

## **ABSTRACT**

### **Alternative Irrigation Systems for Greenhouse Crops**

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Potential surface and groundwater contamination from agricultural runoff has become a primary concern of state and federal regulatory commissions. Highly visible to the community, Nursery and Greenhouse producers must take great care to prevent nitrate and phosphate contamination of surface and groundwater reservoirs. Environmental stewardship as well as irrigation efficiency has been obtained from commercially available systems. The advantages and disadvantages of overhead sprinkler, spot spitter, ebb and flood subirrigation and subirrigation troughs were compared.

## **ABSTRACT**

### **Disease Identification and Control in Foliage**

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Several significant diseases occur in foliage production that can limit efficient production. Certain diseases are more common during the fall and winter months when supplemental heating contributes to condensation which often results in wet foliage. *Alternaria* leaf spot of *Schefflera* and *Fusarium* leaf spot of *Dracaena* are common diseases that can cause serious losses during winter months. Root and crown rots are common diseases that tend to occur on a year-around basis, over-irrigation, excessive soil compaction, poor drainage, salt stress, and break-down of sanitation are factors that contribute to root and crown rots. It is important to learn to recognize certain diseases such as *Cylindrocladium* root and petiole rot of *Spathiphyllum* so that effective control can be achieved. Thorough knowledge of potential diseases, careful evaluation of plant symptoms, and a back-to-basics disease control strategy will help manage plant diseases and reduce production losses.

## **ABSTRACT**

### **Control of the Sweetpotato Whitefly on Vegetables with Naturalis-L, A Bioinsecticide**

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Naturalis-L contains an insect specific fungus, *Beauveria bassiana*, strain number ATC 77044, that is active against all life stages of the sweetpotato whitefly (SPW), *Bemisia tabaci* Genn. Greenhouse trials were conducted on cucumbers and cantaloupes to evaluate the efficacy of Naturalis-L against the SPW with continuous exposure to adult populations. Results indicated that prophylactic treatment of the cucumbers and cantaloupes with Naturalis-L was effective. Small plot field trials to evaluate celery, bell peppers, cantaloupes, cucumbers, and cabbage resulted in control at levels of 75 to 95% of the SPW. Large field plot evaluation of Naturalis-L against the SPW in cucumbers in the fall of 1991 with two types of application equipment, John Deere boom with 5003 nozzles, and Berthoud BN 200 air assist, resulted in full season control of SPW with six applications. No insecticides were used. The Berthoud BN 200 air assist application method resulted in a 28% increase in yield compared to the John Deere 6000 treatment method. The rate of Naturalis-L used in all evaluations was 10 - 15 oz. per acre in 10 - 20 gal. water. Nufilm-17, a sticker-spreader, was added at the rate of 0.5 pt. per acre. Further evaluations are planned for 1992 in cantaloupes and watermelons. Application technology with airplane, ground boom, and mechanical air assist will be evaluated on cantaloupes in the spring of 1992.

## ABSTRACT

### Whitefly-Mediated Disorders in Vegetables

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Large whitefly populations in cotton and certain vegetables were observed during the summer and fall of 1990 in the Lower Rio Grande Valley, Texas. These 1990 whitefly populations overwintered on several winter vegetable crops but cruciferous plants (cabbage, kale, etc.) generally harbored the highest populations at this time. During 1991, certain spring vegetables and cotton primarily in the mid-Valley experienced whitefly populations much larger and more widespread than 1990. These large whitefly populations were associated with unusual symptoms on vegetables. These symptoms such as silverleaf of squash were first observed in the fall of 1990 in Harlingen, TX. Leaves of these plants were entirely silver-gray and fruit very pale colored. White streaking of broccoli and cabbage were observed in the winter of 1990 in Alamo, TX. Stems and florets of broccoli were very whitened and leaves of cabbage were very pale. These whitefly populations were observed reproducing on these cruciferous plants for the first time in the Valley. Irregular ripening of tomatoes was observed in the spring of 1991 in Weslaco, TX. Fruit was characterized by severe incomplete development of the inner locule tissue. These whitefly-mediated disorders are suggested to be systemic phytotoxemias caused by this whitefly and are not incited by whitefly-transmitted viral agents. Samples of whiteflies collected from vegetables during the summer of 1991 were determined to be *Bemisia tabaci* (Gennadius), sweetpotato whitefly, and their esterase isozyme patterns were consistent with that which has been tentatively designated as the B biotype (Judy Brown, pers. comm.). However, sweetpotato whitefly-transmitted viruses have caused serious diseases of melons, peppers, tomatoes, and lettuce worldwide. Recently, this whitefly was detected in Valley bell pepper fields in the fall of 1987 capable of transmitting a geminivirus provisionally designated Texas Pepper Geminivirus (Stenger et al., 1990). Viruslike symptoms in vegetables were observed during 1991 in such crops as tomatoes (stunting), peppers (terminal chlorosis), cabbage (chlorosis), and peanuts (chlorosis). Although these plant samples have shown symptoms reminiscent of whitefly-transmitted viruses most have returned as borderline positives (Judy Brown, pers. comm.). Additional host and biological information is needed to characterize the causal agents involved in these whitefly-mediated disorders to possibly help identify solutions for this potentially devastating crop scenario.

## ABSTRACT

### Bacteriophages for Biological Control of Soft Rot of Potatoes.

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Nineteen of 22 isolates of bacteriophages from lake water had distinct host ranges in tests with 62 strains of *Erwinia carotovora*. Six phage isolates had similar, but not identical, host ranges and five of these failed to survive in storage for 7 wks at -70C. All other phages were viable after such storage. In tests with representatives of 24 serotypes of *E. carotovora*, 12 of the 15 phages caused plagues in lawns of 16 serotypes and the number of hosts susceptible to a given phage ranged from 1 to 10. Four of the five serotypes most often associated with major outbreaks of bacterial soft rot were hosts for at least one phage isolate. Phages with wide host ranges and those with complimentary host ranges are potentially useful for biological control of soft rot. An intermediate titer of a single phage partially controlled bacterial soft rot in whole potato tubers incubated under a continuous aqueous mist. The tubers had been rinsed prior to incubation in a mixture of the phage and an aqueous cell suspension of a host strain of *E. carotovora* subsp. *carotovora*.

## ABSTRACT

### The Whitefly on Ornamental Crops

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First and second instar green lacewing, *Chrysoperla rufilabris* (Burmeister) were evaluated for control of sweetpotato whitefly, *Bemisia tabaci* (Gennadius) on *Hibiscus rosa-sinensis* L. in a greenhouse. Two releases of 25 or 50 lacewing larvae per plant at an interval of two weeks maintained plants in a marketable condition. Two releases of 100 lacewing larvae toward the center of twelve plants also maintained marketability. Most plants with five lacewing larvae each remained marketable, but the majority of the untreated plants became unmarketable. Qualitative evaluation of plant marketability was based on presence of sooty mold and physical effects of whitefly on the plants two weeks after the last release of lacewing larvae. Future research with whitefly on ornamental plants was discussed.