Performance of Grafted Cherry Tomato (CHT501) as affected by plastic mulch and different nutrient sources during wet season cropping

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The study evaluated the growth, yield performance, postharvest quality and economics of grafted cherry tomato (CHT501) during wet season cropping; determined the best nutrient source and found out the effect of plastic mulch on the growth and yield during wet season cropping.The grafted tomato seedlings were planted in plots without mulch and in plots with silvery gray plastic mulch, and were either not applied with fertilizer (control) or applied with the following fertilizers: recommended NPK as inorganic fertilizer, recommended rate of CLSU-CRF, recommended rate of Osmocote, chicken manure and pigwaste slurry.

Mulching grafted cherry tomatoes with silvery gray plastic resulted in significantly taller plants at 90 DAT, enhanced sugar content (^{0}Brix), TSS and yield per plant/ha. The different sources of nutrients on the other hand significantly affected plant heights and yield per plant. There was no significant interaction effects noted between the use of silvery gray plastic mulch and the different nutrient sources on plant height, number of days from full ripe red stage to onset of rotting. However, significant interaction effects were noted between the use of silvery gray plastic mulch and the different nutrient sources on the average yield per plant and the computed yield per hectare. The top three treatment combinations that gave highest cost benefit ratios were CLSU-CRF unmulched and mulched, which registered the highest CBR of 197 and 111, respectively. These were followed by chicken manure with mulch with 90, and Osmocote without mulch with 89. While RR NPK as IF with mulch had 42; pigwaste slurry without mulch, 28; and the control with or without mulch, negative ratio

Key words:

Introduction

Tomato, a member of *Solanaceae* family, is now of the most popular vegetables and one of the most important fruit-bearing vegetable crops. In 1993, the world tomato production was 70 million MT, overtaking banana, some fruits, orange and grapes (Wien, 1997). In the local scenario, however, although tomato is classified as a major crop (Espino and Atienza, 1998), a declined trend has been noted both in areas planted and subsequently on the volume of production.

Production of tomato during off-season cropping is hampered by many production constraints such as pests and diseases, unfavorable environmental factors, and lack of suitable varieties of planting; thus, tomato produced during off-season commands a very high price (Fresco, 2001). The average retail price of tomato from 1991 to 1998 in Luzon markets (e.g. Pangasinan, Benguet, Nueva Ecija and Metro Manila) is generally lower during the summer months of February to March and then picks up to its highest during the months of November to December. In 1999, for instance, the month of January had the highest retail price throughout the Luzon markets. In Southern Luzon, there are instances in January when the retail price goes as high as P 82.32 / kilo (NPNPVRD, 2000).

Meanwhile, the government is spending millions of dollars on imported inorganic fertilizers (Gicana, 1999; Gonzales *et al*., 2003). This is the reason why the prices of these inorganic fertilizers in the local agricultural outlets are prohibitive because of the high exchange rates of the US dollar to PhP, thus, farmers' productivity is likewise affected.

The high seasonality of tomato which causes fluctuation of retail prices, could probably be remedied by producing the crop all year round. To fill the short supply during off-season, i.e., November, December and January, grafted tomato was planted during the wet season period. Likewise, the right kinds of fertilizers was considered so as to reduce the cost of production and eventually to increase farmers' income. Hence the study was conducted.

Objectives of the study

1. To evaluate the growth, yield performance, postharvest quality and economics of grafted tomatoes during wet season cropping under green house condition; and

2. To determine the best nutrient source for grafted tomato production during wet season cropping.

Materials and methods

<u>Experimental crop</u>. Grafted cherry tomato ('CHT501') seedlings were procured from Tarlac College of Agriculture (TCA) in Camiling, Tarlac.

<u>Experimental design and treatments</u>. The split plot Randomized Complete Block Design (RCBD) was used in assigning the treatments in the field. After the experimental area (275 m^2) was thoroughly prepared, it was divided equally into three parts to represent the three replications, after which, each block was again subdivided in two portions for the main plot: mulch and unmulch plants. The main plots were further subdivided into six equal plots of

1 m x 5 m for the six nutrient sources. Main Plot: M1 = No mulch, M2 = With Mulch (silvery gray plastic); Sub Plot: F1 = Unfertilized (control), F2 = Recommended NPK as IF (inorganic fertilizer) based on soil analysis (80-0-0 kg/ha), F3 = Recommended rate of CLSU-CRF for tomato (120-30-60 kg/ha), F4 = Recommended rate of Osmocote for tomato (120-30-60 kg/ha), F5 = Chicken manure (based on soil and nutrient analysis 80-0-0 kg/ha), and F6 = Pigwaste slurry (based on soil and nutrient analysis 80-0-0 kg/ha).

Chicken manure and pigwaste slurry collection and analysis. Prior to field application, chicken manure and pigwaste were collected and placed in plastic containers with covers. Samples were analyzed at the Bureau of Soils and Water Management (BSWM) for nutrient composition.

Transplanting. The grafted tomato seedlings were transplanted double row on top of the furrows distanced at 1 m x 0.50 m.

Fertilizer application. The NPK as IF (inorganic fertilizers) based on soil analysis was applied on two occasions; first at 14 DAT and as a sidedress 35 DAT, while CLSU-CRF, and Osmocote were applied as sidedress fertilizers at 14 DAT. Chicken manure and pigwaste slurry were basally applied five days prior to transplanting of the seedlings.

Mulching. For the treatment with mulch, silvery gray plastic sheet was laid on top of the planting beds prior to transplanting.

Trellising. Two weeks after transplanting, t*ambo* poles (*runo*) five m long were installed along the furrows. The t*ambo* poles were tied with plastic straw creating an H-shape to provide support to the growing tomato plants (Giles, 2000).

Insect pests and diseases control. *Karate*, *Sevin* and *General* were alternately sprayed to control leaf miner and aphids. The plants were protected against fungal diseases by spraying *Dithane* M-45 w/zinc every 10 days during the vegetative stage and every 15 days from fruit setting and fruit development stage.

Harvesting. This was done once or twice a week after the fruits had reached full ripe red stage. The fruits were classified either marketable (without blemishes or worm damage) and non-marketable (with damage). They were counted and weighed by treatment and replication (Giles, 2000).

Data Gathered

1. Plant height (cm). This was recorded thrice, at 30, 60 and 90 DAT (days after transplanting). With the use of a measuring tape, plant height was determined by measuring the plant from the base to its tip.

2. Number of days from green mature to full ripe red stage of fruits. The fruits were placed in storage area under room temperature and the days were counted until 50% of the samples had turned red in color (Giles, 2000).

3. Number of days from full ripe red to the onset of rotting. This was done by counting the number days from full ripe red stage up to the time 50% of the samples had shown signs rotting (Giles, 2000).

4. Fruit sugar content (^{0}Brix). With the use of a hand refractometer (^{0}Brix), the sugar content of the fruits at full ripe red stage of fruits was determined (Pearson, 1970).

5. Fruit total soluble solids (TSS). Fruits at full ripe red stage were squeezed and the solids were separated from the juice. The specific gravity of the juice was taken and referred to the standard conversion table to determine the TSS.

6. Yield per plant and computed yield per hectare. The yield per plant per plot per treatment were converted into t/ha.

$$YPH = \frac{\text{Total yield in kg/plot}}{\text{Area/plot in m}^2} \times 10{,}000$$

7. Cost benefit cost ratio. This was computed using the following formula

$$CBR = \frac{\text{Benefit} - \text{cost}}{\text{Cost}} + 1$$

Where: benefit is the net income; cost is the total cost of production and 1 is the investment.

Results and discussion

Plant Height (cm)

Effect of mulching. The silvery gray plastic mulch did not significantly affect the height of grafted cherry tomato (CHT501) at 30 DAT and 60 DAT. Numerically, plants mulched with silvery gray plastic were taller than those without mulch. However at 90 DAT, plant heights significantly differed. Mulched plants were significantly taller than the unmulched plants. Mulching is known not only to suppress the growth of weeds but also to conserve the moisture content of the soil (Ricotta and Masiuanas, 1991). According Pambid (1984), the adequate soil moisture is essential to the production of most vegetable crops. Besides its direct effect on plant growth and development, water often aids to dissolve granular fertilizers. It also aids in soil nutrient absorption and in cooling the plant body through transpiration. It plays an important part in physiological activities such as photosynthesis and translocation of assimilates. Thus, being essential in crop production, water can be conserved by the addition of organic matter and the use of mulches. Moreover, Nnadi et al., (1984) concluded that mulched crops are taller and more vigorous than the unmulched. They also claimed that mulching provides better soil moisture, temperature regimes and reduces weed competition.

Effect of nutrient source. At 30 DAT, plants applied with Osmocote were the tallest. Plants fertilized with chicken manure, pigwaste slurry or CLSU-CRF had comparable plant heights. The shortest were the control or unfertilized plants. Similarly, at 60 DAT, all the nutrient sources used significantly enhanced the height of cherry tomato (CHT501). Plants fertilized with CLSU-CRF or Osmocote were remarkably the tallest plants. Those applied with RR NPK as IF, chicken manure or pigwaste slurry had statistically comparable heights; the shortest were the control plants. Consistently at 90 DAT, plants applied with Osmocote were significantly taller than those applied with CLSU-CRF. Those treated with chicken manure had statistically comparable heights. The shortest were again the control plants.

Interaction effect. Mulching using silvery gray plastic and the different nutrient sources had no significant effect on the height of cherry tomato (CHT501). These findings imply that the effects of mulching on plant height and the different sources of nutrients are independent from each other.

Table 1. Plant height (cm) at 30, 60 and 90 days after transplanting.

Treatment	Plant height at		
	30 DAT (cm)	**60 DAT (cm)**	**90 DAT (cm)**
Mulching			
No Mulch	24.94a	58.52a	116.44b
With Mulch	27.14a	67.78a	123.39a
Nutrient Source			
Control	22.90d	48.18c	72.83e
RR NPK as IF	23.50cd	58.53b	117.50d
CLSU-CRF	25.22bcd	73.76a	135.83b
Osmocote	31.78a	76.04a	145.17a
Chicken Manure	26.97b	64.93b	128.00bc
Pigwaste Slurry	25.88bc	57.43b	120.17cd
CVa (%)	10.28	13.36	3.14
CVb (%)	8.34	11.30	5.85

Within a column, means with a common letter are not significantly different at 1% level by DMRT.

Green Mature to Full Ripe Red Stage

Effect of mulching. Silvery gray plastic mulch significantly affected the number of days from green mature to full ripe stage of the fruits. Fruits harvested from mulched plants turned to full red stage after 15.11 days, while those taken from unmulched plants reached full ripe red stage at 15.50 days.

Effect of nutrient source. Similarly, the different nutrient sources applied significantly affected the number of days from green mature to full red stage of the fruits. Fruits harvested from plants applied with CLSU-CRF or Osmocote treated-plants turned to full ripe red stage in only 14 days from green mature stag. The other plants applied with other nutrient sources had a mean of 16 days to achieve full ripe red stage.

Interaction effect. The interaction between the use of silvery gray plastic mulch and the different sources of nutrients did not significantly affect the number of days from green mature to full red stage of the tomato fruits.

Full Red Stage to Onset of Rotting

Effect of mulching. The use of silvery gray plastic mulch did not significantly affect the number of days from full red stage to onset of rotting of the fruits harvested from mulched and unmulched plants.

Effect of nutrient source. Fruits taken from plants fertilized with RR NPK as IF, CLSU-CRF, chicken manure or pigwaste slurry had similar durations from full red stage to onset of rotting. Fruits harvested from control plants had significantly shorter postharvest life.

Interaction effect. The two factors used, such as the use of silvery gray plastic mulch and the different sources of nutrients, had no significant effect on the number of days from full red stage to onset of rotting of the fruits.

Table 2. Number of days from green mature to full red and from full ripe red to onset of rotting of fruits.

Treatment	Number of days from	
	Green mature to full red stage	**Full red to onset of rotting**
Mulching		
No Mulch	15.50a	33.94a
With Mulch	15.11b	33.89a
Nutrient Sources		
Control	15.50a	25.33b
RR NPK as IF	16.17a	35.83a
CLSU-CRF	14.33b	35.83a
Osmocote	14.17b	35.00a
Chicken Manure	15.67a	36.00a
Pigwaste Slurry	16.00a	35.50a
CVa (%)	1.09	1.30
CVb (%)	3.64	1.22

Within a column, means with a common letter are not significantly different at 1% level by DMRT.

Sugar Content of the Fruits (^{0}Brix)

Effect of mulching. The use of silvery gray plastic mulch did not significantly affect the fruit sugar content (^{0}Brix) of the fruits. Numerically, those mulched plants had higher fruit sugar content than the unmulched plants. The high sugar content of the fruits obtained from mulched plants could be attributed to the higher temperature brought about by the plastic mulch (Tipayno, 1976; Pangos, 2000).

Effect of nutrient source. The different nutrient sources significantly affected the fruit sugar content of the plants. Those fertilized with chicken manure produced fruits with higher sugar content with 4.167 ^{0}Brix. Plants applied with RR NPK as IF, Osmocote, CLSU-CRF or pigwaste slurry had similar sugar contents. Fruits of control plants or unfertilized plants had the lowest fruit sugar content.

Interaction. The use of silvery gray plastic mulch and the different nutrient sources did not interact to significantly affect the fruit sugar content of the plants.

Total Soluble Solids (TSS) of the Fruits

Effect of mulching. The fruit total soluble solids (TSS) of the plants as influenced by the use of silvery gray plastic mulch did not markedly differ. Numerically, fruits from mulched plants had higher total soluble (TSS) than those from unmulched plants.

Effect of nutrient source. The different nutrient sources significantly affected the fruit total soluble solids (TSS) of the plants. The organic sources of nutrients, namely, chicken manure and pigwaste slurry significantly enhanced the production of higher fruit total soluble solids, followed by plants applied with CLSDU-CRF. Plants applied with RR NPK as IF or Osmocote fertilized plants had statistically similar fruit total soluble solids. The control or unfertilized plants had the lowest computed TSS.

In general, the TSS obtained in the study, which ranges from 5.70 to 6.90 were higher than those reported by Jimenes *et al*., (1996), which was only 5.43, also from green mature stage of cherry tomato fruits. A lower quantity of high TSS fruit is required than low TSS fruit to produce the same amount of processed product. Processors therefore prefer to buy and pay more for fruits with high TSS fruits (Boulton and Quadir, 2003).

Interaction effect. The silvery gray plastic mulch did not significantly interact with the different nutrient sources to effect the total soluble solids (TSS) of the plants.

Table 3. Sugar content (^{0}Brix) and total soluble solids (TSS) of full ripe tomato fruits.

Treatment	Sugar content (^{0}Brix)	Total soluble solids (TSS)
Mulching		
No Mulch	3.999a	6.342a
With Mulch	3.944a	6.356a
Nutrient Sources		
Control	3.483c	5.698d
RR NPK as IF	4.000b	5.918c
CLSU-CRF	4.000b	6.738b
Osmocote	4.000b	5.978c
Chicken Manure	4.167a	6.893a
Pigwaste Slurry	4.000b	6.868a
CVa (%)	0.00	0.50
CVb (%)	14.55	20.89

Within a column, means with a common letter are not significantly different at 5% level by DMRT.

Yield per Plant (kg)

Effect of mulching. The yield per plot was not significantly affected by the use of silvery gray plastic mulch. The average yield was one kilo per plant, in either mulched or unmulched plants. Mulched plants had lesser weeds than unmulched because the latter were occasionally weeded during their vegetative stage, a practice which has resulted to almost the same yield as the former.

Effect of nutrient source. The nutrient sources applied to the grafted cherry tomato (CHT501) significantly differed on their effect on the average yield per plant. The highest yield per plant was obtained from CLSU-CRF-fertilized plants with 1.546 kg, followed by Osmocote fertilized plants with 1.472 kg, and chicken manure-treated plants with 1.129 kg. The lowest yield was obtained from the unfertilized plants. Plants applied with RR NPK as IF or pigwaste slurry had 0.817 kg and 0.758 kg, respectively. The controlled-release fertilizers, i.e. CLSU-CRF, Osmocote including that of chicken manure produced relatively higher yield compared with that of the standard RR NPK as IF. This result could be attributed to the characteristic of controlled-released or slow-released fertilizers, that is, the release of fertilizer nutrients are more synchronized with the growth of plants and are stocked for plants during its growth period; this phenomenon does not occur with the use of conventional fertilizers (Singh *et al*., 1997).

Interaction effect. The use of silvery gray plastic mulch significantly interacted with the different nutrient sources to effect the average yield per plant of grafted cherry tomato (CHT501). CLSU-CRF fertilized and unmulched plants produced significantly higher yield per plant with 1.733 kg, followed by Osmocote with or without mulch. The lowest yield was recorded from the control with or without mulch. Plants applied with RR NPK as IF, pigwaste slurry were out-yielded by those fertilized with chicken manure as nutrient source. Under low lands, Boncato (2003) reported an average yield per plant of 1.292 kg, which is lower compared to the average yield per plant obtained from CSU-CRF and Osmocote treated plants. However, those reported by Boncato (2003 and 2004) were set under rain shelter (net) but the present study was under greenhouse condition.

Computed Yield (t/ha)

Effect of mulching. The computed yield of mulched plants did not remarkably differ from that of the unmulched plants. This contradicts the report made by Wien *et al*., (1993), that tomato plants grown on polyethylene mulch usually have more branches and yield than unmulched plants. The increased yield as a result of mulching was due to stimulated root extension shortly after transplanting. Mulching also enhanced flowering of basal branches and increased concentration of major nutrients in the shoots. They claimed that these effects of mulching may be due to the warming effect of mulch to the stem by air escaping from the planting hole in the mulch.

Effect of nutrient source. The use of the different nutrient sources produced remarkable effects on their computed yield. Consistent with the results on the average yield per plant, those applied with CLSU-CRF, Osmocote or chicken were the top yielders with 30.917 t/ha and 29.417 t/ha, respectively. Chicken manure also enhanced the computed yield with 22.583 t/ha, which was higher compared to the yields effected by RR NPK as IF, pigwaste slurry, and the control. AS mentioned earlier, the controlled-release fertilizers, *i.e.* CLSU-CRF, Osmocote and chicken manure, effected relatively higher yield compared with that of the standard RR NPK as IF. These differences could be attributed to the slow-release of fertilizer nutrients, which were synchronized with the growth of plants and show a reservoir of nutrients for plants during their growth period use in comparison with that of conventional fertilizers (Singh *et al*., 1997). These findings confirm the report of by Aganon *et al*., (2003), that CLSU-CRF significantly enhanced the yield of onion, rice and tomato. Onion bulb yield (39.92 grams/plant) and size (27.86) was found remarkably higher compared to those of the recommended standard inorganic (SI) fertilizer rate as well as the combination of SI and organic fertilizer, which had only 11.29 grams/plant; 15.95 and 7.16 grams/plant 12.87, respectively. The yield of tomato was also increased by 1.57 t/ha resulting to a yield of 5.56 t/ha by using the CLSU-CRF.

Similarly, in the case of rice planted in lahar, CLSU-CRF enhanced the yield by 1.37 t/ha (5.60 t/ha) compared to the recommended standard inorganic (SI) fertilizer which effected only 3.73 t/ha. It is worth noting that CRF is applied in the field only once, while standard inorganic (SI) fertilizer was applied in several stages in the growth of the crop per cropping period. Thus, an increased income is expected to be generated from the cut on labor cost for fertilizer application.

Interaction effect. The use of silvery gray plastic mulch significantly interacted with the different sources of nutrient to effect the computed yield. CLSU-CRF without mulch obtained the highest computed yield of 34.667 t/ha, followed by Osmocote with or without mulch. The chicken manure applied plants outyielded those applied with the standard RR NPK as IF, pigwaste slurry or the control. The average yield reported by Boncato (2003 and 2004) of 18.10 t/ha using the same grafted cherry tomato planted under lowlands farm condition is lower compared to the yield obtained in the study.

Table 4. Interaction effect of mulching and nutrient source on the average yield per plant and computed yield (t/ha).

Treatment	Mean (kg)	Means (t/ha)
No Mulch	0.981a	19.63a
Control	0.111h	2.233h
RR NPK as IF	0.760g	15.200g
CLSU-CRF	1.733a	34.667a
Osmocote	1.450b	29.000b
Chicken Manure	1.067e	21.333e
Pigwaste Slurry	0.767h	15.333g
With Mulch	0.966a	19.317a
Control	0.128h	2.567h
RR NPK as IF	0.875f	17.500f
CLSU-CRF	1.358c	27.167c
Osmocote	1.492b	29.833b
Chicken Manure	1.192d	23.833d
Pigwaste Slurry	0.750g	15.000g
CVa (%)	4.59	4.41
CVb (%)	8.679	3.63
A x B =	significant	significant

Within a column, means with a common letter are not significantly different at 1% level by DMRT.

Cost Benefit Ratio (CBR)

Results show that the top three treatment combinations that gave higher benefit cost ratios were CLSU-CRF unmulched and mulched, which registered the highest BCR of 197 and 111, respectively. Following were chicken manure with mulch with 90; Osmocote without mulch with 89. While RR NPK as IF with mulch had 42; pigwaste slurry without mulch, 28; and the control with or without mulch, negative ratio.

Table 5. Cost benefit ratio (CBR) per hectare basis.

Treatment	Cost of production	Net income	BCR
No Mulch			
Control	418,400	(-319,400)	(-76)
RR NPK IF	521,100	162,900	31
CLSU-CRF	524,648	1,036,852	197
Osmocote	691,720	613,280	89
C. Manure	532,634	425,866	80
PW Slurry	539,554	148,946	28
With Mulch			
Control	550,300	(-433,300)	(-79)
RR NPK IF	553,100	234,400	42
CLSU-CRF	579,148	644,852	111
Osmocote	723,720	617,280	85
C. Manure	564,634	506,366	90
PW Slurry	571,554	103,446	18

Note; US Dollar to Philippine Peso Exchange Rate is 1 US = 55 pesos

Summary

The study was undertaken from June to December 2004 at BSU, La Trinidad, Benguet, with the following objectives; evaluate the growth, yield performance and postharvest quality of grafted cherry tomato (CHT501) during wet season cropping under open field and green house condition; determine the best nutrient source for grafted tomato production during wet season cropping; determine the effect of plastic mulch on the growth and yield of grafted tomato during wet season cropping; and assess the economics of using the different treatments. The treatments used were as follows; (Main Plot) no mulch and with mulch (silvery gray plastic), (Sub Plot), unfertilized, recommended NPK as IF (inorganic fertilizer) based on soil analysis, recommended rate of CLSU-CRF for tomato, recommended rate of Osmocote for tomato, chicken manure (based on soil and nutrient analysis), and pigwaste slurry (based on soil and nutrient analysis).

Effect of mulching. The height of grafted cherry tomato (CHT501) was not enhanced by the use of silvery gray plastic mulch at 30, 60 DAT. However, at 90 and DAT, mulched plants were significantly taller than the unmulched. The fruits harvested from mulched plants took 15.11 days to reach full red stage, and 15.50 days from the unmulched plants. Fruit sugar content (^{0}Brix) and total soluble solids (TSS) of mulched and unmulched plants did not vary significantly, while differences on the yield per plant and computed yield per hectare were not significant between mulched and unmulched plants.

Effect of nutrient source. The different nutrient sources significantly produced varied effects on the height of the plants. At 30 DAT Osmocote treated plants were significantly taller compared to plants fertilized with other nutrient sources, while chicken manure, CLSU-CRF, and pigwaste slurry fertilized plants had comparable heights and those in the control were the shortest. At 60 DAT CLSU-CRF and Osmocote applied plants were the tallest, while the shortest were the unfertilized plants. Similarly, at 90 DAT Osmocote fertilized plants were the tallest with a mean of 145.17 cm, followed by plants treated with CLSU-CRF with 135.83 cm, and with chicken manure with 128.17 cm.

Generally, fruits harvested at green mature stage took 14.7 days to 16.17 days to turn to full red stage and 25.33 days to 36.00 days to the onset of rotting. The fruit sugar content, total soluble solids (TSS) were likewise affected by the different nutrient sources. The higher fruit sugar content (^{0}Brix) and total soluble solids (TSS) were noted from chicken manure fertilized plants. The yield per plant and computed yield was significantly enhanced by the different nutrient sources. CLSU-CRF treated plants produced the highest yield per plant with 1.546 kg, followed by Osmocote with 1.471 kg. Chicken manure applied plants produced 1.129 kg per plant which was higher as compared with those taken from RR NPK as IF, pigwaste slurry and the control. Consistently, CLSU-CRF, Osmocote, and chicken manure fertilized plants produced higher yields with 30.917 t/ha, 29.417 t/ha and 22.583 t/ha, respectively.

Interaction effect. There was no significant interaction effects noted between the use of silvery gray plastic mulch and the different nutrient sources on the following parameters used; plant height, number of days from full red stage to onset of rotting. However, significant interaction effects were noted on the average yield per plant and the computed yield per hectare. The highest yield per plant and computed yield were recorded from CLSU-CRF with no mulch, Osmocote with or without mulch, CLSU-CRF with mulch and chicken manure with mulch. The top three treatment combinations that gave the highest cost benefit ratio (CBR) were CLSU-CRF without mulch which registered the highest CBR of 197, followed by Osmocote without mulch with 89 and chicken manure with mulch with 90. RR NPK as IF with mulch had 42, pigwaste slurry without mulch had 28, while the control with or without mulch had negative (-) CBR.

Conclusions

Based on the findings, the following conclusions are drawn:

1. The use of silvery gray plastic mulch markedly affected the plant height at 90 DAT and number of days from green mature to full red stage of the fruit of grafted cherry tomato (CHT501) planted under greenhouse condition;
2. The different nutrient sources significantly affected the plant height, number of days from green mature to full red stage of the fruits, number of days from full red to the onset of rotting, average yield per plant and computed yield per hectare of grafted cherry tomato (CHT501);
3. Interaction effects between the use of silvery gray plastic mulch and the different nutrient sources significantly influenced the average yield per plant and the computed yield per hectare; and
4. The top three treatment combinations that gave the highest cost benefit ratio (CBR) were CLSU-CRF without mulch which registered having the highest CBR of 197, followed by Osmocote without mulch with 89 and chicken manure with mulch with 90. RR NPK as IF + mulched had 42, pigwaste slurry without mulch had 28, while the control with or without mulch had negative (-) BCR.

Recommendations

Based on the findings, the following are recommended:

1. CLSU-CRF can be used as alternative source of controlled-release fertilizer in growing vegetables and other crops because it is cheaper compared to other slow-released fertilizers which are mostly imported;

2. CLSU-CRF, Chicken manure and Osmocote are recommended nutrient sources for grafted cherry tomato (CHT501) production because they give higher net income and cost benefit ratio (CBR);

3. Further studies on the use of different indigenous organic sources of fertilizer and their combinations with inorganic fertilizers for tomato production; and

4. Since cherry tomatoes command higher price than the other types of tomatoes, studies on the use of different growing structure, other than the use plastic house or greenhouse should be conducted during wet season cropping to ensure a year round supply of cherry tomatoes in the market.

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