

Evaluation of non-preference of melon plants by *B. tabaci*

F.J.Palomares-Rius, López-Sesé, A.I. and M. L. Gómez-Guillamón.

Plant Breeding Department- Experimental Station 'La Mayora' CSIC. 29750-Algarrobo, Málaga, Spain.

Corresponding author: guillamon@eelm.csic.es

The sweetpotato whitefly, *Bemisia tabaci* (Gennadius), is one of the most important pests affecting melon crops in the Mediterranean basin (Boubourakas et al. 2006) and other melon growing areas (Chu et al, 2007). Infestation levels greater than 2,6 larvae per 10 cm² have been reported to be responsible for 30% yield losses in melon (Riley and Palumbo, 1996); *B. tabaci* is also a vector for important viruses like CYSDV (*Cucurbit Yellow Stunting Disorder Virus*) or CVYV (*Cucurbit Vein Yellowing Virus*). Although tolerant accessions to this pest have been described, there are not breeding programs established, probably due to the lack of knowledge of the resistance genetics, the difficult management of whiteflies in a laboratory and the non-existence of an efficient selection method for resistance. We report the attempts to adapt and to examine the feasibility of the method described and tested with aphids by Martin and Fereres (2003) to evaluate resistance to *B. tabaci*.

Materials and Methods: To evaluate the preference or non-preference of different melon genotypes by *B. tabaci*, an adapted free-choice assay following Martin and Fereres (2003) has been carried out. The melon genotypes tested were 'TGR-1551', 'PI-161375', 'PI-414723', 'Nagata kin Makuwa', 'Doublon', 'Ananas', 'AR5' and 'Hale's best Jumbo'. The Spanish cultivar 'Bola de Oro' was used as whitefly susceptible control. Plants used in all the experiments were at 8-10 true leaf stage. Four leaf disks (2 cm diam.) of the second and third leaf from apex of each genotype together with four leaf disks of 'Bola de Oro' were alternately

placed in Petri plates of 14 cm diam. The bottoms of each plate were covered with a layer of moistened filter paper and, over it, a layer Parafilm "M" (Pechiney, Chicago, IL. 60631) in order to avoid whitefly sticking. Eight Petri dishes (replications) by genotype were used and 3 Petri dishes were used as control using the combination 'Bola de Oro' vs 'Bola de Oro'. Fifty whiteflies were introduced into each Petri dish through an upper lid hole (0,5 cm diameter) using a Falcon tube. Petri dishes were then covered by black cloth (Thome et al., 1996) to avoid any phototropism effect (Blackmer and Byrne, 1993) and placed in climatic chamber at 25 °C. Whiteflies settled on each leaf disk were counted at 15 min, 30 min, 1 h, 1.5 h, 3 h and 6 h after the whiteflies were released inside Petri dishes.

Synchronized whiteflies of "Q" biotype (48 h old) reared on whitefly susceptible melon plants were used in all the experiments.

The whole number of whiteflies settled on leaf disks at each time was statistically analyzed by a binomial statistic test in order to estimate preference for one genotype. All statistical tests were performed using the SPSS for windows v.14.0.1 (SPSS for Windows, Rel. 11.0.1. 2001. Chicago: SPSS Inc).

Results and Discussion: The percentage of whiteflies settled on each genotype based on the total whiteflies settled on leaf disks at different observation times is shown in Table 1.

A clear preference of *B. tabaci* towards 'Bola de

Oro' leaf disks was observed when this cultivar was evaluated together with 'PI-414723'. This preference was maintained until the end of the experiment.

When 'TGR-1551' was the tested genotype, differences in the whitefly preference were observed at 30 min, these differences increased and were maintained until 3 hours after the experiment began.

Whiteflies did not show differences between 'Bola de Oro' and most of the tested genotypes: 'Ananas', 'Hale's best Jumbo', 'Nagata Kin Makuwa', 'PI-161375', 'AR-5' and 'Doublon'. However, some differences in whitefly preference were punctually observed for 'Hale's best Jumbo' (3 h), 'Nagata Kin Makuwa' (1.5 h) and AR-5 (3 h) (Table 1).

'PI-414723' leaf disks were rejected in a short time, 15 min after the experiment began, which could indicate the existence of antixenotic mechanisms additional to the antibiotic mechanisms described by Sauvion et al. (2005). *B. tabaci* also showed preference towards 'Bola de Oro' leaf disks when 'TGR-1551' was the alternative, which may confirm the existence of antixenotic mechanisms as described by Soria et al. (1999). In both cases, these results at such early times may indicate the existence of constitutive antixenotic effects on the leaf surface.

'PI-161375' was tested by Boissot et al (2003) in field conditions, showing a low level of adult whitefly presence on leaves. However, in the free-choice test we carried out, whiteflies could not differentiate between 'Bola de Oro' and 'PI-161375'.

This bio-assay has allowed the evaluation of *B. tabaci* preference for several genotypes in a short time and small space. However, unknown

factors could be involved in the behaviour of the whitefly in punctual observations in some susceptible genotypes. This method should be contrasted with other laboratory preference tests in order to evaluate its efficiency. Probably, this method could only differentiate strong differences in whitefly preference.

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Table 1. Percentage of whiteflies settled on leaf disks of each tested genotype over the total of settled whiteflies

Genotype vs 'Bola de Oro'	Time after releasing					
	15 min	30 min	1 h	1,5 h	3 h	6 h
TGR	42.65	40.86*	38.50**	34.43**	34.80**	44.44
AR5	55.13	47.62	48.31	48.30	41.04*	45.63
Ananas	53.03	54.26	47.20	45.54	50.41	51.66
Nagata Kin Makuwa	41.09	47.37	42.26	39.43*	47.39	46.80
Doublon	44.36	48.47	48.78	49.11	50.58	49.38
PI-161375	45.68	52.80	51.13	49.40	50.93	51.02
PI-414723	28.57*	30.67**	32.63**	32.50**	27.84**	29.88**
Hale's best Jumbo	56.48	48.25	45.03	43.35	42.71*	45.56
BO	55.73	52.36	50.90	52.62	52.29	51.84

* Significant deviation (P<0.05) using Binomial test at 0.5 probability

** Significant deviation (P<0.001) using Binomial test at 0.5 probability