non-target species of insects and mites, and may also lose their efficacy against target species because of a build-up of resistance. In an attempt to find those materials that are effective against the target species, and the least harmful to non-target species, new chemicals are continually being evaluated for their effect on both pest and beneficial species of mites and insects. This report presents the results of field trials of new, but as yet unregistered, pesticides that were evaluated as miticides on the European red mite and Pacific mite during 1971.

An infestation of European red mites on mature Santa Rosa plums was treated with several chemicals on June 30, 1971. The orchard was located at the San Joaquin Valley Research and Extension Center, Parlier. Treatments were replicated four times on single trees in a randomized complete block design. The chemicals were applied with a handgun sprayer at 300 psi, using about 5 gals spray per tree. Following the pretreatment count and application, the plots were evaluated at seven-day intervals according to the number of mites brushed from a 25-leaf sample taken from each replicate.

The results of this test (table 1) show that several of the chemicals were effective against European red mites. Carzol, SD 14114, and U-27415 provided the best control 28 days after treatment, while PP-511, Morestan, Plictran, and DPX-1410, in that order, gave satisfactory control up to 28 days. Dursban, Dowco 214, and Lannate were included