

## SYNERGISM BETWEEN TWO FUNGI KILLS NOOGOORA BURR

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Biological control of the Noogoora burr (*Xanthium occidentale*) complex with fungi represents a possible alternative or complementary strategy to traditional control measures. The microcyclic rust, *Puccinia xanthii* can severely affect the growth of the *Xanthium* weeds in some regions of Australia but rarely kills them. The relatively strict dependency on optimum climatic conditions for epidemics of *P. xanthii* on the Noogoora burr complex limits its capacity as a classical biocontrol agent.

Several facultative parasitic fungi infect and cause localized disease lesions via leaf and stem rust lesions on Noogoora burr. Among the fungi tested, *Colletotrichum orbiculare* was the only fungus able to grow beyond the stem rust lesions into the surrounding tissue, girdle the stem and consequently kill the plant tissue above. *C. orbiculare* did not cause disease on healthy plants nor on plants previously infected by *Alternaria zinniae*, a potential bioherbicide for the *Xanthium* weeds. The unique synergy between *P. xanthii* and *C. orbiculare* suggests that *P. xanthii* alters the physiology of the infected and neighbouring host cells and renders them highly susceptible to *C. orbiculare*.

The use of *C. orbiculare* on rust infected populations of Noogoora burr may have the potential to control this weed in the field more effectively. Further investigations of the *P. xanthii* - *C. orbiculare* interaction at the cellular and biochemical levels are necessary to elucidate the interaction mechanism. This knowledge could be useful in the development of an effective bioherbicide for the control of the Noogoora burr complex.

## INTEGRATED SHRUB MANAGEMENT IN SEMI-ARID WOODLANDS: A PRELIMINARY EVALUATION OF SUB-LETHAL CHEMICAL DEFOLIANTS APPLIED TO YOUNG COPPICE REGROWTH

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A series of screening studies were undertaken during 1990-92 to evaluate the effectiveness of several potentially useful chemical defoliant when applied over a range of concentrations to seedlings of *Cassia nemophila* and different aged coppice regrowth of *Eremophila mitchellii* and *E. sturtii*. Initial results, in terms of leaf death, were extremely promising and provided striking evidence that some chemicals, especially glyphosate (Roundup) were capable of mimicking fire by killing young shrub foliage (no older than one season's regrowth), even at the most dilute concentration (1: 80). Timing of secondary chemical treatment is likely to be critical. Research based on repetitive treatments imposed by fire using artificial fuel suggests that 80% of shrubs receiving a second defoliation using chemicals applied in the autumn may fail to recover. Only c. 20-30% mortality may occur from secondary spring defoliation.

This paper reports on the results of initial screening experiments and describes collaborative research currently underway in western New South Wales and western Queensland examining the application technology required for treating extensive areas of shrub-infested rangelands.