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Repellant Effect of Urine Insecticides Spray and NPK (15:15:15) Compound Fertilizer Application on the Growth and Yield of watermelon (Citrullu lonatus Thumb)

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ABSTRACT: A field study conducted to investigate the Repellent effects urine insecticide spray and NPK(15:15:15) compound fertilizer on the growth and yield of watermelon (Citrullus Lonatus Thumb) in forestry Research Institute of Nigeria, (FRIN) experimental plot at Agbede, Etsako West Local Government Area of Edo State. Four regimes of Urine insecticide spray and four rate of NPK compound fertilizer application were factorially combined and laid out in a completely randomized block design (CRBD) with three replication. Urine insecticide spray and fertilizer application did not affect the period of flowering and poddring significantly (P> 0.05). NPK compound fertilizer application significantly (P< 0.05) increase the number and length of main vines, pod number and yield while Vines insecticide spray significantly (P< 0.05) increase the length of the main virus and yield. In the rate of application, 200kg/ha NPK was optimum and this recommended for watermelon cultivation. Twice spray regimes of urine insecticide was recommended for watermelon cultivation

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Watermelon (*Citrillu Lonatus Thumb*) belongs to the family cucerbitaceae. It is grown as a vegetable crop for fresh consumption of the refreshingly juicy and sweet fresh of the nature fruit. Plant Resources of Tropical Africa, (Prota 2008). In many part of the world, watermelon is the most important type of Citrullic Lonatus. Through the demand of watermelon is very high the greatestchallenges to farmers throughout the world and Nigeria in general are the insect pest management (Ladipo *et al*, 2000).Pest damage caused by insect included damage stem, fruit, leaves and even the entire plants.

Wayne and Wande, (2015) reported that watermelon production is however at risk as substantial losses may occur due to high infestation of insect pest. Okaka *et al* ;(2008) and Anebunwa (2000) also reported that many factors limit the growth and yield of melon in Nigeria such as poor cultural practices and pest problem. Babu *et al ;*(2002) also noted that insect, are major setback in watermelon production. That a number of insect including the fruit flies (Dacus spp) chew on various part of watermelon and may transmit diseases pathogens which will destroy or retard the growthand yield of plant. However artificial fertilizer is one of the major recommended cultural practices that increase the yield of watermelon. The response of watermelon to nitrogen fertilizer has been implicated to increase fruit size and seed yield, (Adeniran 1984 Olasantan, 1988 and Sananayake, 2006).Today, the control of insect pest in the field and stored food product has relied heavily in the use of gaseous fumigant and residual contact insecticides. Similarly, the European Union has criticized the use of chemical in the control of insect pest on the field and storage resulting in residual effect to human and environment (Murugen 2006; Fernandez *et al*, 2007 and Akhideno *et al.*, 2017).

Thus this problem has created the need to find materials that will effectively protect field plant, that are readily available, affordable, less poisonous and less detrimental to the environment. In the light of the above, non – chemical, natural material and method are employed for pest management. Urine has some potential in protecting watermelon plant during the growth and reproductive stages. This can be harnessed in the form of bio – insecticides. The achievement in this direction will increase the demand of watermelon production. This trial is aimed to determined efficiency of urine (both human and animal) in control of insect pest in watermelon.

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MATERIALS AND METHODS

Study Area: The study was conducted in Forestry Research Institution of Nigeria (FRIN) experimental plot at Agbede Etsako West Local Government Area Edo State. The site has been left fallow for three years before cropping in 2019. The watermelon seed were obtained from ADP office in Auchi while the urine was collected in 12 household in Auchi. The site was manually prepared by clearing with a cutlass and left dried before burning. The debris was packed by hand. The watermelon was sown by hand drilling two seed into 2 – 4cm deep holes at the unset of the rain in May 2019 at the standard spacing of 1m by 1m which gave an equivalent population density of 10,000 plants/ hectare after supply of missing stands and thinning to one plant by stand.

Each experiment consist of four fertilizer rate and four regimes of urine spray designated N_o, N_1, N_2, N_3 and U_0, U_1, U_2 and U_3, respectively in a 4x4 factorial scheme fitted with a randomized complete block design with three replications. Each fertilizer treatment was applied at 3WAP by spot application. Urine insecticides were sprayed at the rate of 75ml at 4, 5 and 6WAP depending on the number of sprays, using a knapsack sprayer. The spray was done in the evening. The urine was collected and then poured into a gallon left for seven to nine days to Ferment. The urine will produce a very pungent scent. The resulting fermented urine can be diluted or used as (insecticide spray). Two hoe weeding were observed at 2 and 5WAP.

*Data Collected***:** Data were collected on the growth characters as from 4WAP on the number of main vines, length of main vines, number of days to 50% flowering and podding. At harvest, yield and component of yield were determined on number, diameter and weight per plot. Pod per plot were packed in a jute bag and weighed with a pocket spring balance. Pod diameter were determined from the pod circumference using the conversion formulae; D = C/E. where D is the diameter C is the circumference and E is constant taken as 22/7. Data collected were statistically analyzed by analysis of variance while significant means were separated by LSD at 0.05 risk level.

RESULTS AND DISCUSSION

In table 1 and 2 shows that flowering podding commenced about 4WAP and 6WAP respectively and were neither significantly affected by urine insecticides spray and fertilizer application. Insecticides and fertilization treatment slightly increased length of vegetative growth which lead to the delay onset of the productive phase in the study. This finding is in agreement with Okaka and Remison (1998) who observed that in many arable crops fertilizer have a tendency of increasing vegetative growth phase and many therefore not have direct influence on flowering and podding. The number of main vine produced by each of the watermelon was significantly affected ($P<0.05$) by N: P: K 15:15:15 compound fertilizer application. There was no significant interaction between urine Insecticide spray and fertilizer application as shown in table 3. It is also revealed that N: P: K compound fertilizer at any of the application rate significantly increase the number of watermelon main vines.

However the character responded most to 300kg/ha rate of application, while the three application rate produced comparable effect (LSD at 0.05). In table 4, urine insecticide spray and N: P: K 15:15:15 fertilizer application significantly increase the length of watermelon vines. The two factors also significantly interacted. The character to NPK fertilizer application was highest when the rate off application was 300kg/ha which was significantly was higher that 100kg/ha and 200kg/ha rate of application (LSD, 0.05). The response observed was in agreement with the findings of (Anon 1982 and Okaka *et al*; 2008) reported that for a good canopy spread, a minimum application of 200kg/ha NPK 15:15:15 compound fertilizer should be made to melon plant on the field. Urine insecticides spray significantly increased watermelon vine length as indicated in table 4 that there was a better advantage of three times spray regime than once or twice. The result shows that urine insecticide spray is effective against the folia insect pest of watermelon. This pod number was significantly affected ($P<0.05$) by NPK fertilizer application and urine insecticide spray as shown in table 5. In table 6 & 7 shows that pod weight and pod diameter were not significantly affected by the treatment.

Table 1: Repellant Effect

Spray	**Rate of fertilizer Application (kg/ha)**					
Regime	0	100	200	300	Means	SE+
0	35.0	36.0	38.2	38.3	36.9	
1	34.0	35.7	36.2	39.2	36.3	1.52
2	35.0	36.3	37.2	36.0	36.1	
3	36.0	36.7	36.7	36.7	36.5	
Means	35.0	35.7	37.1	37.6		
SE+			1.53			

Table 2: Repellant Effects of Urine Insecticide Spray and NPK 15:15:15 Fertilizer on the Number of Days to 50% Podding

Spray	**Rate of fertilizer Application (kg/ha)**					
Regime	0	100	200	300	Means	SE+
0	48.2	51.0	50.2	49.0	49.6	
1	48.2	52.0	51.6	50.0	50.5	1.26
2	48.2	52.0	51.4	50.7	50.6	
3	48.6	52.0	50.7	49.8	50.3	
Means	48.3	51.8	51.0	49.9		
SE+			1.26			

Table 3: Repellant Effect of Urine Insecticides Spray and NPK 15:15:15 Fertilizer Application on the Number of Main Vines Produced by Water Melon Plant

Spray	**Rate of fertilizer Application (kg/ha)**					
Regime	0	100	200	300	Means	SE+
0	3.2	4.2	4.1	4.4	4.0	
1	3.1	3.9	4.1	4.3	3.9	0.39
2	3.2	4.5	4.4	4.5	4.2	
3	3.4	3.9	3.8	4.6	3.9	
Means	3.2	4.1	4.1	4.5		
SE+			0.39			

Table 4: Repellant effects of Urine Insecticide Spray and NPK 15:15:15 Compound Fertilizer on the Vines length (M) of watermelon

Spray	**Rate of fertilizer Application (kg/ha)**					
Regime	0	100	200	300	Means	SE+
0	1.1	2.6	1.8	3.0	2.1	
1	1.3	2.3	2.6	3.6	2.5	0.14
2	1.8	2.3	3.0	3.2	2.6	
3	2.0	2.5	3.0	3.1	2.7	
Means	1.6	2.4	2.6	3.2		
SE+			0.14			

Table 5: Repellant effects of Urine insecticide spray and NPK 15:15:15 compound fertilizer on Pod Number per plant of watermelon

Spray	**Rate of fertilizer Application (kg/ha)**					
Regime	0	100	200	300	Means	SE+
0	21.0	20.0	39.2	25.7	26.5	
1	16.2	30.0	27.1	12.1	21.4	4.03
2	16.1	29.2	12.2	10.4	17.0	
3	12.2	18.7	25.4	26.3	20.7	
Means	16.4	24.5	26.0	18.6		
SE+			4.03			

Table 6: Repellant Effects of Urine Insecticide Spray and NPK 15:15:15Compound Fertilizer on Pod Diameter (cm) of watermelon.

Spray	**Rate of fertilizer Application (kg/ha)**					
Regime	0	100	200	300	Means	SE+
0	15.8	18.2	17.2	13.6	16.2	
1	16.0	16.1	16.3	16.1	16.1	6.30
2	16.2	17.2	17.4	16.0	16.7	
3	16.3	15.5	16.2	14.9	15.7	
Means	16.1	16.8	16.8	15.2		
SE+			6.30			

Table 7: Repellant Effects of Urine Insecticide Spray and NPK 15:15:15 Compound Fertilizer on Pod Weight (kg/ha) of watermelon.

Spray	**Rate of fertilizer Application (kg/ha)**					
Regime	0	100	200	300	Means	SE+
0	0.5	0.5	0.6	0.5	0.5	
1	0.5	0.5	0.5	0.6	0.5	6.33
2	0.5	0.9	0.6	0.6	0.7	
3	0.6	0.5	0.5	0.4	0.5	
Means	0.5	0.6	0.6	0.5		
SE+			0.03			

Pod number increase significantly by the application of 100kg/ha and 200kg/ha NPK, and only slightly increased in 300kg/ha NPK fertilizer. The drastic production was observed when the rate of application is further increase to 300kg/ha NPK fertilization in pod weight and yield of watermelon as shown in table 8. This observation are clear indication of positive infective of fertilization of 100kg/ha and 200kg/ha on pod filling and subsequent yield of watermelon in consonance with the recommendation of 200kg/ha N: P: K 15:15:15 compound fertilizer (Anon, 1982 an Okaka *et al;* 2008).

Table 8: Repellant Effects of Urine Insecticide Spray and NPK 15:15:15 Fertilizer Application on Yield (kg/ha) of watermelon.

Spray	**Rate of fertilizer Application (kg/ha)**					
Regime	0	100	200	300	Means	SE+
0	73.8	120.2	700.4	95.7	247.5	
1	95.2	351.7	432.1	120.8	250.0	42.55
2	138.4	130.9	140.8	156.4	141.6	
3	90.8	130.8	95.9	162.5	199.8	
Means	99.6	183.4	342.3	133.9		
SE+			42.55			

Urine insecticides spray significantly reduced (P<0.05) pod number (table 5) while pod diameter (table 6) and pod weight (table 7) were affected (P>0.05). These reported is in line with (Okaka 1992 and Okaka et al, 2008) that melon plant exibit some degree of immunity to insect pest attack that insect may retard the growth of melon but the ultimate yield is not affected.The finding in this study shows that watermelon yields can be substantially improved by applying 200kg/ha NPK 15:15:15 compound fertilizer. Urine insecticide spray effectively controlled insect pest of watermelon thereby increasing the vegetative growth in terms of vine spread.This finding is in agreement with the earlier report of (Stoll, 1988, Warbirton and Martin, 1999 and Tancho 2013) that natural materials, non – chemical and method are used for pest management across many regimes, such as Ash, Urine, Soapy water, Neem, Kerosene for crop protection.

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