

BIOLOGY OF CALOMBA DAISY, *PENTZIA SUFFRUTICOSA*

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Summary. Calomba daisy, *Pentzia suffruticosa*, an annual plant originating from South Africa, has been introduced accidentally into South Australia and Western Australia. It occurs as a serious weed in parts of these two states. The current knowledge of Calomba daisy is reviewed, based on information from the literature, from observations of the species in Australia, and from research being conducted in South Australia.

NAME

Pentzia suffruticosa (L.) Hutch ex Merxm, *Compositae*. The species was previously referred to as *Matricaria suffruticosa* (L) Druce (6) and in W.A. it is still referred to commonly as *Matricaria*. In South Australia, Calomba daisy is the accepted common name, although other local names are also used.

DESCRIPTION

A detailed description is provided by Jessop and Toelken (3). Calomba daisy is an annual, with erect stems growing to about 60 cm high and becoming woody with maturity. Leaves are grey-green and finely divided. Masses of small yellow flowers are produced in dense compound corymbs in October-November. The seed is held in the flower heads for several months after maturity. The plant has a strong and objectionable odour.

HISTORY

Calomba daisy originates from South Africa. It was accidentally introduced into South Australia in 1922 in contaminated fodder and was first recorded at Calomba, a railway siding about 60 km north of Adelaide, in 1930-31 (5). It was also recorded at Pt. Lincoln in 1939, and again in 1955, but these appear to be isolated occurrences. Calomba daisy spread considerably in the area north of Adelaide, between Two Wells and Port Wakefield, in the mid-1960's to early 1970's (2) and now infests approximately 100,000 ha. Occasional outbreaks elsewhere in the State are usually eradicated promptly.

The species also occurs in Western Australia, near Kalgoorlie, and in the wheatbelt near Merredin. The earliest specimens were collected from Hamelin Bay, on the south-west coast in 1952 and 1954, but it does not appear to have become established there. It was first recorded at Kalgoorlie in 1954 and spread considerably in the 1970's. The actual area infested by Calomba daisy in the Kalgoorlie region is unknown but a boundary around the affected areas would encompass approximately 4 million ha (A.C. Linto, pers. comm., 1984).

Calomba daisy and globe chamomile, *P. globifera* became established in the wheat belt near Merredin in the 1970's. Globe chamomile is the more abundant of the two species. In 1980, over 14,000 ha of the W.A. wheatbelt was infested by these two *Pentzia* species and the area was increasing. Globe chamomile does not occur in South Australia.

HABITAT

Calomba daisy is not an important plant in South Africa and very little information on the ecology of the species is available from that country. It is most common on sandy soils in semi-arid, winter rainfall regions where the annual rainfall is 375 mm or less, but it can occur in other situations, especially where there has been some form of soil disturbance. In South Australia it occupies a similar habitat. A survey of pastures in the Lower North of South Australia found that Calomba daisy was most common on soils with greater than 90% sand, and with a pH of at least 8.5 (4).

Kalgoorlie has an average annual rainfall of approximately 235 mm but this varies widely from year to year. In this region, Calomba daisy does not appear to favour any particular soil type, but grows most commonly in areas that have been overgrazed or otherwise disturbed, such as holding paddocks and around dams.

GROWTH AND DEVELOPMENT

Germination and emergence. In South Australia, germination of Calomba daisy commences in early to mid-March following the first substantial autumn rains. Of the total germination for the season, 85-90% occurs in the following four to six weeks. If there is adequate rainfall, germination can continue at a low level throughout winter and into early spring. Calomba daisy seed is small and emergence occurs most commonly from, or just below the soil surface. Emergence and establishment of seedlings are more successful on sandy soils than on heavier soils. Establishment is also significantly better on a bare soil surface than on a surface covered by plant residues (Stephenson, unpublished data).

Dormancy and viability. Calomba daisy seed contains a water soluble inhibitor that helps to prevent germination during the summer after the seed is formed. High temperatures, or very low temperatures, also inhibit germination. However, once the inhibitor is leached out, germination is possible at any time of the year if sufficient moisture is available. Most of the seed probably germinates in the season after it is formed, but a small percentage of seed that had been buried for up to three years was still viable (Stephenson, unpublished data). Longer burial periods have not been investigated.

Morphology and phenology. The high relative growth rate of Calomba daisy seedlings and their erect growth habit enable them to compete successfully with other prostrate or slower-growing species. Flowering normally occurs in October-November, and the species appears to be self-pollinated. An 'average' plant has tens of thousands of individual florets. Not all of the florets develop a seed, and not all seeds are viable, but thousands of seeds can be produced by a single plant (Stephenson, unpublished data).

IMPORTANCE

Detrimental. Calomba daisy is a weed of pastures, where it competes with more desirable species. Stock will graze Calomba daisy if feed is limited, but they generally avoid it. Milk and meat of animals that graze the plant are temporarily tainted. Calomba daisy is also a weed of roadsides and non-agricultural areas where it can compete with native vegetation. It occurs in crops, but it is not clear to what extent yields are reduced.

Beneficial. In the past, Calomba daisy has been used for minor medicinal uses and in dried flower arrangements, but it has no current beneficial uses.

Legislation. Calomba daisy is a declared agricultural pest plant throughout most of South Australia. *Pentzia* spp. are not declared pest plants in Western Australia, mainly because the Agriculture Protection Board (APB) considers that suitable control recommendations are not available for all situations. However, an advisory leaflet published by APB states that "it is essential that *Matricaria* is eradicated from Western Australia".

CONTROL

Response to herbicides. Dinoseb is the only herbicide currently registered specifically for the control of Calomba daisy in legume pastures and in field peas. Other suitable techniques for controlling Calomba daisy in pastures include spray-grazing, where the application of a low rate of 2,4-D is followed by a short period of heavy grazing, and spray-topping (7). Spray-topping with paraquat or glyphosate, applied just before flowering, reduces seed production and glyphosate also appears to render the plants more palatable to grazing sheep, thereby improving the level of control (1). Because of its erect growth habit Calomba daisy can also be controlled selectively by glyphosate applied through wiper equipment (e.g. ropewick).

Many of the early post-emergence herbicides normally used to control broad-leaved weeds in cereal crops will also control Calomba daisy (7). Staggered germinations of the weed may present a problem and, for this reason, residual herbicides such as chlorsulfuron have proven most successful (Stephenson, unpublished data).

Spot-spraying with paraquat or glyphosate is the current recommendation for control of Calomba daisy along roadsides, fence lines and in other non-arable situations.

Response to cultural methods. Cultivation effectively controls emerged Calomba daisy plants but may bring previously buried seed to the soil surface where they are then able to germinate.

Mechanical topping can reduce seed production, but Calomba daisy exhibits a strong capacity to regrow following slashing, and a second run with the mower is usually necessary. In one instance Calomba daisy plants, that were 'topped' when a cereal crop was harvested, survived over summer and regrew in the following season.

REFERENCES

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