

Acacia Catechu), in *Supplementum Plantarum* 439. 1781.

The International Code of Botanical Nomenclature permits the correction of errors under provisions of Article 73. E. D. Merrill interpreted the spelling *Cathecu* as an error in his *An Interpretation of Rumphius's Herbarium Amboinense* 123, 1917. The evidence supports Merrill's conclusion and the correction made by Murray. *Areca Catechu*, therefore, may be considered the correct name for the betel palm.

The generic name *Areca*, (ár ee ka, a rée ka) comes from the vernacular. Most dictionaries ascribe it to the Portu-

guese as *Areca* or *Arecca*, derived from the Malay, Kanarese, or Tamil names *adekka*, *adike*, and *adaikay*. Wittstein (*Etymologisch-botanisches Handwörterbuch*, 1852) derives it from *Areec*, said to be the name in Malabar for an old tree (*Royal Horticultural Society Dictionary of Gardening*, 1951). Gowda, in the place previously mentioned, says that the name is of South Indian origin. Among the Nairs the word *Areca* means "cavalier" and in Kannada, one of the major languages of the area, the betel palm is called the *adike* tree, the nut *adike*. Whether *Areca* is derived from *adike* or vice versa he is not sure.

H.E.M.

Diseases of the Coconut Palm*

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II. BRONZE LEAF WILT

The second disease to be considered in this series of articles on the diseases of the coconut palm is bronze leaf wilt which has not been reported from the United States. The symptoms attributed to this disease are very similar to those described for the lethal yellowing or unknown disease. The disease was reported from the Island of Trinidad more than thirty years ago (1, 2). It was classified under the general group of bud rots until Nowell, according to Briton-Jones (2), separated the bud rots into three distinct diseases. In one, still called bud rot, the rotting of the bud was primary

and attributed to infection by the fungus *Phytophthora palmivora*. In the other two, the rotting of the bud was secondary. The second disease was termed red ring and attributed to infection by the nema *Aphelenchoides cocophilus*. The third was due to what Nowell termed "wilt" and for which he could not determine a causal organism.

The symptoms of the disease to which the name bronze leaf wilt was applied by Briton-Jones (2, 3) are similar to those of the lethal yellowing disease, which makes it difficult to differentiate the two diseases.

The lowest three leaves of an apparently healthy palm may start to turn

*For the previous article in this series, see PRINCIPES, 3:5, 1959. Florida Agricultural Experiment Station Journal Series, No. 845.



24. Coconut palm in Trinidad exhibiting symptoms attributed to the bronze leaf wilt disease. Note presence of some fruit still on the tree.

yellowish-bronze from the tip backwards. The tips of the succeeding younger leaves start to turn yellow and the extent of the yellowing increases with the age of the leaf. Figure 24 illustrates a diseased palm in Trinidad in advanced stages of yellowing. The lower fronds on this palm are almost completely yellowish-bronze. The heart leaves have not started to change color, but the heart of the palm has started to decay. According to Bain (1) the rot extends into the cabbage and may develop to a considerable degree before the heart leaves change color. At a later stage the heart leaves tend to wilt. The fronds become greyish-brown and may collapse at the base. The diseased palm in Figure 24 has not shed all its older

fruits. This is one point of difference between lethal yellowing and the bronze leaf wilt disease (6). In lethal yellowing usually all the fruits are shed except in cases where the symptoms are unilateral (i.e., on one side only) (5).

Figure 25 illustrates several palms in Trinidad in advanced stages of bronze leaf wilt. The heart fronds of the palm to the right have collapsed and the remaining fronds are yellowish-bronze. The lower fronds on the palm in the center are yellowish-bronze, but the heart fronds have not yet completely changed color. The heart fronds are greyish-green and tend to hang or wilt at the tips. This symptom is also a distinguishing character between bronze leaf wilt and lethal yellowing. In the case of lethal yellowing, the fronds usually remain turgid until the heart is dead (6). The bronze leaf wilt disease usually seems to affect only older palms, while lethal yellowing has been reported to affect trees of all ages. Palms of the tall variety replanted in areas affected by lethal yellowing usually succumb again within two to three years (6). At present no information is available on the effect of bronze leaf wilt disease on palms of the Malayan dwarf variety.

The etiology or cause of the bronze leaf wilt disease has not been conclusively proved, although several hypotheses have been proposed. Many attempts have failed to show nemas or fungal or bacterial organisms associated with the disease (2, 3, 4). To quote from Britton-Jones (2), the following is his conclusion with regard to the etiology of bronze leaf wilt disease: "The only alternative explanation of the pathological condition of the plant is that it develops in response to external physiological factors. Whether or not an organism is associated with the disease is



25. Coconut palms in advanced stages of the bronze leaf wilt disease. Note fronds hanging over or wilting at the tips.

not known but the writer's observations in Trinidad and St. Lucia suggest very strongly that the *prima causa* is a soil factor. The very definite correlation between the lack of drainage and the incidence of the disease indicates that the organism, if there is one, is secondary. The trouble might be described as 'physiological drought' since it occurs on badly drained land and on land subject to desiccation during the dry season. Excessive soil moisture and too little moisture have the same physiological effect on the coconut palm as on a good many other plants."

Bain (1) reported, after an extensive

investigation of the problem, that the particular factor to be stressed with this disease is a water deficiency in the plant. He concluded that the differences in nutrient status should be considered as contributory factors. Bain (1) considers the bronze leaf wilt disease as a physiological die-back resulting from a water deficiency in the plant. He explains the pattern of disease spread as a result of the exposure of the palm to the wind, which produces high transpiration in the leaves. This, he concludes, causes a physiological die-back that results in the death of the palm. The palm, being a monocotyledonous plant, has only one

bud, and death of this growing point results in death of the palm (1).

Recovery from bronze leaf wilt may occur if affected palms are watered in the early stages of the disease (1, 4). Recovery is not necessarily permanent and the condition of palms may fluctuate with weather conditions (4). A satisfactory explanation has not been proposed to account for the fact that some palms start to show symptoms during the rainy season (4). This recovery is another difference between the bronze leaf wilt disease and lethal yellowing, where recovery has never been observed (7).

Bronze leaf wilt was first described from the Caribbean area. Diseases very similar in symptom expression, and thought to be identical with bronze leaf wilt, have since been reported from Africa. In Nigeria and Ghana the disease has been termed awka wilt and Cape St. Paul wilt, respectively (6). If the bronze leaf wilt disease is caused by the physical condition of the soil, then to have the same disease occur in such varied locations, on many different soil types, and under different environmental conditions induced by the same soil conditions seems highly speculative (6). It thus seems that factors other than physiological drought are needed to explain the cause of bronze leaf wilt.

Adequate control measures are not available. Briton-Jones (4) recommended the use of effective drainage and wider intervals of planting. Unfortunately, information regarding the practicality of such measures is not available.

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Seed Bank News

The Society's Seed Bank is interested in obtaining seeds of *Rhapidophyllum hystrix* for future distribution. Will anyone who can supply such seeds please write the Executive Secretary? Another listing of seeds available through the Seed Bank will appear in the July issue.