Disentangling the ecology of *Aucoumea klaineana* Pierre to improve its sustainable management

a methodological poster on rhizosphere and light

Quentin Guidosse[1,*] , Jean-Louis Doucet[1] , Ludivine Lassois[1]

[1] TERRA Teaching and Research Centre, Gembloux Agro-Bio Tech, Université de Liège, Belgium.

* Corresponding author : qguidosse@uliege.be

Seedlings forming patches of numerous individuals

Context

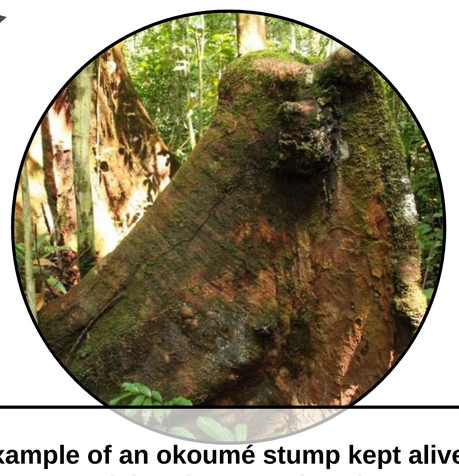
The okoumé (***Aucoumea klaineana*** Pierre) is the most important timber species in Central Africa. Long-lived, **pioneer** and **light-demanding**, it colonises open areas to form **gregarious** populations.

The ageing of the tropical forest **hinders the natural regeneratio**n of okoumé. Moreover, its **artificial regeneration gives limited results** in terms of tree growth and quality.

Despite the existence of many studies on the species, its **light requirements** at the seedling stage have never been precisely quantified. The role of **root anastomoses** observed by Leroy Deval (1973) has never been confirmed. Do they really allow exchanges between individuals or are they rather the result of **mycorrhizal associations**? Are **plantations** depreciated by the absence or the variation of these **mycorrhizal associations** ?

Monospecific stand

Mixed old growth forest with scattered okoumés



Example of an okoumé stump kept alive by potential underground exchanges

Obj. 1 : Clarify the **optimal light conditions** for the development of the species at the seedling stage.

↑ Fig. 1 : Six shade-houses and one platform receiving 100% irradiance.

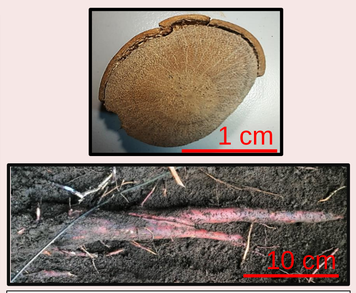
↑ Fig. 2 : 30 seedlings per shade-house are set for a one-year period. Parameters such as growth, mortality and functional traits are measured every month.

Obj. 2 : Understand the functional role and the formation modalities of **root anastomoses**.

↑ Fig. 3 : Young stands are inventoried then clear-cutted. Trunk sections are collected.

↑ Fig. 4 : Root systems are excavated using a high pressure jet (pictures: protocol test).

↑ Fig. 5 : Expected outcome (from Gaspard et al., 2020 on *Populus sp.*).

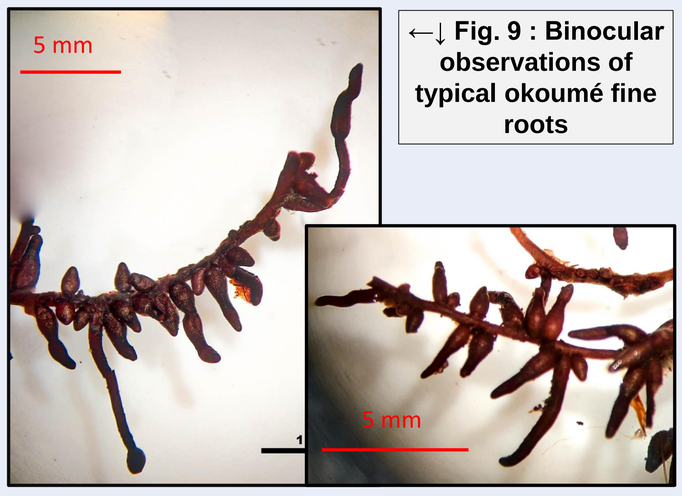


↑ Fig. 6 : Root sections and root grafts (anastomoses) are collected.

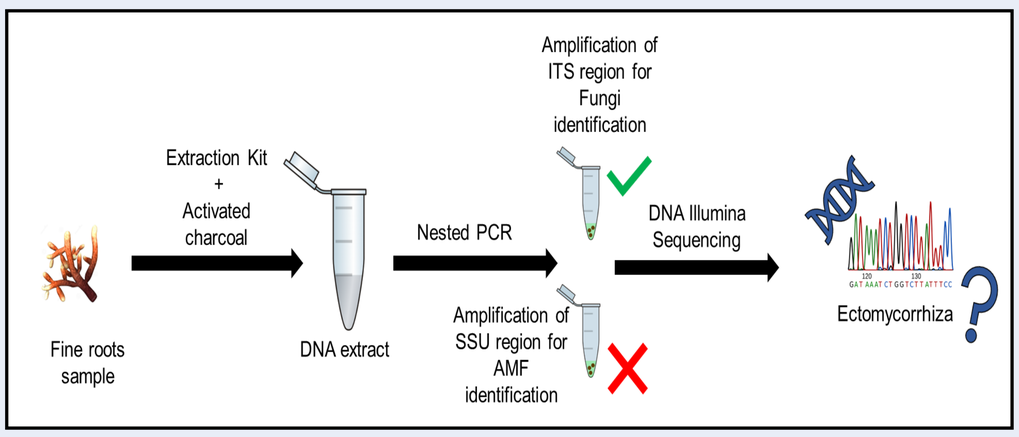
↑ Fig. 7 : dendrochronological ring analyses are carried out by vessel density variation

Obj. 3 : Check for the presence of **mycorrhiza** and identify the **fungi communities** at different stages of development of the species.

↑ Fig. 8 : Harvesting fine roots (<2mm Ø) from okoumé trees.



←↓ Fig. 9 : Binocular observations of typical okoumé fine roots



↑ Fig. 10 : Mycorrhizal DNA sequencing.

Acknowledgement

The OKOUME project was initiated by Gembloux Agro-Bio Tech (University of Liège, Belgium) in partnership with CEB-Precious Wood (Gabon). The contributors to this work are Tom de Mil (GxABT, Belgium) and Annie DesRochers (UQAT, Canada) for root anastomoses and dendrochronology aspects, Sébastien Massart (GxABT, Belgium) and Mario Amalfi (Meise Botanic Garden, Belgium) for the mycorrhizal part of the work.

More about the context and issues

Guidosse Q., du Jardin P., White L.J.T., Lassois L. & Doucet J.-L., 2022. **Gabon's green gold: a bibliographical review of thirty years of research on okoumé (*Aucoumea klaineana* Pierre).** *Biotechnol. Agron. Soc. Env.* 26(1), 30–42.

References

- Gaspard D.T. & DesRochers A., 2020. Natural root grafting in hybrid poplar clones. *Trees* 34(4), 881–890, DOI:10.1007/s00468-020-01966-z.
- Leroy Deval J., 1973. Les liaisons et anastomoses racinaires. *Bois For. Trop*. 152, 37–49.