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Effect of methods of tillage and levels of fertilizer on yield attributes and economics of lablab bean

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Abstract
The field experiment was conducted on coastal lateritic soil of *Konkan* region to study the effect of levels of spacing and plant growth regulator on growth and yield of zero tilled lablab bean during *rabi* 2014 at Agronomy Farm, College of Agriculture, Dapoli. The experiment was laid out in split plot design with three replication. The main plot treatment consists of four tillage methods *i.e.*, conventional tillage, conservation tillage, minimum tillage, zero tillage and Sub plot treatment consist of five levels of fertilizers *i.e.*, control, 100% RDF through line application, 75% RDF (deep placement), 75% RDF (deep placement) + foliar spray 2% DAP (at flowering and pod filling), 100% RDF (placement below seed). All the yield attributes as well as economics at harvest noticed significantly higher when crop was sown in conventional tillage with application of 100% RDF (placement below seed). Grain yield and B: C ratio of lablab bean significantly affected with tillage methods and levels of fertilizer application.

Keywords: Lablab bean, tillage methods, levels of fertilizer application, foliar spray, yield attributes and economics

Introduction
Lablab bean (*Lablab purpureus* L.) belongs to the family leguminaceae with chromosome number 2n = 24. It is popularly recognized as "Wal" in Maharashtra state. Hot and humid climatic conditions of *Konkan* region during *rabi* season is suitable for production of lablab bean. Lablab bean (wal) is one of the important pulse crop grown in *Konkan* region of Maharashtra especially for seed purpose. The crop is mostly grown on residual moisture. So, mostly zero tillage is followed in Maharashtra for the cultivation of lablab bean.

Zero tillage is cultivation practice that not only helps to preserve soil fertility but also conserves scarce water and increases farmer's profits by reducing their production costs. Instead of ploughing the fields, farmers use zero tillage and deposit seeds into holes dibbled into unploughed fields. Due to zero tillage the cost is reduced about 15 to 16 per cent. In *konkan* region *kharif* rice followed by pulses like lablab bean, horse gram, cowpea etc. are commonly grown by the farmers, either on residual moisture or by giving protective irrigation.

Application of balanced and adequate nutrients play a decisive role in deciding the ultimate success of seed production by realizing higher yield. The growth, yield and quality of seed crop are largely influenced by the fertility status of the soil. Altering the soil nutrients and fertility status by providing balanced and adequate major nutrients as per the crop requirement is one of the easiest ways to boost up seed crop productivity of lablab bean. Hence it is important to standardise optimum levels of major nutrients for realizing better seed crop productivity (Dwivedi *et al*., 2002) [4].

Material and Methods
The field experiment on lablab bean was conducted during *rabi* season of 2014 at the Agronomy Farm, College of Agriculture, Dapoli, Dist. Ratnagiri (M.S.). The soil of experimental plot was sandy clay loam in texture and slightly acidic in reaction (pH 5.8) with medium in organic carbon (11.50 g kg^{-1}). It was medium in available nitrogen (280.15 kg ha^{-1}) and low in available phosphorus (12.05 kg ha^{-1}) and moderately high in available potassium (251.22 kg ha^{-1}). The experiment was laid out in split plot design with three replication. The Main plot treatment consists of four tillage methods i.e., conventional tillage, conservation tillage, minimum tillage, zero tillage and Sub plot treatment consist of five levels of fertilizers i.e., control, 100% RDF through line application, 75% RDF (deep placement), 75% RDF (deep placement) + foliar spray 2% DAP (at flowering and pod filling), 100% RDF

(placement below seed). Fertilizers were applied uniformly to the whole plot in the holes dibbled earlier at the spacing of 45 x 20 cm. The whole quantity of nitrogen and phosphorous (25:50 kg NP ha^{-1}) were applied as a basal dose as per treatments except treatment 100% RDF through line application (applied as a line application after emergence of crop). Whole quantity of fertilizers was uniformly mixed and it was applied 3-4 cm below the seed and above that some quantity of FYM was placed to avoid the direct contact of seed with fertilizers. The calculated quantity of N and P_2O_5 was applied through urea and single super phosphate, respectively. Healthy, unbroken and well developed seeds of lablab bean variety Konkan Wal-2 were treated with fungicide and inoculated with bio-fertilizer (Rhizobium @ 25 g kg^{-1} seeds) before sowing of the seeds. The periodical growth observations were recorded at an interval of 20 days and crop was harvested at physiological maturity and data on yield were recorded.

Result and Discussion

Effect of tillage methods on yield attributes of lablab bean

The data presented in Table 1 showed that the yield attributing characters such as number of pods per plant, weight of pods per plant, number of seeds per pod and 100 grain weight were recorded significantly higher under conventional tillage (T_1) than remaining tillage methods except minimum tillage (T_3) which was found to be at par with conventional tillage (T_1). Similar results were obtained by Vedprakash *et al.* (2004), Chendge (2012) [3] and Raut (2014) [7]. Similar trend was observed in grain and straw yields where the grain and straw yields were higher under conventional tillage (T_1). This was due to Conventional and minimum tillage provide better rhizosphere because of more manipulation of soil resulting into good root development, more nutrient absorption and increase in yield attributes ultimately higher yield. Similar result were reported by Chendge (2012) [3] and Raut (2014) [7].

Table 1: Effect of methods of tillage and levels of fertilize application on yield attributes of lablab bean at harvest

Treatment	No. of pods $plant^{-1}$	Weight of pods $plant^{-1}$	No. of grains pod^{-1}	100 grain weight
Methods of tillage				
T_1- Conventional tillage	31.40	30.53	4.16	23.82
T_2- Conservation tillage	28.95	27.55	3.28	20.87
T_3- Minimum tillage	31.07	30.37	4.01	22.81
T_4- Zero tillage	26.47	24.75	2.90	19.28
F. Test	Sig.	Sig.	Sig.	Sig.
S.Em. ±.	0.61	0.75	0.09	0.45
C.D. at 5%	2.11	2.60	0.32	1.57
Levels of fertilize application				
F_0 – Control	26.13	25.08	3.16	19.38
F_1 - 100 % RDF (L.A.)	30.21	28.86	3.62	21.90
F_2 - 75% RDF (D.P.)	28.15	26.61	3.39	20.66
F_3 - 75% RDF (D.P)+2% DAP (F.S.)	30.37	29.42	3.76	22.57
F_4 - 100 % RDF (D.P.)	32.49	31.54	4.00	23.98
F. Test	Sig.	Sig.	Sig.	Sig.
S.Em. ±.	0.69	0.69	0.06	0.41
C.D. at 5%	2.00	1.99	0.18	1.19
Interaction				
F. Test	N.S.	N.S.	N.S.	N.S.
S.Em. ±.	1.39	1.38	0.13	0.83
C.D. at 5%	-	-	-	-
General mean	29.47	28.30	3.58	21.70

Effect of levels of fertilizer application on yield attributes of lablab bean

It is evident from the data presented in Table 1 that the application of 100% RDF through deep placement (F_4) produced highest number of pods per plant, weight of pods per plant, number of seeds per pod and 100 grain weight while the lowest recorded by the control (F_0). The plant nutrients are most important for growth and development of crops. When soil contain less available nutrients, plant cannot absorb sufficient amount of nutrients from soil ultimately, it results in to reduction in yield of crop. Availability of optimum amount of essential plant nutrients resulted in a production of superior yield attibutes. Similar results were reported by Bhukan (2013) [1], Game (2013) [5], Kumar *et al.* (2013) [6] and Tahir *et al*. (2014) [8].

Effect of tillage methods on economics of lablab bean

The gross and net returns influenced significantly by tillage Methods on lablab bean (Table 2). The conventional tillage (T_1) gave significantly higher gross returns (₹ 114970.83 ha^{-1}) and net returns (₹ 48386.11 ha^{-1}) than rest of tillage methods except minimum tillage (T_3) which was at par with conventional tillage (T_1).

The lowest net income obtained from zero tillage method (T_4) of ₹ 29780.83 ha^{-1} whereas, gross income ₹ 93417.07 ha^{-1}, respectively. The highest benefit to cost ratio was also recorded under treatment T_1 (1.72) than rest of the other treatment. Similar results were reported by Tiku and Agbogo (2004) [9], Billore *et.al* (2009) [2], Chendge (2012) [3] and Raut (2014) [7].

Table 2: Effect of methods of tillage and levels of fertilizer application on economics of lablab bean at harvest

Treatment	Total Cost (₹ ha^{-1})	Gross income (₹ ha^{-1})	Net income (₹ ha^{-1})	B: C Ratio
Methods of tillage				
T_1- Conventional tillage	66584.72	114970.83	48386.11	1.72
T_2- Conservation tillage	63679.14	101503.93	37824.79	1.59
T_3- Minimum tillage	65652.19	113026.43	47374.24	1.71
T_4- Zero tillage	63636.24	93417.07	29780.83	1.46
F. Test	Sig	Sig	Sig	-
S.Em. ±.	661.02	3578.76	2892.73	-
C.D. at 5%	1989.05	10830.21	8726.30	-
Levels of fertilize application				
F_0 - Control	58089.39	85465.35	27375.96	1.46
F_1 - 100 % RDF (L.A.)	66987.08	109959.20	42972.11	1.64
F_2 - 75% RDF (D.P.)	66720.80	102664.40	35943.61	1.53
F_3 - 75% RDF (D.P)+2% DAP (FS)	65401.39	111998.40	46597.01	1.71
F_4 - 100 % RDF (D.P.)	67241.71	118560.50	51318.78	1.76
F. Test	Sig	Sig	Sig	-
S.Em. ±.	436.12	4210.89	3624.23	-
C.D. at 5%	1310.13	12630.12	10872.69	-
Interaction				
F. Test	NS	NS	NS	-
S.Em. ±.	987.05	6785.12	5416.78	-
C.D. at 5%	-	-	-	-
General mean	64888.07	105729.56	40841.49	1.62

Effect of levels of fertilizer application on economics of lablab bean

The data presented in Table 2 proved that the fertilizer application of 100% RDF deep placement (F_4) gave the highest gross returns (₹ 118560.50 ha^{-1}) as well as net returns (₹ 51318.78 ha^{-1}) followed by the application of 75% RDF deep placement +2% DAP foliar spray (F_3). However, the highest B: C ratio of 1.76 was recorded under conventional tillage (T_1). The minimum B: C ratio 1.46 was observed in zero tillage (T_4). The above observations are in accordance with Parasuraman, (2001), Nigamananda and Elamathi (2007), Game (2013) [5] and Kumar *et al*. (2013) [6].

References

1. Bhukan AU. Response of Urdbean [*Vigna mungo* (L.) Hepper] response to different Fertility and Boron levels. M.Sc. (Agri.) Thesis, Swami Keshwanand Rajasthan Agricultural University, Bikaner, 2013.
2. Billore SD, Ramesh A, Joshi OP, Vyas AK. Energy budgeting of soybean-based cropping system under various tillage and fertility management. Indian J agric. Sci. 2009; 79(10):827-830.
3. Chendge PD. Effect of tillage system and integrated weed management on growth, yield and quality of summer cowpea (*Vigna unguiculata* L.) M.Sc. (Agri.) Unpublished thesis, submitted to Dr. B.S.K.K.V, Dapoli, 2012.
4. Dwivedi YC, Kushwah SS, Sengupta SK. Studies on nitrogen, phosphorus and potash requirement of *dolichos bean*. JNKKV. Res. J. 2002; 36(1, 2):47-50.
5. Game VN. Effect of irrigation and levels of fertilizer application on zero tilled cowpea (*Vigna unguiculata* L.) M.Sc. (Agri.) Unpublished thesis, submitted to Dr. B.S.K.K.V., Dapoli, 2013.
6. Kumar CV, Vaiyapuri K, Mohamed M, Gopalaswamy G. Influence of Foliar Spray of Nutrients on Yield and Economics of Soybean (*Glycine max* L. Merill*)*. J of Biological Sci. 2013; 13(6):563-565.
7. Raut SD. Response of horse gram (*Dolichos biflorus* Roxb) to different methods of fertilizer application under varying tillage conditions during *rabi* season. Unpublished thesis, M.Sc. (Agri.) submitted to Dr. BSKKV. Dapoli, 2014.
8. Tahir M, Maqbool R, Majeed A, Rehman A, Zafar AM. Potential of foliar applied Diammonium Phosphate (DAP) and Potassium (K) in achieving maximum productivity and quality of Mash bean (*Vigna mungo* L.), Sci. Agri. 2014; 7(3):147-149.
9. Tiku NF, Agbogo EA. Returns on cowpea production using different tillage method within Obubra Local Govt. Area of Cross River State. J Agric. Forestry and Social Sci. 2004; 2(1):24-28.
10. Ved Prakash Bhattacharya R, Srivastva AK. Effect of tillage management on yield and soil properties under soybean (*Glycine max*) based cropping system in mid-hills of north-western Himalayas, 2004.