Growth and Yield Performance of “Sakurab” Scallion Green Onion (Allium Fistulosum L.) Under Different Rates of Chicken Dung and Sources of Soil Amendment

Abstract: The growth and yield performance of “sakurab” scallion green onion (Allium fistulosum) was determined by the use of different rates of chicken dung (5 tons/ha, 10 tons/ha, 15 tons/ha) and soil amendments: rice hull, carbonized rice hull, rice hull ash and mushroom spent with the following objectives namely to: 1. Evaluate the plant height of scallion green onion. 2. Determine the number of tillers. 3. Identify the number of leaves of scallion green onion bulb. 4. Measure the diameter size of scallion green onion. 5. Determine the percent recovery of marketable of scallion green onion. 6. Analyse the Percent of Return of Investment. The study employed a two factor experiment under Randomized Complete Block Design. The results showed significant differences among treatments in the different rates of chicken dung in the average plant height, initial weight (intact leaves) and final weight (detached leaves). Non-significant differences among treatments were noted in the number of leaves, number of tillers, diameter of bulb and percent recovery. In the interaction of different sources of soil amendments and chicken dung, A2B1 (Rice Hull + 5 tons/ha chicken dung) obtained the highest return of investment with 263.63% and also noted with the highest net income (Appendix Table 8.0). Thus, the different sources of soil amendments and rates of chicken dung greatly affects the growth and yield performance of scallion green onion. Hence, rice hull, an agricultural waste that is a bane for rice millers and considered a problem by environments, is now a source of cash for farmers. Therefore, it is recommended to the local “Sakurab” farmers to use 10 tons/ha of rice hull as soil amendment and incorporate 5 tons/ha of chicken dung.

Keywords: Growth and Yield Performance.

INTRODUCTION
Scallion green onion (Allium fistulosum L.) (figure 4.0) is only known in cultivation and probably originated in north-western China. DNA studies indicate that it was derived from the wild Allium altaicum which occurs in Siberia and Mongolia, where it is occasionally collected as a vegetable for local use or for export to China. Cultivation of Allium fistulosum dates back to at least 200 BC in China. It reached Japan before 500 AD and spread further to South-East Asia and Europe. In China, Allium fistulosum is the most important Allium species fulfilling the culinary role of both the common onion and leek in Europe; in Japan it is now second in importance to the bulb onion (Allium cepa L.). The crop is grown throughout the world, but the main area of cultivation remains in Eastern Asia from Siberia to Indonesia; elsewhere it is mainly a crop of home gardens. In Africa it is locally important only and is reported from Sierra Leone, Ghana, Cameroon, Congo, DR Congo, Sudan, Kenya and Zimbabwe. A leaf onion reported from Nigeria probably also belongs to Allium fistulosum (http://www.wikipedia.org).

Scallion green onion (Allium fistulosum L.) is commonly called as salad onion. Among the Meranos, it is called “Sakurab” (Figure 4.0), it is made into a favourite seasoning known as “Palapa” which is also adapted by non Meranos. Per 100g. fresh weight of mature green onion bulb compose of 47.0 calories, 1.4g protein, 7mg sodium, 180mg Potassium, 32mg Calcium, 44mg Phosphorous, 16mg Magnesium, 70mg Sulphur, Chlorine 25mg and Vitamin C 28mg (BPI, 2001).

The plants are said to reduce or prevent termite infestation in gardens. Diluted pressed juice is used against aphids in China. The therapeutic qualities attributed to Allium fistulosum are many, especially in Chinese Medicine. It is used to improve the functioning of internal organs and the metabolism, for the prevention of cardiovascular disorders, and to prolong life. It is further reported to improve eyesight, and to enhance recovery from common colds, headaches, wounds and festering sores (Denton, 2004).

The name “Scallion” is applied to several members of the onion family including a distinct variety called scallion, immature onions (commonly called green onions), young leeks and sometimes the tops of young shallots. In each case the vegetable has a white base that has not fully developed into a bulb and green leaves that are long and straight. Both parts are edible. True scallions are generally identified by the fact that the sides of the base are straight, whereas the others are usually slightly curved, showing the beginnings of a bulb.
All can be used interchangeably although true scallions have a milder flavour than immature onions. It is a herbaceous biennial monocot cultivated as an annual. Each leaf consists of blade and sheaths, the blade may or may not be distinctive. The sheaths develops to invite the growing point and forms a tube. Collectively the growing of these sheaths compose of pseudo-tem. Basal position of the bulb sheaths are storage tissues from which lateral bud produce tillers (Rubatzky and Yamagunchi, 1997).

Green onions are harvested when they reach the proper diameter for particular market. For example, scallion are usually from ¾ to 5/8 inches in diameter or larger at harvest. This can be from 60 to 90 days after seeding, depending on the variety and the season. Be careful during harvest to prevent the damage to the onions, especially the bulb (Extension Bulletin 971, 1999). Thus, scallion onions are pulled from the ground while the bulb is still small and shipped and marketed in bunches with their fresh bulb and tops attached (Encyclopedia Americana, 1997).

It is well known that the alliums like scallion green onion possess unique thiosulfinate that condition anti thrombosis benefits, including antioxidant activity, reduced serum cholesterol and enhance in vitro antiplatelet activity. This latter effect is important for cardiovascular health by reducing the probability that platelets aggregate in the blood, a major cause of heart attacks and strokes. It belongs to the source of botanical family as garlic and leeks has been used for countries for treating different ailments ranging from circulatory disorders to common colds (Orayles, 1994) and its oil is stimulants, diuretic and expectorant both internally and externally which increases the peristaltic action of the bulb in intestines and is thus prescribed in cases of obstruction (Quisumbing, 1978).

Scallion green onion has been at the forefront of various lettuce crops. They have a characteristic pungent aroma and sharp taste which made them an excellent flavouring in many foods particularly meat and salads (BPI, 2001).

Thus, almost all the Meranao people are using scallion green onion for their special dishes and they consider it as part of their basic food needs. The serious implication of scallion green onion shortage supply in other part of our country creates a need for an increase of scallion green onion production which can be grown in rice field of Lanao where irrigation is not available with the utilization of rice hull and it’s by products as soil amendments and chicken manure as organic fertilizer.

The farmers engaged in the production of this crop could naturally augment their income specifically for the rice farmers who are not able to cultivate rice during dry season.

Utilization of rice hull and it’s by products as soil amendments is very much limited to guide the farmers in achieving high production of green onion. Hence, rice farmers can utilize rice residues as soil amendments and organic fertilizer like chicken manure to enhance soil characteristics especially for “sakurab” production where it is planted before or after fallow period.

Scallion green onion or “Sakurab” us widely adapted to Lanao Conditions, thus this study was conducted to encourage the farmers of Lanao to grow this crop to augment their income with the use of soil amendments and organic fertilizer that are just found in the vicinity.

Generally, this study was conducted to evaluate the growth and yield performance of scallion green onion under different sources of soil amendments and rates of chicken dung.

Specifically, this study as affected by different source of soil amendments and rates of chicken dung aim to:
1. To evaluate the plant height of Scallion green onions.
2. To determine the number of tillers.
3. To identify the number of leaves of scallion green onion bulb.
4. To measure the diameter size of scallion green onion.
5. To determine the percent recovery of marketable of scallion green onion.
6. Top analyse the Percent of Return of Investment.

**MATERIALS AND METHODS**

**Location and Description of the Area**
The study was conducted at the experimental area of the College of Agriculture, MSU, Marawi City. The field was previously planted to corn and the soil type is clay loam.

**Duration of the Study**
The study was conducted from January 19, 2007 to March 15, 2007 or a period of 55 days only.

**Source of Planting Materials**
The Local variety of scallion green onion or “Sakurab” was procured from local “Sakurab” farmers of Lanao del Sur. This was used as planting materials.

**Experimental Design**
The experiment used a two factor experiment and was statistically analysed and laid out in (RCBD). The treatments were compared using Duncan Multiple Range Tests (DMRT).
Treatments

The five by three 5 x 3 factorial experiments with three replications are as follows:

Factor A (Chicken Dung)
- B1 – 5 ton/ha Chicken Dung
- B2 – 10 ton/ha Chicken Dung
- B3 – 15 ton/ha Chicken Dung

Factor B (Soil Amendments)
- A1 – Control (No Soil amendments)
- A2 – Rice Hull (10 ton/ha)
- A3 – Carbonized Rice Hull (10 ton/ha)
- A4 – Rice Hull Ash (10 ton/ha)
- A5 – Mushroom Spent (10 ton/ha)

Cultural Practices

Land Preparation

The field was plowed and harrowed two times using animal drawn implement. The area was then divided equally into three representing replications.

Each replication or block contain 15 subplots representing the fifteen treatments combination (figure 3.0). Each subplot (Fig. 2.0) representing one treatment measures 1m wide by 2m long. There were a total of 45 subplots representing three replications (Figure 1.0).

The land preparation was completed by the incorporation of the different soil amendments to their respective plots that were assigned randomly (Fig. 1.0).

Soil Amendment Preparation and Incorporation

Treatment A1 (Control) – No soil amendment

Treatment A2 (RH) – Rice Hull (10 ton/ha)

Fresh rice hull was incorporated directly to the field one week before planting.

Treatment A3 (CRH) – Carbonized Rice Hull (10 ton/ha)

Rice hull was first fired separately away the experimental plots with constant stirring made the rice hull into partial combustion thus black color is produced. This was added to the assigned plots at 10t/ha one week prior to planting.

Treatment A4 (RHA) – Rice Hull Ash (10 ton/ha)

Rice hull ash was first prepared separately away from the experimental plots by total firing the rice hull until it turned to ashes (gray color). When cool these are mixed to the assigned plots at 10 ton/ha one week prior to planting.

Treatment A5 (MS) – Mushroom Spent (10 ton/ha)

Mushroom spent was incorporated to the actual plot/field one week before planting at a rate of 10 tons/ha.

Fertilization (Application of Chicken Dung)

The chicken dung was incorporated in the assigned plot one week ahead of the soil amendments or fifteen days before planting. Foliar fertilizer (Crop Giant) was sprayed 15 days after planting. The plants were also fertilized with complete fertilizer and ammonium sulphate with a rate of 3:1 or 5 grams per plant in a nutrient solution.

Planting

One tiller of scallion green onion was planted with a distance of 15 cm between hills x 30 cm between rows with 36 number of plants per plot. The planting materials were chosen to be as possible of the same sizes and maturity.

Watering

Watering was done twice a day every morning and late afternoon since the growing period was dry season (Table 11.0 – Climatological data).

Weeding

Hand weeding was done frequently to avoid weeds competing the plants.

Harvesting

Scallion green onion was harvested or uprooted at its 55th days from planting. They were cleaned by dry-removal of soils adhering to the roots.

Data Gathered

Plant Height (cm)

Plant height was measured after harvesting. The measurement was done from the bulb base of the plant to the tip of the longest leaf.

Number of Tillers/Clump

This was done by counting the number of tillers that were produced per hill.

Number of Developed Leaves at Harvest

This was done by counting the number of viable leaves per plant after harvesting.

Average Bulb Diameter (cm)

This was done by measuring the diameter of the bulb per plant. The measurement was based on the widest bulb portion using micro caliper.

Initial Weight (Intact leaves) (g)

This was done by weighing the newly harvested scallion green onion after removing the soils adhering from the roots of the plant. The leaves were still intact.

Final Weight (Detached Leaves) (g)

The leaves and roots of the scallion was first removed according to the Local Market Acceptability. There were weighed to recover the percent weight recovery (PWR) of “Sakurab” with the formula:
Cost and Return Analysis

The cost of production was determined by summing up all the expenditures in each treatment combination. The percent return of investment (PRI) as computed using the formula:

\[ PRI = \frac{\text{Net Income}}{\text{Cost of Production}} \times 100 \]

RESULT AND DISCUSSION

Average Plant Height (cm)

The data on the average plant height of the data plants are presented in Table 1.0.

<table>
<thead>
<tr>
<th>SOIL AMENMENT</th>
<th>CHICKEN DUNG</th>
<th>TOTAL</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B1 5TONS/HA</td>
<td>B2 10TONS/HA</td>
<td>B3 15TONS/HA</td>
</tr>
<tr>
<td>A1 – Control</td>
<td>46.59</td>
<td>44.9</td>
<td>44.78</td>
</tr>
<tr>
<td>A2-RH</td>
<td>49.64</td>
<td>45.95</td>
<td>44.29</td>
</tr>
<tr>
<td>A3-CRH</td>
<td>47.23</td>
<td>43.16</td>
<td>44.59</td>
</tr>
<tr>
<td>A4-RHA</td>
<td>45.52</td>
<td>47.09</td>
<td>44.02</td>
</tr>
<tr>
<td>A5-SMS</td>
<td>45.83</td>
<td>44.6</td>
<td>42.78</td>
</tr>
<tr>
<td>TOTAL</td>
<td>234.7</td>
<td>225.7</td>
<td>220.46</td>
</tr>
<tr>
<td>MEAN</td>
<td>46.88b</td>
<td>45.1a</td>
<td>44.49a</td>
</tr>
</tbody>
</table>

Means having the same letter superscript are not significantly different from each other based on DMRT.

It was noted that the tallest scallion onion was obtained in the plots (B1) applied with 5 tons/ha of chicken dung with a mean of 46.88 cm. It was followed by B2 (10 tons/ha) with a mean of 45.14 cm and the shortest scallion green onion with a mean of 44.09 cm was obtained in B2 applied with 10 tons/ha of chicken dung.

Subjecting the different data of the plant height to analysis of variance, the different rates of chicken dung application significantly affect the height of scallion green onion (Appendix Table 1.0).

Chicken Dung provides large amount of nitrogen needed by the plants and it releases nutrients in the soil by returning them into soluble compounds that are absorbed by the plant roots and utilized them for vegetative use (Anderson, 1951) as cited by Patriarcha (1990).

Thus, there were significant differences among treatments in the rates of chicken dung. B2 (10 tons/ha CD) and B3 (15 tons/ha CD) have no significant differences but they significant over B1 (5 tons/ha CD).

The above result in line with the work of Mahinay (1994) as cited by Tatil and Pava (2001) in his study in the different rates of organic fertilizer application in rice where he obtained a comparable significant yield with 10 bags per hectare with the plots applied with 15, 20 and 25 bags per hectare.

Furthermore Tatil and Pava (2001) reported the work of Villaseca III (1992) that a significant yield of 7.02 tons/ha with the application of 10 bags Minoper organic fertilizer alone.

In table 1.0, it was noted that in the soil amendments A2 (Rice Hull) produced the tallest green onion with a mean of 46.63 cm. it was followed by A4 (Rice Hull Ash), A1 (Control), A3 (Carbonized Rice Hull) and A5 (Mushroom Spent) with means of 45.54 cm, 45.42 cm, 44.95 cm and 44.40 cm respectively. However, subjecting these data to analysis of variance it was found out that there were no significant differences among treatments.

In the interaction of the treatments, A2B1 (Rice Hull + 5 tons/ha Chicken Dung) produced the tallest green onion with a mean of 49.64. A5B3 (Mushroom Spent + 15 tons/ha CD) produced the shortest scallion green onion with a mean of 42.78 cm.

This result could attributed to the fact that rice hull has that particle size and resistance to decomposition. This material opens up the soil and increase soil porosity. Having this type of functions the plant is able to attract mycorrhizal association. These mycorrhizal fungi grow inside the plant roots and in the surrounding soil often facilitating mineral uptake by the plant (Fig. 12) Taiz and Zeiger, 1991).
It was observed that the plots applied with 5 tons/ha of chicken dung (B1) obtained the highest number of leaves of scallion green onion with a mean of 20.38. Plant under B3 (15 tons/ha) exhibited the lowest number of leaves with a mean of 18.77 followed by B2 (10 tons/ha) with a mean of 19.50 (Table 2.0). It was shown in Appendix Table 2.0 that there were no significant differences among treatments. The result justify with the results of the study of Plaster (1997) where nitrogen content can promote vegetative growth. It is noted that Chicken Dung is richer in nitrogen because of feed supplement. Thus, chicken dung provide large amount of nitrogen needed by the plants and released nutrient to the soil by turning them into soluble compounds that are absorbed by the plants roots and utilized for vegetative growth (Taleser, 1997).

**Table 2.0** Average number of developed leaves as affected by different rates of chicken dung and sources of soil amendments

<table>
<thead>
<tr>
<th>SOIL AMENMENT</th>
<th>CHICKEN DUNG</th>
<th>TOTAL</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B1 5TONS/HA</td>
<td>B2 10TONS/HA</td>
<td>B3 15TONS/HA</td>
</tr>
<tr>
<td>A1 – Control</td>
<td>18.33</td>
<td>19.12</td>
<td>19.02</td>
</tr>
<tr>
<td>A2-RH</td>
<td>18.64</td>
<td>19.02</td>
<td>19.02</td>
</tr>
<tr>
<td>A3-CRH</td>
<td>22.38</td>
<td>18.95</td>
<td>18.95</td>
</tr>
<tr>
<td>A4-RHA</td>
<td>21.05</td>
<td>17.28</td>
<td>17.28</td>
</tr>
<tr>
<td>A5-MS</td>
<td>21.47</td>
<td>17.57</td>
<td>17.57</td>
</tr>
<tr>
<td>TOTAL</td>
<td>101.87</td>
<td>91.84</td>
<td>91.84</td>
</tr>
<tr>
<td>MEAN</td>
<td>20.38</td>
<td>18.77</td>
<td>18.77</td>
</tr>
</tbody>
</table>

As for the soil amendments, A3 (Carbonized Rice Hull) obtained the highest number of leaves with a mean of (20.53) followed by A4 (RHA) with a mean of 19.35, A5 (MS) with a mean of 19.18, A2 (RH) with a mean of 129.07 and A1 (Control) produced the lowest number of leaves with a mean of 18.82 (Table 2). The results of the number of leaves as affected by different sources of soil amendments revealed that there were no significant differences among treatments applied.

Furthermore, carbonized rice hull or husk (CRH) is made from incomplete or partial burning of rice hull, it is comparable to rice hull which is porous, bulky with uniform intact black particles. It contains phosphorus (P); potassium (K), calcium (CA), magnesium, and other micronutrients vital to growing crops because it is also sterilized, it is pathogen free (Bagaoisan, 1996).

The result for the interaction of the treatments showed in Appendix Table 2.0, that A3B1 with carbonized rice hull and 5 tons/ha of chicken dung obtained the highest number of leaves with a mean of 22.38. The lowest number of leaves was noted in A4B3 (RHA+15tons/ha CD) with a mean of 17.28.

**Number of Tillers Per Clump**

In Table 3.0, revealed that the B2 (10 tons/ha) and B3 (15 tons/ha) garnered the same highest number of tillers with a mean of 3.19 tillers. The treatments applied with 5 tons/ha of chicken dung (B1) produced the lowest number of tillers with a mean of 3.01. Hence, there none significant differences among treatments (Appendix Table 3.0).

**Table 3.0** Average Number of Tillers as affected by different rates of chicken dung and sources of chicken dung.

<table>
<thead>
<tr>
<th>SOIL AMENMENT</th>
<th>CHICKEN DUNG</th>
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<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B1 5TONS/HA</td>
<td>B2 10TONS/HA</td>
<td>B3 15TONS/HA</td>
</tr>
<tr>
<td>A1 – Control</td>
<td>2.94</td>
<td>3.14</td>
<td>3.4</td>
</tr>
<tr>
<td>A2-RH</td>
<td>3.02</td>
<td>3.04</td>
<td>3.02</td>
</tr>
<tr>
<td>A3-CRH</td>
<td>3.02</td>
<td>3.21</td>
<td>3.78</td>
</tr>
<tr>
<td>A4-RHA</td>
<td>3.07</td>
<td>3.47</td>
<td>2.88</td>
</tr>
<tr>
<td>A5-MS</td>
<td>3.02</td>
<td>3.10</td>
<td>2.85</td>
</tr>
<tr>
<td>TOTAL</td>
<td>15.07</td>
<td>15.96</td>
<td>15.93</td>
</tr>
<tr>
<td>MEAN</td>
<td>3.01</td>
<td>3.19</td>
<td>3.19</td>
</tr>
</tbody>
</table>
Hence, several recent studies indicated that carbonized rice hull (CRH), the product of incomplete combustion of organic material, could combine characteristics highly beneficial for soil nutrient dynamics with high stability against chemical and microbial breakdown (IRRI, 1999).

**Diameter of Bulb (cm)**

It was noted in Table 4.0 that the widest bulb diameter was obtained in the plots applied with 15 tons/ha of chicken dung (B1) with a mean of 3.15 cm followed by the plots applied with 10 tons/ha of chicken dung (B3) with a mean of 3.10 cm and the smallest was obtained in the plots treated with 10 ton/ha of chicken dung with a mean of 3.04 cm (B2). There were no significant differences among treatments in the different rates of chicken dung (Appendix Table 4.0).

<table>
<thead>
<tr>
<th>SOIL AMENMENT</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B1 5TONS/HA</td>
<td>B2 10TONS/HA</td>
<td>B3 15TONS/HA</td>
</tr>
<tr>
<td>A1 – Control</td>
<td>2.85</td>
<td>2.77</td>
<td>2.92</td>
</tr>
<tr>
<td>A2-RH</td>
<td>3.17</td>
<td>2.95</td>
<td>3.16</td>
</tr>
<tr>
<td>A3-CRH</td>
<td>3.70</td>
<td>2.77</td>
<td>3.36</td>
</tr>
<tr>
<td>A4-RHA</td>
<td>3.04</td>
<td>3.11</td>
<td>3.35</td>
</tr>
<tr>
<td>A5-MS</td>
<td>3.0</td>
<td>3.62</td>
<td>2.71</td>
</tr>
<tr>
<td>TOTAL</td>
<td>15.76</td>
<td>15.22</td>
<td>15.5</td>
</tr>
<tr>
<td>MEAN</td>
<td>3.15</td>
<td>3.04</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Result in the diameter of bulb in the different sources of amendments revealed that A3-CRH produced the biggest bulb with a mean of 3.28 cm followed by A4-RHA, A5-RH and A1 – Control respectively with means of 3.17 cm, 3.09 cm and 2.84 cm. It was noted that the bulb diameter of scallion green onion was not significantly by the application of different sources of soil amendments.

It was noted in Appendix Table 4.0, that the interaction results in the diameter of bulb was favoured in A3B1-CHR+5 tons/ha with a mean of 3.70 cm followed by A5B2, A3B3, A4B3, A2B1, A2B3, A4B2, A4B1, A5B1, A2B2, A1B3, A1B3, A1B2, A3B2, in that order and A5B3 obtained the smallest bulb with a mean of 2.71 cm.

**Initial Weight (Intact Leaves) (g)**

In Table 5.0, it was observed in the rates of chicken dung, B1 with 5 tons/ha obtained the heaviest weight with a mean of 342.66 grams followed by B2 with 10 tons/ha with a mean of 329.33 g. B3 with 15 tons/ha produced the lightest weight of green onion with a mean of 293.33 grams.

<table>
<thead>
<tr>
<th>SOIL AMENEMENT</th>
<th>CHICKEN DUNG</th>
<th>TOTAL</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B1 5TONS/HA</td>
<td>B2 10TONS/HA</td>
<td>B3 15TONS/HA</td>
</tr>
<tr>
<td>A1 – Control</td>
<td>310</td>
<td>320</td>
<td>276.66</td>
</tr>
<tr>
<td>A2-RH</td>
<td>333.33</td>
<td>330</td>
<td>310</td>
</tr>
<tr>
<td>A3-CRH</td>
<td>360</td>
<td>320</td>
<td>330</td>
</tr>
<tr>
<td>A4-RHA</td>
<td>346.66</td>
<td>373.33</td>
<td>270</td>
</tr>
<tr>
<td>A5-SMS</td>
<td>363.33</td>
<td>303.33</td>
<td>280</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1713.32</td>
<td>1646.66</td>
<td>1466.66</td>
</tr>
<tr>
<td>MEAN</td>
<td>342.66 b</td>
<td>329.332</td>
<td>293.332a</td>
</tr>
</tbody>
</table>

Means having the same letter superscript are not significantly different from each other based on DMRT.

Appendix Table 5.0 revealed that there were significant differences among treatments. B1 and B2 have no significant differences, B3 showed significant differences among treatments in different rates of chicken dung.

Chicken manure is a rich, fertile amendment with nutrient values that can run up to 3 percent nitrogen, 4 percent phosphorus, and 3 percent potassium. It can be strong smelling. It can also burn plants, so don’t use it on sensitive or shallow-rooted plants. If used properly, it gets annuals and vegetables off to a fast start (http://www.horticulture.tamu.edu).

Results in the different sources of soil amendments showed that A3-CRH produced the heaviest weight of green onion with a mean of 336.66 g, followed by A4-MS with a mean of 315.53 and A1-Control with a mean of 302.22 respectively.

Bagaosian (2001) reported that burning of rice hulls significantly reduced the nematode populations in the soil and increased onion yield. Thus, carbonized rice hull (CRH) can be used as a substrate to organic fertilizer, soil conditioner or ameliorant (PRRI, 2001).
Final Weight (Detached leaves) (grams)

Data presented in Table 6.0, showed that B1 5 tons/ha of chicken dung produced the heaviest weight of scallion green onion with a mean of 224.66 grams, followed by B2 – 10 tons/ha with a mean of 208 grams. B3- 15 tons/ha produced the lightest weight of green onion with a mean of 190.66 grams.

It was noted that there were significant differences among treatments in the different rates of chicken dung. B3 -15 tons/ha of chicken dung has significant difference on B1 (5 tons/ha) and B2 (10 tons/ha). However, B1 and B2 have no significant differences base on DMRT (Appendix Table 6.0).

Thus, Perkins and Parker as cited by Balansag (1999) reported that significant increase in yield was obtained on crops with application of chicken dung ranging from 2.5 to 16 tons/aere.

Results in the different sources of amendments revealed that A2-RH manifested the heaviest weight with a mean of 217.77 grams followed by A3-CRH with a mean of 213.33 grams, A5-MS with a mean of 205.55 grams, A4-RH with a mean of 205.33 grams. The lightest weight was observed in A1-control with a mean of 196.66 grams. However, the treatment in the different sources of soil amendments have no significant differences.

Table 6.0 Average Final Weight (Detached leaves) as affected by different rates of chicken dung and sources of soil amendments (cm).

<table>
<thead>
<tr>
<th>SOIL AMENDMENT</th>
<th>CHICKEN DUNG</th>
<th>TOTAL</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B1 5TONS/HA</td>
<td>B2 10TONS/HA</td>
<td>B3 15TONS/HA</td>
</tr>
<tr>
<td>A1 – Control</td>
<td>213.33</td>
<td>203.33</td>
<td>173.33</td>
</tr>
<tr>
<td>A2-RH</td>
<td>240</td>
<td>210</td>
<td>203.33</td>
</tr>
<tr>
<td>A3-CRH</td>
<td>223.33</td>
<td>196.66</td>
<td>220</td>
</tr>
<tr>
<td>A4-RHA</td>
<td>216.66</td>
<td>223.33</td>
<td>176.66</td>
</tr>
<tr>
<td>A5-SMS</td>
<td>230.00</td>
<td>206.66</td>
<td>180</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1123.32</td>
<td>1039.98</td>
<td>953.32</td>
</tr>
<tr>
<td>MEAN</td>
<td>224.664b</td>
<td>207.996ab</td>
<td>190.664a</td>
</tr>
</tbody>
</table>

Means having the same letter superscript are not significantly different from each other based on DMRT.

Rose (1996) noted on rice hulls concerns its use as a soil amendment. A soil amendment is any material mixed into a soil to improves its physical properties, including water retention, permeability, water infiltration, drainage, aeration and structure. The goal is to provide a better environment for roots. To be effective, an amendment must be mixed into the soil thoroughly. If it could dumped on the surface, or buried in a clump, it could interfere with water and air movement and inhibit root growth (Doessett, 1996).

Interaction results in Appendix Table 6.0 revealed that A2B1 (RH+5tons/ha) produced the heaviest weight with a mean of 240 grams followed by A5B1 (Mushroom Spent + 5 tons/ha of chicken dung) with a mean of 173.33.

Percent Weight Recovery (%)

In the percent of recovery, it was noted in Table 7.0 that the plots applied with 5 tons/ha if chicken dung produced the highest percent recovery with a mean of 65.612 %. It was followed by B3 (15 tons/ha) with a mean of 65.237 and B2 (10 tons/ha) obtained the lowest weight percent recovery of green onion with a mean of 64.413 %. Thus, there were no significant differences among treatment in the different rates of chicken dung. The result showed that chicken dung gave the highest yield. Moreover, chicken dung not only increase the yield but also improves the quality of the crop (Bunoan, 1981)

The result in the different sources of soil amendments revealed that A2-RH produced the highest percent recovery of scallion green onion with a mean of 67.23%, followed by A5-MS with a mean of 66.43%, A4-RHA with a mean of 64.39, A3-CRH with a mean of 63.99%. A1-control obtained the lowest percent recovery with a mean of 63.56%

Rice hull are quite stable, lasting up to ten years in the soil. This material opens up the soil and increases porosity; it does not add nutrients or water-holding capacity. This product has been used in golf greens to provide aeration in the soil (Rose, 1996).
Interaction results revealed that A2B1 (Rh + 5 tons/ha CD) produced the highest weight percent recovery with a mean of 72.27%, followed by A3B3 (CRH+15 tons/ha) with a mean of 69.29%. The lowest percent recovery was noted in A1B3 (Control + 15 tons/ha of Chicken dung) with a mean of 57.93%. It also revealed that there were significant differences among treatments in the results of interaction (Appendix Table 7.0).

### Table 7.0 Average percent weight recovery as affected by different rates of chicken dung and sources of chicken dung (cm).

<table>
<thead>
<tr>
<th>SOIL AMENDMENT</th>
<th>CHICKEN DUNG</th>
<th>TOTAL</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B1 5TONS/HA</td>
<td>B2 10TONS/HA</td>
<td>B3 15TONS/HA</td>
</tr>
<tr>
<td>A1 – Control</td>
<td>68.807</td>
<td>63.423</td>
<td>57.935</td>
</tr>
<tr>
<td>A2-RH</td>
<td>72.277</td>
<td>63.650</td>
<td>65.760</td>
</tr>
<tr>
<td>A3-CRH</td>
<td>60.903</td>
<td>61.770</td>
<td>69.297</td>
</tr>
<tr>
<td>A4-RHA</td>
<td>62.560</td>
<td>65.003</td>
<td>193.19</td>
</tr>
<tr>
<td>A5-MS</td>
<td>63.513</td>
<td>68.220</td>
<td>199.27</td>
</tr>
<tr>
<td>TOTAL</td>
<td>328.065</td>
<td>322.066</td>
<td>326.187</td>
</tr>
<tr>
<td>MEAN</td>
<td>65.012</td>
<td>64.413</td>
<td>60.903</td>
</tr>
</tbody>
</table>

**Literature Cited**

17. MUSHROOM RESEARCH LABORATORY. (November 20, 1999). 212 Buckhout Lab University Park, PA 16802 (814)865-7748 FAX: (814) 863-7217.
35. http://www.MushroomsSpawnLab@spu.edu