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# St John's wort

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## Introduction

St John's wort (*Hypericum perforatum*) was brought to Australia in 1875 as a garden plant and is now a serious weed on the tablelands and slopes of New South Wales. It is found in pastures, water catchment reserves, forests and national parks.

St John's wort is a declared noxious plant in many local government areas in New South Wales (see page 11).

## The problem

St John's wort contains the toxin hypericin, which causes photosensitisation in sheep, cattle, horses and goats. The skin damage associated with this problem leads to weight loss, reduced productivity and, in extreme cases, death. St John's wort also adds vegetable fault to wool.

St John's wort competes with useful plants in pastures, and large infestions reduce property values.

## Distribution

St John's wort is a native of Europe, Asia and North Africa, and is a weed in 21 countries.

In Australia, Victoria was first to record St John's wort as a weed, in 1893.

St John's wort now infests large areas in NSW, Victoria and South Australia. The most heavily infested areas are the central and southern tablelands and slopes of New South Wales and north-eastern Victoria.

It is most suited to areas receiving more than 600 mm annual rainfall and above 500 m altitude.

## Identification

### Key Points for Identification

- Yellow flowers in October to January, about 22 mm across, with five petals.
- Leaves and branches always opposite one another on the stem.
- Leaves appear perforated when held up to the light.

St John's wort plant and flower. Photo: B. Trounce.

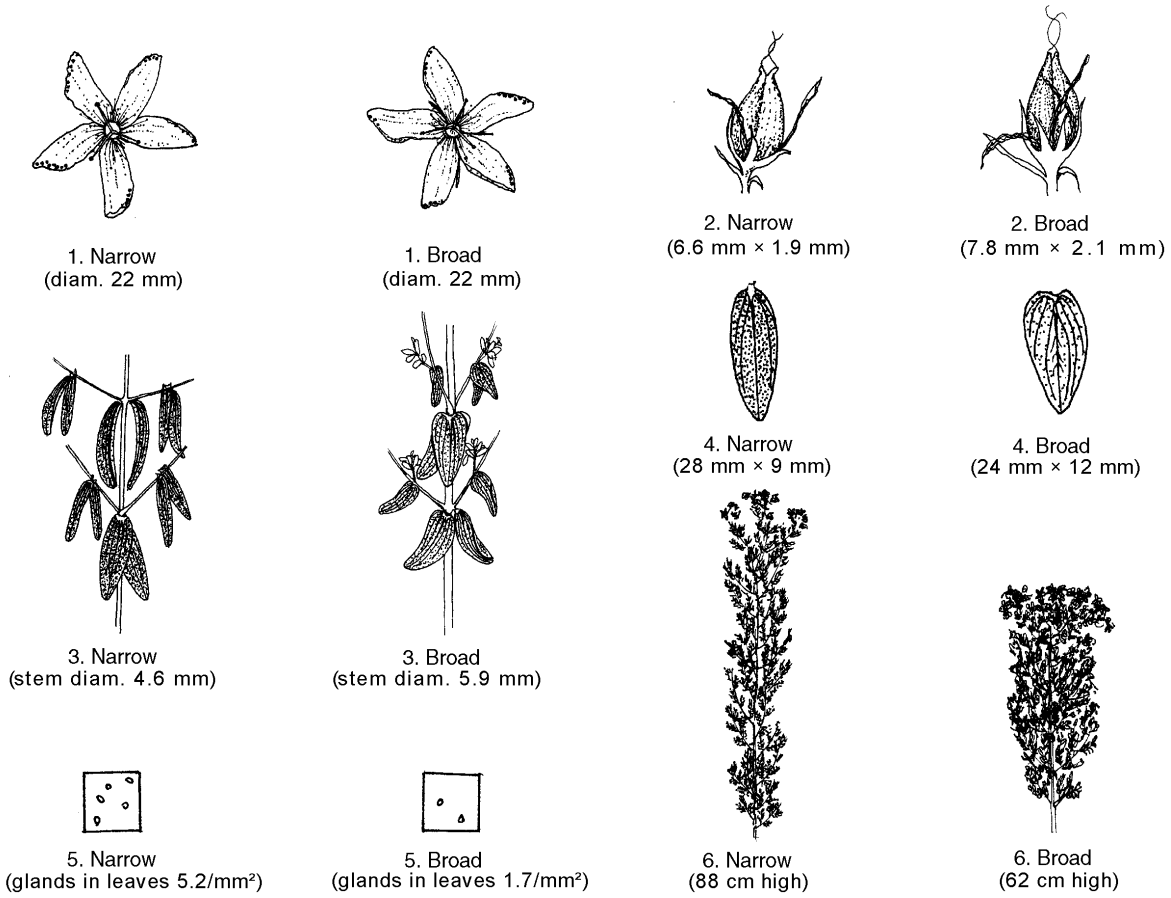


Figure 1. Comparison between narrow- and broad-leaf strains of St John's wort. J. Peacock.

## Strains

There are two main strains of St John's wort in NSW (Figure 1). Knowing which strain of St John's wort you are dealing with is essential, as toxic properties and management options will depend on the strain present.

The **narrow-leaf strain** is more widespread and contains more oil glands in the leaves, resulting in higher levels of hypericin. The plants are late-flowering and tall, with thin stems and small seed capsules.

The **broad-leaf strain** contains fewer oil glands in the leaves, resulting in lower levels of hypericin. It is early-flowering and short, with thick stems and large seed capsules.

### Leaves

Leaf width is the most reliable characteristic to use to distinguish between the broad-leaf and narrow-leaf strains. Leaf width is measured at the 6th node (bump) on the flowering stem when the plant is growing well in spring.

The **narrow-leaf strain** has leaves 7– 9 mm wide.

The **broad-leaf strain** has leaves 10–12 mm wide.

Leaves are paler green on the lower surface and have translucent oil glands, which give them a perforated appearance when held against strong light. They are opposite one another on the stem and have no stalk.

The translucent oil glands in the leaf. The leaf width – narrow (top) and broad (bottom) – allows for easy identification. Photo: NSW DPI

### Flowers

St John's wort flowers from late October to January. The flowers are bright yellow. They grow in dense clusters at the ends of the branches. The flowers are about 22 mm in diameter, and have five petals.

### Fruit and Seed

The fruit, a sticky three-celled capsule, is about 8 mm long. The fruit splits open on ripening in summer, to release seeds in the following autumn and winter.

The seed is small (0.5–1 mm), cylindrical and light to dark brown or black, with a pitted seed coat. Seeds need mild temperatures, light and rainfall (to wash off an inhibitor) before they will germinate. Seeds can remain viable for 12 years.

A plant may produce up to 33 000 seeds per year.

The flower bud, flower and seed capsule of St John's wort. Photo: NSW DPI

### Stems

Non-flowering stems grow from the crown in autumn and winter, and can form tangled thickets if not grazed.

Erect, woody, flowering stems are produced from the crown in spring. These stems sometimes have a reddish tinge, branch near the top and have two opposite longitudinal ridges.

The broad-leaf strain grows to a height of about 60 cm, while the narrow-leaf strain grows to a height of about 90 cm.

### Roots

St John's wort has one set of roots that grow vertically to about 1 m deep into the soil, and another set that grow horizontally and produce buds that form new aerial growth.

Deep soils favour the development of vertical roots and long-term survival of the crown. In shallow soils, the life of the crown is shorter and roots generally grow laterally and sucker more readily than vertical roots.

The broad-leaf strain of St John's wort (left) is short and early flowering, while the narrow-leaf strain (right) is tall and late flowering. Photo: NSW DPI

## Life cycle

St John's wort is a perennial plant. A single plant increases in size by growing outwards from the roots in concentric circles.

Seeds can germinate from autumn to spring, but new plants do not flower in the first year.

It has non-flowering stems that grow from the crown during autumn and winter and die in late spring, and flowering stems that grow from the crown each spring and die in the following autumn.

Viewed from a distance, an infestation of the weed appears yellow from November to January, a mixture of dark green, brown and yellow from February to April and brownish-red in winter.

St John's wort can spread by suckers growing from lateral roots. Photo: NSW DPI

## Dispersal

St John's wort spreads by seeds and lateral roots.

The sticky seed capsules adhere to animals – hence its spread along roads, travelling stock reserves and animal tracks. Seeds are also carried in the digestive tracts of animals, and seedlings have been observed in cattle dung. Seed is spread over short distances by wind, but over long distances by water, machinery, humans, livestock or feral animals.

The roots of St John's wort sucker and grow from fragments; therefore, cultivation can spread the weed unless the roots are brought to the surface and dried out.

## Toxic properties

St John's wort contains the toxin hypericin. Stock will only eat St John's wort when other feed is scarce; however, it is quite poisonous, particularly to animals not accustomed to it.

When animals ingest hypericin, it passes from the stomach to the bloodstream. When hypericin enters the blood vessels in the skin of an animal it is activated by bright sunlight. Sunlight alters the chemical structure of hypericin, making the compound potentially poisonous.

### Variations in hypericin production

*Plant parts and season*

Production of hypericin by St John's wort is strongly associated with the growth and development of its flower stems; consequently, hypericin levels display a large seasonal variation (Table 1).

Hypericin levels rise rapidly in spring once the new season flower shoots exceed a height of 5–10 cm. Levels continue to rise as the flowering heads develop further and reach a maximum when the plant is in full flower. Hypericin levels then decrease as flowers are lost and capsules mature over summer. In late autumn, when the growth of prostrate winter stems begins, only low to moderate levels of hypericin are present; these levels reach a minimum for the year from late July to late August. With spring, the hypericin levels rapidly rise and the cycle begins again.

*Strains*

St John's wort occurs as narrow-leaf and broad-leaf strains, the narrow-leaf strain containing about twice the concentration of hypericin as the broad-leaf strain. However, in both strains the hypericin production level changes as the growth stage of the plant changes (Table 1).

*Climatic factors*

Little is known about the influence of climatic factors on the production of hypericin in St John's wort.

Research was conducted by NSW Department of Primary Industries over two consecutive years (Figure 2). The first year was a lower than average rainfall year, and the second a higher than average rainfall year.

Results indicated that peak hypericin production in the year of above-average rainfall was found to be 20% higher than that for the year of below-average rainfall. This demonstrates that hypericin is not enhanced by water stress.

*Grazing*

When new season flowering stems appear in spring, continued heavy grazing significantly suppresses their rate of growth. This in turn suppresses hypericin production.

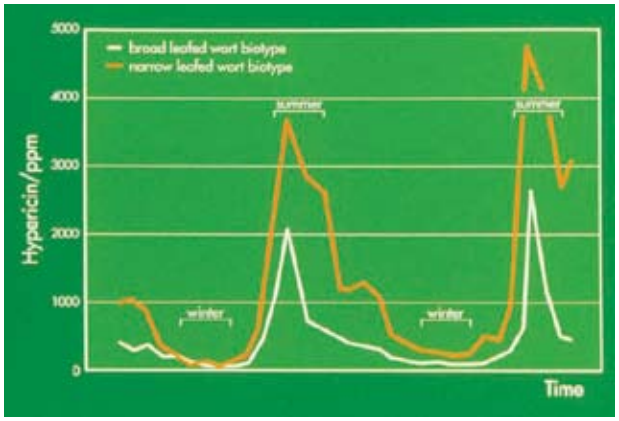


Figure 2. Seasonal hypericin variation over two consecutive years between broad-leaf and narrow-leaf St John's wort. Source: C. Bourke.

Table 1. Variation in hypericin production levels between strains and growth stages of St John's wort

| Growth stage | Time of year | Narrow-leaf | Broad-leaf |
|---|---|---|---|
| Growth of upright flower spikes | Sept–Nov | 300–600 ppm | 100–500 ppm |
| Full flowering | Nov–Dec | 1000–5000 ppm | 500–2500 ppm |
| Development of fruiting capsules | Jan–March | 3000–1500 ppm | 1000–400 ppm |
| Growth of prostrate winter stems | March–June | 1500–300 ppm | 400–100 ppm |
| Winter stem growth | June–Sept | 100–300 ppm | 50–100 ppm |

For example, in spring the broad-leaf strain was continously grazed. In early January, regrowth contained hypericin at 350 ppm. St John's wort which was not continuously grazed during spring contained 1400 ppm of hypericin.

## Effects on livestock

On sunny days, livestock grazing on pastures heavily infested with flowering St John's wort can develop clinical signs of hypericin poisoning in less than five hours.

Early symptoms of hypericin poisoning include agitation, head-rubbing, intermittent hind limb weakness with knuckling over, panting, confusion and depression. Some animals may develop mild diarrhoea.

This is followed by inflammation and swelling of the skin around the forehead and eyes. Affected animals also have abnormally high body temperatures (hyperthermia).

If affected animals continue to graze St John's wort, the reddish inflammation and fluid-associated swelling of the head and ears will worsen.

Affected animals will then rub their irritated heads or ears against fixed objects. Raw, weeping, bleeding areas of skin will develop, and eventually dry to form scabs.

### Production losses

The animal production losses associated with grazing St John's wort pastures include:

- weight loss and failure to gain weight associated with a reduction in eating ability or interest in eating
- less wool produced in sheep, and less milk produced in sheep and cattle
- fewer lambs and calves born alive and less surviving to weaning

Photosentisation causes swelling and scab formation on the face. Photo: C. Bourke.

- fewer ewes or cows that are sufficiently heavy or healthy to conceive in the first place.

### Treatment

Animals affected by hypericin poisoning must be removed from direct sunlight as soon as clinical signs develop, and held in full shade. Animals will need to remain protected by shade for at least four to seven days.

Once animals have excreted all accumulated hypericin they can be returned to sunlight and, provided they have access to good feed and water, should not show any further clinical response.

## Tolerance in animals

Since hypericin only becomes poisonous after it has been activated by sunlight, an animal's hypericin tolerance is influenced by the amount of skin protection it has. Therefore, characteristics that will increase animals' tolerance of hypericin are:

- pigmentation rather than non-pigmentation
- wool cover rather than hair cover
- wool cover rather than shorn wool
- dense, fine fleece or hair rather than open, coarse fleece or hair
- long rather than short wool or hair
- tough rather than soft skin.

In addition, an animal's tolerance of hypericin is increased in the absence of direct sunlight. For example, in trials conducted by NSW Department of Primary Industries, sheep were dosed with twice the daily intake tolerance amount of hypericin, while one group of sheep was kept indoors (out of direct sunlight) and another group outdoors (bright sunlight exposure). Only the sheep kept outdoors in bright sunlight developed clinical signs of hypericin poisoning.

This shows that preventing an animal's exposure to sunlight will increase its tolerance to hypericin. Since it is not practical to keep animals indoors, providing good shade cover in a St John's wort-infested paddock is the most practical way to minimise sunlight exposure and hence improve an animal's hypericin tolerance.

Pregnant and lactating animals should always be removed from St John's wort-infested pastures. Hypericin can cross from the mother into the blood circulation of her foetus or into her milk. This can result in the birth of weak or dead progeny, and poor performance in suckling young.

Adult animals are more hypericin-tolerant than suckling or young weaner animals. The softer, thinner skin of young animals, together with lighter fleece or hair cover, reduces their hypericin tolerance. Also, suckling young ingest hypericin from two sources: the

St John's wort in the pasture and the hypericin in their mother's milk.

Different animal species vary in their tolerance of hypericin, and there are significant differences within an animal species.

### Sheep

Sheep hypericin tolerance is influenced by their amount of wool coverage. For example, research conducted by NSW Department of Primary Industries indicated that the majority of Merino sheep with at least four months wool growth will not be poisoned by a single hypericin dose of 3 mg/kg live weight per day. However, 94% of recently shorn Merino sheep will develop early signs of poisoning, even at this low dose.

There are also small differences in hypericin tolerance between different bloodlines of sheep. Fine and superfine bloodline sheep, with at least four months wool growth, are more tolerant of hypericin than sheep from medium wool bloodlines. Studies show that superfine Merinos are more than twice as well protected against St John's wort poisoning than medium wool Merinos.

The difference in performance of different wool types reflects the greater crimp frequency and fibre density of the finer types, contributing to a tighter fleece with more skin protection from sunlight. Individual variation in hypericin tolerance also exists between sheep within the same bloodline.

Sheep affected by St John's wort showing swollen head and signs of depression. Photo: C. Bourke.

### Cattle

Until recently, it was believed that cattle were more sensitive to hypericin than sheep and goats. However, recent research by NSW Department of Primary Industries indicates that cattle may actually be much more tolerant of hypericin then previously suspected.

For example, the toxic dose of hypericin for yearling Hereford steers (approximately 300 kg) is about 10.5 mg/kg liveweight per day. Therefore, Hereford cattle are at least three times more tolerant of St John's wort than Merino sheep protected by white wool.

Based on this, fully pigmented cattle may be as much as four to six times more tolerant of hypericin. Further research needs to be conducted to more accurately assess the minimum toxic dose of hypericin for cattle.

### Goats

Anecdotal reports suggest that goats are more tolerant of hypericin than sheep and cattle. However, this may not necessarily stand up to scientific scrutiny. Genetic differences between groups of sheep in their sensitivity to St John's wort poisoning appear to relate to the exclusion of light from the skin rather than the capacity of sheep to metabolise and excrete hypericin. Therefore, it is possible that the same trend will apply to other ruminant species.

For example, a white, coarse-haired Saanen doe may be less tolerant of hypericin than a white, superfine, wool-protected Merino wether. A fully pigmented Angus steer may be more tolerant than either of these. Further research needs to be conducted to assess the minimum toxic dose of hypericin for goats.

## Control techniques

The most cost-effective and practical control techniques to use will depend on the scale of the St John's wort infestation and the topography of the infested land. All techniques should aim to remove the weed and replace it with introduced or native pastures.

### Prevention of spread

Preventing the invasion of St John's wort is the cheapest and most effective way of controlling it. Learn to identify the weed, and regularly check for it in October or November along boundary fences, roadsides, stock routes or reserves adjoining your property. If found, act immediately to remove it.

If purchasing livestock from areas contaminated with St John's wort, hold them in a small paddock for five weeks before releasing them, to allow seed on or inside the animal to be released. Later, inspect this paddock and treat any infestations. If you have infested paddocks on your property, minimise stock movements from infested to clean paddocks and clean any vehicles that have passed through infested areas.

Buy only certified seed. If purchasing fodder, obtain as much detail about the source of the fodder as possible. When feeding, restrict the feeding area, preferably to flat, arable areas, as they allow easy access and the opportunity to use a variety of control options; or, feed in paddocks where there is a strong perennial grass pasture, as this will provide good competition against establishing weeds.

Regularly check the feeding areas and treat any new infestations.

Establish a competitive perennial pasture, such as a phalaris pasture, along boundaries of infested paddocks, to create a buffer against the further spread of St John's wort.

### Burning

Burning checks the growth of St John's wort and destroys seeds on the plant, but has a more detrimental effect on the associated pasture than on the St John's wort.

### Hand-weeding

Hand-weeding, either by pulling plants out by hand or digging plants out using a hoe or shovel, is not an effective method of controlling St John's wort.

St John's wort can reproduce from buds produced on its roots; therefore, new plants will grow unless the entire root structure is removed.

### Herbicides

Herbicides registered for control of St John's wort include fluroxypyr, triclopyr + picloram and glyphosate. For a full list of registered herbicides for St John's wort refer to the NSW DPI publication *Noxious and environmental weed control handbook.*

Applied during flowering, fluroxypyr will selectively remove St John's wort while minimising damage to grasses or clovers, triclopyr + picloram will kill all legumes, and glyphosate will kill or severely damage all species growing with the weed.

### Spot-spraying

Spot-spraying is an appropriate control strategy to use on isolated St John's wort infestations. Triclopyr + picloram and glyphosate are both registered for the control of St John's wort using spot-spraying equipment.

Spot-spraying is best carried out when the St John's wort is in flower (November to January), because at this time it is easily seen and most sensitive to herbicides (Figure 3). Start spraying when the St John's wort reaches the 50% open flower stage and finish before it advances to the 50% green capsule stage. Avoid spraying plants when the flowers have turned brown. For best results when spot-spraying, spray to thoroughly wet foliage.

Do not spray St John's wort that has been defoliated by insects, grazing or cutting, or is moisture stressed, as herbicide effectiveness is reduced under these circumstances.

### Boom-spraying

Fluroxypyr, triclopyr + picloram and glyphosate are all registered for the control of St John's wort using boom-spray equipment. Boom-spraying St John's wort should be carried out from bud to full flowering (November to early January).

Patches of St John's wort can be treated with fluroxypyr or triclopyr + picloram using a small boom. Research conducted by NSW Department of Primary Industries indicates that two boom-spray applications of fluroxypyr or triclopyr + picloram one year apart at flowering can result in 100% kill of the weed.

Boom-spraying medium St John's wort infestations can be effective if the existing pasture can be salvaged. A chemical such as fluroxypyr will selectively remove St John's wort in the pasture while minimising damage to clovers or grasses.

If the existing pasture cannot be salvaged, boom-spraying with glyphosate in November/December as part of a pasture resowing program is the best option (see 'pasture competition' section).

### Rotary wiper

A rotary wiper can be effective for treating patches of St John's wort. Trials conducted by the Mid Western County Council near Mudgee resulted in a 90% kill of St John's wort one year after wiping. The St John's wort was treated at full flower with 1 L glyphosate per 20 L water (plus 200 mL wetting agent) by wiping the top two-thirds of the plants one way. It is important to graze any associated useful plants to below the wiper height before treatment.

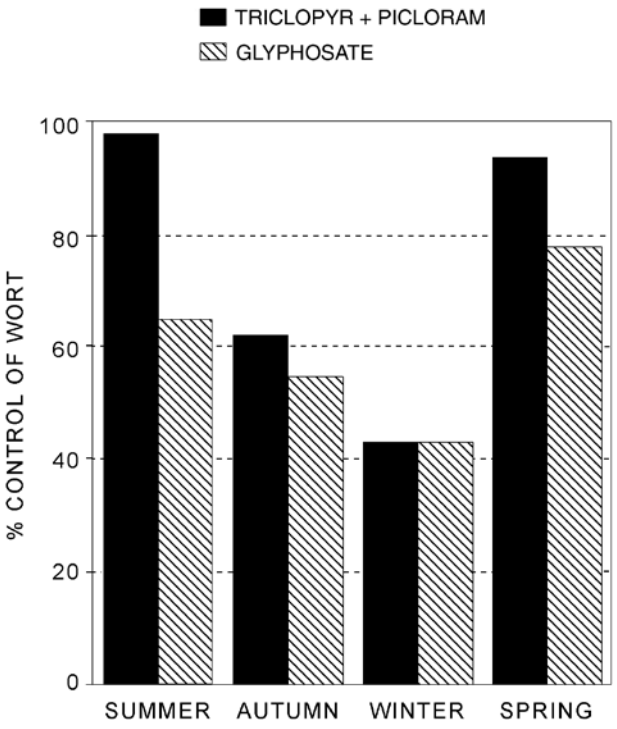


Figure 3. The best time to spray St John's wort is late spring to early summer. Source: Campbell et al. 1991.

### Pasture competition

Competition from perennial pastures is essential for the long-term control of St John's wort. Pasture competition prevents the germination and establishment of St John's wort seedlings by reducing space, light, moisture and nutrient availability. Maintaining pasture cover at the autumn break is particularly effective in reducing germinating St John's wort seedlings, which are highly susceptible to competition early in their life cycle.

In light to medium St John's wort infestations (where the existing pasture can be salvaged) pasture competition can be improved by appropriate grazing management (for example, allowing pastures to occasionally set seed and resting paddocks) and by fertilising regularly and controlling pests.

On fertile country, medium to heavy St John's wort infestations (where the existing pasture cannot be salvaged) can be controlled by sowing a perennial pasture. See below for examples of pasture establishment methods.

### Cropping and pasture sowing on arable land

On arable land, St John's wort can be controlled by cultivation and cropping to remove the St John's wort and reduce seed reserves before sowing a perennial pasture.

For example:

- Year 1 – boom-spray with glyphosate in November/December to obtain an initial kill or plough in summer to expose and dry out the roots of the St John's wort.
- Year 2 – cultivate to prepare a seedbed and sow a winter cereal crop in autumn. Repeat ploughing or glyphosate herbicide application in the summer.

Phalaris and sub clover (green plot) replacing St John's wort two years after using a simulated aerial spray-sow technique at Cassilis. Photo: NSW DPI

- Year 3 – sow a second cereal crop in autumn and repeat ploughing or glyphosate herbicide application in summer, before sowing a perennial pasture in the following autumn.

Perennial grass pastures are the most competitive for St John's wort control. As pasture varieties and sowing requirements vary, consult your local agronomist for recommendations for your property.

### Pasture sowing on non-arable land

Infestations of St John's wort on non-arable fertile hill country can be controlled by replacing it with a direct-drilled or aerially sown perennial pasture.

The direct-drilling/aerial sowing program involves spraying glyphosate in November to January, and again after the autumn break, to control annual weeds before sowing the pasture mix.

New pastures should be allowed to set seed in the year of establishment, and any reinfesting St John's wort can be controlled by spot-spraying.

### Grazing management

Grazing St John's wort offers a cost-effective, long-term control method in all situations; however, it is often the only practical method for steep, inaccessible hill country. Care needs to be taken to avoid poisoning when grazing St John's wort. The following are some guidelines for the grazing management of St John's wort.

*Animals to use*

Superfine or fine-wool adult Merino wethers or dry, non-pregnant ewes with at least four months' wool growth are recommended for grazing of St John's wort infestations. Animals with this wool type and amount of wool growth have the most protection against sunlight, and are also effective defoliators of St John's wort.

Cattle can also be used, either exclusively or to supplement the role of sheep. Cattle are less effective defoliators of St John's wort than sheep (sheep graze more closely than cattle) but they are more tolerant of hypericin. Fully coloured (pigmented) cattle, either 100% black or red, will be the most tolerant.

Cattle can be put onto St John's wort pastures about six weeks earlier than sheep, and the pasture can be used to knock down heavy infestations and open it up for subsequent grazing by sheep. Cattle can also remain on St John's wort pastures much longer than sheep in spring.

*Timing of grazing*

St John's wort should only be grazed when the hypericin levels in the plant are low. For broad-leaf infestations, start grazing (with sheep) in early May and continue through to mid-October. For narrow-leaf

infestations, start grazing (with sheep) in early July, and continue through to mid-September.

Variations in yearly climatic conditions can influence these recommended grazing periods. For example, the grazing period may be extended for a few weeks in years in which dry conditions occur, but reduced during wet years, as hypericin levels become elevated during wet conditions.

During these safer grazing periods, the flowering stems, which are high in hypericin, are dead, but at the base of each plant there are many soft, green, prostrate-growing shoots. These shoots are low in hypericin, and by eating them stock will significantly depress the weed's ability to re-grow the following season. Grazing these shoots will allow competing vegetation to progressively outgrow them. The reduction in St John's wort density in pastures following successive years of grazing will allow the safe grazing period to begin earlier in autumn and continue longer through spring, because it will decrease the potential daily hypericin intake of grazing livestock.

Grazing hard in spring can also delay the growth of hypericin-rich flower stems for several months, and thereby extend the safe grazing period. In spring, always make sure that livestock are moved off St John's wort pastures before the new season flowering stems reach a height of 5–10 cm, because poisonous levels of hypericin will rapidly develop.

*Grazing methods*

Several shorter periods of grazing using high stocking rates will be more effective than one long period using a lower stocking rate. Higher stocking rates will allow stock to defoliate St John's wort and shorter grazing periods allow stock to be removed to protect their health and maintain the competitive nature of the pasture. If possible, fence off heavy St John's wort infestations, to reduce the size of the area to be grazed and thereby facilitate this repeated heavy grazing.

Grazing must be carried out every year to achieve long-term control. The retention of good tree shade in St John's wort-infested paddocks is recommended, to minimise the effect of sunlight on livestock.

### Biological control

Currently, only six of the twelve agents released as biological control agents for St John's wort have become established in Australia. These agents can reduce the spread and density of St John's wort infestations, and in some cases control is achieved to the level where the weed is no longer of concern and no other control is necessary. More commonly, other methods are still required to achieve the desired level of control; however, these need not be used so frequently or intensively.

Contact your local NSW DPI office to arrange an assessment of the suitability of your site and information on release sites for biological agents.

Large infestations of St John's wort can reduce property values. Photo C. Bourke

*Chrysolina beetles*

Two species have established in Australia: *Chrysolina hyperici* and *C. quadrigemina*. They are black with bronze, dark-blue or purple reflections, and are oval in shape. *Chrysolina quadrigemina* is slightly larger (6.0 to 7.1 mm) than *C. hyperici* (5.3 to 6.1 mm). Some individuals of *C. quadrigemina* are distinctly bluish.

The Chrysolina larvae and beetles feed on the leaves of St John's wort. The larvae attack the winter growth and the adult beetles attack the spring growth. At favourable sites, beetles may reach densities high enough to cause complete defoliation, and this suppresses flowering and seed production. The best control is achieved when the beetles and larvae attack the weed in the same or consecutive years. The damage produced by the beetles can appear spectacular, but the impact tends to be sporadic and inconsistent. They can provide effective control in open, unshaded situations, but without follow-up pasture improvement the weed frequently re-establishes. The beetles are not effective in timbered country, as they mate only in sunlight.

Chrysolina beetles have low mobility, and therefore it may be worthwhile to assist their movement by collecting batches in spring and transferring them to new infestations.

Black Chrysolina beetles stripping St John's wort of leaves. Photo: NSW DPI.

Do not use herbicides as an additional method of control when high numbers of Chrysolina beetles are present, because partially defoliated plants are unlikely to absorb enough herbicide to kill them.

*Agrilus hyperici*

The adults of this beetle are bronze in colour and 5 mm x 2 mm in size. They lay their eggs in the crown of St John's wort plants in summer; when the larvae hatch, they bore into the roots and kill the plants. While able to cause significant damage to St John's wort, this beetle is restricted to one or two isolated sites near Mudgee and Tuena.

*Gall midge (Zeuxidiplosis giardi)*

This small fly lays eggs in the terminal buds of St John's wort plants. When the larvae hatch, they form galls by feeding on the leaf buds, thus reducing seed production. Although relatively widespread and common, the gall midge does not generally reach sufficient levels to cause a significant impact on St John's wort infestations. However, the gall midge does help to control St John's wort in shady country where other insects are not active.

*Aphis chloris*

This green aphid attacks flowering stems of St John's wort in summer, when the Chrysolina beetles are inactive, reducing seed production and weakening the plant. Like the gall midge, this aphid is relatively widespread and common, but also does not generally reach sufficient levels to cause an impact on St John's wort infestations.

*St John's wort stunt mite (Aculus hyperici)*

This mite is almost invisible to the naked eye and all life stages are present during the whole year. The mite has established well but it only seems to affect the narrow-leaf form of St John's wort.

The mites feed on the growing tips of plants. Damaged leaves often have yellow streaks or mottling. The mite stunts the growth of rosettes and flowering stems, gradually weakening plants and reducing vigour and seed production. Over a two to three year period mites can exhaust the root reserves and kill narrow-leaf St John's wort plants.

## Legislation

St John's wort is declared a noxious weed under the *NSW Noxious Weeds Act 1993* (Figure 4).

Class 3 control requirements are that 'the plant must be fully and continuously suppressed and destroyed'.

Class 4 control requirements are that 'the growth and spread of the plant must be controlled according to the

measures specified in a management plan published by the local control authority'.

The responsibility for control of noxious weeds on private land rests with the landowner or occupier of the land.

A full list of noxious weeds and requirements under the *NSW Noxious Weeds Act 1993* can be found at www.dpi.nsw.gov.au/weeds

St John's wort. Photo: L. Ayres.

## Further information

For further information contact your local office of NSW Department of Primary Industries.

A complete list of NSW DPI weed publications can be found at www.dpi.nsw.gov.au/weeds

Printed copies can be arranged by contacting the NSW DPI Bookshop, Orange Agricultural Institute, Forest Rd, Orange 2800 on 1800 028 374.

## Further reading


Bourke, CA 1999, 'Control of *Hypericum perforatum* (St John's wort) by grazing management system that uses Merino sheep', *Proceedings 12th Australian Weeds Conference, Hobart,* pp. 4–7.

Bourke, CA 2003, 'The effect of shade, shearing and wool type in the protection of Merino sheep from *Hypericum perforatum* (St John's wort) poisoning', *Australian Veterinary Journal,* vol. 81, pp. 494–498.

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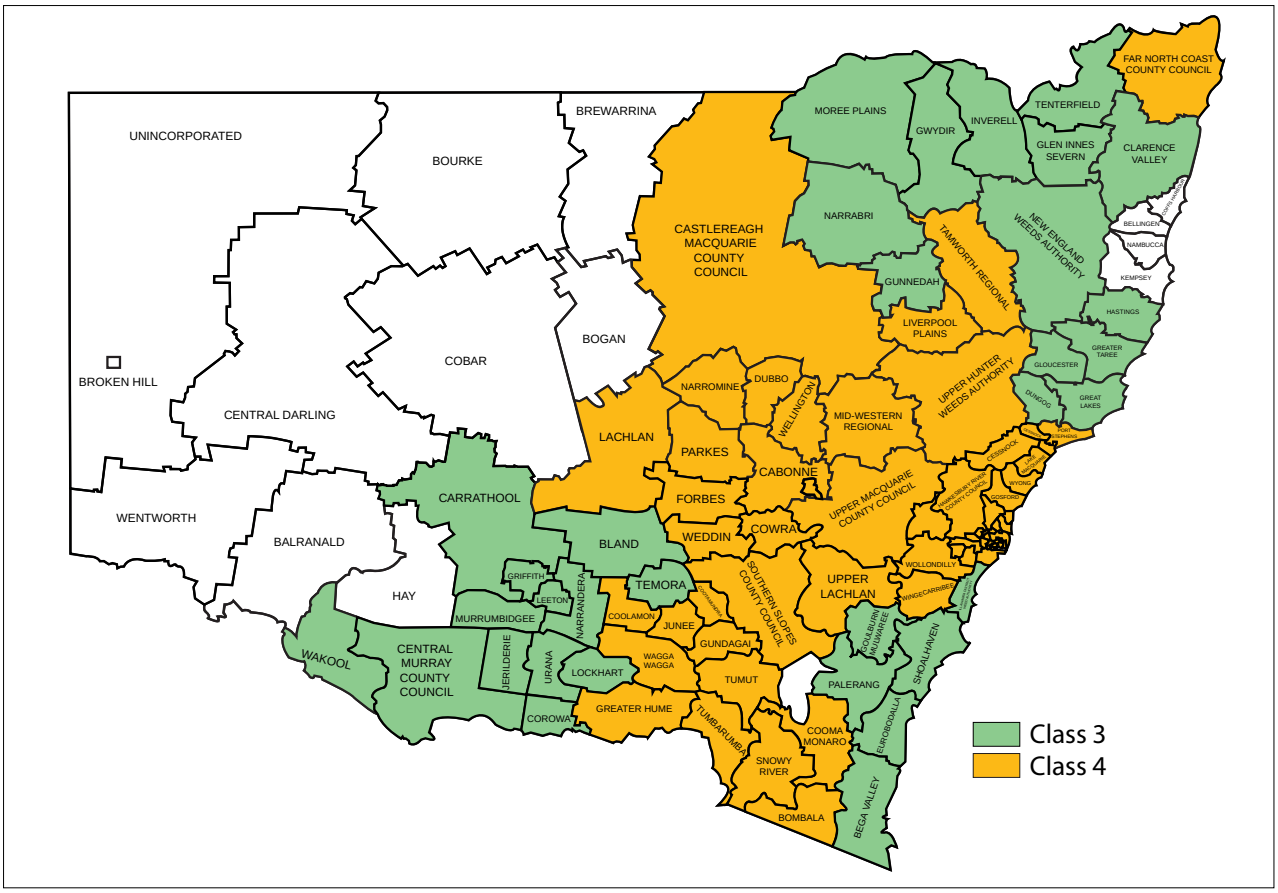


Figure 4. Area of NSW where St John's wort is declared a Class 3 or 4 noxious weed. A. Maguire.

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Updates of this Primefact are available at www.dpi.nsw.gov.au/primefacts



**Warnings**: Pasture improvement may be associated with an increase in the incidence of certain livestock health disorders. Livestock and production losses from some disorders are possible. Management may need to be modified to minimise risk. Consult your veterinarian or adviser when planning pasture improvement.

Legislation covering conservation of native vegetation may regulate some pasture improvement practices where existing pasture contains native species. Contact the nearest Catchment Management Authority office for further information.

Job number 8140