

# Occurrence of Coconut 'Lixas' in Brazilian Native Palms in the Northeastern Coastal Plain

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Some native palms of Brazil may serve as a reservoir for these fungal diseases of coconuts.

Coconut (*Cocos nucifera* L.) was first introduced into Brazil by the Portuguese in 1553 and today is widely grown along the coastal areas of the northeastern region, which provides 92 per cent of national production. In more recent years, there is a vast interest for growing dwarf coconut trees for water utilization, only in São Paulo State a daily consumption of 100 000 tender fruits has been estimated. On average, yearly production of coconut is 3,377 fruits/ha (Cuenca 1994), a consequence of irregular rainfall distribution, low yielding varieties and attack by a number of insect pests and diseases.

Two leaf diseases are responsible for considerable losses in different growing regions of Brazil: *lixa pequena* or small verrucosis, caused by *Phyllachora torrendiella* Subileau [= *Catacauma torrendiella* Batista (Batista, 1948 and Subileau, 1993)] and *lixa grande* or large verrucosis, caused by *Sphaerodothis acrocomiae* (Montagne) von Arx & Muller [= *Coccostroma palmicola* (Speg) von Arx and Muller (Joly 1961)]. Lesions are diamond-shaped with a long axis parallel with the venation of the leaflets, having a crusty, black, wart-like texture and

measuring 4–6 mm × 2–4 mm for *P. torrendiella* and 5–7 mm × 3–4 mm for *S. acrocomiae*, which has brown stromata. A chlorotic yellow halo surrounds the infected spot and the disease incidence can be quite high, such that large areas of tissue become necrotic.

There are two other species of *Catacauma* reported to occur in palm trees, *C. mucosum* in *Butia*, *Cocos* and *Syagrus* spp., while *Acoelorrhaphe wrighii*, *Livistona chinensis*, *Sabal causiarum*, *S. etonia*, *S. mexicana*, *S. minor*, *S. palmetto*, *S. umbraculifera*, *Syagrus romanzoffiana* and *Washingtonia robusta* have been reported as hosts of *Catacauma sabal* (Chase & Broschat 1991). Joly (1961) reported the fungus *S. acrocomiae* in *Acrocomia aculeata* but this palm is the only one reported as host for *lixa grande* disease.

Since coconut was introduced from the Old World and the two fungi are obligate parasites, our work was to discover which palm species native to Brazil are natural reservoirs, to compare the distribution of the two diseases with the natural occurrence of the susceptible palm species, and also to find different species of *Phyllachora* or *Sphaerodothis*.



1. *Attalea funifera*.



2. *Syagrus coronata*.

### Field surveys

Field trips were carried out in the states of Sergipe, Alagoas, Pernambuco and Bahia. Leaves were collected, samples of the material found infected by the fungi were placed under the microscope and fungal structures were carefully examined. Surveys were conducted mainly during the rainy season. *Attalea funifera*, known as Piassava Palm, present in the states of Alagoas, Bahia and Sergipe, was collected in Piaçabuçu County (Al) and Itaporanga d'Ajuda (Se). This palm tree has a stem around 15m and the leaves are long, the crown being funnel-shaped (Figure 1). The fronds serve as roofing material and the fiber used for broom manufacture.

Two *Syagrus* species were collected, 1. the ubiquitous *Syagrus coronata* (Fig. 2). It is known as *arikury*, *ouricuri*, *licury*, or *licurizeiro* palm and 2. *S. schizophylla* (*coco babão* or *arycurioba*). *Arikury* palm has potential for landscaping in regions with low rainfall, as it occurs in a region of transition between the forest and the bush land. The fronds of the palm provide material for roofing, hats and other handicrafts. The mesocarp is edible and the leaves yields wax. *Syagrus schizophylla* is found in

sandy soil near the seashore, and can be used as an ornamental and has a sweet mesocarp which can be eaten (Fig. 3).

*Acrocomia intumescens* was collected from the State of Pernambuco, where it occurs in forest; its fruits are used as a source of oil (from the endosperm) and the mesocarp is edible.

Samples of *Allagoptera brevicalyx*, known as *caxandó* or *buri-da-praia*, were found in the County of Itaporanga d'Ajuda, Pirambu and Estância. It is a small acaulescent palm that occurs on loose sand on beaches, on dunes and in scrub woodlands (Uhl & Dransfield 1987). In Brazil it occurs mainly in the States of Bahia and Sergipe, and can be used for landscaping. The sweet fruits are appreciated by small animals (Fig. 4).

*Bactris ferruginea* (*Mané-veio*) was collected in Sergipe and Bahia, it occurs in the coastal forest land, and has a potential for landscaping; the leaves yields a good fiber and the fruits can be eaten.

### Disease distribution

The surveys indicated differences in the occurrence of *lixas* in the different palm species and are

Table 1. Occurrence of the different *lixas* in the native palm trees of the northeastern coastal plain region of Brazil, with the natural distribution of Palm species in the country.

| Species                       | <i>P. torrendiella</i> | <i>S. acrocomiae</i> | Distribution   |
|-------------------------------|------------------------|----------------------|----------------|
| <i>Acrocomia intumescens</i>  | absent                 | absent               | AL,CE,PB,PE    |
| <i>Allagoptera brevicalyx</i> | present                | absent               | BA, SE         |
| <i>Attalea funifera</i>       | absent                 | present              | Al, BA,SE      |
| <i>Bactris ferruginea</i>     | present                |                      | AL,BA,PB,PE,SE |
| <i>Syagrus coronata</i>       | present                | absent               | AL,SE,BA,PE,MG |
| <i>Syagrus schizophylla</i> * | absent                 | absent               | AL,BA,ES,PE,SE |

\* This palm species was found to be host to another *Phyllachora*, which produces similar symptoms to *lixa pequena*.

reported in Table 1; also the distribution of the palm species can be seen in the map of Brazil (Figure 5). *Acrocomia intumescens* was the only species found to be free from both fungi.

*Lixa pequena* (*Phyllachora torrendiella*) was the fungus with the wider host range. It was collected from *Syagrus coronata*, *Allagoptera brevicalyx* and *Bactris ferruginea*.

The first symptoms of this disease are small black, charcoal-like fruiting bodies formed superficially on the leaflets, midribs or even on the fruits. This formation, known as stroma is either found

### 3. *Syagrus schizophylla*.



isolated, in lines, or in a diamond shape, the number of the formations is usually very high and difficult to count (Fig.6). Later, the plant tissue around the stroma forms brown, necrotic lesions, which enlarge to about 2 × 15 cm. Numerous brown areas coalesce, the leaflets become necrotic and the whole leaf collapses. *Lixa pequena* is widespread in the different coconut regions from the Amazon area to the State of Rio de Janeiro (Renard, 1988 and Warwick, 1989).

*Sphaerodothis acrocomiae* was found only in *Attalea funifera*. As a coconut disease it occurs in a most restricted area along the Atlantic Ocean (eight States), while *P. torrendiella* occurs from Pará to São Paulo State (17 States) (Fig. 5, 8). The stromata of this fungus are brown, larger and more superficial than in the previous fungus described. The fungus has a claviform ascus and the spores, brown when mature, are surrounded by mucus.

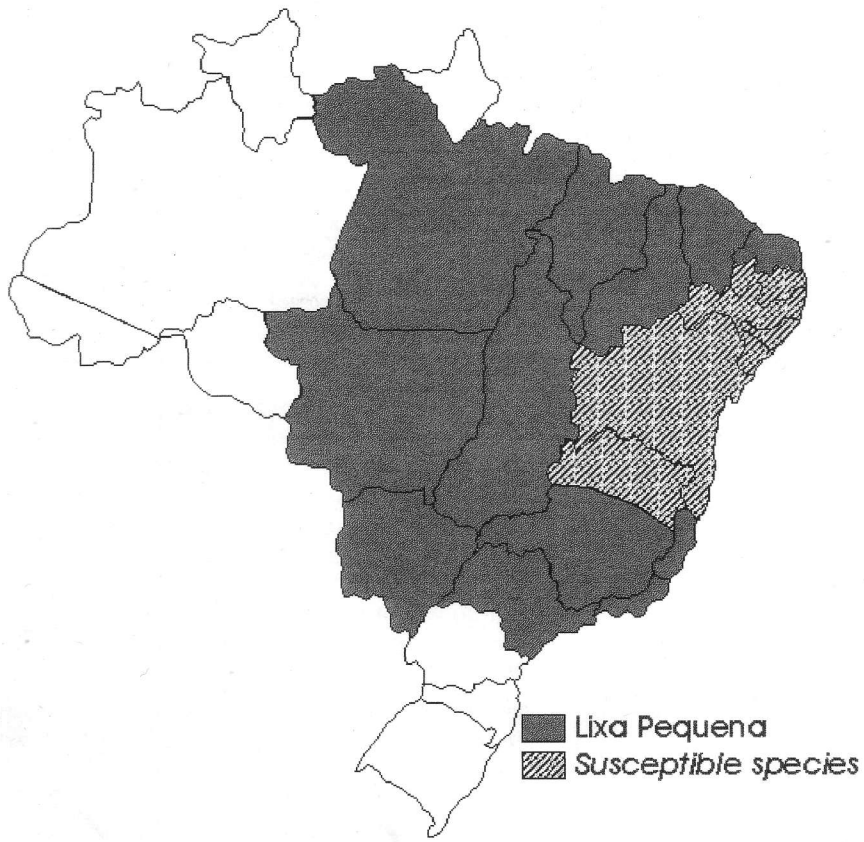
A different species of *Phyllachora* was found in *Syagrus schizophylla* (Fig. 7). It has been sent to a mycologist for identification.

### Inoculation tests

Pathogenicity tests were carried out in a coconut nursery; seedlings of the palms were placed near coconut palms which were contaminated by the two *lixas* for natural inoculation. Symptoms were

### 4. *Allagoptera brevicalyx*.





5. Distribution of *lixia pequena* (*Phyllachora torrendiella*) in relation to the natural occurrence of susceptible palm species.



6. Fruiting bodies (stroma) of *lixia pequena*.



7. A species of *Phyllachora* on *Syagrus schizophylla*.



8. Distribution of *lixas grande* (*Sphaerodopsis acrocomiae*) in relation to the natural occurrence of susceptible palm species.

recorded three months later. The inoculation trial confirmed the data; none of the palm species was infected by the two fungi and the host range was the same as found in nature.

### Conclusion

The two *lixas* are particular to palm species – in another words, a host to *lixas grande* was not found to be host to *lixas pequena*, only coconuts can be infected by both fungi. The capacity of *lixas pequena* to infect more palm species may explain the fact that the disease has a wider distribution in Brazil than *lixas grande*. It can be concluded from this work that coconut planting done in areas where these other palm species do not occur should be carried out with seedlings free from both *lixas* diseases. Surveys in other regions of Brazil will be continued in order to understand better the distribution of these two fungi.

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