Possible Bio- Control of Sifton bush (*Cassinia arcuata*) by scale insects

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Introduction

In 1988 Peter Wykes noticed 1 ha of dead sifton bush (*Cassinia arcuata*) on his property "Daydawn" Kerrs Creek, 26 km north of Orange NSW. Since then about 1600 ha of sifton bush has died in the area. Death of sifton bush in the Hill End area was previously reported in March 1979 (J.Dellow, pers. comm.) and February 1986 (G.Kelson, pers. comm.) on farms within a 20 km radius of the Kerr's Creek property.

The main cause appeared to be a native lac or scale insect of the genus *Austrotachardia* sp. Chamberlin (*Hemiptera, Coccoidea*, family *Kerriidae*), identified by P. Gullan Australian National University, Canberra, 1990. A more recent identification suggests that the scale may belong to *Paratachardina*, a genus closely related to *Austrotachardia* (J.Donaldson, pers. comm., 1991).

Sifton bush is a major native weed in NSW and a number of other *Cassinia* spp. pose similar threats (Campbell, 1990; Campbell *et al.*, 1990).

Scale Insect

The scale insect spreads by 0.5 mm long crawlers (larvae or first-instar nymphs) that walk at 2 m/hr. Emergence of crawlers in the 1990-91 season occurred in late November-early December 1990 and from mid February to late March 1991. Overnight the orange crawlers find a favourable site on a stem, insert their mouth parts (stylets or proboscis), begin feeding by sucking sap and settle down for a stationary life. They then retract or lose all appendages (legs, antennae, 2 long rear filaments, caudal setae or tails) and begin covering themselves with lac (resin) and secreting wax.

The stationary larvae develop into oblong (1.5 x 0.6 mm) male tests (red) and hard, oval (2 to 5 mm diameter) female tests (maroon). The male emerges as a small red fly with 2 wings and the female, after fertilization, develops embryos under the test which later emerge as crawlers. The time from one generation to the next is not known. Crawlers that emerged and established on new plants in early December 1990 could be distinguished as male and female by mid February 1991. Males emerged in mid March 1991 and fertilised the young females (1 mm diameter). When these females will produce crawlers is not known.

Shrub Species Affected

In addition to sifton bush, this scale insect has been observed attacking *C. longifolia* (dogbush) and *C. quinquefaria* (sagobush) at Kerrs Creek. It has not been observed on a plant of any other species. An experiment conducted by M H Campbell, where crawlers were allowed a choice of 10 cm cuttings of 8 plants spaced at random in 4 rows 10 cm apart, showed the crawlers infected sifton bush (24 per cutting) and dogbush (16 per cutting) but completely disregarded blackberry, briar, St. John's wort, wattle, eucalypt and Radiata pine cuttings.

Austrotachardia sp. and, sometimes the white covered diaspid scale *Chionaspis* sp., have been observed attacking sifton bush near Hill End, Cowra, Gulgong and Purlewaugh over the last two years. Another red scale, *Tachardina* sp., has affected large areas of *C. quinquefaria* and *C. laevis* near Bingara.

How scale insects kill sifton bush is not known but other similar groups (mealybugs and armoured scales) kill by sucking out sap, introducing toxins in the saliva or by spreading viruses (P. Gullan, Australian National University, Canberra, 1990).

Potential for Bio-Control

The possibility of *Austrotachardia* sp. controlling sifton bush is regarded as unlikely by entomologists because a native insect will have native predators that will control its population. Observations so far indicate four possible predators - the larval stages of: a small black fly; a lady bird beetle *Rhizobius* sp.; a moth *Eublemme* sp.; a case moth. However if we can transfer cuttings just before emergence of crawlers, allow the crawlers to infect sifton bush in a new area and then destroy the cuttings before the predators emerge it is possible that the scale insects could be spread with minimum damage from predators. Scale insects have been successfully spread in India (Froggatt, 1899) and Australia (Peter Wykes on his own property) by human transmission of cuttings. Already *Austrotachardia* sp. has been established from cuttings, on clean sifton bush near Orange, Booroowa and Crookwell.

It is possible that ants protect scale insects from predators by collecting the sugary secretion called honeydew from the female scales. A healthy infestation of scale insects is attended by swarms of ants that could threaten any predator. One species of attendant ant *Iridomyrmex* (possibly *rufoniger*) was collected at Kerrs Creek but other species have been observed collecting honeydew in other areas. Another associate of the scale insects is the black sooty mould fungus (*Capodium walteri*) which grows on the honeydew. Our observations indicate that the fungus does little harm to the scale insects.

References

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