

***Cytisus scoparius* plants infected by the native parasitic plant *Cassytha pubescens* have reduced growth and reproductive output**

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Summary In the Mount Lofty Ranges of South Australia, the introduced shrub *Cytisus scoparius* L. (Link) (Scotch broom) is one of the hosts of the native parasitic plant, *Cassytha pubescens* R.Br. (dodder laurel). Although infection can result in the death of the host plant, we have also observed that *Cytisus scoparius* plants infected by *C. pubescens* have fewer flowers than uninfected plants. Parasites probably compete with developing seeds and other reproductive structures of the host for photosynthate and other resources. If infection by *C. pubescens* results in reduced seed production, this has important implications for the persistence and spread of *C. scoparius* populations. The aim of this study was to determine whether infection by *C. pubescens* could affect the growth and reproductive output of *C. scoparius*.

Regular observations over one season were made of flowering and consequent fruit and seed production of a field population of 40 *C. scoparius*. Infected plants produced approximately half the number of fruits and flowers as uninfected individuals, although the timing of flower and fruit production was the same. The proportion of pollinated flowers, flowers maturing into fruits and the number of seeds produced per fruit did not differ significantly between infected and uninfected plants. However, as infected plants had fewer fruits, the total seed production of infected plants was less than uninfected plants.

Heavily infected *C. scoparius* branches frequently remained leafless and did not develop flowers during the main growing and flowering season. Flowers on infected plants typically developed on uninfected branches or stems with low densities of *C. pubescens*.

The shoot growth of glasshouse-grown *C. scoparius* plants newly infected with *C. pubescens* cuttings was measured. Six weeks after the infection had formed, infected shoots of *C. scoparius* had very poor growth, but the growth of uninfected shoots on these plants did not differ significantly from the shoot growth of plants not infected by the parasite.

Our results indicate that infection by *C. pubescens* prevents the expansion of leaf and flower buds. This could be a physical process where the *C. pubescens* stems grow over bud primordia thereby preventing their expansion. However, competition from parasite sinks may also reduce the resources available for host bud expansion. There is also a loss of photosynthetic capacity when leaves fail to expand on infected shoots. We are currently investigating this process.

Although *C. pubescens* can hinder reproductive output of *C. scoparius*, the impacts on host mortality may be more important in reducing *C. scoparius* populations. Although mortality wasn't recorded in our trial, it has been widely observed within the central Mount Lofty Ranges. The parasite may be a valuable control tool in association with other biological control agents, particularly in sensitive areas where herbicide application or mechanical control methods are not suitable.

Keywords Biological control, *Cytisus scoparius*.

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