
Can we use plant form to explain the coexistence of woody plants and elephants in the thicket system?

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Abstract

While the notion that elephants topple trees is well recognised, little is known about factors determining the coexistence of elephants and woody plants. This is of particular interest if we are to understand the impacts of elephants, particularly in systems where this coexistence may have been disrupted. Plant growth form (tree - stem with distinct canopy cover vs mutistemmed shrub) may influence elephant tree pushing, and such growth forms may be altered by goat browsing. The Karoo Thicket Mosaic provides an ideal opportunity to explore the impacts of elephants after their return to this system, which has been transformed by goat browsing. We predicted that woody plants in areas exposed to prolonged goat browsing will occur in the tree form. Conversely, woody plants exposed to elephant browsing will occur in shrub form owing to resprouting or coppicing following damage. Additionally we predicted that plant form will play an important role in influencing elephant tree toppling. We tested these hypotheses, using *Pappaea capensis* as a dominant model for thicket woody trees. We sampled in a site with a relic elephant population (Addo Elephant National Park Main Camp), a site where elephants were recently re-introduced (Kuzuko) and a site with domestic livestock but no elephants (a livestock farm adjacent to Kuzuko). As predicted, in the presence of goats, woody plants are converted to umbrella shaped trees, with the tree form predominating in sites with long periods of goat browsing, but not elephants. Further, woody trees suffered higher levels of elephant toppling than shrubs of comparable size. However, toppled *P. capensis* is able to persist, either through coppicing or resprouting and these forming shrubs not trees. The result explains the patterns of woody plants persistence in the presence of elephants, this through change in growth form.

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