Xanthium spinosum 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae

Common name

Synonym *Acanthoxanthium spinosum* , (L.) Fourr.
Xanthium spinosum , L. var. *inerme* Bel

Similar species *Xanthium occidentale*

Summary Xanthium spinosum (Bathurst burr) is classified as a noxious weed in the majority of areas where it has been introduced. It is a prolific seed producer with high germination and survival rates. Xanthium spinosum competes with pasture crops as well as contaminating seeds and wool. Additionally, it threatens native fauna and flora due to its adaptability to a wide range of habitats. Management has proven to be difficult, although possible biological controls are currently being investigated.

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Species Description
Bathurst burr (*Xanthium spinosum*) is an annual herb that is typically around 30 to 60cm in height. Its stem stands erect with a slight curve and is highly branched. The regions beneath each leaf or branch on the stem are covered with three-pronged yellow or green spines which are usually between 0.7 and 2.5cm in length (WA, undated). The leaves are characterised by three irregular lobes with distinct veins in the centre of each lobe. The upper surface of the leaves is dark green and is thinly covered by a layer of short hairs. In contrast, the lower surface of the leaves is paler in comparison and is also covered with a layer of tomentum (IEWF, 2005). *X. Spinosum* is monoecious, that is, the male and female flowers are distinct from one another. The male flowers are usually green and inconspicuous and are clustered near the tips of the branches (DPIW, 2008). The female flowers are found lower down in the leaf axils and the nodes. The female flowers are enclosed in hard bracts which would later become burrs; the fruit carrying the seeds. Burrs are yellowish in colour, ovally shaped (10 to 15 mm long and 4 to 6 mm wide) and project hooked spines up to 3 mm long (DPIW, 2008).

Lifecycle Stages
The lower of the two seeds of Bathurst burr (*Xanthium spinosum*) has a shorter dormancy period, typically germinating few months following maturity (Pitcher, 1989). Conversely, the upper seed can remain dormant up to as long as 8 years (NWCB, 2007). The difference in the observed dormancy period may be due to site and season specific reasons. Moreover, studies have found that the relative permeability of the seed coat to oxygen may, at least partly, contribute to the dormancy periods (Auld *et al*, 1998). Experiment evidence reveals that high temperatures (32-38°C) can also overcome dormancy (Pitcher, 1989). Most plants die in late fall to early winter due to frost (NWCB, 2007).

Uses
Compounds derived from Bathurst burr (*Xanthium spinosum*) can be used as a diuretic.

Habitat Description
Bathurst burrs' (*Xanthium spinosum*) wide distribution can be attributed partly to its ability to adapt to a wide range of climatic conditions. For example, it readily thrives in regions where the soil has been disturbed; including pasture, wasteland and coastal areas. Additionally, warm locations such as sheep camps, watercourses, dam banks and floodplains may also accommodate its growth (Parsons and Cuthbertson, 1992).

Reproduction
The seeds of Bathurst burr (*Xanthium spinosum*) germinate in late spring to late summer. Following germination, fruits (burrs) are produced over a period of two to three months (Pitcher, 1989). On average, 150 seeds are produced per plant. It has been shown that flowering of the plant is day length dependent, with time to flowering decreasing with decreasing daylength (Auld *et al*, 1993). Each burr is characterized by two elongated cavities, each containing a single seed.

Nutrition
Bathurst burr (*Xanthium spinosum*) prefers moist soil as it has a high water requirement. As a result, the seeds tend to germinate after the early summer rains (NWCB, 2007).

General Impacts
Bathurst burr (*Xanthium spinosum*) is a highly invasive weed that is capable of growing under a range of environmental conditions. As a result, it easily establishes in pastures, meadows, riverbanks and potentially threatens native or endemic wildlife (Pitcher, 1989). Additionally, the weed can act as a host for a number of fungal diseases of plants (MDC, undated). It competes with agricultural crops such as soybeans and cotton, leading to a drastically reduced yield (Auld *et al*, 1999). Furthermore, bathurst burr can contaminate wool and other material due to its hooked spines, potentially affecting export (DPIW, 2008). Lastly, the seeds and seedlings of the plant contain the compound, carboxyatractyloside, which is poisonous to livestock, especially pigs and horses (Pitcher, 1989).

Management Info
General management of Bathurst burr (*Xanthium spinosum*) is primarily targeted to prevent seed generation.
Physical: Prior to flowering, mechanical removal such as pulling or hoeing is recommended. If removal is done after flowering, it is important to burn the plants to ensure the seeds are completely destroyed (Pitcher, 1989). Due to the long dormancy of the seeds, periodic follow-ups are necessary.
Chemical: The most common type of chemicals used to control bathurst burr are the broad-leaf selective herbicides. For example, 2,4-D is a phenoxy-type herbicide that does not affect grasses. Best application of 2,4-D is during the 3-5 leaf stage of growth as it is highly effective in penetrating the waxy coat on the leaves (Pitcher, 1989). Dicamba is another non-flammable, non-corrosive broad-leaf selective herbicide used to treat bathurst burr infestation.
Biological: Chemical control may not always be practical, as herbicides can potentially affect neighbouring crops such as cotton, thus certain infestations would have to be managed biologically (Auld *et al*, 1988). The potential of using insects as a biological control agent has been assessed in Australia, India, Pakistan and United States, but with limited success (Pitcher, 1989). Current focus has shifted towards fungal control. For example, the rust *Puccinia xanthii* has been found to attack several parts of the plant, leading to decreased burr production, germination as well as transpiration (Pitcher, 1989). More recently, the fungus *Colletotrichum orbiculare* has been found to cause lesions on stems and leaves of *X. spinosum* (Auld *et al*, 1988). Furthermore, it was found that, under optimal conditions, the fungus was able to kill the plant in just 14 days (Auld *et al*, 1988). The fungus can be applied in a similar convention as herbicide application.

Pathway
The spiny burrs of Bathurst burr (*Xanthium spinosum*) adhere to wool, fur, clothing as well as contaminate grains (PIER, 2008)

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[17] AUSTRALIA
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