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California Cut Flower Commission
2339 Gold Meadow Way Suite 100
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To Whom it May Concern:

Enclosed is my report for the project "Search for Controls of Disease-Producing Organisms Affecting Ornamental Plants".

If you need more information, please let me know.

Very sincerely,

Robert D. Raabe
Professor of Plant Pathology

Cut Flower Commission Report

Robert D. Raabe
University of California, Berkeley CA

Projects worked on or reported on this past year include the following:

Rust on carnation. In two experiments in cooperation with Santa Cruz County Extension Service, 70 cultivars representing nearly all of the commercial carnation cultivars available, were tested for resistance to the carnation rust fungus. Ten pots of four plants each were randomized in a moist chamber and inoculated with the rust. Cultivars varied in resistance and 19 were found to be very resistant whereas 13 were very susceptible. The rest showed varying degrees of resistance between the extremes. Growers with a known rust problem now can select resistance or can select away from susceptibility.

Anigozanthus leaf diseases. Species of this plant have been found to be infected with a leaf spotting fungus (*Alternaria*) and with a foliar nematode. Species and hybrids have been collected to test for resistance. *A. flavidus* is not very susceptible to *Alternaria* but is not one of the more colorful species and is not used much as a cut flower. So far, none have been found resistant to the nematode.

Cosmos wilt. A new disease in cosmos has been found to be due to the *Verticillium* wilt fungus. From another area *Verticillium* was isolated from the chocolate scented cosmos. Attempts to control the fungus in the latter when grown in pots and drenched with Benlate were not successful. Cosmos species collected so far have not been found to be resistant.

Rhizoctonia control. Attempts to control *Rhizoctonia* using a form of biological control (Kodiak), and several concentrations of Terraguard and Terraclor on poinsettia grown in potting mix heavily infested with the fungus showed that only Terraclor gave control. In all of the other materials, the plants were killed. Although not considered as cut flower, this is valuable information because *Rhizoctonia* is a pathogen on many plants grown as cut flowers.

Water mold control. Also tested on poinsettia was an attempt to control the water mold *Pythium* using biological control. A form of *Actinomyces* used in biological control was added to composted cow manure (Nutritect) and allowed to colonize before it was added to a potting mix infested experimentally with *Pythium*

and then planted with poinsettias. This did not give control but will be done soon on gerbera using the same and two other biological control agents.

In a cooperative program at a large nursery, a biological control organism (Glioguard) added to Nutritect was found to give excellent root growth in freesias and carnations where no fungicides were added to the plants.

Bacterial leaf spot of zinnia. A new disease on zinnia was found to be due to a bacterium. So far all species of *Zinnia* tested have been found to be susceptible.

Rose diseases. To date, about 120 species of *Rosa* have been collected and tested for resistance to *Verticillium* and powdery mildew. Only two species have been found resistant to *Verticillium*. Many are resistant to powdery mildew and may eventually be a source of genes for resistance to this fungus. Additional *Rosa* species are being collected to continue the search.

Gladiolus *Fusarium*. This disease continues to be a problem to gladiolus growers. Fumigation or the use of uninfested (no previous history of gladiolus) land is the present approach. Because the latter is hard to find and the possibility that present fumigants may no longer be used poses a problem. *Gladiolus* species are being collected to see if resistance can be found. Treatment of corms with systemic materials is a possibility. This last year an experiment was done doing this. Data are not yet available.

Scabiosa leaf spot. Species and cultivars of *Scabiosa* have been collected and inoculated with *Septoria* found on this plant. One cultivar is more resistant than others. A downy mildew also has been found on *Scabiosa* and species also are being tested for resistance to this fungus.

Disease identification. New diseases found include the southern root rot fungus (*Sclerotium rolfsii*) on calla. Inoculations of the commonly grown callas are underway. A new species of *Fusarium* has been found on Lisianthus (*Eustoma*). The rust fungus on iris (Dutch, bearded and California natives) was thought to be the same fungus. It was found that the fungus on the California natives is different than the one on the cultivated forms so more testing is needed to determine which fungi are present and if the same controls will work on all. A new leaf-infecting fungus has been found on *Achillea*. Identification is difficult and not even experts have been successful yet.