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Effect of skip row planting on yield and yield components of mungbean

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Abstract
The soil of the experimental field was clayey in texture and soil in low and high rating for available nitrogen (224 kg N ha^{-1}), available phosphorus (20.86 kg P_2O_5 ha^{-1}) and available potassium (342 kg K_2O), respectively. Significantly higher seed yield was recorded in skip row planting (4:1) with open furrow at 30 DAS (864 kg/ha) as compared to normal planting (747 kg/ha) and other treatments.

Keywords: planting, components, mungbean

Introduction
Mungbean (*Vigna radiate*) belongs to the family leguminosae. It is one of the most important pulse crops, from tropical to subtropical areas around the world. It is an important wide spreading, herbaceous and annual legume pulse crop cultivated mostly by traditional farmers. Its requirement in growing in areas where the rainy season is short and its wide adaptability together with its digestibility mungbean cultivated all over the world. Mungbean is utilized in several ways, seeds, sprouts and young pods are all consumed and provide a rich source of amino acids, vitamins and minerals. The grain contains 24.2% protein, 1.3% fat and 60.4% carbohydrate. It has low calories and is rich in fiber and easily digestable crop without causing flatulence as happens with many other legumes. The crop is characterized by fast growth under warm conditions, low water requirement and excellent soil fertility enhancement via nitrogen fixation [11, 12].

Rainfall often ceases before or during early grain fill of mungbean in many semi-arid areas of northern dry zone of Karnataka. Severe stress due to soil water deficits during grain fill is common resulting in low 100 seed weight and grain yield. Skip row planting is a means of delaying root access to available soil water until later growth stages as the root system extends [14]. Within row plant density is commonly increased with skip row planting to compensate for fewer planted rows and the crop is more likely to experience stress during the vegetative stage while having greater soil water availability during grain fill [9, 18]. Skip row planting may therefore result in increased 100 seed weight, number of pods and grain yield where soil water deficit stress is common during grain fill. Skip row planting is expected to result in reduced yield where terminal stress due for soil water deficit is not severe or not common but may increase yield and safeguard against crop failure when such stress is severe (Whish *et al*., 2005). Potential for increased yield with skip row planting increases as frequency of severe soil water deficits during grain fill increases, accompanied by potential for deep rooting depth and good oil available water holding capacity. Increased evaporative loss of soil water with skip row planting is a concern, although saving more deep soil water for later in the season can compensate for these losses (Myers *et al*., 1986 & Spackman *et al*., 2000) [16].

Highland pulse grain yield was increased with tie-ridging by 31 to 96% in northern Ethiopia (Brathane and Wortmann, 2008). In eastern Kenya, maize and cowpea (*Vigna unguiculata*) yield was inconsistently increased with tie-ridging (Miriti *et al*., 2007). The tie-ridging effect was enhanced with skip row planting of sorghum in northern Ethiopia (Mesfin *et al*., 2009). The northern dry zone of Karnataka, semi arid region with large variations in total annual rainfall from 2012 to 2016. Most of the highly variable annul precipitation is received during the months of May, June and July. Unfortunately, high temperatures and low relative humidity occur at the same time, resulting in high evaporation and transpiration potential. Extended periods of drought are common. Consequently, dryland (rainfed) production of full *kharif* season crops such mungbean is risky enterprise, i.e., the range of possible grain yields is

large and unpredictable.

The objectives of this research were determine the impact of skip row planting on yield and yield components of mungbean under rainfed condition of northern dry zone of Karnataka.

Materials and Methods

A field experiment was conducted at Agricultural Research Station, Annigeri, University of Agricultural Sciences, Dharwad during *kharif* season of 2012, 2013, 2014, 2015 and 2016 under rainfed condition of northern dry zone of Karnataka. It has average annual rainfall of 546.4 mm, 624.8 mm, 771.0 mm, 580.0 mm and 412.0 mm during 2012, 2013, 2014, 2015 and 2016, respectively (Table 1).

The experiment was laid out in a randomized complete block design (RCBD) with four replication and five treatments

T_1 - (2:1) skip row and furrow opening at 30 DAS
T_2 - (3:1) skip row and furrow opening at 30 DAS
T_3 - (4:1) skip row and furrow opening at 30 DAS
T_4 - (5:1) skip row and furrow opening at 30 DAS
T_5 - Normal planting (37.5 cm x 10 cm)

Table 1: Rainfall during *kharif* 2012-16 at ARS, Annigeri

Months	Rainfall (mm)					
	Avg. of 33 years	2012	2013	2014	2015	2016
January	1.5	0.0	0.0	0.0	0.0	0.0
February	0.8	0.0	3.0	0.0	0.0	0.0
March	11.8	0.0	7.5	0.0	70.8	3.8
April	39.5	38.3	16.5	26.9	40.2	27.0
May	64.4	71.0	58.9	86.8	118.8	60.3
June	94.6	16.0	76.0	65.0	105.4	92.2
July	75.9	75.7	56.7	121.0	21.4	79.6
August	87.2	66.8	44.6	170.4	35.8	32.6
September	145.2	73.6	239.6	130.3	149.2	54.0
October	101.2	64.0	102.6	128.4	38.4	61.2
November	39.4	141.0	19.4	23.6	0.0	0.0
December	4.0	0.0	0.0	18.6	0.0	2.0
TOTAL	665.5	546.4	624.8	771.0	580.0	412.0

Table 2: Effect of skip row planting in green gram under rainfed condition

Treatments	Seed yield (kg/ha)				
	2013-14	2014-15	2015-16	2016-17	Pooled
2:1 Skip row opening at 30 DAS	361	380	701	802	664
3:1 Skip row opening at 30 DAS	383	421	729	841	726
4:1 Skip row opening at 30 DAS	518	603	844	980	864
5:1 Skip row opening at 30 DAS	492	552	745	959	820
Normal planting (37.5cm X 10 cm)	499	582	768	823	747
SEm ±	25	26	22	31	21
CD at 5%	77	79	68	96	64
Treatments	**No. of pods per plant**				
	2013-14	**2014-15**	**2015-16**	**2016-17**	**Pooled**
2:1 Skip row opening at 30 DAS	41	63	75	83	66
3:1 Skip row opening at 30 DAS	55	72	80	92	75
4:1 Skip row opening at 30 DAS	71	80	97	103	88
5:1 Skip row opening at 30 DAS	65	73	87	101	82
Normal planting (37.5cm X 10 cm)	61	76	88	91	79
SEm ±	4	4	2	3	1
CD at 5%	11	NS	7	9	3
Treatments	**100 seed weight(g)**				
	2013-14	**2014-15**	**2015-16**	**2016-17**	**Pooled**
2:1 Skip row opening at 30 DAS	2.78	2.64	2.93	2.97	2.83
3:1 Skip row opening at 30 DAS	2.83	2.72	2.98	3.07	2.90
4:1 Skip row opening at 30 DAS	3.45	2.95	3.30	3.28	3.24
5:1 Skip row opening at 30 DAS	2.95	2.75	2.73	3.03	2.86
Normal planting (37.5cm X 10 cm)	2.85	2.81	2.95	2.93	2.88
SEm ±	0.10	0.07	0.25	0.07	0.07
CD at 5%	0.30	NS	NS	0.23	0.21

The soil of the experimental field was clayey in texture and soil in low and high rating for available nitrogen (224 kg N ha^{-1}) (Kjeldas method), available phosphorus (20.86 kg P_2O_5 ha^{-1}) (Olesen's method) and available potassium (342 kg K_2O) (Flame photometre method), respectively. The soil was found slights alkaline pH (7 qt) (Potentiaometric method) with normal electric conductivity. The seed of mungbean varieties (DDGV-2) variety was used seed rate of 12.5 kg ha^{-1} and fertilized with 25 kg N and 50 kg P_2O_5 [7].

The crop was grown with recommended package of practices of University of Agricultural Sciences, Dharwad for northern dry zone (zone-3) of Karnataka.

Results and Discussion

Number of pods per plant

Results of pooled analysis indicated that, significantly higher number of pods / plant (88) was observed in (T_3) – 4:1 skip row furrow opening of 30 DAS, as compared to other treatments. This result was in line with [6, 10, 14], who reported that planting maize skipping alternate pairs of rows had more yield compared with planting all rows.

100 seed weight (g)

Pooled analysis indicated that, significantly higher 100 seed weight (3249) was observed in 4:1 skip furrow opening at 30 DAS as compared to normal planting and other treatments. This result was in time with [2] who reported the, skipping alternate rows was advantageous for grain sorghum when soil water deficit limited grain yield to less than 4-5 mg ha^{-1} [1, 8, 15].

Seed yield (kg/ha)

Based on the analysis variance resulted of pooled data

indicated that, significantly higher seed yield was recorded in skip row planting (4:1) with open furrow at 30 DAS (864 kg/ha) as compared to normal planting (747 kg/ha) and other treatments. These results are confirmed with [3, 4, 5], observed increased sorghum grain yield with skip row planting. It is concluded that, due to better conservation of moisture in skip row planted mungbean which helped better growth and development of crop [16, 18, 19].

References

1. Abate S. Effects of irrigation frequency and plant population density on growth, yield components and yield of haricot bean (*Phaseolus vulgaris* L.) in Dire Dawa area. M.Sc. thesis presented to Haramaya University, Ethiopia, 2003.
2. Abunyewa AA, Ferguson RB, Wortmann CS, Lyon DJ, Mason SC, Klein RN. Skip-row configuration and plant population effects on sorghum grain yield and yield stability in the Central Great Plains. Agron J. 2010; 102:296-302.
3. Abuzar MR, Sadozai GU, Baloch MS, Baloch AA, Shah IH, Javaid T *et al*. Effect of plant population densities on yield of maize. J Anim Plant Sci. 2011; 21(4):692-5.
4. Asaye Birhanu, Tilahun Tadesse, Daniel Tadesse. Effect of inter and intra-row spacing on yield and yield components of mungbean (*Vigna radiate*) under rainfed condition at Metema District, North Western Ethiopia. Agril. Food Sec. 2019; 7:8. https://doi.org/10.1186/540066-018-0234-9).
5. Clark LE, Knight TO. Grain production and economic returns from dryland sorghum in response to tillage systems and planting patterns in the semi-arid southwestern USA. J Prod. Agric. 1996; 9:249-256.
6. De Bruin JL, Pedersen P. Effect of row spacing and seeding rate on soybean yield in the Upper Midwest. Agron J. 2008; 100:696-703.
7. Gomez KA, Gomez AA. Statistical procedures for agricultural research. 2nd ed. New York: Wiley, 1984.
8. Ihsanullah F, Taj H, Akbar H, Basir A, Noor U. Effect of row spacing on the agronomic traits and yield of mung bean (*Vigna radiata* L. Wilczek). Asian J Plant Sci. 2002; 1(4):328-9.
9. Lemlem HG. Effect of N fertilizer and plant density on yield, seed quality, and oil content of soybean (*Glycine max* L. Merr) at Hawassa, southern Ethiopia. M.Sc. Thesis presented to Haramaya University, Ethiopia, 2011.
10. Lyon DJ, Pavlista AD, Hergert GW, Klein RN, Shapiro CA, Knezevic S *et al*., Skip-row planting patterns stabilize corn grain yields in the central Great Plains. Crop Manage, 2009, http://www.plantmanagementnetwork.org/pub/cm/research/2009/skip/ Accessed 18 Mar, 2013.
11. Mesfin T, Tesfahunegn GB, Wortmann CS, Mamo M, Nikus O. Skip-row planting and tie-ridging for sorghum production in semi-arid areas of Ethiopia. Agron. J. 2010; 102:745-750.
12. Mesfin T, Tesfahunegn GB, Wortmann CS, Nikus O, Mamo M. Tie-ridging and fertilizer use for sorghum production in semi-arid Ethiopia. Nutr. Cycl. Agroecosyst. 2009; 85-87:94.
13. Milroy SP, Bange MP, Hearn AB. Row configuration in rainfed cotton systems: modification of the OZCOT simulation model. Agric. Syst. 2004; 82:1-16.
14. Minh NP. Different factors affecting to mung bean (*Phaseolus aureus*) tofu production. Int J Multidiscip Res Dev. 2014; 1(4):105-10.
15. Miriti JM, Esilaba AO, Bationo A, Cheruiyot H, Kihumba J, Thuranira EG. Tie-riding and integrated nutrient management options for sustainable crop production in semi-arid eastern Kenya. In Bationo A, Waswa B, Kihara J, Kimetu J, (eds) Advances in integrated soil fertility management in sub-Saharan Africa: challenges and opportunities. Springer, Dordrecht, the Netherlands, 2007, pp.435-441.
16. Myers RJK, Foale MA, Thomas GA, French AV, Hall B. How row spacing affects water use and root growth of grain sorghum. Proc First Australian Sorghum Conf. Gatton, 1986, pp.586-591.
17. Nielsen DC, Vigil MF, Caldreon FJ, Schneekloth J, Poss D, Henry WB *et al*. Water extraction patterns in skip-row corn sorghum and sunflower. 305-2. In 2007 Agronomy Abstracts. ASA, Madison, WI, 2007.
18. Shamsi K, Kobraee S. Effect of plant density on the growth, yield and yield components of three soybean varieties under climatic conditions of Kermanshah, Iran. Anim Plant Sci J. 2009; 2(2):96-9.
19. Somta P, Srinives P. Genome research in mung bean (*Vigna radiata* L. Wilczek) and black gram (*Vigna mungo* L. Hepper). Sci Asia. 2007; 33(1):69-74.