

## 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:** 8<sup>th</sup> Dec  
(8 weeks post-emergence)  
**Growth stage at exposure:** 9 nodes

<u>Damage key:</u>	
Leaf loss	
Leaf distortion	x
Petiole distortion	x
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 9 node cotton. Photo taken on 15<sup>th</sup> Dec, 7 days after exposure.

Plant distortion, with petiole reddening and twisting and leaf mis-orientation was apparent soon after the exposure. Leaf burning (red discolouration) was apparent 7 days after exposure.



Tordon 75D (2,4-D amine + picloram) applied broadcast at 100 ml/ha to 9 node cotton. Photo taken on 5<sup>th</sup> Jan, 28 days after exposure.

Plants had taken on a stalky appearance, with long internodes and small, often mis-orientated leaves 28 days after exposure. The new growth was highly distorted. Most new leaves were a narrow wedge shape, ending in multiple narrow fingers. The leaf surface was lightly blistered and leathery in appearance.



Tordon 75D (2,4-D amine + picloram) applied broadcast at 100 ml/ha to 9 node cotton. Photo taken on 14<sup>th</sup> Jan, 37 days after exposure.

Highly distorted growth was obvious on all plants, fringed by some normal growth emerging from the base of the plants 37 days after exposure. The distorted leaves were 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

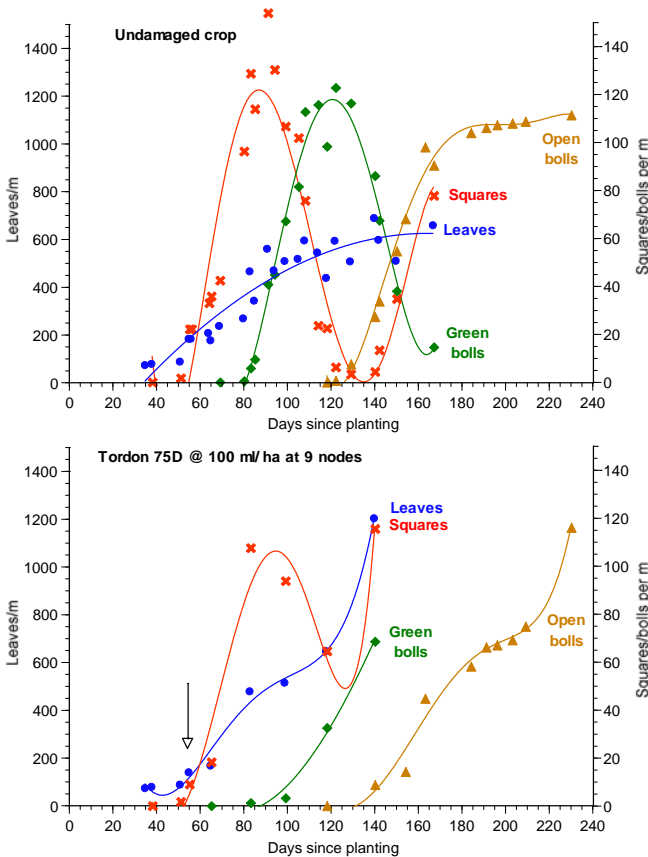
**Plants:** exposure to the 10% rate of 2,4-D + picloram at 9 nodes damaged the plants, damaging leaves and terminals, doubling the proportion of tipped-out plants. Plants responded, producing a flush of new distorted leaf growth, but remained 13 cm shorter at picking.

**Leaves:** plants had 75% more leaves and 40% more leaf area at the last observation.

**Squares:** peak squaring was reduced by around 32%, but plants produced additional late squares.

**Bolls:** few early bolls were retained following the herbicide exposure, giving a 35 day delay in initial boll retention. Additional bolls were retained on lateral branches and outer fruiting positions, increasing the final boll load by 32% but reducing boll weight by 32% and delaying crop maturity by 48 days.

**Lint:** the herbicide damage didn't affect fibre quality but reduced ginning turnout by 6.9% and lint yield by 56%.



Final plant count data		
	undamaged crop	2,4-D + picloram
<b>Nodes/plant</b>	30.9	30.1
<b>Leaves/m*</b>	687	1201
<b>Leaf area (cm<sup>2</sup>/m)*</b>	23830	33438
<b>Reduction in leaf area*</b>		-
<b>Bolls/m</b>	132	174
<b>Boll weight (g/open boll)</b>	5.3	3.6
<b>Retention in posit's 1-3<sup>^</sup></b>	95%	58%
<b>Nodes carrying &gt;80% bolls<sup>#</sup></b>	7 - 18	5 - 20
<b>Days to 50% open bolls</b>	157	205
<b>Maturity delay (days)</b>		48
<b>% Open bolls at picking</b>	85%	67%
<b>Lint yield/ha</b>	2380	1052

Exposure to 10% of a typical field rate of 2,4-D + picloram at 9 nodes caused extensive leaf and terminal damage.

Plants producing a flush of new, distorted leaf growth, and a flush of late bolls on the lateral branches and the outer fruiting positions. Many of these bolls were small and not mature at picking.

Crop maturity was delayed by 48 days and lint yield was reduced by 56%.

Note\* Leaf number and leaf area were last recorded 140 days after planting.

Note<sup>^</sup> Percentage of retained bolls in positions 1-3.

Note<sup>#</sup> The spread of nodes carrying more than 80% of open bolls.