Herbicide damage guide for cotton

Photographs & material by: Graham Charles
NSW Dept. Primary Industries

Herbicide:	**2,4-D amine + picloram**
Rate:	**30 g + 7.5 g a.i./ha**
% of typical field rate	**10%**
Date of exposure:	**25th Nov**
	(5 weeks post-emergence)
Growth stage at exposure:	**5 nodes**

Damage key:	
Leaf loss	
Leaf distortion	**x**
Petiole distortion	
Plant stunting	**x**
Square shedding	
Boll shedding	**x**

Herbicidal action

Herbicide group: I

2,4-D

Translocation: readily moves to the plant growth points
Mode of action: an auxin-type (phenoxy) herbicide that affects cell wall plasticity & nucleic acid metabolism. Low concentrations cause uncontrolled cell division & growth, leading to plant death.
Residual activity: limited
Soil half-life: 10 days in moist soil

picloram

Translocation: readily absorbed by roots and foliage and moves to the growing points
Mode of action: an auxin-type herbicide
Residual activity: strong residual activity and readily absorbed by plant roots
Soil half-life: 90 days, but can be up to 200 days. Breakdown is slower in dry, cool conditions.

Tordon 75D (2,4-D amine + picloram) applied broadcast at 100 ml/ha to 5 node cotton. Photo taken on 1st Dec, 6 days after exposure.

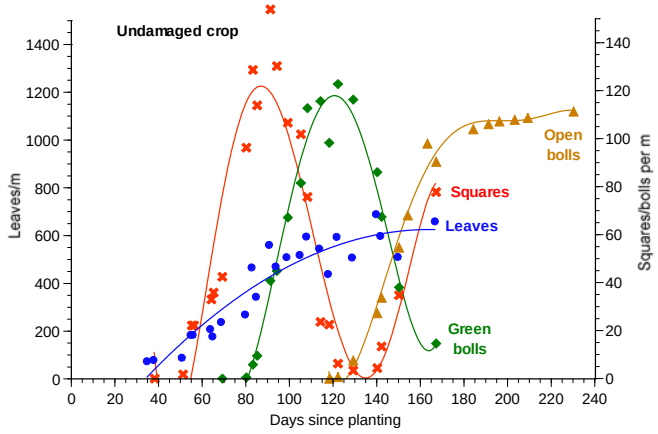
Symptoms of herbicide damage were apparent on the expanding leaves, which are cupped and discoloured, yellowish, turning reddish towards the margins 6 days after exposure.

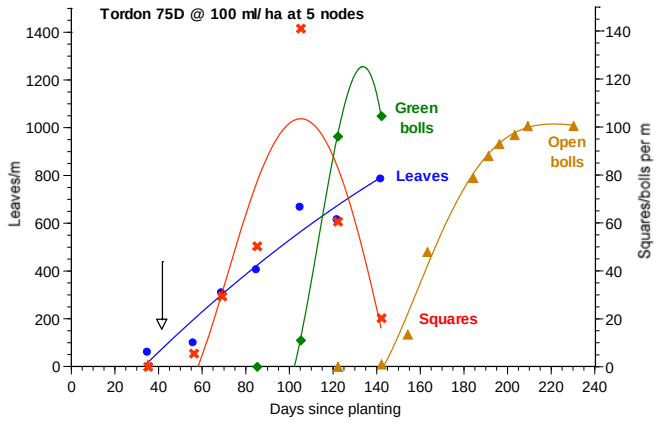
Tordon 75D (2,4-D amine + picloram) applied broadcast at 100 ml/ha to 5 node cotton. Photo taken on 15th Dec, 20 days after exposure.

Symptoms typical of Group I damage were obvious on all newly emerged leaves 20 days after exposure. New leaves were mildly to heavily distorted, cupped with crinkled edges or tending towards a narrow wedge shape, ending in multiple narrow fingers.

Tordon 75D (2,4-D amine + picloram) applied broadcast at 100 ml/ha to 5 node cotton. Photo taken on 14th Jan, 50 days after exposure.

Most of the top growth was still highly distorted 50 days after exposure, although 'normal' leaves had emerged from the lateral branches. The top leaves were mildly to heavily distorted, cupped with crinkled edges or tending towards a narrow wedge shape, ending in multiple narrow fingers. The leaf surface was lightly blistered and leathery in appearance.





Impact on plant growth

Plants: exposure to the 10% rate of 2,4-D + picloram at 5 nodes caused extensive damage to new growth. The plant stand was reduced by 17%, 80% more plants were tipped-out and plants were 24 cm and 1.3 nodes shorter at picking.

Leaves: the herbicide exposure damaged most expanding leaves and all new leaf growth for more than 50 days.

Squares: peak square production was delayed by around 15 days.

Bolls: no early bolls were retained following the herbicide exposure, resulting in a 25 day delay in initial boll retention. The pattern of boll retention was also altered, with more bolls retained on lateral branches and on outer fruiting positions. Peak boll retention was not delayed, but plants retained 28% fewer bolls and crop maturity was delayed by 15 days.

Lint: ginning turnout and fibre quality were unaffected by the herbicide exposure, but lint yield was reduced by 26%.

Final plant count data

	undamaged crop	2,4-D + picloram
Nodes/plant	30.9	29.6
Leaves/m*	595	785
Leaf area (cm²/m)*	24900	26835
Reduction in leaf area*		-
Bolls/m	132	95
Boll weight (g/open boll)	5.3	5.2
Retention in posit's 1-3^	95%	80%
Nodes carrying >80% bolls#	7 - 18	2 - 18
Days to 50% open bolls	157	172
Maturity delay (days)		15
% Open bolls at picking	85%	86%
Lint yield/ha	2380	1753

Exposure to 10% of a typical field rate of 2,4-D + picloram at 5 nodes caused extensive leaf damage, reduced the plant stand, and tipped-out many plants, delaying crop growth and development.

Few bolls were retained on the main stem, but the lateral branches developing normally and held most of the boll load. This reduced the boll load and delayed crop maturity but didn't affect fibre quality. Lint yield was reduced by 26%.

Note* Leaf number and leaf area were last recorded 142 days after planting.

Note^ Percentage of retained bolls in positions 1-3.

Note# The spread of nodes carrying more than 80% of open bolls.