

GOLDEN WATTLE LOSES ITS LUSTRE

Biological control of Australian acacias in South Africa

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Golden wattle (*Acacia pycnantha*) takes pride of place as the national floral emblem of Australia where it occurs naturally in the south-eastern parts of the country. Indeed, in his book *A field guide to Australian trees*, Ivan Holliday gives top billing to golden wattle as 'the *Acacia* that most enlivens the Australian bushland and roadsides after a drab winter'. The bright yellow flowers occur in clusters on stalks and are prominently exhibited in masses above the green foliage. This impressive display of flowers has become a part of the spring vista in some areas of the Western Cape and Eastern Cape following deliberate plantings of golden wattle in South Africa during the 1800s.

Ironically, golden wattle is not easy to cultivate in Australia because attacks by specialist, gall-forming insects stunt the growth and flower production of the plants. One of these gall-forming insects has now been introduced into South Africa in a deliberate attempt to check the natural dispersal of golden wattle here. The galls are induced by the grubs of a species of wasp (*Trichilogaster*, Pteromalidae) which can only develop on golden wattle. The adult wasps are active throughout November but individuals only live for a few days. During this period, the females insert eggs into the small immature inflorescences which are destined to become flowers and seeds during the following spring. On hatching, the grubs feed in the inflorescence and secrete chemicals that mimic the plant's hormones and induce abnormal growth.

Inflorescences with grubs become distended and develop into characteristic galls instead of normal flowers and seed pods. The grubs live in hollow chambers within the galls and are thus protected from environmental extremes and predation while being ensured an abundance of food. Besides destroying the reproductive tissues, galling stunts the growth of plants because more resources are required to produce galls than would normally be allocated to flowers and seeds. In the



Golden wattle flowers. Photo: Tony Gordon.

process the vigour of the plants is drastically curtailed.

The first releases of golden wattle-gall wasps were made in 1987 by entomologists from the Plant Protection Research Institute (PPRI). Initially the insects were slow to increase in numbers but since 1995 massive populations have developed around the original release sites and the wasps have been manually redistributed throughout the range of the weed. Galls are now extremely common and flowers are becoming increasingly scarce so that the once-prominent displays of golden flowers are no longer apparent. Although this loss may be felt by some, it is a small price to pay for the benefits that will accrue from not allowing golden wattle to spread further.

In the case of the golden wattle-gall wasp, history is repeating itself in many ways. This project follows the successful introduction of a closely related species of gall wasp (*Trichilogaster acaciaelongifoliae*) to control long-leaved wattle (*Acacia longifolia*) in 1982. Before this, long-leaved wattle was one of the major invasive alien plant species in the country. Nowadays the weed is not even mentioned when rankings are assigned to the many invasive species

that threaten our environment.

The impact of the long-leaved wattle-gall wasp has been gradual because in most infestations, vast quantities of seeds had accumulated in the soil over extensive areas. However, because of the insect, very few seeds have been produced in the last twenty years and seed banks have become depleted to the extent that decreasing numbers of new plants are recruited following fires.

In the case of golden wattle, the effect of the wasps is expected to be more immediate because the weed is at a much earlier stage of invasion and is still confined to a few isolated areas in the Western and Eastern Cape. Golden wattle occupies much the same habitat as another invasive species, Port Jackson willow (*Acacia saligna*) which is currently being brought under control by an introduced fungus. Without the wasps to control it, golden wattle was expected to spread rapidly into areas vacated by Port Jackson willow so that one invasive species would have replaced another with no apparent gain. The wasps which are effectively sterilizing their host plants will largely prevent any such take-over by golden wattle.

There is no doubt that golden wattle will virtually stop spreading naturally. In time the densities of existing infestations of plants will decline, with substantial benefits for the environment and the sustainable flow of water in our alien-infested rivers. All this will have been achieved at very little expense and with no detrimental ecological side effects. In the mean time, other insects, especially seed-feeding weevils, are being used to enhance the biological control of these and other invasive alien acacia species. The aim is to have a complex of two to three biological control agents on each weed species so that the damage caused by the plants will be minimized and the integrity of our natural ecosystems can be restored.

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Far left A female adult of the golden wattle gall-wasp. Photo: Tony Gordon.

Left Galls induced by the larvae of the golden wattle gall-wasp. Photo: John Hoffmann.

