Chapter 4. Pest Management Alternatives for Key FQPA-Targeted Pesticides

Pest management in South Florida vegetable crops is challenging under the best of circumstances. Over the course of many years, pest managers have come to rely on the availability of a wide range of pesticides. With the implementation of the Food Quality Protection Act (FQPA), pest managers will undoubtedly experience some difficult transitions as older, well-established products lose registrations. In addition, our most important soil fumigant, methyl bromide, is also being phased out over the next few years as part of the nation's effort to reduce global warming.

Much of Glades Crop Care, Inc.'s contract research, IPM scouting and field advising is focused on developing viable, cost-effective alternatives to conventional pesticides for our grower/clients (see Chapters 2 and 3). In addition to these routine efforts, we sought and received funding under the USDA's Pest Management Alternatives Program (PMAP) to evaluate systems-based alternatives to FQPA-targeted pesticides, with special emphasis on biologically-based products and interventions. This chapter describes field tests on alternative products and tactics conducted during the 1999-2000 season in South Florida growers' fields.

Our focus in these field tests covers two major aspects of pest management. First, we address insecticide use in sweet corn, where reliance on organophosphate and carbamate insecticides is high. Due to long-term reliance on the EBDC fungicides, maneb and mancozeb, for control of highly destructive plant diseases, disease management in tomatoes, peppers and sweet corn is the second major aspect we discuss.

Alternatives evaluated covered a wide range of tactics and modes of action, few of which are likely to be as effective when used alone as the products they will replace. Novel modes of action explored include biological controls, insecticides derived from fungal byproducts, enhancements in plant nutrition, products triggering or reinforcing plant defense mechanisms, protective barriers and plant growth stimulants. Alternatives were selected for our trials based on positive results in other crops in commercial, laboratory and research plot settings. The individual approaches, the tests conducted and the results are described in the remainder of this chapter.

Sweet Corn Pest Management Using Alternative Pesticides

Alternatives to the organophosphate and carbamate insecticides used in conventional sweet corn production were assessed in a small plot test conducted in Boynton Beach, FL during the spring of 2000. In this test we evaluated the efficacy of spray programs consisting of *Bacillus thuringiensis* Berliner (*B. t.*), a well-known biological worm control agent, and spinosad, a recently registered insecticide derived from a fungal byproduct for fall armyworm control. These materials were chosen for testing based on their successful use in other crops, primarily tomatoes and peppers (see

Chapters 2 and 3). Successful control of sweet corn pests with these insecticides would allow a reduction or elimination of methomyl, thiodicarb or chlorpyrifos, all of which have been targeted for regulatory action under FQPA. These three pesticides are widely used in the control of foliar pests of sweet corn (Glades Crop Care, Inc., 1999b). A second benefit from the use of *B. t.* and spinosad arises from their relative safety to beneficial insects, which advances progress toward more prevention-oriented, biologically based IPM systems.

The test site was planted with the sweet corn variety, "Snow White", on 4/8/00 in plots of approximately 0.1 acre each. Treatments evaluated in this test are shown in Table 4.1. Treatments 1 and 2 received the *B. t.* and spinosad regimen, while Treatments 3 and 5 received conventional treatments. Calcium silicate slag, evaluated separately for its potential efficacy in disease management, was incorporated in treatment 1 prior to planting at the rate of 10,000 pounds per acre (Appendix Table 4.1 provides details of treatment application dates and rates). The entire field was fertilized with 225 lb N and 160 lb K per acre. Each treatment was replicated 4 times.

Table 4.1. Treatment regimens for evaluation of alternatives to FQPA-targeted pesticides for control of sweet corn pests, Boynton Beach, FL, Spring 2000.

Treatment 1	Calcium Silicate Slag	B.t.(13X)	Spinosad (9X)				
Treatment 2		B.t.(13X)	Spinosad (9X)			Manex (7X)	Propiconazole (4X)
Treatment 3		B.t. (4X)		Methomyl (7X)	Lambdacyhalothrin (4X)	Manex (3X)	
Treatment 5		B.t. (2X)	Spinosad (2X)	Methomyl (7X)	Lambdacyhalothrin (5X)		

Insects evaluated included armyworms, primarily the fall armyworm, *Spodoptera frugiperda* (J. E. Smith), and the silkfly, *Euxesta stigmatis* (Loew). Evaluations were conducted on 5/19, 5/26, 6/2, 6/5, 6/8, 6/12 and 6/16/00. On 5/19 and 5/26/00, the percentage of whorls infested with worms was determined. Insect infestations in the ears were evaluated beginning 5/26 through the end of the trial. The percentage of ears infested with worms and silkflies was determined for each date, except 6/16/00, when the silkfly infestation severity was graded on a scale of 0 (no damage) to 5 (very high damage). The final ear evaluation included only harvestable primary ears, while the previous evaluations had included all ears.

Treatments 1 and 2, which received only *B. t.* (Crymax, Monsanto; and Dipel 2X, Abbott Labs) and spinosad (Spintor 2SC, Dow AgroSciences) insecticides provided significantly better control of armyworms in the whorled corn foliage and in the ear shoots on 5/26/00 (see Figure 4.1, and Appendix Tables 4.2 and 4.3). Otherwise, there were no significant differences among the treatments in worm control.

The percentage of sweet corn ears infested with silkflies was not significantly affected by the treatments (Figure 4.2 and Appendix Table 4.4). When the severity of silkfly damage was evaluated on 6/16/00, there was more damage in Treatments 1, 2 and

5 (Appendix Table 4.4). This would indicate that while the infestation of silkfly was uniform throughout the plots, Treatment 3, with frequent applications of maneb (Manex w/ zinc, Griffin LLC) in addition to methomyl (Lannate LV, DuPont) and lambdacyhalothrin (Warrior, Zeneca) reduced the damage caused by the silkfly maggots. This is probably due to the greater crop vigor in Treatment 3 where defoliation due to rust was significantly lower than in Treatment 5. The silkfly tends to preferentially attack plants under stress before they attack vigorous plants (Glades Crop Care, Inc., unpublished data), thus leading to higher levels of damage in Treatment 5.

The high level of damage by both worms and silkflies, which exceeded USDA standards of 5 percent ear damage for US #1, is probably the result of the small plot format of this test, especially given the high mobility of both pests. Inadequacies in spray timing (frequency) may also be involved. Standard commercial practice would call for every-other-day other insecticide applications during the silking period of the crop, given the high infestation levels at the 5/26 and 6/5/00 evaluations. Such application frequency would have markedly reduced damage.

The results of this test indicate that the *B.t.* and spinosad may serve as alternatives to methomyl in controlling armyworms during the early stages of a sweet corn crop, i.e., prior to silking. However, these alternative pesticides should not be counted upon to provide control of silkflies, at least not as near-stand alone products and definitely not at the reduced frequency of this test.

These results show that in sweet corn systems, the two products tested for substitution are not likely to be successful and that the successful adaptation to the FQPA is likely to require more systematic and multifaceted changes in IPM systems. In addition to poor efficacy, the cost of the *B.t.* and spinosad programs was somewhat above conventional programs, and thus would have been difficult for growers to accept, given the highly competitive nature of the market during the main spring growing season. In short, the search for alternatives to methomyl and the other targeted insecticides must go on both in terms of efficacy and affordability.

Silicon Nutrition in Disease Management

Soil amendments containing calcium silicate slag (CSS) are an accepted part of the cultural and disease control programs in rice in the muck soils of Florida's Everglades Agricultural Area (EAA). Its use provides significant control of rice brown spot (*Bipolaris oryzae* (Breda de Jaan) Shoemaker) and blast (*Pyricularia grisea* (Cooke) Sacc.) (Datnoff, et al., 1997). Significant growth and yield responses, as well as some control of ringspot disease (*Leptosphaeria sacchari* Breda de Hann) have also been observed in sugarcane grown in the EAA (Raid, et al., 1992).

Worldwide, extensive research efforts into the effects of silicon nutrition in these and other crops indicate that this nutritional supplement may provide an important alternative, or emerge as a valuable component within an alternative system, that works as or more effectively than conventional fungicides in controlling plant diseases. Grower interest in CSS was evident during a well attended and informative conference on silicon in agriculture sponsored by the University of Florida, USDA and others, held September 26-30, 1999, in Fort Lauderdale, FL.

Given this background, the small plot test described in the preceding section included a comparison of plots treated with CSS to plots receiving either no fungicide or conventional fungicides without CSS (Table 4.1 and Appendix Table 4.1). In this comparison, Treatments 1 and 2 received similar insecticide treatments, while Treatment 2 received conventional fungicides. Treatment 5, which received conventional insecticide treatments served as an untreated disease check plot, and no fungicides were applied.

Evaluation dates were the same as in the preceding trial description. Diseases evaluated included rust, northern corn leaf blight (NCLB) and southern corn leaf blight (SCLB), caused by *Puccinia* sp Pers.:Pers., *Bipolaris maydis* (Nisikado) Shoemaker and *Exserohilum turcicum* (Pass.) K.J. Leonard & E.G. Suggs, respectively. Disease incidence was evaluated by counting or estimating the number of lesions per plant (rust) or per sample of 100 plants (NCLB and SCLB). On the last evaluation date, the percentage of ears infected with each disease was determined.

Disease incidence was low throughout this trial, primarily due to lower than normal rainfall and relative isolation from sources of disease inoculum. Despite the use of a sweet corn variety having no useful disease resistance, incidence of all foliar diseases was below the level expected for the spring season. Accordingly, further testing will be needed to determine CSS efficacy against NCLB and SCLB.

Rust disease levels were unaffected by the CSS treatment. The conventional fungicide program provided significant reduction of rust disease on 6/2, 6/5, 6/8 and 6/12/00 (Figure 4.3 and Appendix Table 4.5). NCLB was significantly affected on 6/2, 6/5, 6/8 and 6/12/00 by one or both of these treatments (Figure 4.4 and Appendix Table 4.6). SCLB was affected by both Treatments 1 and 2 on one evaluation date, 6/12/00 (Figure 4.5 and Appendix Table 4.7). There were no treatment differences in infection levels on the ears.

It is encouraging to note that incorporation of CSS provided control of NCLB and SCLB similar to a program of maneb and propiconazole on at least one evaluation date, while there was no indication of a reduction in rust. The pathogens causing NCLB (*Bipolaris maydis* (Nisikado) Shoemaker) and SCLB (*Exserohilum turcicum* (Pass.) K.J. Leonard & E.G. Suggs) fall into the same large group of fungi, the Hyphomycetes, as the pathogens causing brown spot (*Bipolaris oryzae* (Breda de Jaan) Shoemaker) and blast (*Pyricularia grisea* (Cooke) Sacc.) of rice. Incorporation of CSS in Florida's muck soils has provided a significant level of control of these rice diseases (Datnoff, et al. 1997). The unrelated rust pathogen (s), (*Puccinia* sp Pers.:Pers.), apparently was not similarly affected by the host plant's reaction to this nutritional practice.

A similar pattern of disease control through use of a CSS supplement was observed in sugarcane by Raid et al. (1992). A possible explanation for differential efficacy across different groups of fungi lies in their modes of penetration of the host plant. The basidiomycete, *Puccinia*, enters leaves through natural openings, such as stomates, while the hyphomycetes tend to enter directly though the cell wall. Silicon affects plants primarily by strengthening their cell walls, thus possibly making them less susceptible to this fungal penetration (Raid, personal communication).

Although treatment differences were statistically significant, they were not large, suggesting that the effect of additional silicate nutrition in sweet corn may not be helpful. Alternatively, owing to the low rainfall, the silicon may have remained largely undissolved, thus being unavailable to the corn. We believe that this approach to disease management in sweet corn should be further evaluated at higher application rates and in a season with more normal rainfall.

Plant disease management is a critical issue as well in tomato and pepper production. Although most of the research into the effects of silicon nutrition deal with graminaceous crops, recent studies indicate that supplemental silicon can enhance disease resistance in dicots as well (Voogt and Sonneveld, 1999; Belanger, 1999). These reports indicate that silicon lends a degree, or reinforces resistance in dicots to fungal pathogens, notably powdery mildews, leaving unanswered the question of a role for silicon nutrition in the management of bacterial diseases. As bacterial spot disease, caused by *Xanthomonas campestris* pv *vesicatoria*, was cited as the leading cause of economic losses in tomatoes and peppers (Glades Crop Care, Inc., 1999a and 1999c), any potential control measure, even if just supplemental, is worth consideration. This is especially true since the disease control programs in both crops rely heavily on the marginally effective combination of copper products and either of the EBDC's, maneb and mancozeb. Despite frequent applications of tank mixes of these compounds, control is often inadequate. This is one of several examples in South Florida vegetable production where growers need new management options regardless of whether FQPA implementation impacts pesticide product availability.

In order to incorporate any novel chemistry, especially a plant nutrient, into an integrated crop production/pest management program, effects on plant growth and development must be evaluated. This was done through an evaluation of CSS as a soil amendment in transplant production (Table 4.2).

The greenhouse phase of this trial was carried out at Trans Gro, Inc., PO Box 739, Immokalee, FL 33934. Finished transplants were grown to fruit set at the University of Florida/ IFAS Southwest Florida Research and Education Center (SWFREC) located about 2 miles north of Immokalee, FL.

Tomato seeds (variety "Sanibel") were placed into 128-cell Speedling flats containing Vergro Transplant Mix A on 3/16/00. Each plant cell had a 1.5-inch square top opening, and was approximately 2.0 inches deep. Flats were mechanically filled, seeded and topped with Perlite using the grower's standard practices. Following a 4-day germination period, the seeded flats were placed into the greenhouse, where they received water and fertilizer via a travelling overhead boom. Each flat was considered a replicate, with four replicates of each treatment in the greenhouse phase. Each flat measured 13.5X12 inches. The volume of each flat was calculated to be 296.8 cu in. This yielded a volume of 5.1 gal of soil needed to fill each four-flat treatment. Peppers (variety "Boynton Bell") were planted on 4/10/00 and were treated similarly to tomatoes throughout the trial.

CSS was obtained from Calcium Silicates Corporation, Lake Harbor, FL. To eliminate variability in weighing samples for incorporation, the slag was dried by heating for 2 minutes in a microwave oven. After cooling, the slag was weighed using an Ohaus Triple Beam Balance. Treatments 15 and 24 received 107.3 g of slag per 5.1 gal of soil. Treatments 16 and 25 received 64.4 g of slag per 5.1 gal of soil (Table 4.2). These incorporation rates were based on the recommendation of Dr. Larry Datnoff (Univ. of FL/IFAS, Everglades Research and Education Center) to apply the slag at 3 and 5 tons per acre. The volumes of slag needed to apply these rates were determined, then adjusted for the difference in soil depth between field incorporation to a 6-inch depth and the greenhouse flat depth of 2 inches. Incorporation was performed by hand-stirring the slag into the potting soil in buckets, for a minimum of 5 minutes per lot. Flats were then manually filled and prepared for seeding.

Table 4.2. Treatment schedule for evaluating calcium silicate slag effects in tomato and pepper transplants.

Treatment No.	Crop	Material	Application Rate	Application Method	Application Timing
1	Tomato	None			
15	Tomato	Calcium Silicate Slag	5 T/A (107.3 g/5.1 gal soil)	Incorporated	Pre-seeding
16	Tomato	Calcium Silicate Slag	3 T/A (64.4 g/5.1 gal soil)	Incorporated	Pre-seeding
23	Pepper	None			
24	Pepper	Calcium Silicate Slag	5 T/A	Incorporated	Pre-seeding
25	Pepper	Calcium Silicate Slag	3 T/A	Incorporated	Pre-seeding

Fifteen tomato plants of each crop were pulled at random from the four replicates in each treatment on 4/24/00. These plants were set into 6-inch raised beds at SWFREC. The test plot received fertilizer through drip irrigation tubes placed under the white plastic mulch. Additional irrigation was supplied by a perched water table using a completely covered subsurface irrigation system. During the first two weeks after transplanting the plants were also hose-watered. This was done because the perched water table could not be maintained at the desired depth due to extremely dry weather conditions. Fifteen pepper plants were pulled from each treatment on 5/16/00 for growout in the same field at SWFREC.

Growth effects in the transplant facility were evaluated by measuring plant height. Crop height was measured at 2, 4 and 5 weeks after seeding in the transplant facility and at 2 weeks after transplanting in the field. Tomatoes were also evaluated at 3 and 4 weeks after transplanting for the number of open blooms and for fruit set.

Dr. Charles Vavrina (SWFREC) performed an analysis of root and shoot development. In this analysis, the plant was cut at the hypocotyl and the soil was washed from the roots. The surface area of the leaves and cotyledons was measured using a LICOR leaf area meter. Leaves and stems were placed in paper envelopes separately from roots. All tissues were then dried in an oven and their dry weights were determined. Five plants were selected at random from each replicate flat for this analysis on 5/16/00.

Plant heights at 2, 4 and 5 weeks after seeding are presented in Tables 4.3, 4.4 and Appendix Tables 4.8-4.10 and in Figures 4.6 and 4.7. Tomato transplants grown in the slag-amended soil were shorter than the untreated check on all evaluation dates. Pepper transplants grown in the amended soil were taller than the untreated check on all evaluation dates. A possible treatment effect was observed, in that tomato transplants in Treatment 16 (3 T slag/A) grew to heights intermediate to the untreated check and Treatment 15 (5 T slag/A). This treatment effect was evident on 4/24, both in measurements taken in the greenhouse and from the root/shoot analysis performed at SWFREC (Appendix Table 4.15) and in field measurements on 5/9/00. The situation in peppers was different in that the slag incorporation did not adversely affect growth. Pepper transplants grown in soil amended at 5 T/A were taller than both the untreated check and the lower incorporation rate on all dates except 5/9/00.

Table 4.3. Effect of calcium silicate slag on tomato transplant growth during transplant production and early field growth, Immokalee, FL, Spring 2000. Table contents summarize parts of Appendix Tables 4.8 through 4.11.

Tomato Plant Height (mm)				
Evaluation Timing	Weeks after seeding			Weeks after transplanting
	2	4	5	2
Evaluation Date	3/30/00	4/14/00	4/24/00	5/9/00
Treatment 1	35.6	67.0	112.4	176.4
Treatment 15	32.7	61.9	96.5	117.8
Treatment 16	31.1	60.6	97.2	155.0

Table 4.4. Effect of calcium silicate slag on pepper transplant growth during transplant production, Immokalee, FL, Spring 2000. Table contents summarize parts of Appendix Tables 4.8 through 4.11.

Pepper Plant Height (mm)			
Evaluation Timing	Weeks after seeding		
	2	4	5
Evaluation Date	4/25/00	2/24/00	5/16/00
Treatment 23	12.7	58.0	96.0
Treatment 24	13.7	58.2	107.4
Treatment 25	13.0	101.7	101.7

For several weeks before the transplants were set out into the field at SWFREC the weather had been unusually dry and hot. This resulted in poor soil moisture at the time of transplanting and less than normal rainfall persisted for the next two weeks. As a result, the newly set tomatoes were hand-watered daily during this time. They also received fertilizer through the drip system. There was no indication through the field phase of this study that the subsurface irrigation system provided sufficient water to wet the soil. At 4 and 5 weeks after transplanting, stunting due to drought stress was observed in random areas throughout the tomato test plots. Despite the adverse growing conditions, tomato plant heights at 3 weeks after transplanting reflected the same trends observed in the greenhouse, with the untreated check being tallest, followed by the low CSS incorporation rate and then the high rate (Table 4.3 and Appendix Table 4.11). Peppers were set 3 weeks after the tomatoes, and suffered over 50 percent mortality due to the dry, hot conditions. Because of the poor condition of the peppers, they were not evaluated after transplanting.

Tomato flower and fruit development appeared to proceed normally, despite the poor growing conditions. Numbers of blooms per plant were higher than the untreated check on 5/16/00, but were slightly lower than the untreated check a week later. The number of fruits per plant was higher in both slag treatments than in the untreated check on 5/23/00. Plants in treatment 16 had higher bloom and fruit counts on 5/23/00, although this difference may not be significant (Figure 4.8, Table 4.5 and Appendix Tables 4.12, 4.13 and 4.14).

Table 4.5. Effect of calcium silicate slag on tomato blooming and fruit set, Immokalee, FL, Spring 2000. Table contents summarize parts of Appendix Tables 4.12 through 4.14.

	Blooms per plant		Fruits per plant
Evaluation Date	5/16/00	5/23/00	5/23/00
Treatment 1	1.6	4.2	1.6
Treatment 15	2.1	4.0	2.3
Treatment 16	2.0	4.1	2.6

Root and shoot data are presented in Appendix Tables 4.15-4.21. From these data, the same conclusions can be drawn as from the field observations. Plant height (Appendix Table 4.15) was slightly reduced in tomatoes and increased in peppers by both slag treatments. The treatment effects mentioned above were slight in tomatoes and more marked in peppers. Stem diameter (Appendix Table 4.16) was not significantly affected by the treatments. Tomato leaf surface area (Appendix Table 4.17) was lower in both treatments than in the control, while it was higher in both treatments in peppers. Root and shoot dry weights were lower in both treatments than the untreated check (Appendix Tables 4.18-4.20). Leaf counts were lower in slag-treated tomatoes and higher in treated peppers than the untreated checks (Appendix Table 4.21)

Incorporation of calcium silicate slag appears to have a reduced growth effect on the tomato transplant and an increased height effect on pepper transplant growth. This reduced height response is puzzling, considering the apparent improvement in bloom and fruit development in the tomato crop. It is possible that calcium silicate differentially affects vegetative and reproductive tissues at early stages of development. The greenhouse manager stated that both the tomato and pepper transplants in the slag treatments were commercially acceptable.

A second method of providing supplemental silicon nutrition to tomato and pepper transplants was tested concurrently with the CSS described above. This test was conducted in the same site and using the same cultural methods as in the CSS trial. Kasil I (The PQ Corporation, Valley Forge, PA), an aqueous solution of water, silicic acid and potassium salt, was tested as foliar sprays and drenches. These treatments were selected to determine whether Kasil I had any effects on the growth of the transplants. If no detrimental effects were observed, Kasil I or similar liquid formulations of silicates might warrant further testing, not only as nutritional amendments, but as protectants against disease.

The theory behind this protectant approach to disease management is that the silicates upon drying would form a barrier of silica gel, a familiar desiccant. The desiccating activity of the silica gel would theoretically have a fatal effect on bacterial cells or fungal spores landing on the leaf surface. This same deposition of silica gel on the leaf surface results from silicon uptake from the soil (Ma, et al., 1999). For this reason, drench applications of Kasil I were tested along with foliar sprays.

Treatments for this trial are detailed in Table 4.6. The test substance was applied using a CO^2 pressurized backpack sprayer. The sprayer had a single nozzle, consisting of a TK-1.5 Flood-Jet nozzle with a 4193A-PP screen (Spraying Systems Company). Drenches were applied in two passes. The first contained Kasil I and targeted an application rate of 1,596.5 ml per plot. This was followed immediately by an application of water at 4,789.4 ml per plot. The sprayer was calibrated before each application and spray passes were timed to deliver 100 gal per acre.

Table 4.6. Treatment schedule for evaluating the effects of Kasil I applications in tomato and pepper transplants.

Treat. No.	Crop	Material	Rate	Application Method	Application Date
1	Tomato	None			
17	Tomato	Kasil I	1000 ppm	Foliar spray	3/31/00
18	Tomato	Kasil I	1000 ppm	Foliar spray	3/31/00and 4/14/00
19	Tomato	Kasil I	500 ppm	Foliar spray	3/31/00
20	Tomato	Kasil I	500 ppm	Foliar spray	3/31/00 and 4/14/00
21	Tomato	Kasil I	1000 ppm	Drench	4/14/00
22	Tomato	Kasil I	500 ppm	Drench	4/14/00
23	Pepper	None			
26	Pepper	Kasil I	1000 ppm	Foliar spray	4/25/00
27	Pepper	Kasil I	1000 ppm	Foliar spray	4/25/00 and 5/9/00
28	Pepper	Kasil I	500 ppm	Foliar spray	4/25/00
29	Pepper	Kasil I	500 ppm	Foliar spray	4/25/00 and 5/9/00
30	Pepper	Kasil I	1000 ppm	Drench	5/9/00
31	Pepper	Kasil I	500 ppm	Drench	5/9/00

Evaluations were carried out in the same manner as those described in the CSS study. The results show that Kasil I has little effect on the growth of tomato transplants, but an increased growth effect of certain pepper transplant treatments as shown in Tables 4.7 and 4.8 and Figures 4.9 and 4.10. Full details of these results are presented in

Appendix Tables 4.22-28 and 4.32-45. Although Kasil I had little to no effect on tomato plant height, it did increase flowering and fruit set (Table 4.9, Figure 4.11 and Appendix Tables 4.29-31). This was especially noticeable in Treatments 17 and 18 (high concentration sprays) and in Treatments 21 and 22 (drenches).

Table 4.7. Effect of Kasil I on tomato transplant growth during transplant production and early field growth, Immokalee, FL, Spring 2000. Table contents summarize Appendix Tables 4.22 through 4.25.

Tomato Plant Height (mm)				
Evaluation Timing	Weeks after seeding			Weeks after transplanting
	2	4	5	2
Treatment	3/30/00	4/14/00	4/24/00	5/9/00
1	35.6	67.0	112.4	176.4
17	34.9	68.6	113.4	146.6
18	33.7	71.1	107.6	140.0
19	33.0	68.9	104.5	136.2
20	33.0	69.5	109.5	145.4
21	32.4	70.5	108.9	151.2
22	34.0	71.4	115.9	140.0

Table 4.8. Effect of Kasil I on pepper transplant growth during transplant production, Immokalee, FL, Spring 2000. Table contents summarize parts of Appendix Tables 4.26 through 4.28.

Pepper Plant Height (mm)			
Evaluation Timing	Weeks after seeding		
	2	4	5
Treatment	4/25/00	5/9/00	5/16/00
23	12.7	55.5	96.0
26	12.4	51.3	86.6
27	12.1	52.0	89.2
28	13.0	54.0	98.2
29	13.0	55.4	101.2
30	12.7	54.0	98.5
31	12.7	55.0	103.9

Table 4.9. Effect of Kasil I on tomato blooming and fruit set, Immokalee, FL, Spring 2000. Table contents summarize parts of Appendix Tables 4.29 through 4.31.

	Blooms per plant		Fruits per plant
Evaluation date	5/16/00	5/23/00	5/23/00
Treatment			
1	1.6	4.2	1.6
17	2.2	4.0	2.5
18	2.4	4.4	2.8
19	1.7	3.6	2.0
20	1.7	3.5	1.9
21	1.7	3.7	2.2
22	1.7	3.7	2.2

Further research with this product in tomato transplant production is warranted and may lead to optimal application methods and concentrations that will promote tomato development. Once we learn how to best use the product, possible benefits beyond growth promotion will be explored, with a special focus of whether the product can somehow reinforce disease defense mechanisms.

Pepper transplant growth was also positively affected by the drench treatments, while the low concentration sprays resulted in greater plant height than the high concentration sprays (Appendix Tables 4.26-4.28 and Figure 4.10). Again this suggests that an optimal application method may be found that could be further tested for disease control efficacy.

The root and shoot analyses carried out by Dr. Charles Vavrina (SWFREC) did not indicate any consistent patterns in either crop (Appendix Tables 4.32-45). In fact the variability in the greenhouse and field measurements suggests that, while the trends described above are intriguing and suggest that further research is warranted, they may not be statistically significant.

Triggering or Reinforcing Systemic Acquired Resistance in Disease Management.

Systemic Acquired Resistance (SAR) has been actively researched for well over a decade and is regarded widely as perhaps the single most promising area of plant disease management technology development. Several biopesticide products and transgenic approaches have been explored and are in varying stages of commercialization.

Two new products (Syngenta’s acibenzolar, trade name Actigard; Eden BioSciences’s harpin protein product, Messenger) have now received EPA registrations for use on several vegetable crops. Their mode of action is unusual among disease management products since neither is directly toxic to plant pathogens. Under certain circumstances, they appear to trigger a cascade of biochemical reactions within the plant that, in effect, confers a broad based immunity to a wide range of pathogens.

Interestingly, the silicon nutrition supplements discussed above exhibit some characteristics of SAR-induced plant protection (Belanger, et al., 1999). Many researchers have demonstrated a key role for nutrition and root-colonizing microorganisms in SAR. Accordingly, we suspect that silicon nutrition supplements may be enhancing the plant's normal SAR response through impacts on microbial communities and/or nutrient cycling in addition to the documented effects on the cell wall. The presence of the supplements may somehow augment the strength of the initial systemic immune response triggered by an initial attack by a pathogen, setting in motion or somehow reinforcing the plant's defense mechanisms.

Other benefits of compounds capable of triggering or reinforcing SAR include shortened growth cycles and yield increases. Owing to the nature of this chemistry, with its direct activity on plant physiology, its use is not without risk, especially to crop quality. Improper timing or rates of application, or unrelated crop stresses can result in no perceptible effects, severe crop damage, unusual physiological problems (sometimes difficult to diagnose), morphological problems, and in extreme cases, major yield losses.

The attraction of this novel approach to crop protection stems from the extremely low amount of active ingredient needed to bring about a sustained crop response and, extremely low mammalian and nontarget toxicity of these highly active and specific compounds. With the prevalence of hard-to-control plant diseases in the Florida vegetable production system, the capacity to manage SAR is a logical and attractive alternative to conventional fungicides and bactericides.

This is especially true in tomatoes, peppers and sweet corn, where the FQPA-targeted B_2 carcinogens, maneb and mancozeb, have formed the backbone of disease control programs for many years, and continue to be heavily used (Glades Crop Care, Inc., 1999a, b and c). In tomatoes and peppers both of these EBDC fungicides are applied in tank mixes with copper compounds, usually copper hydroxide, to control several diseases. The most damaging of these is bacterial spot, caused by *Xanthomonas campestris* pv *vesicatoria*.

With its resistance to copper, this pathogen has been the target of extensive research. Yet control measures have remained, at least in tomatoes, basically unchanged over the last 30 years. The situation is somewhat different in peppers, where the use of cultivars resistant to Races 1, 2 and 3 of the bacterial spot pathogen, have allowed growers some relief from disease pressure. Unfortunately the presence of other pathogen races has resulted in the continued use of maneb/copper mixtures in that crop as well.

The situation in sweet corn is not quite as bleak. Development of disease tolerant or resistant varieties has advanced well over the years. Yet, the demand for blemish free produce, the diversity of the varieties grown in South Florida (not all of which have commercially acceptable levels of disease resistance), and competitive markets during the main spring crop demand that diseases be kept under the tightest control possible with the least expenditure. Having an alternative approach to disease management would allow growers to reduce the amounts of EBDCs currently in use without markedly changing disease management costs. This goal was a major focus of our PMAP efforts.

Four field tests were conducted to evaluate the efficacy and crop safety of the commercially available SAR compounds, Actigard and Messenger. Two of these involved sweet corn and two were carried out in tomatoes.

Triggering SAR in Sweet Corn

Sweet corn tests were established in Pahokee and Boynton Beach, FL. The trial site at Pahokee was seeded with "Snow White" sweet corn on 3/24/00. This was a small plot test with each treatment replicated 4 times. Each replicate plot was approximately 3x15 ft and contained approximately 25 plants. The crops were grown according to the growers' standard practices. Treatments in the Pahokee trial are outlined in Table 4.10. Treatments were applied with a CO_2 backpack sprayer. Evaluations on 5/1 and 5/15/00 involved assigning a Horsfall-Barrett grade to each plot. These ratings reflect the combined severity of the diseases (Table 4.11). The grades and the level of defoliation each represents are listed in Table 4.11.

Table 4.10. Treatments applied to the sweet corn disease control trial in Pahokee, FL, Spring, 2000.

Treatment	Application rate/ acre	Application Dates
Actigard	0.25 oz	04/03, 04/17, 05/01/2000
Actigard	0.50 oz	
Actigard	1.0 oz	
Actigard	1.0 oz	
Manex	1.0 qt	
Untreated Check		

Table 4.11. Horsfall-Barrett grades used in evaluating disease severity on sweet corn and tomatoes.

Horsfall-Barrett Grade	Disease observation
0	No disease;
1	1-3% of the foliage was infected;
2	4-6% of the foliage was infected;
3	7-12% of the foliage was infected;
4	13-24% of the foliage was infected;
5	25-50% of the foliage was infected;
6	51-75% of the foliage was infected;
7	75-87% of the foliage was infected.

The Boynton Beach small plot test site establishment and treatment details (Appendix Table 4.1) were discussed earlier. Disease development in this trial was evaluated by counting the number of lesions per plant (rust) or per 100 plants (northern and southern corn leaf blights). Evaluations were conducted on 5/26, 6/2, 6/5, 6/8, 6/12 and 6/16/00. On the final evaluation, the percentage of ears with disease symptoms was recorded.

With the exception of rust, disease incidence was not severe in these trials. This was due to the abnormally dry weather experienced during the spring of 2000.

In the Pahokee trial, the crop was rapidly overtaken by rust, which caused 51-75 percent diseased leaf area within 7 weeks of planting. No significant differences were observed between treatments in rust disease severity (Table 4.12). Bacterial blight (*Pseudomonas avenae*) was also observed, but at a much lower level, with 4-12 percent of the foliage covered with lesions at week 7. There were some slight reductions in the rate of disease development between the two evaluation dates, but these were not statistically significant.

Table 4.12. Horsfall-Barrett grades for rust and bacterial spot of sweet corn, Pahokee, FL, May 2000.

Treatment	Rust		Bacterial Blight	
	05/01/00	05/15/00	05/01/00	05/15/00
Actigard 0.25 oz product / A	4	6	2	2
Actigard 0.50 oz product / A	4	6	2	3
Actigard 1.0 oz product / A	4	6	2	2
Actigard 1.0 oz product / A	4	6	2	2
Manex	4	6	2	3
Untreated Check	4	6	5	3

In the Boynton Beach trial, some treatment effects were statistically significant. Most of these involved Treatment 2, maneb rotated with propiconazole and Treatment 3, maneb alone. These fungicide regimens provided significant reduction in rust on all but the initial evaluation date. Actigard treatments apparently had no effect on rust in this trial (Figure 4.12, Appendix Table 4.46).

Northern (NCLB) and southern corn leaf blights (SCLB) were both reduced by the treatments on one or more evaluation dates relative to the untreated check (Treatment 5). All three treatments provided a similar level of NCLB control on the 6/2 and 6/8/00 evaluations (Figure 4.13, Appendix Table 4.47). The Actigard treated plots (Treatment 4) had more NCLB lesions per plant than all other treatments on 6/12/00, although this difference was not statistically significant. This may indicate that Actigard's residual activity in a corn plant is approximately a week, since the last application occurred 13 days earlier (5/31/00) and the intervening evaluation had shown lower NCLB incidence in the Actigard plot than in the untreated check. This apparent drop in efficacy may also be an artifact, as the disease level in all treatments actually declined between these evaluations. The only reduction in SCLB was observed on 6/12/00 (Figure 4.14, Appendix Table 4.48). On that date, all fungicide regimens provided similar SCLB control. No significant differences were observed in disease levels on the ears on 6/16/00.

A puzzling result of this trial was that the differences between Treatments 2 and 3 were not great. Although Treatment 2 (Manex followed by Tilt) had consistently lower rust infection levels, the differences were not statistically significant. This may have been due to the applications beginning too late in the disease buildup cycle, especially in a variety with no known disease resistance.

Based on these observations, it appears that Actigard's activity on corn provides no protection against rust. At the rate used in the Boynton Beach trial, the protection provided against northern and southern leaf blights, while statistically significant, were not better than that provided by the conventional treatments. This suggests that further testing is needed, possibly using higher rates or different intervals of application. The varying activity against different taxa of fungi mirrors the pattern observed in the CSS trial discussed earlier.

Triggering SAR in Tomatoes

SAR chemistry was also tested in two phases of tomato production. In the first, a phytotoxicity test was conducted to evaluate Actigard's crop safety during transplant production. The second was a commercial scale field test where both disease control efficacy and crop yield impacts were evaluated.

The Actigard phytotoxicity test was conducted concurrently in the same transplant production range as the CSS and Kasil I tests. Planting, cultural practices, application and evaluation methods are similar to those described for those trials. Treatments in this trial are detailed in Table 4.13.

Table 4.13. Treatment schedule for phytotoxicity evaluation of Actigard 50WG in tomato transplants.

Treatment No.	Material	Rate (gai/ha)	Application Method	Application Date
1	None			
2	Actigard 50WG	35,000	Drench	4/14/00
3	Actigard 50WG	10,000	Drench	4/14/00
4	Actigard 50WG	3,500	Drench	4/14/00
5	Actigard 50WG	1,000	Drench	4/14/00
6	Actigard 50WG	350	Drench	4/14/00
7	Actigard 50WG	100	Drench	4/14/00
8	Actigard 50WG	35	Drench	4/14/00
9	Actigard 50WG	100	Foliar Spray	4/14/00
10	Actigard 50WG	35	Foliar Spray	4/14/00
11	Actigard 50WG	17.5	Foliar Spray	4/14/00
12	Actigard 50WG	100	Foliar Spray	3/30/00
13	Actigard 50WG	35	Foliar Spray	3/30/00
14	Actigard 50WG	17.5	Foliar Spray	3/30/00

Plant heights at 2 weeks after seeding (Appendix Table 4.49, summarized in Table 4.14 and Figure 4.15) were uniform, ranging from 32.7 mm to 36.2 mm. At 7 days after application of treatments 12-14, no decrease in plant height was noted in these plots (Appendix Table 4.50). A week after application of the remaining treatments, plants receiving the highest drench application rates (treatments 2, 3 and 4) were visibly shorter than the untreated check (Appendix Table 4.51). A pale, gray discoloration was also noted in these plots.

Table 4.14. Effects of Actigard 50WG treatments on tomato plant growth during transplant production and early field growth, Immokalee, FL, Spring 2000. Table contents summarize Appendix Tables 4.49 through 4.52.

Tomato Plant Height (mm)				
Evaluation Timing	Weeks after seeding			Weeks after transplanting
	2	4	5	2
Evaluation Date	3/30/00	4/14/00	4/24/00	5/9/00
Treatment 1	35.6	67.0	112.4	176.4
Treatment 2	35.6	68.6	99.4	157.2
Treatment 3	32.7	65.7	94.6	161.4
Treatment 4	34.3	67.3	100.3	150.4
Treatment 5	36.2	63.8	105.1	131.2
Treatment 6	34.3	69.5	111.1	145.8
Treatment 7	34.0	66.4	101.9	144.6
Treatment 8	34.0	70.5	108.6	154.6
Treatment 9	35.9	69.2	112.1	162.0
Treatment 10	35.9	68.3	96.8	149.2
Treatment 11	34.0	68.0	110.8	150.8
Treatment 12	33.3	68.9	113.4	155.0
Treatment 13	33.0	72.1	112.4	152.4
Treatment 14	33.7	68.3	99.4	138.8

The remaining plots retained normal color, although some plots were shorter than the untreated check (Treatments 5, 7, 8, 10, and 14. While these differences indicate that there may be some phytotoxicity in the drenches at 1,000, 350, 100 and 35 gai/ha, the observation that plants in these treatments retained healthy color indicates that these rates may merit further testing. Reduced plant height in two of the plots sprayed at 35 and 17.5 gai/ha also hints at phytotoxicity. However, the fact that higher rate sprays were similar in height to the untreated check indicates foliar sprays at all the rates tested should be re-evaluated.

For several weeks before the transplants were set out into the field at SWFREC the weather had been unusually dry and hot, resulting in poor soil moisture at transplanting and requiring watering over the next two weeks, when rain showers returned to the area. At 4 and 5 weeks after transplanting, stunting due to drought stress was observed in random areas throughout the test plots. Plant height data collected at 2 weeks after transplanting were inconclusive (Appendix Table 4.52), as all plots were markedly shorter that the untreated check. Good growth in the untreated check may have been attributable to proximity to the head end of the drip tubes, which would have provided more water to this plot than to the remaining plots on that row (Treatments 2-8).

Flower and fruit development appeared to proceed normally, despite the uneven plant height. Numbers of blooms per plant at 3 and 4 weeks after transplanting were reduced compared with the untreated check in treatments 2-6 (Appendix Tables 4.53-54, summarized in Table 4.15 and Figure 4.16). Similarly, fruits per plant (Appendix Table 4.55) were also lower than the untreated check in these treatments except for treatment 4. Considering the results of the bloom and fruit counts only drenches at 100 and 35 gai/ha and all foliar spray rates should be considered for further testing.

Table 4.15. Effects of Actigard 50WG treatments on tomato blooming and fruit set, Immokalee, FL, Spring 2000. Table contents summarize Appendix Tables 4.53 through 4.55.

	Blooms per plant		Fruits per plant
	5/16/00	5/23/00	5/23/00
Treatment 1	1.6	4.2	1.6
Treatment 2	0.5	3.1	0.6
Treatment 3	1.1	3.9	1.3
Treatment 4	1.3	3.5	1.8
Treatment 5	1.1	2.9	1.4
Treatment 6	1.1	3.6	1.7
Treatment 7	1.5	4.1	1.9
Treatment 8	1.7	3.3	1.9
Treatment 9	1.6	4.2	1.8
Treatment 10	1.7	3.6	2.3
Treatment 11	2.1	4.2	2.5
Treatment 12	2.4	4.8	2.6
Treatment 13	1.9	4.5	2.0
Treatment 14	2.1	4.0	2.3

Root and shoot data are presented in Appendix Tables 4.56-62. Due to manpower constraints, samples were collected from treatments 1, 2, 5, 8, 9, and 10. From these data, the same conclusions can be drawn as from the field observations. Plant height (Appendix Table 4.56) was adversely affected by the higher drench treatments (numbers 2 and 5), while the lowest drench rate and both 4-week sprays had little or no effect. Stem diameter (Appendix Table 4.57) was not significantly affected by the treatments. Leaf surface area (Appendix Table 4.58) was lower in all treatments than in the control. Among the treatments, leaf surface area was highest at the lowest treatment rates. An apparent anomaly is the average plant height of the highest drench treatment, which is intermediate between the untreated check and treatment 5, which was treated at a lower rate. The same rate response is seen in shoot dry rate (Appendix Table 4.59), root dry weight (Appendix Table 4.60) and total dry weight (Appendix Table 4.61, which aggregates data in Appendix Tables 4.59 and 60). There was no treatment effect on the number of true leaves per plant (Appendix Table 4.62).

On 5/31/00 plants were inspected for symptoms of virus infection, and the number of symptomatic plants was recorded. Virus incidence was randomly distributed across the treatments and treatment effects were not discernable (Appendix table 4.63).

Commercial success for any pesticide depends on efficacy at dose rates that are acceptable in terms of food, worker and environmental safety, non-phytotoxic and affordable for the grower. As can be seen from the previous trial descriptions, despite low application rates, SAR compounds can have profound positive and negative effects on crop vigor and productivity.

A Field Scale Test of SAR Inducers

In order to evaluate the efficacy of this approach to bacterial spot management, a commercial 5 acre field trial was established in a tomato farm in Collier County, FL. Tomatoes were planted on 8/24/99. Actigard 50WG was applied 10 times on weekly intervals between 8/31 and 11/15/99 at 0.5 oz/acre as part of a phytotoxicity evaluation. Mancozeb and copper hydroxide were not applied in the Actigard plot until after the last Actigard application, when their use was resumed. Messenger was applied 6 times on 14-day intervals between 9/1 and 11/10/99 in a rotation with mancozeb and copper (Appendix Table 4.64). All applications were made using a standard ground rig at between 45 and 90 gallons per acre according to the size of the crop. The remainder of the field was treated with the grower's standard bacterial spot treatment of mancozeb and copper hydroxide, applied twice weekly beginning 8/25/99.

Disease incidence was evaluated twice weekly by Glades Crop Care, Inc., who assigned a numerical severity grade between 0 and 5 for bacterial spot disease on fruits and foliage. Detailed evaluations were carried out on 10/27/99 and 11/12/99 with a Horsfall-Barrett (HB) grade assigned to each of 25 plants at four randomly located sites within each treatment area. This grade reflected the disease severity of bacterial spot disease at each site. A summary of HB grades is presented in Table 4.11. The number of lesions per leaflet was also counted on the terminal leaflet of the fourth leaf from the growing point on 25 plants and on 25 fruits measuring 2 inches in diameter at each site. Because of the distance between the treatment areas, the grower's standard treatment of mancozeb and copper hydroxide was evaluated in two locations, each immediately adjacent to the edge of the experimental treatment. These were referred to as Growers' Standard I and Grower's Standard II (GSI and GSII, respectively). The weekly reports did not include a separate evaluation of the grower's standard.

Bacterial spot was first detected on foliage in the Messenger treatment on 9/16/99, followed by the grower's standard on 9/22/99 and the Actigard treatment on 10/04/99 (Figure 4.17). Severity grades for foliar disease rose rapidly in all plots, reaching a final grade of 2.5 within 4.5 weeks the initial detection. The same grade was given to the Actigard plot after only 3.5 weeks. Bacterial spot lesions were detected on the fruit in the Messenger plot on 10/07/99, followed by the grower's standard on 10/18/99 and the Actigard plot on 10/21/99 (Figure 4.18). On fruit, the severity grade rose to 1.5 in the grower's standard within 14 days after discovery, while the highest grade in the

Messenger and Actigard plots plot was 1.0. In both foliage and fruits, the maximum grades were reached in the following order: Messenger then grower's standard followed by Actigard.

Disease severity, as reflected in defoliation graded according to the HB scale, is presented in Appendix Table 4.65 and in Figure 4.19. In both evaluation areas, average HB grades were similar between the experimental treatment and the associated grower's standard on 10/27/99, although the grades were higher (2.4 and 2.5) in the Messenger and GSI plots than in the Actigard and GSII plots (2.0 each). This reflects the earlier incidence and faster increases in disease severity observed by the scouts in that part of the field. Defoliation increased in all plots between this initial evaluation and 11/12/99. This increase was highest in the Messenger plot, followed by the GSI (4.1 and 3.6, respectively). Final average HB grades in the Actigard plot and GSII were the same (2.5).

The number of lesions per leaflet and the abundance of disease-free leaflets indicate an ongoing disease spread in the latter stages of the crop. In both evaluations the highest number of lesions per leaflet occurred in the grower's standard plot, while the corresponding SAR-treated plot had fewer lesions per leaflet. Interestingly, although bacterial spot was found first and increased most rapidly in the Messenger and GSI plots, by 10/27/99, upper foliage of these treatments showed a lower level of new disease lesions than the Actigard and GSII plots (Appendix Table 4.66, Figures 4.20 and 4.21). The abundance of lesions on fruit, however, clearly reflects the earlier incidence in the Messenger and GSI plots. In both evaluations the lowest level of fruit infection was found on the Actigard plot. The abundance of disease-free fruit also reflects this trend. (Appendix Table 4.67, Figures 4.22 and 4.23).

The ability of SAR chemistry to affect bacterial spot disease control in tomatoes is clearly indicated in this test. The disease occurred earliest and increased rapidly in the Messenger treatment, where a rotation with mancozeb and copper hydroxide was being applied. This phenomenon has also been observed in peppers treated with Messenger (Glades Crop Care, Inc., unpublished data). The reason for early disease development is not known, but it indicates a potential drawback to the use of this product.

The Actigard plot, on the other hand, did not receive any mancozeb or copper hydroxide until late in the crop. The fact that disease development was significantly lower in that part of the field may be the result of the treatment regimen or of separation from the initial infection site in the Messenger plot. This is suggested by the fact that the HB grades for defoliation, which largely reflected early disease activity in the lower foliage, were lower to a similar degree in the Actigard and GSII plots in contrast to the Messenger and GSI plots (Appendix Table 4.65).

Although the late-season foliar lesion counts suggest that bacterial spot control with Actigard was better than with Messenger, the influence of physical location is probably a strong influence here as well. It is significant to note that on both foliage and fruit, the number of lesions was higher in the grower's standard than in the corresponding SAR treatment. Unfortunately, detailed yield data were not collected in this trial.

Regarding yield, Syngenta, the manufacturer of Actigard, has found that a measurable yield reduction can result when Actigard is applied more than six times weekly early in the crop. They recommend that treatments be discontinued after about week six. In the current trial, Actigard was applied 10 times with the treatment period extending through most of the crop's development.

The results of this trial indicate that SAR chemistry is a potentially powerful addition to conventional chemistry for the control of bacterial spot in tomatoes. However, there remain many serious lessons to learn about their use before they can be fully adopted consistent with grower economic realities.

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Appendix Table 4.1. Pesticide applications in small plot sweet corn trial, Boynton Beach, FL, Spring, 2000.

Treatment #	Pesticides used	Application rate (s) per acre	Application dates
1	Calcium Silicate Slag	10,000 lb	4/7/00
	Crymax	16 oz	4/24, 4/26, 4/28, 5/1/00
		24 oz	5/31, 6/2, 6/5, 6/6, 6/9, 6/12/00
	Dipel 2X	16 oz	5/20, 5/27/00
		24 oz	5/13/00
	Spintor 2 SC	2 oz	4/28, 5/1/00
		4 oz	5/20/00
		6 oz	5/13, 5/27, 6/5, 6/6, 6/9, 6/12/00
2	Crymax	16 oz	4/24, 4/26, 4/28, 5/1/00
		24 oz	5/31, 6/2, 6/5, 6/6, 6/9, 6/12/00
	Dipel 2X	16 oz	5/20, 5/27/00
		24 oz	5/13/00
	Spintor 2 SC	2 oz	4/28, 5/1/00
		4 oz	5/20/00
		6 oz	5/13, 5/27, 6/5, 6/6, 6/9, 6/12/00
	Manex w/ Zinc	38 oz	5/7, 5/13, 5/20/00
	Tilt	4 oz	5/27, 5/31, 6/5, 6/12/00
3	Crymax	16 oz	4/24, 4/26/00
	Lannate LV	16 oz	4/28, 5/7, 5/13, 6/2/00
		24 oz	5/20, 5/25, 5/29/00
	Warrior	1.5 oz	6/2/00
		3.8 oz	6/5, 6/6, 6//00
	Manex w/ Zinc	38 oz	5/7, 5/13, 5/20/, 5/27, 5/31, 6/5, 6/12/00
4	Crymax	16 oz	4/24, 4/26, 4/28, 5/1/00
	Spintor 2 SC	2 oz	4/28, 5/1/00
	Lannate LV	16 oz	5/7, 6/2/00
		24 oz	5/3, 5/13, 5/20, 5/25, 5/29/00
	Warrior	1.5 oz	6/2/00
		3.8 oz	6/5, 6/6, 6/9, 6/12/00
	Actigard 50WG	0.5 oz	5/7/00
		2.0 oz	5/13, 5/24, 5/31/00
5	Crymax	16 oz	4/24, 4/26, 4/28, 5/1/00
	Spintor 2 SC	2 oz	4/28, 5/1/00
	Lannate LV	16 oz	5/7, 6/2/00
		24 oz	5/3, 5/13, 5/20, 5/25, 5/29/00
	Warrior	1.5 oz	6/2/00
		3.8 oz	6/5, 6/6, 6/9, 6/12/00

Appendix Table 4.2. Incidence of worms (*Spodoptera* spp.) in sweet corn whorls, Boynton Beach, FL, Spring, 2000.

	% plants with worms in the whorl	
Evaluation Date	5/19/00	5/26/00
Treatment 1	3.75	5.00
Treatment 2	2.75	3.75
Treatment 3	7.75	6.50
Treatment 5	8.25	6.75
LSD	1.87	2.60

Appendix Table 4.3. Incidence of worms (*Spodoptera* spp.) in sweet corn ears, Boynton Beach, FL, Spring, 2000.

	% plants with worms in ear shoots or ears					
Evaluation Date	5/26/00	6/2/00	6/5/00	6/8/00	6/12/00	6/16/00
Treatment 1	1.75	11.25	23.50	29.75	37.50	11.50
Treatment 2	2.25	13.25	19.50	23.50	33.25	10.75
Treatment 3	4.50	15.00	28.00	26.00	37.00	10.00
Treatment 5	4.50	14.50	28.25	25.25	34.50	9.75
LSD	2.35	3.91	11.07	9.42	13.58	6.09

Appendix Table 4.4. Incidence of silkflies in sweet corn ears, Boynton Beach, FL, Spring, 2000.

	% ears infested with silkflies			Silkfly larval infestation severity (0-5)
Evaluation Date	6/5/00	6/8/00	6/12/00	6/16/00
Treatment 1	6.00	27.50	63.25	2.28
Treatment 2	5.25	25.50	67.50	2.37
Treatment 3	5.25	28.75	61.50	1.72
Treatment 5	6.00	31.50	62.25	2.05
LSD	5.06	9.55	16.09	0.47

Appendix Table 4.5. Incidence of rust on sweet corn treated with calcium silicate slag, Boynton Beach, FL, Spring, 2000.

	Rust lesions per plant					% Ears infected
Evaluation Date	5/26/00	6/2/00	6/5/00	6/8/00	6/12/00	6/16/00
Treatment 1	110.00	90.63	218.75	225.00	287.50	0.25
Treatment 2	62.50	24.38	56.25	93.75	112.50	0.00
Treatment 5	90.00	115.63	275.00	250.00	287.50	0.00
LSD	91.58	37.60	87.53	91.58	57.43	1.22

Appendix Table 4.6. Incidence of northern corn leaf blight on sweet corn treated with calcium silicate slag, Boynton Beach, FL, Spring, 2000.

	Northern corn leaf blight lesions per 100 plants					% Ears infected
Evaluation Date	5/26/00	6/2/00	6/5/00	6/8/00	6/12/00	6/16/00
Treatment 1	1.75	2.33	2.00	2.46	2.48	9.75
Treatment 2	1.48	1.75	2.17	2.34	1.67	9.25
Treatment 5	4.00	5.00	3.75	4.58	3.00	9.00
LSD	3.02	2.59	1.72	0.96	0.95	6.28

Appendix Table 4.7. Incidence of southern corn leaf blight on sweet corn treated with calcium silicate slag, Boynton Beach, FL, Spring, 2000.

	Southern corn leaf blight lesions per 100 plants					% Ears infected
Evaluation Date	5/19/00	6/2/00	6/5/00	6/8/00	6/12/00	6/16/00
Treatment 1	0	0	1.50	1.75	1.36	3.50
Treatment 2	0	0	1.00	1.42	1.42	3.00
Treatment 5	0	0	1.42	1.83	2.42	3.50
LSD			0.64	0.83	0.73	3.15

Appendix Table 4.8. Transplant heights at 2 weeks after seeding, Immokalee, FL Spring 2000.

Evaluation Date	Crop	Treatment	Rep	Plant Height (mm)					Average this rep	Average this treatment
3/30/00	Tomato	01	A	32	38	44	44	32	38.10	35.56
3/30/00	Tomato	01	B	38	38	32	38	38	36.83	
3/30/00	Tomato	01	C	25	32	38	32	44	34.29	
3/30/00	Tomato	01	D	32	32	32	38	32	33.02	
3/30/00	Tomato	15	A	32	32	38	38	38	35.56	32.70
3/30/00	Tomato	15	B	25	32	32	32	38	31.75	
3/30/00	Tomato	15	C	32	38	38	25	25	31.75	
3/30/00	Tomato	15	D	32	32	32	32	32	31.75	
3/30/00	Tomato	16	A	32	32	32	32	38	33.02	31.12
3/30/00	Tomato	16	B	25	25	32	32	32	29.21	
3/30/00	Tomato	16	C	32	32	32	38	38	34.29	
3/30/00	Tomato	16	D	25	25	25	32	32	27.94	
4/25/00	Pepper	23	A	13	13	13	13	13	12.7	12.7
4/25/00	Pepper	23	B	13	13	13	13	13	12.7	
4/25/00	Pepper	23	C	13	13	13	13	13	12.7	
4/25/00	Pepper	23	D	13	13	13	13	13	12.7	
4/25/00	Pepper	24	A	13	13	13	13	13	12.7	13.7
4/25/00	Pepper	24	B	6	13	13	13	19	12.7	
4/25/00	Pepper	24	C	13	13	13	19	19	15.2	
4/25/00	Pepper	24	D	13	13	13	13	19	14.0	
4/25/00	Pepper	25	A	13	13	13	13	13	12.7	13.0
4/25/00	Pepper	25	B	13	13	13	13	13	12.7	
4/25/00	Pepper	25	C	19	13	13	13	13	14.0	
4/25/00	Pepper	25	D	13	13	13	13	13	12.7	

Appendix Table 4.9. Transplant heights at 4 weeks after seeding, Immokalee, FL Spring 2000.

Evaluation Date	Crop	Treatment	Rep	Plant Height (mm)					Average this rep	Average this treatment
4/14/00	Tomato	01	A	76	70	76	64	70	71.12	66.99
4/14/00	Tomato	01	B	64	64	70	57	70	64.77	
4/14/00	Tomato	01	C	64	64	57	70	64	63.50	
4/14/00	Tomato	01	D	64	89	64	64	64	68.58	
4/14/00	Tomato	15	A	64	57	57	57	64	59.69	61.91
4/14/00	Tomato	15	B	64	64	64	64	64	63.50	
4/14/00	Tomato	15	C	57	64	64	57	64	60.96	
4/14/00	Tomato	15	D	64	70	64	57	64	63.50	
4/14/00	Tomato	16	A	51	64	57	57	70	59.69	60.64
4/14/00	Tomato	16	B	57	70	70	64	64	64.77	
4/14/00	Tomato	16	C	51	57	57	64	64	58.42	
4/14/00	Tomato	16	D	57	64	64	57	57	59.69	
5/9/00	Pepper	23	A	52	57	57	55	64	57.0	55.5
5/9/00	Pepper	23	B	54	52	48	53	60	53.4	
5/9/00	Pepper	23	C	51	53	55	60	62	56.2	
5/9/00	Pepper	23	D	52	55	57	57	55	55.2	
5/9/00	Pepper	24	A	55	57	58	57	53	56.0	58.0
5/9/00	Pepper	24	B	62	55	57	60	57	58.2	
5/9/00	Pepper	24	C	54	60	60	62	57	58.6	
5/9/00	Pepper	24	D	54	60	62	62	57	59.0	
5/9/00	Pepper	25	A	50	54	52	55	50	52.2	58.2
5/9/00	Pepper	25	B	57	60	65	57	60	59.8	
5/9/00	Pepper	25	C	57	67	60	69	60	62.6	
5/9/00	Pepper	25	D	53	53	65	60	60	58.2	

Appendix Table 4.10. Tomato transplant heights at 5 weeks after seeding, Immokalee, FL Spring 2000.

Evaluation Date	Crop	Treatment	Rep	Plant Height (mm)										Average this rep	Average this treatment
4/24/00	Tomato	01	A	108	114	114	121	127						116.84	112.40
4/24/00	Tomato	01	B	108	108	121	114	114						113.03	
4/24/00	Tomato	01	C	102	102	108	108	121						107.95	
4/24/00	Tomato	01	D	108	102	121	108	121						111.76	
4/24/00	Tomato	15	A	83	83	95	95	76						86.36	96.52
4/24/00	Tomato	15	B	95	95	95	95	102						96.52	
4/24/00	Tomato	15	C	95	95	102	102	108						100.33	
4/24/00	Tomato	15	D	89	108	108	108	102						102.87	
4/24/00	Tomato	16	A	95	95	102	102	102						99.06	97.16
4/24/00	Tomato	16	B	89	95	102	95	102						96.52	
4/24/00	Tomato	16	C	89	89	95	102	114						97.79	
4/24/00	Tomato	16	D	83	95	95	95	108						95.25	
5/16/00	Pepper	23	A	100	110	98	103	108	105	98	98	103	96	101.9	96.0
5/16/00	Pepper	23	B	87	97	90	87	79	92	98	103	102	105	94.0	
5/16/00	Pepper	23	C	87	95	100	94	97	94	92	107	104	100	97.0	
5/16/00	Pepper	23	D	77	87	78	87	109	88	107	98	98	80	90.9	
5/16/00	Pepper	24	A	90	102	95	100	119	103	102	108	98	97	101.4	107.4
5/16/00	Pepper	24	B	100	102	103	117	119	117	113	115	115	113	111.4	
5/16/00	Pepper	24	C	112	100	117	113	113	112	121	110	111	100	110.9	
5/16/00	Pepper	24	D	92	93	98	121	117	115	107	118	94	103	105.8	
5/16/00	Pepper	25	A	83	76	78	90	83	89	85	100	97	95	87.6	101.7
5/16/00	Pepper	25	B	90	107	105	100	112	117	102	109	118	103	106.3	
5/16/00	Pepper	25	C	115	98	98	120	106	117	117	118	118	121	112.8	
5/16/00	Pepper	25	D	88	98	97	93	94	102	103	114	118	95	100.2	

[z] Only five plants per replicate were measured in tomatoes at five weeks.

Appendix Table 4.11. Tomato plant heights [z] at 2 weeks after transplanting, Immokalee, FL Spring 2000.

Evaluation Date	Treatment	Plant Height (mm)					Average
5/9/00	1	180	155	177	185	185	176.40
5/9/00	15	90	90	120	137	152	117.80
5/9/00	16	175	130	158	156	156	155.00

[z] Peppers were not evaluated after transplanting because of poor survival.

Appendix Table 4.12. Open blooms per tomato plant [z] at 3 weeks after transplanting, Immokalee, FL Spring 2000.

Date	Treatment	Blooms per plant															Average
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
5/16/00	1	2	2	1	3	2	1	0	2	2	2	2	2	0	2	1	1.6
5/16/00	15	1	2	0	2	3	1	1	2	2	3	4	3	3	3	2	2.1
5/16/00	16	2	3	3	3	1	3	1	1	1	x	2	2	3	1	2	2.0

[z] Peppers were not evaluated after transplanting because of poor survival.

Appendix Table 4.13. Open blooms per tomato plant [z] at 4 weeks after transplanting, Immokalee, FL Spring 2000.

Date	Treatment	Blooms per plant															Average
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
5/23/00	1	4	4	5	5	5	3	4	5	3		5	5	3	4	4	4.2
5/23/00	15	4	5	5	4	4	4	5	3	4	4	5	4	2	3	4	4.0
5/23/00	16	4	5	5	4	5	5	4	4	3	3	3	4	6	3	x	4.1

[z] Peppers were not evaluated after transplanting because of poor survival.

Appendix Table 4.14. Fruits per tomato plant [z] at 4 weeks after transplanting, Immokalee, FL Spring 2000.

Date	Treatment	Fruits per plant															Average
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
5/23/00	1	2	2	2	3	1	1	0	2	1	x	2	2	2	2	1	1.6
5/23/00	15	3	3	3	3	3	3	2	2	2	1	2	2	2	1	2	2.3
5/23/00	16	3	3	3	3	2	4	2	2	2	2	2	3	3	3	x	2.6

[z] Peppers were not evaluated after transplanting because of poor survival.

Appendix Table 4.15. Aboveground plant height (cm) of transplants treated with calcium silicate slag, 4/24/00 (tomato), 5/16/00 (pepper), Immokalee, FL.

Treatment	Rep	Crop	Height (cm)					Average this rep	Average this treatment
			1	2	3	4	5		
1	A	Tomato	12.5	13.3	12.2	10.6	11.5	12.0	11.6
1	B	Tomato	11.2	11.6	11.6	11.8	10.6	11.4	
1	C	Tomato	11.3	11.5	12.9	11.9	10.2	11.6	
1	D	Tomato	11.6	11.9	11.5	11.8	11.0	11.6	
15	A	Tomato	9.0	10.0	8.2	8.6	10.3	9.2	10.2
15	B	Tomato	10.0	10.0	10.0	9.7	9.8	9.9	
15	C	Tomato	10.0	10.2	10.5	11.3	10.7	10.5	
15	D	Tomato	11.4	11.9	10.6	11.3	10.0	11.0	
16	A	Tomato	12.0	10.0	9.8	11.5	10.0	10.7	10.3
16	B	Tomato	10.0	9.9	11.1	11.0	10.6	10.5	
16	C	Tomato	10.5	8.3	10.2	10.0	10.5	9.9	
16	D	Tomato	11.5	8.5	10.0	10.5	10.5	10.2	
23	A	Pepper	11.7	13.0	11.9	12.9	10.2	11.9	10.8
23	B	Pepper	10.5	10.3	8.6	10.1	9.4	9.8	
23	C	Pepper	12.1	10.1	10.0	11.8	9.9	10.8	
23	D	Pepper	9.6	11.7	9.7	12.0	11.3	10.9	
24	A	Pepper	10.5	10.7	12.8	11.0	12.7	11.5	11.7
24	B	Pepper	12.0	12.2	12.5	11.7	12.0	12.1	
24	C	Pepper	11.5	11.5	11.3	10.5	10.8	11.1	
24	D	Pepper	12.6	13.7	10.3	11.5	11.5	11.9	
25	A	Pepper	9.0	9.9	10.7	8.5	10.0	9.6	11.1
25	B	Pepper	12.5	11.0	13.0	11.5	12.0	12.0	
25	C	Pepper	11.5	12.7	12.3	11.5	11.5	11.9	
25	D	Pepper	10.7	10.2	11.0	11.6	10.3	10.8	

Appendix Table 4.16. Stem diameter (mm) of transplants treated with calcium silicate slag, 4/24/00 (tomato), 5/16/00 (pepper), Immokalee, FL.

Treatment	Rep	Crop	Stem diameter (mm)					Average this rep	Average this treatment
			1.00	2.00	3.00	4.00	5.00		
1	A	Tomato	3.46	2.98	3.16	3.22	3.22	3.21	3.34
1	B	Tomato	3.20	3.53	3.11	3.21	3.27	3.26	
1	C	Tomato	3.63	3.35	3.51	3.48	3.18	3.43	
1	D	Tomato	3.20	4.09	3.28	3.41	3.29	3.45	
15	A	Tomato	3.00	3.15	3.32	3.30	3.31	3.22	3.33
15	B	Tomato	3.30	3.39	3.19	3.14	3.56	3.32	
15	C	Tomato	3.33	3.42	3.67	3.18	3.57	3.43	
15	D	Tomato	3.18	3.52	3.29	3.31	3.56	3.37	
16	A	Tomato	3.17	3.40	2.96	3.25	3.22	3.20	3.29
16	B	Tomato	3.36	3.48	3.31	3.12	2.96	3.25	
16	C	Tomato	3.65	3.53	3.37	3.38	3.10	3.41	
16	D	Tomato	3.70	3.02	3.43	3.24	3.15	3.31	
23	A	Pepper	2.63	2.53	2.86	2.83	2.86	2.74	2.70
23	B	Pepper	2.63	2.68	2.76	2.66	2.61	2.67	
23	C	Pepper	2.65	2.80	2.53	2.74	2.72	2.69	
23	D	Pepper	2.83	2.77	2.54	2.59	2.84	2.71	
24	A	Pepper	2.88	2.58	2.73	2.66	2.42	2.65	2.68
24	B	Pepper	2.58	2.65	2.47	2.70	2.51	2.58	
24	C	Pepper	2.79	2.85	2.78	2.89	2.87	2.84	
24	D	Pepper	2.73	2.50	2.66	2.55	2.75	2.64	
25	A	Pepper	2.43	2.66	2.67	2.88	2.89	2.71	2.74
25	B	Pepper	2.77	2.66	2.56	2.65	2.69	2.67	
25	C	Pepper	2.99	3.06	2.84	2.47	3.10	2.89	
25	D	Pepper	2.70	2.63	2.81	2.68	2.59	2.68	

Appendix Table 4.17. Leaf surface area (cm^2) of transplants treated with calcium silicate slag, 4/24/00 (tomato), 5/16/00 (pepper), Immokalee, FL.

Treatment	Rep	Crop	Leaf area (cm^2)					Average this rep	Average this treatment
			1	2	3	4	5		
1	A	Tomato	28.33	32.28	26.86	25.30	26.97	27.95	28.14
1	B	Tomato	23.47	27.68	26.58	28.39	28.52	26.93	
1	C	Tomato	27.66	26.80	27.61	29.73	24.66	27.29	
1	D	Tomato	27.63	39.47	28.01	26.16	30.74	30.40	
15	A	Tomato	21.33	22.96	20.81	22.72	26.25	22.81	24.87
15	B	Tomato	25.49	26.41	25.25	23.87	22.88	24.78	
15	C	Tomato	28.74	26.36	27.84	24.61	27.21	26.95	
15	D	Tomato	25.08	26.50	23.29	24.52	25.21	24.92	
16	A	Tomato	23.98	24.00	26.51	22.52	25.53	24.51	23.86
16	B	Tomato	22.45	22.93	20.89	20.51	24.99	22.35	
16	C	Tomato	25.00	20.11	25.16	21.86	22.45	22.92	
16	D	Tomato	28.29	19.57	23.08	29.77	27.68	25.68	
23	A	Pepper	44.58	29.64	46.48	45.72	38.47	40.98	39.50
23	B	Pepper	40.03	39.01	40.69	41.68	41.23	40.53	
23	C	Pepper	36.34	37.44	38.63	41.67	40.78	38.97	
23	D	Pepper	34.69	43.93	33.25	36.73	39.06	37.53	
24	A	Pepper	41.94	40.38	43.74	30.45	30.89	37.48	39.90
24	B	Pepper	40.11	35.51	38.73	42.62	40.97	39.59	
24	C	Pepper	43.94	34.75	47.23	42.52	41.91	42.07	
24	D	Pepper	45.28	36.31	41.27	40.26	39.10	40.44	
25	A	Pepper	33.39	34.83	40.85	39.34	50.76	39.83	40.91
25	B	Pepper	43.17	43.73	41.47	40.71	45.24	42.86	
25	C	Pepper	41.47	43.71	44.33	34.42	45.00	41.79	
25	D	Pepper	39.56	36.41	45.88	37.89	36.06	39.16	

Appendix Table 4.18. Shoot dry weight (g) of transplants treated with calcium silicate slag, 4/24/00 (tomato), 5/16/00 (pepper), Immokalee, FL.

Treatment	Rep	Crop	Shoot dry weight (g)					Average this rep	Average this treatment
			1	2	3	4	5		
1	A	Tomato	0.4103	0.3931	0.3783	0.3863	0.3907	0.3917	0.3818
1	B	Tomato	0.2985	0.3820	0.3583	0.3613	0.3617	0.3524	
1	C	Tomato	0.3390	0.3898	0.3980	0.4174	0.3258	0.3740	
1	D	Tomato	0.3848	0.5626	0.3714	0.3632	0.3640	0.4092	
15	A	Tomato	0.3454	0.4138	0.2955	0.3591	0.4219	0.3671	0.3674
15	B	Tomato	0.3390	0.3913	0.3867	0.3514	0.3429	0.3623	
15	C	Tomato	0.3489	0.3950	0.3957	0.3360	0.4043	0.3760	
15	D	Tomato	0.3392	0.3949	0.3705	0.3771	0.3384	0.3640	
16	A	Tomato	0.3619	0.3564	0.3316	0.3313	0.3504	0.3463	0.3282
16	B	Tomato	0.3121	0.3477	0.3203	0.3159	0.3304	0.3253	
16	C	Tomato	0.3245	0.2663	0.3389	0.3258	0.3190	0.3149	
16	D	Tomato	0.3968	0.2521	0.2912	0.3691	0.3229	0.3264	
23	A	Pepper	0.2849	0.1963	0.3126	0.2830	0.2582	0.2670	0.2638
23	B	Pepper	0.2617	0.2653	0.2882	0.2755	0.2472	0.2676	
23	C	Pepper	0.2528	0.2193	0.2529	0.3067	0.2756	0.2615	
23	D	Pepper	0.2413	0.3026	0.2298	0.2406	0.2824	0.2593	
24	A	Pepper	0.2713	0.2452	0.2897	0.1640	0.1721	0.2285	0.2443
24	B	Pepper	0.2476	0.2571	0.2034	0.2750	0.2468	0.2460	
24	C	Pepper	0.2762	0.1949	0.2759	0.2402	0.2803	0.2535	
24	D	Pepper	0.3008	0.2063	0.2653	0.2352	0.2379	0.2491	
25	A	Pepper	0.2063	0.2261	0.2568	0.2783	0.3385	0.2612	0.2583
25	B	Pepper	0.2724	0.2647	0.2577	0.2455	0.2825	0.2646	
25	C	Pepper	0.2463	0.2723	0.2899	0.2214	0.2836	0.2627	
25	D	Pepper	0.2319	0.2442	0.2730	0.2360	0.2391	0.2448	

Appendix Table 4.19. Root dry weight (g) of transplants treated with calcium silicate slag, 4/24/00 (tomato), 5/16/00 (pepper), Immokalee, FL.

Treatment	Rep	Crop	Root dry weight (g)					Average this rep	Average this treatment
			1	2	3	4	5		
1	A	Tomato	0.1223	0.0994	0.1088	0.1060	0.1000	0.1073	0.1076
1	B	Tomato	0.1129	0.1099	0.0928	0.1113	0.1077	0.1069	
1	C	Tomato	0.1077	0.1044	0.1259	0.1095	0.0997	0.1094	
1	D	Tomato	0.1006	0.1305	0.1089	0.0923	0.1019	0.1068	
15	A	Tomato	0.0887	0.0976	0.0699	0.0907	0.0928	0.0879	0.0936
15	B	Tomato	0.0961	0.1020	0.0969	0.1036	0.0954	0.0988	
15	C	Tomato	0.1032	0.0988	0.0887	0.0842	0.0982	0.0946	
15	D	Tomato	0.0956	0.1029	0.0904	0.0909	0.0860	0.0932	
16	A	Tomato	0.0826	0.0885	0.0789	0.1006	0.0976	0.0896	0.0848
16	B	Tomato	0.0858	0.0940	0.0865	0.0859	0.0929	0.0890	
16	C	Tomato	0.0920	0.0751	0.0854	0.0893	0.0850	0.0854	
16	D	Tomato	0.0694	0.0670	0.0783	0.0890	0.0714	0.0750	
23	A	Pepper	0.1105	0.0560	0.1275	0.1161	0.1003	0.1021	0.1055
23	B	Pepper	0.1167	0.1316	0.1395	0.1049	0.1124	0.1210	
23	C	Pepper	0.0977	0.0792	0.1014	0.1233	0.1148	0.1033	
23	D	Pepper	0.0801	0.1230	0.0857	0.0790	0.1095	0.0955	
24	A	Pepper	0.1145	0.1046	0.1053	0.0453	0.0485	0.0836	0.0947
24	B	Pepper	0.0970	0.0928	0.0644	0.1154	0.0995	0.0938	
24	C	Pepper	0.1217	0.0751	0.1145	0.1062	0.1092	0.1053	
24	D	Pepper	0.1130	0.0578	0.0991	0.1036	0.1067	0.0960	
25	A	Pepper	0.0830	0.0933	0.0989	0.1035	0.1263	0.1010	0.1004
25	B	Pepper	0.1036	0.1089	0.0892	0.0945	0.1099	0.1012	
25	C	Pepper	0.0968	0.1152	0.1131	0.0840	0.1181	0.1054	
25	D	Pepper	0.0913	0.1002	0.0968	0.0844	0.0966	0.0939	

Appendix Table 4.20. Total dry weight (g) of transplants treated with calcium silicate slag, 4/24/00 (tomato), 5/16/00 (pepper), Immokalee, FL.

Treatment	Rep	Crop	Total dry weight (g)					Average this rep	Average this treatment
			1	2	3	4	5		
1	A	Tomato	0.5326	0.4925	0.4871	0.4923	0.4907	0.4990	0.4895
1	B	Tomato	0.4114	0.4919	0.4511	0.4726	0.4694	0.4593	
1	C	Tomato	0.4467	0.4942	0.5239	0.5269	0.4255	0.4834	
1	D	Tomato	0.4854	0.6931	0.4803	0.4555	0.4659	0.5160	
15	A	Tomato	0.4341	0.5114	0.3654	0.4498	0.5147	0.4551	0.4610
15	B	Tomato	0.4351	0.4933	0.4836	0.4550	0.4383	0.4611	
15	C	Tomato	0.4521	0.4938	0.4844	0.4202	0.5025	0.4706	
15	D	Tomato	0.4348	0.4978	0.4609	0.4680	0.4244	0.4572	
16	A	Tomato	0.4445	0.4449	0.4105	0.4319	0.4480	0.4360	0.4130
16	B	Tomato	0.3979	0.4417	0.4068	0.4018	0.4233	0.4143	
16	C	Tomato	0.4165	0.3414	0.4243	0.4151	0.4040	0.4003	
16	D	Tomato	0.4662	0.3191	0.3695	0.4581	0.3943	0.4014	
23	A	Pepper	0.3954	0.2523	0.4401	0.3991	0.3585	0.3691	0.3693
23	B	Pepper	0.3784	0.3969	0.4277	0.3804	0.3596	0.3886	
23	C	Pepper	0.3505	0.2985	0.3543	0.4300	0.3904	0.3647	
23	D	Pepper	0.3214	0.4256	0.3155	0.3196	0.3919	0.3548	
24	A	Pepper	0.3858	0.3498	0.3950	0.2093	0.2206	0.3121	0.3390
24	B	Pepper	0.3446	0.3499	0.2678	0.3904	0.3463	0.3398	
24	C	Pepper	0.3979	0.2700	0.3904	0.3464	0.3895	0.3588	
24	D	Pepper	0.4138	0.2641	0.3644	0.3388	0.3446	0.3451	
25	A	Pepper	0.2893	0.3194	0.3557	0.3818	0.4648	0.3622	0.3587
25	B	Pepper	0.3760	0.3736	0.3469	0.3400	0.3924	0.3658	
25	C	Pepper	0.3431	0.3875	0.4030	0.3054	0.4017	0.3681	
25	D	Pepper	0.3232	0.3444	0.3698	0.3204	0.3357	0.3387	

Appendix Table 4.21. Number of true leaves of transplants treated with calcium silicate slag, 4/24/00 (tomato), 5/16/00 (pepper), Immokalee, FL.

Treatment	Rep	Crop	Number of true leaves					Average this rep	Average this treatment
			1	2	3	4	5		
1	A	Tomato	4	5	4	4	5	4.4	4.3
1	B	Tomato	4	4	4	4	5	4.2	
1	C	Tomato	4	4	4	5	4	4.2	
1	D	Tomato	4	5	4	4	4	4.2	
15	A	Tomato	4	4	4	4	4	4.0	4.1
15	B	Tomato	4	4	4	5	4	4.2	
15	C	Tomato	4	4	4	5	4	4.2	
15	D	Tomato	4	4	3	5	4	4.0	
16	A	Tomato	4	4	5	4	5	4.4	4.2
16	B	Tomato	4	4	4	4	4	4.0	
16	C	Tomato	4	4	4	4	4	4.0	
16	D	Tomato	5	4	4	5	4	4.4	
23	A	Pepper	7	4	6	7	6	6.0	6.2
23	B	Pepper	6	7	7	6	6	6.4	
23	C	Pepper	6	7	6	6	6	6.2	
23	D	Pepper	6	7	6	6	6	6.2	
24	A	Pepper	6	7	7	4	5	5.8	6.3
24	B	Pepper	7	5	5	7	5	5.8	
24	C	Pepper	7	5	8	6	7	6.6	
24	D	Pepper	7	7	7	7	7	7.0	
25	A	Pepper	6	6	7	7	8	6.8	6.6
25	B	Pepper	6	6	5	6	7	6.0	
25	C	Pepper	6	7	7	6	7	6.6	
25	D	Pepper	7	7	7	6	7	6.8	

Appendix Table 4.22. Tomato transplant height at 2 weeks after seeding, Immokalee FL.

Evaluation Date	Treatment	Rep	Plant Height (mm)					Average this rep	Average this treatment
3/30/00	01	A	32	38	44	44	32	38.10	35.56
3/30/00	01	B	38	38	32	38	38	36.83	
3/30/00	01	C	25	32	38	32	44	34.29	
3/30/00	01	D	32	32	32	38	32	33.02	
3/30/00	17	A	32	32	32	32	32	31.75	34.93
3/30/00	17	B	32	38	38	38	38	36.83	
3/30/00	17	C	32	32	38	38	38	35.56	
3/30/00	17	D	32	32	32	38	44	35.56	
3/30/00	18	A	25	32	32	32	38	31.75	33.66
3/30/00	18	B	32	32	32	38	38	34.29	
3/30/00	18	C	25	32	32	38	38	33.02	
3/30/00	18	D	32	32	32	38	44	35.56	
3/30/00	19	A	32	32	38	38	38	35.56	33.02
3/30/00	19	B	32	32	32	32	38	33.02	
3/30/00	19	C	25	32	32	32	38	31.75	
3/30/00	19	D	32	32	32	32	32	31.75	
3/30/00	20	A	32	32	32	32	38	33.02	33.02
3/30/00	20	B	25	32	32	32	38	31.75	
3/30/00	20	C	32	32	32	32	38	33.02	
3/30/00	20	D	32	32	32	38	38	34.29	
3/30/00	21	A	25	32	32	32	38	31.75	32.39
3/30/00	21	B	32	32	32	32	38	33.02	
3/30/00	21	C	32	32	32	38	38	34.29	
3/30/00	21	D	25	25	32	32	38	30.48	
3/30/00	22	A	32	32	38	38	44	36.83	33.97
3/30/00	22	B	32	32	32	38	44	35.56	
3/30/00	22	C	32	32	32	32	38	33.02	
3/30/00	22	D	25	25	32	32	38	30.48	

Appendix Table 4.23. Tomato transplant height at 4 weeks after seeding, Immokalee FL.

Evaluation Date	Treatment	Rep	Plant Height (mm)					Average this rep	Average this treatment
4/14/00	01	A	76	70	76	64	70	71.12	66.99
4/14/00	01	B	64	64	70	57	70	64.77	
4/14/00	01	C	64	64	57	70	64	63.50	
4/14/00	01	D	64	89	64	64	64	68.58	
4/14/00	17	A	76	76	57	64	70	68.58	68.58
4/14/00	17	B	70	70	64	57	70	66.04	
4/14/00	17	C	70	70	64	70	70	68.58	
4/14/00	17	D	64	70	76	76	70	71.12	
4/14/00	18	A	70	70	70	64	76	69.85	71.12
4/14/00	18	B	64	70	70	70	76	69.85	
4/14/00	18	C	70	76	76	64	70	71.12	
4/14/00	18	D	70	70	83	70	76	73.66	
4/14/00	19	A	76	64	70	70	70	69.85	68.90
4/14/00	19	B	64	70	57	64	64	63.50	
4/14/00	19	C	64	57	57	64	64	60.96	
4/14/00	19	D	89	89	83	76	70	81.28	
4/14/00	20	A	64	64	76	76	64	68.58	69.53
4/14/00	20	B	64	64	70	70	70	67.31	
4/14/00	20	C	76	70	76	57	64	68.58	
4/14/00	20	D	64	76	83	70	76	73.66	
4/14/00	21	A	76	64	70	70	83	72.39	70.49
4/14/00	21	B	70	76	70	76	64	71.12	
4/14/00	21	C	64	70	76	70	76	71.12	
4/14/00	21	D	64	76	64	70	64	67.31	
4/14/00	22	A	64	76	76	76	70	72.39	71.44
4/14/00	22	B	70	76	70	83	70	73.66	
4/14/00	22	C	57	70	70	76	70	68.58	
4/14/00	22	D	64	64	76	76	76	71.12	

Appendix Table 4.24. Tomato transplant height at 5 weeks after seeding, Immokalee FL.

Evaluation Date	Treatment	Rep	Plant Height (mm)					Average this rep	Average this treatment
4/24/00	01	A	108	114	114	121	127	116.84	112.40
4/24/00	01	B	108	108	121	114	114	113.03	
4/24/00	01	C	102	102	108	108	121	107.95	
4/24/00	01	D	108	102	121	108	121	111.76	
4/24/00	17	A	114	102	121	133	108	115.57	113.35
4/24/00	17	B	108	102	114	127	114	113.03	
4/24/00	17	C	95	114	114	114	121	111.76	
4/24/00	17	D	108	114	114	114	114	113.03	
4/24/00	18	A	102	108	108	108	114	107.99	107.64
4/24/00	18	B	83	102	102	102	108	99.06	
4/24/00	18	C	108	108	114	114	114	111.76	
4/24/00	18	D	108	102	127	114	108	111.76	
4/24/00	19	A	102	108	108	108	114	107.95	104.46
4/24/00	19	B	95	95	95	102	108	99.06	
4/24/00	19	C	89	89	89	95	95	91.44	
4/24/00	19	D	95	108	127	127	140	119.38	
4/24/00	20	A	95	108	121	114	127	113.03	109.54
4/24/00	20	B	95	95	108	108	114	104.14	
4/24/00	20	C	108	108	108	114	114	110.49	
4/24/00	20	D	95	108	108	114	127	110.49	
4/24/00	21	A	95	95	121	121	127	111.76	108.90
4/24/00	21	B	108	114	114	121	121	115.57	
4/24/00	21	C	95	95	95	108	114	101.60	
4/24/00	21	D	102	102	108	108	114	106.68	
4/24/00	22	A	89	102	121	121	121	110.49	115.89
4/24/00	22	B	108	121	127	133	140	125.73	
4/24/00	22	C	102	102	108	114	121	109.22	
4/24/00	22	D	114	114	121	121	121	118.11	

Appendix Table 4.25. Tomato transplant height at 2 weeks after transplanting, Immokalee FL.

Evaluation Date	Treatment	Plant Height (mm)					Average
5/9/00	1	180	155	177	185	185	176.40
5/9/00	17	158	140	168	145	122	146.60
5/9/00	18	143	140	127	148	142	140.00
5/9/00	19	142	150	117	127	145	136.20
5/9/00	20	147	147	137	158	138	145.40
5/9/00	21	170	157	150	145	134	151.20
5/9/00	22	136	148	133	128	155	140.00

Appendix Table 4.26. Pepper transplant height at 2 weeks after seeding, Immokalee FL.

Evaluation Date	Treatment	Rep	Plant Height (mm)					Average this rep	Average this treatment
4/25/00	23	A	13	13	13	13	13	12.7	12.7
4/25/00	23	B	13	13	13	13	13	12.7	
4/25/00	23	C	13	13	13	13	13	12.7	
4/25/00	23	D	13	13	13	13	13	12.7	
4/25/00	26	A	13	13	13	13	13	12.7	12.4
4/25/00	26	B	13	13	13	13	13	12.7	
4/25/00	26	C	13	13	13	13	13	12.7	
4/25/00	26	D	6	13	13	13	13	11.4	
4/25/00	27	A	13	13	13	13	13	12.7	12.1
4/25/00	27	B	13	13	13	13	13	12.7	
4/25/00	27	C	13	13	13	13	13	12.7	
4/25/00	27	D	6	6	13	13	13	10.2	
4/25/00	28	A	13	13	13	13	13	12.7	13.0
4/25/00	28	B	19	13	13	13	13	14.0	
4/25/00	28	C	13	13	13	13	13	12.7	
4/25/00	28	D	13	13	13	13	13	12.7	
4/25/00	29	A	13	13	13	13	13	12.7	13.0
4/25/00	29	B	13	13	13	13	13	12.7	
4/25/00	29	C	13	13	13	13	19	14.0	
4/25/00	29	D	13	13	13	13	13	12.7	
4/25/00	30	A	13	13	13	13	13	12.7	12.7
4/25/00	30	B	13	13	13	13	13	12.7	
4/25/00	30	C	13	13	13	13	13	12.7	
4/25/00	30	D	13	13	13	13	13	12.7	
4/25/00	31	A	13	13	13	13	13	12.7	12.7
4/25/00	31	B	13	13	13	13	13	12.7	
4/25/00	31	C	13	13	13	13	13	12.7	
4/25/00	31	D	13	13	13	13	13	12.7	

Appendix Table 4.27. Pepper transplant height at 4 weeks after seeding, Immokalee FL.

Evaluation Date	Treatment	Rep	Plant Height (mm)					Average this rep	Average this treatment
5/9/00	23	A	52	57	57	55	64	57.0	55.5
5/9/00	23	B	54	52	48	53	60	53.4	
5/9/00	23	C	51	53	55	60	62	56.2	
5/9/00	23	D	52	55	57	57	55	55.2	
5/9/00	26	A	53	55	47	60	60	55.0	51.3
5/9/00	26	B	55	48	55	50	55	52.6	
5/9/00	26	C	43	46	48	43	52	46.4	
5/9/00	26	D	42	53	48	48	65	51.2	
5/9/00	27	A	48	53	48	48	55	50.4	52.0
5/9/00	27	B	52	52	54	53	54	53.0	
5/9/00	27	C	52	55	55	66	52	56.0	
5/9/00	27	D	43	44	54	50	52	48.6	
5/9/00	28	A	47	52	50	50	50	49.8	54.0
5/9/00	28	B	54	53	52	57	55	54.2	
5/9/00	28	C	57	58	50	60	58	56.6	
5/9/00	28	D	57	52	57	55	55	55.2	
5/9/00	29	A	50	50	50	52	55	51.4	55.4
5/9/00	29	B	53	54	60	60	55	56.4	
5/9/00	29	C	48	60	55	57	52	54.4	
5/9/00	29	D	57	60	60	57	62	59.2	
5/9/00	30	A	52	50	58	63	52	55.0	54.0
5/9/00	30	B	48	57	62	50	48	53.0	
5/9/00	30	C	47	54	52	53	60	53.2	
5/9/00	30	D	55	58	55	53	52	54.6	
5/9/00	31	A	44	57	55	58	52	53.2	55.0
5/9/00	31	B	52	57	52	57	64	56.4	
5/9/00	31	C	48	53	48	60	60	53.8	
5/9/00	31	D	60	58	58	52	55	56.6	

Appendix Table 4.28. Pepper transplant height at 5 weeks after seeding, Immokalee FL.

Evaluation Date	Treatment	Rep	Plant Height (mm)										Average this rep	Average this treatment
5/16/00	23	A	100	110	98	103	108	105	98	98	103	96	101.9	96.0
5/16/00	23	B	87	97	90	87	79	92	98	103	102	105	94.0	
5/16/00	23	C	87	95	100	94	97	94	92	107	104	100	97.0	
5/16/00	23	D	77	87	78	87	109	88	107	98	98	80	90.9	
5/16/00	26	A	67	78	74	90	90	100	90	96	98	100	88.3	86.6
5/16/00	26	B	84	78	87	88	71	94	100	108	105	100	91.5	
5/16/00	26	C	70	76	67	84	87	97	90	80	86	91	82.8	
5/16/00	26	D	85	80	80	100	96	82	81	77	75	82	83.8	
5/16/00	27	A	81	84	88	99	97	95	89	95	93	93	91.4	89.2
5/16/00	27	B	74	83	87	97	92	95	100	79	98	102	90.7	
5/16/00	27	C	79	85	77	102	97	102	92	102	88	87	91.1	
5/16/00	27	D	70	65	72	73	77	92	90	99	102	95	83.5	
5/16/00	28	A	92	87	97	86	95	95	93	94	92	110	94.1	98.2
5/16/00	28	B	98	82	101	108	95	89	98	98	98	102	96.9	
5/16/00	28	C	78	102	95	90	103	100	103	105	102	110	98.8	
5/16/00	28	D	93	102	117	107	102	103	102	104	101	99	103.0	
5/16/00	29	A	102	102	100	105	102	88	103	103	103	95	100.3	101.2
5/16/00	29	B	87	102	102	101	110	101	109	103	107	98	102.0	
5/16/00	29	C	95	83	93	100	98	97	105	109	122	105	100.7	
5/16/00	29	D	94	103	85	103	114	97	110	112	96	103	101.7	
5/16/00	30	A	85	87	96	98	116	112	109	108	98	87	99.6	98.5
5/16/00	30	B	92	89	86	98	112	126	110	112	92	97	101.4	
5/16/00	30	C	76	94	88	96	96	114	98	98	100	98	95.8	
5/16/00	30	D	90	90	78	102	98	112	92	102	95	113	97.2	
5/16/00	31	A	91	97	90	123	107	104	107	115	112	90	103.6	103.9
5/16/00	31	B	98	115	110	112	113	115	110	109	118	94	109.4	
5/16/00	31	C	85	95	90	102	116	103	113	118	98	111	103.1	
5/16/00	31	D	91	85	108	98	97	98	108	97	102	112	99.6	

Appendix Table 4.29. Blooms per tomato plant at 3 weeks after transplanting, Immokalee FL.

Date	Treatment	Blooms per plant															Average
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
5/16/00	1	2	2	1	3	2	1	0	2	2	2	2	2	0	2	1	1.6
5/16/00	17	3	3	1	1	0	3	2	3	0	2	3	4	3	3	2	2.2
5/16/00	18	1	3	3	0	3	2	4	2	3	2	1	2	5	3	2	2.4
5/16/00	19	3	2	0	3	2	0	2	3	0	2	2	2	0	3	2	1.7
5/16/00	20	2	3	2	0	4	0	3	0	2	2	2	1	1	1	2	1.7
5/16/00	21	1	2	2	0	3	2	1	2	3	2	1	2	2	2	1	1.7
5/16/00	22	3	0	1	2	3	3	0	0	0	3	4	0	2	2	2	1.7

Appendix Table 4.30. Blooms per tomato plant at 4 weeks after transplanting, Immokalee FL.

Date	Treatment	Blooms per plant															Average
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
5/23/00	1	4	4	5	5	5	3	4	5	3		5	5	3	4	4	4.2
5/23/00	2	3	5	3	4	3	4	3	3	5	2	3	2	2	2	3	3.1
5/23/00	17	5	5	7	5	4	4	3	5	2	3	4	5	4	2	2	4.0
5/23/00	18	3	2	5	3	5	4	6	4	4	5	5	5	7	3	5	4.4
5/23/00	19	4	2	1	5	5	3	12	5	1	2	3	3	1	4	3	3.6
5/23/00	20	6	3	3	4	5	4	4	5	3	2	3	3	3	1	3	3.5
5/23/00	21	x	2	1	4	8	3	5	4	5	3	2	5	1	5	4	3.7
5/23/00	22	5	3	5	3	6	3	3	2	2	7	1	4	5	3	3	3.7

Appendix Table 4.31. Fruits per tomato plant at 4 weeks after transplanting, Immokalee FL.

Date	Treatment	Fruits per plant															Average
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
5/23/00	1	2	2	2	3	1	1	0	2	1	x	2	2	2	2	1	1.6
5/23/00	17	4	4	2	2	0	3	2	3	1	2	3	3	3	3	3	2.5
5/23/00	18	1	3	4	2	3	2	3	2	3	2	3	3	6	3	2	2.8
5/23/00	19	3	2	0	3	3	0	2	5	0	2	2	2	0	3	3	2.0
5/23/00	20	2	3	2	1	5	1	3	0	2	2	2	2	1	1	2	1.9
5/23/00	21	x	2	2	1	4	3	1	2	3	2	2	3	2	2	2	2.2
5/23/00	22	3	1	2	3	3	3	0	2	1	3	7	0	1	2	2	2.2

Appendix Table 4.32. Above ground plant height (mm) of tomato transplants treated with Kasil I, 4/24/00, Immokalee, FL.

Treatment	Rep	Height (cm)					Average this rep	Average this treatment
		1.0	2.0	3.0	4.0	5.0		
1	A	12.5	13.3	12.2	10.6	11.5	12.0	11.6
1	B	11.2	11.6	11.6	11.8	10.6	11.4	
1	C	11.3	11.5	12.9	11.9	10.2	11.6	
1	D	11.6	11.9	11.5	11.8	11.0	11.6	
17	A	11.9	11.0	12.1	12.5	11.0	11.7	11.9
17	B	12.0	11.5	12.1	11.9	14.0	12.3	
17	C	12.0	11.8	12.1	12.0	11.3	11.8	
17	D	12.5	11.5	11.5	11.5	11.9	11.8	
19	A	11.5	12.6	10.7	11.9	10.5	11.4	10.8
19	B	9.2	10.5	11.1	10.6	8.6	10.0	
19	C	10.3	10.0	10.0	9.5	9.2	9.8	
19	D	12.5	11.4	11.5	13.9	10.6	12.0	

Appendix Table 4.33. Stem diameter (mm) of tomato transplants treated with Kasil I, 4/24/00, Immokalee, FL.

Treatment	Rep	Stem diameter (mm)					Average this rep	Average this treatment
		1.00	2.00	3.00	4.00	5.00		
1	A	3.46	2.98	3.16	3.22	3.22	3.21	3.34
1	B	3.20	3.53	3.11	3.21	3.27	3.26	
1	C	3.63	3.35	3.51	3.48	3.18	3.43	
1	D	3.20	4.09	3.28	3.41	3.29	3.45	
17	A	3.45	2.91	3.50	3.33	3.40	3.32	3.33
17	B	3.27	3.17	3.58	3.09	3.15	3.25	
17	C	3.20	3.58	3.38	3.56	3.02	3.35	
17	D	3.79	3.53	3.15	3.31	3.29	3.41	
19	A	3.30	3.27	3.39	3.43	3.29	3.34	3.39
19	B	3.19	3.55	3.46	2.86	3.29	3.27	
19	C	3.24	3.17	3.63	3.46	3.63	3.43	
19	D	3.93	3.46	3.54	3.54	3.15	3.52	

Appendix Table 4.34. Leaf surface area (cm^2) of tomato transplants treated with Kasil I, 4/24/00, Immokalee, FL.

Treatment	Rep	Leaf surface area (cm^2)					Average this rep	Average this treatment
		1	2	3	4	5		
1	A	28.33	32.28	26.86	25.30	26.97	27.95	28.14
1	B	23.47	27.68	26.58	28.39	28.52	26.93	
1	C	27.66	26.80	27.61	29.73	24.66	27.29	
1	D	27.63	39.47	28.01	26.16	30.74	30.40	
17	A	29.34	27.26	25.69	30.78	31.29	28.87	27.47
17	B	23.79	29.98	29.17	25.01	29.98	27.59	
17	C	22.46	29.23	23.86	25.72	24.21	25.10	
17	D	30.92	27.01	26.33	28.30	28.99	28.31	
19	A	23.89	22.05	19.63	23.48	22.06	22.22	25.70
19	B	23.46	28.70	24.62	19.91	24.66	24.27	
19	C	23.49	30.26	27.73	27.77	26.72	27.19	
19	D	34.30	28.30	25.36	31.38	26.23	29.11	

Appendix Table 4.35. Stem Dry Weight (g) of tomato transplants treated with Kasil I, 4/24/00, Immokalee, FL.

Treatment	Rep	Stem Dry Weight (g)					Average this rep	Average this treatment
		1	2	3	4	5		
1	A	0.4103	0.3931	0.3783	0.3863	0.3907	0.3917	0.3818
1	B	0.2985	0.3820	0.3583	0.3613	0.3617	0.3524	
1	C	0.3390	0.3898	0.3980	0.4174	0.3258	0.3740	
1	D	0.3848	0.5626	0.3714	0.3632	0.3640	0.4092	
17	A	0.4357	0.3432	0.3890	0.4173	0.3955	0.3961	0.3774
17	B	0.3836	0.3439	0.4212	0.3918	0.4694	0.4020	
17	C	0.3297	0.3916	0.3198	0.3535	0.2583	0.3306	
17	D	0.4407	0.3460	0.3841	0.3362	0.3982	0.3810	
19	A	0.3385	0.2816	0.2971	0.3583	0.3469	0.3245	0.3588
19	B	0.2935	0.3978	0.3486	0.2764	0.3501	0.3333	
19	C	0.3601	0.3752	0.4157	0.3963	0.3883	0.3871	
19	D	0.4327	0.3927	0.3521	0.4524	0.3208	0.3901	

Appendix Table 4.36. Root dry weight (g) of tomato transplants treated with Kasil I, 4/24/00, Immokalee, FL.

Treatment	Rep	Root dry weight (g)					Average this rep	Average this treatment
		1	2	3	4	5		
1	A	0.1223	0.0994	0.1088	0.1060	0.1000	0.1073	0.1076
1	B	0.1129	0.1099	0.0928	0.1113	0.1077	0.1069	
1	C	0.1077	0.1044	0.1259	0.1095	0.0997	0.1094	
1	D	0.1006	0.1305	0.1089	0.0923	0.1019	0.1068	
17	A	0.1066	0.1071	0.1066	0.1025	0.1015	0.1049	0.0984
17	B	0.0978	0.0854	0.1055	0.0778	0.1027	0.0938	
17	C	0.0782	0.1179	0.0801	0.1227	0.1020	0.1002	
17	D	0.0948	0.0944	0.0923	0.0960	0.0968	0.0949	
19	A	0.0880	0.0729	0.0870	0.1004	0.0932	0.0883	0.1001
19	B	0.0840	0.1029	0.0966	0.0736	0.1037	0.0922	
19	C	0.0951	0.1210	0.1069	0.1091	0.1135	0.1091	
19	D	0.1298	0.1085	0.0954	0.1132	0.1073	0.1108	

Appendix Table 4.37. Total dry weight (g) of tomato transplants treated with Kasil I, 4/24/00, Immokalee, FL.

Treatment	Rep	Total dry weight (g)					Average this rep	Average this treatment
		1	2	3	4	5		
1	A	0.5326	0.4925	0.4871	0.4923	0.4907	0.4990	0.4895
1	B	0.4114	0.4919	0.4511	0.4726	0.4694	0.4593	
1	C	0.4467	0.4942	0.5239	0.5269	0.4255	0.4834	
1	D	0.4854	0.6931	0.4803	0.4555	0.4659	0.5160	
17	A	0.5423	0.4503	0.4956	0.5198	0.4970	0.5010	0.4759
17	B	0.4814	0.4293	0.5267	0.4696	0.5721	0.4958	
17	C	0.4079	0.5095	0.3999	0.4762	0.3603	0.4308	
17	D	0.5355	0.4404	0.4764	0.4322	0.4950	0.4759	
19	A	0.4265	0.3545	0.3841	0.4587	0.4401	0.4128	0.4589
19	B	0.3775	0.5007	0.4452	0.3500	0.4538	0.4254	
19	C	0.4552	0.4962	0.5226	0.5054	0.5018	0.4962	
19	D	0.5625	0.5012	0.4475	0.5656	0.4281	0.5010	

Appendix Table 4.38. Number of true leaves in tomato transplants treated with Kasil I, 4/24/00, Immokalee, FL.

Treatment	Rep	# true leaves					Average this rep	Average this treatment
		1	2	3	4	5		
1	A	4	5	4	4	5	4.4	4.3
1	B	4	4	4	4	5	4.2	
1	C	4	4	4	5	4	4.2	
1	D	4	5	4	4	4	4.2	
17	A	5	5	4	5	5	4.8	4.7
17	B	4	5	4	5	5	4.6	
17	C	4	5	4	5	5	4.6	
17	D	5	4	5	5	5	4.8	
19	A	4	4	4	4	4	4.0	4.5
19	B	4	5	4	4	5	4.4	
19	C	5	5	5	4	5	4.8	
19	D	5	5	4	5	4	4.6	

Appendix Table 4.39. Aboveground transplant height (cm) in peppers treated with Kasil I, 5/16/00, Immokalee FL.

Treatment	Rep	Height (cm)					Average this rep	Average this treatment
		1	2	3	4	5		
23	A	11.7	13.0	11.9	12.9	10.2	11.9	10.8
23	B	10.5	10.3	8.6	10.1	9.4	9.8	
23	C	12.1	10.1	10.0	11.8	9.9	10.8	
23	D	9.6	11.7	9.7	12.0	11.3	10.9	
26	A	9.3	9.0	10.3	10.0	8.6	9.4	9.8
26	B	11.4	9.5	9.5	10.0	12.0	10.5	
26	C	10.0	9.1	9.6	10.0	9.4	9.6	
26	D	10.0	10.5	9.0	9.0	9.2	9.5	
27	A	10.2	10.6	10.1	9.0	11.3	10.2	10.0
27	B	10.2	10.7	11.1	10.3	9.7	10.4	
27	C	7.7	9.8	10.3	10.3	10.7	9.8	
27	D	11.2	7.9	10.6	9.2	8.5	9.5	
28	A	9.2	10.9	10.0	10.2	11.1	10.3	10.7
28	B	10.0	11.0	11.2	9.7	9.6	10.3	
28	C	10.4	11.3	10.5	11.8	9.7	10.7	
28	D	11.3	11.0	11.2	12.0	11.0	11.3	
29	A	10.4	11.2	11.8	10.7	11.1	11.0	10.9
29	B	10.2	11.0	11.5	9.6	11.7	10.8	
29	C	8.8	10.5	11.5	11.0	11.3	10.6	
29	D	11.2	12.4	12.2	11.5	9.1	11.3	
30	A	12.2	9.8	12.0	10.3	9.7	10.8	10.5
30	B	10.2	11.0	11.5	9.5	11.5	10.7	
30	C	11.5	10.2	9.7	8.0	10.6	10.0	
30	D	11.7	9.6	10.5	10.9	10.1	10.6	
31	A	11.0	10.7	9.6	11.0	9.9	10.4	10.9
31	B	10.9	12.2	12.8	11.7	10.6	11.6	
31	C	8.8	10.1	11.2	10.2	12.0	10.5	
31	D	9.3	11.8	11.0	11.5	10.7	10.9	

Appendix Table 4.40. Stem diameter (mm) in peppers treated with Kasil I, 5/16/00, Immokalee FL.

Treatment	Rep	Stem Diameter (mm)					Average this rep	Average this treatment
		1	2	3	4	5		
23	A	2.63	2.53	2.86	2.83	2.86	2.74	2.70
23	B	2.63	2.68	2.76	2.66	2.61	2.67	
23	C	2.65	2.80	2.53	2.74	2.72	2.69	
23	D	2.83	2.77	2.54	2.59	2.84	2.71	
26	A	2.38	2.48	2.54	2.70	2.54	2.53	2.59
26	B	2.77	2.44	2.67	2.80	2.79	2.69	
26	C	2.61	2.37	2.60	2.57	2.51	2.53	
26	D	2.50	2.41	2.52	2.73	2.93	2.62	
27	A	2.63	2.77	2.68	2.58	2.34	2.60	2.69
27	B	2.57	2.77	2.69	2.93	2.54	2.70	
27	C	2.66	2.75	2.82	2.96	2.46	2.73	
27	D	2.79	2.58	2.88	2.63	2.72	2.72	
28	A	2.50	2.51	2.62	2.57	2.70	2.58	2.69
28	B	2.82	2.62	2.41	2.44	2.57	2.57	
28	C	2.82	2.56	2.94	2.86	2.76	2.79	
28	D	2.91	2.82	2.79	2.60	2.92	2.81	
29	A	2.57	2.65	2.83	2.57	2.63	2.65	2.80
29	B	2.84	2.64	2.91	2.85	2.75	2.80	
29	C	2.67	2.68	3.37	2.98	3.01	2.94	
29	D	2.82	2.88	2.86	2.83	2.67	2.81	
30	A	2.50	2.66	2.36	2.71	2.72	2.59	2.68
30	B	2.51	2.93	2.87	2.53	2.75	2.72	
30	C	2.81	2.78	2.51	2.77	2.94	2.76	
30	D	2.32	2.81	2.53	2.64	2.91	2.64	
31	A	2.74	2.63	2.72	2.63	2.64	2.67	2.71
31	B	2.61	2.95	2.71	2.81	2.40	2.70	
31	C	2.78	2.86	2.99	2.80	2.46	2.78	
31	D	2.47	2.68	2.78	2.77	2.78	2.70	

Appendix Table 4.41. Leaf surface area (cm^2) in peppers treated with Kasil I, 5/16/00, Immokalee FL.

Treatment	Rep	Leaf Surface Area (cm^2)					Average this rep	Average this treatment
		1	2	3	4	5		
23	A	44.58	29.64	46.48	45.72	38.47	40.98	39.50
23	B	40.03	39.01	40.69	41.68	41.23	40.53	
23	C	36.34	37.44	38.63	41.67	40.78	38.97	
23	D	34.69	43.93	33.25	36.73	39.06	37.53	
26	A	26.62	30.14	33.55	36.62	29.07	31.20	33.50
26	B	40.39	27.32	41.37	38.56	40.05	37.54	
26	C	33.79	27.54	36.14	36.41	29.58	32.69	
26	D	33.78	26.08	27.87	35.43	39.75	32.58	
27	A	28.82	42.57	35.11	38.65	25.02	34.03	35.68
27	D	37.87	25.29	34.19	29.47	40.07	33.38	
27	B	34.38	40.67	39.34	39.21	37.27	38.17	
27	C	37.32	36.77	41.75	38.55	31.30	37.14	
28	A	30.11	41.96	36.77	28.84	40.63	35.66	38.55
28	B	40.10	37.88	30.31	37.33	41.67	37.46	
28	C	42.66	29.23	40.70	42.51	41.96	39.41	
28	D	45.00	40.59	39.84	39.31	43.59	41.67	
29	A	39.54	43.60	47.63	38.16	44.95	42.78	42.32
29	B	36.92	43.59	46.53	45.99	43.65	43.34	
29	C	31.41	45.78	48.74	37.88	45.72	41.91	
29	D	40.42	40.19	44.78	44.25	36.62	41.25	
30	A	35.94	44.00	30.93	38.63	40.31	37.96	38.13
30	B	30.41	47.68	43.63	30.33	47.75	39.96	
30	C	37.76	40.87	29.32	37.40	45.36	38.14	
30	D	29.11	48.42	30.89	37.06	36.86	36.47	
31	A	41.15	37.18	37.85	42.93	41.01	40.02	39.34
31	B	44.49	41.63	45.38	39.41	29.98	40.18	
31	C	37.30	42.37	42.36	37.30	32.99	38.46	
31	D	33.44	33.77	41.31	42.79	42.08	38.68	

Appendix Table 4.42. Shoot dry weight (g) in peppers treated with Kasil I, 5/16/00, Immokalee FL.

Treatment	Rep	Shoot Dry Weight (g)					Average this rep	Average this treatment
		1	2	3	4	5		
23	A	0.2849	0.1963	0.3126	0.2830	0.2582	0.2670	0.2638
23	B	0.2617	0.2653	0.2882	0.2755	0.2472	0.2676	
23	C	0.2528	0.2193	0.2529	0.3067	0.2756	0.2615	
23	D	0.2413	0.3026	0.2298	0.2406	0.2824	0.2593	
26	A	0.1600	0.1941	0.2120	0.2512	0.1962	0.2027	0.2170
26	B	0.2806	0.1848	0.2693	0.2622	0.2667	0.2527	
26	C	0.1888	0.1608	0.2288	0.2335	0.1955	0.2015	
26	D	0.2134	0.1543	0.1943	0.2447	0.2481	0.2110	
27	A	0.2058	0.2821	0.2381	0.2691	0.1333	0.2257	0.2369
27	B	0.2042	0.2767	0.2460	0.2621	0.2559	0.2490	
27	C	0.2643	0.2447	0.2780	0.2565	0.1831	0.2453	
27	D	0.2259	0.2284	0.2373	0.2018	0.2450	0.2277	
28	A	0.1920	0.2720	0.2418	0.1624	0.2767	0.2290	0.2531
28	B	0.2696	0.2510	0.1807	0.2427	0.2777	0.2443	
28	C	0.2748	0.1712	0.2735	0.2753	0.2832	0.2556	
28	D	0.3269	0.2715	0.2776	0.2472	0.2947	0.2836	
29	A	0.2310	0.2784	0.3295	0.2369	0.2889	0.2729	0.2813
29	B	0.2221	0.2831	0.3095	0.2864	0.2896	0.2781	
29	C	0.2479	0.3047	0.3433	0.2757	0.3124	0.2968	
29	D	0.2646	0.2939	0.2984	0.2976	0.2320	0.2773	
30	A	0.2221	0.2730	0.1778	0.2599	0.2727	0.2411	0.2434
30	B	0.1798	0.3272	0.2798	0.1835	0.3003	0.2541	
30	C	0.2504	0.2772	0.1705	0.2449	0.3031	0.2492	
30	D	0.1483	0.3215	0.1881	0.2382	0.2495	0.2291	
31	A	0.2482	0.2422	0.2474	0.2811	0.2639	0.2566	0.2558
31	B	0.2988	0.2869	0.3048	0.2478	0.1813	0.2639	
31	C	0.2552	0.2626	0.2790	0.2577	0.1783	0.2466	
31	D	0.2148	0.2260	0.2895	0.2757	0.2756	0.2563	

Appendix Table 4.43. Root dry weight (g) in peppers treated with Kasil I, 5/16/00, Immokalee FL.

Treatment	Rep	Root Dry Weight (g)					Average this rep	Average this treatment
		1	2	3	4	5		
23	A	0.1105	0.0560	0.1275	0.1161	0.1003	0.1021	0.1055
23	B	0.1167	0.1316	0.1395	0.1049	0.1124	0.1210	
23	C	0.0977	0.0792	0.1014	0.1233	0.1148	0.1033	
23	D	0.0801	0.1230	0.0857	0.0790	0.1095	0.0955	
26	A	0.0537	0.0825	0.0775	0.1059	0.0926	0.0824	0.0862
26	B	0.1015	0.0598	0.1128	0.1073	0.0928	0.0948	
26	C	0.0656	0.0604	0.1064	0.1055	0.0906	0.0857	
26	D	0.0703	0.0521	0.0831	0.0975	0.1060	0.0818	
27	A	0.0633	0.1046	0.0902	0.1158	0.0332	0.0814	0.0952
27	B	0.0702	0.1048	0.0831	0.1043	0.0966	0.0918	
27	C	0.1165	0.1209	0.1191	0.1068	0.0693	0.1065	
27	D	0.1005	0.1098	0.1033	0.0738	0.1174	0.1010	
28	A	0.0667	0.1269	0.1047	0.0514	0.1021	0.0904	0.0981
28	B	0.1046	0.1030	0.0588	0.1059	0.1164	0.0977	
28	C	0.1099	0.0494	0.1119	0.1048	0.1157	0.0983	
28	D	0.1239	0.1008	0.1002	0.0975	0.1079	0.1061	
29	A	0.1040	0.1282	0.1428	0.0895	0.1226	0.1174	0.1139
29	B	0.0807	0.1160	0.1129	0.1255	0.1069	0.1084	
29	C	0.1158	0.1210	0.1373	0.0981	0.1215	0.1187	
29	D	0.1085	0.1077	0.1193	0.1266	0.0940	0.1112	
30	A	0.0667	0.1273	0.0527	0.1083	0.1070	0.0924	0.0926
30	B	0.0640	0.1251	0.1159	0.0630	0.1319	0.1000	
30	C	0.0854	0.0964	0.0542	0.1052	0.1180	0.0918	
30	D	0.0385	0.1363	0.0596	0.0997	0.0967	0.0862	
31	A	0.1144	0.1014	0.1394	0.1415	0.1022	0.1198	0.1080
31	B	0.1271	0.1021	0.1226	0.0937	0.0701	0.1031	
31	C	0.1074	0.1189	0.1192	0.0964	0.0641	0.1012	
31	D	0.0858	0.0929	0.1138	0.1282	0.1180	0.1077	

Appendix Table 4.44. Total dry weight (g) in peppers treated with Kasil I, 5/16/00, Immokalee FL.

Treatment	Rep	Total Dry Weight (g)					Average this rep	Average this treatment
		1	2	3	4	5		
23	A	0.3954	0.2523	0.4401	0.3991	0.3585	0.3691	0.3693
23	B	0.3784	0.3969	0.4277	0.3804	0.3596	0.3886	
23	C	0.3505	0.2985	0.3543	0.4300	0.3904	0.3647	
23	D	0.3214	0.4256	0.3155	0.3196	0.3919	0.3548	
26	A	0.2137	0.2766	0.2895	0.3571	0.2888	0.2851	0.3032
26	B	0.3821	0.2446	0.3821	0.3695	0.3595	0.3476	
26	C	0.2544	0.2212	0.3352	0.3390	0.2861	0.2872	
26	D	0.2837	0.2064	0.2774	0.3422	0.3541	0.2928	
27	A	0.2691	0.3867	0.3283	0.3849	0.1665	0.3071	0.3321
27	B	0.2744	0.3815	0.3291	0.3664	0.3525	0.3408	
27	C	0.3808	0.3656	0.3971	0.3633	0.2524	0.3518	
27	D	0.3264	0.3382	0.3406	0.2756	0.3624	0.3286	
28	A	0.2587	0.3989	0.3465	0.2138	0.3788	0.3193	0.3513
28	B	0.3742	0.3540	0.2395	0.3486	0.3941	0.3421	
28	C	0.3847	0.2206	0.3854	0.3801	0.3989	0.3539	
28	D	0.4508	0.3723	0.3778	0.3447	0.4026	0.3896	
29	A	0.3350	0.4066	0.4723	0.3264	0.4115	0.3904	0.3952
29	B	0.3028	0.3991	0.4224	0.4119	0.3965	0.3865	
29	C	0.3637	0.4257	0.4806	0.3738	0.4339	0.4155	
29	D	0.3731	0.4016	0.4177	0.4242	0.3260	0.3885	
30	A	0.2888	0.4003	0.2305	0.3682	0.3797	0.3335	0.3360
30	B	0.2438	0.4523	0.3957	0.2465	0.4322	0.3541	
30	C	0.3358	0.3736	0.2247	0.3501	0.4211	0.3411	
30	D	0.1868	0.4578	0.2477	0.3379	0.3462	0.3153	
31	A	0.3626	0.3436	0.3868	0.4226	0.3661	0.3763	0.3638
31	B	0.4259	0.3890	0.4274	0.3415	0.2514	0.3670	
31	C	0.3626	0.3815	0.3982	0.3541	0.2424	0.3478	
31	D	0.3006	0.3189	0.4033	0.4039	0.3936	0.3641	

Appendix Table 4.45. Number of true leaves in peppers treated with Kasil I, 5/16/00, Immokalee FL.

Treatment	Rep	# True leaves					Average this rep	Average this treatment
		1	2	3	4	5		
23	A	7	4	6	7	6	6.0	6.2
23	B	6	7	7	6	6	6.4	
23	C	6	7	6	6	6	6.2	
23	D	6	7	6	6	6	6.2	
26	A	7	7	5	7	7	6.6	6.6
26	B	7	5	8	7	7	6.8	
26	C	6	5	7	7	6	6.2	
26	D	7	6	6	7	7	6.6	
27	A	6	7	7	7	4	6.2	6.6
27	B	6	7	7	7	7	6.8	
27	C	7	6	6	7	5	6.2	
27	D	7	7	7	7	7	7.0	
28	A	5	7	6	6	8	6.4	6.4
28	B	6	6	5	6	7	6.0	
28	C	7	4	7	7	7	6.4	
28	D	7	7	7	6	7	6.8	
29	A	6	7	8	6	7	6.8	6.8
29	B	5	7	6	6	7	6.2	
29	C	7	7	8	7	7	7.2	
29	D	7	7	7	7	6	6.8	
30	A	5	7	5	6	7	6.0	6.5
30	B	5	7	6	7	7	6.4	
30	C	7	7	6	7	7	6.8	
30	D	5	8	6	6	8	6.6	
31	A	7	6	6	7	7	6.6	6.5
31	B	6	6	6	7	5	6.0	
31	C	7	7	7	7	6	6.8	
31	D	7	6	6	6	7	6.4	

Appendix Table 4.46. Incidence of rust on sweet corn treated with different fungicide programs, Boynton Beach, FL, Spring, 2000.

	Rust lesions per plant					% Ears infected
Evaluation Date	5/26/00	6/2/00	6/5/00	6/8/00	6/12/00	6/16/00
Treatment 2	62.5	24.4	56.3	93.8	112.5	0.0
Treatment 3	109.0	51.9	78.8	112.5	150.0	0.8
Treatment 4	106.3	100.0	193.8	205.0	275.0	0.5
Treatment 5	90.0	115.6	275.0	250.0	287.5	0.0
LSD	91.6	37.6	87.5	91.6	57.4	1.2

Appendix Table 4.47. Incidence of northern corn leaf blight on sweet corn treated with different fungicide programs, Boynton Beach, FL, Spring, 2000.

	Northern corn leaf blight lesions per 100 plants					% Ears infected
Evaluation Date	5/26/00	6/2/00	6/5/00	6/8/00	6/12/00	6/16/00
Treatment 2	1.5	1.8	2.2	2.3	1.7	9.3
Treatment 3	2.6	1.7	2.3	2.3	1.8	3.5
Treatment 4	1.7	2.3	2.6	3.5	3.2	7.3
Treatment 5	4.0	5.0	3.8	4.6	3.0	9.0
LSD	3.0	2.6	1.7	1.0	1.0	6.3

Appendix Table 4.48. Incidence of southern corn leaf blight on sweet corn treated with different fungicide programs, Boynton Beach, FL, Spring, 2000.

	Southern corn leaf blight lesions per 100 plants					% Ears infected
Evaluation Date	5/26/00	6/2/00	6/5/00	6/8/00	6/12/00	6/16/00
Treatment 2	0	0	1.0	1.4	1.4	3.0
Treatment 3	0	0	1.1	1.3	1.3	3.3
Treatment 4	0	0	1.2	1.3	1.5	1.3
Treatment 5	0	0	1.4	1.8	2.4	3.5
LSD			0.6	0.8	0.7	3.2

Appendix Table 4.49. Tomato transplant heights at 2 weeks after seeding, Immokalee, FL Spring 2000.

Evaluation Date	Treatment	Rep	Plant Height (mm)					Average this rep	Average this treatment
3/30/00	01	A	32	38	44	44	32	38.10	35.56
3/30/00	01	B	38	38	32	38	38	36.83	
3/30/00	01	C	25	32	38	32	44	34.29	
3/30/00	01	D	32	32	32	38	32	33.02	
3/30/00	02	A	38	32	32	32	32	33.02	35.56
3/30/00	02	B	32	38	38	32	38	35.56	
3/30/00	02	C	32	44	38	38	32	36.83	
3/30/00	02	D	38	32	44	38	32	36.83	
3/30/00	03	A	38	32	32	25	32	31.75	32.70
3/30/00	03	B	32	38	38	32	32	34.29	
3/30/00	03	C	32	32	32	32	32	31.75	
3/30/00	03	D	32	32	32	32	38	33.02	
3/30/00	04	A	32	32	32	38	44	35.56	34.29
3/30/00	04	B	25	32	38	38	44	35.56	
3/30/00	04	C	32	32	32	32	32	31.75	
3/30/00	04	D	32	32	32	38	38	34.29	
3/30/00	05	A	32	32	32	38	38	34.29	36.20
3/30/00	05	B	44	38	44	32	32	38.10	
3/30/00	05	C	32	44	38	32	32	35.56	
3/30/00	05	D	44	38	32	38	32	36.83	
3/30/00	06	A	32	32	38	32	38	34.29	34.29
3/30/00	06	B	38	32	38	38	38	36.83	
3/30/00	06	C	32	38	44	32	32	35.56	
3/30/00	06	D	32	25	32	32	32	30.48	
3/30/00	07	A	38	32	25	32	32	31.75	33.97
3/30/00	07	B	32	32	32	38	38	34.29	
3/30/00	07	C	32	32	32	32	38	33.02	
3/30/00	07	D	32	32	38	38	44	36.83	
3/30/00	08	A	32	32	38	38	38	35.56	33.97
3/30/00	08	B	32	32	32	32	38	33.02	
3/30/00	08	C	32	32	32	38	38	34.29	
3/30/00	08	D	32	32	32	32	38	33.02	
3/30/00	09	A	32	32	32	38	38	34.29	35.88
3/30/00	09	B	32	32	38	38	44	36.83	
3/30/00	09	C	32	32	38	44	44	38.10	
3/30/00	09	D	32	32	32	38	38	34.29	
3/30/00	10	A	32	32	38	38	38	35.56	35.88
3/30/00	10	B	32	38	38	38	38	36.83	
3/30/00	10	C	32	32	38	38	44	36.83	
3/30/00	10	D	32	32	32	38	38	34.29	
3/30/00	11	A	32	32	38	38	38	35.56	33.97
3/30/00	11	B	32	32	32	38	38	34.29	
3/30/00	11	C	25	32	32	32	38	31.75	

Appendix Table 4.49 (Continued). Tomato transplant heights at 2 weeks after seeding, Immokalee, FL Spring 2000.

3/30/00	11	D	32	32	32	38	38	34.29	
3/30/00	12	A	32	32	32	32	38	33.02	33.34
3/30/00	12	B	32	32	32	38	38	34.29	
3/30/00	12	C	32	32	32	38	38	34.29	
3/30/00	12	D	32	32	32	32	32	31.75	
3/30/00	13	A	32	32	32	32	32	31.75	33.02
3/30/00	13	B	25	32	32	32	38	31.75	
3/30/00	13	C	32	32	38	38	38	35.56	
3/30/00	13	D	32	32	32	32	38	33.02	
3/30/00	14	A	32	32	32	38	38	34.29	33.66
3/30/00	14	B	32	32	32	32	32	31.75	
3/30/00	14	C	25	32	32	32	38	31.75	
3/30/00	14	D	32	38	38	38	38	36.83	

Appendix Table 4.50. Tomato transplant heights at 4 weeks after seeding, Immokalee, FL Spring 2000.

Evaluation Date	Treatment	Rep	Plant Height (mm)					Average this rep	Average this treatment
4/14/00	01	A	76	70	76	64	70	71.12	66.99
4/14/00	01	B	64	64	70	57	70	64.77	
4/14/00	01	C	64	64	57	70	64	63.50	
4/14/00	01	D	64	89	64	64	64	68.58	
4/14/00	02	A	64	89	64	64	64	68.58	68.58
4/14/00	02	B	64	64	64	64	76	66.04	
4/14/00	02	C	70	70	76	70	70	71.12	
4/14/00	02	D	64	64	70	70	76	68.58	
4/14/00	03	A	64	70	64	70	64	66.04	65.72
4/14/00	03	B	57	64	64	64	64	62.23	
4/14/00	03	C	64	76	64	70	76	69.85	
4/14/00	03	D	64	64	64	70	64	64.77	
4/14/00	04	A	57	64	64	64	70	63.50	67.31
4/14/00	04	B	64	70	83	70	64	69.85	
4/14/00	04	C	70	64	57	76	64	66.04	
4/14/00	04	D	64	64	76	76	70	69.85	
4/14/00	05	A	64	70	64	64	64	64.77	63.82
4/14/00	05	B	64	83	64	70	70	69.85	
4/14/00	05	C	51	57	64	57	64	58.42	
4/14/00	05	D	70	57	57	64	64	62.23	
4/14/00	06	A	64	70	70	76	70	69.85	69.53
4/14/00	06	B	64	76	70	76	70	71.12	
4/14/00	06	C	64	70	70	76	70	69.85	
4/14/00	06	D	64	76	70	64	64	67.31	
4/14/00	07	A	64	57	64	64	57	60.96	66.36
4/14/00	07	B	76	70	70	70	64	69.85	
4/14/00	07	C	70	64	64	70	70	67.31	
4/14/00	07	D	64	70	64	70	70	67.31	
4/14/00	08	A	57	70	76	70	76	69.85	70.49
4/14/00	08	B	64	70	76	76	76	72.39	
4/14/00	08	C	64	76	64	70	70	68.58	
4/14/00	08	D	64	70	70	70	83	71.12	
4/14/00	09	A	64	83	64	83	64	71.12	69.22
4/14/00	09	B	57	70	64	64	64	63.50	
4/14/00	09	C	64	70	76	70	70	69.85	
4/14/00	09	D	64	83	70	76	70	72.39	
4/14/00	10	A	57	64	64	76	76	67.31	68.26
4/14/00	10	B	57	70	64	64	64	63.50	
4/14/00	10	C	64	70	76	70	70	69.85	
4/14/00	10	D	64	83	70	76	70	72.39	
4/14/00	11	A	64	70	64	70	76	68.58	67.95
4/14/00	11	B	70	64	70	76	70	69.85	
4/14/00	11	C	57	57	83	83	64	68.58	

Appendix Table 4.50 (Continued). Tomato transplant heights at 4 weeks after seeding, Immokalee, FL Spring 2000.

4/14/00	11	D	70	64	64	64	64	64.77	
4/14/00	12	A	57	64	70	76	70	67.31	68.90
4/14/00	12	B	64	76	76	76	70	72.39	
4/14/00	12	C	64	64	64	70	76	67.31	
4/14/00	12	D	64	70	70	70	70	68.58	
4/14/00	13	A	70	64	76	70	76	71.12	72.07
4/14/00	13	B	70	64	70	83	76	72.39	
4/14/00	13	C	51	76	70	76	76	69.85	
4/14/00	13	D	70	76	76	76	76	74.93	
4/14/00	14	A	83	57	57	64	57	63.50	68.26
4/14/00	14	B	57	64	76	64	64	64.77	
4/14/00	14	C	70	70	76	76	70	72.39	
4/14/00	14	D	76	76	70	70	70	72.39	

Appendix Table 4.51. Tomato transplant heights at 5 weeks after seeding, Immokalee, FL Spring 2000.

Evaluation Date	Treatment	Rep	Plant Height (mm)					Average this rep	Average this treatment
4/24/00	01	A	108	114	114	121	127	116.84	112.40
4/24/00	01	B	108	108	121	114	114	113.03	
4/24/00	01	C	102	102	108	108	121	107.95	
4/24/00	01	D	108	102	121	108	121	111.76	
4/24/00	02	A	95	95	95	102	89	95.25	99.38
4/24/00	02	B	102	102	102	95	108	101.60	
4/24/00	02	C	114	95	114	114	89	105.41	
4/24/00	02	D	89	102	102	95	89	95.25	
4/24/00	03	A	89	102	102	102	89	96.52	94.62
4/24/00	03	B	95	102	95	102	95	97.79	
4/24/00	03	C	89	102	95	102	89	95.25	
4/24/00	03	D	83	83	102	89	89	88.90	
4/24/00	04	A	89	95	95	102	95	95.25	100.33
4/24/00	04	B	89	102	108	95	102	99.06	
4/24/00	04	C	114	95	102	114	95	104.14	
4/24/00	04	D	89	102	95	102	127	102.87	
4/24/00	05	A	102	102	102	108	108	104.14	105.09
4/24/00	05	B	108	108	108	114	114	110.49	
4/24/00	05	C	102	108	114	108	102	106.68	
4/24/00	05	D	95	108	102	89	102	99.06	
4/24/00	06	A	108	108	108	114	127	113.03	111.13
4/24/00	06	B	114	114	114	114	114	114.30	
4/24/00	06	C	108	108	114	121	121	114.30	
4/24/00	06	D	108	95	114	95	102	102.87	
4/24/00	07	A	95	95	108	95	95	97.79	101.92
4/24/00	07	B	95	89	108	114	108	102.87	
4/24/00	07	C	102	95	95	95	108	99.06	
4/24/00	07	D	108	108	108	108	108	107.95	
4/24/00	08	A	102	108	114	127	114	113.03	108.59
4/24/00	08	B	102	102	102	102	108	102.87	
4/24/00	08	C	108	114	114	108	108	110.49	
4/24/00	08	D	108	95	114	102	121	107.95	
4/24/00	09	A	108	108	102	114	127	111.76	112.08
4/24/00	09	B	89	95	108	121	102	102.87	
4/24/00	09	C	114	114	108	108	133	115.57	
4/24/00	09	D	102	127	127	121	114	118.11	
4/24/00	10	A	89	89	102	95	95	93.98	96.84
4/24/00	10	B	95	102	102	108	108	102.87	
4/24/00	10	C	83	102	102	102	83	93.98	
4/24/00	10	D	89	89	95	102	108	96.52	
4/24/00	11	A	102	102	89	121	108	104.14	110.81
4/24/00	11	B	108	108	114	114	121	113.03	
4/24/00	11	C	102	121	121	121	108	114.30	

Appendix Table 4.51 (Continued). Tomato transplant heights at 5 weeks after seeding, Immokalee, FL Spring 2000.

4/24/00	11	D	95	102	114	121	127	111.76	
4/24/00	12	A	95	102	114	121	121	110.49	113.35
4/24/00	12	B	114	121	121	121	127	120.65	
4/24/00	12	C	95	108	114	121	121	111.76	
4/24/00	12	D	102	102	114	114	121	110.49	
4/24/00	13	A	108	108	121	127	127	118.11	112.40
4/24/00	13	B	102	108	108	114	121	110.49	
4/24/00	13	C	95	108	102	121	102	105.41	
4/24/00	13	D	102	121	121	127	108	115.57	
4/24/00	14	A	89	95	102	83	83	90.17	99.38
4/24/00	14	B	89	89	83	108	102	93.98	
4/24/00	14	C	95	95	108	102	102	100.33	
4/24/00	14	D	108	108	114	114	121	113.03	

Appendix Table 4.52. Tomato plant heights at 2 weeks after transplanting, Immokalee, FL Spring 2000.

Evaluation Date	Treatment	Plant Height (mm)					Average
5/9/00	1	180	155	177	185	185	176.40
5/9/00	2	175	152	137	155	167	157.20
5/9/00	3	155	153	167	167	165	161.40
5/9/00	4	160	192	143	127	130	150.40
5/9/00	5	140	137	132	115	132	131.20
5/9/00	6	156	147	135	153	138	145.80
5/9/00	7	135	155	143	152	138	144.60
5/9/00	8	143	160	174	153	143	154.60
5/9/00	9	165	152	157	168	168	162.00
5/9/00	10	162	127	140	192	125	149.20
5/9/00	11	148	143	157	173	133	150.80
5/9/00	12	162	165	158	142	148	155.00
5/9/00	13	125	172	130	158	177	152.40
5/9/00	14	137	152	133	145	127	138.80
5/9/00	15	90	90	120	137	152	117.80
5/9/00	16	175	130	158	156	156	155.00
5/9/00	17	158	140	168	145	122	146.60
5/9/00	18	143	140	127	148	142	140.00
5/9/00	19	142	150	117	127	145	136.20
5/9/00	20	147	147	137	158	138	145.40
5/9/00	21	170	157	150	145	134	151.20
5/9/00	22	136	148	133	128	155	140.00

Appendix Table 4.53. Open blooms per plant at 3 weeks after transplanting, Immokalee, FL Spring 2000.

Date	Treatment	Blooms per plant															Average
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
5/16/00	1	2	2	1	3	2	1	0	2	2	2	2	2	0	2	1	1.6
5/16/00	2	2	2	0	1	0	0	1	0	0	0	1	0	0	1	0	0.5
5/16/00	3	0	2	0	0	1	3	2	2	2	2	0	0	0	0	2	1.1
5/16/00	4	3	1	1	1	1	2	2	0	2	2	0	1	2	2	0	1.3
5/16/00	5	1	0	1	2	2	2	2	0	0	2	0	1	2	2	0	1.1
5/16/00	6	2	1	1	1	1	1	2	2	0	0	1	0	1	1	2	1.1
5/16/00	7	2	1	2	2	2	1	0	2	1	3	0	1	2	0	3	1.5
5/16/00	8	2	2	2	2	2	1	2	2	2	2	1	2	2	0	2	1.7
5/16/00	9	3	1	2	2	0	3	3	2	0	0	2	2	2	2	0	1.6
5/16/00	10	0	0	1	2	3	1	2	3	2	3	2	0	2	4	0	1.7
5/16/00	11	2	3	2	2	2	4	4	0	0	4	2	2	2	0	3	2.1
5/16/00	12	3	2	3	2	4	3	3	2	2	2	2	0	2	3	3	2.4
5/16/00	13	3	1	3	0	3	1	3	0	2	2	1	3	2	3	2	1.9
5/16/00	14	3	2	3	1	0	2	4	2	3	3	2	0	3	1	2	2.1

Appendix Table 4.54. Open blooms per plant at 4 weeks after transplanting, Immokalee, FL Spring 2000.

Date	Treatment	Blooms per plant															Average
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
5/23/00	1	4	4	5	5	5	3	4	5	3		5	5	3	4	4	4.2
5/23/00	2	3	5	3	4	3	4	3	3	5	2	3	2	2	2	3	3.1
5/23/00	3	3	4	3	3	5	3	4	4	7	4	3	4	4	3	5	3.9
5/23/00	4	3	2	4	5	4	3	4	3	3	5	3	5	4	2	2	3.5
5/23/00	5	4	3	2	2	4	3	2	2	4	2	2	3	5	2	3	2.9
5/23/00	6	5	2	4	4	5	3	5	5	4	5	3	2	2	3	2	3.6
5/23/00	7	5	5	5	3	5	2	4	4	4	4	5	3	3	4	6	4.1
5/23/00	8	1	3	2	5	6	2	6	3	2	3	6	4	2	2	2	3.3
5/23/00	9	3	5	5	5	2	4	4	3	3	6	4	7	4	4	4	4.2
5/23/00	10	3	3	4	5	5	5	4	4	4	2	4	4	2	2	3	3.6
5/23/00	11	5	4	4	4	4	7	3	3	5	5	4	4	3	5	3	4.2
5/23/00	12	6	3	2	4	5	6	5	5	5	5	6	5	4	3	8	4.8
5/23/00	13	5	4	3	x	x	4	7	5	4	3	6	2	5	5	5	4.5
5/23/00	14	3	4	3	3	4	4	5	3	5	4	1	5	8	3	5	4.0

Appendix Table 4.55. Fruits per plant at 4 weeks after transplanting, Immokalee, FL Spring 2000.

Date	Treatment	Fruits per plant															Average
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
5/23/00	1	2	2	2	3	1	1	0	2	1	x	2	2	2	2	1	1.6
5/23/00	2	1	2	0	1	0	1	1	0	0	0	1	0	1	1	0	0.6
5/23/00	3	0	2	1	0	2	3	2	3	2	1	1	0	0	0	2	1.3
5/23/00	4	5	2	1	2	1	2	4	0	2	2	1	1	2	2	0	1.8
5/23/00	5	0	1	2	3	2	2	2	1	0	2	1	1	2	2	0	1.4
5/23/00	6	1	2	2	2	2	2	3	3	1	1	2	0	1	1	2	1.7
5/23/00	7	2	2	2	2	3	2	2	2	1	3	0	1	2	2	3	1.9
5/23/00	8	1	2	2	2	3	1	2	2	3	3	2	1	2	0	2	1.9
5/23/00	9	0	3	2	2	2	0	1	2	3	2	0	3	2	2	3	1.8
5/23/00	10	1	5	2	1	2	4	3	3	2	2	3	2	2	1	1	2.3
5/23/00	11	3	1	2	2	3	3	1	2	3	3	4	2	2	3	3	2.5
5/23/00	12	3	3	2	1	3	2	2	3	3	2	3	2	3	4	3	2.6
5/23/00	13	4	3	2	x	x	2	2	0	3	1	2	0	3	1	3	2.0
5/23/00	14	2	1	4	0	2	3	3	3	4	2	0	2	3	1	4	2.3

Appendix Table 4.56. Aboveground plant height (mm) of tomato transplants treated with Actigard 50WG, 4/24/00, Immokalee, FL.

Treatment	Rep	Height (cm)					Average this rep	Average this treatment
		1	2	3	4	5		
1	A	12.5	13.3	12.2	10.6	11.5	12.0	11.6
1	B	11.2	11.6	11.6	11.8	10.6	11.4	
1	C	11.3	11.5	12.9	11.9	10.2	11.6	
1	D	11.6	11.9	11.5	11.8	11.0	11.6	
2	A	10.7	10.9	11.7	9.1	10.5	10.6	11.2
2	B	10.6	11.0	11.0	10.8	11.9	11.1	
2	C	11.5	11.0	12.0	12.1	12.2	11.8	
2	D	11.0	11.5	10.2	10.6	12.0	11.5	
5	A	11.5	10.7	9.6	11.3	11.5	10.9	11.2
5	B	11.1	11.0	10.9	11.0	11.4	11.1	
5	C	10.3	10.7	12.2	11.6	11.9	11.3	
5	D	11.0	12.0	12.5	11.2	10.5	11.4	
8	A	12.0	11.8	10.7	12.5	13.0	12.0	11.6
8	B	11.2	10.4	10.3	11.9	12.0	11.2	
8	C	8.8	12.2	11.0	13.0	12.1	11.4	
8	D	12.0	11.4	12.8	11.4	12.3	12.0	
9	A	11.5	10.4	11.7	11.0	10.5	11.0	11.5
9	B	11.5	11.7	11.2	10.5	10.5	11.1	
9	C	11.0	12.2	11.4	13.5	11.5	11.9	
9	D	12.0	12.0	11.4	11.9	12.0	11.9	
11	A	11.8	11.5	12.0	11.8	11.3	11.7	11.8
11	B	11.9	10.4	12.0	11.0	12.0	11.5	
11	C	12.0	12.8	12.5	12.9	12.9	12.6	
11	D	11.0	10.0	11.8	12.5	11.4	11.3	

Appendix Table 4.57. Stem diameter (mm) of tomato transplants treated with Actigard 50WG, 4/24/00, Immokalee, FL.

Treatment	Rep	Stem diameter (mm)					Average this rep	Average this treatment
		1.00	2.00	3.00	4.00	5.00		
1	A	3.46	2.98	3.16	3.22	3.22	3.21	3.34
1	B	3.20	3.53	3.11	3.21	3.27	3.26	
1	C	3.63	3.35	3.51	3.48	3.18	3.43	
1	D	3.20	4.09	3.28	3.41	3.29	3.45	
2	A	3.39	3.59	3.30	3.30	3.48	3.41	3.42
2	B	3.21	3.41	3.67	3.29	3.69	3.45	
2	C	3.31	3.48	3.32	3.53	3.47	3.42	
2	D	3.40	3.60	2.99	3.72	3.30	3.40	
5	A	3.17	3.19	3.26	3.23	3.51	3.27	3.32
5	B	3.15	3.33	3.51	3.22	3.43	3.33	
5	C	3.42	3.32	3.21	3.31	3.40	3.33	
5	D	3.49	3.21	3.43	3.17	3.37	3.33	
8	A	3.07	3.26	3.04	3.07	3.10	3.11	3.28
8	B	3.52	3.27	3.16	3.44	3.55	3.39	
8	C	2.43	3.61	3.28	3.66	3.03	3.20	
8	D	3.46	3.48	3.65	3.16	3.42	3.43	
9	A	3.06	2.93	3.21	3.33	3.35	3.18	3.24
9	B	3.45	3.03	3.17	3.28	3.21	3.23	
9	C	3.22	3.43	3.38	3.17	3.27	3.29	
9	D	3.30	3.30	3.01	3.59	3.07	3.25	
11	A	3.11	3.23	3.22	3.43	3.12	3.22	3.31
11	B	3.25	3.46	3.41	3.49	3.34	3.39	
11	C	3.25	2.98	3.56	3.44	3.42	3.33	
11	D	3.15	3.17	3.31	3.40	3.43	3.29	

Appendix Table 4.58. Leaf area (cm^2) of tomato transplants treated with Actigard 50WG, 4/24/00, Immokalee, FL.

Treatment	Rep	Leaf area (cm^2)					Average this rep	Average this treatment
		1	2	3	4	5		
1	A	28.33	32.28	26.86	25.30	26.97	27.95	28.14
1	B	23.47	27.68	26.58	28.39	28.52	26.93	
1	C	27.66	26.80	27.61	29.73	24.66	27.29	
1	D	27.63	39.47	28.01	26.16	30.74	30.40	
2	A	24.37	21.57	26.05	23.95	25.64	24.32	25.64
2	B	24.21	30.37	30.86	24.66	31.45	28.31	
2	C	22.85	26.48	26.90	28.97	26.77	26.39	
2	D	20.94	22.93	22.96	27.59	23.20	23.52	
5	A	23.22	17.53	21.89	23.91	22.53	21.82	22.93
5	B	23.10	23.16	26.02	26.71	25.00	24.80	
5	C	18.06	23.26	26.48	24.65	22.25	22.94	
5	D	24.33	22.70	23.39	17.93	22.54	22.18	
8	A	29.47	25.96	22.39	27.07	25.44	26.07	26.19
8	B	27.98	25.24	26.11	25.14	31.15	27.12	
8	C	21.93	25.70	23.84	31.17	27.58	26.04	
8	D	23.92	24.37	27.73	24.72	26.91	25.53	
9	A	26.77	26.07	25.04	24.61	24.97	25.49	24.72
9	B	23.04	24.11	25.40	25.33	22.81	24.14	
9	C	23.21	25.26	25.51	23.43	25.61	24.60	
9	D	26.30	24.76	21.78	25.94	24.38	24.63	
11	A	24.69	26.94	27.92	28.36	22.12	26.01	26.75
11	B	22.67	27.37	30.09	24.92	26.12	26.23	
11	C	25.48	25.62	21.14	28.94	34.00	27.04	
11	D	24.60	26.58	27.37	27.78	32.36	27.74	

Appendix Table 4.59. Shoot dry weight (g) of tomato transplants treated with Actigard 50WG, 4/24/00, Immokalee, FL.

Treatment	Rep	Shoot dry weight (g)					Average this rep	Average this treatment
		1	2	3	4	5		
1	A	0.4103	0.3931	0.3783	0.3863	0.3907	0.3917	0.3818
1	B	0.2985	0.3820	0.3583	0.3613	0.3617	0.3524	
1	C	0.3390	0.3898	0.3980	0.4174	0.3258	0.3740	
1	D	0.3848	0.5626	0.3714	0.3632	0.3640	0.4092	
2	A	0.2954	0.3091	0.3252	0.2760	0.3525	0.3116	0.3190
2	B	0.3269	0.3461	0.4043	0.3262	0.3972	0.3601	
2	C	0.3011	0.3229	0.3596	0.3215	0.3285	0.3267	
2	D	0.2662	0.2652	0.2548	0.3245	0.2771	0.2776	
5	A	0.3424	0.2864	0.2925	0.3396	0.3367	0.3195	0.3172
5	B	0.3282	0.2900	0.3428	0.3725	0.3286	0.3324	
5	C	0.2709	0.3084	0.3381	0.3158	0.2969	0.3060	
5	D	0.2836	0.3257	0.3544	0.2848	0.3065	0.3110	
8	A	0.4376	0.4138	0.3531	0.3575	0.4036	0.3931	0.3607
8	B	0.4128	0.3232	0.3548	0.3782	0.4208	0.3780	
8	C	0.1641	0.3514	0.2863	0.4081	0.3697	0.3159	
8	D	0.3509	0.3258	0.4048	0.3399	0.3568	0.3556	
9	A	0.3694	0.3173	0.3157	0.3824	0.3658	0.3501	0.3325
9	B	0.3495	0.3345	0.3437	0.3298	0.2746	0.3264	
9	C	0.3406	0.3444	0.3356	0.3310	0.3210	0.3345	
9	D	0.3493	0.2838	0.3019	0.3211	0.3393	0.3191	
11	A	0.3411	0.3421	0.3557	0.4235	0.3274	0.3580	0.3656
11	B	0.3410	0.3745	0.3709	0.3751	0.3346	0.3592	
11	C	0.3524	0.3828	0.4148	0.4103	0.3919	0.3904	
11	D	0.3327	0.3396	0.3521	0.3341	0.4145	0.3546	

Appendix Table 4.60. Root dry weight (g) of tomato transplants treated with Actigard 50WG, 4/24/00, Immokalee, FL.

Treatment	Rep	Root dry weight (g)					Average this rep	Average this treatment
		1	2	3	4	5		
1	A	0.12230	0.09940	0.10880	0.10600	0.10000	0.10730	0.10763
1	B	0.11290	0.10990	0.09280	0.11130	0.10770	0.10692	
1	C	0.10770	0.10440	0.12590	0.10950	0.09970	0.10944	
1	D	0.10060	0.13050	0.10890	0.09230	0.10190	0.10684	
2	A	0.08880	0.08880	0.08330	0.09090	0.08610	0.08758	0.08095
2	B	0.08520	0.07800	0.09230	0.08280	0.10090	0.08784	
2	C	0.06650	0.09130	0.07820	0.08300	0.07370	0.07854	
2	D	0.06320	0.07600	0.07550	0.08060	0.05380	0.06982	
5	A	0.09210	0.10170	0.08110	0.09460	0.10150	0.09420	0.08790
5	B	0.07860	0.09940	0.09770	0.08820	0.09950	0.09268	
5	C	0.06920	0.08820	0.09530	0.08450	0.09240	0.08592	
5	D	0.07700	0.07290	0.08330	0.07520	0.08550	0.07878	
8	A	0.10810	0.11030	0.09320	0.10140	0.09620	0.10184	0.09856
8	B	0.11260	0.09260	0.09650	0.09740	0.10160	0.10014	
8	C	0.04640	0.08760	0.09280	0.11280	0.10580	0.08908	
8	D	0.09250	0.09200	0.11030	0.09690	0.12410	0.10316	
9	A	0.09920	0.08040	0.09350	0.09180	0.10690	0.09436	0.09317
9	B	0.10110	0.08860	0.08550	0.09830	0.09680	0.09406	
9	C	0.09040	0.10040	0.08700	0.08020	0.12260	0.09612	
9	D	0.08880	0.08740	0.07980	0.09760	0.08700	0.08812	
11	A	0.09530	0.09670	0.09940	0.01140	0.08670	0.07790	0.09527
11	B	0.10110	0.10260	0.11670	0.10190	0.08190	0.10084	
11	C	0.09440	0.09160	0.10190	0.11270	0.10460	0.10104	
11	D	0.09510	0.09530	0.11650	0.10310	0.09640	0.10128	

Appendix Table 4.61. Total dry weight (g) of tomato transplants treated with Actigard 50WG, 4/24/00, Immokalee, FL.

Treatment	Rep	Total dry weight (g)					Average this rep	Average this treatment
		1	2	3	4	5		
1	A	0.5326	0.4925	0.4871	0.4923	0.4907	0.4990	0.4895
1	B	0.4114	0.4919	0.4511	0.4726	0.4694	0.4593	
1	C	0.4467	0.4942	0.5239	0.5269	0.4255	0.4834	
1	D	0.4854	0.6931	0.4803	0.4555	0.4659	0.5160	
2	A	0.3842	0.3979	0.4085	0.3669	0.4386	0.3992	0.4000
2	B	0.4121	0.4241	0.4966	0.4090	0.4981	0.4480	
2	C	0.3676	0.4142	0.4378	0.4045	0.4022	0.4053	
2	D	0.3294	0.3412	0.3303	0.4051	0.3309	0.3474	
5	A	0.4345	0.3881	0.3736	0.4342	0.4382	0.4137	0.4051
5	B	0.4068	0.3894	0.4405	0.4607	0.4281	0.4251	
5	C	0.3401	0.3966	0.4334	0.4003	0.3893	0.3919	
5	D	0.3606	0.3986	0.4377	0.3600	0.3920	0.3898	
8	A	0.5457	0.5241	0.4463	0.4589	0.4998	0.4950	0.4592
8	B	0.5254	0.4158	0.4513	0.4756	0.5224	0.4781	
8	C	0.2105	0.4390	0.3791	0.5209	0.4755	0.4050	
8	D	0.4434	0.4178	0.5151	0.4368	0.4809	0.4588	
9	A	0.4686	0.3977	0.4092	0.4742	0.4727	0.4445	0.4257
9	B	0.4506	0.4231	0.4292	0.4281	0.3714	0.4205	
9	C	0.4310	0.4448	0.4226	0.4112	0.4436	0.4306	
9	D	0.4381	0.3712	0.3817	0.4187	0.4263	0.4072	
11	A	0.4364	0.4388	0.4551	0.4349	0.4141	0.4359	0.4608
11	B	0.4421	0.4771	0.4876	0.4770	0.4165	0.4601	
11	C	0.4468	0.4744	0.5167	0.5230	0.4965	0.4915	
11	D	0.4278	0.4349	0.4686	0.4372	0.5109	0.4559	

Appendix Table 4.62. Number of true leaves of tomato transplants treated with Actigard 50WG, 4/24/00, Immokalee, FL.

Treatment	Rep	Number of true leaves					Average this rep	Average this treatment
		1	2	3	4	5		
1	A	4	5	4	4	5	4.4	4.3
1	B	4	4	4	4	5	4.2	
1	C	4	4	4	5	4	4.2	
1	D	4	5	4	4	4	4.2	
2	A	4	4	4	4	4	4.0	4.3
2	B	4	5	4	5	5	4.6	
2	C	4	4	5	4	4	4.2	
2	D	4	4	5	4	4	4.2	
5	A	5	3	4	4	4	4.0	4.1
5	B	4	4	4	4	5	4.2	
5	C	4	4	5	4	4	4.2	
5	D	4	4	4	4	4	4.0	
8	A	5	4	4	4	5	4.4	4.3
8	B	4	4	5	4	4	4.2	
8	C	4	4	4	5	5	4.4	
8	D	4	4	4	4	5	4.2	
9	A	5	4	4	4	3	4.0	4.2
9	B	4	4	5	4	4	4.2	
9	C	4	4	3	5	4	4.0	
9	D	4	5	4	5	4	4.4	
11	A	4	4	5	4	4	4.2	4.3
11	B	4	4	5	4	4	4.2	
11	C	4	4	5	5	5	4.6	
11	D	4	4	5	4	4	4.2	

Appendix Table 4.63. Virus incidence in tomatoes grown from transplants treated with Actigard 50WG, 5/31/00, Immokalee, FL.

Treatment	Number of plants with virus symptoms.
1	4
2	2
3	2
4	7
5	1
6	3
7	6
8	3
9	3
10	5
11	6
12	5
13	5
14	8

Appendix Table 4.64. Messenger application dates and rates for control of bacterial spot in tomatoes, Collier County, FL, Fall 1999.

Application date	Messenger rate/acre (oz of product)
9/1/99	2.0
9/14/99	2.0
9/28/99	4.5
10/13/99	6.3
10/27/99	6.6
11/10/99	8.5

Appendix Table 4.65. Horsfall-Barrett grades for defoliation by bacterial spot in tomatoes, Collier County, FL, Fall, 1999.

	Horsfall Barrett grade	
Date	10/27/99	11/12/99
Treatment		
Grower's Standard I	2.5	3.6
Messenger	2.4	4.1
Grower's Standard II	2.0	2.5
Actigard	2.0	2.5

Appendix Table 4.66. Number of bacterial spot lesions per tomato leaflet, Collier County, FL, Fall 1999.

	Lesions per leaflet		Disease-free leaflets	
Date	10/27/99	11/12/99	10/27/99	11/12/99
Treatment				
Grower's Standard I	13.0	10.9	7%	22%
Messenger	11.6	7.6	19%	20%
Grower's Standard II	16.0	16.2	8%	11%
Actigard	11.2	12.1	13%	16%

Appendix Table 4.67. Number of bacterial spot lesions per tomato fruit, Collier County, FL, Fall 1999.

	Lesions per fruit		Disease-free fruits	
Date	10/27/99	11/12/99	10/27/99	11/12/99
Treatment				
Grower's Standard I	10.4	4.0	25%	46%
Messenger	9.4	3.5	49%	57%
Grower's Standard II	4.6	0.8	57%	72%
Actigard	1.7	0.5	71%	84%

Figure 4.1 Armyworm management in sweet corn using alternatives to FQPA-targeted pesticides, Boynton Beach, FL, Spring 2000

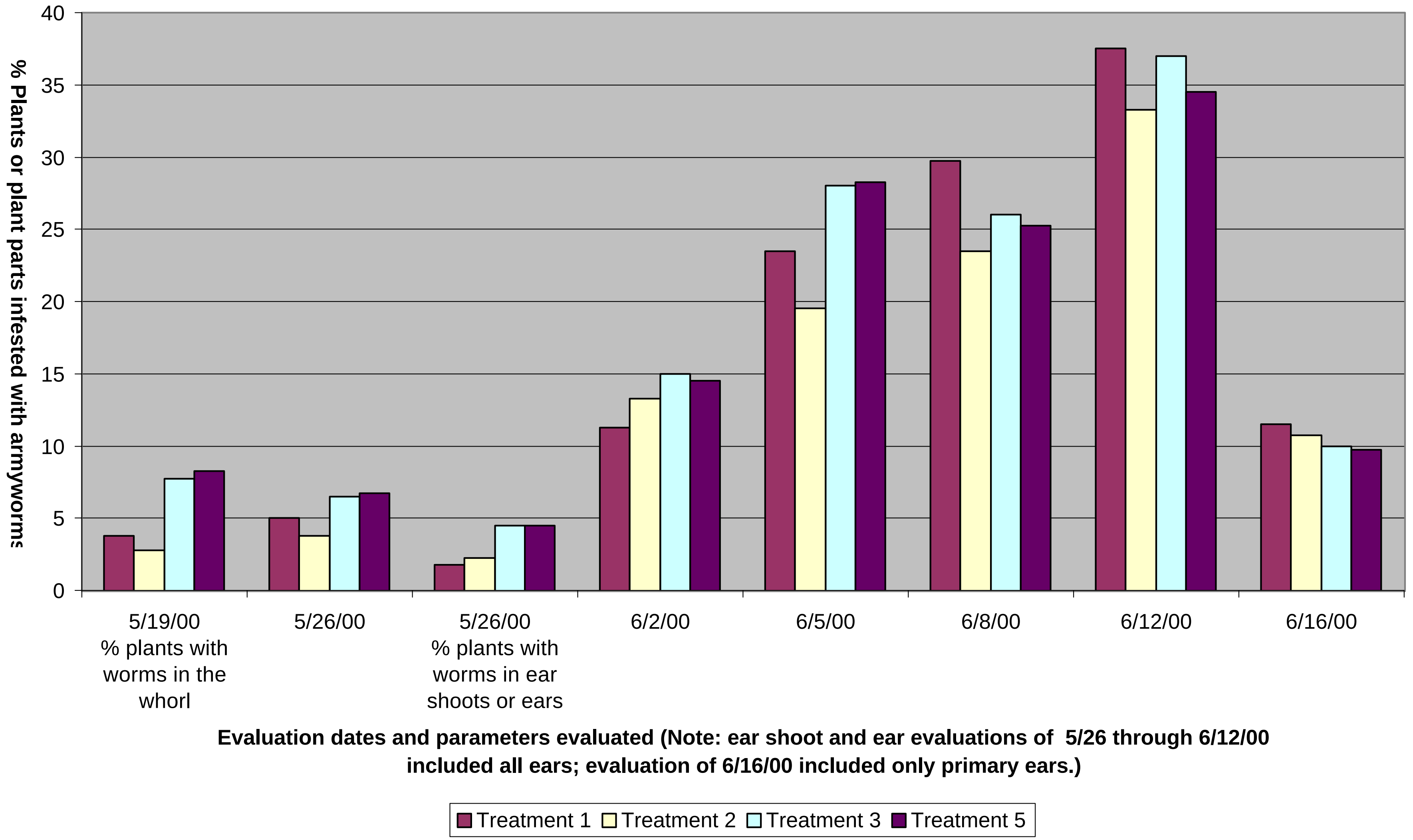

Figure 4.2 Silkfly management with alternatives to FQPA-targeted pesticides, Boynton Beach, FL, Spring 2000

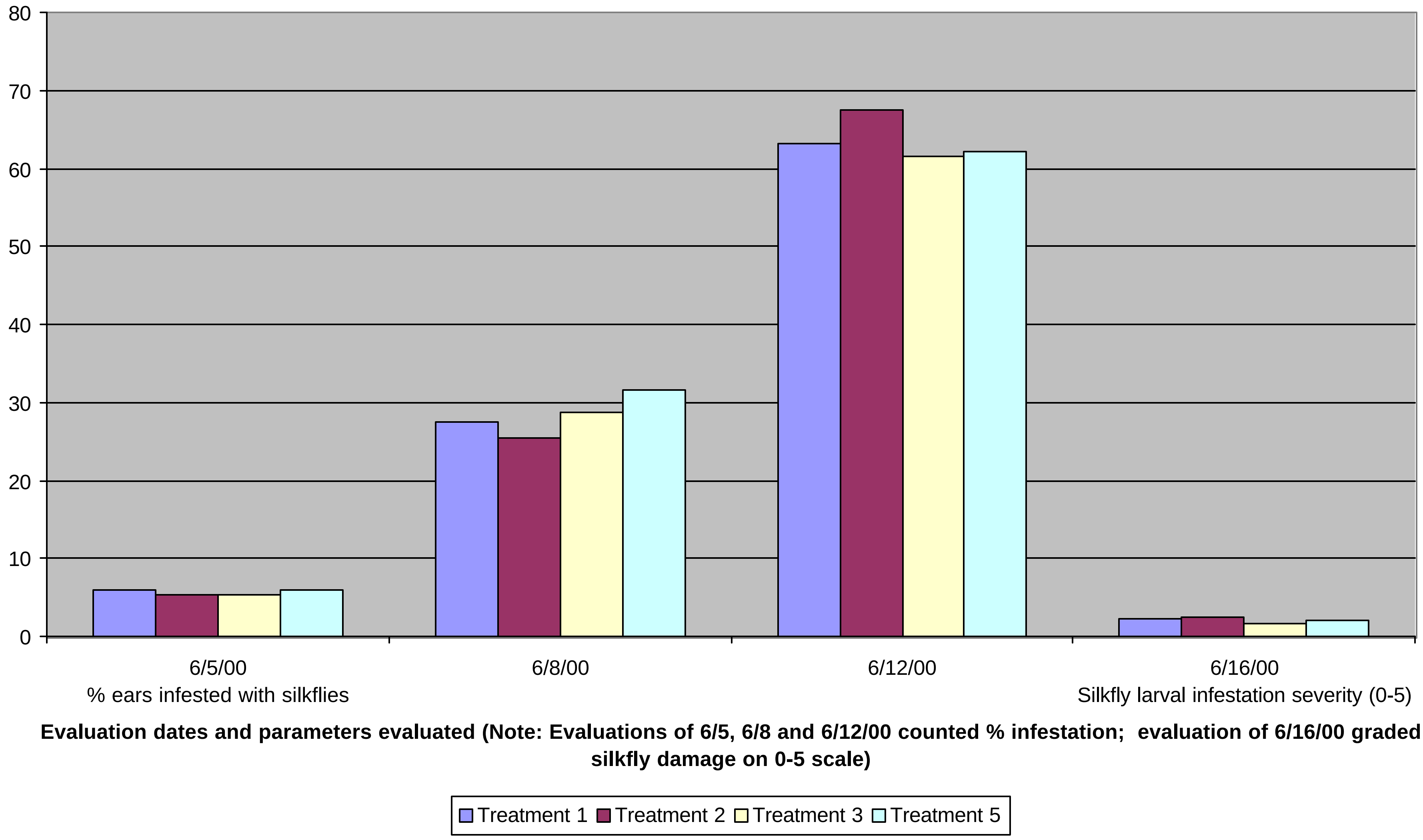

Figure 4.3 Control of sweet corn rust using calcium silicate slag, Boynton Beach, FL, Spring 2000

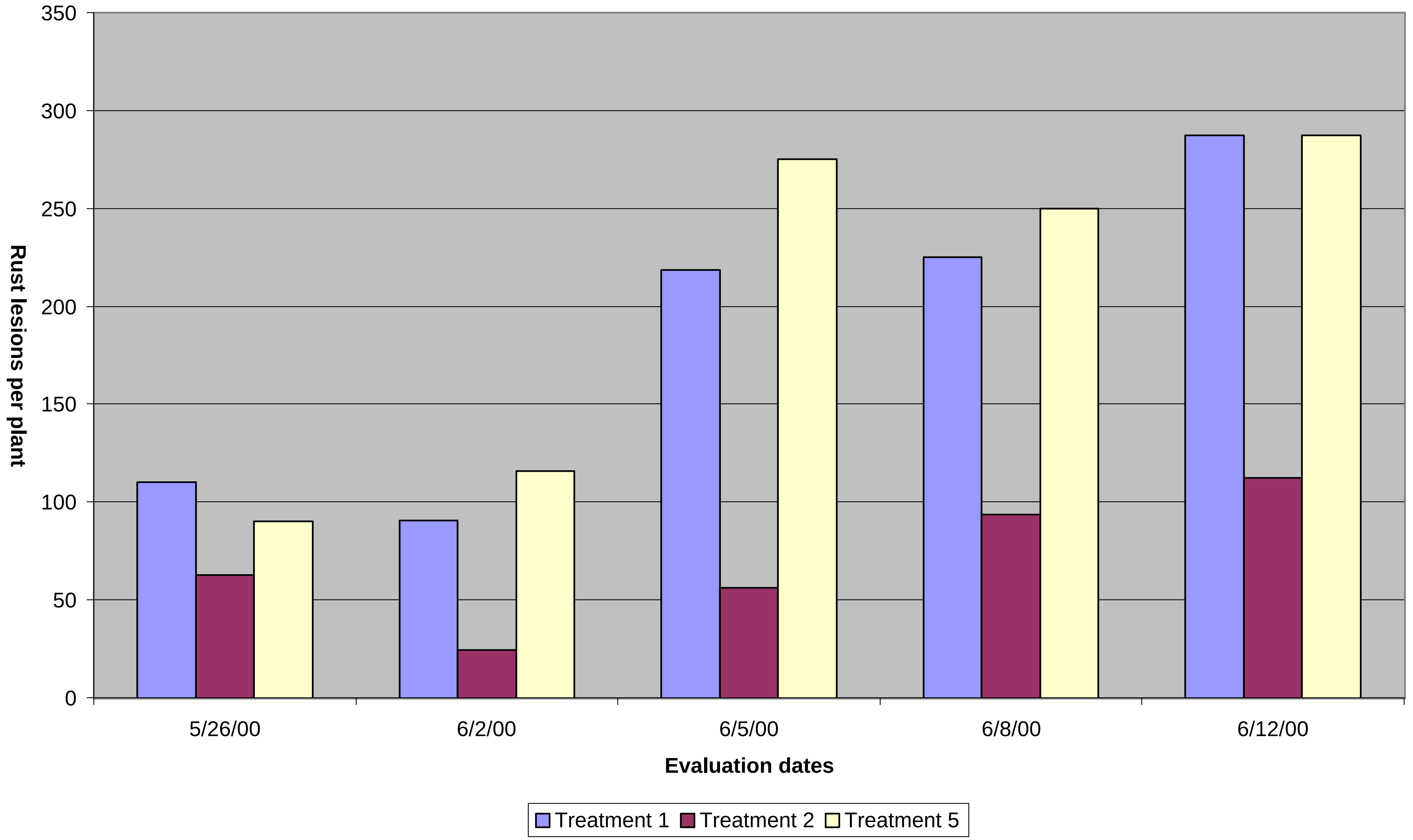

Figure 4.4 Control of northern corn leaf blight using clacium silicate slag, Boynton Beach, FL, Spring 2000

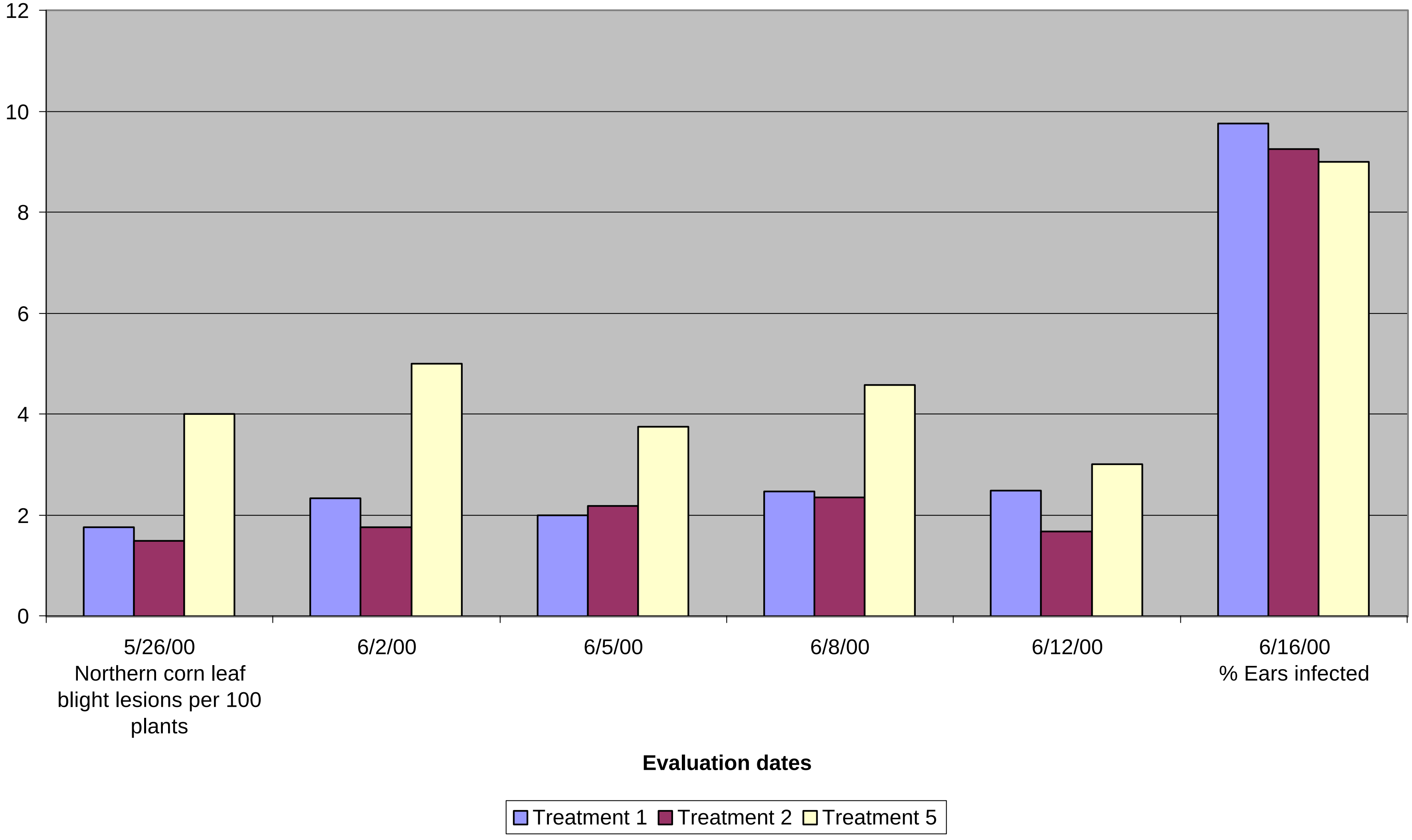

Figure 4.5 Control of southern corn leaf blight using calcium silicate slag, Boynton Beach, FL, Spring 2000

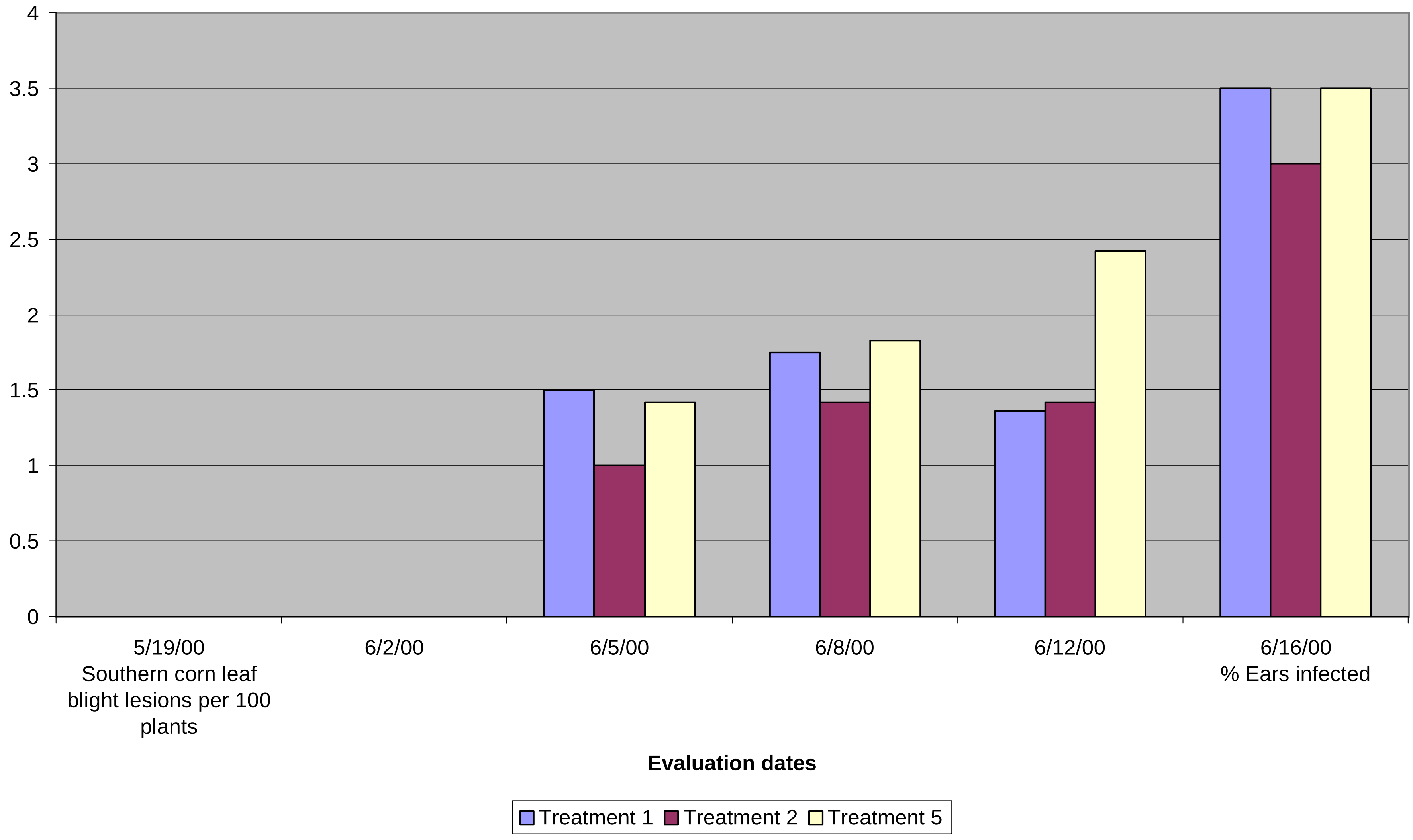

Figure 4.6 Effects of calcium silicate slag on tomato plant growth during transplant production and early field growth, Immokalee, FL, Spring 2000

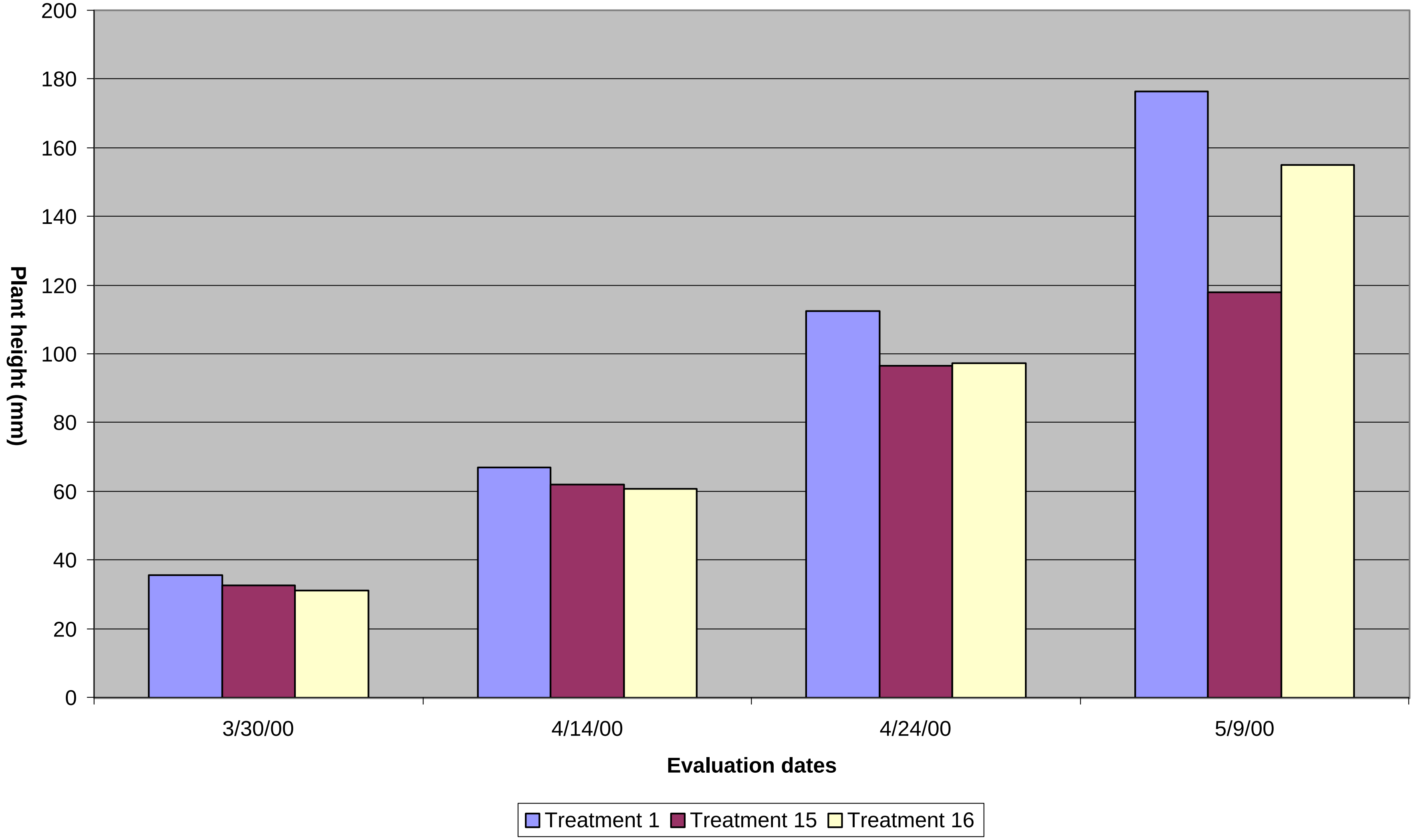

Figure 4.7 Effects of calcium silicate slag on pepper prowth during transplant production, Immokalee, FL, Spring 2000

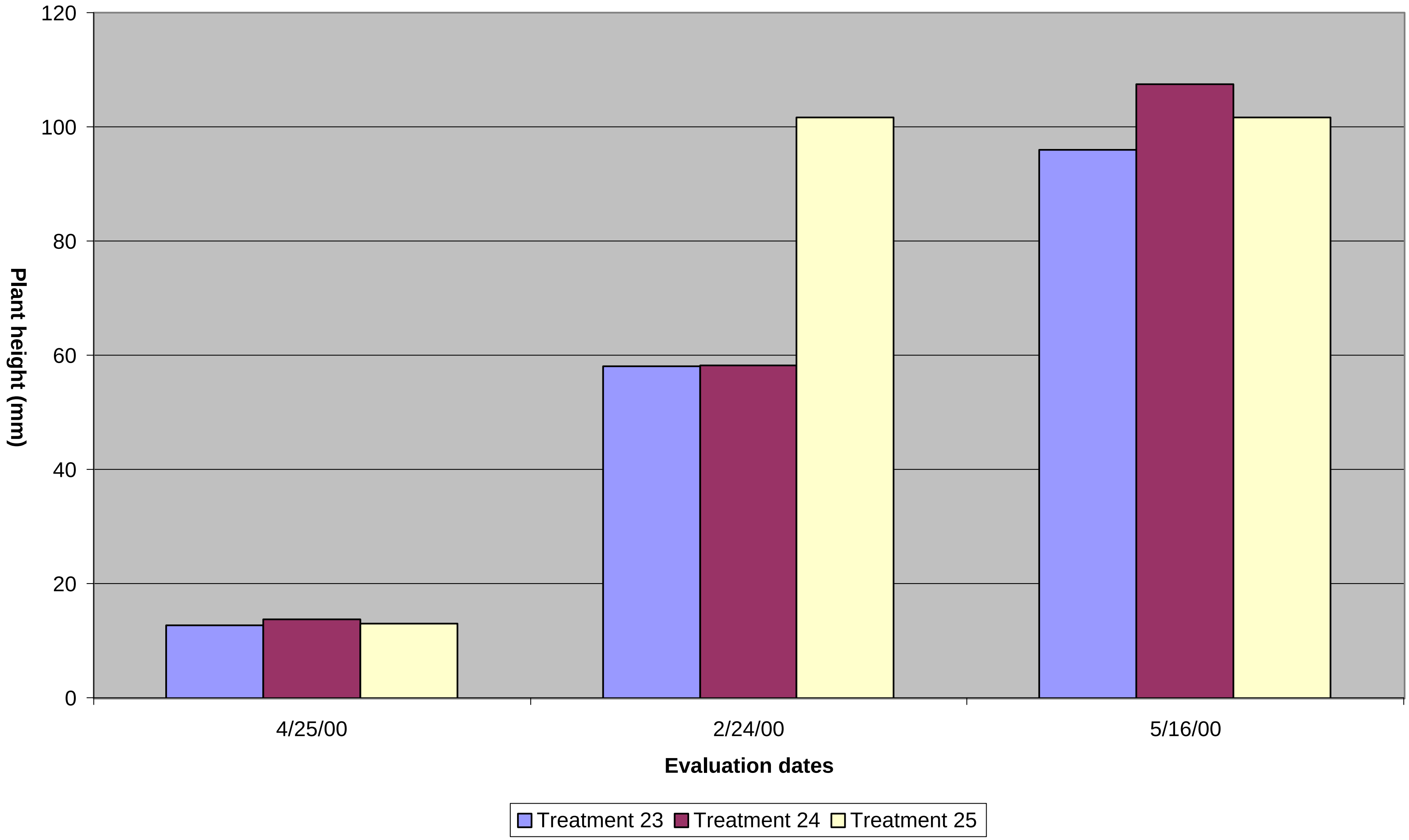

Figure 4.8 Effects of calcium silicate slag on tomato blooming and fruit set, Immokalee, FL, Spring 2000

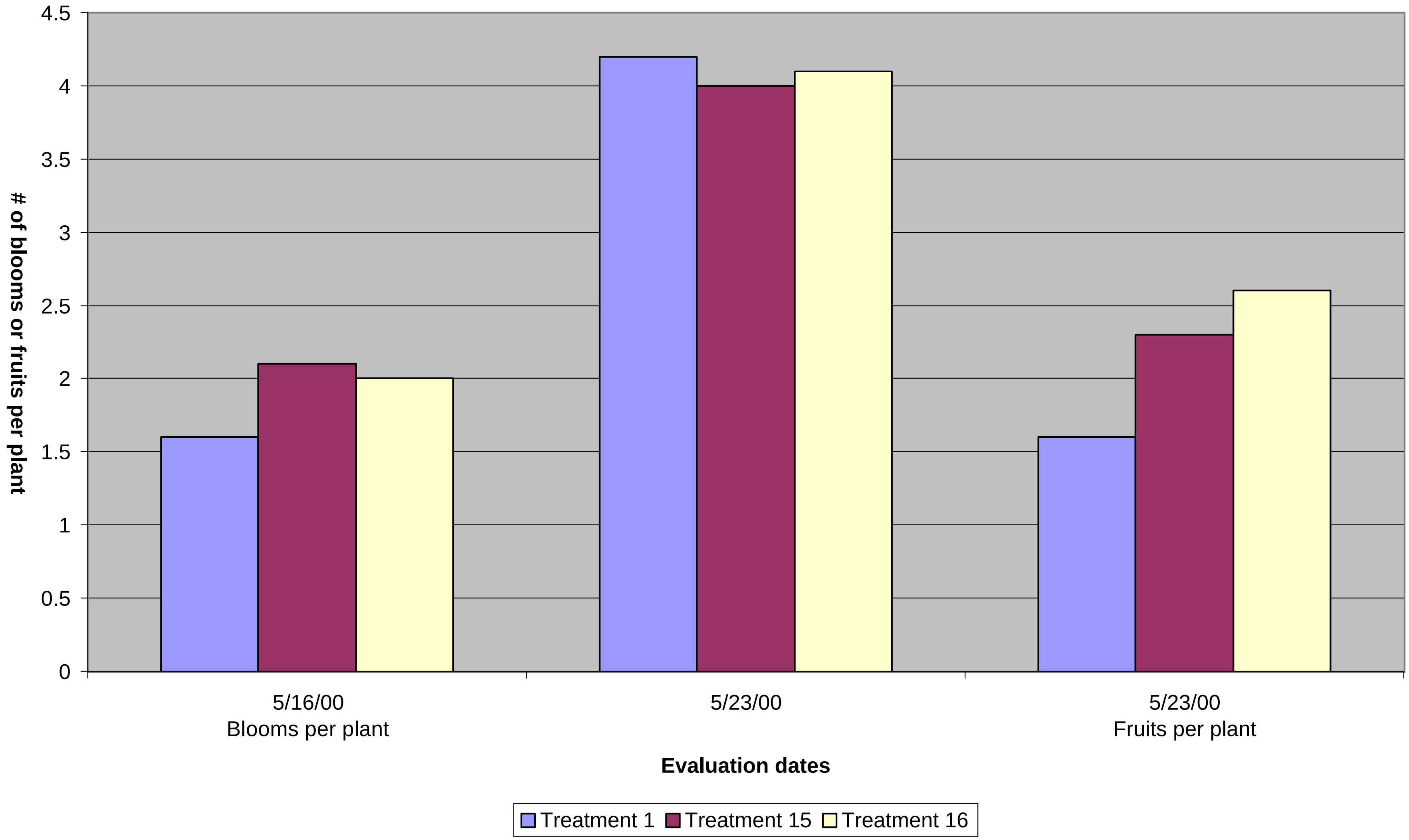

Figure 4.9 Effects of Kasil I on tomato plant growth during transplant production and early field growth, Immokalee, FL, Spring 2000

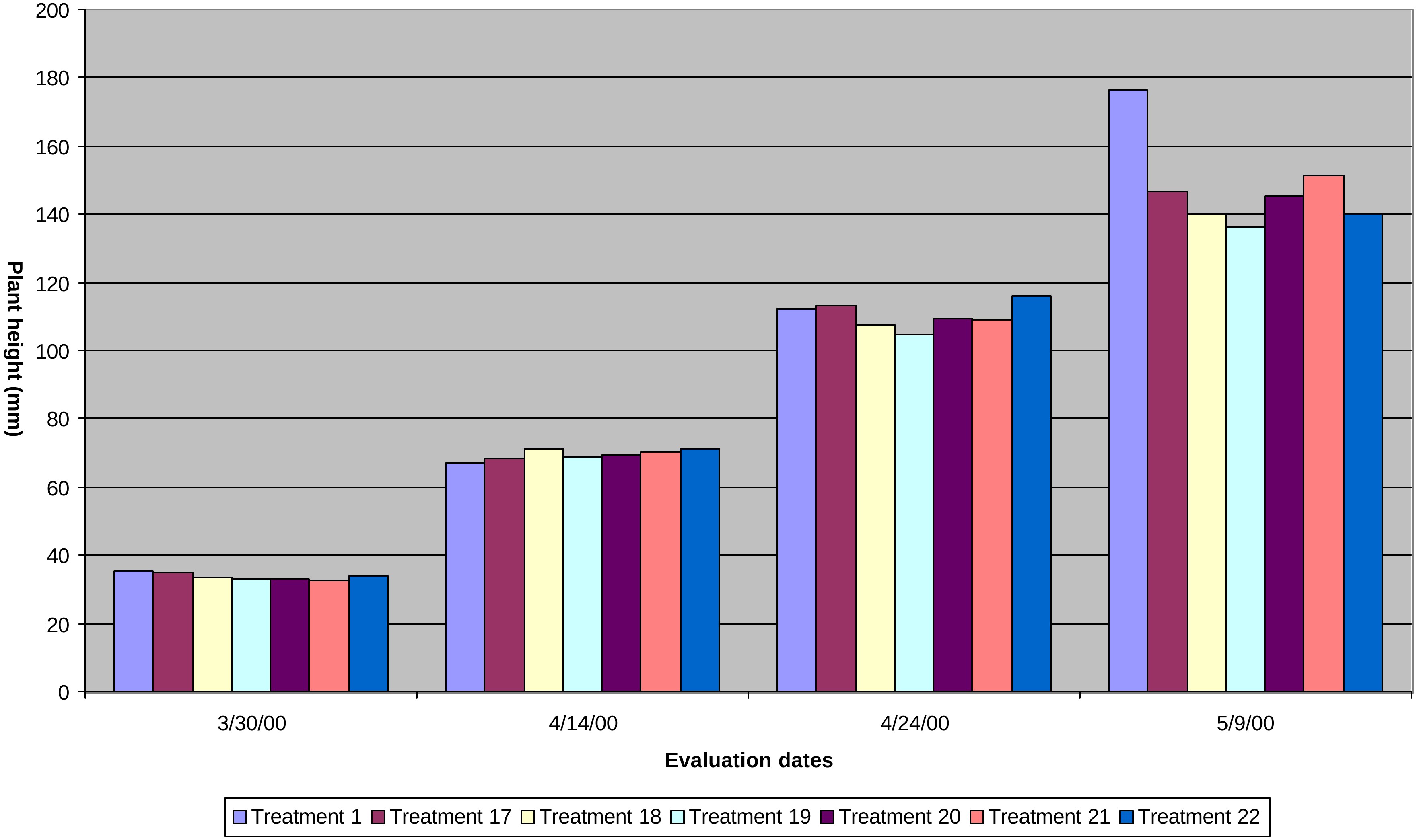

Figure 4.10 Effects of Kasil I on pepper plant growth during transplant production, Immokalee, FL, Spring 2000

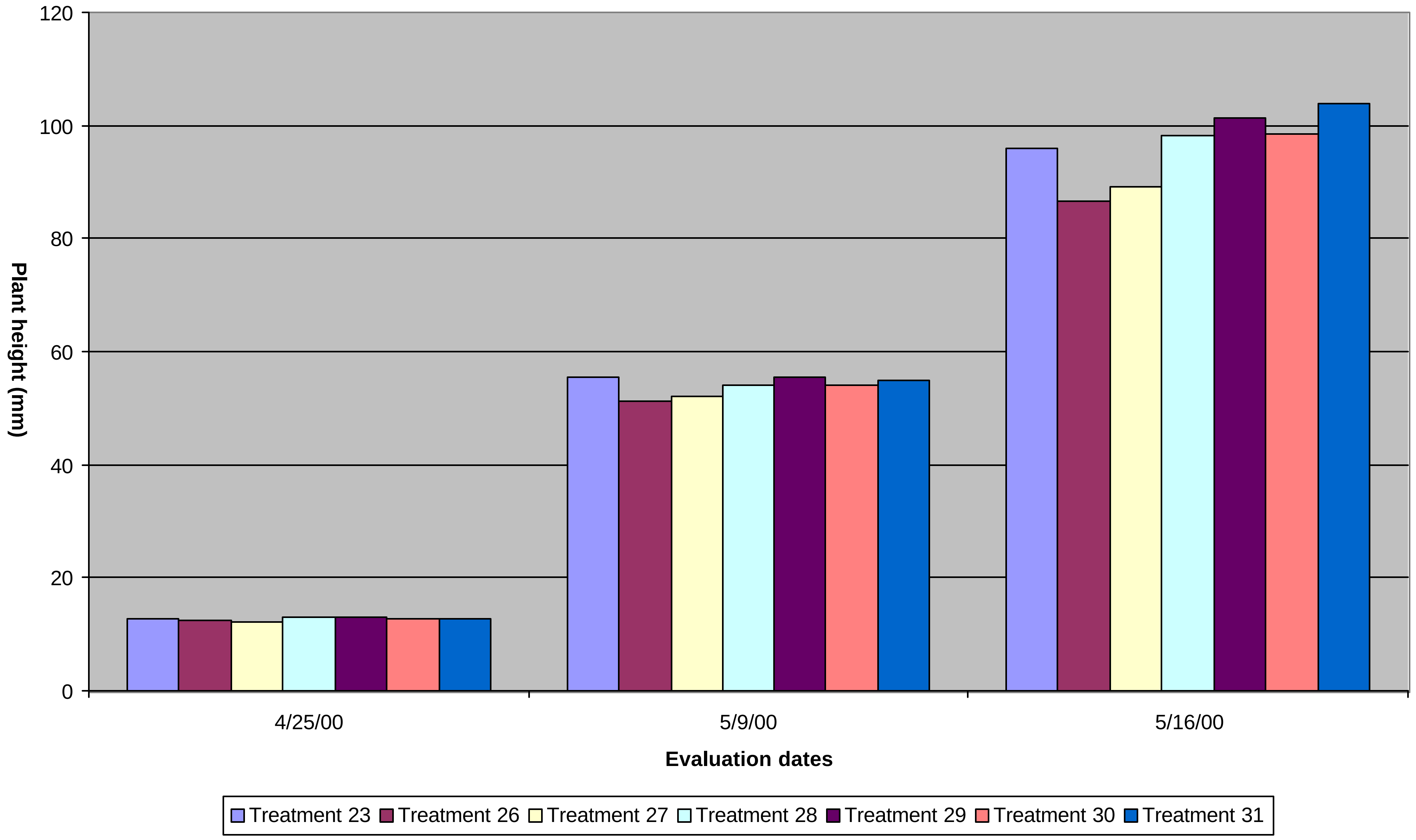

Figure 4.11 Effects of Kasil I on tomato blooming and fruit set, Immokalee, FL, Spring 2000

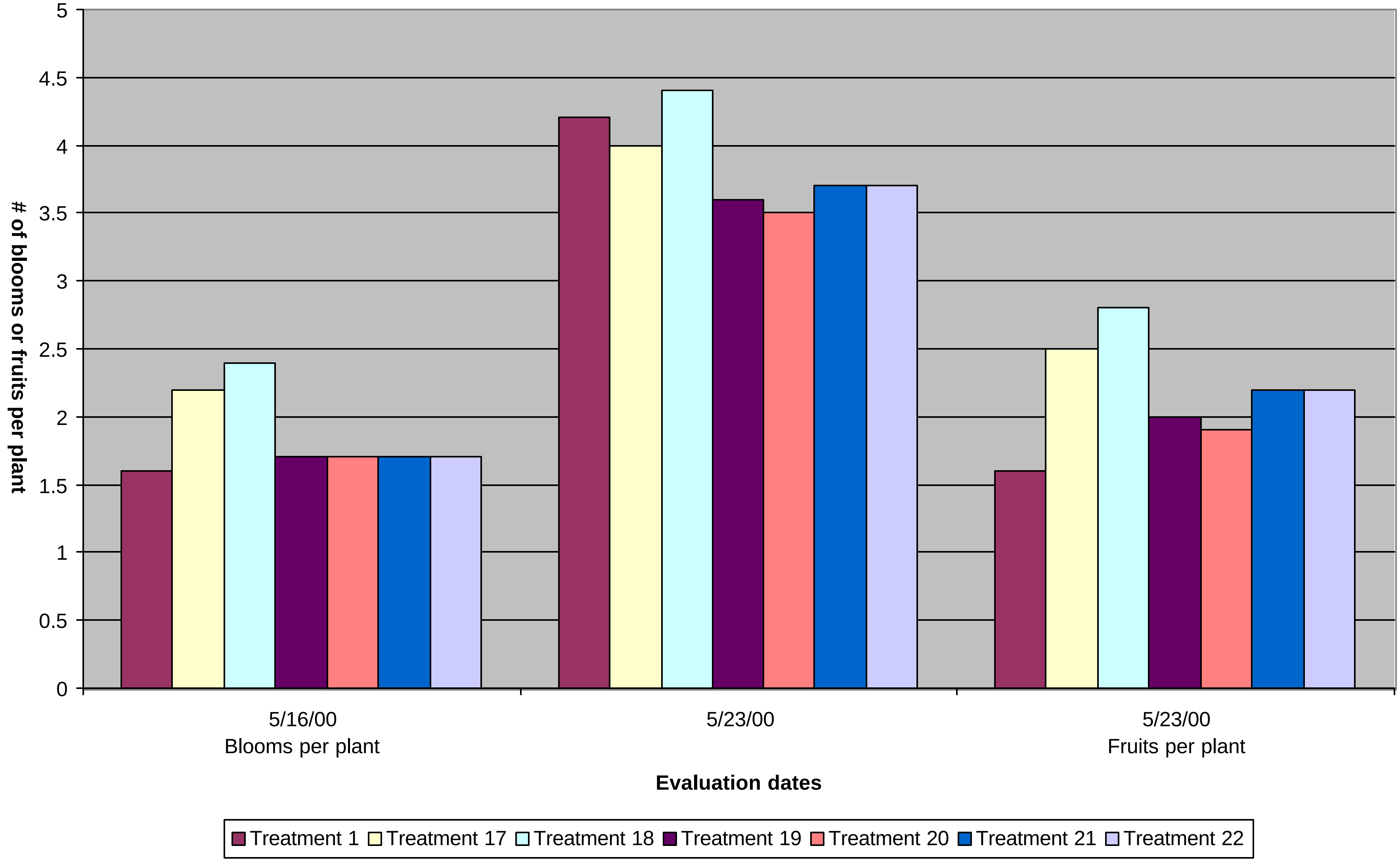

Figure 4.12 Incidence of rust on sweet corn treated with different fungicide programs, Boynton Beach, FL, Spring 2000

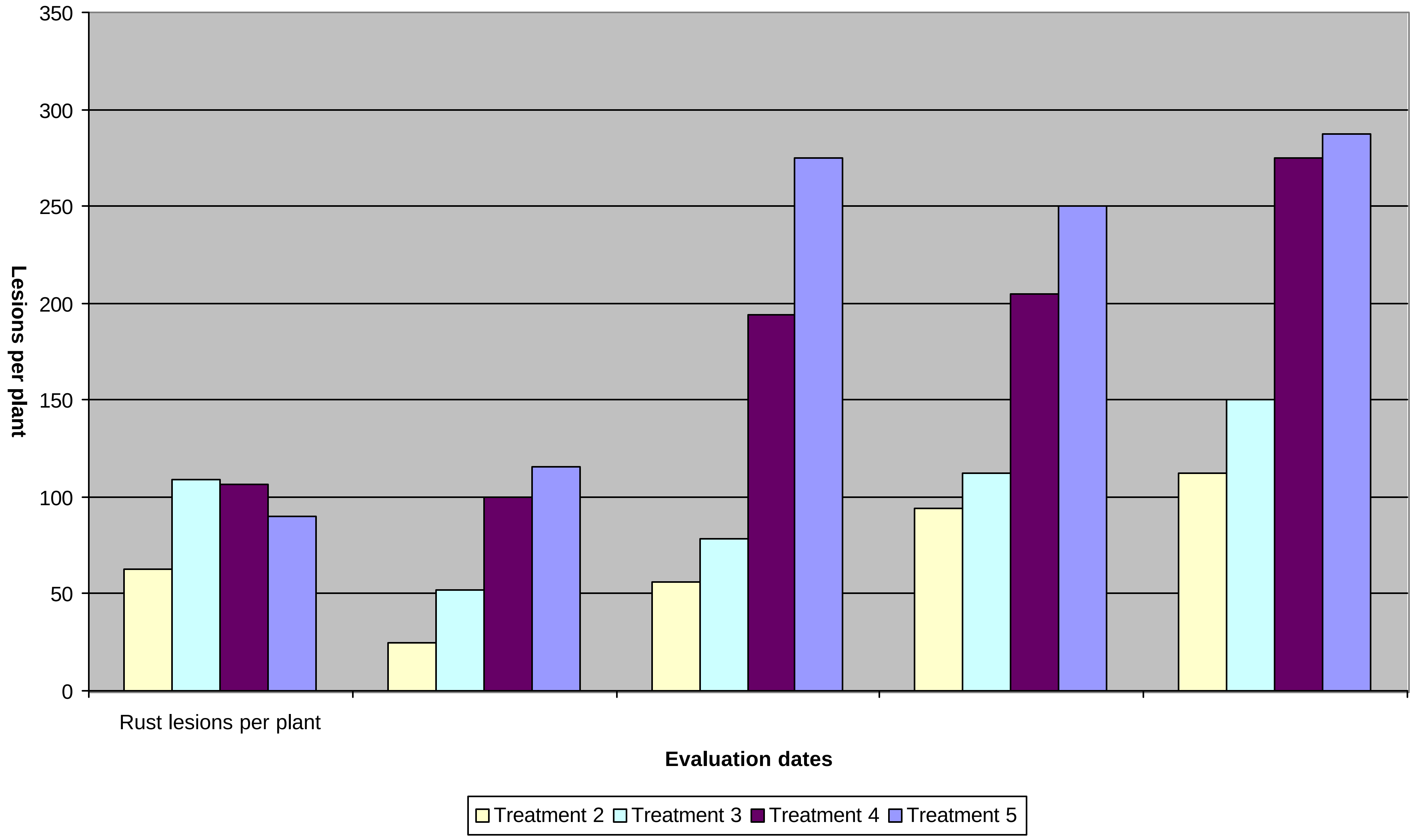

Figure 4.13 Incidence of northern corn leaf blight on sweet corn treated with different fungicide programs, Boynton Beach, FL, Spring 2000

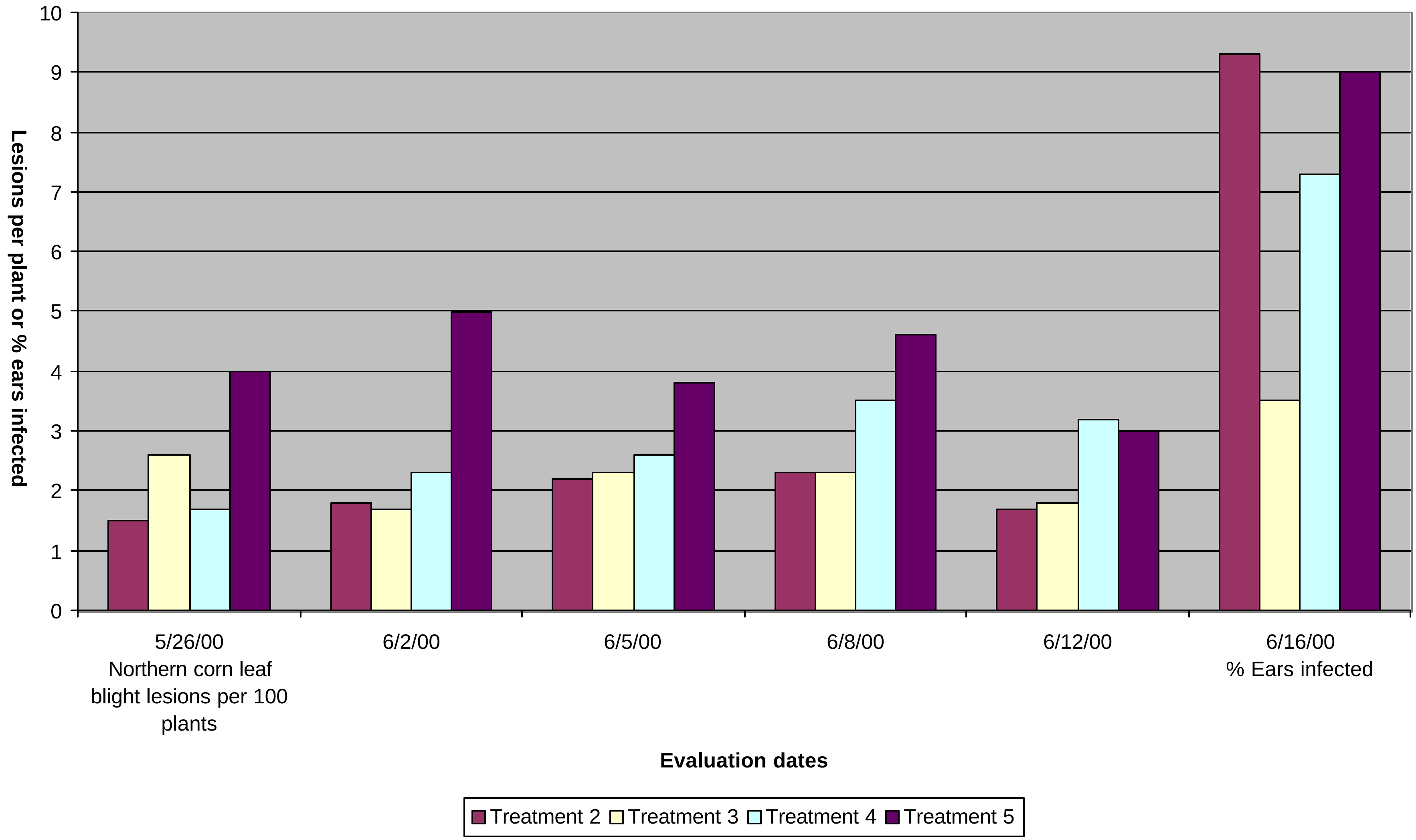

Figure 4.14 Incidence of southern corn leaf blight on sweet corn treated with different fungicide programs, Boynton Beach, FL, Spring 2000

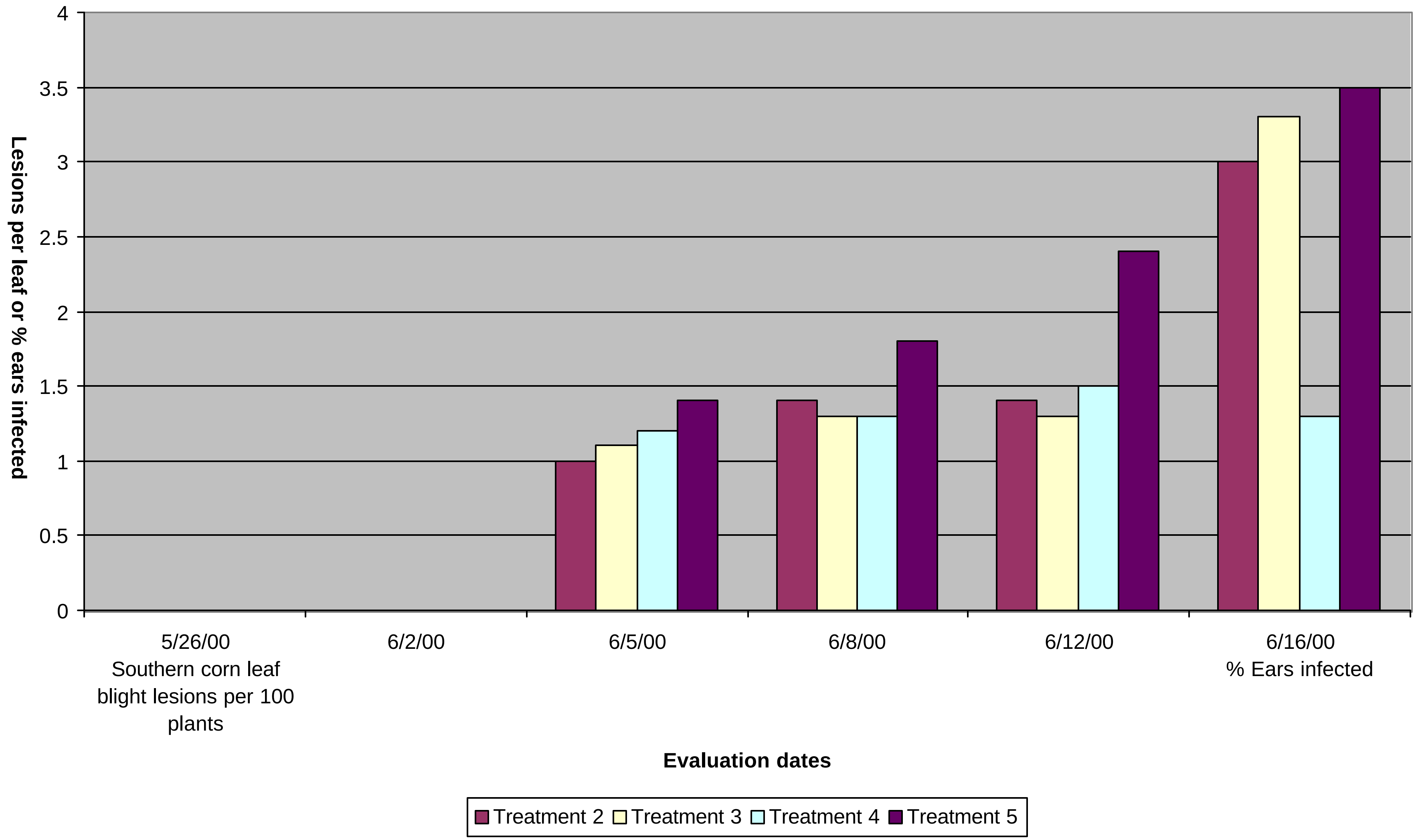

Figure 4.15 Effects of Actigard 50WG treatments on tomato plant growth during transplant production and early field growth, Immokalee, FL, Spring 2000

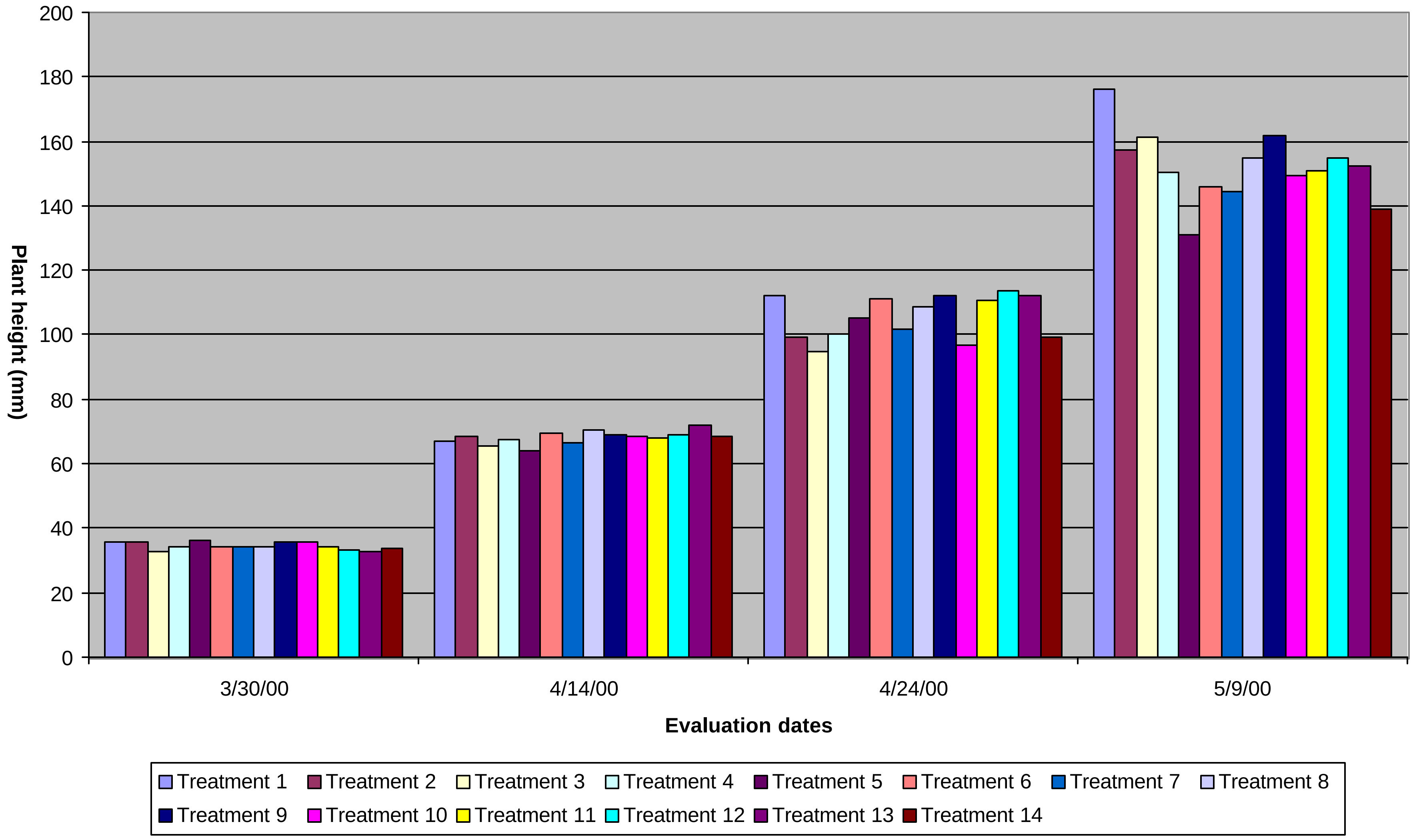

Figure 4.16 Effects of Actigard 50WG applications on tomato blooming and fruit set, Immokalee, FL Spring 2000

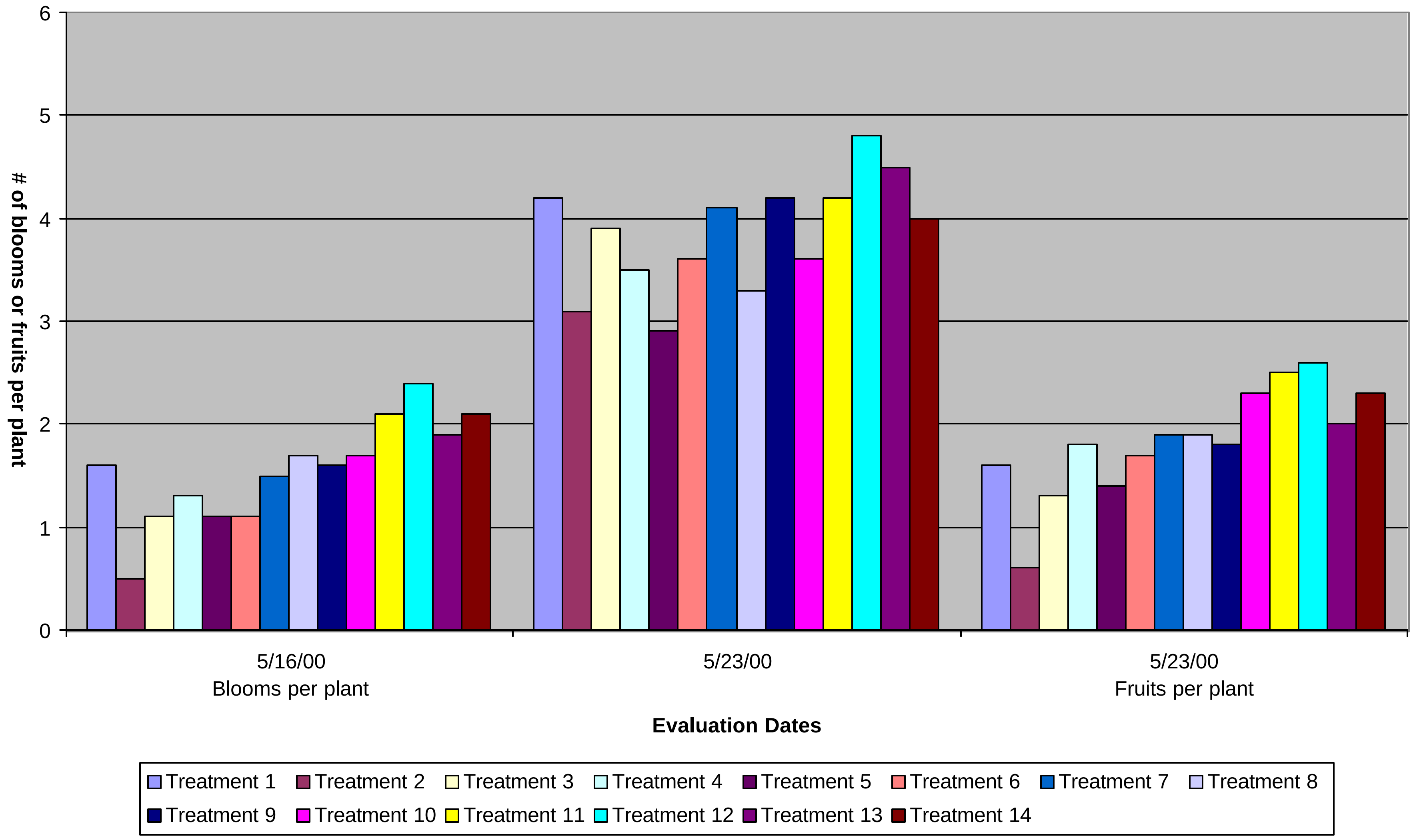

Figure 4.17. Scouting grades for foliar bacterial spot disease on tomato, Collier County, FL, Fall 1999

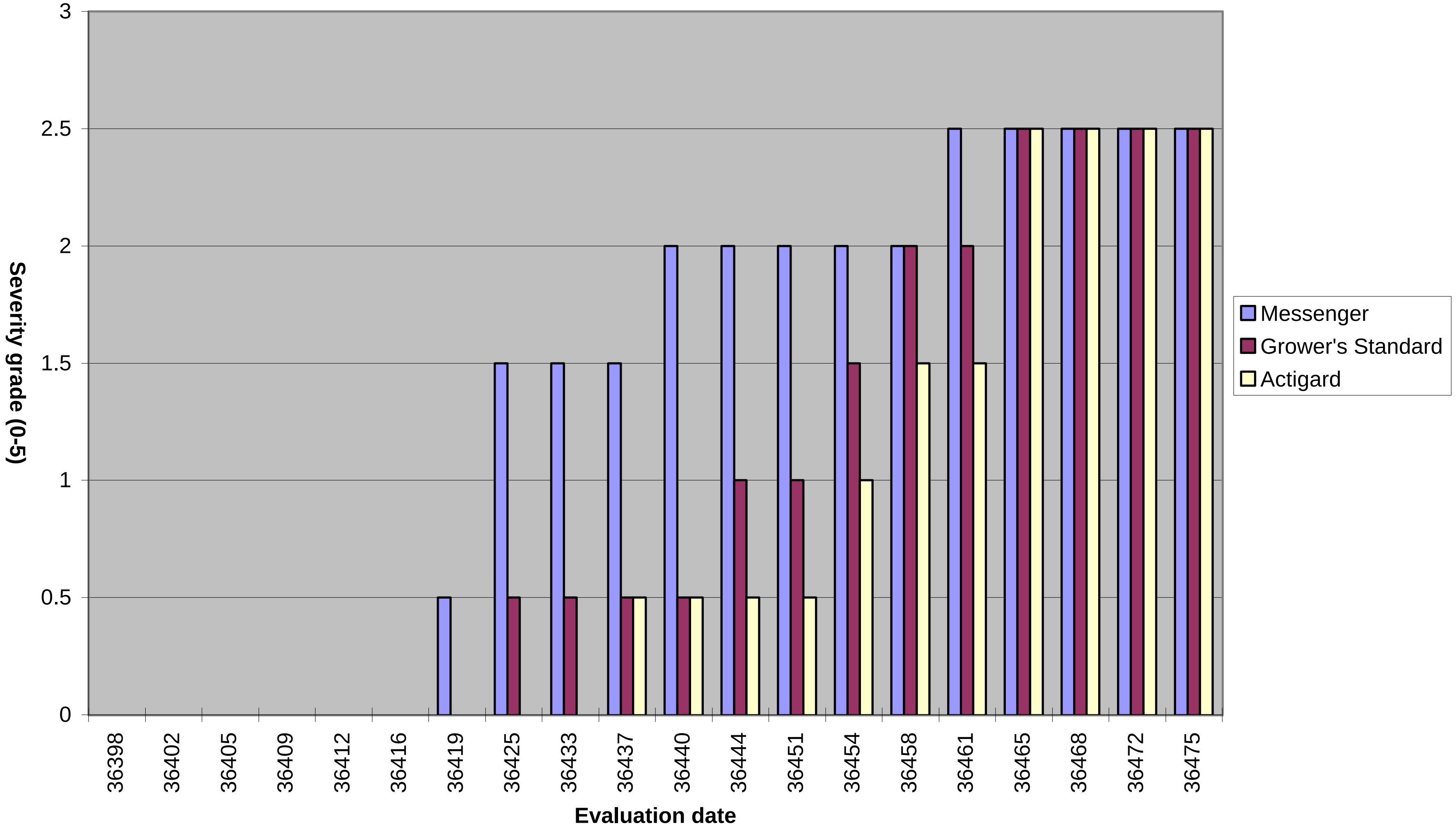

Figure 4.18. Scouting grades for bacterial spot disease on tomato fruits, Collier County, FL, Fall 1999.

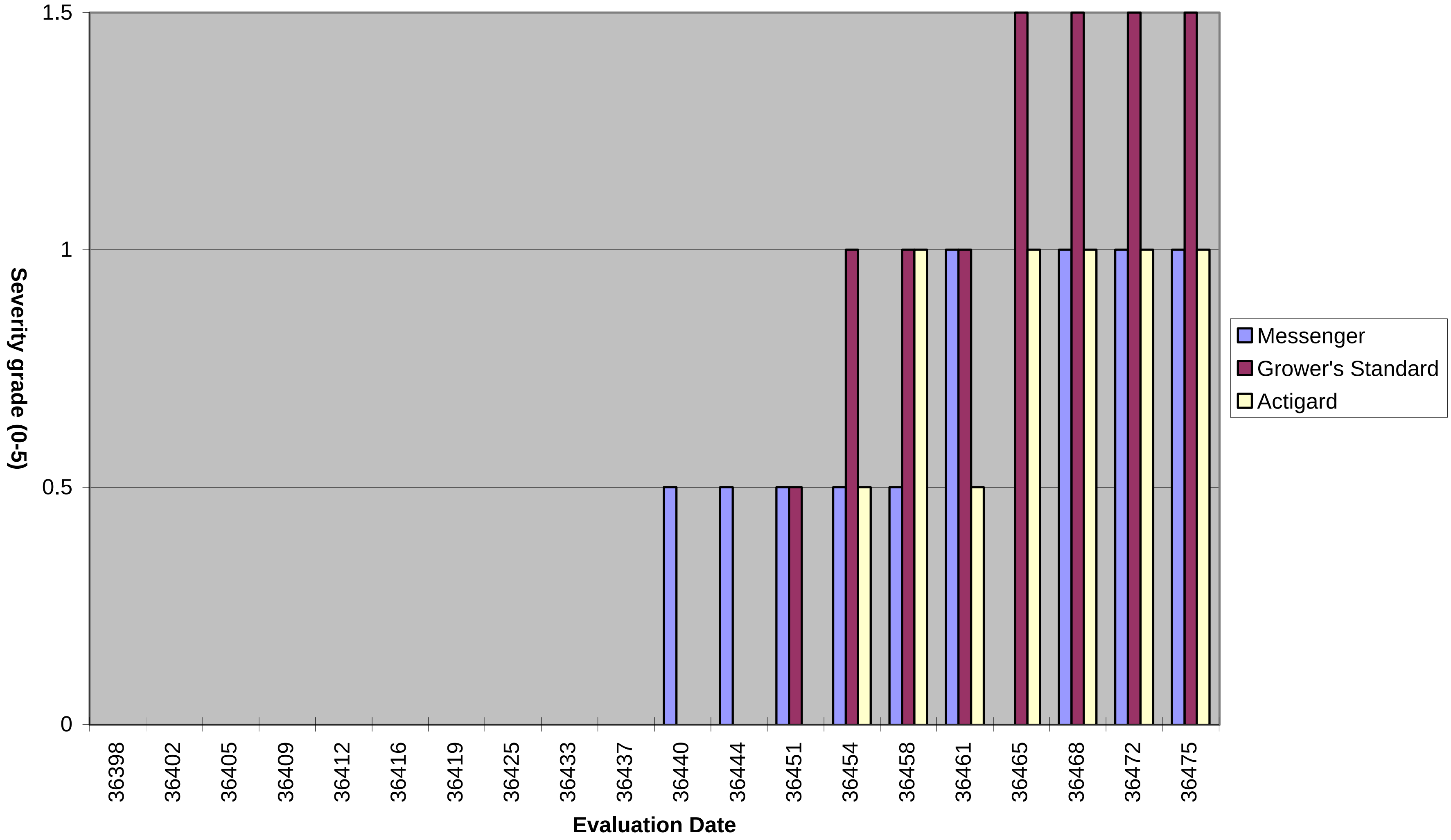

Figure 4.19. Horsfall-Barret grades for defoliation by bacterial spot disease in tomato, Collier County, FL, Fall 1999.

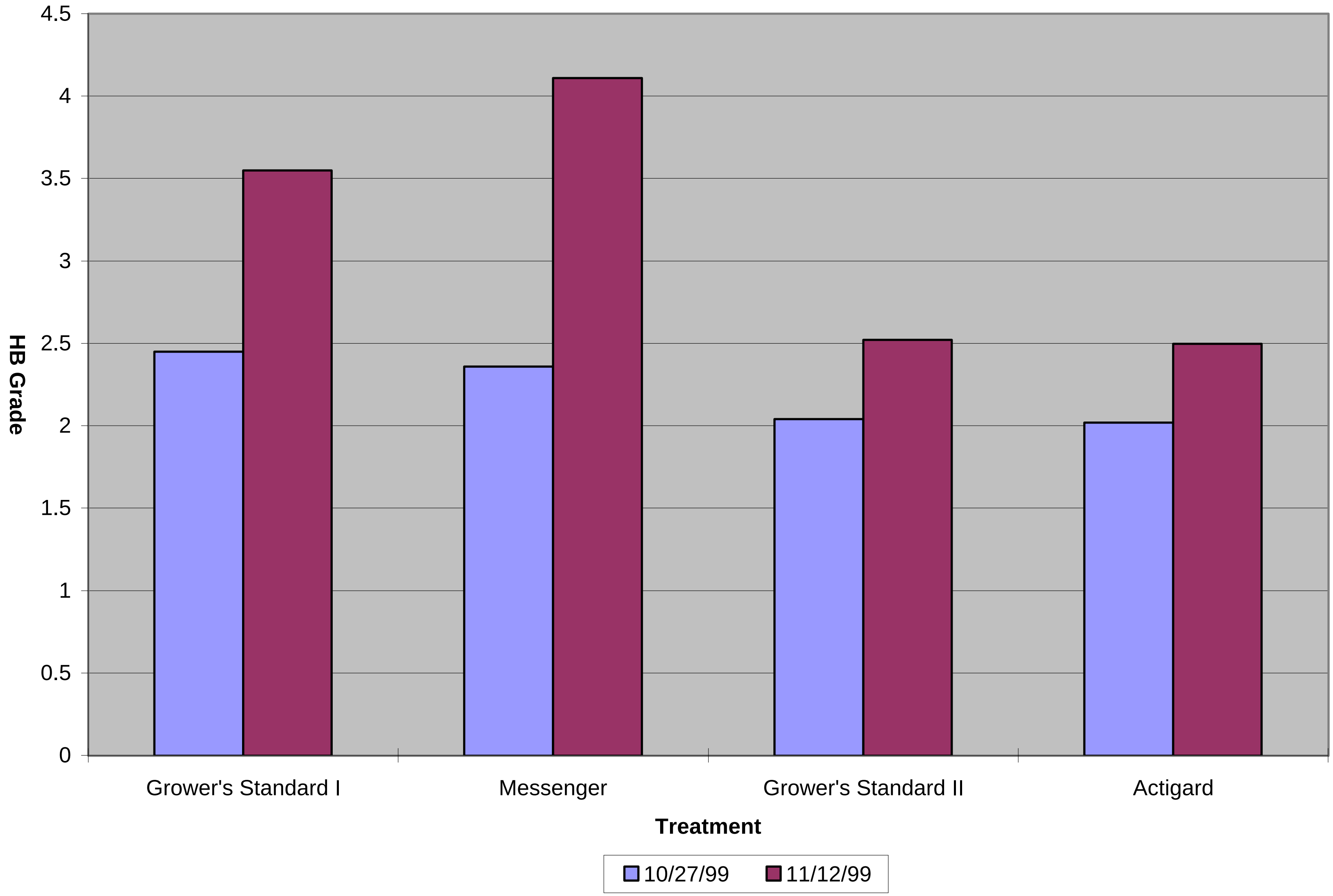

Figure 4.20. Bacterial spot disease incidence on tomato foliage, Collier County, FL, Fall 1999

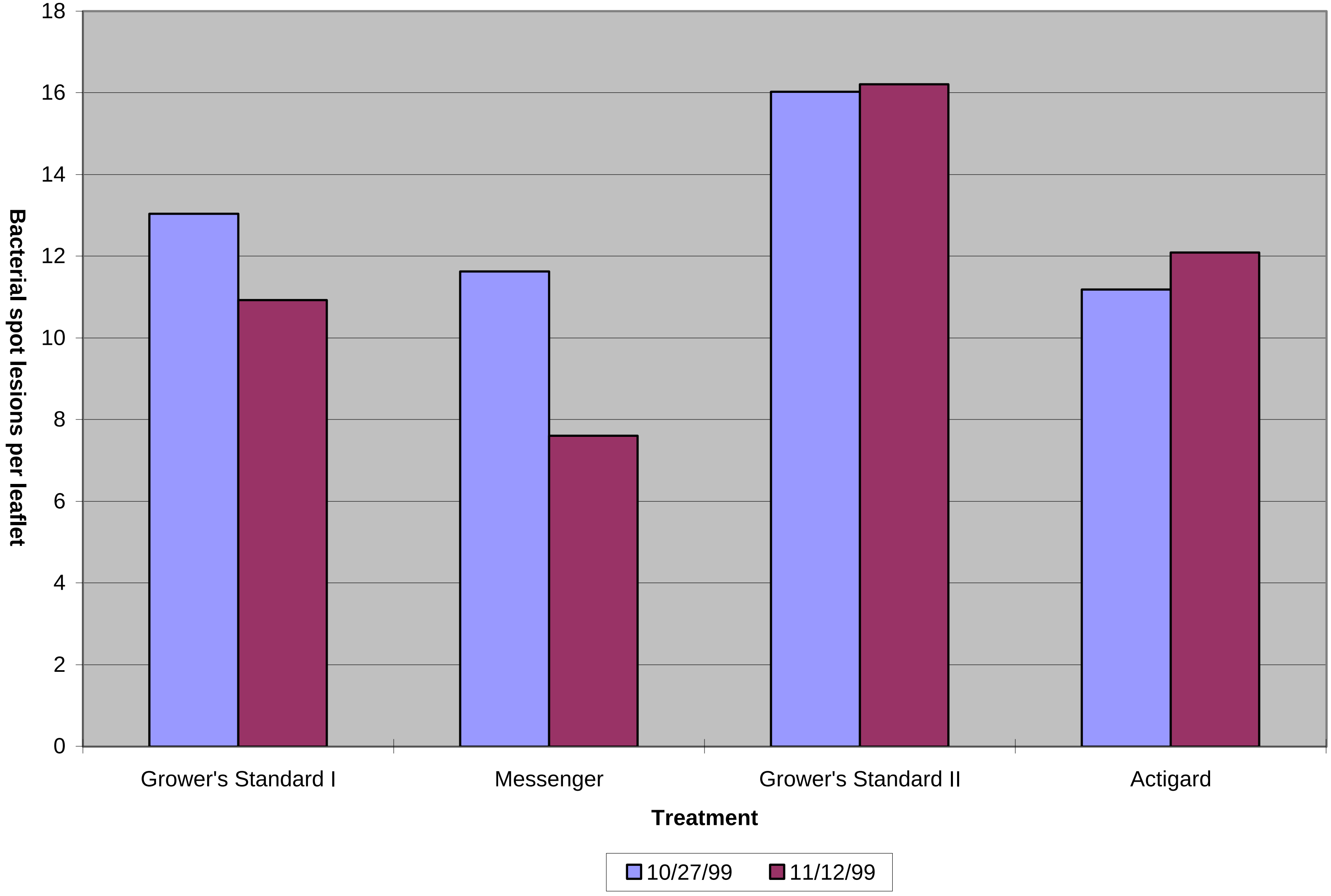

Figure 4.21. Incidence of bacterial spot disease on tomato foliage, Collier County, FL, Fall 1999.

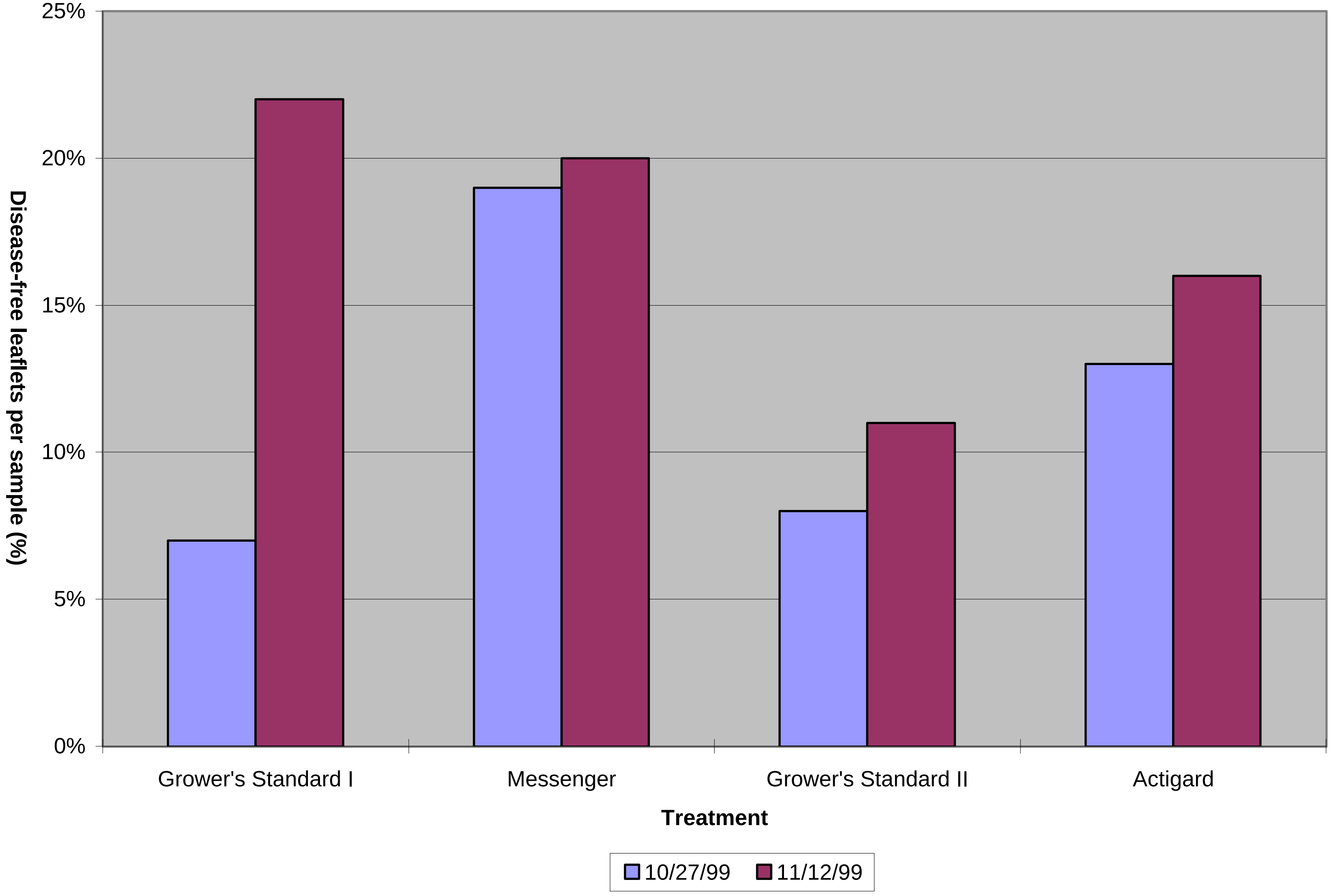

Figure 4.22. Bacterial spot disease incidence on tomato fruits, Collier County, FL, Fall 1999.

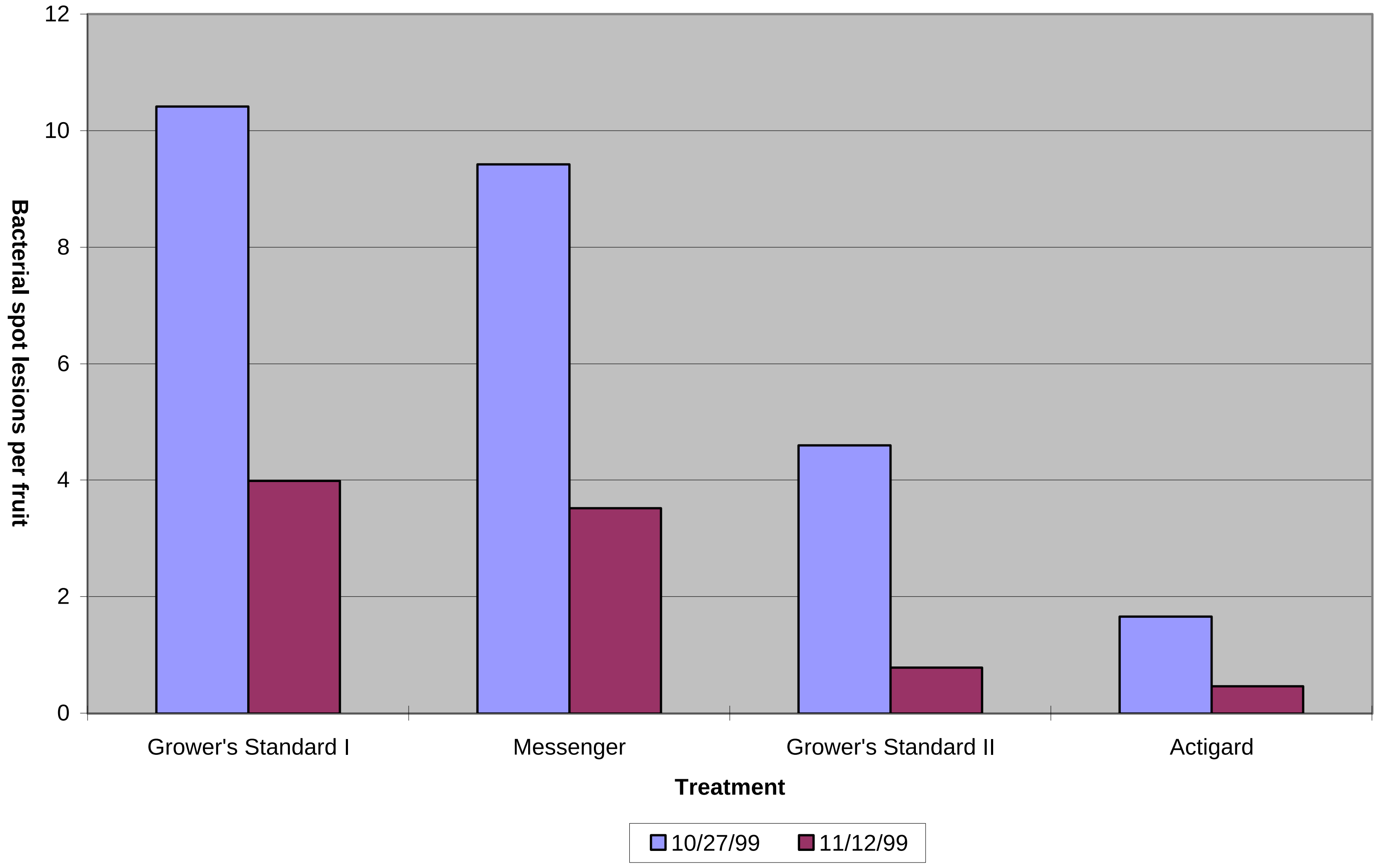

Figure 4.23 Incidence of bacterial spot disease on tomato fruits, Collier County, FL Fall 1999