

SURVEY OF AUCHENORRHYNCHA  
(INSECTA: HOMOPTERA) ASSOCIATED WITH THE  
CANARY ISLAND DATE PALM IN SOUTHERN TEXAS

D. E. MEYERDIRK AND W. G. HART  
Citrus Insects Research, USDA, ARS  
Weslaco, TX 78596 USA

ABSTRACT

A survey of the Auchenorrhyncha (Insecta: Homoptera) associated with the Canary Island date palm *Phoenix canariensis* Hort. ex Chab., in southern Texas was conducted. Twenty-eight species were collected by various means: a yellow sticky trap, a trap consisting of a frond coated with a tacky material, vacuum samples, and visual collections. *Myndus crudus* Van Duzee, a suspected vector of lethal yellowing of coconut palms in Florida, was collected and is a new record for Texas. The most abundant species collected was *Oliarus acicus* Caldwell. *Oliarus aridus* Ball also was collected. All 3 species belong to the Family Cixiidae and are implicated as potential vectors of lethal yellowing of Canary Island date palms in Texas.

RESUMEN

El el sur de Tejas (USA) se hizo un reconocimiento para determinar la presencia de vectores potenciales del amarillamiento letal, enfermedad asociada con organismos micoplasmoides que infectan ciertas especies de palmeras. Empleando varios metodos, se encontraron 28 especies de insectos homópteros auquenorrincos asociados con la palmera detilera de las Islas Canarias, *Phoenix canariensis* Hort. ex Chab. Dichos métodos incluyeron la trampa amarilla pegajosa, la trampa al vacio, hojas de palmera con substancia pegajosa y colecciones manuales.

*Myndus crudus* Van Duzee, vector implicado en el amarillamiento letal de cocoteros en el estado de Florida, fue identificado en este estudio y representa un nuevo record para el estado de Tejas. La especie hallada con más abundancia fue *Oliarus acicus* pero tambien se identificó *Oliarus aridus* en las colecciones. Las tres especies descritas representan posibles vectores del amarillamiento letal de *P. canariensis* en Tejas.

---

A disease of the Canary Island date palm, *Phoenix canariensis* Hort. ex Chabaud, and the true date palm, *P. dactylifera* L., was first detected in the Lower Rio Grande Valley of Texas in mid-1978 (Miller et al. 1980). The disease at that time was concentrated in the Brownsville area, but within 4 years spread westward to La Feria, ca. 45 km, killing thousands of palms. The disease was first identified in Texas by McCoy et al. (1980) who has discussed the symptomology and etiology in detail. They described the probable causative agent, found in the phloem sieve elements, as a microplasma-like organism (MLO) believed to be the same agent known to cause lethal yellowing (LY) of palms. Death of the palm occurs ca. 4 months from the initial onset of the symptoms (Fig. 1).

LY has been reported to attack 26 palm species in Florida, including the economically important coconut palm, *Cocos nucifera* L. (Thomas 1979). This disease has been reported in Jamaica, Cuba, Cayman Island, Haiti,

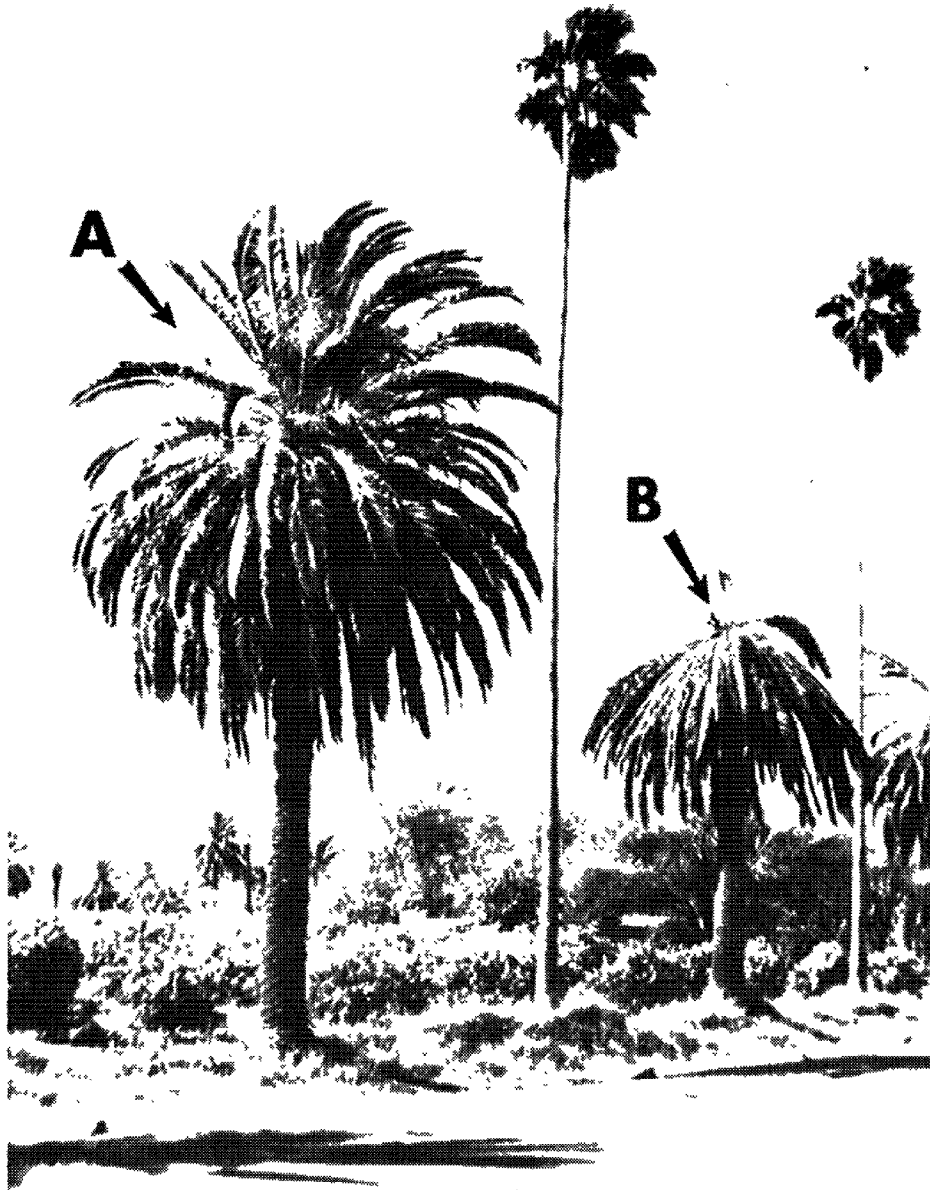


Fig. 1. Canary Island date palms—A: healthy; B: dying from lethal yellowing disease. The taller interspersed palms are *Washingtonia* sp. palms and appear resistant to the lethal yellowing disease.

Dominican Republic, Nassau (Bahama Islands), Togo, Ghana, and Cameroon (Leach 1946, Dollet et al. 1977, Romney 1972).

*Myndus crudus* Van Duzee, a planthopper, is a suspected insect vector of LY in coconut palms (Tsai 1975). Initial attempts to transmit the disease by the planthopper were not successful (Tsai 1977, 1980), but transmission of MLO to Manila palm, *Veitchia merrillii* (Becc.) H. E. More, was recently accomplished (Howard and Thomas 1980). *Myndus crudus* feeds as nymphs and adults on roots in the thatch layer of at least 8 different plant species, including St. Augustine grass and Bermuda grass (Eden-Green and Schuiling 1976, Tsai and Kirsch 1978). Adults also feed on many species of palm trees (Howard and Mead 1980, Reinert 1977). Howard (1981) has shown that *M. crudus* is attracted to ornamental date palms as well as to coconut palms in Florida.

*Myndus crudus* was reportedly abundant on coconut palms in Jamaica (Schuiling and Johnson 1973) and in Florida (Woodiel 1976). The geographical distribution of *M. crudus* is extensive in the Neotropics and includes northern South America, Central America, Mexico, West Indies, and the United States which was restricted to Florida alone (Kramer 1979).

The purpose of this investigation was to survey the Auchenorrhyncha associated with the Canary Island date palm in the LY affected area of Texas in search of potential vectors of this disease.

#### METHODS AND MATERIALS

Past survey techniques for collecting *M. crudus* have included the use of rotary flight traps (Woodiel and Tsai 1978) and use of adhesives applied either to the surface of palm leaves (Howard and Hutchinson 1977), or to plastic squares fixed to the leaves (Howard 1980). In this project several traps were used. A yellow sticky trap coated with Tack Trap®, as described by Harlan et al. (1979), was modified by adding a fluorescent yellow pigment to the plastic. These traps were placed 5-7 m high within the crowns of Canary Island date palms with a 6.1 m extension pole equipped with a release clip (Fig. 2). Traps were fastened to a wire clip designed to snap over the palm frond's mid rib near the base of the frond and removed with a hook attached to another extension pole. Fourteen trap sites, ca. 8 km apart, were selected along Expressway 83. This highway served as a transect line through the Lower Rio Grande Valley, extending ca. 97 km from Brownsville to McAllen, TX. The Canary Island date palm usually had been interplanted with *Washingtonia* spp. Four to 5 trees had a trap at each site totaling 48 trees at 10 sites.

The second trap was a cut, mature date palm frond, 1 m long, coated with Tack Trap®. A rope tied to the base of the frond allowed it to be hoisted up the tree, using a frond clip for a pulley. The frond was secured within the center of the tree canopy. Two traps/site were hung in separate trees at 5 different locations within heavily diseased areas of the Valley. Traps were changed every 2 weeks from February through July, 1980.

Live specimens also were collected on small palms 0.6-2.0 m in trunk height either with aspirators during visual survey or with a D-Vac® suction sampler.

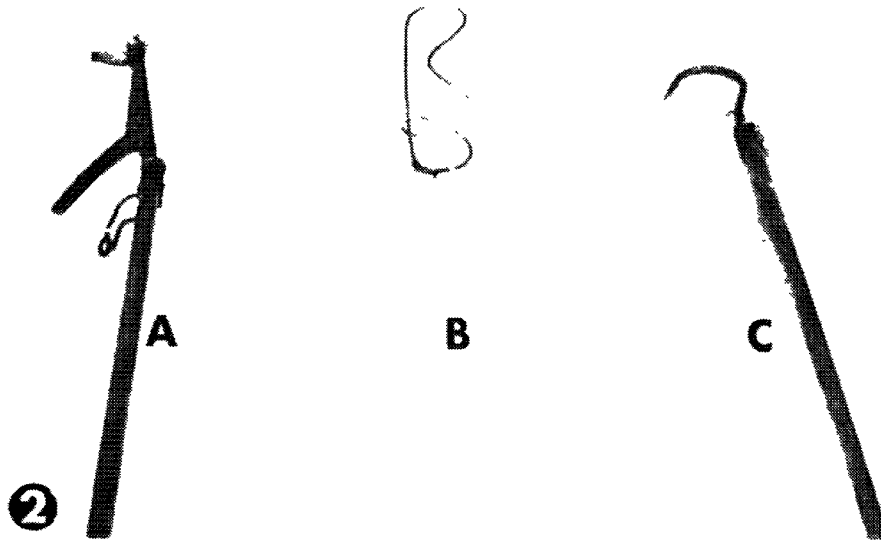


Fig. 2. Sampling equipment. A: extension pole with clamp and release latch used for trap placement; B: yellow sticky trap attached to wire clip; and C: extension pole with hook for trap removal.

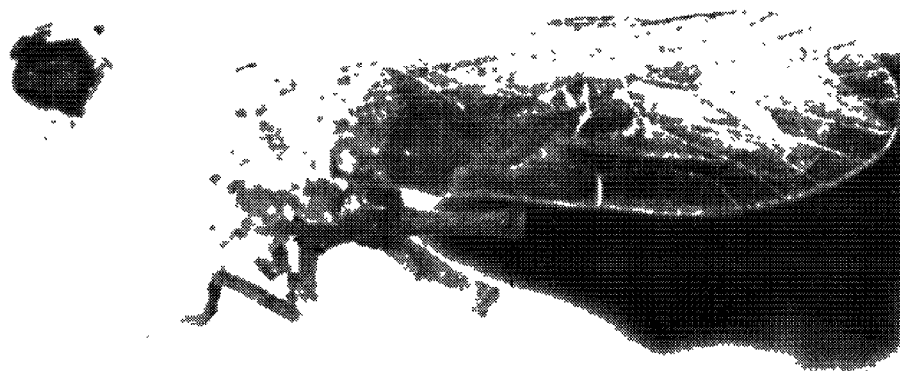


Fig. 3. *Myndus crudus* Van Duzee, male.

TABLE 1. AUCHENORRHYNCHA (INSECTA: HOMOPTERA) TRAPPED OR VISUALLY COLLECTED FROM CANARY ISLAND DATE PALMS IN THE LOWER RIO GRANDE VALLEY OF TEXAS.

Family	Species
Cixiidae	<i>Myndus crudus</i> Van Duzee
	<i>Oliarus acicus</i> Caldwell
	<i>Oliarus aridus</i> Ball
Delphacidae	<i>Delphacodes</i> sp.
Cicadellidae	<i>Aceratagallia</i> sp.
	<i>Agallia</i> sp.
	<i>Balclutha hebe</i> (Kirkaldy)
	<i>Carneocephala sagittifera</i> (Uhler)
	<i>Draeculacephala producta</i> (Walker)
	<i>Empoasca</i> sp.
	<i>Exitianus exitiosus</i> (Uhler)
	<i>Graminella</i> sp.
	<i>Graminella sonora</i> (Ball)
	<i>Graphocephala versuta</i> (Say)
	<i>Limotettix</i> sp.
	<i>Macrosteles fascifrons</i> (Stål)
	<i>Norvellina</i> sp.
	<i>Ollarianus</i> sp.
	<i>Osbornellus</i> sp.
	<i>Opsius stactogalus</i> Fieber
	<i>Paraphlepsius</i> sp.
	<i>Planicephalus flavocostatus</i> (Van Duzee)
	<i>Ponana</i> sp.
	<i>Scaphytopius</i> sp.
<i>Stragania</i> sp.	
<i>Stirellus bicolor</i> (Van Duzee)	
<i>Xerophloea viridis</i> (Fab.)	
<i>Xestocephalus</i> sp.	

## RESULTS AND DISCUSSION

Twenty-eight species of Auchenorrhyncha, belonging to the families Cixiidae, Delphacidae and Cicadellidae, were collected and identified (Table 1). Most of the species may not have been feeding or ovipositing on the Canary Island date palm, but rather were flying through the trap area, or seeking shelter. *Myndus crudus* (Fig. 3) and *Oliarus acicus* Caldwell (Fig. 4) were the only 2 species observed piercing the plant as if in a feeding behavior.

The collection of *M. crudus* in Texas is a new state record, although it occurs in Veracruz, Mexico (Kramer 1979), and Florida (Howard and Thomas 1980). How the disease was introduced into Texas is not known. It may have been introduced by means of importing infected palms, or the accidental introduction of infected *M. crudus*, or another vector.

*Myndus crudus* has been found at only one of the collection sites in San Benito at extremely low population levels. Only 1 to 3 individuals could be found at any one time on 3 small ornamental date palms alongside an arroyo.

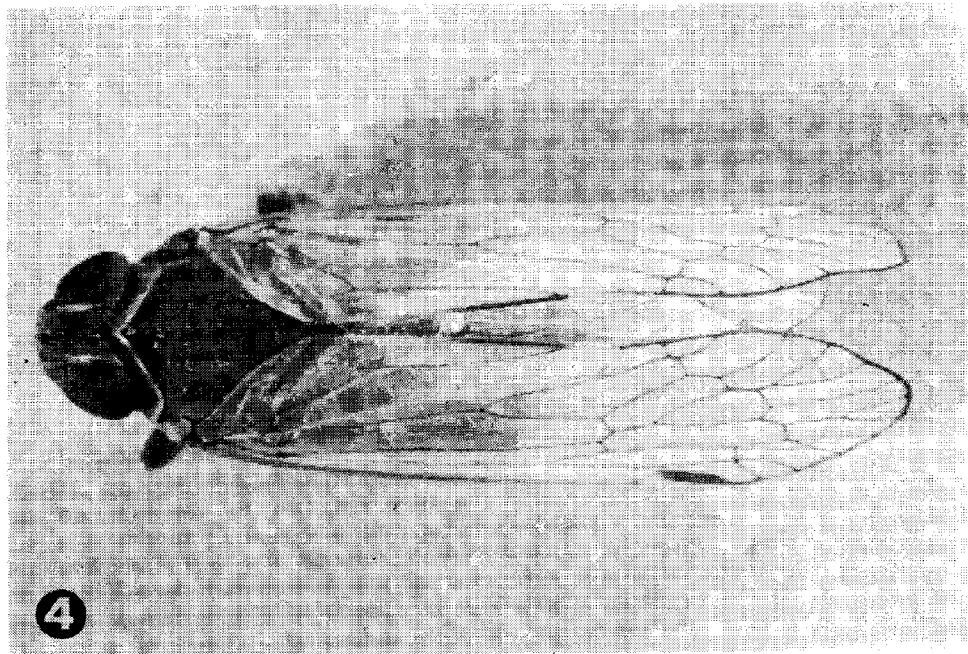


Fig. 4. *Oliarus acicus* Caldwell, male.

This limited distribution of this planthopper is puzzling in view of the rapid spread of the disease over 64 km during the last few years. Possibly, LY was spread several years ago, when populations of *M. crudus* were more abundant and symptoms were not expressed until recently, or another vector may be present. The incubation period of LY in young coconut palms in

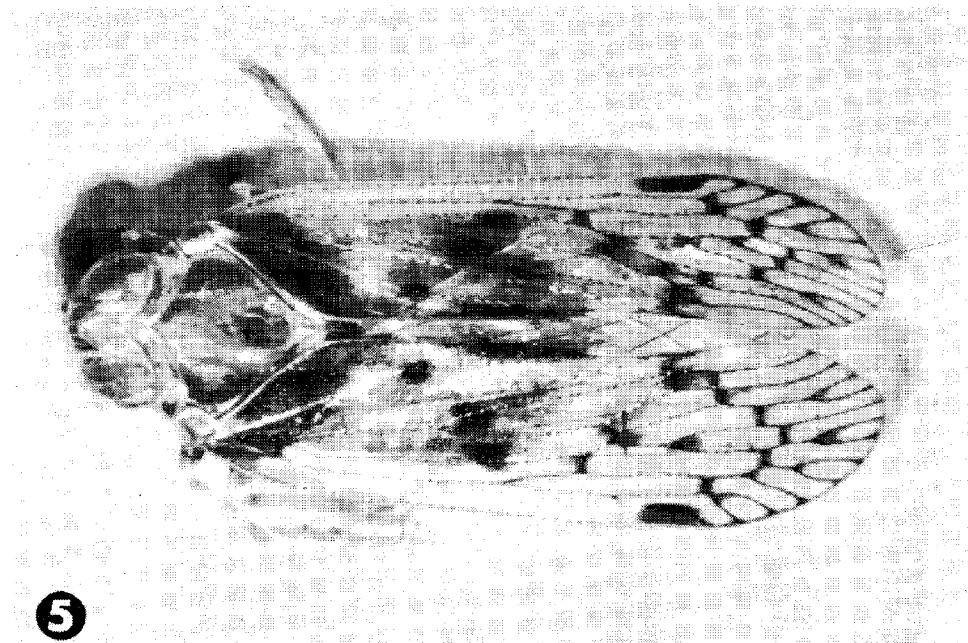


Fig. 5. *Oliarus aridus* Ball, female.

Jamaica is 114-191 days (Dabek 1975). Romney (1972) indicated an incubation period for LY in coconuts in Jamaica of 230-450 days. The incubation period in the date palm has not yet been determined.

Species in the genus *Oliarus* are known vectors of MLO related diseases. *Oliarus atkinsoni* Myers is a reported vector of "yellow leaf" disease of New Zealand flax, *Phormium tenax* Forst., (Cumber 1952) which is a MLO associated disease (Ushiyama et al. 1969). *Oliarus acicus* was the most abundant species found throughout the diseased area in the Valley. The range of *O. acicus* Caldwell is the southwestern border area of the United States and parts of northern Mexico (Mead 1968). Only a few specimens of *Oliarus aridus* Ball (Fig. 5) were visually found and aspirated at 2 trap locations in south Texas. *Oliarus acicus*, *O. aridus* and *M. crudus* belong to the Family Cixiidae which contains species which are commonly found feeding in the phloem tissue where the MLO persists. Future investigations should be directed toward determining whether any of these 3 species are true vectors of LY of the Canary Island date palm in Texas. The MLO agent has not yet been isolated and cultured in the laboratory from the vector or plant which makes it extremely difficult to confirm the vector-plant relationships of these planthoppers.

#### ACKNOWLEDGEMENTS

We gratefully appreciate the identification of the Auchenorrhyncha by Dr. J. P. Kramer, Insect Identification and Beneficial Insect Introduction Institute, USDA, Agricultural Research Center, Beltsville, MD; and Dr. F. W. Mead, Florida Department of Agriculture, Gainesville. Some Auchenorrhyncha were not identified to species because of their poor condition after being removed from traps, lack of numbers or lack of males. We thank Drs. J. H. Tsai and F. W. Howard, University of Florida, Agricultural Research Center, Fort Lauderdale, for their assistance and useful suggestions. Mention of proprietary products does not constitute endorsement by the USDA.

#### REFERENCES CITED

- CUMBER, R. A. 1952. Studies on *Oliarus atkinsoni* Myers (Hem: Cixiidae), vector of the "yellow-leaf" disease of *Phormium tenax* Forst. New Zealand J. Sci. Technol. 34: 92-8.
- DABEK, A. J. 1975. The incubation period, rate of transmission and effect on growth of coconut lethal yellowing disease in Jamaica. Phytopath. Z. 84: 1-9.
- DOLLET, M., J. GIANOTTI, J. L. RENARD, and S. K. GHOSH. 1977. Etude d'un jaunissement léthal des cocotiers au Cameroun: la maladie de Kribi. Observaciones d'organismes de type mycoplasmes. Oléagineux. 32: 317-22.
- EDEN-GREEN, S. J., AND M. SCHULING. 1976. "Root acquisition" transmission tests with *Haplaxius crudus* (Hom: Cixiidae) and *Proarna hilaris* (Hom: Cicadidae). (Abstr.) Principes 20: 66.
- HARLAN, D. P., W. G. HART, C. A. GARCIA, AND J. CABALLERO. 1979. A yellow coffee lid trap for the citrus blackfly, *Aleurocanthus woglumi* Ashby. Southwest. Ent. 4: 125-6.
- HOWARD, F. W. 1980. Population densities of *Myndus crudus* Van Duzee (Homoptera: Cixiidae) in relation to coconut lethal yellowing distribution in Florida. Principes 24: 174-8.

- . 1981. Attractiveness of date and coconut palms to *Myndus crudus* and other homopterans. Proc. Florida State Hort. Soc. 93: 199-201.
- , AND G. A. HUTCHINSON. 1977. Tanglefoot for collecting Homoptera associated with palms, and plastic tubes for specimen storage. Florida Ent. 60: 280.
- , AND F. W. MEAD. 1980. A survey of Auchenorrhyncha (Insecta: Homoptera) associated with palms in southern Florida. Trop. Agric. (Trinidad) 57: 145-53.
- , AND D. L. THOMAS. 1980. Transmission of palm lethal decline to *Veitchia merrillii* by a planthopper, *Myndus crudus*. J. Econ. Ent. 73: 715-7.
- KRAMER, J. P. 1979. Taxonomic study of the planthopper genus *Myndus* in the Americas (Homoptera: Fulgoroidea: Cixiidae). Trans. American Ent. Soc. 105: 301-89.
- LEACH, R. 1946. The unknown disease of the coconut palm in Jamaica. Trop. Agric. (Trinidad) 23: 50-60.
- MCCOY, R. E., M. E. MILLER, AND D. S. WILLIAMS. 1980. Lethal yellowing in Texas Phoenix palms. Principes 24: 179-80.
- MEAD, F. W. 1968. A revision of the genus *Oliarus* in North America, north of Mexico (Homoptera: Cixiidae) Ph.D. Thesis, North Carolina State Univ., Raleigh, NC, 398 p.
- MILLER, M. E., N. P. MAXWELL, AND J. AMADOR. 1980. Lethal decline of *Phoenix canariensis* and *P. dactylifera* in the Rio Grande Valley. J. Rio Grande Valley Hort. Soc. 34: 89-95.
- REINERT, J. A. 1977. Field biology and control of *Haplaxius crudus* on St. Augustine grass and Christmas palm. J. Econ. Ent. 70: 54-6.
- . 1980. Phenology and density of *Haplaxius crudus* (Homoptera: Cixiidae) on three southern turfgrasses. Environ. Ent. 9: 13-5.
- ROMNEY, D. H. 1972. Past studies on and present status of lethal yellowing disease of coconuts. PANS 18: 386-94.
- SCHULING, M., AND C. G. JOHNSON. 1973. Current attempts to find a vector associated with lethal yellowing disease of coconut. (Abstr.) Principes 17: 156.
- THOMAS, D. L. 1979. Mycoplasma-like bodies associated with lethal declines of palms in Florida. Phytopath. 69: 928-34.
- TSAI, J. H. 1975. Transmission studies of three suspected insect vectors of lethal yellowing of coconut palm. FAO Plant Prot. Bull. 23: 140-5.
- . 1977. Attempts to transmit lethal yellowing of coconut palms by the planthopper, *Haplaxius crudus*. Plant Dis. Rep. 61: 304-7.
- . 1980. Lethal yellowing of coconut palm: Search for a vector. Pages 176-200 In K. F. Harris and K. Maramorosch, eds. Vectors of Plant Pathogens. Academic Press, New York.
- , AND O. H. KIRSCH. 1978. Bionomics of *Haplaxius crudus* (Homoptera: Cixiidae). Environ. Ent. 7: 305-8.
- USHIYAMA, R., S. BULLIVANT, AND R. E. F. MATTHEWS. 1969. A mycoplasma-like organism associated with *Phormium* yellow leaf disease. New Zealand J. Bot. 7: 363-71.
- WOODIEL, N. L. 1976. Insects associated with the coconut palm in South Florida. (Abstr.) Principes 20: 66-7.
- , AND J. H. TSAI. 1978. A rotary flight trap used for sampling *Haplaxius crudus* (Homoptera: Cixiidae) in coconut groves. J. New York Ent. Soc. 86: 37-44.



