Induced or acquired plant resistance against a pest or pathogen is the result of protective mechanisms activated by the plant upon contact with a previous invader or an abiotic factor. Research in our laboratory during the last years showed a great variability in the responses of susceptible tomato plants (cv. Marmande) to by infestation of \textit{Bemisia tabaci} Gemmatus (Hemiptera: Aleyrodidae).

1. Preinfection by whiteflies (\textit{Bemisia tabaci}) or aphids (\textit{Macrosiphum euphorbiae}) induce variable resistance or susceptibility responses

- After 3 days of exposure to 20 apterous adult aphids, the plants acquired a transiently induced resistance to \textit{B. tabaci} when aphid removal occurred one or 18 hours prior to \textit{B. tabaci} infestation; the effect disappeared when four days passed between aphid and whitefly infestations (Fig. 1). The resistance observed was both locally and systematically induced.

- The tomato responses to \textit{M. euphorbiae} induced by 10 adults of \textit{B. tabaci} during 48 h depend on the aphid clone. For the Spanish clone Sp, the number of aphid nymphs 10 days after adult removal was significantly higher on whitely preinfested plants than on uninfested plants (Fig. 2). The duration of this plant response is apparently limited, as no significant differences were observed when another aphid clone from The Netherlands (Nt) was tested.


2. Tomato responses to \textit{Bemisia tabaci} induced by biotypes Q and B

A 3-day preinfestation by 10 males per plant of the Q-biotype had an attractive effect on adults of the same biotype in free-choice assays (Fig. 3). Consistently, greater values of oviposition and number of insects of the second generation were observed. However, the B-biotype did not influence a later infestation by the Q-biotype, nor it was affected by previous infestations by any biotype.

In no-choice assays, preinfestation by the B-biotype for 3 days increased plant susceptibility against a second infestation by the same biotype, with significant increases in the number of eggs and individuals of the next generation (Fig. 4). This response was both local and sistemically induced, and independent of plant age.


3. Effects of the plant growth stimulant SB Plant Invigorator SBPI®

In a free-choice experiment, adult Q-biotype \textit{B. tabaci} significantly preferred control plants than plants sprayed with Bion® at 0.2 g/l (Fig. 5). In consequence, the number of eggs was lower on treated plants. After 23 days, a decrease in the number of empty pupal cases was also observed in plants treated with Bion® at 0.2 g/l. The effect produced by Bion® applied at 0.1 g/l was not significant. In no-choice assay, the total number of immature insects (eggs+N1+N2) on Bion®-treated leaflets was significantly lower than on water-treated leaflets from control plants (Fig. 6). This difference was mostly due to the number of N1 nymphs. The acquired resistance seemed to be local (LAB) because of the differences between Bion®-treated and non-treated leaflets in the same plants, meanwhile no statistically significant differences were observed in no-treated leaflets between Bion®-treated and control plants.


4. Effects of the plant growth stimulant SB Plant Invigorator SBPI®

Three days after tomato plants were sprayed for the first time with SBPI (Stan Brouard Group) at 2 ml solution, this product seemed to be ineffective against \textit{Bemisia tabaci} adults. Oviposition values on control plants at the same day did not differ significantly from those on treated plants (Fig. 7). However, 31 days after the first treatment with weekly repeated treatments, new adult whiteflies started to emerge from pupae on control plants, but no N3, N4 or new adults were found on SBPI-treated plants (Fig. 8). Differences in the number of 1st+2nd instar nymphs were not statistically significant.


\textbf{CONCLUSIONS}

1. After limited exposure to the potato aphid \textit{M. euphorbiae}, the plants transiently expressed a local and systemic induced resistance to \textit{B. tabaci}. Conversely, preinfestation with \textit{B. tabaci} Adults 10 days before \textit{M. euphorbiae} increased susceptibility to the \textit{Sp} clone of \textit{M. euphorbiae} meanwhile no significant differences between preinfested and uninfested plants were observed when the response to another aphid clone (Nt) was evaluated.

2. In other assays with both B and Q biotypes of \textit{B. tabaci} it was observed that a first infestation with these insects increased tomato susceptibility to a second attack by the same species.

3. Acquired resistance to \textit{B. tabaci} (B and Q biotypes) was locally observed when tomato plants were sprayed with BTH (acibenzolar-S-methyl), the Syngenta plant activator Bion®, decreasing the total number of individuals and delaying the insect development.

4. The plant growth stimulant SB Plant Invigorator (SBPI® Stan Brouard Group) was effective for the control of \textit{B. tabaci} on susceptible tomato, as field application with this product at 2ml solution inhibited larval development decreasing the risk of a new whitefly generation.