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A NEW BAOBAB ARCHITECTURE ASSESSED BY AMS RADIOCARBON DATING: TREES WITH FALSE INNER CAVITIES

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Abstract

In 2008 we extended the AMS radiocarbon investigation of large angiosperm trees by introducing a methodology, which also allows the dating of standing and live specimens. This approach is based on the dating of very small wood samples, collected mainly from inner cavities and from deep incisions in the trunks of large live individuals, belonging to angiosperm species. As model species, we selected the longest living angiosperm: the African baobab (Adansonia digitata L.) Research performed on the largest individuals from several African countries allowed us to determine their age and growth rate dynamics, but also some new architectures of the investigated trees.

Often, Baobabs become hollow at a relatively early age. Most old baobabs have large hollow parts, especially in the central area of their trunks/stems. Trunks/stems are hollowed with major wood removal by decay fungi, large fires, elephant damage, human activity or twisting of large branches. In many old baobabs the cavities have openings toward the exterior, which render them accessible to birds, snakes or other animals and, often, to humans, as well.

For samples collected from normal cavities, the sample ages decrease from the cavity walls toward the outer part of the trunk/stem. Occasionally we found, however, that sample ages increase considerably from the inner cavity walls toward the exterior, up to a certain distance into the wood. In such cases, the inner cavities in the trunk of large individuals are in fact false cavities between perfectly fused stems. Hence, false cavities, which are always covered by bark, can form only in multi-stemmed trees and are just empty spaces between several fused stems, disposed in a ring-shaped structure.

As the most relevant specimens with false inner cavities, investigated by us, we mention the well-known baobab of Samba Dia (Senegal) (circumference at 1.30 m; cbh = 26.13 m) and the Lebombo Eco Trail baobab (Mozambique) (cbh = 26.13 m). The oldest dated samples suggest ages of 600 years for the baobab of Samba Dia and 1450 years for the Lebombo baobab. In addition to age, AMS dating results indicate that for both trees different stems have different ages and belong to different generations. Hence, ring-shaped structures have formed progressively, while the false cavities closed completely or quasi-completely over time. Thus, the very large false cavity of the baobab of Samba Dia closed only 150-200 years ago.

Dating results also indicate that the stems of the very old Lebombo baobab continue growing at a quasi-constant rate toward the outer part of the tree. However, the same stems basically stopped growing toward the common false cavity over the past ca. 500 years, probably for not disturbing the stable internal architecture. On the other hand, the fused stems of the baobab of Sambia Dia continue growing relatively fast both toward the outer part and toward the false cavity.