

Utilization cow urine and liquid organic fertilizer weed to production of tomato varieties timoti F1

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Abstract. Effect fertilizer chemical inputs are continuously cause soil its low fertility, can be used for high fertility through utilization cow urine and liquid organic fertilizer weed. The study was conducted to know the effect cow urine and POC weeds on growth and yield of tomato. The current study provide a two factors: first factor was cow urine concentration have four treatment (cow urine concentration 50 ml l⁻¹, 100 ml l⁻¹, 150 ml l⁻¹) and second factor was POC type of weeds have seven treatment (POC weed type of *Tithonia diversifolia*, *Chromolaena odorata*, *Eichornia crassipes*, *T. diversifolia* + *C.odorata*, *T. diversifolia* + *E. crassipes*, *C.odorata* + *E. crassipes*, *T. diversifolia* + *C.odorata* + *E. crassipes*) with three replications. The results showed concentration cow urine 150 ml l⁻¹ gives heavier fruit weight and all POC weeds give the same effect on growth and yield of tomato plants. Findings provide empirical support for sustainable agriculture.

1. Introduction

Cow urine and weed are two organic matter, if not manage properly can pollute on environment and harm the production on plant. Cow urine has the potential to increase the production of Sorghum [1], where as for broad leaf weeds have the potential supply N availability [2]. The addition of organic matter can increase the biomass of microorganisms in order to increase soil fertility and increase plant production [3].

Application cow urine and weed as liquid organic fertilizer are organic fertilizer that can supply the nutrient needs of the plant. Dose cow urine 100 cc l⁻¹ given good effect to growth and yiled Sorghum [1]. Compost *Tithonia diversifolia* and *Chromolaena odorata* giving Cowpea drying weight is higher [4]. Utilization weed as organic matter can reduce the use chemical fertilizer [5]. Bokashi weed *Ageratum conizoydxe*s can be utilized as a substitute for synthetic fertilizer NPK for tomato plants [6].

In contrast with previous research which used cow urine and weeds were applied separately, in this study we combined cow urine and liquid organic fertilizer weed. The aim of the research was to know the effect cow urine and POC weeds on growth and yield of tomato.

2. Material and Method

The material used were cow urine, liquid organic fertilizer *Tithonia diversifolia*, *Chromolaena odorata*, *Eichornia crassipes*, EM4, Tomato seed var, Timoti F1, and cow manure.



The experiment used was randomized block design two factors with factorial pattern and three replication. The first factor was concentration cow urine namely: u_1 : 50 ml l^{-1} , u_2 : 100 ml l^{-1} , u_3 : 150 ml l^{-1} . The second factor was liquid organic fertilizer type weed namely: g_1 : *Tithonia diversifolia*, g_2 : *Chromolaena odorata*, g_3 : *Eichornia crassipes*, g_4 : *T. diversifolia* + *C. odorata*, g_5 : *T. diversifolia* + *E. crassipes*, g_6 : *C. odorata* + *E. crassipes*, g_7 : *T. diversifolia* + *C. odorata* + *E. crassipes*. Before planting done tillage, and than basic fertilizer 4 t ha^{-1} cow manure, and 60 kg ha^{-1} P_2O_5 . Urea 60 Kg ha^{-1} , KCl 40 kg ha^{-1} were given 1 weeks after planting (WAP) and 4 WAP each of 30 percent at the recommended dosage. Pest and disease control was done by mechanical method and harvesting at 11 WAP. Application cow urine and liquid organic fertilizer weed 1 WAP, 2 WAP, 3 WAP, 4WAP, 5 WAP according to treatment.

The parameters observed were Relative Growth Rate, shoot root ratio, and fresh tomato fruit weight were measured at the time of harvest. To analyse the data, F test at 5 % level was used and continued with Duncan Multi Range Test at 5 % level.

3. Result and Discussion

3.1. Relative Growth Rate

The application of cow urine and liquid organic fertilizer weed gave not significant effect on Relative Growth Rate (RGR). Tomato plant have RGR sigmoid curve (Figure 1). Average maximum RGR tomato occurs to 20-40 DAP, cause the plant get into fruit formation.

40-74 DAP decrease RGR, cause plant get into senescence. Senescence process not accumulation photosynthate, and than not occurs process addition biomass [7].

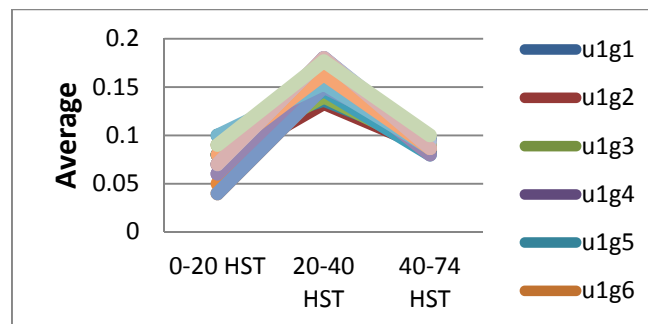


Figure 1. Average Relative Growth Rate all treatment

3.2. Shoot Root Ratio

Application of cow urine and liquid organic fertilizer weed showed significant effect on shoot root ratio. The value of shoot root ratio varied from 5.26 to 10.72. Application of liquid organic fertilizer mix three weed (g_7) significantly increased shoot root ratio when applied with cow urine 150 ml l^{-1} (U_3), when these low concentration cow urine and liquid organic fertilizer one or two weed the shoot root ratio decreased (Table 1).

Table 1. The effect of cow urine and liquid organic fertilizer weed on shoot root ratio

Cow urine	Liquid organic fertilizer weed						
	--g--						
	g_1	g_2	g_3	g_4	g_5	g_6	g_7
u_1	5,26 a A	6,10 a A	5,11 a A	7,33 a A	6,22 a A	6,12 a A	6,44 a A
u_2	6,73 a A	8,84 b A	8,21 a A	4,75 a A	6,41 a A	9,96b A	7,20 b A
u_3	6,20 a A	6,60 a A	5,94 a A	8,49 a B	6,68 a A	6,64 a B	10,78 b B

Remarks: Numbers followed by same small letter (vertical) and same capital letter (horizontal) are not significantly different based on Duncan's Multiple Range Test at 5% level

Concentration cow urine 150 ml l⁻¹ can add nutrition N and K. Cow urine has any advantages, including as a source of nutrients for plants that absorbed by plants can also help water absorption is also one of the potential organic fertilizer as a source of nutrients for plant such as N, P, and K [1]. Giving nutrients from liquid organic fertilizer weeds can increase the supply of nutrients from cow urine. *T. diversifolia* able to decompose the decomposition process so that the immobilized residue N for the plant is reduced [3].

3.3. Fruit Weight

Cow urine 100 ml l⁻¹ increased fresh fruit weight, but 50 and 150 ml l⁻¹ produced fresh fruit weight lower. Liquid organic fertilizer weed had no effect on fresh fruit weight (Table 2).

Table 2. The effect of cow urine and liquid organic fertilizer weed on fruit Weight

	fresh fruit weight (g)
Urine	
u ₁	826,79 a
u ₂	836,98 a
u ₃	1018,14 b
Weed type	
g ₁	896,52 a
g ₂	887,65 a
g ₃	948,01 a
g ₄	887,59 a
g ₅	851,63 a
g ₆	852,14 a
g ₇	936,11 a

Remarks: Numbers followed by same small letter are not significantly different based on Duncan's Multiple Range Test at 5% level

The highest mean value of weight is in the treatment of cow urine with the highest concentration. It is related with Phosphorus as one of nutrients needed for fruit development. The positive effect of organic waste provided essential plant nutrients and maintain soil fertility and stimulate crop growth and yield [8]. Cow urine contains Phosphorus 0.006%, add accumulation P contained on high concentration [1].

4. Conclusion

Concentration cow urine 150 ml l⁻¹ gives heavier fruit weight and all POC weeds give the same effect on growth and yield of tomato plants.

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