

Strange but True

A Never-Before-Reported Characteristic of *Zamia pseudoparasitica*
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Conventional botanical wisdom states that *Zamia pseudoparasitica* Yates is the only known obligately epiphytic cycad and gymnosperm. As such, the roots of mature plants grow on the branches or in crooks of trees and reportedly never touch the soil (Norstog and Nicholls, 1997; Jones, 2007; Whitelock, 2002). Based on data from ongoing research in many sites along the Atlantic slope of Panama, it can now be said that this concept of *Z. pseudoparasitica* is only partially true. In fact, the long-held paradigm of the roots of this species never reaching the soil has just been shattered!

Plants of this species are epiphytic in the sense that they receive support from tree branches in the humid Atlantic coastal primary forests in which they thrive. However, many plants in at least three populations—including northern Veraguas and Coclé provinces—are apparently nurtured from primary roots that grow down into the soil on the forest floor by way of a long taproot. This root consists of anastomosing branches that form a strong, braided structure with high tensile strength that may grow 15 meters or more in length before it finally reaches the ground. In some plants, this taproot appears to be the sole source of nutrients (with the exception of nitrogen, which the plants may obtain from the large, ball-like

coralloid roots attached to the primary root). In these plants, especially the older ones, the usual adventitious roots that hold the stem to the tree branch are often lacking or dead. In addition to providing nutrients from the soil, the plant body itself—which may weigh more than 15 lbs—may also be supported by this taproot; in some cases, plants lose their hold on the branches on which they are perched (perhaps because of a tree fall or due to root rot or other reasons) and are kept aloft by the very strong primary root. In other populations, plants grow numerous secondary roots and the tap root becomes severed, rots off, or just does not keep growing. In this latter situation, the secondary roots act to both hold the plant in place and obtain nutrients from surrounding decaying organic matter.

The long taproot of *Zamia pseudoparasitica* has previously been observed by other botanists (e.g., Dr. Gaspar Silvera and Prof. Jorge Mendieta), and even by a philosopher working in a social framework with a mining company (Sr. Ronald Bernal), but it had been given no special meaning or significance. Now, however, we have to decide what is the true ecological nature of this species. Is it a bona fide epiphyte in some cases and a hemiepiphyte in others? Much remains to be seen!



Mature *Zamia pseudoparasitica* plant with at least 11 leaves hanging solely by a well-developed taproot that is likely anchored in the soil



A 15-meter taproot with caudex and leaves. Notice the branched caudex (one branch without leaves and apparently dead), the very long pendent leaves, and the twining branches of the primary root.



Zamia pseudoparasitica growing on an old tree.



Workers pull the twining primary root of *Zamia pseudoparasitica* from a tree.



Details of *Zamia pseudoparasitica* twining branched taproot system.