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Abstract
The effect of herbicide treatments on weed control and yield of green gram (IPM-2-3) was studied under field conditions. The treatments were hand weeding, 200 g a.i. ha⁻¹ of pendimethalin, 200 g a.i. ha⁻¹ of oxyfluorfen, 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl, 200 g a.i. ha⁻¹ of quizalofop-ethyl, 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen, 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl, 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl and 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl. The treatments were applied at 20 days after sowing. The results showed that the treatments with 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl and 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl were found to be most effective for weed control and yield of green gram.

Keywords: Herbicides; Hand weeding; Green gram; Weed; Yield

Introduction
Pulses constitute an important group of crops and have been the main stay in Indian Agriculture, as they improve physical condition of soil and provide nutritious food and fodder. India has a distinction of being world's largest producers of pulses. However, India needs to make immediate strides in pulse production programme taking into account the extreme relevance of pulses in our diet. Increasing yield of pulse crops should be the top priority to fill up the existing gap in the requirement and availability of pulses. This will not only ensure food security but will also provide nutritional security, particularly to the large vegetarian population of our country. Among the grain legumes, green gram ranks third after chickpea and pigeon pea among the pulses in respect of production, and it can be grown throughout the year. In India, there is substantial scope of summer green gram after harvesting of winter crops due to its short duration in nature and deep rooted, it can be grown with limited irrigation. However weed infestation is one of the major constraints in green gram cultivation. The loss of yield due to weeds is quite high, ranges from 40-68%. In view of severe infestation of annual and perennial weeds in summer green gram, the potential yield is generally not realized. The available pre and post-emergence herbicide, pendimethalin, oxyfluorfen, fenoxaprop-p-ethyl and quizalofop-ethyl are able to check the emergence and growth of annual grasses and broadleaved weeds. Keeping the above in view and the known possible reasons, the present study was taken up with the following objectives: i) To determine the effect of herbicide on weed control and yield of green gram.

Materials and Methods
The experiment was conducted at the Agronomy Research Station, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal, India during the kharif season, 2014. The soil was sandy loam with 12.5% organic carbon, 0.5% available nitrogen, 0.1% available phosphorus and 0.05% available potassium. The experimental area was prepared by ploughing, followed by harrowing and leveling. The green gram variety IPM-2-3 was sown on 15th August 2014. The experimental area was divided into 12 plots of 10 m x 10 m each. The plots were arranged in a randomized block design with three replications. The treatments were hand weeding, 200 g a.i. ha⁻¹ of pendimethalin, 200 g a.i. ha⁻¹ of oxyfluorfen, 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl, 200 g a.i. ha⁻¹ of quizalofop-ethyl, 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen, 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl, 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl and 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl. The herbicides were applied at 20 days after sowing. The plots were weeded by hand weeding at 20 days after sowing. The weeds were counted at 20, 40, 60 and 80 days after sowing. The yield and yield attributes of green gram were recorded at 120 days after sowing. The data were analyzed by using the analysis of variance technique.

Results and Discussion
The effect of herbicide treatments on weed control and yield of green gram (IPM-2-3) was studied under field conditions. The treatments were hand weeding, 200 g a.i. ha⁻¹ of pendimethalin, 200 g a.i. ha⁻¹ of oxyfluorfen, 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl, 200 g a.i. ha⁻¹ of quizalofop-ethyl, 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen, 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl, 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl and 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl. The treatments were applied at 20 days after sowing. The results showed that the treatments with 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl and 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl were found to be most effective for weed control and yield of green gram.

Conclusion
The treatments with 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl and 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl were found to be most effective for weed control and yield of green gram.

200 g a.i. ha⁻¹ and @ 100 g a.i. ha⁻¹ were found less effective for

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green gram variety used was IPM-2-3.

of green gram. These treatments were at par with hand weeding twice at 20 and 40 days after sowing. The treatments with 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl and 200 g a.i. ha⁻¹ of pendimethalin + 200 g a.i. ha⁻¹ of oxyfluorfen + 200 g a.i. ha⁻¹ of fenoxaprop-p-ethyl + 200 g a.i. ha⁻¹ of quizalofop-ethyl showed the best performance in respect of yield and yield attributes of green gram. The yield of green gram was 1.5 t/ha.

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