

Herbicide damage guide for cotton

Photographs & material by:

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Herbicide: 2,4-D amine + picloram
Rate: 150 g + 37.5 g a.i./ha
% of typical field rate 50%
Date of exposure: 25th Nov
(5 weeks post-emergence)
Growth stage at exposure: 5 nodes

<u>Damage key:</u>	
Leaf loss	
Leaf distortion	x
Petiole distortion	x
Plant stunting	x
Square shedding	x
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 500 ml/ha to 5 node cotton. Photo taken on 1st Dec, 6 days after exposure.

The plants were extensively damaged by the herbicide 6 days after exposure. Plant distortion, with petiole twisting and leaf mis-orientation was apparent soon after the exposure. Leaf burning (red discolouration) was apparent by 6 days, and the growing tips were severely burned.



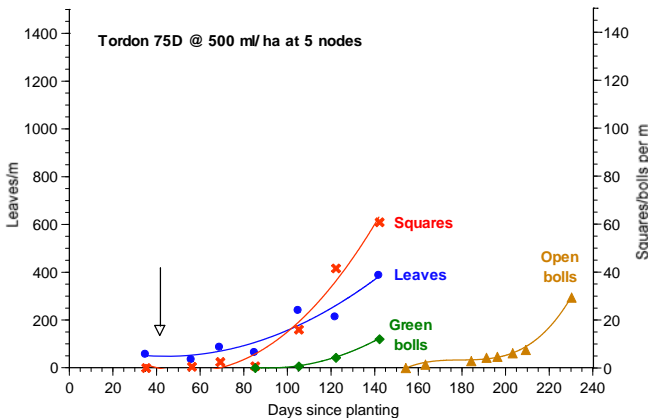
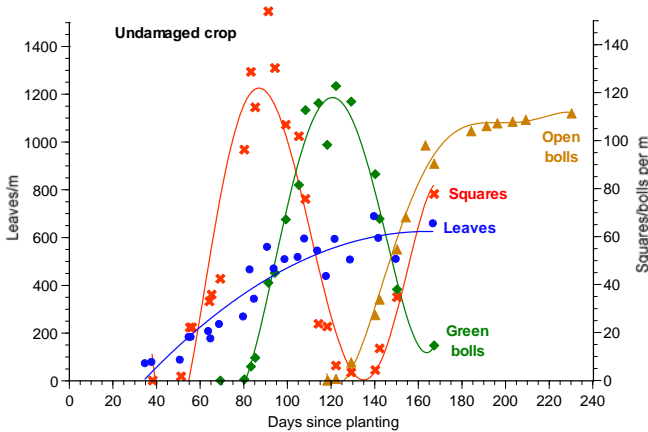
Tordon 75D (2,4-D amine + picloram) applied broadcast at 500 ml/ha to 5 node cotton. Photo taken on 15th Dec, 20 days after exposure.

The appearance of the plants changed little over the next 14 days, with no growth occurring on most plants. Leaf damage and some leaf loss, petiole twisting and terminal burning were still very obvious.



Tordon 75D (2,4-D amine + picloram) applied broadcast at 500 ml/ha to 5 node cotton. Photo taken on 14th Jan, 50 days after exposure.

Some plants had not begun to recover from the herbicide damage 50 days after exposure. Growth had resumed on some plants, but the growth was highly distorted. The 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 50% rate of 2,4-D + picloram at 5 nodes severely damaged leaves and terminals, suppressing growth and development for 50 days or more. The plant stand was reduced by 26% and 75% of plants were tipped-out. Plants were 9.8 nodes and 44 cm shorter at picking and 74% smaller by weight.

Leaves: all new leaves were distorted. Plants had 35% fewer leaves and 42% less leaf area at the last observation.

Squares: square production was delayed by 40 days and peak squaring was reduced.

Bolls: no early bolls were retained following the herbicide exposure, giving a 30 day delay in boll retention. Most retained bolls were on the outer fruiting positions on the lateral branches, though few bolls were retained anywhere on the plant. The final boll load was reduced by 52%, boll weight was down 25% and average crop maturity was delayed by more than 80 days.

Lint: ginning turnout and fibre quality were unaffected, but lint yield was down 67%.

Final plant count data		
	undamaged crop	2,4-D + picloram
Nodes/plant	30.9	21.1
Leaves/m*	595	386
Leaf area (cm²/m)*	24900	14461
Reduction in leaf area*		42%
Bolls/m	132	63.8
Boll weight (g/open boll)	5.3	3.9
Retention in posit's 1-3[^]	95%	57%
Nodes carrying >80% bolls[#]	7 - 18	5 - 25
Days to 50% open bolls	157	>237
Maturity delay (days)		>80
% Open bolls at picking	85%	46%
Lint yield/ha	2380	794

Exposure to 50% of a typical field rate of 2,4-D + picloram at 5 nodes caused extensive leaf and terminal damage, delaying crop growth and development by around 58 days. Lateral branches were not as affected, but plants were slow to initiate the laterals.

Most bolls were retained on the outer fruiting positions on the lateral branches. Boll production, boll size and crop maturity were all affected. Lint yield was down 67%.

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.