

## Weed Control in Soybean

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Weed control in cultivated crops is of immense importance to enhance crop production. Weeds growing in soybean crop cause reduction of nearly 17% in the yield in general and on an average 8 to 10 bushels per hectare (Staniforth *et al.* 1950).

Most of the herbicides used at present to suppress weeds in soybean crop are not very effective. Only very few have been found to be promising. Applications of the pre-emergence herbicides is still in experimental stages. The present paper deals with the effect of some of the latest herbicides on weeds and the appropriate cultural practices that can help in the eradication of dominant weeds of this crop

### MATERIALS AND METHODS

The experiment was conducted at the J. N. Krishi Vishwa Vidyalaya Farm, Jabalpur in *khari*f season of 1967. The soil is heavy clayey loam. Four herbicides (Amiben, Treflan, TOK E-25 and BV-201) were tried each at 3 rates (2.0, 3.0, 4.0, 0.5, 1.0, 1.5, 1.0, 1.5, 2.0 and 1, 0, 2.0, 3.0) kg/per hectare respectively applied on two varieties Clark-63 and Bragg in a randomized block design. The cultural treatments were—thorough hoeing (clean cultivation within and between the rows), farmer's practice (No cultivation for 30 days, then normal interculture) and control. 600 litres of water per hectare was used for application of herbicides.

The rainfall during the growing period of the crop was about 1400 mm. Some rains were also received during the harvesting, but crop was not adversely affected. Weather data are presented in Table 1.

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Table 1 — Climatological data during crop season

| Month     | Average Temp. in C |       | Average humidity % | Rainfall in m m | No. of rainy days |
|-----------|--------------------|-------|--------------------|-----------------|-------------------|
|           | Max.               | Min.  |                    |                 |                   |
| May       | —                  | —     | —                  | 1.52            | 1                 |
| June      | 37.87              | 26.16 | 68.7               | 50.29           | 11                |
| July      | 30.69              | 24.27 | 76.2               | 363.14          | 19                |
| August    | 27.55              | 23.81 | 79.7               | 482.27          | 23                |
| September | 28-50              | 23.24 | 75.5               | 287.55          | 13                |
| October   | 31.52              | 17.83 | 59.3               | 1.27            | 1                 |
| November  | 29.42              | 12.66 | 52.0               | —               | —                 |

From the above data it is evident that maximum rainfall was in the month of July and August. The relative humidity was also in order of rain fall.

Out of the four weedicides, Treflan was the pre planting herbicide incorporated into the soil before planting. Amiben, BV-201 and TOK E-25 were pre-emergence herbicides and applied immediately after planting. No nitrogen was given to the crop but 100 kg/ha  $P_2O_5$ , 60 kg/ha  $K_2O$  and 20 kg/ha minor elements mixture were applied as a basal dose.

## RESULTS

The findings of the experiment are summarised below.

1. *Weed Spectrum* :— Soybean crop was infested with both perennial and annual weeds. Perennial weeds include *Cyperus rotundus* (31.1%), *Themada caudata* (34%), whereas annual weeds, *Echinochloa colonum* (7.1%), *Alysicarpus spp.* (8.3%), *Indigofera terifoliata* (7.8%), *Phyllanthus niruri* (4.3%) and others.

II. *Effect of different treatments on Weed Population.*

Table 2 — Weed population per square foot

| Treatments        | Weed population (in number) prior to application of treatments | Final weed population after the treatment has been applied | Statistical significance      |
|-------------------|--|--|-------------------------------|
| Control           | 14.9   | 13.0   | C. D. at 5% (treatments) 1.73 |
| Clean cultivation | 15.41  | —  |                               |
| Farmers' practice | 13.91  | —  |                               |
| Amiben 2.0 kg/ha  | 12.1   | 11.9   | —                             |
| „ 3.0 „           | 14.01  | 10.5   |                               |
| „ 4.0 „           | 11.41  | 11.7   |                               |

Contd.

|                   |          |      |
|-------------------|----------|------|
| Treflan 0.5 kg/ha | 14.1     | 12.2 |
| „ 1.0 „           | 14.4     | 10.0 |
| „ 1.5 „           | 12.5     | 11.2 |
| TOK E-25 1.0 kg   | 18.6     | 10.5 |
| „ 1.5 kg          | 18.3     | 10.5 |
| „ 2.0 kg          | 17.4     | 8.7  |
| EV 201 1.0 kg     | 18.2     | 16.7 |
| „ 2.0 kg          | 11.6     | 10.7 |
| „ 3.0 kg          | 10.8     | 9.7  |
| F Test            | Not sig. | sig  |

Data revealed that cultural practices controlled all weeds and the weed population was found practically nil. Amongst various herbicides, TOK E-25 was significantly superior in controlling weeds followed by Treflan over control. Other weedicides i. e. Amiben and BV 201 failed to exhibit significant difference in reducing weed population over control.

### III. *Effect of different treatments on the yield of the crop:*

Effect of different weed control measures on the yield of Soybean crop is presented in the following table.

**Table 3 — Average yield in kg/ha as affected by different treatments**

| Treatment              | Yield in kg/ha | Statistical sig. |
|------------------------|----------------|------------------|
| 1. Control             | 2017           | C. D at 5% = 337 |
| 2. Clean cultivation   | 2910           |                  |
| 3. Farmer's practice   | 2592           |                  |
| 4. Amiben 2 kg/ha      | 2083           |                  |
| 5. „ 3 kg/ha           | 1873           |                  |
| 6. „ 4 kg/ha           | 1777           |                  |
| 7. Treflan 0.5 kg/ha   | 2319           |                  |
| 8. „ 1.0 kg/ha         | 2362           |                  |
| 9. „ 1.5 kg/ha         | 2393           |                  |
| 10. TOK E-25 1.0 kg/ha | 2056           |                  |
| 11. „ 1.5 kg/ha        | 2380           |                  |
| 12. „ 2.0 kg/ha        | 2319           |                  |
| 13. BV 201 1.0 kg/ha   | 1970           |                  |
| 14. „ 2.0 kg/ha        | 2472           |                  |
| 15. „ 3.0 kg/ha        | 2372           |                  |

From the data it is revealed that clean cultivation gave the highest yield, followed by farmer's practice, BV 201 at 2.0 kg, Treflan at 1.5 kg, TOK E-25 at 1.5 kg/ha. Among the various herbicides, treflan, TOK E-25 and BV 201 have given significantly higher yields (20%, 15% and 13%) respectively over control.

### DISCUSSION

Out of four herbicides, Amiben gave the lowest yield. The present results are in agreement with those found at Pantnagar (Report, 1966) which showed that the yield was highest under the clean cultivation (32.18 q/ha) and the lowest in Amiben (23.76 q/ha) plot. Failure of Amiben may be due to its high solubility in soil moisture resulting in leaching out of the zone of weed seeds. Yield in treflan plot was superior to that in amiben, though the weed competition was more or less same. Two other herbicides TOK E-25 and BV 201 were also less effective as compared to treflan. TOK E-25 treated plot was having less weed population than plots under other three. In the case of amiben, the weight of the plants and pod number per plant were comparatively less, while in case of treflan, height and pod number per plant were more. A trial conducted at Illinois Agri. Expt. station (U. S. A.) in 1966 (Report, 1967) showed that treflan gave the highest yield (38.8 bu/ac) while the yield in normal cultivation was 27.7 bu/ac. In U. S. A. treflan gave maximum yield than thorough cultivation, but in India such a trial has not been undertaken. Performance of herbicides depends on many factors, chemical and physical properties of the soil playing the maximum role. Part of the herbicide may be lost by volatilization or by photodecomposition when applied in the soil. Temperature, soil moisture, rainfall, micro-organisms and pH or other influencing factors also affect the herbicidal action in the soil and in turn the crop weed competition.

The yield under cultural practice was found to be more than under herbicides treatments. This may be due to the fact that the cultural practices exhibited less weed competition. The latter was least in hoeing; hence this treatment gave the maximum yield.

Each successive hoeing also helped in the improvement of soil structure. Hoeing was superior to farmer's practice and the latter to control which revealed highest amount of crop weed competition.

### SUMMARY

An experiment was conducted at the J. N. Krishi Vishwa Vidyalaya Farm, Jabalpur (M. P.) with four herbicides and cultural practices in the *kharif* season of 1967 to determine which of the four herbicides or cultural practices is most effective in controlling weeds in soybean crop.

The yield in cultural practices was more as compared to that in herbicidal treatments, the maximum being under hoeing followed by farmer's practices. Among the herbicides, Treflan gave the highest yield followed by TOK E-25 and BV 201. Amiben gave the least yield (19.33 q/ha) out of four herbicides. Weed population per square foot was lowest in TOK E-25 plot and highest in control plot.

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