

Conventional and Novel Procedures for Evaluating Herbivore Damage on Plants: the Biological Control of *Sesbania punicea* (Fabaceae)¹

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Abstract

The introduction of the aponid weevil *Trichapion lativentre* into South Africa for biological control of the leguminous weed *Sesbania punicea* has provided an opportunity to study the effects on the host plant of a single herbivore species, in the absence of predators, parasitoids or competition from other herbivores. A sampling programme to measure the net annual above ground (stems, rachides, leaflets, inflorescences and pods) of the *S. punicea* plants at sites with and without the weevil *T. lativentre* is described. The methods can be applied to most studies of herbivore/host-plant interactions including crop-pest associations. The limitations of conventional graphs of plant productivity, including Allen curve plots, are discussed. Novel plots, here termed "relative-growth-curves", are described that illustrate the productivity and phenology of each or all of the components of the plants and which overcome these limitations. Comparisons of relative-growth-curves from weevil-free sites and from sites with weevils show both the obvious and subtle effects of these herbivores on the host plant. Graphs of the ratio of plant productivity at weevil-free sites to plant productivity at sites with weevils, quantify the differences in productivity between the two situations. Feeding by larvae and adults of *T. lativentre* greatly reduces net annual productivity of both the vegetative (up to about a three-fold reduction) and the reproductive components (up to about ten-fold) of the *S. punicea* plants.

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