

LEARNING TO LIVE WITH LETHAL YELLOWING: PART 2 –

Hugh Harries

Continued from Part 1 - the ever present threat

New readers begin here...

A lethal yellowing epidemic, once experienced, is never forgotten – a single infected coconut palm dies in 3 to 6 months and most of the neighbouring palms are dead in 4 to 5 years. The disease, which kills coconut and other palms, came to prominence in the Caribbean 100 years ago when a major epidemic destroyed the fledgling coconut industry in Cuba. In the last 40 years Jamaica has experienced two island-wide epidemics, despite replacing six or seven million highly susceptible Jamaica Tall palms by distributing ten million resistant Malayan Dwarf and Maypan hybrid seedlings. Similar diseases, caused by the same, or related, phytoplasmas, are epidemic in Africa (particularly Ghana, Tanzania and Mozambique) and in north and central America (Belize, Guatemala, Honduras, Mexico and USA (Florida and Texas)), but not in south America. Different phytoplasmas found in Asia (India, Indonesia, Malaysia and Sri Lanka) may cause sporadic declines, perhaps because resistant varieties are already present. Lethal yellowing is not found in Australia or the Pacific islands, which might remain free if quarantine regulations are enforced. But, realistically, nowhere is safe from the threat of Lethal Yellowing and it is the purpose of the second part of this article to suggest action strategies that are suited to three different situations: during an epidemic (the most **serious** time); after an epidemic (the most **difficult** time); and before an epidemic (the most **important** time).

Now read on...

Setbacks and suggested solutions

Following successful research and rehabilitation programmes, the lethal yellowing epidemic in Jamaica had been brought under control by the early 1990s. However, sporadic outbreaks with unexpectedly high losses amongst Malayan Dwarf and Maypan, that were first reported from Jamaica and Florida in 1987, became more widespread in Jamaica by the turn of the century. There even were losses amongst the famous Roundhill planting of red Malayan Dwarf that had resisted this disease for 50 years. Although hurricanes, droughts and economic downturns all threatened coconuts, with the situation looking as serious as it did 30 years earlier, it was the apparent loss of resistance that was cause for most concern. However, no better disease resistant varieties have been found.

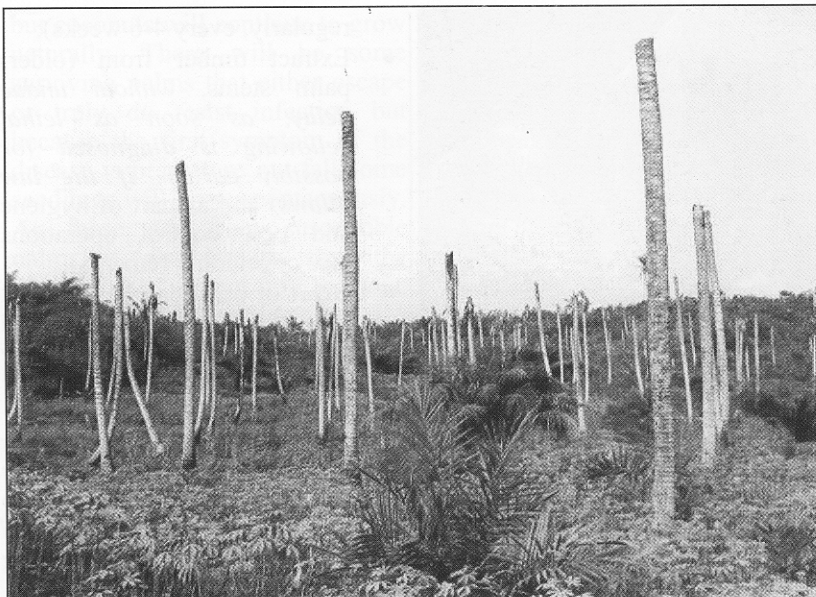


Healthy coconut Palms intercropped with cocoa

International involvement

When the disease had been active in Jamaica and Florida in the 1970s an International Council on Lethal Yellowing (ICLY) was set up, but it did not continue into

the 1980s for various reasons, not the least of which was the very success of work in Jamaica. Bringing the disease under control by replanting with resistant varieties meant that support agencies could direct



Badly Affected Coconut Plantations by Lethal Yellowing Disease

attention elsewhere, to coconut tissue culture, or away from coconut altogether. The net effect was that when the disease began to spread in Mexico in the early 1980s, it was not dealt with as a regional problem. By 1999, when the disease had spread throughout the Yucatan peninsula and had appeared in Belize and Honduras, ICLY was revived as CICLY - the Centre for Information on Coconut Lethal Yellowing - an internet group and web site initially hosted by Centro de Investigación Científica de Yucatán. In the ensuing decade CICLY has built a membership of over 330 and more than 2200 emails have been circulated. However, only a few members supply fresh information to update the web pages.

In 2002 a number of CICLY members participated in an expert consultation organized by the Common Fund for Commodities (CFC), in collaboration with the Coconut Industry Board of Jamaica and with technical guidance from the Food and Agriculture Organization of the United Nations (FAO). The result was a project, "Sustainable coconut production through control of

CLYD", between the CFC and three regional institutions - Coconut Industry Board, Jamaica, Centro de Investigación Científica del Yucatán, México and Escuela Agrícola Panamericana, Honduras. However, the project was not inaugurated until 2005 and reports of its progress are not readily available.

Current events

Just last year, in June 2008, over 57 scientists from countries in Africa, Latin America, Asia and Europe met at a four day workshop on lethal yellowing disease. This was held in Accra, Ghana where one project to investigate the Cape St Paul Wilt Disease (CSPWD) phytoplasma and to breed resistant varieties, was extended for 12 months by the French Centre de Coopération Internationale en Recherche Agronomique pour le



Palm Lethal Yellowing Phytoplasma

Développement (CIRAD), while another was initiated by the University of Nottingham, United Kingdom and the Oil Palm Plantation Institute, Ghana. At the conclusion, the workshop participants designated individuals from Ghana, France, Mexico, the Philippines, Jamaica and the FAO to be a coordinating committee for an "integrated lethal yellowing disease programme and network". However, the committee has not been active and one workshop participant, who suspected this kind of "no action", thought the group was much too wide, with some people not really convinced that work must be done, some already sponsored and yet others not directly concerned.

Also in 2008, a multi-million dollar farm income support project began in Mozambique, targeted on areas of epidemic lethal yellowing and, in the first year, the lethal yellowing rehabilitation input has been to distribute some 55,000 coconut seedlings to smallholders in the provinces of Nampula and Zambezia. However, there has been no consultancy service provider with a team of technical and administrative staff, and this has had to be re-advertised (at the time of writing).

Searching for Solutions

Part 1 of this article began by suggesting that when a lethal yellowing epidemic struck Cuba, at the start of the 20th century, planters and traders went to the Philippines, making it the dominant coconut producing country for the rest of the century. Today, Cuba suffers the disease at a lower intensity that has been attributed to inter-planting resistant coconut palms with immune Royal palms. Whether or not these are coincidences, they serve to summarize alternative solutions. Briefly - go to another location;

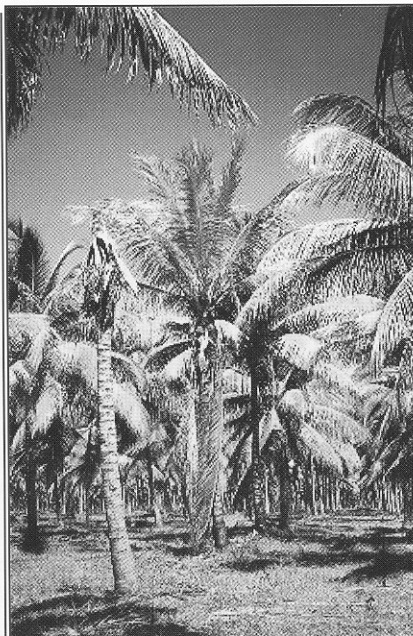
seek resistant varieties; and avoid mono-cropping.

The title of this article is "Learning to live with lethal yellowing", so going to another location is an escape, not an answer. Lethal yellowing will find that location eventually and, in time, there may be nowhere else to go. Disease resistant varieties are an important part of any answer – but diseases with insect vectors may overcome resistance eventually and, in time, there may be no more varieties to use. Mono-crop coconut plantations that used to be important sources of raw materials for colonial export are now largely replaced by rubber or oil palm but in traditional coconut growing regions, where communities are composed of many small farms, each with its own stand of coconut palms, the closely adjacent plots may eventually and, in time, come to resemble a mono-crop. So everybody needs to learn how to live with lethal yellowing.

To encourage the learning process, the three action strategies outlined below cover location, resistance and inter-cropping and add some novel, possibly controversial, ideas for generating income - even from diseased or dead palms - whilst minimising expenditure. The first strategy suggests appropriate action following the onset of lethal yellowing (to be taken by farmers and associated traders in copra, coir, shell etc.); the second deals with the subsequent rehabilitation programme (and should concern the local and national advisory or extension services); while the third strategy is aimed at prevention (and might help to inform the consultants who advise governments and international agencies).

Strategy 1: to be applied DURING an epidemic

Watching coconut palms of all ages progressively and relentlessly die, all in a matter of months, is a traumatic experience for everyone



Lethal Yellowing Symptoms

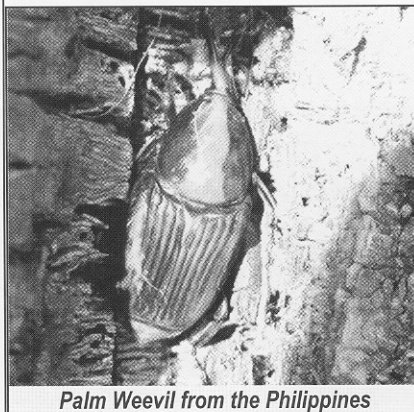
in the local community and the total loss of livelihood of many of the stakeholders in the commodity chain make it the most serious time. There is a need to generate income from **all parts of healthy and diseased palms:**

- Harvest **tender** nuts as well as



Palm Weevil from Manado, Indonesia

ripe nuts before lethal yellowing makes them drop prematurely (and harvest whatever is available,



Palm Weevil from the Philippines

- regularly, every 4-6 weeks);
- Extract timber from (older) palm stems, *without undue delay, as soon as lethal yellowing is diagnosed (or possibly earlier, if the law allows)* and as part of hygiene and pest control operations (see concluding remarks);
- Heart of palm can be obtained from lethal yellowing diseased palms *at the appearance of the earliest symptoms* (see concluding remarks);
- Larvae of rhinoceros beetle or palm weevil, can be regularly collected, for **conversion to cattle- or fish-farming food supplements** (see concluding remarks).
- It is also necessary to minimize expenditure by adopting ways that avoid, reduce, change or eliminate unnecessary operations:
- Cultivate – circle weed (and apply fertilizer if available) all uninfected palms while they live - and include volunteer seedlings (from uncollected dropped-nuts that germinate) until such time as used for heart of palm;
- Plant inter-crops that are immune to lethal yellowing (see concluding remarks);
- Re-plant coconut – **but only if there is a well-thought-out rehabilitation scheme** - and perhaps not until the epidemic is (almost) over (see concluding remarks);
- Hygiene – dispose of dead palms by cut & **compost** instead of cut & burn (see concluding remarks);
- Pest control programmes by collection and conversion to **farming food supplements** (see concluding remarks).

Strategy 2: to be applied AFTER an epidemic

The option to **stop** growing coconuts following an epidemic of lethal yellowing might be considered by individual farmers, plantation directorates, community councils or even as a national policy by government ministers,

but coconuts will continue to grow naturally. There will be some surviving palms that either escape or truly do resist infection but because the first symptom of the disease is premature nut-fall some seedlings will grow spontaneously. As these are from susceptible palms it also means that the disease will remain in the area, threatening future epidemics . . . which makes it a difficult time to generate income because priorities change when there are fewer options:

- Heart of palm - culled **four years** after planned **high density** planting, and also from **unplanted** seedlings remaining in the nursery (see concluding remarks);
- Tender nuts - fresh or for processing (from five years);
- Ripe nuts - for desiccated, oil, coir, coco-peat, shell charcoal, etc. (from six years).
- Minimise expenditure (**donor rehabilitation funding** excepted):
- Avoid pure stand monocropping (see concluding remarks);
- Pest control and hygiene (see concluding remarks).

Strategy 3: to be applied BEFORE an epidemic

The desire to prevent lethal yellowing makes the time before an epidemic most important if the risk is to be reduced or managed since it may never be eliminated. There are four options which can be categorised as impractical, international inappropriate, and interactive. The first, to not grow coconuts at all, would entail removing any existing coconut palms and that makes it impractical. The second option – quarantine – might be effective if stringently applied to all plant material, not just to other coconuts (since lethal yellowing is not considered to be seed transmitted). Quarantine requires international government cooperation and is a top down approach, easily circumvented. The third or “easy” option that is often adopted (by popularity-seeking politicians) is the distribution of free coconut seedlings and reliance on resistant varieties or hybrids alone can be a poverty trap that makes farmers hostages to fortune when lethal yellowing does occur. The fourth option is to understand that this disease cannot be avoided for ever

and that living with lethal yellowing requires anticipation, participation and planning along the lines indicated here.

Concluding remarks

The three action strategies that are outlined must be thoroughly examined and their implications carefully considered before being accepted for trial or rejected out of hand. Most of the suggestions are no more than common sense but some require more detailed consideration than can be given here and now. If readers of CocoInfo International require further clarification, they are invited to join the the Google coconut knowledge network at <http://groups.google.com/group/cocoinfo/> and post an inquiry on the “Learning to Live with Lethal Yellowing” page

Mr. Hugh Harries is Moderator, Coconut Information Exchange and Time Line based in the United Kingdom, Email address: hugh.harries@gmail.com



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 • sucofindo Laboratory Jakarta

FOR FUTURE INFORMATION
 CV. HERBA BAGOES
 Jl. Letjen Sutoyo 65 Malang East Java - Indonesia
 Telp. 0341- 491170