



## Effect of Bioresources and Environmental Variance on the Performance on Fruit Vegetable in Southern Nigeria

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### ABSTRACT

*An experimental study was conducted on the effect of bioresources and environmental variance on fruit and vegetable performance in southern Nigeria. Treatments used for the study were arranged without bias in split-plots fitted in a randomized complete block design and replicated three times. The treatments consisted of four bioresources (varieties of a vital fruit vegetable called watermelon) while environmental variance consisted of three planting dates. The combination of bioresource (Heracles variety) and the most suitable environmental indices identified (27th August planting date) performed better than other interactions in the experiment. The results obtained showed that environmental factors such as rainfall amount, temperature, relative humidity, and sunshine hours during the august 27 planting date suited the production of watermelon in southern Nigeria, which resulted in optimum performance in vegetative growth and yield characters of the studied fruit vegetable crop*

**Key words:** Impact, Maize yield, Levels of growth enhancers, Varied intercrop population

### INTRODUCTION

Fruit vegetable crops provide numerous benefits to human health (Sonia, 2011). In Nigeria, production of some fruit vegetables is mainly carried out in the northern parts of the country, despite their economic and health benefits. However, studies on some of these vital fruit vegetables such as watermelon and others, has showed that the crop can thrive in wider range of environmental conditions, southern Nigeria environmental indices inclusive.

Environmental variance in local weather conditions such as rainfall, temperature, relative humidity and sunshine amount etc. bring about normal or abnormal plant growth and yield (Environmental Information from National Geography, 2014). The proper planting date for any plant, enables it to fully express its genetic potential and adaptation (Anonymous, 2018). Different environmental conditions. Some of the indices that influenced environmental variance include rainfall and temperature (Adekoya, 2008). Bioresources difference equally influenced growth and yield of fruit vegetables (Tindal, 1986). The observed differences in growth pattern among watermelon varieties could be attributed to their inherent varietal characteristics (Uwah and Solomon, 1999). It is then necessary to carry out research work on varieties that will be best favoured by the climatic and edaphic conditions in southern region of Nigeria. In order to increase the production areas of vital fruit vegetables in Nigeria, field study was carried out with the view of identifying suitable environmental conditions and to determined best bioresources (varieties) for the study area. This study was therefore conducted with the objective of evaluating the effect of bioresources and environmental variance on fruit vegetable production in southern Nigeria .

### MATERIALS AND METHODS

The research was conducted in southern Nigeria (Calabar) located at longitude 80 20'E, latitude 4058'N, about 39m above sea level and has annual rainfall distribution that ranges from 2,500mm to 3500mm, with mean annual temperature range of 23.2to 29.600C, relative humidly of between 79 to 88 percent. The soil textural class is sandy loam and the area is in the rain forest zone (Effiong, 2011). The experimental sites were in a secondary vegetation. Site of the experiment was dominated with the following weeds; *Pannicum maximum*, *Mucuna purien* and *Calapogoonum mocunoides*. Marking out of the total plot size needed for the experiment was done in both years using a measuring tape, machete and pegs. The existing vegetation was

cleared with machete manually. The cleared thrash was packed out, then the land was plough and harrowed into flat beds with the use of hand hoe in the three blocks where treatments were randomly applied, the treatment combinations used consisted of three planting dates (7th August, 27th Augusts and 16th September) and four varieties of watermelon (Koloss, Sugar-baby, Kaolack and Heracle). The experimental design used for the experiment was split-plot fitted into a randomized complete block design (RCBD), having 36 plots. The replicates were separated from each other by 1.5m path while each plot had 1 m path separating them. The gross size of land for experiment was 48.8 x 26.6 m(1,298.08 m<sup>2</sup>), each block size was 26.6 x 14.6 m(388.36 m<sup>2</sup>), the size of the individual bed was 5.4 x 4.2 m(22.68 m<sup>2</sup>) and the net plot had a size of 2.4x1.2m(2.88 m<sup>2</sup>).

## RESULTS AND DISCUSSION

### Effect of Environmental Variance

The result of the meteorological data indicated environmental variation in weather indices. The environmental factors in august favoured best performance of the studied fruit vegetable. Data revealed moderate rainfall, adequate sun shine during August planting date, which can be attributed to august break usually observed in the middle to ending of august (Tables 1). This agrees with the findings of Passioura (2007), Coe and Stern (2011), Tsimba, (2013) and Akpan et al. (2016) who reported that growing of watermelon during excessive rainfall, resulted in waterlogged soil conditions leading to reduced sunlight, increased pest infestation and reduction in yield.

Table 1. Calabar, 2019 meteorological data

| Months    | Rainfall (mm) | Temperature (°C) | Sunshine (Hrs) | Relative Humidity (%) |
|-----------|---------------|------------------|----------------|-----------------------|
| January   | 25            | 24.5             | 11.9           | 79                    |
| February  | 55            | 28.5             | 12.0           | 83                    |
| March     | 187           | 29.6             | 12.1           | 82                    |
| April     | 49            | 28.8             | 12.2           | 81                    |
| May       | 273           | 25.6             | 12.4           | 83                    |
| June      | 555           | 22.9             | 11.4           | 92                    |
| July      | 753           | 22.1             | 10.4           | 91                    |
| August    | 210           | 24.4             | 12.3           | 88                    |
| September | 233           | 25.6             | 12.1           | 89                    |
| October   | 286           | 26.1             | 12.0           | 81                    |
| November  | 156           | 24.6             | 11.9           | 80                    |
| December  | 93            | 23.2             | 11.8           | 80                    |
| Total     | 2975          | 308.9            | 42.5           | 1001                  |
| Mean      | 236           | 24.1             | 11.1           | 83                    |

Source: Department of geography and regional planning, weather data

The result of the study showed that, growth and yield performance of fruit vegetable (watermelon) was best during the 27th August planting date when compared with 7th and 16th of september. The environmental factors put together favoured best performance of watermelon during the 27th August planting date as against the 7th August and 16th September planting dates (Tables 2-8).

### Effect of Bioresources

Heracles variety exhibited the best performance during the crop vegetative growth phase and was closely followed by Koloss variety in number of leaves, main vine length number of internodes, number of branches, girth of main vine, TDM, leaf area, and crop growth rate. Kaolack variety was third best, followed lastly by Sugarbaby (Tables 2-9). These differences in performance among the varieties was due to their genetic makeup (Achigan-Dako, 2008). Among the reproductive parame. The superiority seen in Heracles and Koloss varieties over the other varieties in the performance of watermelon is attributed to the fact that Heracles and Koloss varieties are both F1 hybrids and are found to be well adapted to the environment they were planted while Kaolack and Sugarbaby varieties were not F1 hybrid but are native varieties. This agreed with the findings of Chadha, (2007) and Amuji et al. (2013) who reported that differences among watermelon varieties could be attributed to their inherent varietal characteristics.

**Table 2: Main Vine Length (cm) of Fruit Vegetable Effect by Bioresources and Environmental Variance**

| Treatment                  | Week after planting |        |        |        |
|----------------------------|---------------------|--------|--------|--------|
|                            | 3 WAP               | 5 WAP  | 7 WAP  | 9WAP   |
| Planting date              |                     |        |        |        |
| 7 <sup>th</sup> August     | 20.39               | 95.54  | 198.60 | 275.16 |
| 27 <sup>th</sup> August    | 25.59               | 107.29 | 332.37 | 336.29 |
| 18 <sup>th</sup> September | 15.86               | 87.98  | 169.74 | 266.96 |
| LSD (0.05)                 | 4.77                | 10.25  | 18.08  | 30.07  |
| Varieties                  |                     |        |        |        |
| Koloss                     | 23.26               | 90.27  | 235.34 | 289.26 |
| Sugar baby                 | 12.59               | 57.82  | 187.72 | 228.87 |
| Kaolack                    | 21.38               | 89.03  | 227.08 | 272.12 |
| Heracles                   | 25.23               | 106.63 | 263.11 | 320.97 |
| LSD (0.05)                 | 5.50                | 14.14  | 20.87  | 34.72  |
| Interactions               |                     |        |        |        |
| PDI x VI                   | 26.05               | 95.29  | 192.87 | 248.78 |
| PDI x V2                   | 8.32                | 64.79  | 153.58 | 221.56 |
| PDI x V3                   | 22.13               | 96.88  | 228.45 | 235.75 |
| PDI x V4                   | 25.07               | 125.21 | 247.51 | 348.54 |
| PD2 x V1                   | 18.94               | 113.20 | 320.62 | 331.63 |
| PD2x V2                    | 13.13               | 83.35  | 238.65 | 342.63 |
| PD2 V3                     | 13.35               | 115.32 | 244.54 | 305.38 |
| PD2x V4                    | 16.95               | 117.30 | 358.03 | 360.52 |
| PD3x V1                    | 24.78               | 62.32  | 170.20 | 298.39 |
| PD3x V2                    | 28.65               | 54.89  | 169.65 | 269.24 |
| PD3 x V3                   | 28.65               | 54.89  | 169.65 | 269.24 |
| PD3 x V4                   | 33.68               | 77.39  | 185.45 | 273.84 |
| LSD (0.05)                 | NS                  | NS     | 36.16  | NS     |

PD (1,2 and 3), V(1,2 and 3), and NS = planting dates (7<sup>th</sup> August, 27<sup>th</sup> August, 16<sup>th</sup> September), varieties (Koloss, Sugarbaby, Kaolack and Heracles) and not significantly different at 5 percent level using f-LSD

**Table 3: Number of Leaves per Plant of Fruit Vegetable Effect by Bioresources and Environmental Variance**

| Treatment                  | Weeks after planting |       |        |        |
|----------------------------|----------------------|-------|--------|--------|
|                            | 3 WAP                | 5 WAP | 7 WAP  | 9WAP   |
| Planting dates             |                      |       |        |        |
| 7 <sup>th</sup> August     | 8.49                 | 25.54 | 79.40  | 103.53 |
| 27 <sup>th</sup> August    | 8.12                 | 31.29 | 125.99 | 128.34 |
| 16 <sup>th</sup> September | 8.12                 | 23.37 | 51.56  | 61.25  |
| LSD (0.05)                 | NS                   | 3.51  | 11.91  | 9.27   |
| Varieties                  |                      |       |        |        |
| Koloss                     | 8.53                 | 28.42 | 97.16  | 105.45 |
| Sugar baby                 | 6.96                 | 21.23 | 70.86  | 73.50  |
| Kaolack                    | 8.25                 | 28.62 | 96.85  | 104.23 |
| Heracles                   | 9.23                 | 29.96 | 111.68 | 115.16 |
| LSD (0.05)                 | 1.09                 | 1.05  | 15.75  | 10.70  |
| Interactions               |                      |       |        |        |
| PDI x VI                   | 8.77                 | 27.45 | 76.10  | 121.77 |
| PDI x V2                   | 8.21                 | 20.87 | 66.32  | 68.54  |
| PDI x V3                   | 8.06                 | 20.20 | 73.96  | 117.77 |
| PDI x V4                   | 8.90                 | 26.64 | 101.21 | 128.40 |
| PD2 x V1                   | 8.54                 | 33.04 | 135.44 | 137.65 |

|            |       |       |        |        |
|------------|-------|-------|--------|--------|
| PD2x V2    | 6.99  | 22.56 | 96.82  | 99.92  |
| PD2 V3     | 8.34  | 35.33 | 128.89 | 130.93 |
| PD2x V4    | 10.62 | 37.22 | 143.72 | 144.86 |
| PD3x V1    | 8.27  | 21.78 | 54.95  | 59.37  |
| PD3x V2    | 5.67  | 19.25 | 34.20  | 47.21  |
| PD3 x V3   | 8.37  | 31.33 | 50.97  | 66.04  |
| PD3 x V4   | 8.18  | 28.12 | 66.10  | 72.38  |
| LSD (0.05) | NS    | 7.16  | NS     | NS     |

PD (1,2 and 3), V(1,2,3 and 4), and NS = planting dates (7<sup>th</sup> August, 27<sup>th</sup> August, 16<sup>th</sup> September), varieties (Koloss, Sugarbaby, Kaolack and Heracles) and not significantly different at 5 percent level using f-LSD.

**Table 4: Girth of Main Vine of Fruit Vegetable Effect by Bioresources and Environmental Variance**

| Treatment                  | Week After planting |       |       |      |
|----------------------------|---------------------|-------|-------|------|
|                            | 3 WAP               | 5 WAP | 7 WAP | 9WAP |
| Planting dates             |                     |       |       |      |
| 7 <sup>th</sup> August     | 0.26                | 0.27  | 0.28  | 0.29 |
| 27 <sup>th</sup> August    | 0.26                | 0.26  | 0.30  | 0.31 |
| 16 <sup>th</sup> September | 0.26                | 0.28  | 0.27  | 0.28 |
| LSD (0.05)                 | NS                  | NS    | 0.02  | 0.02 |
| Varieties                  |                     |       |       |      |
| Koloss                     | 0.28                | 0.28  | 0.30  | 0.30 |
| Sugar baby                 | 0.18                | 0.23  | 0.27  | 0.29 |
| Kaolack                    | 0.25                | 0.27  | 0.29  | 0.30 |
| Heracles                   | 0.29                | 0.29  | 0.31  | 0.31 |
| LSD (0.05)                 | 0.05                | 0.02  | 0.03  | 0.02 |
| Interactions               |                     |       |       |      |
| PDI x VI                   | 0.30                | 0.30  | 0.30  | 0.30 |
| PDI x V2                   | 0.21                | 0.27  | 0.27  | 0.28 |
| PDI x V3                   | 0.25                | 0.28  | 0.30  | 0.30 |
| PDI x V4                   | 0.26                | 0.28  | 0.30  | 0.30 |
| PD2 x Vi                   | 0.25                | 0.25  | 0.30  | 0.30 |
| PDI2x V2                   | 0.19                | 0.25  | 0.30  | 0.30 |
| PD2 V3                     | 0.22                | 0.25  | 0.30  | 0.30 |
| PD2x V4                    | 0.28                | 0.25  | 0.30  | 0.31 |
| PD3x V1                    | 0.30                | 0.30  | 0.30  | 0.30 |
| PD3x V2                    | 0.25                | 0.30  | 0.30  | 0.30 |
| PD3 x V3                   | 0.28                | 0.28  | 0.30  | 0.32 |
| PD3 x V4                   | 0.30                | 0.30  | 0.30  | 0.31 |
| LSD (0.05)                 | NS                  | NS    | 0.02  | NS   |

PD (1,2 and 3), V(1,2, 3 and 4), and NS = planting dates (7<sup>th</sup> August, 27<sup>th</sup> August, 16<sup>th</sup> September), varieties (Koloss, Sugarbaby, Kaolack and Heracles) and not significantly different at 5 percent level using f-LSD

**Table 5: Number of Internodes on Main Vine per Plant of Fruit Vegetable Effect by Bioresources and Environmental Variance**

| Treatment                  | Weeks after planting |       |       |
|----------------------------|----------------------|-------|-------|
|                            | 5 WAP                | 7 WAP | 9WAP  |
| Planting dates             |                      |       |       |
| 7 <sup>th</sup> August     | 13.23                | 27.83 | 30.56 |
| 27 <sup>th</sup> August    | 21.98                | 30.10 | 35.50 |
| 16 <sup>th</sup> September | 12.55                | 21.89 | 29.14 |
| LSD (0.05)                 | 1.40                 | 1.99  | 3.11  |
| Varieties                  |                      |       |       |
| Koloss                     | 16.66                | 28.99 | 38.50 |
| Sugar babv                 | 14.15                | 21.56 | 24.09 |
| Kaolack                    | 16.54                | 28.81 | 38.18 |
| Heracles                   | 17.33                | 30.09 | 38.75 |
| LSD (0.05)                 | 1.33                 | 2.30  | 3.60  |
| Interactions               |                      |       |       |

|             |       |       |       |
|-------------|-------|-------|-------|
| PDI x V1    | 14.55 | 26.73 | 35.95 |
| PDI x V2    | 11.54 | 21.37 | 34.56 |
| PDI x V3    | 12.01 | 29.45 | 37.94 |
| PDI x V4    | 14.82 | 33.78 | 43.81 |
| PD2 x V1    | 22.38 | 29.22 | 36.50 |
| PD2x V2     | 20.20 | 28.16 | 39.01 |
| PD2 V3      | 21.38 | 31.80 | 38.94 |
| PD2x V4     | 23.95 | 33.79 | 40.56 |
| PD3x V1     | 12.05 | 33.89 | 34.04 |
| PD3x V2     | 10.70 | 27.69 | 29.69 |
| PD3 x V3    | 13.23 | 32.17 | 33.46 |
| PD3 x V4    | 13.22 | 32.89 | 33.38 |
| LSD (0.05)] | NS    | NS    | NS    |

PD (1,2 and 3), V(1,2, 3 and 4), and NS = planting dates (7<sup>th</sup> August, 27<sup>th</sup> August, 16<sup>th</sup> September) varieties (Koloss, Sugarbaby, Kaolack and Heracles) and not significantly different at 5 percent level using f-LSD

**Table 6: Number of Branches per Plant of Fruit Vegetable Effectted by Bioresources and Environmental Variance**

| Treatment                  | Weeks after planting |       |       |
|----------------------------|----------------------|-------|-------|
|                            | 5WAP                 | 7 WAP | 9 WAP |
| Planting dates             |                      |       |       |
| 7 <sup>th</sup> August     | 2.16                 | 7.73  | 7.78  |
| 27 <sup>th</sup> August    | 3.25                 | 11.82 | 12.26 |
| 16 <sup>th</sup> September | 2.41                 | 6.86  | 7.27  |
| LSD (0.05)                 | 0.30                 | 0.91  | 0.85  |
| Varieties                  |                      |       |       |
| Koloss                     | 3.05                 | 8.21  | 9.00  |
| Sugar baby                 | 2.46                 | 6.29  | 6.40  |
| Kaolack                    | 3.02                 | 8.36  | 9.62  |
| Heracles                   | 3.30                 | 8.94  | 10.10 |
| LSD (0.05)                 | 0.35                 | 1.05  | 0.98  |
| Interactions               |                      |       |       |
| PDI x V1                   | 2.88                 | 7.39  | 8.95  |
| PDI x V2                   | 2.14                 | 6.45  | 6.65  |
| PDI x V3                   | 2.73                 | 6.13  | 8.11  |
| PDI x V4                   | 2.71                 | 9.55  | 9.75  |
| PD2 x V1                   | 3.28                 | 13.30 | 13.74 |
| PD2x V2                    | 3.06                 | 8.38  | 8.88  |
| PD2 V3                     | 3.12                 | 12.55 | 12.95 |
| PD2x V4                    | 3.35                 | 9.79  | 13.05 |
| PD3x V1                    | 2.99                 | 6.31  | 7.95  |
| PD3x V2                    | 2.18                 | 5.45  | 6.04  |
| PD3 x V3                   | 3.22                 | 6.38  | 7.80  |
| PD3 x V4                   | 3.65                 | 6.89  | 7.26  |
| LSD (0.05)                 | NS                   | 1.82  | 1.69  |

PD (1,2 and 3), V(1,2, 3 and 4), and NS = planting dates (7<sup>th</sup> August, 27<sup>th</sup> August, 16<sup>th</sup> September), varieties (Koloss, Sugarbaby, Kaolack and Heracles) and not significantly different at 5 percent level using f-LSD

**Table 7: Leaf Area (cm<sup>2</sup>) of Fruit Vegetable Effectted by Bioresources and Environmental Variance**

| Treatment                  | Weeks after planting |       |      |
|----------------------------|----------------------|-------|------|
|                            | 5 WAP                | 7 WAP | 9WAP |
| Planting dates             |                      |       |      |
| 7 <sup>th</sup> August     | 1.72                 | 2.50  | 2.81 |
| 27 <sup>th</sup> August    | 1.78                 | 2.86  | 2.87 |
| 16 <sup>th</sup> September | 1.37                 | 1.86  | 1.92 |
| LSD (0.05)                 | 0.28                 | NS    | 0.35 |
| Varieties                  |                      |       |      |
| Koloss                     | 1.60                 | 2.09  | 2.11 |
| Sugar baby                 | 1.28                 | 1.56  | 1.64 |
| Kaolack                    | 1.49                 | 2.23  | 2.29 |
| Heracles                   | 1.82                 | 2.20  | 2.22 |
| LSD (0.05)                 | 0.32                 | Ns    | 0.40 |
| Interactions               |                      |       |      |
| PDI x V1                   | 1.43                 | 1.52  | 2.16 |
| PDI x V2                   | 0.94                 | 1.49  | 1.51 |
| PDI x V3                   | 1.04                 | 1.72  | 2.28 |
| PDI x V4                   | 1.16                 | 2.25  | 2.27 |
| PD2 x V1                   | 1.8                  | 2.58  | 2.59 |
| PD2x V2                    | 1.62                 | 1.76  | 2.83 |
| PD2x V3                    | 1.67                 | 2.75  | 2.85 |
| PD2x V4                    | 1.96                 | 2.39  | 2.67 |
| PD3x V1                    | 1.49                 | 1.86  | 1.88 |

|            |      |      |      |
|------------|------|------|------|
| PD3 x V2   | 1.28 | 1.41 | 1.85 |
| PD3x V3    | 1.47 | 2.22 | 2.95 |
| PD3 x V4   | 1.73 | 1.94 | 1.97 |
| LSD (0.05) | NS   | NS   | NS   |

PD (1,2 and 3), V(1,2, 3 and 4), and NS = planting dates (7<sup>th</sup> August, 27<sup>th</sup> August, 16<sup>th</sup> September), varieties (Koloss, Sugarbaby Kaolack and Heracles) and not significantly different at 5 percent level using f-LSD

**Table 8: Crop Growth Rate (g/m<sup>2</sup>/w) of Fruit Vegetable Effect by Bioresources and Environmental Variance**

| Treatment                  | Weeks After Planting |       |       |
|----------------------------|----------------------|-------|-------|
|                            | 5WAP                 | 7 WAP | 9 WAP |
| Planting dates             |                      |       |       |
| 7 <sup>th</sup> August     | 0.29                 | 0.54  | 0.95  |
| 27 <sup>th</sup> August    | 0.32                 | 1.19  | 1.27  |
| 16 <sup>th</sup> September | 0.20                 | 0.35  | 0.99  |
| LSD (0.05)                 | NS                   | 0.15  | NS    |
| Varieties                  |                      |       |       |
| Koloss                     | 0.34                 | 1.91  | 1.87  |
| Sugar baby                 | 0.10                 | 0.15  | 0.26  |
| Kaolack                    | 0.28                 | 1.30  | 0.98  |
| Heracles                   | 0.36                 | 1.98  | 2.06  |
| LSD (0.05)                 | 0.02                 | NS    | 0.14  |
| Interactions               |                      |       |       |
| PDI x VI                   | 0.43                 | 0.71  | 0.75  |
| PDI x V2                   | 0.38                 | 0.21  | 0.40  |
| PDI x V3                   | 0.38                 | 0.31  | 0.41  |
| PDI x V4                   | 0.41                 | 0.84  | 2.03  |
| PD2 x VI                   | 0.36                 | 0.49  | 0.87  |
| PD2x V2                    | 0.17                 | 1.66  | 0.18  |
| PD2x V3                    | 0.37                 | 1.15  | 1.30  |
| PD2x V4                    | 0.68                 | 2.44  | 2.72  |
| PD3x VI                    | 0.24                 | 0.30  | 1.40  |
| PD3 x V2                   | 0.07                 | 0.28  | 0.47  |
| PD3x V3                    | 0.20                 | 0.40  | 1.40  |
| PD3 x V4                   | 0.30                 | 0.26  | 0.36  |
| LSD (0.05)                 | 0.03                 | NS    | NS    |

PD (1,2 and 3), V(1,2, 3 and 4), and NS = planting dates (7<sup>th</sup> August, 27<sup>th</sup> August, 16<sup>th</sup> September), varieties (Koloss, Sugarbaby, Kaolack and Heracles) and not significantly different at 5 percent level using f-LSD

### Interaction effect

Interaction was due to the complimentary action between the two factors of environment and crop genetic makeup which in turn influenced the outcome of the results shown. The 27<sup>th</sup> August planting date for Heracles variety was found to exhibit best performance in vegetative growth parameters as well as in yield characters. Interaction revealed that Heracles variety had better adaptability to the August 27<sup>th</sup> planting date than the other varieties. The 16<sup>th</sup> September planting date for Sugar baby variety showed the least performance in growth and yield (Tables 1-9). This agreed with Neidz (1990), Musniki et al. (1999); Srivastava et al., (2004) who in their reports stated that some environmental and genetic differences can lead to varying performance of watermelon.

**Table 9: Number of Fruits (per plant), Weight of Melons (kg), Fruit Girth (cm), Fruit Length (cm) and Total Fruit yield (t/ha) at Harvest of Fruit Vegetable Effect by Bioresources and Environmental Variance**

| Treatment                  | No of fruits (per plant) | Weight of melons (kg) | Total fruit yield (t/ha) |
|----------------------------|--------------------------|-----------------------|--------------------------|
| Planting date              |                          |                       |                          |
| 7 <sup>th</sup> August     | 3.39                     | 2.58                  | 17.92                    |
| 27 <sup>th</sup> August    | 6.01                     | 2.98                  | 20.58                    |
| 16 <sup>th</sup> September | 2.62                     | 2.02                  | 14.08                    |
| LSD (0.05)                 | 0.51                     | 0.25                  | 2.11                     |
| Varieties                  |                          |                       |                          |

|              |      |      |       |
|--------------|------|------|-------|
| Koloss       | 4.45 | 3.06 | 20.87 |
| Sugar baby   | 2.77 | 1.54 | 10.67 |
| Kaolack      | 4.25 | 2.26 | 15.70 |
| Heracles     | 4.54 | 3.18 | 22.87 |
| LSD (0.05)   | 0.49 | 0.09 | 2.44  |
| Interactions |      |      |       |
| PDI x VI     | 3.78 | 3.35 | 20.26 |
| PDI x V2     | 2.45 | 2.29 | 19.65 |
| PDI x V3     | 3.55 | 3.01 | 16.00 |
| PDI x V4     | 3.79 | 3.40 | 22.61 |
| PD2 x VI     | 6.86 | 4.00 | 24.70 |
| PD2x V2      | 4.03 | 2.90 | 14.19 |
| PD2x V3      | 6.32 | 3.51 | 16.48 |
| PD2x V4      | 6.88 | 3.90 | 26.65 |
| PD3x VI      | 2.97 | 3.54 | 14.65 |
| PD3 x V2     | 1.84 | 2.20 | 18.17 |
| PD3x V3      | 2.90 | 3.00 | 14.47 |
| PD3 x V4     | 2.79 | 3.49 | 17.03 |
| LSD (0.05)   | 0.84 | NS   | NS    |

PD (1,2 and 3), V(1,2, 3 and 4), and NS = planting dates (7<sup>th</sup> August, 27<sup>th</sup> August, 16<sup>th</sup> September) varieties (Koloss, Sugarbaby, Kaolack and Heracles) and not significantly different at 5 percent level using f-LSD

## CONCLUSION

In conclusion, the most suitable bioresource for this study was ( Heracles variety) which had the best performance. The study has revealed that for production of fruit vegetable in southern Nigeria, environmental variance had significant effect on the studied crop, indicating that the 27th August planting date had potential to produce the highest yield of watermelon. The combination of bioresource and environmental variance (Heracles variety and 27th August planting date), gave highest fruit vegetable (watermelon) yield when compared with the other interactions.

## RECOMMENDATION

The research has showed that fruit vegetable (Heracles watermelon variety) has the potential to thrive best in the southern Nigeria. While the best time with appropriate environmental condition for production is august 27, in other words during late august, for the studied crop to expressed its full yield potentials.

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