

# Trunk spines can defend against bark feeding and climbing mammals

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Pictures of spiny trunk species illustrating the two spiny syndromes. Thorny trunk (top) and prickly trunk (bottom) related to new functions of spinescence. *Cratogeomys cochinchinense* (top left), *Gleditsia microphylla* (top right), *Ceiba speciosa* (bottom left) and *Hura crepitans* (bottom right). Credit: XTBG

Spines on plants are widely distributed across plant families. The defensive role of spines has previously been associated with leaves, young shoots and reproductive organs. However, the different syndromes of spiny plants have barely been explored and people do not yet have a complete synthesis of their function based on their morphological attributes.

In a study published in *Annals of Botany*, researchers from the Xishuangbanna Tropical Botanical Garden (XTBG) of the Chinese Academy of Sciences identified four morphological syndromes of trunk spines. Two corresponded to already known functions (anchorage for lianas and crown defense against large ground mammals), and two strategies are newly described trait syndromes with traits suggesting a defense against bark feeding and climbing mammals.

Using the living collections of XTBG, the researchers analyzed the traits of 31 tropical woody species with spines on their trunk, and investigated their potential functions using arguments from simulation and the nutritiousness of defended organs.

They performed [virtual experiments](#) to evaluate the potential roles of trunk spines against bark removal and climbing animals of different sizes. They then compared for each species and their confamilial non-spiny species the nutritional profiles of leaf, bark and [reproductive organs](#) to test whether trunk spines were associated with a nutritious organ.

They identified two new morphological syndromes that spines likely defend against debarking and climbing animals. They also identified already known functions that spines present as a remnant of a function performed earlier in their ontogeny (anchoring the plant in lianas, or defending the canopy from ground mammals).

"Our results provide an informed guide about trunk [spine](#) strategies and the criteria to identify them, their most likely function and the likely feeding mode and size of animal targeted by the defense, which could be used for setting up further [experimental work](#)," said Kyle W. Tomlinson of XTBG.

**More information:** Théodore Lefebvre et al, Trunk spines of trees: a physical defence against bark removal and climbing by mammals? *Annals of Botany* (2022). [DOI: 10.1093/aob/mcac025](https://doi.org/10.1093/aob/mcac025)

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