

Weak Root Systems Causing Old Baobab (*Adansonia digitata* L.) Trees to Fall

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ABSTRACT

Many of the baobabs (*Adansonia digitata* L.) found across the landscapes in Africa are over one thousand years old. There were reports in 2018 of some of the oldest baobab trees dying, especially in Southern Africa without knowing the causes. Other articles also reported that most of the perceived dead baobab trees were still alive, indicating the resilience of the species. We took advantage of three fallen old baobab trees at Adaklu, Ghana to investigate the probable causes of their falling. One of the trees fell in 2023 and another in 2024. The third tree fell about ten years earlier. Visual examination revealed that the trees fell due to weak root systems as a result of decay. Out of the three fallen baobab trees, only the one that fell in 2023 was dead at the time of the investigation supporting the resilience of the tree. We conclude that the fallen baobabs were the result of decayed roots and in cases where some roots remain in the soil after the fall, the possibility of the baobab tree continuing living is high.

Keywords: Decayed Roots, Resilience, Southern Africa, Landscape

Citation: Kenneth Fafa Egbadzor, James Gakpo and Rita Sam [2025]. Weak Root Systems Causing Old Baobab (*Adansonia digitata* L.) Trees to Fall. *Journal of Diversity Studies*. DOI: <https://doi.org/10.51470/JOD.2025.4.1.49>

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Article History: Received 11 January 2025 | Revised 10 February 2025 | Accepted 07 March 2025 | Available Online April 02, 2025

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Introduction

Baobab (*Adansonia digitata* L.) is a very long-lived tree, some of them over one thousand years old [1, 2]. There has been concern about the death of some old baobab trees, especially in Southern Africa. The death of the old baobab trees was reported in 2018 [3]. This raised concern among lovers of biodiversity. Later, in 2024, there was argument that old baobabs are not dying at an alarming rate as ascribed earlier [3, 4]. Those who argued that the trees were not dying, however, agreed that the trees reported to had died [3] fell, however, the whole plant or parts of most of these trees are still alive, indicating the resilience of the African baobab.

We took advantage of three fallen old baobab trees at Adaklu, Ghana to investigate the probable causes of their falling. One of the trees fell in 2023 and another in 2024. The third tree fell about ten years earlier. Examination revealed that the trees fell due to weak root systems as a result of decay. Only one of these fallen baobabs (the one which fell in 2023) is dead at the time of the investigation in line with the report of 2024 [4].

Materials and Methods

Location of the fallen baobab trees

The observation was made in Adaklu district of the Volta region of Ghana. The specific locations of the fallen baobab trees are:

1. The most recent fallen tree (August 2024) is located at Adaklu Helekpe (N6°29'42.51880; E0°29'14.66620). This was numbered 1.

2. Two of the fallen baobabs are located at Adaklu Goefe (N6°30'18.18840; E0°29'47.69180). The Goefe trees were about twenty meters apart. The earlier fallen tree was numbered 2 and the 2023 fallen one numbered 3.

The vegetation of Adaklu district is mainly woodland savannah. However, the Adaklu mountain on which the baobab trees are found is deciduous forest with baobab trees among the dominant trees.

Baobab on Adaklu mountain grows in harmony with other trees and farmers conveniently cultivate crops under them.

Description of the fallen baobab trees

Some data were taken on the falling baobab trees as their description (Table 1).

Table 1: Measurement of the fallen baobab trees

Parameter	Tree 1	Tree 2	Tree 3
Tree height (m)	16	9	12
Canopy diameter (m)	7.5	N/A	N/A
Trunk circumference (m)	8	7	6
Lateral root length (m)	37	N/A	21

N/A (not applicable). Some of the data taken on the most recent fallen tree could not be taken on the two that fell earlier.

Results and Discussion

The height of the studied baobab trees ranged from 9 m to 16 m. These baobab trees are relatively short compared to the height of up 30 m reported elsewhere [5, 6, 7]. However, there was available evidence that part of the canopy of tree number 2 was removed resulting in the shorter plant height (9 m) measured (Fig. 1). The tallest baobab in this study was also not the tallest in the population from which the study was conducted. There was interaction with the farmer whose field the fallen baobab number 2 was, and he confirmed that part of the canopy was removed to create space for other crops. The plant height for tree number 3 was also not the actual as part of the canopy was removed before the measurement was taken. The accurate plant height was therefore taken for only tree number 1.

The canopy diameter could be measured for only tree number 1 (7.5 m) as that of tree number 2 and 3 was cut off by the farmers or had rotten respectively before data could be taken. Similar to plant height, the recorded canopy spread of the studied baobab was relatively narrow [8]

Lateral roots stretched to over 37 m away from the trunk of tree number 1.

It was not possible to measure the lateral roots length for tree numbers 2 because of the compacted soil and the intention not to disturb the plant. In the case of tree number 3, the roots had decayed but gave some clue to how far it had grown to. The 37 m length of the root of tree number 3 is comparable to 50 m reported [7].

The main cause for the falling of the baobab trees at Adaklu could be the weakening roots due to rot (Fig. 2). The tap root of tree number 1 rot from the tip, remaining just about one metre length to the trunk. Some of the lateral roots were also rotten. These conditions affected the anchorage of the trees and therefore might result in them falling. It has been reported that short taproot system of baobab make them sensitive to strong wind and can be uprooted by storm [7]. The falling of the baobabs at Adaklu could be attributed to this.

The rotting of the taproot could also be the beginning of cavity formation (hollowing) in the baobab trunk. Cavity formation is normal occurrence in some trees and is known in baobab as well. Tree age and environmental factors are among the determinants of hollowing in trees [9]. The cavity in the baobab tree number 2 is along the entire trunk from the base to the crown. Tree cavities on its own does not cause harm to the tree. As could be seen in this observation, the fallen baobab with the cavity fell about ten years earlier but it is still alive. Trees with cavities are referred to as habitat trees and they are promoters of biodiversity [9, 10]. There are known habitat baobab trees including the famous Chapman baobab of Botswana [11, 12].



Fig. 1: Fallen baobab with cavity (number 2, fell about 10 years earlier)



Fig. 2: Rotten roots of 2024 fallen baobab



Fig. 3: The 2024 fallen baobab at Adaklu continues to grow and produces fruits six months after falling

Two of the three baobabs reported continue to grow and produce fruits (Fig. 1 and 3). Their canopies were, however, pruned to make more space for farming activities. Although the data is small, this observation confirmed that most fallen baobab trees continue to grow after falling.

Conclusion

The fallen baobab trees at Adaklu fell because of rotten roots including their taproots. The cause of the rot is not known. The rotten roots made the baobabs succumbed and fell during storm. Baobab, however, is very resilient, and even after falling, the probability of continuous growth is high. Two of the trees are alive and only one has died. Considering the number of baobab trees that have been observed to fall and the number that died, it would be appropriate to refer to them as fallen rather than dead.

Conflict of interest

We do not have any conflict of interest to declare

Acknowledgements

The authors express their appreciations to Mr. Edward Narh, the transport officer of the Ho Technical University for assigning a staff to drive the research team to the baobab field. They also thank Evans Nonu and Samuel Ayim of the Department of Agricultural sciences and Technology, for their assistance in excavating the root system of the fallen baobab trees.

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