

MANAGING MINTWEED IN COTTON

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Mintweed has a distinctive cotyledon shape and texture and the leaves have a strong mint smell when crushed.



Mintweed is a minor annual weed of cotton. It develops a compact bush and is a prolific seed producer. A single plant can produce up to 180 000 seeds in a season.

Background

Mintweed (*Salvia reflexa*), is generally a minor annual weed of cotton, but has the potential to become a serious pest in some situations. Mint weed has in the past been a major problem weed on some fields in the Macquarie and Upper Namoi valleys, requiring additional inputs of residual herbicides and hand-chipping for control.

Mintweed is easily identified. It has a distinctive cotyledon shape and texture and the leaves of seedlings and plants have a strong mint smell when crushed.

A large flush of mintweed seedlings can emerge with or soon after the cotton crop and lesser numbers of seedlings may continue to emerge throughout the season. Seedlings grow rapidly in warm spring conditions (more rapidly than the cotton crop) and can quickly smother establishing cotton seedlings, competing strongly for light, water and nutrients. Mintweed seedlings may begin to flower and set seed within 50 - 60 days of emergence and will continue to set seed throughout the season. Later emerging seedlings grow even more rapidly and may begin flowering as soon as 32 days after emergence.

A mature plant can produce up to around 180 000 seeds during the season, but these seeds initially have strong dormancy and will not germinate before the following season. This dormancy is broken over winter, often resulting in a flush of mintweed seedlings in spring.

Mintweed has been problematic in some of the cooler cotton growing areas and may also be problematic in dryland cotton, competing for moisture and nutrients. The first flush of seedlings

has often been controlled with inter-row cultivation and chipping, but this option is labour-intensive and expensive.



A flush of mintweed seedlings may emerge with the cotton crop and grow rapidly in the warm conditions, quickly smothering establishing cotton seedlings.

Herbicides for pre-emergent control of mintweed in cotton

Dual and diuron both gave some level of control of mintweed when applied and incorporated prior to cotton planting, with the best control coming from a combination of the two herbicides (Tables 1 & 2).

Good soil incorporation and good soil moisture are essential to the success of these pre-planting treatments. Poor incorporation, a cloddy seedbed or rapidly falling soil moisture are all likely to result in poor control of mintweed with pre-planting incorporated residual herbicides.

Stomp, Gesagard, Cotogard and Cotoran were all relatively ineffective in controlling mintweed, but are valuable for controlling a range of other weeds. Trifluralin was not included in the experiments.

Table 1. Control of mintweed with residual herbicides incorporated pre-planting in an irrigated cotton crop at Carroll. Control was assessed 8 weeks after application.

Herbicide	% Control
Dual (720 g/L) 4 L/ha	60
Zoliar 4 kg/ha	40
Dual (720 g/L) 2 L/ha	38
Gesagard (500 g/L) 6 L/ha	30
Stomp (330 g/L) 3 L/ha	10
Cotoran (500 g/L) 6 L/ha	7
Diuron (500 g/L) 2 L/ha + Cotogard (250 + 250 g/L) 4 L/ha	40
Dual (720 g/L) 2 L/ha + Cotogard (250 + 250 g/L) 4 L/ha	20
Diuron (500 g/L) 4.7 L/ha *	0
Untreated	0

Note* - this diuron treatment was not incorporated.

Table 2. Pre-emergence control of mintweed with residual herbicides incorporated pre-planting in an irrigated cotton crop at Carroll (2nd season). Control was assessed 8 weeks after application.

Herbicide	% Control
Dual (720 g/L) 4 L/ha	73
Dual (720 g/L) 2 L/ha	75
Diuron (900 g/kg) 2.5 kg/ha	65
Cotogard (250 + 250 g/L) 3.5 L/ha	12
Dual (720 g/L) 2 L/ha + Diuron (900 g/kg) 2.5 kg/ha	90
Dual (720 g/L) 2 L/ha + Cotogard (250 + 250 g/L) 3.5 L/ha	46
Diuron (900 g/kg) 2.5 kg/ha + Cotogard (250 + 250 g/L) 3.5 L/ha	41
Untreated	0

Contact herbicides for post-emergence control of mintweed in cotton

Glyphosate and heavy rates of Daconate gave the best post-emergence control of mintweed with contact herbicides (Table 3), although Daconate was less effective in a second experiment (Table 5). Shielded applications of glyphosate should be effective in controlling mintweed in conventional cotton, but may leave an unacceptably large population of mintweed in the cotton plant-line. Roundup Ready Herbicide should be effective in removing the early flush of mintweed in Roundup Ready cotton and Roundup Ready Flex cotton crops. However, later germinations will require additional treatments.

Table 3. Post-emergence control of mintweed with broadcast herbicides applied to 1 – 5 leaf mintweed seedlings in an irrigated cotton crop at Carroll. There was a population of around 10 mintweed seedlings per m² when the herbicides were applied.

Herbicide	% Weed Kill
Glyphosate 450 2 L/ha	100
Daconate 1 L/ha	10
Daconate 2 L/ha	85
Daconate 3 L/ha	100
Basta 5 L/ha	88
Staple 60 g/ha	60
Staple 90 g/ha	75
Staple 120 g/ha	65
Daconate 1 L/ha + Staple 90 g/ha	83
Daconate 2 L/ha + Staple 60 g/ha	80
Dual (720 g/L) 4 L/ha	10
Dual (720 g/L) 2 L/ha	5
Untreated	0

Dual, which gave good pre-emergence control of mintweed, was ineffective for post-emergence control. Staple appears to have some activity on mintweed, but even at 120 g/ha (the maximum use rate) did not give effective control of this weed. Combinations of Staple and Daconate were

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included in order to explore a more cost effective way of using Staple, but gave no better control than either herbicide alone.

Alternative herbicides for pre-emergence control of mintweed

Excellent mintweed control was achieved with Atrazine, Simazine and Primextra (a mixture of atrazine and metolachlor). These herbicides are not safe to apply to cotton, but can be used with rotation crops such as maize and sorghum (Atrazine and Primextra (plus Concept for sorghum)), chick peas and faba beans (Simazine).

An option for cotton growers with a heavy infestation of mintweed is to rotate to one of these alternative crops for one or two seasons until the mintweed seedbank is reduced. However, there is an extended plant-back period before it is safe to grow cotton following the use of these residual herbicides, depending on the application rate, soil type and pH and soil moisture (rainfall and irrigation pattern).

Table 4. Control of mintweed with residual herbicides incorporated pre-planting in an irrigated cotton crop at Carroll. Control was assessed 8 weeks after application.

Herbicide	% Control
Atrazine (500 g/L) 5.4 L/ha	100
Simazine (900 g/kg) 3 kg/ha	100
Primextra (227 + 223 g/L) 4 L/ha	90
Untreated	0

Fallow herbicides for post-emergence control of mintweed

Although a wide range of herbicides and herbicide combinations are available for controlling weeds in fallows, spray drift can be a major issue with many of these options as most are not safe on other crops, including cotton, and can cause unacceptable levels of damage to crops or pastures if spray drift does occur.

Glyphosate, bromoxynil and atrazine were all effective in controlling mintweed when applied over-the-top of 1 - 4 leaf seedlings (Table 5). However, plant-back issues may occur with atrazine, as previously discussed. Plant-back problems can also occur with some of the other options, although the plant-back periods are much shorter than with atrazine.

Spray.Seed and Basta also gave reasonable control of mintweed, but some seedlings survived these treatments and would have needed to be controlled with a follow up treatment.

Table 5. Mintweed control with post-emergence herbicides applied over-the-top to 1 – 4 leaf mintweed seedlings in an irrigated cotton crop at Carroll in January.

Herbicide	% Weed kill
Glyphosate 450 2 L/ha	100
Bromicide 3 L/ha	100
Atrazine (500 g/L) 5.4 L/ha	100
Spray.Seed 4 L/ha	88
Basta 5 L/ha	88
Daconate 3 L/ha	60
Banvel 200 2 L/ha	53
Express 30 g/ha	0
Glyphosate 450 0.6 L/ha + Express 15 g/ha	48
Untreated	0

Summary

Mintweed is a minor annual weed of cotton that can emerge in large numbers at or soon after crop emergence. Mintweed seedlings grow more rapidly than cotton seedlings in spring conditions and can compete for sunlight, nutrients and water.

A pre-planting combination of Dual and Diuron gave the best residual control of mintweed. Atrazine and simazine also gave excellent residual control of mintweed, although these herbicides can not be safely used in cotton.

Glyphosate gave good post-emergence control of mintweed in cotton, and should be an effective management option for this weed in Roundup Ready Flex crops.

