



■ THE PROBLEM ADDRESSED

Lethal yellowing disease: a threat to the coconut industry in Ghana

Coconut is a small-holder crop grown mainly by resource for poor farmers living along the coastal regions of Ghana. It is estimated to support the livelihood of about 8% of the country's rural population. In the Western Region, it is estimated that about 20% of the rural population depend on coconut for sustenance. Coconut tree is referred to worldwide as the "tree of life" and it is the main source of livelihood for several rural communities, providing food, fuel-wood, drink, edible oil, fiber, animal feed and building material with a minimum capital outlay. The crop has great potential for job creation, contributing to food security and increased foreign exchange for Ghana. This potential is, however, challenged by a devastating lethal yellowing disease known locally as Cape St. Paul wilt disease.



• A healthy coconut farm (left) and a lethal yellowing disease devastated farm (right). Photo by J. Nkansah-Poku (left); Egya N. Yankey (right).

■ THE PRACTICE/INNOVATION PROPOSED BY TROPICSAFE

Assessment of the agronomic potential of promising disease resistant coconut varieties

Disease resistance is not a once-forever phenomenon. Large scale deployment of the "Maypan" hybrid in Jamaica suffered massive destruction when the supposed resistance collapsed during the 80's (Broschat *et al.*, 2002). The search for resistant varieties must be a continuous process. In 2007, in collaboration with CIRAD and under the Farmer Support Project sponsored by the French Government, eight dwarf varieties were planted at three disease *foci* in the Central and Western Regions of Ghana to assess their resistance to the disease. Two of the trial sites have been affected by the disease. At both sites, two varieties, IBD and NLD were not showing disease symptoms. Two other varieties, NGBD and MGD have recorded low disease incidence levels of 1.21% and 1.19% respectively. The agronomic performance of these varieties, however, needs still to be determined so that both disease resistant and high yielding materials can be released to farmers.



■ HOW IS TROPICSAFE IMPLEMENTING IT?

Field assessment of the productivity of promising coconut varieties

Under the framework of TROPICSAFE, the agronomic performance of the above-mentioned varieties that have shown promising/potential resistance to Cape Saint Paul wilt disease was evaluated. The trials are carried out at Anwea, a disease endemic area in the Western Region where coconut was the major cultivated tree crop before being replaced by cocoa because of the phytoplasma epidemic disease. The district is characterized by all year round rainfall and good textured soils which support the cultivation of different types of crops. The trial has been set up using a randomized complete block design. The SGD, SGD x VTT hybrid and the West African Tall type (susceptible control) have been included. Varietal vigour is assessed by collecting growth parameters such leaf emission, number of leaflets, plant girth, petiole length and total leaf length on 30 palms of each variety at six-monthly intervals. The palms are also observed for symptoms of Cape Saint Paul wilt disease.



• The trial field at Anwea.

■ HOW IS IT WORKING?

Data collection and monitoring of palms

After two years of planting, none of the palms have shown disease symptoms. The palms are expected to start producing flowers and fruits in 2021. At this time, yield and other reproductive data will be collected and used to ascertain yield stability, uniformity, and distinctiveness of the different coconut varieties. A long time is required to collect such data from coconut plantations. However, it is expected that the initial data, along with the growth data, will indicate the value of each coconut variety being assessed. The outcome of the trial will give hope to the Ghanaian coconut farmers and facilitate the revival of the replanting program in Ghana.



• Measurement of collar girth (left) and fertilization to maximise the potential of the palms (right).



KEY WORDS

Coconut, agronomic performance, resistance, lethal yellowing, disease

FURTHER INFORMATION

Broschat T.K., Harrison N.A., Donselman H. 2002. Losses to lethal yellowing cast doubt on coconut cultivar resistance. *Palms* 46, 185-189.

Dery S.K., Philippe R. 1997. Preliminary study on the epidemiology of Cape St Paul wilt disease of coconut in Ghana. In: Eden-Green S.J., Ofori F., eds. Proceedings of an International workshop on lethal yellowing-like diseases of coconut, Elmina, Ghana, November 1995, 255-260.

Harrison N.A., Davis R.E., Oropeza C., Helmick E.E., Narvaez M., Eden-Green S., Dollet M., Dickinson M. 2014. 'Candidatus Phytoplasma palmicola', a novel taxon associated with a lethal yellowing-type disease (LYD) of coconut (*Cocos nucifera* L.) in Mozambique. *International Journal of Systematic and Evolutionary Microbiology* 64, 1890-1899.

Nkansah-Poku J., Dery S.K., Philippe R. 2005. Reduction of spread of CSPWD of coconut by insecticidal hot-fogging and removal of diseased palms. *Ghana Journal of Agricultural Science* 1, 193-198.

Nkansah-Poku J., Philippe R., Quaicoe R.N., Dery S.K., Ransford A. 2009. Cape Saint Paul wilt disease of coconut in Ghana: surveillance and management of disease spread. *Oleagineux* 16, 111-115.

Quaicoe R.N., Dery S.K., Philippe R., Baudouin L., Nipah J.O., Arthur R., Dare D., Yankey E.N., Pilet F., Dollet M. 2009. Resistance screening trials on coconut varieties to Cape Saint Paul wilt disease in Ghana. *Oleagineux* 16, 132-136.

AUTHORSHIP

Linda Arhin Council for Scientific Research Program - Oil Palm Research Institute, Sekondi, Ghana
lindaarhin460@yahoo.com

Egya Ndede Yankey Council for Scientific Research Program - Oil Palm Research Institute, Sekondi, Ghana
ndedeyankey@yahoo.com

Fabian Pilet CIRAD, Saint-Pierre, La Réunion, France fabian.pilet@cirad.fr

April, 2020



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727459

www.tropicsafe.eu

This factsheet is produced as part of the TROPICSAFE project. Although the author has worked on the best information available, neither the author nor the EU shall in any event be liable for any loss, damage or injury incurred directly or indirectly in relation to the project.