Aphids commonly occur as pests on chrysanthemums and carnations as well as on many other plants grown in plastic or glass houses in California. They are usually found in colonies on plant tips, shoots of new growth, or flowers. Aphids multiply so rapidly under favorable conditions that a light infestation may increase to alarming proportions in a week. They are generally more numerous during cooler months when the most serious damage occurs. However, damage can be observed throughout the year.

Aphids injure plants by inserting their long proboscis or beak into the plant tissue and sucking out the juices. Feeding on new leaves causes the leaves to curl or crinkle, and plants become stunted or may die. Also, honeydew secretions from the aphids drop to the lower leaves forming a shiny, sticky coating. These honeydew deposits attract ants and promote the growth of black smut fungus causing a black or sooty, unsightly appearance. Aphids can transmit several plant virus diseases. For example, the green peach aphid transmits carnation streak and several other viruses.

In this investigation, several insecticides were evaluated for: (a) aphid pest control on chrysanthemums and carnations grown for cut flowers, and (b) phytotoxicity. On February 29, 1972 Pompon (Hurricane variety) chrysanthemums in the tight bud stage were treated with four insecticides for the green peach aphid (Myzus persicæ) and the leaf curl plum aphid (Brachycænus helichrysi) in El Modeno, California (table 1). Separate plots were established for phytotoxicity observations of four compounds on 19 chrysanthemum varieties. On June 1, 1972 four compounds were tested on chrysanthemums in propagating beds in Encinitas, California for leaf curl plum aphid control (table 2) and 26 varieties were sprayed with Pirimor for phytotoxicity observations. In 1974, on February 7, 11 different treatments were applied on carnations in Encinitas, California for green peach aphid control (table 3). Three insecticides were sprayed on 8 carnation varieties at the same location at 2 and 4 week intervals between April 19, 1974 and April 12, 1975 for phytotoxicity observations. A total of 15 applications were applied on each plot.

In three experiments, Pirimor and Orthene gave effective and long-lasting aphid control. No phytotoxicity was ob-
and for 5 weeks in Encinitas. Aphids on the chrysanthemums in the bud stage, carried out for cate. Plants were observed for signs of on the crown, stems, and buds) per repli-
cations and 10,500 square feet each for the
periods. There were three replications in
fields. The chrysanthemum varieties were 300 square feet in
El Modeno and 270 square feet in Encin-
itas, arranged in a randomized block design. There were three replications in
each experiment. The phytotoxicity tests on
carnations were not replicated and the treatment areas were 6,375 square feet each for Pirimor and Orthene treat-
ments and 10,500 square feet each for the
Lannate treatments. Materials were ap-
plied as full coverage sprays with a power
sprayer at 200 psi pressure using a Spray-
ing Systems 8006 TeeJet nozzle on a
spray wand. In each experiment, the
sprays were applied at a rate of 400
gallons per acre.

**Evaluation**

Adult and immature aphids were
counted weekly beginning the first week
after application. Weekly sampling was
carried out for 3 weeks in El Modeno
and for 5 weeks in Encinitas. Aphids were
counted on ten growing tips (or, on the chrysanthemums in the bud stage, on the crown, stems, and buds) per repli-
cate. Plants were observed for signs of
phytotoxicity throughout the test
periods.

**Control**

The results of the experiments are
summarized in tables 1 to 3. Pirimor (a
contact poison) and Orthene (a contact
and systemic poison) were the most ef-
efective materials with quick and long
lasting aphid control. Each material pro-
vided good control of aphids for up to 5
weeks. In the experiment on carnations,
Orthene at the 8 ounce rate provided
excellent protection for 4 weeks but was
beginning to lose its effectiveness at 5
weeks. Orthene, with acute oral LD$_{50}$
of between 860 and 950 mg per kg in rats,
and Pirimor, with around 1,000 mg per
kg are among the safer insecticides.

Meta-Systox-R also provided excel-
lent protection on chrysanthemums but
its activity was somewhat slower be-
cause it is a systemic insecticide and it
took about a week before its activity
reached a level high enough to control all
of the aphids. On carnations Meta-Systox-
R was not as effective as Pirimor and Or-
there. Furadan gave good initial results
but lost its activity before 2 weeks.

**Phytotoxicity**

Chrysanthemums and carnations were
observed for phytotoxicity resulting from
the aphid control treatments. Pirimor
(4 ounces AI/100 gallons), Meta-
Systox-R (12 ounces AI/100 gallons), Or-
there (12 ounces AI/100 gallons), and
Furadan (8 ounces AI/100 gallons) were
applied in the tight bud stage. Phyt-
otoxicity was observed on both Hurricane
varieties sprayed with Furadan; slight
discoloration on the upper leaves after 2
weeks, no further discoloration after 3
weeks. No phytotoxicity was observed
from the application of the other com-
ounds.

The chrysanthemum varieties treated
were: POMPONS—Hurricane white, Hurri-
cane yellow, Bonnie-jean white, Bonnie-jean yellow, Alabaster
white, Alabaster yellow, Starburst white,
Jackstraw yellow, Polaris white, Polaris
yellow, and Dramatic bronze; STAN-
ARDS—Wildfire bronze, Shoesmith #2
golden, Shoesmith white, and Improved
Fred Shoesmith white; and SPIDERS—
Luyona yellow, Yellow Knight, Donlope
white, and Nightingale green.

When Pirimor (4 ounces AI/100 gal-
ons with 6 ounces of spreader) was ap-
plied to chrysanthemum propagating
propagation beds were of peat moss and
perlite. Treatment replicate areas on
houses in standard ground beds except
stands, except on 2 Hurricane varieties
of chrysanthemum sprayed with Furadan.
Downy mildew of lettuce controlled by systemic fungicide

Albert O. Paulus ■ Jerry Nelson ■ Marvin Snyder ■ Judy Gafney

Downy mildew of lettuce, caused by the fungus *Bremia lactucae*, can cause considerable damage especially to early spring and late fall crops in coastal areas. It is favored by cool, moist weather and may occasionally cause economic damage in the Imperial Valley during the winter lettuce season. Trials were initiated in the summer and fall of 1976 to compare new systemic fungicides from Ciba Geigy with commonly used materials.

1976 trials

The Calmar variety was used in the first trial and plots were conducted in the Santa Maria Valley. Fungicide treatments were started immediately after thinning and applied on August 24 and September 13. Sprays were applied with a Hudson 2 gallon CO2 pressurized sprayer at 30 psi and rates of materials are per 100 gallons of water per acre. Plots were 25 feet long and replicated four times. Downy mildew was present in a light infestation before application of the first spray. Results are shown in table 1.

Both Ciba Geigy materials gave excellent commercial control of lettuce downy mildew to harvest, although CG 48988 gave significantly better control than CG 38140. Maneb provided intermediate control.

Second trial

The Moran Gold variety was used in this trial and plots were again conducted in the Santa Maria Valley. Fungicide treatments were started immediately after thinning and applied on September 13 and October 4. Procedure was the same as in the previous trial. Plots were 25 feet long and replicated four times. Results are shown in table 2.

Ciba Geigy 48988 gave better control of downy mildew than Ciba Geigy 31840, as in the previous trial. Addition of maneb to Copper Count N improved control over Copper Count N used alone, but after 2 sprays, plots containing Copper Count N + maneb showed yellowing of wrapper leaves. Light brown necrotic areas were noted on leaf and leaf blades where Copper Count N was used alone.

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