From Demise to Revival: The Unexpected Persistence of Panama Redwood (*Platymiscium pinnatum*) (Fabaceae) after Complete Stump Removal

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Abstract

Despite being felled with its stump removed because it was deemed hazardous and unsafe, a Panama redwood tree (*Platymiscium pinnatum*) has defied expectations by producing over 100 new shoots from its roots over three cutting episodes. It is unlikely that most tropical woody tree species can survive after being levelled to the ground, let alone produce three generations of healthy sprouts. This event showcases the remarkable resilience inherent in the plant kingdom and warrants further investigation.

Introduction

In late 2024, a Panama redwood tree (*Platymiscium pinnatum*) located on The University of the West Indies, Cave Hill Campus, Barbados, was felled due to safety reasons, primarily a split trunk and proximity of the tree to pedestrian traffic and automobiles. The trunk and associated buttresses were completely removed with the aid of a stump grinding/chipping machine. Several months after felling, the root network produced over 30 healthy shoots, which underwent initial pruning in early January 2025. Continued shoot development necessitated subsequent pruning by the maintenance department in March and May 2025. Here, I report on this resprouting phenomenon of the Panama redwood tree, the ability of trees to resprout, conditions that affect resprouting, the future of the resprouted tree, and the need for further investigation of this phenomenon.

The Panama Redwood Tree

Panama redwood belongs to the Fabaceae family, Dalbergieae tribe, and can be differentiated from other members of the tribe by its unique opposite leaves and interpetiolar stipules (Klitgaard 2005). This medium to large, tropical forest tree grows to an approximate maximum height of 20 to 30 meters with a trunk diameter up to 1 meter at standard height, occasionally featuring buttresses (Klitgaard 2005). The bark is characteristically rough and brown with vertical

1. Panama redwood trees are rare in Barbados. At present, apart from the fallen tree at the University of the West Indies, Cave Hill; only six other established trees have been recorded, all in the carpark of Sky Mall in Haggatt Hall, Saint Michael, southwestern Barbados. (**A–C**) illustrate mature leaves, flowering buds and young fruit. *Note*: No sprouting shoots were observed on the trunks or root networks of any of these other six trees. The possibility exists that other trees of this species occur on the island; however, none was identified during this study.

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fissures, and the leaves are oppositely arranged, imparipinnate, approximately 30 cm long, comprising 5 to7 dark green, ovoid leaflets (Klitgaard 2005). The pea-like flowers are small, bright yellow, measuring approximately 1.5 cm and are produced in an extensive raceme, whereas the elliptic, glabrous fruit is a samara, with a rusty brown exocarp (Klitgaard 2005). Indigenous to the Americas, the Panama redwood typically grows in tropical moist and tropical wet forests at elevations below 800 meters but can also be found in dryer rainforests, often on slopes, and grassy savannas (Klitgaard 2005). In Barbados, this exotic species is very rare and seldom recorded (**Fig 1**). Renée (2022) captured the healthy-looking tree, which is the subject of our discussion, during a campus tour (**Fig. 2**); however, the tree was subsequently deemed a health hazard due to its split trunk and proximity of the tree to pedestrian traffic and automobiles.

2. The Panama redwood tree on The University of the West Indies, Cave Hill Campus, south-west, Barbados, W. I. Photo © 2022 by S. A. Renée.

Trunk and Root Resprouting

Resprouting from trunk and roots in woody plant species occurs in tropical and temperature forests, and varies in different forms with increasing disturbance severity, from axillary shoots (stem and branch epicormic biomass) to basal shoots (trunk epicormic biomass) (Bond and Midgley 2001; Fig. 1a). Some tropical tree species are able to regenerate from stems and roots (Mostacedo et al. 2009). Such resprouting is a survival mechanism used to recover from various disturbances, such as fires, flooding, droughts, and wind storms (Bond and Midgley 2001). However, little is known about the potential for tropical tree stumps and root buttresses, once completely disintegrated, to sustain consecutive shoot production and survive. In this case, the Panama redwood tree stump and above-ground roots (buttresses) were chipped using a mechanical grinder in November 2024 and the resulting material was subsequently used as mulch, and within months new shoots resprouted as appeared in **Fig. 3**.

3. The Panama redwood tree producing well over 45 shoots months after being repeatedly completely cut back. The tree originally stood toward the top-center of the brown area. *Note*: Resprouting shoots emerged as far as 30 meters from the trunk (not visible in photograph).

Species within the Fabaceae family are known to produce new shoots from the root system after felling (Mostacedo et al. 2009), which possibly is due to factors such as trunk damage, water stress, and/or other specific environmental cues. The split in the observed Panama redwood tree and associated conditions, might have acted as elicitors, potentially triggering the expression of underlying genetic predispositions that stimulated the proliferation of meristematic tissues and facilitated the establishment or enhancement of symbiotic nitrogen fixation within root nodules. Nevertheless, what is known is that this Panama redwood tree shows unexpected persistence to survive after most of its biomass was removed.

4. Detailed views of a third-generation Panama redwood tree sprouts, illustrating different shoot cut-backs (A–D).

The Future of the Resprouted Panama Redwood Tree

The observed tree provides an opportunity to study the species's genetic and phenotypic characteristics. Interestingly, throughout its lifespan, this tree—much like the six others at Sky Mall in Haggatt Hall, Saint Michael, southwestern Barbados (**Fig. 1**)—showed no emergence of sprouting shoots from its trunk or root network. However, since the felling of the tree, it has continued to produce shoots, with the initially cut sprouts either dying back, producing additional sprouts, or continuing to grow vigorously (**Figs. 3**–**4**). After initial discussions with the ground and custodial section of the University's maintenance department, one of the resprouted shoots may be allowed to grow undisturbed, allowing the life-history parameters to be meticulously monitored.

By actively managing this single resprouted shoot, the challenging loss of this unique tree can be transformed into a significant conservation initiative. This effort will directly contribute to the rare Panama redwood population in Barbados and will demonstrate best practices in urban

landscaping and the species recovery. Also, this approach provides a tangible educational opportunity for students and the wider community, fostering a deeper understanding of tree biology and conservation.

Conclusions

This observation reveals a remarkable level of persistence in the Panama redwood, suggesting a higher capacity for regeneration from severely damaged root systems than commonly assumed for this and other tropical woody species. This event might be the first record of numerous resprouting of *Platymiscium pinnatum* shoots after the stump was completely removed, adding to our understanding of the species' resilience and potential for recovery, even after significant damage in foreign environments. More research is warranted to understand the implication of such survival strategies and how ecological managers, such as Landscape Designers/Architects, Invasive Species Specialists, Plant Curators, and Exotic Species Collectors, should response to such occurrences.

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