



## Potassium salt based glyphosate effect on cotton yield and quality

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Cotton, being a fibre crop, it plays a predominant role in the national and international economy. Cotton, being a long duration, wide spaced and relatively slow growing crop during early growth stages is subjected to severe weed problem. About 30% of the cotton crop losses were due to weeds.

Number of sympodial branches are significantly reduced due to weed infestation. Velayutham *et al.* (2002) reported that unweeded check reduced the boll number/plant and boll weight of cotton. Khan and Khan (2003) reported that grassy weeds cause 15 to 40% and broad-leaf weeds 15 to 30% yield losses in cotton crop. The weeds adversely affected the quality characters of cotton like fibre length, seed weight, fibre uniformity, Micronaire and Pressely indices. With these references, the present study was undertaken to evaluate the performance of potassium salt based glyphosate in cotton weed control.

The present study was carried out during winter season of 2011-12 at Eastern Block farm, Tamil Nadu Agricultural University. The soil was sandy clay loam in texture with low in available nitrogen (187.3 kg/ha), medium in available phosphorus (12.8 kg/ha) and high in available potassium (559.0 kg/ha) with pH of 8.44. The experiment was laid out in randomized block design with ten treatments and replicated thrice (Table 1). Good viable delinted seeds of 'MRC 7347 BG-II' were dibbled on one side of the ridges with a spacing of 90 × 60 cm. The seed rate adopted was 2.5 kg of delinted seeds/ha. The experimental plots were applied with recommended dose of fertilizers (150:75:75 kg NPK /ha). Nitrogen, phosphorus and potassium were applied in the form of urea (46% N), single super phosphate (16% P<sub>2</sub>O<sub>5</sub>) and muriate of potash (60% K<sub>2</sub>O) respectively. Full dose of P and 50% of N and K were applied as basal before sowing and the balance of 50% of N and K were applied as top dressing at 45 and 60 DAS in two equal splits.

The pre-emergence herbicide was applied with pendimethalin (30 EC) at 750 g/ha at 3 DAS followed by earthing up at 45 and 55 DAS. Calculated quantity

of herbicide with a spray fluid of 500 l/ha was sprayed uniformly over the plots using hand operated sprayer fitted with fan type nozzle. Calculated quantity of potassium salt based glyphosate at three different doses, viz. 1350, 1800, 2250 g/ha to the respective treatment plots was sprayed at 35 and 70 DAS using hand operated sprayer fitted with fan type and mist type nozzle, respectively under controlled application by using hood. The treatments which having hand weeding, hand weeder weeding and power weeding were done at the respective days. The seed cotton (Kapas) was harvested in three pickings commencing on 125 DAS in all the treatment plots. Observations on weed characters like weed flora, weed density, weed dry weight were recorded on regular intervals.

Yield attributes significantly improved in various weed management methods over unweeded control and resulted in higher seed cotton yield as earlier reported by Bhoi *et al.* (2010). More number of sympodial branches with higher number of bolls and boll weight (Table 1) were obtained with the post-emergence application of glyphosate at 1800 g/ha at 35 and 70 DAS + IC at 45 and 55 DAS due to better control of late emerging weeds and creating favourable environment through intercultural operations which was comparable with PE pendimethalin at 750 g/ha + IC at 45 and 55 DAS. These results are also in conformity with Stewart *et al.* (2005) who reported that, total number of bolls and boll weight are important components of overall yield and also, number of bolls, boll weight and seed cotton yield were higher with glyphosate applied treatments compared to non-treated control.

Better growing conditions with lesser weed competition with POE glyphosate at 1800 g/ha at 35 and 70 DAS + IC at 45 and 55 DAS resulted in higher number of sympodial branches (19.6), bolls (58.4) and boll weight (6.6 g) with higher boll setting per cent of 53 (Table 1). These results are in line with the earlier findings of Ali *et al.* (2005) who had stated that, application of PE pendimethalin at 1.0 kg/ha in combination with interculturing plus hand weeding

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**Table 1. Effect of weed management methods on yield attributes and yield of cotton**

Treatment	Sympodial branches/ plant	Bolls/ plant	Boll setting percentage (%)	Boll weight (g/boll)	Yield (t/ha)
Glyphosate at 1350 g/ha+ IC at 35 and 70 DAS	16.2	44.7	50.8	5.0	1.94
Glyphosate at 1800 g/ha + IC at 35 and 70 DAS	17.7	49.2	49.8	5.6	2.18
Glyphosate at 2250 g/ha + IC at 35 and 70 DAS	18.2	54.8	51.3	5.7	2.25
Glyphosate at 1800 g/haat 35 and 70 DAS+ IC at 45 and 55 DAS	19.6	58.4	53.0	6.6	2.93
Pendimethalin at 750 g/ha+ ICat 45 and 55 DAS	18.4	55.4	53.0	6.5	2.71
HW at 35 and 70 DAS + IC at 45and 55 DAS	18.2	55.8	51.8	5.8	2.42
HWW at 35 and 70 DAS + IC at 45 and 55 DAS	16.3	51.3	50.8	5.1	2.00
PWW at 35 and 70 DAS + IC at 45 and 55 DAS	16.5	51.7	50.6	5.2	2.24
HW at 25 and 45 DAS	17.5	50.4	52.8	5.5	2.29
Unweeded control	15.1	22.5	33.1	4.9	0.91
LSD (P=0.05)	0.95	3.31	10.9	0.52	0.46

gave 199.4% increase in seed cotton yield over untreated check. Nalini *et al.* (2011) also reported higher number of bolls and seed cotton yield from PE pendimethalin + hand weeding treatment. Followed by this treatment, HW at 35 and 70 DAS + IC at 45 and 55 DAS recorded higher yield attributes.

Highest seed cotton yield was obtained with post-emergence application of glyphosate at 1800 g/ha applied at 35 and 70 DAS with intercultural operation of earthing up at 45 and 55 DAS which was comparable with pre-emergence application of pendimethalin at 750 g/ha + intercultural operation at 45 and 55 DAS. The treatments with intercultural operation performed better in yield attributes and higher yield compared to treatments without intercultural operation.

Cotton fibre quality in glyphosate applied plots was showed similarity with hand weeding, hand weeder weeding and power weeder weeding. This shows that, POE glyphosate application did not affect the quality parameters. Cotton fibre quality characteristics are dependent upon the inherent genetics of the individual variety (Bradow and Davidonis 2000).

### SUMMARY

A field investigation was carried out at Eastern Block farm, Tamil Nadu Agricultural University, during winter season of 2011-12 to evaluate the new formulation of potassium salt based glyphosate (Roundup Crop Shield 460 SL) on seed cotton yield and quality parameters in winter irrigated cotton. Experimental results revealed that higher seed cotton yield was obtained with POE glyphosate at 1800 g/ha at 35 and 70 DAS with + IC at 45 and 55 DAS which was comparable with PE pendimethalin at 750 g/ha +

IC at 45 and 55 DAS. While comparing, intercultural operation carried out treatments performed better and recorded more seed cotton yield than the treatments without intercultural operation, Cotton fibre quality in glyphosate applied plots was showed similarity with hand weeding, hand weeder weeding and power weeder weeding, shows that POE glyphosate application did not affect the quality parameters.

### REFERENCES

- Ali H, Muhammad D and Abid SA. 2005. Weed control practices in cotton (*Gossypium hirsutum* L.) planted in beds and furrow. *Pakistan Journal of Weed Science Research* **11**(2): 43-48.
- Bhoi SK, Lakpale R, Jangre A and Mishra S. 2010. Studies on the effect of weed control methods on growth and yield attributes of hybrid cotton. *Research Journal of Agricultural Science* **1**(4): 434-437.
- Bradow JM and Davidonis GH. 2000. Quantitation of fibre quality and the cotton production processing interface: A physiologist's perspective. *Journal of Cotton Science* **4**: 34-64.
- Khan NU and Khan SU. 2003. Integrated weed management in upland cotton. *Pakistan Journal of Weed Science Research* **9**(3&4):185-192.
- Nalini K, Muthukrishnan P and Chinnusamy C. 2011. Evaluation of pendimethalin 38.7 EC on weed management in winter irrigated cotton. *Madras Agricultural Journal* **98**(6): 165-168.
- Stewart AM, York AC, Culpepper AS and Vidrine PR. 2005. Response of glyphosate-resistant cotton to pre-harvest glyphosate application. *Journal of Cotton Science* **9**: 110-114.
- Velayutham A, Ali AM and Veerabadrán V. 2002. Influence of intercropping systems and weed management practices on the growth and yield of irrigated cotton. *Madras Agricultural Journal* **89**(1-3): 59-62.