

Myndus* spp, (Fulgoromorpha, Cixiidae) public enemy number one of the coconut palm, *Cocos nucifera

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The coconut palm (*Cocos nucifera* L.), an often crucial crop for small landholders, plays a major role in the intertropical farming system. This plant is considered in several countries as one of the nature's most useful gifts to man, a primary source of drink, food, and shelter. Every part of coconut is utilized for some human need. It is why coconut palm is called the "tree of life" or the "tree with 100 uses." Contrary to what is claimed by those marketing competing edible oils, the properties of coconut oil imparts many physiological benefits for those struggling to overcome obesity, heart disease, and other disorders. Coconut palms have become strongly associated with tropical tourism. Posters show white sandy beaches, with a clear, transparent sea ... and coconut palms. Unfortunately, the parasite pressure exerted on this crop is a threat to its sustainability and sometimes leads to its disappearance. Various pathogens have been identified that could be responsible for different diseases that have long been classed as of "unknown etiology": viroids, viruses, phytoplasmas (Mollicutes), and *Phytomonas* (Trypanosomatidae). The discovery of the role of insects as vectors of several for these disorders has been important landmarks of the end of the 20th century.

Insect vectors

The first insect vectors were discovered in West Africa in the years 1979-1982, mainly thanks to the strategy of insect introductions *en masse* in cages (Dollet, 1992). The discovery of *Recilia mica* Kramer (Homoptera, Cicadellidae, Deltocephalinae) as the vector for blast disease, which is the main nursery disease of oil palm and coconut and presumed to be caused by a phytoplasma, was the first success opening the doors for several others (Desmier De Chenon 1979). *R. mica*, vector of blast, also transmits phytoplasma to periwinkle (Dollet 1980). Then two species of *Sogatella* (Delphacidae)- *S. Kolophon* Kirkaldi and *S. cubana* Crawford were shown to be vectors for Dry bud rot, another nursery disease of coconut and oil palm, presumed to be viral (Julia 1979, Julia and Mariau, 1982). During 1980-1983 experiments provided evidence that *Myndus crudus* Van Duzee (Homoptera: Cixiidae) was the vector of the causal agent of Coconut lethal yellowing (LY) in Florida (Howard and Thomas 1980, Howard et al., 1983; 1984). LY is the most devastating disorder of coconut in the Caribbean. Besides coconut palm, LY also affects more than 35 other palm species. The disease was first reported in the Cayman Islands in 1834; by 1980 LY had killed over 7 million coconut palms in Jamaica alone. *M. crudus* is known from northern South America (Brazil), Central America; Mexico, and several islands of the Caribbean as far south as Honduras and Dominican Republic. However the southern limits of LY are the Dominican Republic and Honduras, and experimental demonstration of the LY transmission by *Myndus* was successful only in Florida.

Another *Myndus*, species –*M. taffini* – is prohibiting any new introduction of coconut germplasm in the Pacific island of Vanuatu. *M. taffini* Bonfils is the vector of the Coconut Foliar Decay Virus (CFDV), a disease killing all the introduced coconut varieties in Vanuatu (Julia, 1982, Julia et al. 1985). Only the local variety, the "Vanuatu Tall" is tolerant to the disease, caused by a small DNA virus (Randles et al. 1986, Randles and Hanold, 1989). *M. taffini* appears to be endemic to Vanuatu. An additional *Myndus* species, *M. adiopodoumeensis* Synave, is suspected as the vector for a lethal yellowing disease (LYD) in West Africa (known as Cape Saint Paul Wilt in Ghana and Kaincopé disease in Togo) (Dery et al. 1996.). But its role in the propagation of the LYD has not yet been proven. In East Africa, similar LYD occurs in Kenya, Tanzania and Mozambique. Although the phytoplasma associated with LYD in Mozambique is very similar genetically to those found in LYD-affected palms in Ghana, *M. adiopodoumeensis* has not been found in Mozambique nor in Tanzania.

Hartrot, a disease of coconut (called Marchitez when affecting oil palm) has the same syndrome as Lethal Yellowing Disease in the region stretching between Peru/Brazil and Honduras through Trinidad. Phloem-restricted *Phytomonas* spp. (flagellate protozoa, Trypanosomatidae) are responsible for this syndrome (Dollet 1984, 2001). Different species of *Lincus* Stal (Hemiptera: Pentatomidae, Discocephalinae) are vectors of these trypanosomatids (Desmier De Chenon 1984, Louise et al. 1986, Dollet et al. 1993)

Discussion.

Different *Myndus* species are associated with the propagation of very severe wilt diseases of coconut. But their role was demonstrated so far only in Florida. Why? Is the percentage of infectious insects very low? Are there distinctive taxa (sibling species, subspecies?) of what are now considered "*Myndus crudus*"? Is there another vector? Could *M. crudus* transmit CFD virus? And can *M. taffini* transmit LY? What are exactly the similarities between *Myndus* spp and *Lincus* spp, both phloem feeders on coconut palm? What are the similarities between LY Phytoplasma (prokaryote), and Hartrot *Phytomonas* (eukaryote), which both multiply in coconut sap?

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