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# Management of weeds with new molecule XL-71 AG under non-crop situation

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## ABSTRACT

Field experiment at the Bidhan Chandra Krishi Viswavidyalaya, Kalyani, West Bengal revealed that *Cynodon dactylon, Eleusine indica, Imperata cylindrica, Cyperus rotundus, Blainvillea latifolia, Heliotropium indicum* and *Parthenium hysterophorus* constituted the major weed flora in non-crop areas. Though the chemical XL-71 AG (mono ammonium salt of glyphosate) either at 9 ml or 12 ml $l^{-1}$ of water proved effective against almost all categories of weeds upto two months of its application, it showed results comparable to glyphosate 41 SL 10 ml $l^{-1}$. However, their application should be stopped at one season, but to be continued till existing seed bank is completely exhausted for managing the persistent perennial weeds in the long run.

In recent years, the increasing trends of some pernicious weeds in non-crop areas jeopardize the natural environment. These weeds are most neglected although they develop unsightly and dangerous growth. There is no better example to this in India than the way *Parthenium hysterophorus* was allowed to become a serious menace in vacant and uncultivated areas including roadsides, railroads, industrial sites, and airfields. However, very little attention is paid to obviate these weeds in lieu of their economic and aesthetic significance. Though weeds in such areas can be controlled by mechanical methods like mowing, burning, grazing, discing, hand pulling, etc., these are cost-prohibitive, labour-intensive and time-consuming. Thus, chemical tactic for weed management is gaining importance. Today, glyphosate seems to be a safe and effective herbicide which can be used at low rate with improved formulation. Keeping this in view, the present study was taken up to find out a suitable measure for eradicating the obnoxious and troublesome weeds for a long time on non-crop areas.

## MATERIALS AND METHODS

The experiment was conducted at the wasteland of 'C'- Block Farm, Bidhan Chandra Krishi Viswavidyalaya, Kalyani, West Bengal during rabi season of 2000-01. The plots were laid out in a randomized block design having eight treatments replicated thrice. The treatments were varying concentrations of XL-71 AG (a formulation containing 71% ammonium salt of glyphosate) and glyphosate 41 SL [N-(phosphonomethyl) glysine] besides an untreated control. Application of chemical was done on 16 November, 2000 with knapsack sprayer fitted with flat nozzle using 500 l water $ha^{-1}$. Regular observation on type and population of weed flora were done at 15 days interval from the very day of herbicide application (before spraying). Regrowth of newly emerged weeds and weed dry matter from each plot were also periodically recorded. A quadrate of 0.25 $m^2$ was used to record weed biomass in the experimental plots.

## RESULTS AND DISCUSSION

The dominant weed flora recorded in the experimental field have been furnished in Table 1. Similar weed flora was earlier reported by Bhattachrya *et al.* (2000). Other important weds were *Sporobolus diander, Ageratum conyzoides, Dioscorea deltoida, Physalis minima, Polygonum hydropiper* and *Sida carpinifolia,*

The treatment under study showed differential significant responses in killing weeds at different dates of observation (Table 2). Massive weed kill was recorded within 15 days of application of both the chemicals, irrespective of their dose rates. Though minimum weed growth was also discernible at 30 days after spraying (DAS) of glyphosate 2.5-5.0 ml $l^{-1}$, it took only 15 days to better kill the weeds at higher dose rates. This might be due to the fact that herbicide application at higher doses had a quick knock down effect on the existing weed flora, whilst chemicals at lower doses promised satisfactory and significant weed kill at a lower rate. Bhattacharya *et al.* (1989) working with arsenal opined in the same way. Untreated control plots recorded the existence of all types of weeds.

Both the population and dry matter of weeds were minimum at 45 DAS under glyphosate 10 ml $l^{-1}$ and XL-71 AG 9 ml or 12 ml $l^{-1}$, which did not differ significantly (Table 2). Regeneration of weeds was, however, noted at 45 DAS in the plots treated with glyphosate at lower dose. On the contrary, only a few weeds appeared under XL-71 AG 6 ml $l^{-1}$. The distinct superiority of XL-71 AG over glyphosate might be due to the former's faster translocation to underground organs (tuber or rhizome) of perennial weeds, which caused more exhaustion of the food reserve than that achieved by glyphosate. Better performance and increased phytoxicity due to addition of ammonium salt to glyphosate formulations were earlier reported by Duke (1988), and Ampong-Nyarko and De Datta (1991). Weed population and dry matter were, however, on increase in the control plots.

XL-71 AG at higher doses (9 ml or 12 ml $l^{-1}$) did not permit any type of weeds to sprout and accumulate dry matter significantly at 60 DAS, whereas XL-71 AG 6 ml $l^{-1}$ and glyphosate 2.5 ml or 5.0 ml $l^{-1}$ gave some counts (Table 2). XL-71 AG at 9 ml or 12 ml $l^{-1}$ also exhibited results comparable to glyphosate 10 ml $l^{-1}$ with regard to weed kill. Increase in weed growth was uninterrupted in the control plots, obviously due to continuous seed production ability, easy sprouting ability and / or regenerative power of most of the non-crop land weeds in general, and *Cynodon, Cyperus, Imperata* and *Dioscorea* in particular.

From the present study, it appears that post-emergence application of XL-71 AG at 9-12 ml $l^{-1}$ or glyphosate 41 SL at 10 ml $l^{-1}$ water checked weed growth effectively for two months. For long term management of persistent perennial weeds, it however becomes essential to exhaust the existing soil seed bank to prevent further seed bank formulation in the soil by spraying glyphosate or its improved formulation XL-71 AG continuously for about 3-4 years.

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## REFERENCES

Ampong-Nyarko, Kwesi and . De Datta, S. K.1991. *A handbook for weed control in rice.*

International Rice Research Institute, Manila Philippines. p. 69.

Bhattacharya, S. P., Ghorai, A. and Kumar, T. K.1989. Massive eradication of some non-crop land weeds through application of arsenal. *Environment & Ecology* **7** (1):242-244.

Bhattachrya, S. P., Das, D., Karmakar, A. J. and Ray M. 2000. Long term control of non-cropped land weed through application of arsenal. *Environment & Ecology* **18**(2): 434-436.

Duke, S.O.1988. Glyphosate. *in* Herbicidal chemistry, degradation, and mode of action, Vol. **3** (P. C. Kearney and D.D. Kaufman, eds.). Mercel Dekker Inc., New York and Basel, pp. 1-70.

**Table 1 Floristic composition of dominant weeds prevalent in non-crop experimental field**

| Botanical name | Family | Common name |
|---|---|---|
| A. Grass | | |
| Cynodon dactylon (L.) Pers. | Poaceae | Bermuda grass |
| Eleusine indica (L.) Gaertn. | Poaceae | Goose grass |
| Imperata cylindrical (L.) Beauv. | Poaceae | Thatch grass |
| B. Sedge | | |
| Cyperus rotundus L. | Cyperaceae | Purple nut sedge |
| C. Broad leaf | | |
| Blainvillea latifolia | Asteraceae | Blainvillea |
| Heliotropium indicum L. | Boraginaceae | Indian heliotrope |
| Parthenium hysterophorus L. | Asteraceae | Wild carrot weed/ Congress grass |

**Table 2 Effect of treatments on weed population and dry matter production**

| Treatment | Dosage (ml $l^{-1}$) | Days after spraying (DAS) | | | | |
|---|---|---|---|---|---|---|
| | | 0 | 15 | 30 | 45 | 60 |
| 1. XL-71 AG | 12.0 | 98.3 (25.0) | 0.0 (0.0) | 0.0 (0.0) | 1.3 (0.2) | 3.0 (0.6) |
| 2. XL-71 AG | 9.0 | 101.3 (25.3) | 0.0 (0.0) | 0.0 (0.0) | 2.7 (0.4) | 5.7 (1.1) |
| 3. XL-71 AG | 6.0 | 94.5 (24.9) | 0.0 (0.0) | 0.3 (0.0) | 4.3 (0.6) | 13.3 (2.7) |
| 4. Glyphosate 41 SL | 10.0 | 122.7 (26.8) | 0.0 (0.0) | 0.0 (0.0) | 2.3 (0.3) | 5.0 (0.9) |
| 5. Glyphosate 41 SL | 7.5 | 100.3 25.2 | 0.0 (0.0) | 0.0 (0.0) | 5.0 (0.7) | 14.7 (2.9) |
| 6. Glyphosate 41 SL | 5.0 | 89.5 (24.7) | 0.4 (0.0) | 1.0 (0.1) | 7.7 (1.2) | 19.3 (3.8) |
| 7. Glyphosate 41 SL | 2.5 | 117.3 (26.6) | 1.2 (0.1) | 2.7 (0.3) | 21.0 (2.3) | 32.0 (6.3) |
| 8. Untreated control | - | 110.0 (26.1) | 126.7 (34.3) | 151.3 (41.1) | 197.5 (49.9) | 221.0 (57.1) |
| LSD (P=0.05) | - | NS (NS) | 3.5 (0.1) | 2.1 (0.2) | 1.5 (0.2) | 5.4 (0.5) |

Values without and with parentheses indicate population (No. $m^{-2}$) and dry matter ($gm^{-2}$) of newly emerged and / or escape weeds, respectively.