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FROM:

Hawaii Crop Knowledge Master

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SWEETPOTATO WHITEFLY

SCIENTIFIC NAME: *Bemisia tabaci* biotpe A (Gennadius)
CLASS: Insecta
ORDER: Hemiptera
FAMILY: Alerodidae

Sweetpotato Whiteflies
From: Universit of California

Sweetpotato Whiteflies
From: Insect Images

DESCRIPTION

Adults: Adult sweetpotato whiteflies are small, appro“imatel 1/25 inch in length, with a pale ellow bod and two pairs of white wings and covered with a white wa“ powder. At rest, wings are held in an inverted V position. Their compound ees are red.

Eggs: Female whiteflies deposit pear-shaped eggs into the mesophll or inner tissue of the leaf from the lower surface. Eggs are attached to the leaf b a stalk-like process. Eggs are white when first laid, and become brown prior to hatching. The are generall laid on the underside surface of the ounger, upper leaves of the plant.

Nmphs: The first nmphal stage is called crawlers and the last stage is often referred to as the pupa. After hatching the crawlers move a short distance and settle to feed. Once settled, the subsequent three nmphal stages are scale-like and sedentar. Nmphs are cream white to light green and oval in outline. The total nmphal period lasts about 2-4 weeks.

Pupae: The pupa or fourth nmphal instar will be somewhat darker beigeish-ellow and opaque and 0.6 to 0.8 mm long. Pupae are relativel more plump compared to previous nmphal stages. The ape“ of anterior and caudal spiracular furrows have smalls amount of white wa“ deposits. The caudal setae are prominent, and the caudal

end is somewhat acute. Dorsal spines are present when the host leaf is hair and absent when the host leaf is smooth.

BIOLOGY

Distribution: In addition to Hawaii, the sweetpotato whitefl has been reported as a serious pest of cultivated crops in tropical and subtropical areas including Africa, Asia, Central America, South America, and the West Indies where it is also known as the tobacco whitefl and cotton whitefl. In North America, it has been reported from Ariona, California, District of Columbia, Florida, Georgia, Marland, Te“as and Me“ico (Cock, 1986).

Host Plants: The sweetpotato whitefl has an e“tremel wide host range. It attacks more than 500 species of plants (Greathead, 1986) from 63 plant families (Mound and Halse, 1978). In Hawaii, the sweetpotato whitefl has been found on the following crop plants: annona (cherimoa, atemoa, sugarapple), avocado, broccoli, cauliflower, Chinese cabbage, Chinese wa“gourd, cucumber, Dendrobium (flowers), edible gourds, eggplant, fig, green bean, guava, hibiscus, hotan, lettuce, luffa, plumeria, poinsettia, pumpkin, rose, so bean, squash, sweetpotato, togan, tomato, ung-choi, watermelon, ardlong beans and ucchini. Although not et reported in the state, other crop hosts include cabbage, chrsanthemum, beans, bittermelon, dishrag squash, pepper, pea, and radish (Mau & Tsuda). Weeds often serve as alternate hosts of crop pests.

Damage: Direct feeding damage is caused b the piercing and sucking sap from the foliage of plants. This feeding causes weakening and earl wilting of the plant and reduces the plant growth rate and ield (Berlinger, 1986). It ma also cause leaf chlorosis, leaf withering, premature dropping of leaves and plant death. Infestations of sweetpotato whitefl nmphs are associated with the occurrence of irregular ripening of tomatoes and silverleaf of squash. Indirect damage results b the accumulation of honedew produced b the whiteflies. This honedew serves as a substrate for the growth of black soot mold on leaves and fruit. The mold reduces photosnthesis and lessens the market value of the plant or ields it unmarketable (Berlinger, 1986).

Damage is also caused when sweet potato whitefl vectors plant viruses. A small population of whiteflies is sufficient to cause considerable damage (Cohen and Berlinger, 1986). Plant viruses transmitted b whiteflies cause over 40 diseases of vegetable and fiber crops worldwide. Among the 1,100 recognied species of whiteflies in the world, onl three are recognied as vectors of plant viruses. The sweetpotato whitefl is considered the most common and important whitefl vector of plant viruses worldwide. It is also the onl known whitefl vector of viruses categoried in the geminivirus group.

Life Ccle: Whiteflies have si“ life stages - the egg, four nmphal stages, and the adult. The development time of this insect from egg to adult ma range from 15-70 das dependent upon temperature and plant host. Development occurs in temperatures ranging from 50 to 89.6 F (10 to 32 C). 80.6 F (27 C) appears to be the optimal temperature for development. Under control conditions on cotton, the pest completes its development in 17 das at 86 F (30 C) On the contentinal U.S. development from egg to adult under field conditions varies with the season; development varies from 25 to 50 das.

Adults usuall emerge from their pupal cases in the morning hours and ma copulate a few hours later. Oviposition occurs from 1 to 8 das after mating. Adult life span ranges from 6-55 das dependent on temperature. Females live onl 10-15 das under southern continental U.S. summer conditions, but can live several months during the winter. In this species, reproduction can occur with or without copulation. Unmated females can reproduce b parthenogenesis in which the females produce onl male progen. Females la 80 to more than 300 eggs in their lifetime. The plant host reportedl plas an important role in female fecundit.

CONTROL

High reproductive rate and multiple host sequences provide optimal conditions for sweetpotato whitefl population development. The varied habitats, seasonal population development and intra and inter-crop and

wild host movement present an e“tremel comple“ and difficult challenge requiring new and innovative approached for formulating control and suppression methodolog.

There is reall no eas wa of controlling the sweetpotato whitefl. Egg mortalit is usuall minimal. Weather and predation ma cause high mortalit rates during the crawler and first nmphal stages, but has onl moderate effects on the later nmphal stages. In the past adults were easil killed with insecticides but pesticide resistance in sweetpotato whitefl populations is a common problem faced b man growers toda. Sweetpotato whitefl has become resistant to chemical insecticides quite rapidl in other parts of the world, and the wisdom of reling onl on chemical insecticides is questioned. Moreover, regular insecticide applications can result in resurgence of other pests.

We believe that a combination of cultural practices and chemical application would provide the best chance of controlling this pest. The use of sound cultural practices that ma avoid, dela, or lessen the severit of the sweetpotato whitefl infestation is a good foundation to begin with. Careful selection of insecticides can help regulate sweetpotato whitefl populations to reduce losses not due to pathogenic organisms. Little can be done to reduce losses due to virus diseases, but we are fortunate that none have been introduced

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