

Managing Lippia in the cotton farming system

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Lippia is a highly invasive weed which is rapidly spreading in the Murray Darling Basin, and currently infests over five million hectares. It is seriously degrading the riparian and floodplain environments in this region, reducing biodiversity and threatening valuable ecosystems.

As well as its major environmental impact, lippia has serious negative implications for the grazing industry. It competes very strongly with all native and introduced pasture species. Once established, lippia out-competes other pasture species, resulting in almost pure lippia stands.

Lippia flowers prolifically, establishes readily from seed and also spreads from vegetative parts that are carried in flood waters. It is a perennial plant that grows rapidly in wet conditions, but can survive prolonged dry periods.

Lippia can spread until it forms an almost continuous mat, and will out-compete most other species. This means a lack of vegetative bulk in typical infestations (see photo this page).

Lippia is extremely tolerant of grazing, but has little grazing value. Neither heavy grazing nor the exclusion of grazing appear to restrict the spread of this weed.

Lippia doesn't tolerate cultivation, and so isn't normally a problem in convention-



Lippia can spread until it forms an almost continuous mat, and will out-compete most other species. Note the lack of any vegetation bulk in this typical infestation in the Gwydir valley.

al farming systems. Yet lippia has the potential to directly impact the cotton industry in a number of ways.

Lippia and irrigation structures

Lippia has an extensive and well developed root system which enables it to dry the soil to depth. This results in severe cracking

in many irrigation soils and opens the soil to erosion. Lippia infested creek and river banks are often unstable and heavily eroded. The same effect could occur on irrigation structures, reducing bank stability, leading to erosion and bank failures.

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Lippia can cause severe cracking, destabilising banks and causing slumping. (Photo: Mike Lucy)



A table-drain uniformly infested with lippia was used in the first experiment sprayed in March 2000.

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Lippia could easily establish above the water level in a Turkey's nest and grow over the banks. If this happens, lippia will cause extensive cracking of the banks, and will inevitably lead to bank failure.

Turkey's nests with lippia established on the walls are predisposed to fail.

It is critical that lippia not be allowed to establish on irrigation structures.

Lippia and water movement

Heavy infestations of lippia result in a great reduction in the bulk of vegetation on the ground, potentially increasing the rate of water movement and the potential for erosion and soil movement.

Continuing expansion of the lippia infested areas in the river valleys is likely

to result in an increase in the rate of water flow in these valleys during flood times, increasing erosion and soil movement problems.

Lippia and farming

Lippia is not a problem in conventional farming systems, as it doesn't tolerate cultivation. But it is likely to become problematic in zero-tillage systems, where it does tolerate the herbicides commonly used.

Inclusion of strategic cultivation into a zero-tillage system may become a necessary management input where lippia becomes a problem.

Lippia and grazing

The spread of lippia in pastures can be reduced by good grazing management, encouraging other pasture species. Competitive pasture species may need to be

introduced to degraded areas, and overgrazing and set-stocking should be avoided.

Lippia and the riparian zone

Moves by the cotton industry towards better management of the riparian zone are being hampered by heavy lippia infestations where these occur. Re-establishment of native species into areas degraded by lippia will be very difficult and will probably necessitate short-term control of lippia with cultivation or herbicides.

Controlling lippia

Lippia doesn't tolerate cultivation, but cultivation isn't a desirable option in easily erodible areas, in pastures or treed areas, or in close proximity to water.

A range of herbicides that control lippia is available, although repeated applications are always necessary, as lippia rapidly re-establishes from seed and surviving plants.

Lippia is also likely to reinvade clean areas after flood inundation. Management must make allowances for the movement of this weed in flood water, and in high-flow water pumped from rivers during flood events.

Lantana 600, an Agricrop product, is registered at five litres per hectare for use on lippia on non-crop areas. The Australian Pesticides and Veterinary Medicines Authority (APVMA) has also approved the use of two or three way mixtures of glyphosate at 2.6–5.4 litres per hectare plus 2,4-D and/or metsulfuron for lippia control on fallows in NSW and Queensland. Effective control of this weed requires two applications over summer when possible. Details of these permits are available from the APVMA.

But 2,4-D can not be safely used around cotton, and metsulfuron has a long plant-back to cotton and some other species, especially when applied to alkaline soils.

So how effective are glyphosate or Lantana 600 alone?

Experiment 1 used a single herbicide application in March 2000 and was monitored for two years (see Table 1).

Best control over the two years came from Roundup CT at 20 litres per hectare and Arsenal at six litres per hectare. Roundup CT at five litres per hectare was also still giving a reasonable level of control after one year.

Given the high cost of a six litres per hectare rate of Arsenal, the lack of registration of this product for this use and the problems sometimes associated with the use of this herbicide, the results from this

TABLE 1: Experiment 1— The long-term control of lippia following a single herbicide application in March 2000

Herbicide* (rate/ha)	% lippia control		
	60 days	1 year	2 years
Arsenal 6L	67	77	40
Roundup CT 20L	100	80	37
Lantana 600 6L	63	43	27
Roundup CT 5L	70	60	27
Lantana 600 3L	53	33	23
Tordon 75D 5L	97	13	10
Arsenal 2L	30	10	10
Starane 6L	57	3	10
Tordon 242 5L	30	7	10
Garlon 2L	77	7	10
Grazon 2L	47	7	10
Starane 2L	80	3	7
nil	0	0	3

*NOTE: Lantana 600 is the only herbicide registered for the control of lippia. Glyphosate may be used under permit.

experiment don't justify the use of Arsenal to control lippia.

None of the other herbicides that might be used in a fallow over summer — Tordon, Starane, or Grazon were effective in controlling lippia. These results are supported by the findings of Mike Lucy (QDPI&F) and others who recorded similarly poor results from a range of fallow herbicides.

A second experiment was initiated in late 2000 to determine if repeated applications of lower herbicide rates could give similar or better results.

All repeated herbicide applications gave good results, and better control than was achieved with a single application, even at a higher rate. Lantana 600 at five litres per hectare (twice) gave very good control

after one year (90 per cent). Two applications of Roundup CT at five litres per hectare also gave good results on a difficult to control weed.

Clearly, both these herbicides gave good levels of control with repeated applications at their label/permit rates and would be suitable for controlling lippia in fallows and non-crop areas.

Lantana 600 has an advantage over Roundup CT for spot applications in that it acts extremely quickly when applied to flowering lippia, rapidly dulling the flowers. This readily distinguishes sprayed and unsprayed patches, simplifying spot applications. Lantana 600 is also softer on other species, leaving more of these species to compete with any re-establishing lippia.

SUMMARY

Lippia is a highly undesirable weed and should not be allowed to establish in the cotton industry.

Lippia should be controlled with cultivation where appropriate, Lantana 600 on non-crop areas, or glyphosate on fallows. Glyphosate plus metsulfuron is the preferred option on fallows on non-alkaline soils, where cotton will not be a following crop.



Roundup CT gave good short and medium-term control of lippia.