Oil palm growing satisfies most of the oil and fat requirements of populations in developing countries. However, it comes up against generally lethal parasitic diseases that become worse in replantings: vascular wilt is particularly rife in Africa; *Ganoderma* basal stem rot causes substantial losses and is a major drawback for sustainable replanting in Southeast Asia. Genetic improvement, based on the search for durable resistance, is the surest and neatest way of slowing down the spread of such diseases.

**Producing resistant planting material**

With the development of early resistance screening tests for vascular wilt, and improved yields, CIRAD is able to propose resistant planting material that has been tried and tested in several African countries. Particularly affected zones have thus been replanted with material whose resistance has proved to be durable.

Controlling these diseases will guarantee the future of plantations and reduce the need to extend the crop to other environments that need to be conserved. CIRAD thus helps to secure production in the major growing zones and contributes towards sustainable development of the oil palm, the most productive oil crop in the world.
Two soil-borne fungi to be controlled

Vascular wilt caused by *Fusarium oxysporum* f. sp. *elaeidis* is particularly rife in Africa, and some rare foci have been identified in Brazil and Ecuador. Southeast Asia, the leading palm oil production zone, so far remains free of the disease, which can cause substantial damage. Its incidence increases in replantings. It cannot be significantly reduced by any cultural practices, and chemical control would have unacceptable economic and environmental consequences.

Another soil-borne fungus causing rot, *Ganoderma boninense*, leads to substantial losses and is a major drawback for sustainable replanting in Southeast Asia. Some cultural practices–soil tilling prior to replanting, eradication of diseased palms as they grow–reduce its incidence. Chemical control cannot be considered for similar reasons to those for vascular wilt.

The symptoms are basal stem rot and yellowing of the leaf crown. Sparophores, fungal fruiting bodies, often form at the base of the stem. *Ganoderma* also exists in Africa and Latin America, with a lower incidence.

The genetic pathway

Along with its partners, CIRAD possesses a large genetic improvement network in the main oil palm growing zones–Africa, Southeast Asia, Latin America. For instance, for vascular wilt, considerable differences in reaction have been found over several decades between and within genetic origins, under natural contamination conditions.

The search for sources of resistance has thus proved to be the most promising approach. CIRAD set out to develop early screening tests to detect sources of resistance to vascular wilt. The tests are based on artificially inoculating nursery plants around two months old with the pathogen, *Fusarium oxysporum* f. sp. *elaeidis*. The results are incorporated into the oil palm breeding scheme, thereby ensuring that genetic resistance and yields improve together.

For *Ganoderma*, the research is more recent, since the existence of sources of resistance was only confirmed at the turn of the century in Indonesia.

It is now possible to inoculate *Ganoderma boninense* artificially and obtain symptoms on three-month-old seedlings. Correlation with the field remains to be established, to completely validate the inoculation procedure.

What about tomorrow?

Resistance tests are continuing and are becoming geographically diversified. A network of partners, with laboratories and nurseries, is studying *Fusarium oxysporum* in Cameroon and Benin, and *Ganoderma* in Indonesia. Such a situation, with no equivalent elsewhere, should make it possible to continue supplying growers on a sustainable basis with planting material that is adapted to local parasitic constraints. It will make it possible to study interactions between the two fungi.

Partners...

- Centre national de recherches agronomiques (CNRA), Ivory Coast
- Institut national de la recherche agricole du Bénin, Centre de recherches agricoles sur les plantes pérennes (INRAB – CRA-PP), Benin
- Lonsum Group (London Sumatra), Bah Lias Research Station, Indonesia
- Socfin Group: Socfinco (Belgium and Indonesia), Socindio (Indonesia), Socapalm (Cameroon)

![Experimental prenursery for vascular wilt tests. © H. de Franqueville](image1)

![Experimental prenursery for Ganoderma tests. © F. Breton](image2)

![Artificial induction of Ganoderma symptoms in the prenursery. © F. Breton](image3)

![Basal stem rot with Ganoderma sporophore. © H. de Franqueville](image4)