Evaluation of eggplant (*Solanum melongena* L.) parental varieties against their hybrid progenies and responses to N-fertilizer doses and dosing options on well-drained humid tropical soil

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Assessment of phenotypic variability is crucial to progress in plant breeding. We evaluated 19 varieties of eggplant (*Solanum melongena* L.) comprising five parents and 14 hybrid progenies on a coarse-textured soil in southeastern Nigeria. All entries differed in the agronomic traits considered. Six weeks after transplanting (WAT), Kaduna3 and Iyoyo were the shortest and tallest varieties, respectively, with Kaduna3 also showing the lowest values of all other growth traits. Ogbojioroke (local variety), with the most branches/leaves and nodes/internodes, took the shortest time to 50% flowering/fruiting while Kaduna3 × Iyoyo (F_4) took the longest. Ogbojioroke had the most fruits (1,716) and Kaduna3 the fewest (1.30) per 3 m^2 plot. However, Kaduna3 × Iyoyo had the highest fruit weight (1205 g) per plot, similar to Ogbojioroke and two others. The hybrid with the highest mean-weight per fruit (Yalo × Kaduna3 (BC2P1) was selected for a N-fertilizer trial where responses to N-fertilizer (urea) doses (0, 50, 100 and 150 kg ha^{-1}) and dosing options (single or half-split) were evaluated in the same environment. At 6 WAT, the number of nodes differed thus: 150/100 > 50 > 0 kg ha^{-1}, with half-split > single dosing. Flowering/fruiting time decreased with dose peaking at 100 kg ha^{-1}. Fruiting trailed in the order 150/100 > 50 > 0 kg ha^{-1} in single and half-split dosing at 1st and 2nd harvests, respectively. Half-split dosing 150 and 100 kg ha^{-1} produced similar and highest fruit weights (mean = 3110 g) per 3-m^2-plot while 0 kg ha^{-1} gave the lowest (mean = 433.50 g). Ogbojioroke's traits need to be exploited in eggplant improvement programmes. Half-split dosing 100 kg urea ha^{-1} is suggested for promising varieties of eggplant grown on well-drained humid tropical soils.

Keywords: Agronomic evaluation, eggplant varieties, field trials, humid environment, low-fertility soils

Eggplant (*Solanum melongena* L.) is one of the most economically important members of the Solanaceae family (Knapp et al. 2013). Most eggplant wild relatives are from Africa particularly in the central and western regions. There are three worldwide cultivated species, namely *S. aethiopicum*, *S. macrocarpon* and the more familiar *S. melongena*, grown mainly in Africa. Variability assessment in crop plants is a pre-requisite for formulating effective breeding programmes and realizing responses to selection (Kumar et al. 2013). Genetic variability by way of morphological and molecular diversity can be used to develop eggplant cultivars with improved agronomic traits (Begum et al. 2013).

Both vegetative and reproductive phases of growth proceed simultaneously in eggplant (Sharma and Brar 2008). This, coupled with the fact that it is a biennial crop, makes eggplant require large quantity of nutrients, the shortfall in soils of which is normally augmented by the use of inorganic fertilizers (Agbo et al. 2012). Eggplant production in Nigeria is constrained by the low level of soil fertility and the prevailing unfavourable climatic conditions. The productivity of eggplant crop could be increased through appropriate cultural practices, particularly those that enhance fertilizer use efficiency (Feleafel 2005).

Nitrogen (N) is vital for most plant metabolic processes and plays a key role in tillering and stalk elongation in some field crops (Koochekzadeh et al. 2009). The uptake and utilization of N depends on the quantity and quality of the N-fertilizer, period of application, frequency of application, duration

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of the fertilizer in soil, the crop grown, crop rooting depth, N-utilization efficiency, rainfall characteristics, soil intrinsic and hydraulic properties, and soil-agronomic management practices (Rasiah and Armour 2001). In humid tropical environments, N-rich fertilizers can increase the content of N in coarse-textured soils which in turn can reflect in crop yields (Nwite et al. 2013; Unagwu et al. 2013). Considering all of these factors together, it is necessary to supply the plants with nutrients throughout the growing period.

Research has shown that N is a key nutrient in the physiology of eggplant as it improves photosynthetic efficiency of the plant and ultimately the yield (Sharma and Brar 2008). Also, dosage (amount and frequency of application) of N-fertilizers influences the plant's responses and is a key factor in minimizing losses of the added N (Feleafel 2005). Split dosing reduces N exposure in saturated soils where losses to leaching and denitrification are high; thus, it serves as a risk management technique in dryland cropping. Split dosing of N to the soil can potentially increase N uptake and use efficiency of crops (SSCA 2017). However, in the humid tropics there are insufficient data on optimum doses and split dosing of N for the dominant well-drained, coarse-textured soils (Abd Allah et al. 2001; Babu et al. 2004). There is thus the need to co-study N doses and splitting. The objectives of this study were: (i) to evaluate growth traits and yield of 19 eggplant varieties, and (ii) to determine the growth traits and yield responses of a selected hybrid, cv. Yalo × K3 (BC_2P_1), to varying N-fertilizer doses and their split dosing.

Materials and methods

Location of the experiment

The study took place at the University of Nigeria Teaching and Research Farm at Nsukka (6^{o}52′N, 7^{o}24′E; 447 m asl) in southeastern Nigeria. The climate is humid tropical; with mean annual rainfall of 1600 mm. The range of mean temperature is 21-31 ^{o}C. Rainfall in the 'growing' season is bimodally distributed with a short break around August, separating the major (April to July) and the minor (September to October) seasons. Relative humidity is rarely lower than 60%. The prevailing vegetation depicts the location as typical derived savannah. The soil has quartz and kaolinite as the dominant minerals. It has a very deep profile, with reddish brown to reddish layers. It has been classified as Ultisols, using the USDA Soil Taxonomy system (Soil Survey Staff 2006). The soil is mostly of coarse sandy-loam texture and of low organic matter content; however, it often shows granular surface structure for which it can be excessively porous, with a characteristic well-drained profile (Obalum et al. 2012a; Obalum and Obi 2014).

The mean values of key physicochemical properties of the topsoils of the study site have been stated elsewhere (Obalum et al. 2017; Adubasim et al. 2018). In brief, 1 kg of the dry soil has 750, 70, and 180 g of sand, silt and clay, respectively (a soil texture classified as sandy-loam), with soil pH of 4.8-6.8 (strongly to slightly acidic); it has 8 - 18 g of soil organic carbon, 0.56 - 0.60 g of total nitrogen and 10.30 mg of available phosphorus, while showing a cation exchange capacity of 12.40 cmol and exchangeable K, Ca and Mg of 0.04, 3.20, and 0.80 cmol, respectively.

Field methods

There were two experiments (varietal evaluation and N-fertilizer trial), with the varietal evaluation preceding the N-fertilizer trial. For the varietal evaluation, 19 eggplant varieties comprising five parental varieties sourced from various locations in Nigeria and their hybrid progenies were evaluated in the 2016 minor rainy season. Five entries that were parental varieties (Ewa, Iyoyo, Kaduna3 [K3], Ogbojioroke and Uyo) were selected from among six parents of the hybridized progenies based on differences in fruit size, shape and colour (Table 1); the remaining 14 entries were crosses and back crosses (BC) to the parents (P). The 14 hybridized progenies included K3 × Iyoyo (BC_2P_1), K3 × Iyoyo (BC_2P_2), K3 × Iyoyo (F_3), K3 × Iyoyo (F_4), Uyo × Iyoyo (BC_2P_1), Uyo × Iyoyo (BC_2P_2), Uyo × Iyoyo (F_4), Yalo × Iyoyo (BC_2P_2), Yalo × Iyoyo (F_3), Yalo × Iyoyo (F_4), Yalo × K3 (BC_2P_1), Yalo × K3 (BC_2P_2), Yalo × K3 (F_3), and Yalo × K3 (F_4). The details of the crossing and selection history based on fruit yield can be found in Akpan et al. (2016a, b).

The hybrid, Yalo × K3 (BC_2P_1), with the highest mean-weight per fruit in the 2016 minor season was used for N-fertilizer trial with urea (46% N) in the 2017 major season. Four urea doses (0, 50, 100 and 150 kg ha^{-1}) and two dosing options (single or half-split dosing) were studied in a 4 × 2 factorial fashion. The urea pellets were applied to the topsoil by band placement 3 weeks after transplanting (WAT). For the half-split dosing, half of the respective doses were applied 3 WAT and the other half at 50% flowering.

For both experiments, individual plot size was 3 m × 1 m, surrounded by earthen bunds, and a randomized complete block design (RCBD) with three blocks was adopted. To boost the soil's initial fertility status, 5 kg of cured poultry droppings was added to each treatment plot, corresponding to a basal manure dose of 16.70 t ha^{-1}. Using an African hoe, all plots were manually tilled to 20 cm deep and prepared into seedbeds two weeks later, followed by transplanting of seedlings raised in a nursery. The seedlings were transplanted at the age of 5 weeks when they were at the three to five leaf stage. Transplanting of the seedlings was done at a spacing of 70 cm × 50 cm, giving 8 seedlings per plot. Routine cultural practices of weeding and pest control were carried out.

Plant height, shoot girth, and number of branches, leaves, nodes/internodes were measured at 6 WAT. For these growth parameters, data were taken from three randomly selected plants and averaged. Also monitored were number of days to 50% flowering and 50% fruiting. Fruit harvest was done three and two times for the progeny and N-fertilizer trials, respectively. The total number of harvested fruits and fruit weight per plot were recorded.

Table 1: Sources of eggplant parents used in the study

S/No.	Parent name	Place of collection in Nigeria	Remarks
1	Ewa	Umudike, Abia State	Small round light green fruits
2	Iyoyo	Umudike, Abia State	Small round light green fruits
3	Kaduna3 (K3)	Kaduna, Kaduna State	Big round white fruits
4	Ogbojioroke	Umudike, Abia State	Tiny round dark fruits
5	Uyo	Uyo, Akwa Ibom State	Medium round deep green fruits
6	Yalo	Nsukka, Enugu State	Big and green stripe fruits

Statistical analysis

Data were subjected to one-way analysis of variance (ANOVA) to test for differences among varieties, while to two-way ANOVA for the effects of urea dose and dosing option on eggplant using the software GenStat Discovery Edition 4 (VSN International Ltd., Hemel Hempstead, UK). Significantly ($P \leq 0.05$) different means were separated using unprotected Fishers least significant difference (LSD) test.

Results and discussion

Evaluation of all 19 entries of the study

Plant growth traits of the 19 varieties of *S. melongena* at 6 WAT are shown in Table 2. All the growth traits differed among the varieties, indicating great variability among them. Kaduna3 (K3) was the shortest and had the narrowest shoot girth and the fewest leaves and nodes, and was also among those with the fewest branches and internodes. The variety K3 could, therefore, be said to be the worst in terms of growth attributes among the 19 varieties. Iyoyo was the tallest, while Ewa, Uyo × Iyoyo (BC_2P_1), and Yalo × K3 (F_4) showed the widest shoot girth. Ogbojioroke showed the highest number of leaves and number of branches. Iyoyo, Ogbojioroke, and Uyo had the highest numbers of nodes and internodes. Thus, Ogbojioroke out-performed most of the other varieties in terms of all the growth traits evaluated at 6 WAT.

Table 3 shows the number of days to attain 50% flowering and 50% fruiting as well as number of fruits per plant and fresh fruit yield of the 19 varieties. Uyo and Ogbojioroke took the shortest time to attain 50% flowering, whereas K3 × Iyoyo (F_4) and Uyo × Iyoyo (F_4) took the longest time to attain the same status. Ogbojioroke and K3 × Iyoyo (F_4) took the shortest and the longest time to attain 50% fruiting, respectively. Ogbojioroke had the highest number of fruits per plot which was different from the rest; K3 had the lowest. Notably, Ogbojioroke had over 13 times as many fruits as the others. However, the highest fresh fruit weight per plot was recorded in K3 × Iyoyo (BC_2P_1), and the values were similar to Uyo × Iyoyo (BC_2P_1), Yalo × K3 (F_4) and Ogbojioroke. The impressive growth attributes of Ogbojioroke, coupled with its ability for early flowering and fruiting and for fruit proliferation compared to others, show that it is genetically superior to these other varieties in this environment. One would expect this parental variety of eggplant to give the highest fruit weight (fruit yield), and not just making the list of the four varieties with the highest fresh fruit yield, an observation attributable to the small size of its fruits (Plate 1).

An insight into the implication of the small size of Ogbojioroke fruits is given by the ratio of fruit weight to number of fruits. Though this variety had similar fruit weight per plot as K3 × Iyoyo (BC_2P_1) with the highest values, it had the lowest weight-number ratio of 0.58 when compared with the other varieties. The small size of Ogbojioroke fruits is, therefore, an unwanted genetic attribute of the variety. However, its fruit proliferation attribute could be harnessed in crossing with contrasting varieties for improvement in eggplant.

Plate 1: Selected fresh fruits of the variety Ogbojioroke showing the tiny nature of its fruits

Table 2: Growing attributes of the 19 varieties of *S. melongena* 6 weeks after transplanting

Variety	Plant height (cm)	Shoot girth (cm)	Number of leaves	Number of branches	Number of nodes	Number of internodes
Ewa	34.7	2.1	31.3	7.2	23.0	22.0
Iyoyo	39.0	1.7	43.7	12.5	29.3	28.3
K3	8.1	0.6	13.7	3.0	6.0	5.7
Ogbojioroke	37.5	1.9	79.7	19.2	29.0	28.0
Uyo	33.2	1.8	44.7	11.1	28.3	27.3
K3 × Iyoyo (BC_2P_1)	36.9	1.9	33.3	7.1	19.3	18.3
K3 × Iyoyo (BC_2P_2)	31.6	1.5	53.0	10.0	23.3	22.3
K3 × Iyoyo (F_3)	33.9	1.7	38.0	7.1	17.0	16.0
K3 × Iyoyo (F_4)	24.6	1.9	25.3	3.3	9.7	8.7
Uyo × Iyoyo (BC_2P_1)	27.2	2.1	29.3	7.1	16.3	15.3
Uyo × Iyoyo (BC_2P_2)	35.1	1.7	54.7	11.7	25.3	24.3
Uyo × Iyoyo (F_4)	27.7	1.6	29.0	5.2	12.7	11.7
Yalo × Iyoyo (BC_2P_2)	38.1	1.7	51.7	10.6	21.7	20.7
Yalo × Iyoyo (F_3)	32.1	1.9	35.0	9.4	25.7	24.7
Yalo × Iyoyo (F_4)	27.4	1.8	32.0	7.2	14.3	13.3
Yalo × K3 (BC_2P_1)	21.8	1.8	24.0	2.9	6.0	5.0
Yalo × K3 (BC_2P_2)	26.0	1.6	17.7	2.3	9.3	8.3
Yalo × K3 (F_3)	23.9	1.7	21.0	3.7	10.0	9.0
Yalo × K3 (F_4)	27.3	2.1	26.3	6.5	14.0	13.0
$LSD_{(0.05)}$	9.17	0.62	17.42	3.87	10.75	10.66

Table 3: Flowing, fruiting and fruit yield attributes of the 19 varieties of *S. melongena*

Variety	Days to 50% flowering	Days to 50% fruiting	Number of fruits per plot	Fresh fruit weight per plot† (g)	Weight-number ratio‡
Ewa	71.3	85.3	45.7	504.0 (1.68)	11.03
Iyoyo	70.3	83.0	123.3	576.0 (1.92)	4.67
K3	80.7	91.0	1.3	11.3 (0.04)	8.69
Ogbojioroke	69.0	76.7	1716.0	987.0 (3.29)	0.58
Uyo	68.0	85.0	43.3	624.0 (2.08)	14.41
K3 × Iyoyo (BC_2P_1)	78.7	89.3	44.0	1205.0 (4.02)	27.39
K3 × Iyoyo (BC_2P_2)	70.3	81.3	132.0	557.0 (1.86)	4.22
K3 × Iyoyo (F_3)	72.3	83.0	67.7	824.0 (2.75)	12.17
K3 × Iyoyo (F_4)	89.3	105.7	8.0	215.0 (0.72)	26.88
Uyo × Iyoyo (BC_2P_1)	70.7	82.3	40.0	1046.0 (3.49)	26.15
Uyo × Iyoyo (BC_2P_2)	70.7	84.0	76.0	629.0 (2.10)	8.28
Uyo × Iyoyo (F_4)	90.3	94.7	11.0	178.0 (0.59)	16.18
Yalo × Iyoyo (BC_2P_2)	79.7	90.7	50.7	620.0 (2.07)	12.23
Yalo × Iyoyo (F_3)	82.3	92.0	31.7	616.0 (2.05)	19.43
Yalo × Iyoyo (F_4)	82.7	89.3	35.0	729.0 (2.43)	20.83
Yalo × K3 (BC_2P_1)	84.0	94.7	4.3	413.0 (1.38)	96.05
Yalo × K3 (BC_2P_2)	78.0	90.3	7.7	288.0 (0.96)	37.40
Yalo × K3 (F_3)	79.3	86.0	12.3	574.0 (1.91)	46.67
Yalo × K3 (F_4)	86.3	94.7	27.0	1027.0 (3.42)	38.04
$LSD_{(0.05)}$	8.7	7.2	64.1	442.1 (1.47)	

†Numbers in parenthesis represent the equivalent fruit yield on a per hectare basis, i.e., fresh fruit yield in t/ha.
‡The ratio of fruit weight per plot to the number of fruits per plot, translating into mean-weight per fruit

Plate 2: Selected fresh fruit of the *S. melongena* hybrid, Yalo × K3 (BC_2P_1), used for the N-fertilizer trial

Evaluation of the hybrid Yalo x K3 (BC_2P_1) under N dosages (doses and dosing options)

The hybrid Yalo × K3 (BC_2P_1) was selected from among the 19 contrasting varieties for the N-fertilizer trial despite its low yields because of its short height as evident at 6 WAT, highest mean-weight per fruit of 96.05, and high market value (Plate 2). Its low yield is attributed to its large-sized fruits that take a longer time to mature and harvesting it at the same time as others might have inhibited formation of extra fruits.

Main effects of N dose and dosing option

The main effects of N dose and dosing option on the growth traits of the eggplant hybrid Yalo × K3 (BC_2P_1), as assessed at 6 WAT, were not evident; the only exception was number of nodes per plant values of which differed among 150 and 100 kg ha^{-1} (72.50 and 69.83, respectively), 50 kg ha^{-1} (49.39) and 0 kg ha^{-1} (39.39). Its values were also higher due to half-split dosing (60.89) compared to single dosing (54.67).

Urea dose affected number of days to 50% flowering; the time was longer for plants that received 0 kg ha^{-1} (78.17 days) compared to 50 and 150 kg ha^{-1} (70.25 days) which in turn was longer compared to 100 kg ha^{-1} (63.78 days). Urea dose also affected number of days to 50% fruiting; plants that received 0, 50, 100 and 150 kg ha^{-1} attained this status in 89.83, 84.67, 75.61 and 81.50 days, respectively (LSD = 5.73). Dosing option affected neither of these flowering and fruiting time parameters.

Treatment effects on the number of fruits and fruit weight per plot of the eggplant hybrid manifested better when 1st and 2nd harvest data were analysed separately, showing that both urea dose and dosing option affected these fruiting parameters of the crop (Table 4). At both harvest events the number of fruits and fruit weight per plot decreased in the order of urea application 100 or 150 > 50 > 0 kg ha^{-1}. Single dosing out-performed half-split dosing at the 1st harvest and vice versa at the 2nd. When comparing the effect of dosing option discretely for all three doses of urea (excluding the control), half-split dosing consistently yielded higher than single dosing at the 2nd harvest. Again, total fresh fruit yield tended to mirror the 2nd harvest fruit weight data.

Regardless of the urea dosing option adopted, the crucial role of N-fertilizers in increasing the productivity of eggplants as represented by Yalo × K3 (BC_2P_1) on low-fertility, coarse-textured tropical soils was evident in this study. Considering that the yield responses of eggplant to N-fertilizers could be cultivar-specific (Bobadi and Van Damme 2003), the selection of Yalo × K3 (BC_2P_1) for the study could be said to be appropriate.

Shortage of N reduces photosynthetic leaf area and crop yields (Sreewarome et al. 2007). In the present study, 100 kg urea ha^{-1} was the optimum dose for enhancing growth parameters of this promising variety of eggplant. Plants that received 100 kg urea ha^{-1} flowered earlier and had earlier fruit setting compared to those that received 150 kg urea ha^{-1}. Also, fruit yield declined when the dose increased from 100 to 150 kg urea ha^{-1}. One likely reason for this situation is N-induced nutrient imbalance leading to reduced uptake of other nutrients.

There are similar reports of increased flowering in eggplant due to N-fertilizers and decreased flowering and fruiting rates when the fertilizers are in excess (Sat and Saimbhi 2003; Sharma and Brar 2008; Umar and Momoh 2015).

Pal et al. (2002) reported that, in a coarse-textured tropical soil, eggplant fruit yield increased with N up to 187.50 kg N ha^{-1}. For the sandy-loam, well-drained soil of the present study, we attained optimum results with 46 kg N ha^{-1} as supplied by 100 kg urea ha^{-1}. This is within the N-fertilizer range of 70 - 285 kg ha^{-1} reported to increase vegetative growth and fruit yield of eggplant in Egypt (Abd Allah et al. 2001). Fruit yield of eggplant normally peaks with N-fertilizer rate in the range of 50 - 400 kg ha^{-1} depending on the cultivar (Bobadi and Van Damme 2003). The rather low optimum dose here (100 kg urea ha^{-1}) suggests that soil type and humidity could also influence this optimum dose. As a hint, the status of total N in humid tropical environments tends to decrease with soil coarseness and with increasing humidity (Obalum et al. 2012b, 2014).

Single dosing out-yielded half-splitting at the 1st but not the 2nd harvest when the reverse occurred. Perhaps eggplant N uptake peaks during early and mass fruiting (Doikova 1979). Split dosing of N has been suggested for coarse-textured soils (Obalum et al. 2012b), and specifically for eggplant (SSCA 2017). In our study, half-split dosing out-yielded single dosing, indicating improved nutrient use efficiency with the former. The data suggest that half-splitting promotes N retention in the soil against leaching, thus offering N more precisely to the crop to enhance vegetative growth and fruit yield. These results were due partly to the high humidity in the study area, and partly to the well-drained attribute of the soil.

Table 4: Main effects of N-fertilizer (urea) dose and dosing option on number of fruits and fresh fruit weight per plot of the hybrid Yalo × K3 (BC_2P_1)

Urea dose (kg ha^{-1})	1st harvest: Number of fruits per plot	1st harvest: Fresh fruit weight per plot† (g)	2nd harvest: Number of fruits per plot	2nd harvest: Fresh fruit weight per plot† (g)	Total fresh fruit yield (t ha^{-1})
0	3.0	439.7 (1.47)	3.0	434.0 (1.45)	2.91
50	10.0	1536.5 (5.12)	9.0	1526.0 (5.09)	10.21
100	16.0	2728.3 (9.09)	16.0	2691.0 (8.97)	18.06
150	17.0	2653.0 (8.84)	14.0	2428.0 (8.09)	16.84
$LSD_{(0.05)}$	4.3	578.0	3.2	471.5 (1.57)	1.70
Dosing option					
Single	13.0	2050.7 (6.84)	9.0	1467.0 (4.89)	11.68
Half-split	10.0	1628.1 (5.43)	12.0	2072.0 (6.91)	12.33
$LSD_{(0.05)}$	3.0	408.7	2.2	333.4	ns

†Values in parenthesis represent the equivalent fruit yield on a per hectare basis, i.e., fresh fruit yield in t ha^{-1}.

Interaction effects of N dose and dosing option

The interaction effects of urea dose and dosing option on all the growth traits of the hybrid Yalo × K3 (BC_2P_1) at 6 WAT were consistently non-significant. Similarly, there were no interactions for number of days to 50% flowering and number of days to 50% fruiting of Yalo × K3 (BC_2P_1).

Although treatment effects on number of fruits and fruit weight per plot manifested better when 1st and 2nd harvest data were analysed separately, there were no interactions between urea dose and dosing option for these fruiting parameters, except for fresh fruit weight per plot at the 2nd harvest (Table 5).

Application of 100 or 150 kg ha^{-1} by half-splitting gave the highest fruit weight per plot, while non-application (control) gave the lowest values. At this 2nd harvest, number of fruits per plot tended to follow the same trend as fresh fruit weight per plot. Notably, fruit weight and number of fruits per plot at the 1st harvest tended to be highest with 100 and 150 kg ha^{-1} by single dosing while still showing lowest values due to the control. However, total fresh fruit yield tended to mirror the 2nd harvest fruit weight data.

Table 5: Interaction effects of N-fertilizer (urea) dose and dosing option on number of fruits and fresh fruit weight per plot of the eggplant hybrid Yalo × K3 (BC_2P_1)

Treatments	1st harvest		2nd harvest		Total fresh fruit yield (t ha^{-1})
	Number of fruits per plot	Fresh fruit weight per plot† (g)	Number of fruits per plot	Fresh fruit weight per plot† (g)	
0-single	3.0	511.8 (1.71)	3.0	481.0 (1.60)	3.31
50-single	12.0	1670.8 (5.57)	8.0	1369.0 (4.56)	10.14
100-single	19.0	3162.2 (10.54)	14.0	2070.0 (6.90)	17.44
150-single	18.0	2857.9 (9.53)	11.0	1949.0 (6.50)	15.83
0-half-split	2.0	367.5 (1.23)	2.0	386.0 (1.29)	2.51
50-half-split	9.0	1402.3 (4.67)	10.0	1684.0 (5.61)	10.29
100-half-split	13.0	2294.4 (7.65)	19.0	3312.0 (11.04)	18.69
150-half-split	16.0	2448.1 (8.16)	16.0	2908.0 (9.69)	17.85
$LSD_{(0.05)}$	ns	ns	ns	666.90	ns

†Values in parenthesis represent the equivalent fruit yield on a per hectare basis, i.e., fresh fruit yield in t ha^{-1}.

Conclusion

The agronomic data attained from the trial conducted with the 19 entries of eggplant including five parental varieties and 14 of their hybrid progenies, showed that they varied in growth, flowering, fruiting, and yield indices. The variety Ogbojioroke out-performed most of the other entries in these indices, a manifestation of its genetic qualities and suitability for use in improvement programmes. Furthermore, both the amount and the fraction of N-fertilizers to apply at a time are factors in the production of short but fruity varieties of eggplants on coarse-textured and well-drained and hence highly leached soils in humid tropical environments. Urea fertilizers should not be applied beyond 100 kg ha^{-1}, and should be half-split into two equal doses. This practice ensures optimum eggplant yields while guarding against fertilizer wastage due to unguided choice of dose and dosing option and associated negative effects on the environment.

Conflict of Interest

The authors declare no conflict of interest.

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