

ALEURODICUS DISPERSUS RUSSELL (HOMOPTERA: ALEYRODIDAE), A POSSIBLE

VECTOR OF THE LETHAL YELLOWING DISEASE OF COCONUT PALMS¹

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INTRODUCTION: A WHITEFLY, ALEURODICUS DISPERSUS RUSSELL, NOW DISTRIBUTED OVER MUCH OF THE FLORIDA KEYS, IS THE PRIME SUSPECT VECTOR OF A DEADLY VIRUS DISEASE OF COCONUT PALMS, LETHAL YELLOWING, WHICH HAS CAUSED THE LOSS OF MORE THAN NINETY PER CENT OF THE NATIVE COCONUT PALMS OF THE KEY WEST AREA WITHIN THE LAST 15 YEARS. THE DISEASE WAS CONFINED TO THE WESTERN-MOST FLORIDA KEYS UNTIL 1970; HOWEVER, A NEW INFESTATION HAS BEEN DISCOVERED RECENTLY ON KEY LARGO KEY, ACCOMPANIED BY AN EXTENSION OF THE RANGE OF A. DISPERSUS INTO THE EASTERN-MOST OR UPPER KEYS. WHILE THE EVIDENCE IS CIRCUMSTANTIAL THAT IN FLORIDA A. DISPERSUS IS THE PRIMARY, IF NOT THE SOLE VECTOR OF THE LETHAL YELLOWING DISEASE OF COCONUT PALMS, IT REMAINS THE MOST LIKELY SUSPECT. RECENTLY AN ENGLISH SCIENTIST, NORMAN GRYLLES, APPARENTLY ESTABLISHED A RELATIONSHIP BETWEEN THE DISEASE AND WHITEFLIES. HE REPORTED THAT HE HAD TRANSMITTED LETHAL YELLOWING FROM A DISEASED COCONUT PALM TO A HEALTHY PALM WITH ANOTHER SPECIES OF WHITEFLY IN THE SAME GENUS--ALEURODICUS COCCOLOBAE QUAINANCE AND BAKER--AS THE VECTOR. ALTHOUGH HE WAS SUCCESSFUL IN ACHIEVING ONLY ONE TRANSMISSION OF THE DISEASE, INDICATING THAT WHITEFLIES ARE INEFFICIENT VECTORS, HE DID SHOW THAT THEY CAN BE VECTORS OF LETHAL YELLOWING. SINCE THE DISEASE NOW ENDANGERS MANY THOUSANDS OF COCONUT PALMS ON THE SOUTHERN FLORIDA MAINLAND, THE POSSIBILITY OF A. DISPERSUS BEING THE PRIMARY VECTOR IS OF MAJOR CONCERN TO REGULATORY AND RESEARCH WORKERS IN FLORIDA. HOWEVER, THE CONCERN OVER THE SPREAD OF THIS WHITEFLY ONTO THE MAINLAND OF FLORIDA IS NOT ONLY BECAUSE OF ITS POSSIBLE RELATIONSHIP TO THE SPREAD OF THE LETHAL YELLOWING DISEASE. THIS WHITEFLY OFTEN OCCURS IN GREAT NUMBERS AND ATTACKS MANY SPECIES OF PLANTS, INCLUDING CITRUS, AVOCADOES, BANANAS, MANGOES, AND A WIDE VARIETY OF ORNAMENTALS. ITS POTENTIAL DANGER TO THESE PLANTS IS SUFFICIENT CAUSE FOR CONCERN. DAMAGE TO THE PLANTS IS INFLECTED BY BOTH IMMATURES AND ADULTS SUCKING SAP FROM THE LEAVES OF PLANTS. AN OBJECTIONABLE SOOTY FUNGUS WHICH INTERFERES WITH PHOTOSYNTHESIS OFTEN GROWS ON THE DROPLETS OF HONEYDEW SECRETED ON THE FOLIAGE BY WHITEFLIES.

HOSTS: A. DISPERSUS HAS BEEN RECORDED FROM 38 GENERA BELONGING TO 27 PLANT FAMILIES INCLUDING THE FOLLOWING: ACALYPHA HISPIDA, ACALYPHA SP., ACHRAS SAPOTA, ACHRAS SP., ADONIDIA MERRILLI, ALPINIA SPECIOSA, ANNONA SQUAMOSA, ARALIA SP., ARTOCARPUS SP., BARRINGTONIA SPECIOSA, BAUHINIA SP., BEAUMONTIA GRANDIFLORA, BEGONIA SP., BOUGAINVILLEA SP., BURSERA SIMARUBA, CALADIUM SP., CALOPHYLLUM INOPHYLLUM, CAPSICUM SP., CARYOTA MITIS, CASSIA BAHAMENSIS, CASSIA FISTULA, CASSIA SIAMEA, CASSIA SP., CESTRUM DIURNUM, CHAMAEDOREA SP., CHRYSALIDOCARPUS LUTESCENS, CITRUS AURANTIFOLIA, CITRUS AURANTIUM, CITRUS SP., COCCOLOBA FLORIDANA, COCCOLOBA UVIFERA, COCCOTHRINAX ARGENTATA, COCOS NUCIFERA, COCOS SP., COFFEA SP., COLEUS SP., CONOCARPUS ERECTUS, DATURA SUAVEOLENS, DIEFFENBACHIA PICTA, DIZYGOHECA ELEGANTISSIMA, EUGENIA BUXIFOLIA, FICUS GLOMERATA, FICUS RELIGIOSA, FICUS SP., HIBISCUS ROSA-SINENSIS, HURA CREPITANS, INGA LAURINA, INGA SP., IXORA SP., MANGIFERA INDICA, MELALEUCA LEUCADENDRA, MELICocca BIJUGA, MIMUSOPS SP., MONSTERA DELICIOSA, MORUS RUBRA, MUSA NANA, MUSA PARADISIACA, MUSA SAPIENTUM, MUSA SUMATRANA, MUSA SP., ORCHIDACEAE (SEVERAL GENERA), PERSEA AMERICANA, PERISTERIA SP., PLATANUS OCCIDENTALIS, PLUMERIA SP., PRITCHARDIA THURSTONI, PRUNUS AMYGDALUS, PRUNUS SP., PSIDIUM GUAJAVA, PSIDIUM SP., PYRACANTHA SP., SANCHEZIA NOBILIS, SCHEELEA LEANDROANA, SCHINUS TEREBINTHEFOLIUS, SIDA SP., SOBRALIA SP., SOLANDRA SP., SPATHYPHYLLUM SP., STRELITZIA SP., TABEBUIA ARGENTEA, TERMINALIA CATAPPA, AND ON SEVERAL UNIDENTIFIED SPECIES OF PLANTS FROM BRAZIL, COSTA RICA, PANAMA, CUBA, AND BARBADOS. SOME OF THESE SPECIES OF PLANTS MAY NOT BE TRUE HOSTS OF A. DISPERSUS. (HOST PLANTS ARE DEFINED AS THOSE ON WHICH THIS WHITEFLY CAN COMPLETE ONE OR MORE LIFE CYCLES.) CAREFULLY CONTROLLED REARING ON EACH RECORDED HOST WILL BE NECESSARY TO DETERMINE THE VALID HOSTS. AT TIMES POPULATIONS OF THIS WHITEFLY BECOME EXTREMELY ABUNDANT ON SOME HOST PLANTS AND "SPILL OVER" ONTO ADJACENT SPECIES OF PLANTS WHICH MAY NOT BE TRUE HOSTS AND EVEN ONTO NEARBY INANIMATE OBJECTS SUCH AS FENCE POSTS, BUILDINGS, AND AUTOMOBILES.

COMMON SEAGRAPE (COCCOLOBA UVIFERA), TROPICAL ALMOND (TERMINALIA CATAPPA), AND VARIOUS BROAD-LEAF PALMS PROVIDE EXCELLENT PROTECTION FOR THE WHITEFLY FROM WIND AND RAIN AND ARE PARTICULARLY GOOD HOSTS TO CHECK WHEN CONDUCTING A SURVEY FOR THIS WHITEFLY.

LIFE HISTORY AND HABITS: THE LIFE HISTORY OF THIS WHITEFLY HAS NOT BEEN DETERMINED. SEVERAL GENERATIONS PER YEAR OCCUR, AND ALL STAGES MAY BE FOUND THROUGHOUT THE YEAR.

IDENTIFICATION: A DETAILED DESCRIPTION OF THE SLIDE-MOUNTED PUPA, ON WHICH SPECIFIC IDENTIFICATION IS PRIMARILY BASED, IS GIVEN BY LOUISE M. RUSSELL (1965) IN HER ORIGINAL DESCRIPTION OF THE SPECIES, ALONG WITH DESCRIPTIONS OF THE FIRST-STAGE, SECOND-STAGE, AND THIRD-STAGE LARVAE AND BOTH MALE AND FEMALE ADULTS. THE ADULTS (FIG. 1) ARE SIMILAR IN APPEARANCE TO THOSE OF MANY OTHER SPECIES OF WHITEFLIES, BEING WHITE AND QUITE SMALL (2-3MM IN LENGTH) AND COATED WITH A FINE DUST-LIKE WAXY SECRETION. THEY SOMEWHAT RESEMBLE TINY MOTHS, AND BOTH SEXES ARE WINGED.

THE MATURE PUPA (FIG. 1, 2) BEARS A COPIOUS AMOUNT OF A WHITE COTTONY SECRETION EXTENDING UPWARD AND OUTWARD FROM THE DORSUM; SOME FLUFFY, SOME WAXY AND IN RIBBONS AS LONG AS, OR LONGER THAN, WIDTH OF BODY; A WHITE, GLASSLIKE WAXY ROD ARISING FROM EACH COMPOUND PORE, 3-4 TIMES LONGER THAN WIDTH OF BODY; A BAND OF WHITISH, TRANSLUCENT, STRIATED WAX EXTENDING FROM VENTRAL SUBMARGIN TO LEAF. NEARLY FLAT

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DORSALLY; YOUNG PUPAE FLAT VENTRALLY, BUT MATURE ONES WITH VENTRAL SURFACE SWOLLEN AND SURROUNDED BY A BAND OF WAX. COLORLESS OR YELLOWISH. MEMBRANOUS. NEARLY OVAL, 1-1.25MM LONG AND 0.75-0.90MM WIDE.

A FEW TO SEVERAL DOZEN TINY, ELLIPTICAL, WHITISH EGGS, ALONG WITH NUMEROUS TINY WAXY SECRETIONS, ARE DEPOSITED ON THE SURFACE OF A LEAF, USUALLY THE UNDERSIDE, IN IRREGULAR, WAVY LINES TYPICALLY FORMING A SOMEWHAT SPIRALING PATTERN (FIG. 3, 4).

REFERENCES:

RUSSELL, LOUISE M. 1965. A NEW SPECIES OF ALEURODICUS DOUGLAS AND TWO CLOSE RELATIVES (HOMOPTERA: ALEYRODIDAE). FLA. ENT. 48(1):47-55, 3 FIG.

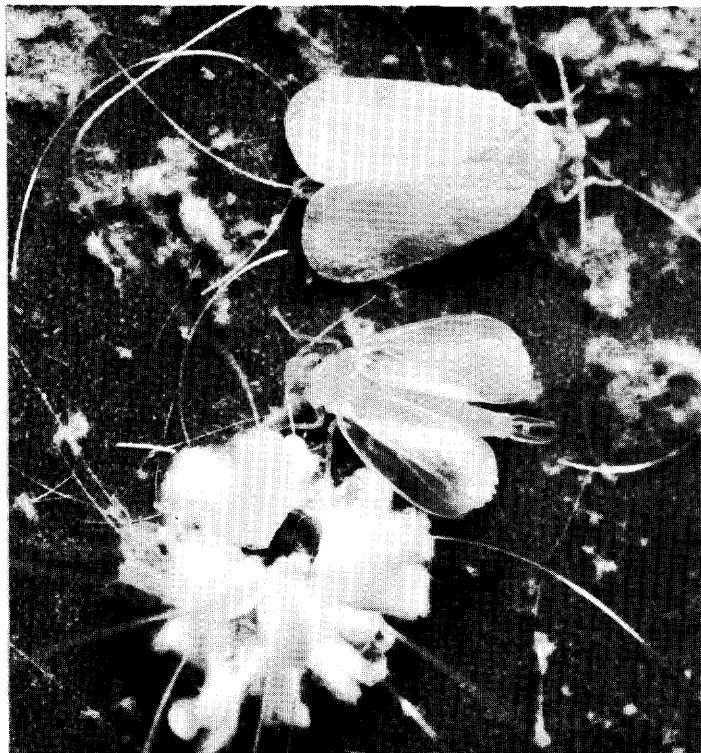


FIG. 1. A MATURE ADULT WHITEFLY (UPPER LEFT), A NEWLY EMERGED ADULT, AND ONE PUPA OF THE WHITEFLY, ALEURODICUS DISPERSUS RUSSELL.

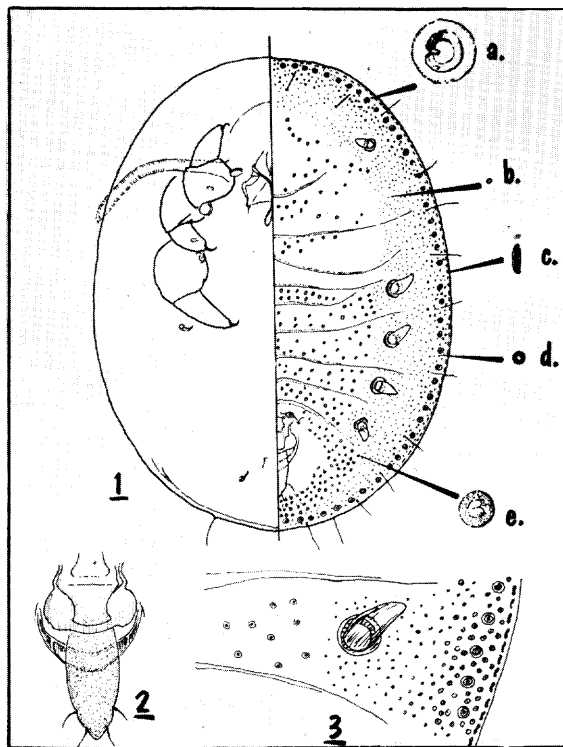


FIG. 2. (1) DORSAL AND VENTRAL HALVES OF BODY; A, DOUBLE-RIMMED PORE; B, MINUTE WIDE-RIMMED PORE; C, 8-SHAPED PORE; D, WIDE-RIMMED PORE; E, SEPTATE PORE. (2) VASIFORM ORIFICE. (3) PORTION OF DORSAL SURFACE OF ABDOMINAL SEGMENT 4.

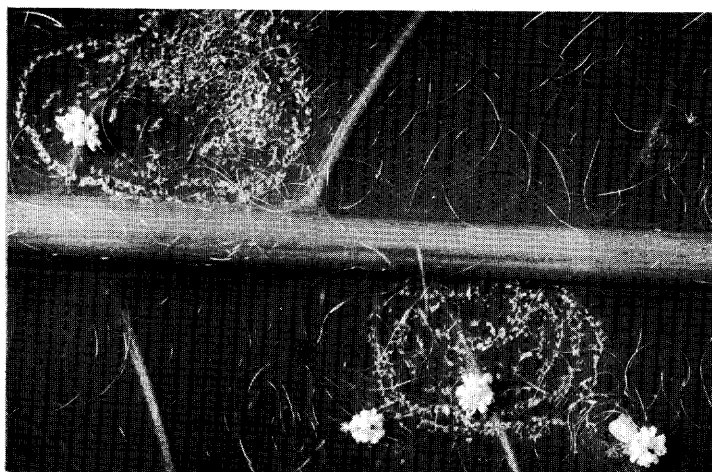


FIG. 3. CLOSE-UP VIEW OF THE UNUSUAL PATTERN OF WHITEFLY EGG DEPOSITS, ALONG WITH SEVERAL PUPAE. NOTE THE GLASSY FIBERS WHICH ARE ALSO CHARACTERISTIC OF HEAVY INFESTATIONS OF THIS WHITEFLY

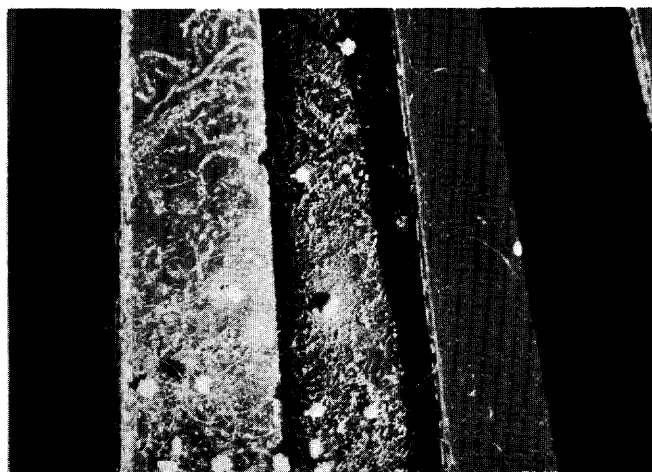


FIG. 4. THE FEMALE WHITEFLY DEPOSITS HER EGGS ON THE SURFACE OF PALM LEAVES IN A POWDERY SUBSTANCE WHICH IS EASILY BLOWN BY WIND. (PHOTO COMPLIMENTS OF DR. LOREN STEINER)