

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: 8th 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	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 9 node cotton. Photo taken on 15th Dec, 7 days after exposure.

The plants were extensively damaged by the herbicide. 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, and the growing tips were severely damaged.



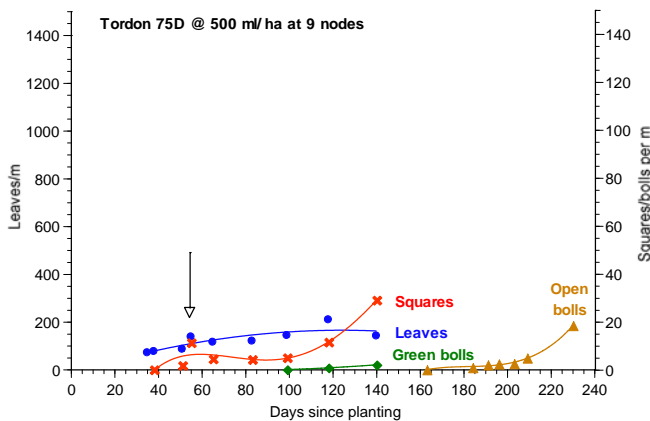
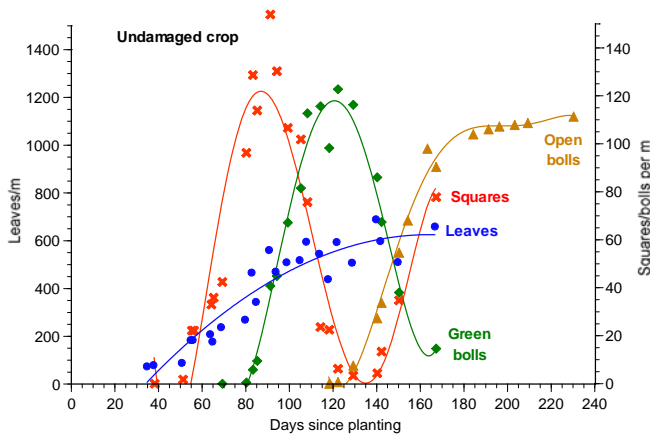
Tordon 75D (2,4-D amine + picloram) applied broadcast at 500 ml/ha to 9 node cotton. Photo taken on 5th Jan, 28 days after exposure.

Plants had begun to recover by 28 days after exposure, with new top growth and lateral growth. 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 500 ml/ha to 9 node cotton. Photo taken on 14th Jan, 37 days after exposure.

Highly distorted growth is obvious on all plants, fringed by some normal growth at 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 50% rate of 2,4-D + picloram at 9 nodes damaging the leaves and terminals, delaying plant growth and development. New growth was distorted and 65% of plants were tipped out. Plants were 13 nodes and 70 cm shorter at picking, and 84% smaller by weight.

Leaves: plants had 79% fewer leaves and 82% less leaf area at the last observation.

Squares: square production was delayed by more than 60 days and peak squaring was greatly reduced.

Bolls: no early bolls were retained following the herbicide exposure, giving a >70 day delay in boll retention. Most retained bolls were on the outer fruiting positions of the lateral branches, though few bolls were retained. The final boll load was reduced by 65%, only 53% of bolls were open at picking, boll weight was down 14% and crop maturity was delayed by >80 days.

Lint: ginning turnout was reduced by 8.4% and the fibre was immature, with low micronaire (3.3). Lint yield was down 87%.

Final plant count data		
	undamaged crop	2,4-D + picloram
Nodes/plant	30.9	17.9
Leaves/m*	687	141
Leaf area (cm²/m)*	23830	4203
Reduction in leaf area*		82%
Bolls/m	132	46
Boll weight (g/open boll)	5.3	4.5
Retention in posit's 1-3[^]	95%	53%
Nodes carrying >80% bolls[#]	7 - 18	10 - 18
Days to 50% open bolls	157	>237
Maturity delay (days)		>80
% Open bolls at picking	85%	40%
Lint yield/ha	2380	310

Exposure to 50% of a typical field rate of 2,4-D + picloram at 9 nodes caused extensive leaf and terminal damage, delaying crop growth and development on both the main stem and lateral branches. Plants were very slow to recover from the damage and remained very stunted.

Boll production, the pattern of boll retention, boll size, ginning percentage, fibre quality and crop maturity were all affected. Lint yield was reduced by 87%.

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

Note[^] Percentage of retained bolls in positions 1-3

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