

ABSTRACT

Characterization of morphological and anatomical features in tomato (*Lycopersicon spp*), and their relationship to whitefly (*Bemisia tabaci*) population density

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This study investigated the association between leaf morphological and anatomical characteristics on five tomato cultivars (*Lycopersicon spp*), and infestation by different developmental stages of whitefly (*Bemisia tabaci*). Whiteflies are vectors of geminiviruses and are recognized as the limiting factor to tomato production in the Caribbean.

Five tomato cultivars were investigated. Two were wild types (LA1223, LA1963), while the others were commercial cultivars derived from *L. esculentum* (Kada, Cascade, Calypso). LA1223 and LA1963 were chosen since they may be resistant to geminivirus. The precise mechanism of that resistance is not known and may be at the insect or virus level.

This study concentrated on the effect that leaf abaxial surface morphology and anatomy of leaves from the upper, middle and lower third of tomato may have on the population densities of eggs, first to fourth nymphal instars, and adult whiteflies. The morphological and anatomical characteristics investigated were

length and density of total and Type VI trichomes, stomatal density and size, and epidermal and intervening tissue width.

Whitefly developmental stages exhibited characteristic vertical distribution on all cultivars. Eggs were predominant on the upper leaves, while first, second and third nymphal instars were predominant on the middle leaves, and fourth instars the lower leaves. At all plant levels the wild type LA1963 supported the lowest population densities of all whitefly developmental stages. It also had the highest total trichome density and length, and stomatal density. The intervening tissue width was however similar to some of the other cultivars, and the Type VI trichome density was the lowest of all cultivars studied.

No single leaf characteristic independently affected whitefly infestation. However, intervening tissue width and trichome length may have influenced penetration of insect stylet to the phloem. The efficiency of trichomes as a barrier appeared to depend on the total trichome density.

The effect of these morphological and anatomical characteristics on whitefly infestation of tomato should be further tested in a segregating tomato population. If any of these characteristics is confirmed to impart resistance to whitefly infestation, it is envisaged that they can be bred into commercial cultivars and thus form part of an IPM program for controlling whitefly.