



EFFICACY OF CHICKEN MANURE AND PLANTS SPACING ON THE GROWTH AND YIELD OF GARDEN HUCKLEBERRY (*Solanum scabrum*) IN SARDAUNA LOCAL GOVERNMENT AREA, TARABA STATE

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ABSTRACT

Garden Huckleberry is an edible form of the common nightshade weed plant belonging to the family Solanaceae. The research was conducted in Sardauna Local Government, Taraba State. The objectives of the study were to determine the fertilizer (chicken manure) rate and spacing adequate for garden huckleberry cultivation. The experiment consists of three rate of chicken manure (0t/ha, 15t/ha and 20t/ha) with two spacing of 10cm×15cm and 15cm×20cm, with plots size of 0.75m² which was laid out in a randomized complete block design (RCBD) with three replications. The data were analyzed and presented using Figureical presentation. The result shows that chicken manure rate of 20t/ha, and 15×20cm spacing produced Huckleberry with highest number of leaves at 6 weeks after sowing among others. The researcher therefore, recommended that poultry manure at the rate of 20t/ha and the spacing of 15×20cm to be use by the farmers in huckleberry production for maximum yield.

Keywords: Chicken manure, Plant spacing, Growth, Yield of Huckleberry

INTRODUCTION

(S. Scarbrum) is an edible form of the common nightshade weed plant. It is also known as quonderberry, wonderberry, sunberry, moralle, morella, petty morel, solanberry, black berried nightshade, and houndsberry. Since is a member of the Solanaceae (nightshade) family and a close relative of the common nightshade (*S. nigrum* L.). Common nightshade is also called black nightshade, poison berry, garden nightshade, and sometimes deadly Nightshade. Whereas common nightshade is reported to be poisonous, garden huckleberry appears to be relatively safe. They should not be confused with the true deadly nightshade, (*S. dulcamara* L.) and (*Atropa belladonna* L.) both have highly toxic levels of alkaloids. The garden huckleberry has a high content of micronutrients, medical properties and other benefits, but has not been widely used (Odhiambo and oluoch 2015).

Garden Huckleberry perform well in a wide range of climatic conditions, it grow best at medium to high altitudes in moist conditions at optimal growth temperatures between 15°C and 35°C. They tolerate shade but grow best under full sunlight. Garden huckleberry are generally intolerant of water deficit, and thrive in tropical rainy seasons and in areas with an annual precipitation of 500-1500mm. They grow in various soil types, but are best adapted to sandy loams to friable clay soils with a pH range of 6.0-6.5, and high in nitrogen, phosphorus and organic matter. Worldwide, there are over 1,000 plant species that are cultivated or harvested from the wild for food (Edmonds and Chweya, 2017). But increasingly, global food security depends on a shrinking basket of selected crops (Mwai and Schipper, 2014). Only a few plant crops are grown and traded worldwide and provide more than 50% of all vitamins and calories consumed worldwide (Edmonds and Chweya, 2017). With the prices of these crops recently doubling or even tripling, it is time to refocus on neglected or underutilized crops that can provide food security and income generation, especially for the poor. This research focuses on the garden huckleberry which has been neglected or undervalued, but which has the potential to provide increased commercial opportunities and increased and/or improved health and nutrition for communities in Nigeria and Africa at large (Weinberger et al. (2014).

Since 100g fresh portion of garden huckleberry contains 87.2g water, 1.0mg iron, 4.3g protein, 38g calories, 5.7g carbohydrates, 1.4g fibre 20mg ascorbic acid, 442mg calcium, 75mg phosphorus, 3660 µg β-carotene, and 0.59mg riboflavin. Aside from its nutritional value, Garden huckleberry contain plant phytochemicals that can vary widely in structure and overall classification, but all share a common characteristic: they contain at least one aromatic ring and one or more hydroxylamine groups (Ryans et al., 2017). Plant phytochemicals are natural antioxidants and their free radical scavenging abilities are thought to play an important role in the prevention of many chronic diseases (Christensen and Brandt, 2016).

Inappropriate fertilizer application rate, and spacing lead to poor growth and yields of huckleberry. Most farmers are not aware of the benefits of appropriate usage of fertilizer and spacing (inter and intra spacing) on the growth and yields of huckleberry. Farmers still practice the primitive unmeasured used of fertilizer and broadcasting method of planting and the yields are poor. Hence the need to evaluate the effects of organic manure (poultry dropping) rate and different inter and intra row spacing on the growth and yields of huckleberry. This prompted the study "effect of chicken manure and plant spacing, on the growth and yield of huckleberry. The specific objectives were to determine the fertilizer rate adequate for huckleberry in the study area and determine the spacing adequate for huckleberry in the study area

MATERIALS AND METHODS

The experiment was conducted in Leme Village in Sardauna Local Government Area, Taraba State Leme is a village outskirts of Gembu on the Mambilla Plateau domicile in Sardauna Local Government in Taraba State that has an elevation of about 1,600 meters (423ft) above sea level making it the highest plateau in Nigeria. The town lies between longitude of 11° 20'645" (11° 12' 23" E) and latitude of 6.75548" (6° 45' 20" N). The town is boarded with Cameroon republic, which is located in the montane and northern guinea Savannah zone of Nigeria. Sardauna has an estimated population of 310,615 (NPC, 2006). The area is characterized with rainfall of 1260- 1620mm per annum, annual low temperature of 17°C. The main crops growing

include; maize, cowpea, Irish Potato, Huckleberry, Sweet potato, all kinds of fruits and vegetables. The area is also known for livestock farming such as cattle, sheep, poultry etc. A randomized complete block design consisting of two treatment for *S. scabrum* : 1 poultry manure (15t/ha,20t/ha and 0t/ha) and 2 Plant spacing (10cm ×15cm,15cm× 20cm)

on 18 plots of 0.75cm² each with each treatment replicated three times.

The data obtained were analyze using graphical representation in finding the mean differences of plant height and number of leaves for each treatment between the different rate of organic manure (chicken) and spacing with their control each week.

RESULTS AND DISCUSSION

Plant height and Number of leaves

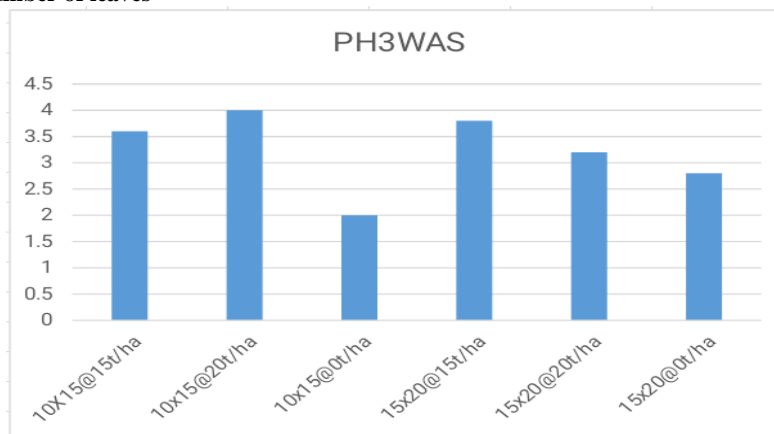


Figure 1: Plants height at 3 Weeks After Sowing

Figure 1 shows the effect of difference rate of poultry manure and plant spacing on garden huckleberry at 3week after showing, where the results shows that there is not a significant difference of less than 0.5 between poultry manure rate of 20t/ha and 15t/ha, but there is a much significant difference of

more than 0.5 with their control (0t/ha) of the same spacing of 10×15cm, but there is a significant difference of more than 0.5 between the treatment of 15t/ha and 20t/ ha as well as the control (0t/ha) of the same spacing of 15 by 20cm.

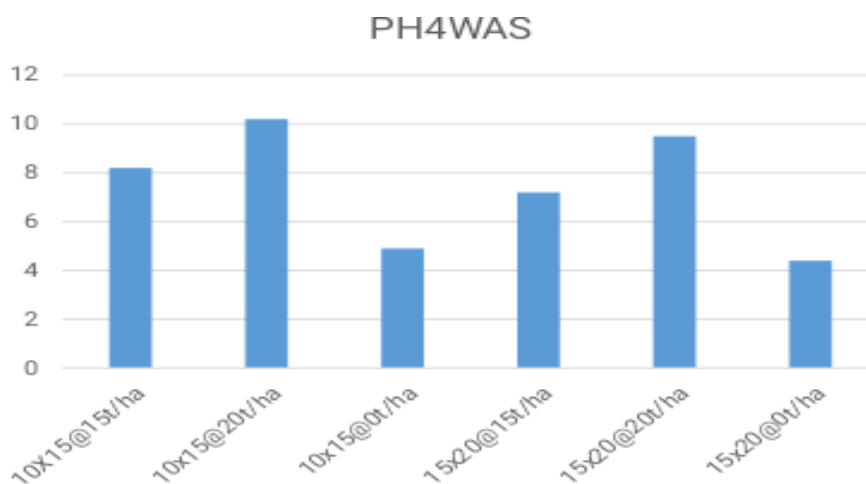


Figure 2: Plant height at 4 Weeks After Sowing

Figure 2 above showed plant heights at week 4 after sowing. It reveals that at the fourth week after sowing, there is not a significant difference between plots with plant spacing of 10×15cm and that of 15×20cm of the same poultry manure rate of 20t/ha, But there is a significant difference between the plots with the spacing of 10×15cm and that of 15×20cm of same poultry manure rate of 15t/ha, and also there is no

significant difference between 10×15cm and that of 15×20cm of the control 0t/ha. therefore, treatment with poultry manure of 20t/ha has the highest height, followed by 15t/ha, and control 0t/ha has the lowest plants height. Also the treatment with plant spacing of 10× 15cm has the highest plants height follow by the plots with the spacing of 15×20cm, which is due to response to light and space competition.

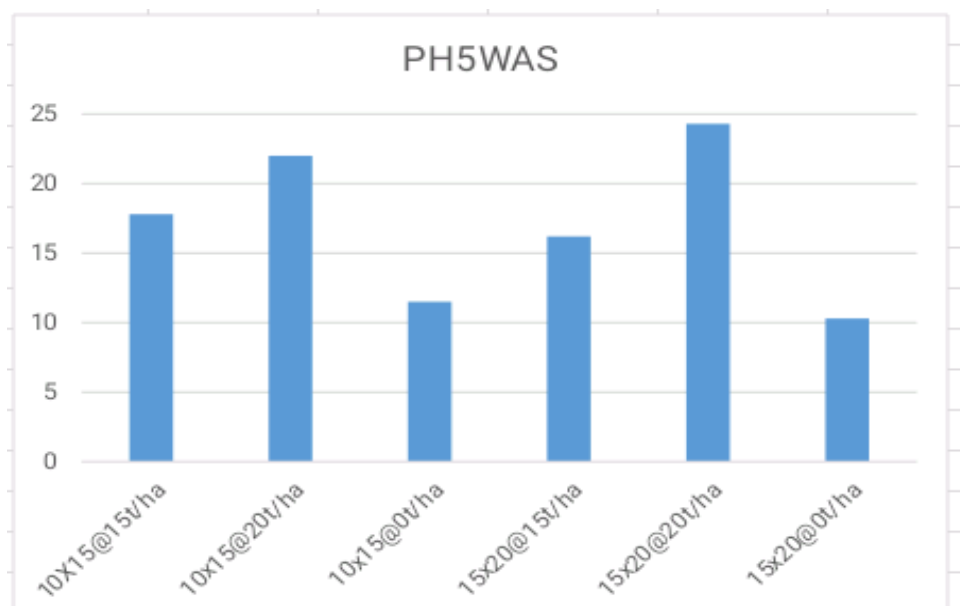


Figure 3: Plant Height at 5 Weeks After Sowing

Figure 3 above showed plant heights at week 5 after sowing. The data shows that at the fourth week after sowing, there is a significant difference between the plots with the spacing of 15x20cm and that of 10x15cm of the same poultry manure rate of 20t/ha, also there is a significant difference between the plots with the spacing of 10x15cm and that of 15x20cm of the same poultry manure rate of 15t/ha, but there is not a significant difference between the spacing 10x15cm and that

of 15x20cm of the control 0t/ha. therefore, there is a change in week5 because the plots with the spacing of 15x20cm of 20t/ha, has the highest plants, followed by the plots with the spacing of 10x15cm of 20t/ha, then follow by the plots with spacing of 10x15cm of 20t/ha, then followed by the plots with the spacing of 15x20cm of 15t/ha, followed by control 0t/ha with the spacing of 10x15cm spacing, and the least is control 0t/ha of 15x20cm spacing.

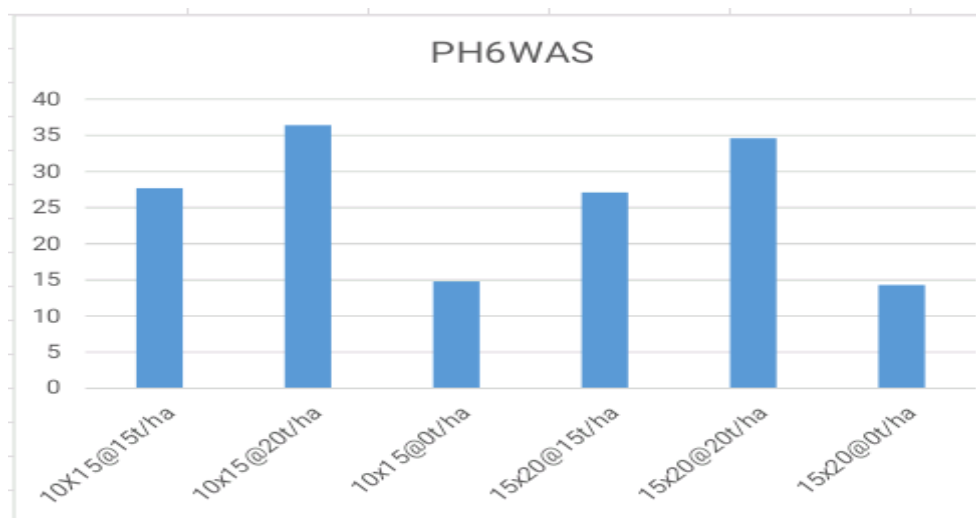


Figure 4: Plant Height at 6 Weeks After Sowing

Figure 4 above shows the data of plants height of garden huckleberry at week 6 after sowing. Where the results reveal that at week 6 after sowing that there is not a significant difference between the plots with spacing 10x15cm and that of 15x20cm of same poultry manure rate of 20t/ha, Also there is not a significant difference between the plots with plant spacing of 10x15cm and that of 15x20cm of the same poultry rate of 15t/ha, in same way there is a significant difference between the control 0t/ha, of 10x15cm, and that of the control

0t/ha of 15x20cm. therefore at week 6 after sowing the plots with the spacing of 10x15cm and poultry manure rate of 20t/ha, has the highest plants height, followed by the plots with the spacing of 15x20 of poultry manure rate of 20t/ha, followed by the plots with the spacing of 10x15cm of poultry manure rate of 15t/ha, and then the plots with the spacing of 15x20cm of 15t/ha, then followed by control 0t/ha, of 10x15cm plants spacing, and the least is control 0t/ha of 15x20cm.

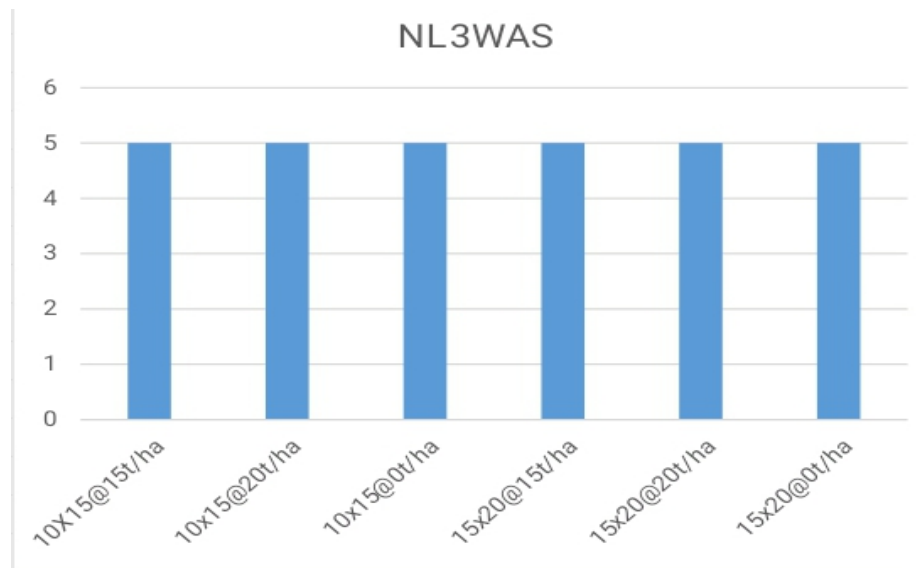


Figure 5: Plant Number of leaves at 3 weeks after sowing

Figure 5 Above shows the data of plants number of leaves of garden huckleberry. The results revealed that at 3 weeks after sowing there is no any difference between all the treatment

but all the plants number of leaves are same. Therefore, at 3 weeks after sowing, all the treatment has 5 number of leaves.

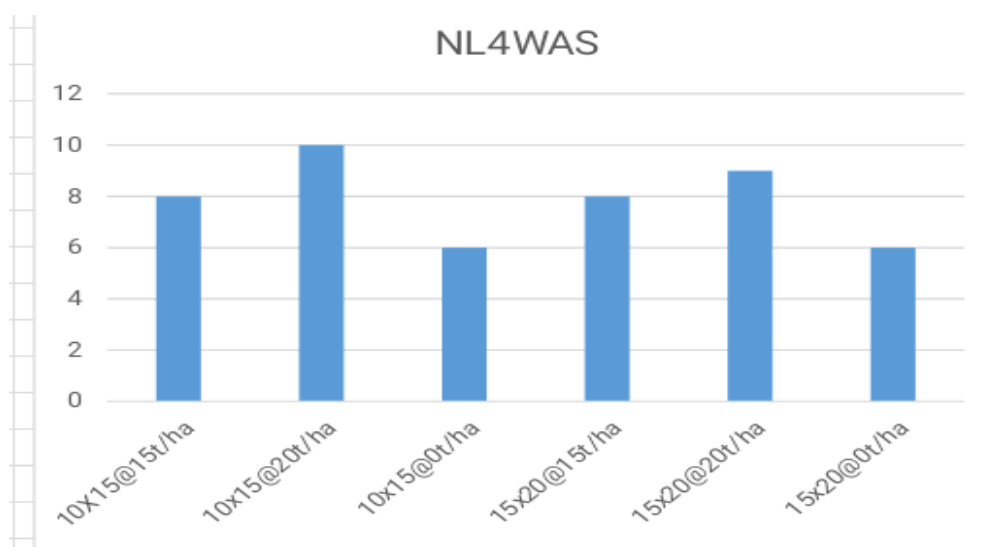


Figure 6: Plants Number of Leaves at 4weeks after Sowing

Figure 6 above shows the data of plants number of Leaves at 4 weeks after sowing. The results revealed that the plots with spacing 10x15cm of 20t/ha has the highest number of Leaves, followed by the plots with spacing 15x20cm of 20t/ha. Followed the plots with spacing of both 10x15cm and that of 15 x20cm of 15t/ha. and the control 0t/ha of both 10x15cm and 15x20cm plants spacing has the least number of Leaves.

Therefore, there is a difference between plots with plant spacing of 10x15cm and that of 15x20cm of 20t/ha.while plots with spacing of 10x15cm and that of 15x20cm of 15t/ha has the Same numbers of Leaves, and control 0t/ha also both the spacing of 10x15cm and that of 15x20cm has the same number of Leaves.

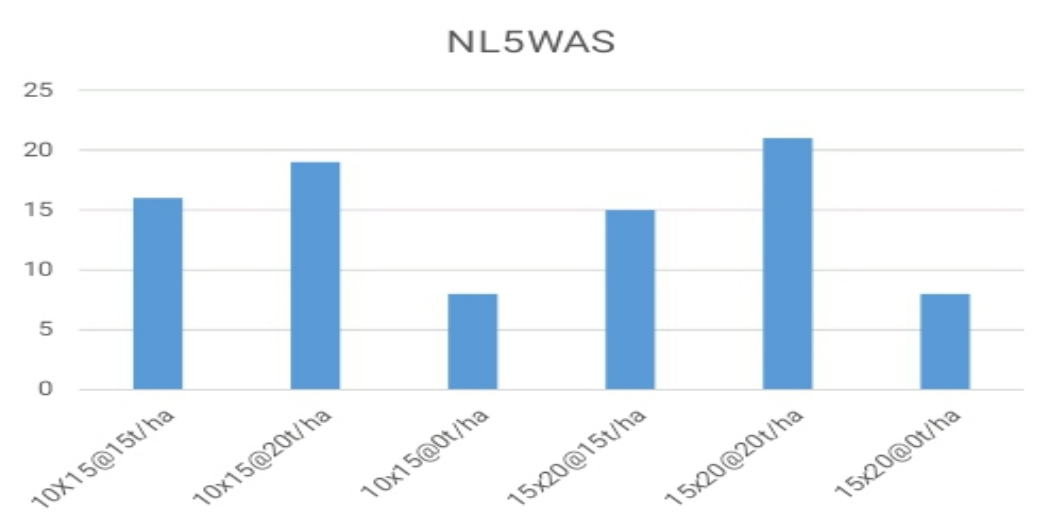


Figure 7: Plants Number of Leaves at 5 Weeks after Sowing

Figure 7 above shows the data of plants number of leaves at 5 weeks after sowing. the results revealed that the plots with the spacing of 15x20cm has the highest number of leaves, followed by that of 10x20cm spacing of 20t/ ha, followed by the plots with the spacing of 10x15cm of 15t/ha, followed by that of 15x20cm spacing of 15t/ha, followed by control 0t/ha with both 10x15cm and 15x20cm.therefore, there is a

significant difference between plots with 15x20cm spacing and that of 10x15cm of 20t/ha poultry manure rate, but there is not a significant difference between the plots with spacing of 10x15cm and that of 15x20cm of 15t/ha. And there is also no significant difference between the control 0t/ha with the spacing of both 10x15cm, and that of 15x20cm

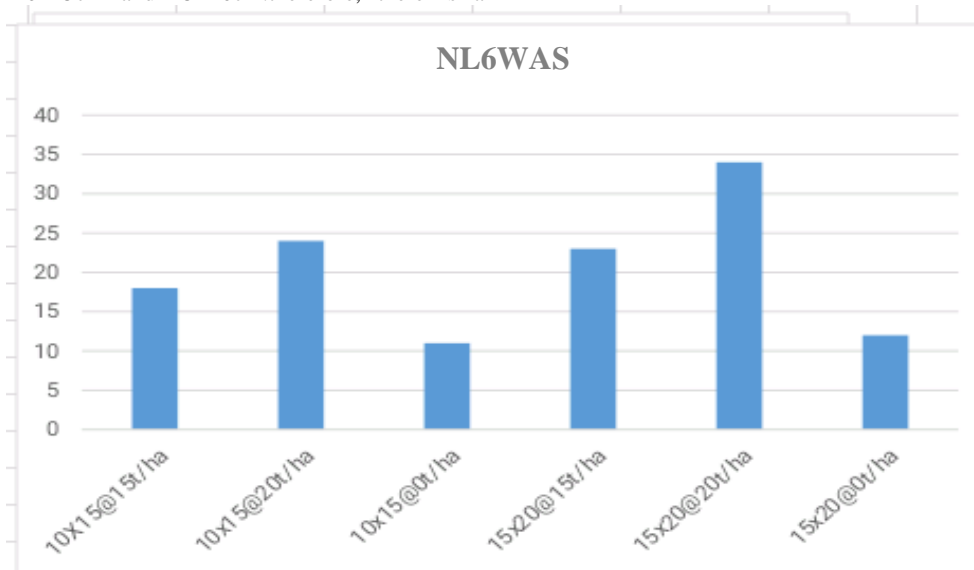


Figure 8: Plant Number of Leaves at 6 weeks after sowing

Figure 8 above shows the data of numbers of Leaves at 6 weeks after sowing. the results revealed that, the plots with spacing of 15x20cm of 20t/ha manure rate, has the highest number of Leaves followed by that of the plots with the spacing of 10x15cm of 20t/ha manure rate. Followed also by the plots with the spacing of 15x20cm of 15t/ha manure rate, followed by that of 10x15cm spacing of 15t/ha. Then followed by control 0t/ha manure rate of 20t/ha, followed by the control 0t/ ha manure rate of 10x15cm spacing.

Discussion of Findings

The result obtained from the experiment at week 3,4,5,6 after sowing shows a significant difference between the treatment with different poultry manure application rate, the treatment with poultry manure rate of 20t/ha and spacing of 10cm x 15cm has the highest plants height than that with the spacing

of 15cm x 20cm. The results show also recorded significant difference between the poultry manure rate of 20t/ha and 15t/ha and much more in 0t/ha(control) and a significant difference between the spacing of 10 x15cm with 15 x20cm in terms of the number of leaves. The observed differences obtained in all the parameters assessed could be attributed to the differences in nutrient contained in the rate of poultry manure applied. Asiegbu and Carol (2000), Nweke and Obasi (2013) observed that higher organic manure rates 15t/ha and 20t/ha, and pig manure rates 12t/ha and 24t/ha respectively gave higher yield result than where manure was not applied. Therefore, the plot with poultry manure rate of 20t/ha and spacing of 15x20cm has the highest number of leaves, Tarla D.N and Fontem, 2011 reported that poultry manure is rich in nitrogen and other plant nutrients and as a result it favors the growth and development of root system which reflects better

growth, photosynthetic activity and dry matters accumulation. This is in collaboration with the findings of Abdulbaki, A.S. (2023) that, yield components tended to increase with increasing poultry manure application. However, as reported by researchers such as Mitchel et al. (1978), accumulation of heavy metals from plant tissues and soil is possible when poultry manure is applied above the agronomic rate, resulting in a negative effect on crop growth and yield.

CONCLUSION

Conclusively, the results obtained in this study indicated that the use of chicken manure in huckleberry production is desirable because it has variable effects on the parameters evaluated in this trial. Chicken manure applied at 0 t/ha, 15 t/ha and 20 t/ha were found to have a consistent effect on plant height, number of blueberry leaves and plant spacing 10 cm x 15 cm, 15 cm x 20 cm.

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