Management Guidelines:

- Mapping in late autumn is suggested - the mature plants being highly visible.
- Cutting plants off at ground level after seed set should result in their death. Mechanical slashing is not recommended due to the increased possibility of contact with the toxic sap.
- Removal and careful disposal of all plant material is important.
- After any significant rainfall, and through early winter, the site should be checked for seedling and crown growth emergence.
- Seedlings should be carefully hand weeded from bushland with minimal soil disturbance, and crown regrowth rechipped.
- Small plants if grubbed must have their roots completely removed from the soil (it is important not to waste effort by removing plants ineffectively).
- Over very large areas seedlings and crown regrowth may need to be dealt with by an appropriate herbicide.

NOTE: Given the effectiveness of chipping it is likely that fire will also kill mature plants. However, fire should not be used as a control method as effects on *Euphorbia terracina* seedbank stimulation are unknown. Furthermore, in disturbed areas fire may contribute to weed invasion. A fire may, however, open an opportunity to use one of the other suggested control methods on subsequent seedlings.

Cautionary note: The sap in the stems of *Euphorbia terracina* is highly caustic and can cause quite dramatic and painful inflammations of sensitive skin. If the sap gets into the eyes temporary blindness is often reported and in some severe cases varying but permanent vision loss has been reported. When working in or with this plant, or any *Euphorbia*, care should be taken to minimise direct contact with the plant.

Safety glasses or face shields and gloves, a minimum, with fully enclosed shoes and neck to wrist to ankle protection advised.

References and further information:

Hussey, B.M.J., Keighery, G.J., Cousens, R.D., Dodd, J. and Lloyd, S.G. (1997). *Western Weeds: a guide to the weeds of Western Australia*. The Plant Protection Society of Western Australia, Victoria Park.

Parsons, W.T. and Cuthbertson, E.G. (1992). *Noxious Weeds of Australia*. Inkata Press, Melbourne & Sydney.

Peirce, J. (1998). Declared Plant Control Handbook. 5th Ed. Misc Pub. 4/98. Agriculture Western Australia (updated version online at http://www.agric.wa.gov.au/progserv/plants/weeds/weed_control/index.htm).

Scheltema, M. and Harris, J. (1995). *Managing Perth's Bushlands: Perth's bushlands and how to manage them.* Greening Western Australia, Perth.

Getting Involved - The Environmental Weeds Action Network:

The Environmental Weeds Action Network (EWAN) is a community initiative to tackle the problem of environmental weeds in bushland and waterways. It brings together community members in both urban and rural areas, bush regenerators, local government, weed scientists and ecologists to save our indigenous flora from the threat of weeds.

The aims of EWAN include:

- promoting an understanding of the threat of environmental weeds to our precious bushland
- providing useful information about weed control in native vegetation and elsewhere convincing governments at all levels of the need for appropriate legislation and funding for weed control
- researching methods of weed control
- encouraging community participation

Telephone (08) 9220 5311 or visit our web site at http://members.iinet.net.au/~ewan/

Acknowledgements:

John Peirce, Research Officer, Agriculture Western Australia.
Cheam, A.H. (1994-96). Ecology of Geraldton Carnation Weed. Research Information System unpublished data. AGWEST.

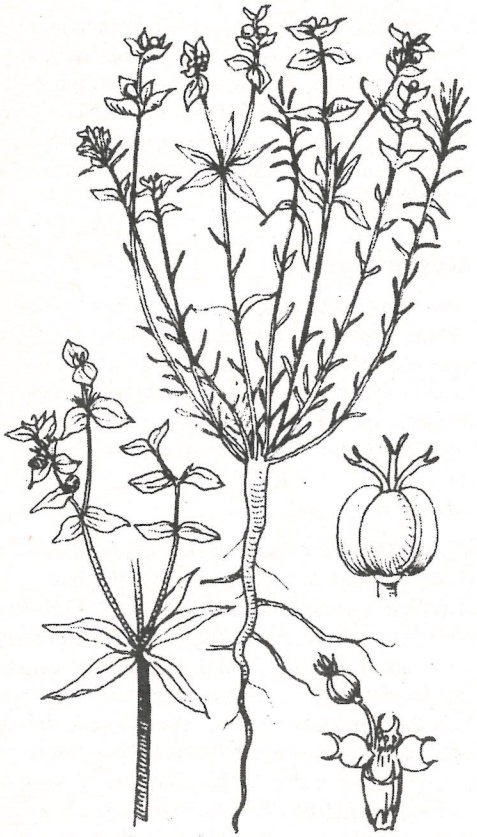
Kate Brown, Project Officer, EWAN.

Compiled by Rod Randall (AGWEST) and Kris Brooks (EWAN) for the Environmental Weeds Action Network, October 2000.

Bushcare

Swan Avon Integrated Catchment Management

Managing Weeds in Bushland



Geraldton Carnation Weed

***Euphorbia terracina* L.**
Euphorbiaceae

WOW
WEEDS OR WILDFLOWERS
Environmental Weeds Action Network (Inc)

Watch out for Geraldton carnation weed!

Geraldton carnation weed, false caper, spurge and terracina spurge all refer to the species ***Euphorbia terracina***. A large shrub-like herb it forms dense thickets which out compete native species for space, light and nutrients. Its rapid growth and prolific seeding gives it the potential to invade areas of healthy bushland.

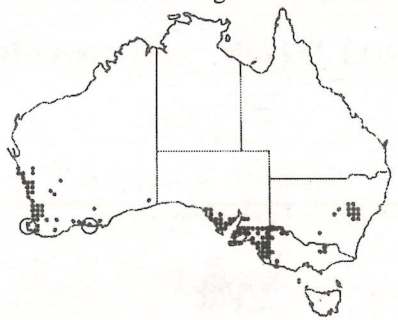
Euphorbia terracina is an upright perennial to 1m high, supported by a robust vertical taproot. The shrub-like herb consists of several green to reddish, slender leafy stems which branch at the top to produce 4 or 5 flower stems. Flowers are highly modified, yellow/green cup like structures, quite distinct from the bright green leaves. **The whole plant exudes a toxic milky sap when cut.**

A declared plant!

In parts of Western Australia *Euphorbia terracina* is a listed **'Declared Plant'** under the Agriculture and Related Resources Protection Act and a **'Pest Plant'** under the Local Government Act. Landholders with declared plants are obliged to control them at their own expense whilst declaration as a pest plant authorises the Shire Council to enforce control of the plant.

Where does it grow?

Despite the name Geraldton Carnation weed is not confined to Geraldton – far from it. This Mediterranean native has naturalised in Western Australia from Geraldton to Esperance, predominantly in coastal heath and Tuart woodland. In South Australia it extends from Yorke Peninsula, north to Gawler, and along the Murray River to north-western Victoria. It is also recorded from the North East region of Victoria and Central Western Slopes and South Western Plains of New South Wales. The weed is common on well-drained sandy soils, sand dunes, roadsides and degraded bushland. It is often associated with shallow soils that have a high calcium carbonate content.



Distribution of *Euphorbia terracina*. Adapted from Parsons and Cuthbertson (1992).

Biology and Life Cycle:

The bulk of seedlings emerge at the start of winter, with a decline in emergence as the weather cools. Good summer rains and mild winters promote early seedling emergence. Seedlings grow strongly throughout winter producing several stems from the crown. Flowering commences in spring and continues into summer given suitable conditions. The occurrence of flowers and mature fruit together on the one plant is common. New stems are produced from the crown of established plants in autumn. Inflorescences may then develop on both the older and new season's stems.

How does it spread?

Euphorbia terracina does not spread vegetatively, proliferation is by seed only. Seed is scattered over several metres when the ripe fruit bursts open explosively. Long distance dispersal is mostly by soil, **especially in crushed limestone used in road and path construction**. Seed can also be transported by water movement or carried by animals and machinery.

Knowledge of seed longevity in the soil is important in planning a control program. Generally speaking a seed bank, if not allowed any further recruitment, would probably last 3-5 years dependent on the severity of the winters. The rapid onset of a cold winter may force seed into dormancy before having the chance to germinate, extending the life of the seed bank.

Limestone: Seed recruitment from external sources is the most common cause of new infestations and the use of limestone in paths and access roads is a major source of these incursions. If crushed limestone is proposed for use in this manner it should be obtained from a verified *Euphorbia terracina* free quarry or supplier and preferably not from material that has been exposed for any period of time, hence minimising the possibility of contamination.

Control and Management:

Understanding the distribution: Knowing the extent of an infestation is paramount to any good management program. Accurate maps allow targeted control of infestations and provides evidence of where the program has been effective and where it has failed. As with all weeds it is important to remove isolated patches within intact bushland before they spread. Working from the intact bushland out towards the disturbed areas also limits spread – especially where the infestation cannot be removed in one concentrated effort. Updating maps regularly provides good feedback to workers on the effectiveness of their efforts.

Physical Control: Hand removal must be complete or the plants will regrow. Plants as young as 3 weeks of age must have the roots entirely removed or regrowth occurs with final seed production the same as an ungrubbed plant. Soil disturbance resulting from the grubbing of plants will encourage other weeds to colonise the area. Care must be taken not to allow wind erosion on light soils through unnecessary soil disturbance.

Cutting plants off at the base is completely ineffective **until** after the plants have seeded. Once plants have finished seeding cutting the plants at ground level will kill all plants (**see cautionary note**). To minimise seed recruitment in the soil, cut plants should be taken from the site and disposed of carefully. As few seed germinate from below 5 cm, deep burial of plants is a suitable disposal method. In highly disturbed areas, a heavy mulch layer (greater than 5cm) applied after the removal of cut plants will effectively block seedling recruitment from the soil surface.

Chemical control: Care must be taken to avoid off target damage when using herbicides in bushland. It is important that training in the correct use of herbicides is undertaken. The following herbicide information is supplied by the Agriculture Protection Board.

Herbicide	Garlon 600® (minor use registration)	chlorsulfuron (minor use registration)	metsulfuron + 2,4-D amine or MCPA (minor use registration)
Active ingredient & Group	600 g/litre triclopyr	750 g/kg chlorsulfuron	600 g/kg metsulfuron methyl + 500 g/litre 2,4-D 500 g/litre MCPA
Rates of dilution for spot spraying	1:300	1 g in 50 litres	1 g in 150 litres
Knapsack amount of product per 10 litres water	30 mL	0.2 g	0.05 g + 10 mL wetter
Rate of product per hectare	3 litres	15 g	3 - 5 g + 0.5 - 1 litre
Wetting agent dilution			1:400
Time of application	winter - spring	early winter	winter
Remarks	More effective on older plants	Effective on seedlings and adult plants	More effective on adult plants
Additional information	Try glyphosate at 1:10 from flowering to seed maturity.		