

Effect of Herbicides (Lasso and Basalin) On Plant Dry Weight and Number of Pods per Plant on Soybean (*Glycine Max L.*)

Madhulika Singh

Department of Botany, St. Xavier's College, Ranchi-834 001, India

Abstract

100 presoaked seeds of varieties Bragg and Birsa-1 of Soybean (*Glycine max L.*) were treated with three concentrations namely 0.25%, 0.50% and 1.00% for Lasso and 0.17%, 0.33% and 0.66% for Basalin for two hours and then sown in experimental field in two replications along with the control after thorough washing.

The plant dry weight showed marked reduction in all the treatment doses of both the varieties as compared to the control. In variety Birsa-1 dose dependent inverse relationship with plant dry weight was observed in both Lasso and Basalin.

For observation on number of pods per plant in variety Bragg both the herbicide treatments at all concentration showed reduction as compared to that of control but no definite correlations were observed. In variety Birsa-1 a decreasing trend in the number of pods with increase in concentration was observed in both Lasso and Basalin.

Variety Birsa-1 seems to be more sensitive to the treatments than variety Bragg.

KEYWORDS: Herbicides, Number of Pods Per Plant, Plant Dry Weight, Soybean

INTRODUCTION

Agricultural chemicals are being used extensively by the farmers for obtaining high crop yields by controlling pests and diseases and eliminating weeds. But the Indian farmers do not realize that their indiscriminate use may have adverse effect on the crop plants as well as other non target organisms.

MATERIALS AND METHOD

The present investigation deals with the effect of two herbicides, Lasso (Alachlor) and Basalin (Fluchloraline) on plant dry weight and number of pods per plant, on two varieties of Soybean (*Glycine max L.*) namely Bragg and Birsa-1.

The normal concentration used in controlling weeds during crop cultivation under field conditions was used as medium dose; half of this and double the normal concentration were designated as low and high doses, respectively. (Table-1).

Table-1 : Concentrations of Herbicides used for treatments

| Sl. No. | Herbicides | Low Conc. | Medium Conc. | High Conc. |
|---------|------------|-----------|--------------|------------|
| 1. | Lasso | 0.25% | 0.50% | 1.00% |

| | | | | |
|----|---------|-------|-------|-------|
| 2. | Basalin | 0.17% | 0.33% | 0.66% |
|----|---------|-------|-------|-------|

RESULTS

In variety Bragg, the plant dry weight varied from 19.50g. in Basalin (high conc.) to 34.30g. in Lasso (medium conc.). In the control it was 36.90g. (Table 2). For both the herbicides plant dry weights were observed to be lowest in the highest concentration. Significantly lower plant dry weight was found in the case of Lasso (high conc.) and Basalin (low and high conc.) treatments as compared to the control.(Table 2).

Variety Birsa -1 showed a marked reduction in the plant dry weight in both the herbicides. It ranged from 24.50g. in Basalin (high conc.) to 38.70g. in Lasso (low conc.) while the plant dry weight in the control was 40.00g.(Table 2). A decreasing trend in the plant dry weight was observed in both the herbicides with increase in concentration. All the three concentrations of Basalin were significantly lower as compared to that of the control (Table 2).

In variety Bragg number of pods per plant ranged from 27.70 in Basalin (high conc.) to 49.83 in Basalin (medium conc.) ; the control's figure being 58.20 (Table 2). Although there is an increase in the number of pods per plant in the medium concentrations of both Lasso and Basalin however, the low and high concentrations of these herbicides significantly reduced the number of pods per plant as compared to the control (Table 2).

Number of pods per plant in variety Birsa-1 varied from 41.70 in Basalin (high conc.) to 69.90 in Lasso (low conc.). In the control it was 69.40 (Table 2). Significant reduction in the number of pods from the control was observed in Lasso (high conc.) and Basalin (low, medium and high conc.). A decreasing trend in the number of pods with increase in concentration was observed in both Lasso and Basalin (Table 2).

DISCUSSION

The plant dry weight of the control in variety Bragg was 36.90g. while it was 40.00g. in Birsa-1.

In variety Bragg the mean plant dry weight of Lasso and Basalin was 29.95g. and 25.60g. respectively whereas in Birsa-1 it was 35.7g. in Lasso and 26.61g. in Basalin (Table 2). The effect of these herbicides shows depression in various treatments as compared to the control. While in variety Birsa-1, the depression is gradual with increase in concentration; in variety Bragg, the depression is not dose dependent (Figure a). These observations are similar to the effect of varying concentration of certain herbicides and radiations on pigeon pea made by Bertholet & Clark(1985) and on groundnut by Pahwa & Prakash (1992), where the increasing concentration of herbicide treatments reduced the fresh and dry weight of plants as compared to their respective controls.

The average number of pods per tagged plant in the control of variety Bragg was 58.2 while it was 69.40 in Birsa-1 (Table 2). In variety Bragg, although a clear cut dose dependent reduction for the number of pods per plant was not observed yet reduction was maximum in higher doses of both Lasso and Basalin. In variety Birsa-1, dose dependent reduction in pods per plant was observed in both the herbicides and it was significantly lower in Basalin (all three concs.) (Table 2). Although Lasso low dose had very slight

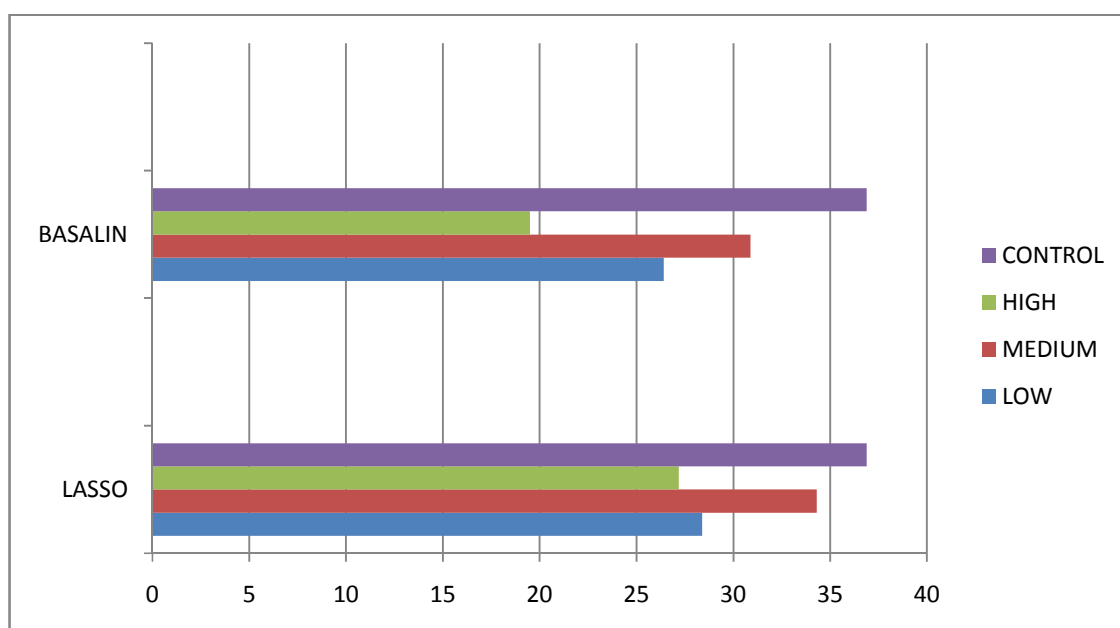
and non significant stimulating effect in this character, the high dose was significantly lower as compared to that of control (Figure b). Similar effects have been observed on the effect of agricultural chemicals and irradiations on various plants also viz., Bari (1971) on Flax , Baijukya and Semu (1998) on *Phaseolus vulgaris*, Wang and Zhou (2006) on wheat and Amaregouda et al (2013) on Soybean.

Basalin seems to have more adverse effect in both the varieties. The differential response of the two varieties could be attributed due to their genetic difference.

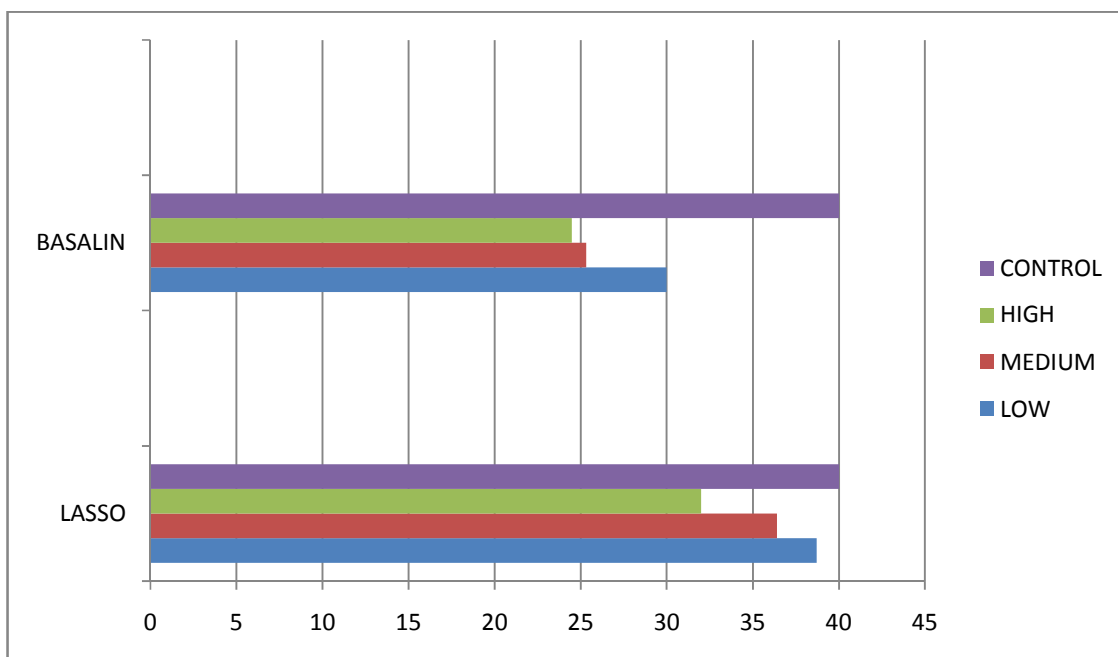
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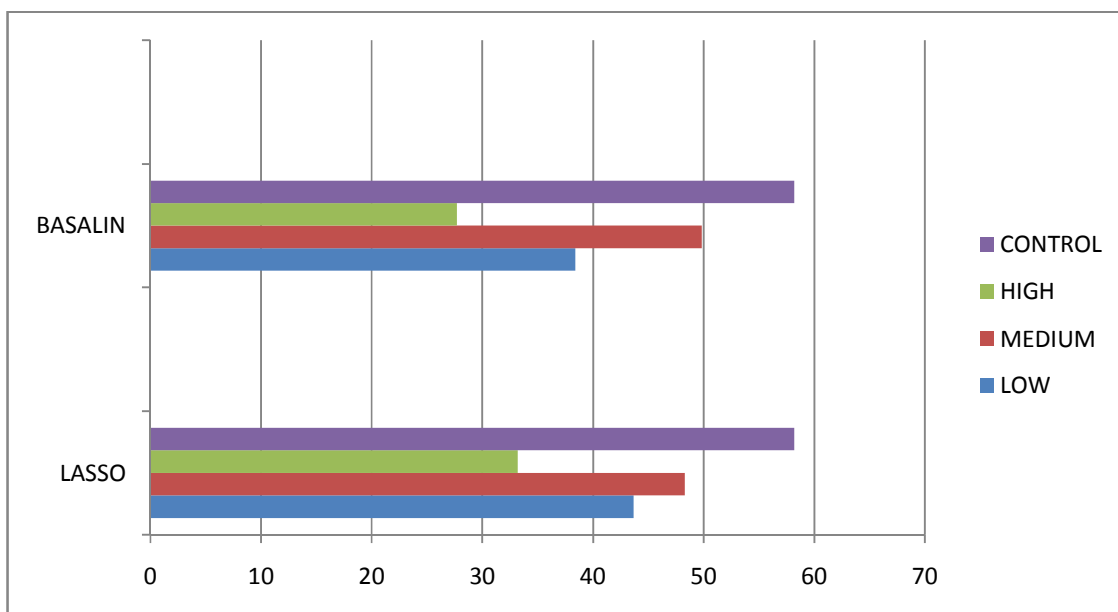
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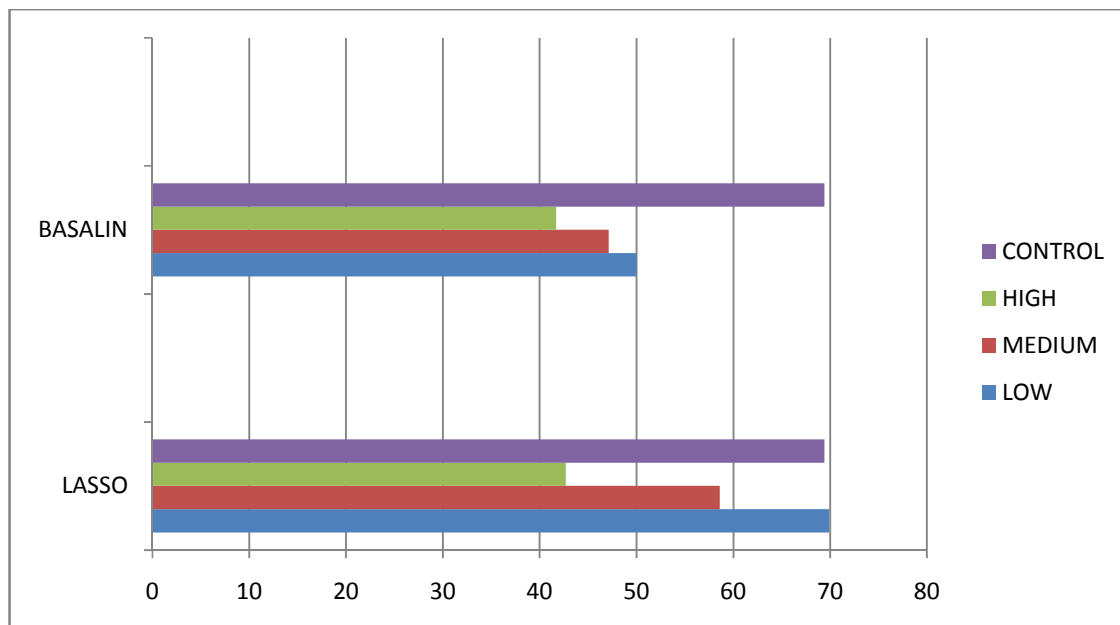
EFFECT OF AGROCHEMICALS ON PLANT DRY WEIGHT
SOYBEAN VARIETY BRAGG (Figure a)



EFFECT OF AGROCHEMICALS ON PLANT DRY WEIGHT
SOYBEAN VARIETY BIRSA-1 (Figure a)



EFFECT OF AGROCHEMICALS ON NUMBER OF PODS PER PLANT
SOYBEAN VARIETY BRAGG (Figure b)



EFFECT OF AGROCHEMICALS ON NUMBER OF PODS PER PLANT SOYBEAN VARIETY BIRSA-1 (Figure b)

Mean values of plant dry weight and number of pods per plant under Lasso and Basalin treatments in Soybean Variety – Bragg (Table 2)

| TREATMENTS | | PLANT DRY WEIGHT(g) | NO. OF PODS PER PLANT |
|------------|------|---------------------|-----------------------|
| CONTROL | | 36.90 | 58.20 |
| LASSO | LOW | 28.38 | 43.67* |
| | MED | 34.30 | 48.30 |
| | HIGH | 28.20* | 33.20* |
| MEAN | | 29.95 | 41.72 |
| BASALIN | LOW | 26.40* | 38.40* |
| | MED | 30.90 | 49.83 |
| | HIGH | 19.50* | 27.70* |

| | | |
|------|-------|-------|
| MEAN | 25.60 | 38.64 |
|------|-------|-------|

Variety - Birsa-1

| TREATMENTS | | PLANT DRY WEIGHT(g) | NO. OF PODS PER PLANT |
|------------|------|---------------------|-----------------------|
| CONTROL | | 40.00 | 69.40 |
| LASSO | LOW | 38.70 | 69.90 |
| | MED | 36.40 | 58.60 |
| | HIGH | 32.00 | 42.70* |
| MEAN | | 35.70 | 57.06 |
| BASALIN | LOW | 30.00* | 50.00* |
| | MED | 25.33* | 47.16* |
| | HIGH | 24.50* | 41.70* |
| MEAN | | 26.61 | 46.28 |