



## Research Article

# INFLUENCE OF DIFFERENT HERBICIDES FOR MANAGEMENT OF WEED IN MUNGBEAN [*Vigna radiata* (L.) Wilczek]

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**Abstract:** Mungbean cultivar PDM-139 (Samrat) was tested under different weed management practices. Among the grasses *Fimbristylis miliacea* (L.) was the predominant weeds followed by *Cyperus iria* (L.), *Digitaria sanguinalis* (L.) Scop and *Cyperus rotundus* (L.). The predominant dicot weed was *Euphorbia hirta* (L.) Followed by *Phyllanthus niruri*. The lowest weed population per m<sup>2</sup> was recorded under treatment T3 at 50 DAS while minimum weed population was recorded under T2 and T3. Dry weight of weed recorded significantly higher (6.26 g and 9.70 g) under control plot (T1). Weed control efficiency was maximum of 60.25 % in T3 at 15-20 DAS. Plant height, dry matter weight and number of root nodules per plant did not varied significantly due to treatment. There was significant effect of different treatment on Pods/plant and seeds/pods while it was non-significant with respect to test weight. The highest biological yield was observed 3746 Kg under T5 at 15-20 DAS. While highest seed yield and Stover yield was recorded with T8 followed by T6.

**Keywords:** Mungbean cultivar, Herbicides, Weed

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## Introduction

Mungbean [*Vigna radiata* (L.) Wilczek] is the third important pulse crop after chick pea and pigeon pea in India. Greengram [*Vigna radiata* (L.) Wilczek] is a self-pollinated leguminous crop which is grown during *kharif* and *Zaid* in arid and semi-arid region in India. It is tolerating to drought and can be grown successfully on well drain loamy to sandy soil in areas of sparse rainfall. Pulses are being cultivated almost all the district of M.P. despite being an important pulse crop average productivity of green gram in state is quite low ( 587 Kg/ha ) then its production potential (1200 Kg/ha), hence our research efforts should be intended to remove the constraints responsible for its low productivity, an important constraint is heavy weed infestation. Being a rainy season crop, it is invaded by a large number of fast-growing weeds, which is recognized major setback in realizing the potential yield. Therefore, research needs to be conducted to evolve the appropriate weed management programme for exploiting the yield potential of green gram. Traditional or physical weed management always is better but due to labour crises and limited time period exploring the possibility of herbicidal weed management in green gram deserves attention. In view of the above a research works on different weedicide for management of weed in mungbean were carried out with the objectives to find out the most suitable weed management practices in mungbean.

## Material and Methods

The present field experiment entitled was carried out during *kharif* 2017 at research farm of Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya Chitrakoot, Satna (MP). Mungbean cultivar PDM-139 (Samrat) was tested under three replicated RBD and nine weed management practices i.e. T0 (Control , T1 - Pendimethalin 30 EC@ 0.75 kg a.i./ha PE (Pre emergence)), T2 (Pendimethalin 30 EC+Imazethapyr 2 EC @ 0.75 kg/ha PE), T3 ( Imazethapyr 0 % SL @ 40g/ha at 15-20 DAS) , T4 ( Imazamox 35 WG+Imazethapyr 35 WG @ 40g/ha at 15-20

DAS) , T5 ( Imazamox 35 WG+Imazethapyr 35 WG @ 60g/ha at 15-20 DAS) T6 ( Clodinafop propargyl 8%+ Aciflourfen sodium 16.5% @ 125 g/ha at 15-20 DAS) , T7 ( Clodinafop propargyl 8%+Aciflourfen sodium 16.5% @ 125 g/ha at 15-20 DAS) T8 ( Clodinafop propargyl 8%+Aciflourfen sodium 16.5% @ 187.5 g/ha at 15-20 DAS) and T9 (Two manual weeding at 15-20 and 35-40 DAS) . The observation in mungbean was recorded on weeds like associated weed flora, weed density, dry matter of weed, weed control efficiency, parameters for growth and yield of mungbean.

## Result and Discussion

Weed flora from the experimental plot was collected, identified and classified as monocot and dicot weeds [Table-1]. There were 14 major weed species belonging to 10 families were found in the experimental plots. Among the grasses *Fimbristylis miliacea* (L.) was the predominant weeds followed by *Cyperus iria* (L.), *Digitaria sanguinalis* (L.) Scop and *Cyperus rotundus* (L.). The predominant dicot weed was *Euphorbia hirta* (L.) Followed by *Phyllanthus niruri*, at 30 DAS, out of the total weed flora in the experimental field *Euphorbia hirta* (L.) contributed 32.3 % followed by *Fimbristylis miliacea* (L.) alone 10.10%. Similarly, at 50 DAS, out of the total weed flora in the experimental field *Digera arvensis* contributed 32.3 % followed by *Cyperus iria* (L.) alone 8.4 percent. find many weeds associated with pulse [1-4]. The weed population (m<sup>2</sup>) dry weight (g) and Weed control efficiency (%) in different treatment plots was recorded at 30 and 50 DAS and presented in [Table-2]. Weed density and weed biomass recorded significantly higher in the control plots (Without use of herbicide) than rest of the treatment .Weed population at 30DAS was found non-significant with regards to treatment However lowest weed population per m<sup>2</sup> was recorded under treatment T3 at 30DAS while it was minimum under T2 followed by T4. Dry weight of weed recorded significantly higher (6.26 g and 9.70 g) under control plot (T1) followed by T6 and

Table-1 Mean population and relative weed density of different weeds in mungbean (30 &amp; 50 DAS)

| SN      | Botanical name                         | Family         | 30 DAS          |                           | 50 DAS          |                           |
|---------|----------------------------------------|----------------|-----------------|---------------------------|-----------------|---------------------------|
|         |                                        |                | Weed population | Relative weed density (%) | Weed population | Relative weed density (%) |
| Monocot |                                        |                |                 |                           |                 |                           |
| 1       | <i>Cynodon dactylon</i> (L.) Pers      | Poaceae        | 8.76            | 5.3                       | 3.52            | 5.8                       |
| 2       | <i>Echinochloa colonum</i> (L.) Link   | Poaceae        | 8.92            | 5.4                       | 1.5             | 2.3                       |
| 3       | <i>Digitaria sanguinalis</i> (L.) Scop | Poaceae        | 11.03           | 6.6                       | 4.35            | 5.6                       |
| 4       | <i>Cyperus rotundus</i> (L.)           | Cyperaceae     | 9.25            | 5.6                       | 5.6             | 7.2                       |
| 5       | <i>Fimbristylis miliacea</i> (L.)      | Cyperaceae     | 16.67           | 10.1                      | 2.4             | 4.9                       |
| 6       | <i>Cyperus iria</i> (L.)               | Cyperaceae     | 12.72           | 7.7                       | 5.1             | 8.4                       |
| Dicot   |                                        |                |                 |                           |                 |                           |
| 1       | <i>Phyllanthus niruri</i>              | Euphorbiaceae  | 9.38            | 5.68                      | 3.5             | 4.5                       |
| 2       | <i>Launaea nudicaulis</i>              | Compositae     | 3.23            | 1.95                      | 1.3             | 1.7                       |
| 3       | <i>Lauca aspera</i>                    | Lamiaceae      | 7.82            | 4.73                      | 3.25            | 4.2                       |
| 4       | <i>Euphorbia hirta</i> (L.)            | Euphorbiaceae  | 53              | 32.12                     | 3.98            | 5.1                       |
| 5       | <i>Phyllanthus niruri</i>              | Phyllanthaceae | 13              | 7.8                       | 3.72            | 4.8                       |
| 6       | <i>Digera arvensis</i> Forks.          | Amaranthaceae  | 3.25            | 1.96                      | 25              | 32.3                      |
| 7       | <i>Physalis minima</i> (L.)            | Solanaceae     | 3.1             | 1.87                      | 4.9             | 6.3                       |
| 8       | <i>Convolvulus arvensis</i>            | Convolvulaceae | 5.5             | 3.33                      | 5.3             | 6.8                       |

Table-2 Influence of treatments for weed management on weed population, dry weight and Weed control efficiency in mungbean

| Treatment        | Weed population (m <sup>2</sup> ) |        | Weed dry weight (g) |        | Weed control efficiency (%) |        |
|------------------|-----------------------------------|--------|---------------------|--------|-----------------------------|--------|
|                  | 30 DAS                            | 50 DAS | 30 DAS              | 50 DAS | 30 DAS                      | 50 DAS |
| T <sub>1</sub> : | 11.96                             | 12.88  | 6.26                | 9.7    | -                           | -      |
| T <sub>2</sub> : | 7.74                              | 7.31   | 4.48                | 6.38   | 47.95                       | 56.97  |
| T <sub>3</sub> : | 6.99                              | 7.81   | 3.9                 | 7.32   | 60.25                       | 45.32  |
| T <sub>4</sub> : | 7.88                              | 7.5    | 4.44                | 7.5    | 60.25                       | 41.43  |
| T <sub>5</sub> : | 8.14                              | 8.75   | 4.42                | 7.44   | 49.16                       | 41.56  |
| T <sub>6</sub> : | 8.9                               | 9.22   | 4.89                | 7.11   | 35.2                        | 46.66  |
| T <sub>7</sub> : | 9.31                              | 8.07   | 4.86                | 6.96   | 41.23                       | 49.41  |
| T <sub>8</sub> : | 8.85                              | 9.01   | 4.4                 | 6.28   | 40.83                       | 58.47  |
| T <sub>9</sub> : | 7.51                              | 7.8    | 4.03                | 6.51   | 56.59                       | 55.12  |
| S.E.m.±          | 0.87                              | 0.71   | 0.43                | 0.2    | 4.11                        | 2.64   |
| CD at 5%         | 2.6                               | 2.14   | NS                  | 0.59   | 12.46                       | 8.02   |
| CV( %)           | 17.52                             | 14.15  | 16.12               | 4.72   | 14.54                       | 9.28   |

Table-3 Influence of different treatment for weed management on growth parameters of mungbean

| Treatment        | Plant height (cm) |        |         | Dry wt. / plant (g) | No. of root nodules / plant |
|------------------|-------------------|--------|---------|---------------------|-----------------------------|
|                  | 25 DAS            | 45 DAS | Harvest |                     |                             |
| T <sub>1</sub> : | 28.63             | 41.47  | 58.27   | 4.12                | 7.66                        |
| T <sub>2</sub> : | 26.93             | 40.07  | 56.67   | 3.78                | 8.22                        |
| T <sub>3</sub> : | 24.27             | 38.40  | 54.00   | 4.50                | 8.33                        |
| T <sub>4</sub> : | 26.27             | 38.60  | 55.07   | 4.04                | 7.33                        |
| T <sub>5</sub> : | 25.07             | 38.07  | 52.00   | 4.01                | 8.22                        |
| T <sub>6</sub> : | 25.60             | 37.07  | 52.80   | 4.09                | 8.33                        |
| T <sub>7</sub> : | 27.87             | 40.40  | 55.33   | 4.01                | 7.77                        |
| T <sub>8</sub> : | 25.60             | 36.60  | 52.80   | 4.10                | 7.22                        |
| T <sub>9</sub> : | 22.80             | 34.60  | 49.13   | 4.22                | 7.77                        |
| S.E.m.±          | 2.09              | 1.78   | 2.50    | 0.33                | 0.72                        |
| CD at 5%         | NS                | NS     | NS      | NS                  | NS                          |
| CV( %)           | 13.99             | 8.01   | 8.02    | 13.87               | 15.81                       |

Table-4 Influence of different weed management treatment on yield parameters of mungbean

| Treatment        | Yield attributes |           |                 | Yield                    |                    |                      |                   |
|------------------|------------------|-----------|-----------------|--------------------------|--------------------|----------------------|-------------------|
|                  | Pods/plant       | Seeds/pod | Test weight (g) | Biological yield (kg/ha) | Seed yield (kg/ha) | Stover yield (kg/ha) | Harvest index (%) |
| T <sub>1</sub> : | 13.40            | 8.70      | 32.90           | 2991                     | 409                | 2582                 | 13.70             |
| T <sub>2</sub> : | 14.80            | 9.27      | 33.63           | 3733                     | 478                | 3254                 | 12.80             |
| T <sub>3</sub> : | 16.00            | 9.17      | 33.30           | 3471                     | 537                | 2934                 | 15.75             |
| T <sub>4</sub> : | 15.13            | 8.93      | 33.67           | 3456                     | 505                | 2951                 | 14.60             |
| T <sub>5</sub> : | 15.87            | 9.47      | 33.93           | 3746                     | 532                | 3214                 | 14.22             |
| T <sub>6</sub> : | 15.67            | 8.27      | 33.27           | 3505                     | 549                | 2957                 | 18.64             |
| T <sub>7</sub> : | 16.07            | 9.80      | 33.90           | 3497                     | 517                | 2980                 | 17.27             |
| T <sub>8</sub> : | 16.07            | 9.29      | 33.83           | 3584                     | 569                | 3015                 | 18.93             |
| T <sub>9</sub> : | 16.27            | 8.38      | 33.53           | 3411                     | 488                | 2923                 | 16.74             |
| S.E.m.±          | 0.53             | 0.26      | 0.48            | 122                      | 29                 | 116                  | 0.95              |
| CD at 5%         | 1.59             | 0.79      | NS              | 367                      | 87                 | 349                  | 2.86              |
| CV( %)           | 5.95             | 5.03      | 2.47            | 6.08                     | 9.94               | 6.76                 | 10.42             |

T<sub>7</sub> at the 30 DAS and similarly at 50 DAS it was highest in control followed by T<sub>4</sub> and T<sub>5</sub>. All the treatments are significantly superior over the control. Similarly weed control efficiency was maximum of 60.25 % in T<sub>3</sub> and T<sub>4</sub> at 30 DAS closely followed by 56.59 % in T<sub>9</sub>. However it was maximum 58.47% (T<sub>8</sub>) followed by T<sub>2</sub>

56.97. These results are in confirmation to the finding of Devi, *et al.*, (1998) [5], Singh and Rao (1992) [6] and Srinivasan, *et al.*, (1990) [7], they reported that application of oxyflourfen or pendimethalin in green gram gave effective control of weeds.

Ali, *et al.*, (2011) [8], Bhagat, (2014) [9] and [17] Upasani, *et al.*, (2017) [10] find good control of weeds with the application of pendimethalin and ready mix Imazethapyr in green gram.

### Growth parameters

Data related to plant height, dry matter weight per plant and number of root nodules per plant was recorded and presented in [Table-3]. Height of mungbean increased with each successive stage. It is evident from the table that there was no significant difference in the plant height at all the stages of plant growth. Almost similar trend was noticed in plant height of mungbean at harvest stage. The mean data of dry matter of each treatment did not varied significantly due to treatment of weed management. Similarly, Root nodules per plant did not significantly influenced due to treatment of weed management. Plants under the control plots faced higher competition with weeds throughout their life which may restrict the vigorous growth of mungbean [11-14].

### Yield attributes

The pod and seed character such as pods/plant, seeds/pods, and test weight (1000-seed weight) were recorded at maturity of the crop. These data were summarized and presented in [Table-4]. Perusal of data showed that number of pods per plant significantly affected by weed control treatment. The treatment T9 shows highest pod/plant followed by T7 and T8. It was minimum (13.40) under T1 (Weedy check) followed by T2.

Seeds per pod have the significant difference with respect to treatments. Highest seed per plot was recorded under T7 followed by T5 and T5. It is evident from table that test weight was not affected by weed control treatments. Almost similar size of seed was found in all the treatment

### Yield

The biological yield, seed yield and Stover yield were recorded significantly higher under herbicidal treatment including manual weeding then control (T1). The highest biological yield was observed 3746 Kg under T5 at 15-20 which is closely followed by T2 (3733 Kg/ha). Seed yield was produced lowest in control (408.90 kg/ha) plot. However significant high seed yield was observed 569 kg/ha in T8 followed by T6 (549 kg/ha), Stover yield also behaved in similar way. This could be achieved due to high weed control efficiency of respected treatment [15-20]. Significantly highest harvest index (which is ratio of grain yield into total biomass) of 18.93 was recorded under T8 at 15-20 DAS followed by (18.64) T6 at 15-20 DAS and 17.27 under T7. It might be due to less weed competition [15-20].

### Conclusion

It can be concluded that in spite of lowest weed population under Treatment T3 (Imazethapyr 10 % SL @ 40g/ha at 15-20 DAS) at 30 DAS and T2 (Pendimethalin 30 EC+Imazethapyr 2 EC @ 0.75 kg/ha PE) at 50 DAS. Highest yield and harvest index were recorded with treatment T8 (Clodinafop propargyl 8%+Aciflourfen sodium 16.5% @ 187.5 g/ha at 15-20 DAS) which can be recommended as effective weedicide for moongbean.

**Application of research:** Find out the suitable weedicide or their combination for effective weed management in mungbean

**Research Category:** Assessment of weedicide

**Abbreviation:** q/ha: quintal/hectare, lt/ha: litter/hectare, ha: Hectare

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**Study area / Sample Collection:** Research farm, Mahatma Gandhi Chitrakoot Gramoday Vishwavidyalaya, Chitrakoot, 485334, Madhya Pradesh

**Cultivar / Variety name:** Mungbean cultivar PDM-139 (Samrat)

**Conflict of Interest:** None declared

**Ethical approval:** This article does not contain any studies with human participants or animals performed by any of the authors.  
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