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Melon Cultivar Response to *Bemisia*

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ABSTRACT

The silverleaf whitefly, *Bemisia argentifolii* Bellows & Perring [previously b-strain sweetpotato whitefly, Bemisia tabaci (Gennadius)] , was evaluated on selected melon cultivars, *Cucumis melo*, in insecticide-treated and untreated field plots in 1992, 1993 and 1994 at Weslaco, Texas. Differences in whitefly host preference, antibiosis and plant tolerance were measured by monitoring whitefly egg/adult ratios, large nymph/egg ratios and plant yield response to whitefly control, respectively. The distribution of size classes of melons shifted toward smaller sizes with increased whitefly damage and, therefore, the effect on marketable value was dependant on pricing by size categories. Possible non-preference, antibiosis, and plant tolerance mechanisms were suggested by the data from these trials. Abundant long leaf-trichomes in breeding lines in 1994 were positively correlated with whitefly population density and apparently affected preference. Plant tolerance in terms of yield response to direct whitefly damage was detected at the whitefly population densities in these tests.

RESUMEN

Se evaluó a la mosca blanca de hoja-plateada, *Bemisia argentifolii* Bellows & Perring [anteriormente la cepa b de la mosca blanca del camote, *Bemisia tabaci* (Gennadius)] en cultivares seleccionados de melón, *Cucumis melo*, en parcelas de campo tratadas y no tratadas con insecticida en 1992, 1993 y 1994 en Weslaco, Texas. Se midieron las diferencias en la preferencia de hospedero de la mosca blanca, la antibiosis y la tolerancia de la planta mediante la determinación de la relación huevecillo de la mosca blanca/adulto, la relación ninfa grande/huevo y la respuesta de rendimiento de la planta al control de la mosca blanca, respectivamente. La distribución en clases de tamaño de los melones cambió a tamaños más pequeños cuando se presentó mayor daño por mosca blanca y por lo tanto el efecto sobre el valor comercial fue dependiente del precio según las categorías de tamaño. Los resultados de estos ensayos parecen indicar una posible no preferencia, antibiosis y mecanismos de tolerancia de la planta. En 1994, la presencia de abundantes tricomas foliares largos en las lineas de mejoramiento se correlacionó positivamente con las densidades de las poblaciones de la mosca blanca y aparentemente afectó la preferencia. Con las densidades poblacionales de las moscas usadas en estas pruebas, se detectó tolerancia de la planta en términos de repuesta de rendimiento al daño directo por la mosca blanca.

Quantification of damage to crops by the silverleaf whitefly (SW), *Bemisia argentifolii*, or other *Bemisia* spp. is no simple matter because of the complexity of interactions between the host plant and whiteflies (Van Lenteren and Noldus, 1990). Whitefly damage can include a reduction of plant vigor due to adults and nymphs feeding on the plant phloem (Azab et al., 1971), the development of disorders including silver leaf symptoms in squash and irregular ripening of fruit in tomato, excretion of honey-dew which promotes sooty mold, and the transmission of plant viruses (Byrne et al., 1990). Van Lenteren and Noldus (1990) and De Ponti et al. (1990) summarized literature on whitefly-plant interactions and host plant resistance, respectively, and suggested that far too little research had been done to quantify the impact of *B. tabaci* on crop quality. Horber (1980) defined various categories of functional host plant resistance to insects and summarized definitions of mechanisms. The mechanisms included: (1) non-preference, an insect's response to plants with poor host characteristics; (2) antibiosis, adverse effects of the plant on insect survival, development and reproduction; and (3) tolerance, the plant response in terms of withstanding insect attack. Damage by whitefly in agricultural systems has been mostly based on general associations with insecticide treatment effects or high whitefly numbers (Byrne et al., 1990) and not in terms of these mechanisms.

The silverleaf whitefly's impact on cucurbit crops in general is quite severe (Riley and Palumbo, 1995a, b). Symptoms range from leaf silvering in squash to fruit discoloration, stunting of growth and plant death. One of the reasons why SW affects melons so severely is because melons are an excellant host for whitefly reproduction. Life table studies of SW on various host plants suggests that melons support rapid population growth (Riley et al., 1995). Specific plant factors in cucurbits probably involved in resistance to whiteflies are: density and pattern of leaf trichomes (Kishaba et al., 1992), thickness of leaf tissue (or access to the phloem), pH of plant sap, nitrogen content, and other undefined factors (De Ponti et al., 1990).

One goal of these tests was to determine the relative susceptibility or resistance of melon cultivars to SW attack under field conditions. Three specific objectives under this goal were: 1) to measure the suitability of melon cultivars for supporting whitefly populations by monitoring adult and nymph populations throughout the season, 2) to determine plant yield response of each of the culivars and 3) to investigate potential mechanisms of resistance.

MATERIALS AND METHODS

1992 Test. Selected melon cultivars were planted in 2 m beds by 15 m length field plots on 17 March. Treatments were arranged in a split plot design with two whole plots, untreated and insecticide treated, and cultivars as the subplots. In the treated plots the dates and insecticides applied were: (1) 20 April, bifenthrin 0.2 kg a.i./ha (Capture® 2EC, FMC) plus acephate 1.1 kg a.i./ha (Orthene® 90S, Valent); (2) 6 May, endosulfan 1.1 kg a.i./ha (Thiodan® 3EC, FMC) plus buprofezin 0.3 kg a.i./ha (Applaud® 440F, Noram Chemical Co.); (3) 11 May, endosulfan 1.1 kg a.i./ha plus 1% agricultural oil (ValOil®, Valco Chemical Co., Harlingen, TX); (4) 14 May, bifenthrin 0.2 kg a.i./ha; (5) 25 May, endosulfan 1.1 a.i./ha plus 1% agricultural oil; (6) 3 June, bifenthrin 0.2 kg a.i./ha, (7) 8 June, endosulfan 1.1 a.i./ha plus 1% agricultural oil; (8) 15 June, endosulfan 1.1 a.i./ha plus 1% agricultural oil. Applications of insecticide were made with one overhead and two lateral hollow-cone spray tips (TX SS18, Spraying Systems Co.) at 3.5 kg/cm^2 CO_2 pressure resulting in 45 l/ha spray volume. Melon cultivars are listed in Table 1.

Whitefly preference was evaluated by monitoring SW adults, eggs, and nymphs throughout the season. SW adults were counted per whole leaf at the 3rd node from the growing point by carefully turning the leaf. Immature SW were sampled on two leaf disks per leaf (total 7.6 cm^2 of leaf area) sampled at the 6th node from the growing point. Sample size was five leaves per plot for adults and ten leaves per plot for immature stages.

Indications for non-preference (the insect's ovipositional behavior) and anti-biosis (survival of eggs to pupal stage) were calculated from season-long averages of egg/adult ratios and pupa/egg ratios, respectively. Plant tolerance, as evidenced by a lack of a negative correlation of dollar yield to whitefly numbers, was evaluated by measuring number of fruit by grade and correlating total dollar value to season-long, whitefly averages. Visual plant damage ratings included the presence of sooty mold, measured as percent fruit with surface discoloration, and the reduction of plant vigor, as indicated by vine length. Yield was evaluated in terms of total harvested fruit by size class. The number of harvested melons by size class was reported per 9.3 m^2 (100 ft^2) plot. The total dollar value per 9.3 m^2 (100 ft^2) plot for all three years was based on the dollar values per carton of melons for the following size categories (# = number of melons per box): #30=$0, #23=$2.85, #18=$5.42, #15=$7.30, #12=5.96, #9=$4.93 (Anonymous, 1993 for June, 1993). Analysis of variance and correlations were made using SAS procedures (SAS, Institute 1987). Only subplot effects and overall correlations were reported here.

1993 Test. Selected melon cultivars (Table 3) were planted in 2 m beds by 5 m length plots on 24 February. Treatments were arranged similarly to the 1992 Test. The insecticide treatment consisted of an in-furrow band application of imidacloprid at 0.5 kg a.i./ha (Admire® 240FS at 2 l/ha, Miles Inc.) at planting. SW adults were sampled weekly on whole leaves at the 3rd node from the growing point using a leaf turn technique and immature SW were sampled on two leaf disks per leaf (total 7.6 cm^2 of leaf area) sampled between the 6th and 9th node from the growing point. The sample size was three leaves per plot. Whitefly preference and plant tolerance were evaluated by monitoring SW numbers and plant yield response as previously described. Melon yield and whitefly data were analysed similarly to the 1992 Test.

Table 1. Seasonal average of whiteflies, as adults per leaf and immature stages per 7.6 cm^2 of leaf area, and percent sooty mold at the end of the season by melon cultivars averaged over the treated and untreated plots at Weslaco, TX in 1992.

Melon Cultivar	Adults	Eggs	Small Nymph	Large Nymph	Dead Nymph	%Sooty Mold
Durango	4.8a[1]	2.5b	0.67ab	3.3ab	0.45abc	20abc
Laredo	4.3ab	3.2ab	0.58ab	2.8ab	0.87a	20abc
Cruiser	4.2a	1.7b	0.46ab	1.4b	0.10c	13c
Mainpak	3.9abc	5.7a	1.32a	4.8a	0.44abc	33ab
Mission	3.8abc	2.2b	0.43ab	2.5ab	0.22bc	13c
Pronto	3.4cd	2.2b	0.50ab	3.9ab	0.06c	8c
Otero	3.3abcd	2.3b	0.85ab	2.8ab	0.10c	18bc
Caravelle	3.3bcd	1.7b	0.57ab	2.0ab	0.35abc	15c
Gold Mark	33abcd	2.7b	0.88ab	4.1ab	0.71ab	10c
Hymark	3.obcd	1.0b	0.25b	1.0b	0.12bc	15c
Explorer	2.5de	1.3b	0.34b	1.6ab	0.35abc	10c
Primo	2.1e	1.8b	0.43ab	1.5b	0.30abc	35a

[1]Means followed by the same letter are not significantly different based on LSD tests (P<0.05) on log-transformed values for adult data and non-transformed values for other data.

Table 2. Melon yield as number of fruit by size grades (no. per carton), total number and dollar value for 9.3 m² (100 ft²) for melon cultivars averaged over the treated and untreated plots at Weslaco,TX in 1992.

Melon Cultivar	Grade #9	Grade #12	Grade #15	Grade #18	Grade #23	Grade #30	Total $ Value
Explorer	1.9ab	0.1cd	8.6a	4.9abc	2.3ab	2.4ab	7.03a
Otero	2.1ab	1.1abc	8.0a	3.0cd	1.1abc	0.9bc	6.66ab
Hymark	2.4a	0.3bcd	7.4ab	4.0bcd	2.5a	0.4bc	6.53ab
Cruiser	1.9ab	1.8a	7.3ab	2.8cd	1.0abc	1.3abc	6.38ab
Laredo	0.8bc	0.9abcd	7.8ab	4.4bcd	1.1abc	0.9bc	6.07abc
Primo	1.8abc	1.0abcd	6.8abc	1.9d	1.3abc	0.4bc	5.46bcd
Caravelle	1.5abc	0.3bcd	6.6abc	3.1cd	2.6a	1.5abc	5.44bcd
Durango	0.9abc	1.1abc	6.6abc	2.3cd	0.6bc	1.4abc	5.02cd
Mission	1.5abc	0.0d	4.4cd	6.1ab	1.6abc	3.1a	5.00cd
Pronto	0.8bc	0.5bcd	5.8bc	3.4cd	1.9abc	1.8abc	4.71d
Mainpak	1.1abc	0.0d	3.0d	7.5a	2.6a	1.1abc	4.66d
Gold Mark	0.3c	1.3aab	6.4abc	2.1d	0.5c	0.0c	4.56d

[1]Means followed by the same letter are not significantly defferent based on LSD test (P<0.05)

1994 Test. Selected melon cultivars (Table 5) were transplanted in 2 m beds by 5 m length plots on 15 March. Treatments were arranged arranged similarly to the 1992 Test. SW adults were sampled weekly similarly to the 1993 Test. Whitefly preference and plant tolerance were evaluated as previously described. Leaf trichomes (divided into long and short categories) were counted on a randomly selected 0.9 cm² area on the underside of the same leaf taken for nymph counts. Vine lengths were measure weekly after the five-leaf stage and the vine increase in cm per week was recorded. Vine length, melon yield, and whitefly data were analysed similarly to the 1992 data.

RESULTS AND DISCUSSION

1992 Test. Differences were found between melon cultivars in terms of SW adults and nymphs (Table 1) and yield (Tables 2). Explorer was associated with relatively low SW numbers and provided the greatest harvested dollar value. Generally, greater yields were associated with lower SW numbers, but the response varied with cultivar (Tables 1 and 2). Mainpak appeared to be the most severely affected by whitefly since it was associated with high SW numbers and provided the second lowest weight and the smallest sizes.

It was expected that earlier maturing cultivars, such as Cruiser and Caravelle, would experience less whitefly pres-

Table 3. Seasonal average of whiteflies, as adults per leaf and immature stages per 7.6 cm² of leaf area, on melon cultivars averaged over the treated and untreated plots at Weslaco, TX in 1993.

Melon Cultivar	Adults	Eggs	Small Nymph	Large Nymph	Dead Nymph	Total Nymph
Tms 89	12a	20abcd	14bcd	12bcd	2.3abcd	13bcd
Hymark	10ab	23abcd	1.5bcd	11bcd	1.9abcde	12bcd
HMX9583	10abc	28abcd	4.2a	28a	2.7abc	32a
Cruiser	9abc	26abc	1.8bcd	15bcd	1.3de	16bcd
Tasty Sweet	9abc	19abcd	1.4bcd	11bcd	2.0abcde	13bcd
Tam Sun	9abc	20abcd	1.9bcd	16bc	2.1abcd	18bc
Otero	9abc	18abcd	2.4bcd	16bcd	1.6cde	18bc
Explorer	9abc	23abcd	1.5bcd	11bcd	2.8ab	13bcd
MainPak	8abc	15bcd	2.6abc	12bcd	1.6cde	15bcd
D21-1005	8abc	8d	1.2bcd	4d	1.0e	5d
Perlita	8abc	17abcd	1.2bcd	11bcd	1.6cde	12bcd
Caravelle	8abc	34a	1.6bcd	18abc	1.7bcde	20bc
Gold Mark	7bcd	18abcd	1.3bcd	11bcd	1.4be	12bcd
Primo	7bcd	13cd	1.0cd	7cd	1.7bcde	7cd
Tam Uvalde	6cd	7d	0.8d	6cd	0.8e	7cd
Tam Dew	3d	31ab	2.7ab	19ab	3.0a	21bc

[1]Means followed by the same letter are not significantly defferent based on LSD test (P<0.05)

Table 4. Melon yield as number of fruit by size grades (no. per carton), total number and dollar value for 9.3 m² (100 ft²) for melon cultivars averaged over the treated and untreated plots at Weslaco, TX in 1993.

Melon Cultivar	Grade #9	Grade #12	Grade #15	Grade #18	Grade #23	Grade #30	Total $ Value
Tam Sun	5.5abc	6.9a	12a	4.2abcd	2.3bc	0.2ab	13.94a
Mainpak	1.7def	4.1bcd	12a	4.9abcd	2.1bc	0.2a	10.46b
Explorer	2.0def	3.2bcd	9.2ab	7.5a	2.0bc	1.2ab	9.78bc
Cruiser	7.3a	4.6abc	4.6de	2.6cde	0.3c	0.8ab	9.36bc
Tasty Sweet	4.3abcd	3.3bcd	7.6bcd	4.4abcd	0.9c	0.0b	9.14bcd
HMX9583	5.7ab	3.9bcd	5.7bcde	2.0cde	0.5c	0.0b	8.50bcde
Gold Mark	6.1ab	3.5bcd	4.6de	3.0cde	0.6c	0.0b	8.30bcdef
Otero	4.5abc	2.1cde	5.8bcde	4.3abcd	1.4bc	0.8ab	8.25bcdef
Hymark	2.4cde	5.3ab	6.5bcde	2.4cde	1.3bc	0.4ab	8.06bcdefg
Caravelle	3.4bcde	4.0bcd	6.9bcde	2.5cde	0.5c	0.6ab	8.04bcdefg
D21-1005	0.8ef	1.7de	8.8abc	6.5ab	2.3bc	1.3ab	7.75cdefg
Primo	5.6ab	2.3cde	3.8de	1.6de	1.3bc	0.1ab	6.67defg
TMS 89	2.3def	2.6cde	4.9cde	3.8bcde	0.0c	1.1ab	6.02efghi
Tam Uvalde	0.0f	0.0e	6.0bcde	7.2ab	5.6a	1.5a	5.79fghi
Perlita	0.5ef	1.7de	4.0de	5.1abc	3.5ab	1.2ab	5.04hi
Tam Dew	2.0def	1.5de	3.5e	0.6e	0.8c	1.5a	3.82i

[1]Means followed by the same letter are not significantly defferent based on LSD test (P>0.05)

sure late in the season than late maturing cultivars, such as Hymark and Mainpak, but sooty mold ratings were not always consistant with this. Cruiser and Caravelle did have low sooty mold ratings as expected, but so did Hymark (Table 1). There was no clear division of whitefly susceptibility based on duration of melon maturation. Another observation was that the ranking of cultivars by level of SW adults was different between the earliest and latest date, so host preference was probably affected by plant age.

1993 Test. Again, significant differences were observed between melon cultivars in terms of SW adults and nymphs averaged over the the sampling period (Table 3) and yield (Table 4). Tam Sun, HMX 9583, and Explorer were associated with moderate to relatively high SW numbers (Table 3), but provided the greatest yield and harvested dollar value (Table 4). This suggested that tolerance to SW was a possible mechanism of host plant resistance, at least at these SW population densities. D21-1005 and Tam Dew had low nymph and adult numbers, respectively, but were not high yielding.

1994 Tests. Similar to the first two tests, significant differences were noted between melon cultivars in terms of SW adults and nymphs throughout the sampling period (Table 5) and yield (Table 6). Tam Sun, HMX 9583, Explorer, Cruiser, and Mission were associated with moderately high SW numbers (Table 5), but provided the greater yield and harvested dollar value (Table 6) so tolerance to whiteflies was again sug-

Table 5. Seasonal average of whitefly as adults per leaf and immature stages per 7.6 cm² of leaf area, weekly vine length (cm) increase, and long trichomes per 0.9 cm² leaf area averaged over the treated and untreated plots at Weslaco, TX in 1994.

Melon Cultivar	Adults	Eggs	Small Nymph	Large Nymph	Vine Length	Long Trichome
PI116915	21a	179a	41a	36a	72cde	25ab
PI125966	20a	117bc	24ab	38a	94a	27a
PI126125	17ab	103bc	31a	34a	78bcde	16bc
Tam Sun	17bc	111bc	43a	45a	85abcde	14cd
PI125951	16bc	119bc	21ab	36a	87ab	24ab
Primo	15bc	92bc	37a	44a	86abcd	7.5d
Cruiser	14bc	112bc	38a	42a	85abcde	12cd
Mission	14bc	100bc	26ab	38a	88ab	15cd
HMX9583	14bc	81c	27ab	54a	87abc	14cd
Mainpak	14bc	150ab	42a	56a	70e1	7bc
Hymark	13c	110bc	32a	34a	71de	20abc
Explorer	13c	106bc	40a	37a	80abcde	17bc

[1]Means followed by the same letter are not significantly defferent based on LSD test (P>0.05)

gested. Higher yields of Tam Sun were associated with lower SW numbers (Tables 5 and 6). Cultivars that resulted in low yields could be grouped into categories, i.e. those that were initially robust plants with expected normal yields (commercial cultivars) and those that had non-commercial fruit resulting in low yields (PI's). Yield differences were dramatic between the commercial cultivars and PI's, but also between certain commercial cultivars (Table 6). Tam Sun, HMX 9583, Hymark, Mission, and Cruiser produced the greatest value of melons as well as Primo, Mainpak and Explorer.

The PI's in this test were hairy-leaf types as evidenced by the number of long trichomes per leaf area (Table 5). Positive correlations were found between long-leaf trichomes and numbers of whitefly adults and immatures (R=0.5, n=96, P<0.001 and R=0.5, n=96, P<0.001, respectively). Also there was a negative correlation between long-leaf trichomes and dollar yield (R=-0.42, n=96, P<0.001), partially an artifact of the low-yielding PI being the hairy leaf types. The PI 125966 line had exceptionally high vine length growth (Table 5) in both treated and untreated plots suggesting that there was tolerance to SW in terms of plant vigor. Even though these PIs exhibited tolerance, the association of high whitefly numbers with hairy-leaf type cultivars suggests that less hairy-leaf melon cultivars could be a source of non-preference.

Certain sizes of melons were affected more than others depending on the cultivar (Table 7). Since melon size is closely associated with the dollar value of the harvest, dollar value was consistantly a good indicator of whitefly's impact on the melon plant. The closer the correlation coefficient was to -1.0 the more negative yield variation was explained by increased whitefly numbers. If the yield parameter was not significantly correlated or positively correlated with whitefly population density, then whiteflies probably had no negative effect on the parameter. Based on these assumptions, Tam Sun, PI125966, HMX9583, Mainpak, Cruiser, Explorer and Hymark were more susceptible to whitefly damage than other cultivars.

Table 6. Melon yield as number of fruit by size grades (no. per carton), total number and dollar value for 9.3 m^2 (100 ft^2) for melon cultivars averaged over the treated and untreated plots at Weslaco, TX in 1994.

Melon Cultivar	Grade #9	Grade #12	Grade #15	Grade #18	Grade #23	Grade #30	Total $ Value
Tam Sun	5.4a	4.4ab	5.0abc	8.8a	3.9a	2.8bcd	9.7a
HMX9583	1.8cd	5.9a	4.3bcd	4.6b	2.9ab	7.3a	9.7a
Hymark	2.8bc	4.5ab	7.8a	4.3bc	4.0a	4.9ab	9.6a
Mission	4.6ab	5.3ab	3.8bcd	6.4ab	4.1a	3.0bcd	8.6a
Cruiser	2.6bc	4.5ab	3.6bcd	5.0b	3.5a	4.4abc	8.2a
Primo	2.0cd	2.8bc	3.4bcde	3.8bcde	1.6abc	5.0ab	6.7a
Explorer	5.9a	5.1ab	5.5ab	4.0bcd	2.0abc	1.9bcd	6.3ab
Mainpak	4.3ab	4.5ab	6.1ab	4.6b	2.4abc	0.4d	6.0abc
PI126125	0.4d	0.9c	0.3f	0.3ef	0.4bc	2.8bcd	2.0bcd
PI125951	1.1cd	1.0c	2.3cdef	0.5def	0.3c	1.1bcd	1.8cd
PI116915	0.1d	0.5c	0.4ef	0.6cdef	0.1c	0.5cd	0.8d
PI125966	1.3cd	0.6c	1.3def	0.0f	0.3c	0.4d	0.8d

[1]Means followed by the same letter are not significantly defferent based on LSD test (P>0.05)

Table 7. Correlation coefficients over all tests (1992, 1993, and 1994 combined) for melon culivars significantly affected by the presence of whitefly large nymphs (arranged from high yielding to low yielding) in terms of number of fruit by grade and total dollar value.

Cultivar n	Grade #9	Grade #12	Grade #15	Grade #18	Grade #23	Grade #30	Total $ Value	
Tam Sun	16	-0.49*	-0.64*	-0.53*	-0.31	0.02	0.31	-0.87*
HMX9583	16	-0.42	-0.31	-0.38	-0.28	0.03	-0.33	-0.57*
Hymark	24	-0.22	-0.28	-0.14	-0.5	0.15	0.24	-0.46*
Cruiser	24	-0.23	-0.15	-0.3	-0.15	0.1	0.19	-0.52*
Explorer	24	-0.2	-0.12	-0.46*	-0.24	0.52	-0.26	-0.50*
Mainpak	24	-0.21	-0.25	-0.33	-0.13	0.07	-0.11	-0.53*
PI125966	8	-0.53	-0.38	-0.00	-0.76*	0.07	-0.47	-0.77*

[1]Pearson's correlation coefficients with * significant at P<0.05.

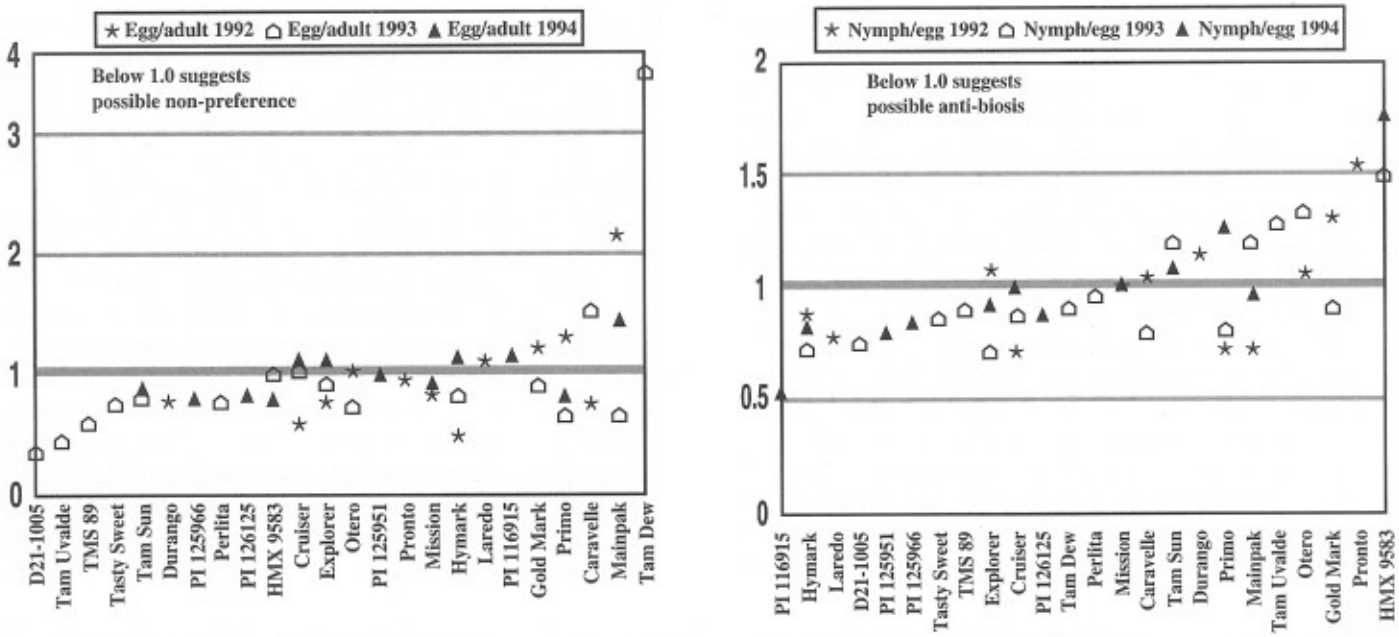

Fig. 1. Cultivars grouped into higher or lower levels of non-preference and antibiosis based on being consistently above or below the median value of egg/adult or large nymph/egg for a given year at Weslaco TX.

Those cultivars, arranged from high to low yielding, not significantly correlated ($P>0.05$) with whiteflies were: Tasty Sweet, D211005, Otero, Mission, Gold Mark, Primo, Laredo, TMS89, Caravelle, TamUvalde, Durango, Perlita, Pronto, TamDew, PI126125, PI125951, and PI116915. Thus, these cultivars exhibited some tolerance to the presence of whiteflies.

Indicators of non-preference (low egg/adult ratio) and anti-biosis (low large nymph/egg ratios), calculated for all three tests, indicated that differences in whitefly response to the melon cultivars in these tests were somewhat consistant (Table 8). For certain cultivars, i.e., Hymark and Cruiser, similar trends of low large nymph/egg ratios were noted in all three years, so that with certain commercial cultivars there is consistent tendencies toward antibiosis. In life-table studies for SW as much as a 16% difference in whitefly survivorship occurred between two melon cultivars, HMX 9583 and Tam Sun (Riley et al., 1995). Further studies such as Kishaba et al. (1992) are needed to identify possible mechanisms of host plant resistance to whiteflies in melon germplasm.

SUMMARY

Differences between cultivars in oviposition and nymph numbers were detected in all trials. Tam Sun, HMX 9583, Explorer were associated with moderate to relatively high SW numbers, but provided the greatest yield and harvested dollar value, suggesting tolerance. Melon sizes were affected to a large degree by the presence of SW. The plant introduction 125966 in the 1994 test, a hairy-leaf melon, showed tolerance to SW in terms of vine growth. Yield differences in 1994 were dramatic between the commercial cultivars and PI's, but also between certain commercial cultivars. The measurements of yield response in these trials provided some initial information on the relative resistance of melon cultivars to whitefly damage.

Some consistent, relative differences in preference and antibiosis were indicated by egg/adult and large nymph/egg ratios, respectively, in all three tests. For example, Hymark, Explorer and Cruiser had consistantly lower nymph/egg ratios suggesting some antibiosis. Positive correlations occurred between long-leaf trichomes and numbers of whitefly adults and immatures suggesting that hairiness increased SW preference. In melons, leaf trichomes seem to affect whitefly populations similarly to the presence of leaf trichomes in cotton, that is that smooth leaves appear to reduce whitefly attack. Further life-table tests are needed to characterize *Bemisia* response to cultivars in terms of preference and survivorship.

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