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INFLUENCE OF VARIETIES ON THE PERFORMANCE OF CUCUMBER (*Cucumis sativus* L.) IN MUBI ADAMAWA STATE, NIGERIA

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Abstract

A field experiment was conducted during the 2025 cropping season at the FAO/TCP Teaching and Research Farm, Adamawa State University, Mubi, to evaluate the performance of three cucumber [Cucumis sativus (L.) varieties Dasher II, Vietnam, and Persian—under rain-fed conditions. The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. Results showed significant varietal differences in vegetative growth and flowering behavior. Dasher II recorded the tallest plants at 3, 6, and 9 WAS with mean

Key: Influence, cucumber, Performance, varieties and Mubi

Introduction

Cucumber [(*Cucumis sativus* (L.)] is an important vegetable crop cultivated across tropical, subtropical, and temperate regions of the world. It is believed to have been originated in India and has since spread globally due to its adaptability and multiple uses (Nath, *et al*, 2014). Cucumber is valued for its refreshing taste, low-calorie content, and richness in vitamins A, C, and K, as well as minerals like potassium and magnesium (Singh, *et al*, 2016). The fruit is consumed in salads, pickled, or used as an ingredient in various culinary preparations. Globally, cucumber is ranked fourth among the most important vegetable crops in terms of production, after tomato, cabbage, and onion (FAO, 2020). In Nigeria, cucumber production is gaining momentum due to increasing awareness of its nutritional and economic benefits. It is now commonly grown by

heights of 8.80 cm, 38.30 cm, and 61.65 cm, respectively, while Persian had the shortest (6.03 cm, 24.50 cm, and 47.81 cm). Leaf number differed slightly, with Vietnam having the highest leaves at 6 and 9 WAS (22.93 and 46.27, respectively). Vietnam flowered earliest with 35.66 days to first flowering and 42.66 days to 50% flowering, compared to Dasher II which flowered last (44.33 and 49.00 days, respectively). In yield attributes, Dasher II produced significantly the longest fruit (21.63 cm), while Vietnam had the highest fruit diameter (62.83 mm), fruits per plant (9.66), and fruit yield (3.33 kg/plant) though these were not statistically significant. Persian consistently recorded the lowest yield values. The study revealed that Vietnam was superior in earliness and yield traits, while Dasher II excelled in vegetative growth and fruit length. Persian performed the least across most parameters.

both commercial and subsistence farmers, especially in urban and peri-urban areas, where there is a ready market. One of the major factors influencing the success of cucumber production is the choice of variety. Varietal differences in cucumber are expressed in traits such as growth habit, fruit size and shape, time to maturity, disease resistance, and overall yield potential (Peter, *et al*, 2013). The availability of improved varieties has significantly contributed to increased yields and better adaptability to different growing environments. The varieties *Dasher II*, *Vietnam*, and *Persian* represent diverse genotypes with differing morphological and physiological characteristics. *Dasher II* is a hybrid slicing type that produces dark green, cylindrical fruits with good shelf life and disease resistance (Ibrahim, *et al*, 2017). It is widely grown in commercial settings. *Vietnam* cucumber, known for its slender fruits and fast maturity, is often used for fresh consumption due to its mild flavor and soft skin. *Persian* cucumber is a parthenocarpic (self-fruitful) variety with a crisp texture and is widely appreciated in both local and export markets for its seedless, tender fruit (Ahmed, *et al*, 2018).

Cucumber (*Cucumis sativus* (L.) is a warm-season crop that thrives best in regions with moderate to high temperatures, ample sunlight, and well-distributed rainfall. It is highly sensitive to frost and extreme temperatures, making climate an essential factor in successful cultivation (Nath, *et al*, 2014). The optimal temperature range for cucumber growth is between 25°C and 30°C during the day and 18°C to 21°C at night (Peter, *et al*, 2013). Temperatures below 15°C or above 35°C can adversely affect germination, flowering, and fruit development. Cucumber performs best in full sunlight, as inadequate light can lead to poor flowering, delayed fruit set, and reduced yield. According to Singh, *et al*, (2016), the crop requires at least 6 to 8 hours of direct sunlight per day to support optimal photosynthetic activity and proper fruit development. Rainfall is another critical climatic factor for cucumber production. The crop requires a moderate and evenly distributed rainfall ranging from 500 mm to 1000 mm throughout the growing season (Ado, *et al*, 2015). Excessive or poorly distributed rainfall can cause waterlogging, leading to root rot and other fungal diseases, while insufficient moisture during flowering and fruiting stages may reduce yield. Humidity plays a role in disease development, especially fungal infections such as downy mildew and powdery mildew. High relative humidity above 80% can encourage the growth and spread of these diseases, particularly in poorly

ventilated environments (Ahmed, *et al*, 2018). Conversely, excessively dry conditions can lead to poor pollination and fruit abortion. Wind is another climatic element that can affect cucumber production. Strong winds can damage vines and flowers, leading to poor fruit set and increased water loss through transpiration. As such, windbreaks or protective structures are sometimes used in open-field cultivation to minimize damage (Ibrahim, *et al*, 2017). For optimal growth and fruiting, cucumber requires a growing period free from frost, preferably during the late dry season or early rainy season in tropical regions like Nigeria. According to Chukwu, *et al*, (2020), choosing the right planting date and aligning it with favorable weather patterns is essential to maximize yield and minimize losses due to climatic stresses.

With the increasing demand for cucumber, especially in urban markets and health-conscious populations, there is a growing need to identify the best-performing varieties suited to local agro-ecological zones. Cucumber farmers often face challenges related to inconsistent yields, susceptibility to pests and diseases, and lack of knowledge about appropriate varieties for specific environments (Chukwu, *et al*, 2020). Therefore, evaluating and comparing the performance of multiple cucumber varieties is essential to guide production decisions and enhance yield efficiency. This study, therefore, seeks to examine the performance of three selected cucumber varieties (*Dasher II*, *Vietnam*, and *Persian*) in terms of their vegetative growth, flowering and fruiting characteristics, and yield potential under the same field conditions. Understanding how these varieties perform can contribute to the development of best practices for cucumber cultivation and provide insights for breeders and extension agents to support farmer adoption of superior genotypes. The study was aimed at assessing the influence of cucumber varieties on growth and yield.

MATERIALS AND METHODS

Field experiment was conducted at the Department of Crop Science, Teaching and Research farm, Food and Agricultural Organization/Tree Crop Program (FAO/TCP) farm, Adamawa State University Mubi, Nigeria under rain fed condition in 2025 cropping season. Mubi located in the Northern Guinea Savannah of Nigeria is situated between latitude 10 ° 11" and 10 ° 30" North of the equator and between longitude 13 ° 10" and 13 ° 30" East of the Greenwich meridian and at altitude of 969 m above mean sea level (MSL). (Adebayo *et al.,* 2012 and 2021). ADSU Metrological station, (2024), however according to Adamawa State University Meteorological Station, Mubi has an average annual rainfall **of 579 mm,** relative humidity varies between **50% and 80%** and annual temperature is **27°C**.

Experimental Materials

Three cucumbers [*Cucumis sativus* (L.)] varieties were used for the study:

1. **Dasher II** (an improved hybrid known for early maturity),
2. **Vietnam** (noted for its resistance to pests attack and uniform fruiting), and
3. **Persian** (a vigorous, high-yielding variety with long fruits).

Experimental Design and Treatments

The experiment was laid out in a **Randomized Complete Block Design (RCBD)** with three (3) replications. The treatments consist of the three cucumber varieties: Dasher II, Vietnam, and Persian, each plot measured 3 m × 2 m with a spacing of 1 m between plots and 1.5 m between replicates. A spacing of 60 cm × 45 cm was used for sowing to accommodate good canopy development (Okunlola and Adebayo, 2015). See Figure 3.1.

Cultural Practices

Land was manually cleared and tilled using local tools. Beds were raised for each plot. No chemical fertilizer was used to minimize external influences on varietal performance, in line with methods used. Weeding was done manually at two-week intervals and insecticide was used when and where necessary.

Seed Sowing

Two seeds were sown per hole at a depth of 2–3 cm and later thinned to one seedling per stand at 10 days after emergence.

Data Collection

Data was collected from five randomly selected plants per plot, and the following parameters was measured:

Growth Parameters

1. **Plant Height (cm):** was measured at 3, 6 and 9 WAS from the soil surface to the apical bud using a meter rule from five randomly selected plant and mean was calculated and recorded.
2. **Number of Leaves/Plant:** was counted at 3, 6 and 9 WAS from five randomly selected plant and mean was calculated and recorded.

Phonological Parameters

1. **Days to 1st Flowering:** was recorded by number of days.
2. **Days to 50% Flowering:** was recorded by number of days from planting to the appearance of flowers on 50% of the plants.

Yield and Yield Attributes Characters

1. **Number of Fruits/Plant:** was counted from matured, marketable fruits from five randomly selected plant and mean was calculated and recorded.
2. **Fruit Length (cm):** was measured with a meter rule from harvested fruits from five randomly selected plant and mean was calculated and recorded.
3. **Fruit Diameter (cm):** was taken using a Vernier caliper from five randomly selected plant and mean was calculated and recorded.
4. **Fruit Yield (t/ha):** was calculated based on the total marketable fruit weight and plot area, extrapolated to per hectare.

RESULTS

Influence of Cucumber Varieties on Plant Height (cm) at 3, 6 and 9 WAS, Number of Leaves at 3, 6 and 9 WAS Sowing, Days First Flowering, Days 50% Flowering and Number of Fruit/Plant

The influence of cucumber varieties on plant height at 3, 6, and 9 WAS is presented in (Table 1) and the result showed clear varietal differences, with Dasher II consistently recorded the tallest plants across all stages with mean values of (8.80 cm, 38.30 cm and 61.65 cm respectively), followed by Vietnam with a mean value of (8.13 cm, 34.60 cm and 57.93 cm), while the shortest plants were Persian with a mean value of (6.03 cm, 24.50 cm and 47.81 cm respectively). The differences were statistically significant (P = > 0.05), indicating early growth potential is influenced by varietal genetic traits. (Table 1) also present the influence of cucumber varieties on the number of leaves at 3, 6, and 9 WAS. The result showed no significant difference (P = < 0.05) across all the growing stages. At 3 WAS, Persian had the highest number of leaves with a mean value of (5.80), followed by Vietnam with a mean value of (5.20), while Dasher II recorded the lowest with a mean value of (5.13). At 6 WAS, Vietnam showed superior leaf production with a mean value of (22.93), followed by Persian with a mean value of (18.67) and Dasher II with a mean value of (19.73). At 9 WAS, Vietnam again had the highest number of leaves with a mean value of (46.27), followed by Dasher II with a mean value of (44.40), while Persian recorded 42.00.

The mean performance of the cucumber varieties for days to first flowering (DFF), days to 50% flowering (D50), and number of fruits per plant (NFP) is presented in (Table 1) and Significant differences ($P \leq 0.05$) were observed among the varieties for DFF and D50, while NFP showed no significant variation. For days to first flowering, Vietnam flower first with a mean value of (35.66 days) flowered earliest, followed by Persian with a mean value of (40.66 days), while Dasher II recorded the latest flowering at with a mean value of 44.33 days. A similar trend was observed for days to 50% flowering, where Vietnam again reached 50% flowering earliest with a mean value of (42.66 days), followed by Persian (46.00 days), and Dasher II with a mean value of (49.00 days). Although differences among varieties for number of fruits per plant were not statistically significant (P = 0.44), Vietnam produced the highest number of fruits with a mean value of (22.66), followed by Dasher II with a mean value of (19.00), while Persian had the lowest fruit number with a mean value of (13.66).

Table 4.1: influence of Cucumber Varieties on Plant Height at 3, 6 and 9 WAS, Number of Leaves at 3, 6 and 9 WAS, Days First Flowering, Days 50% Flowering and Number of Fruit/Plant

Varieties	PH3 (cm)	PH6 (cm)	PH9 (cm)	NL3	NL6	NL9	DFF	D50F	NFP
Dasher II	8.80	38.30	61.65	5.13	19.73	44.40	44.33	49.00	19.00
Vietnam	8.13	34.60	57.93	5.20	22.93	46.27	35.66	42.66	22.66
Persian	6.03	24.50	47.81	5.80	18.67	42.00	40.66	46.00	13.66
P of F	0.04	0.34	0.24	0.24	0.51	0.35	0.00	0.02	0.44
LSD	0.87	8.92	7.42	0.38	3.60	2.68	0.94	1.65	6.59

Key: PH = Plant height, NL = number of leaves, DFF = Days first flowering, D50F = Days to 50 % flowering and NFP = Number of fruit/plant

Influence of Cucumber Varieties on Growth Fruit Length, Fruit Diameter, Fruit Yield

The performance of the cucumber varieties for fruit length, fruit diameter, fruits per plant, and fruit yield is presented in Table (2). Significant differences ($P \leq 0.05$) were observed only for fruit length, while fruit diameter, number of fruits per plant, and fruit yield showed no statistically significant variation among the varieties. Dasher II recorded the longest fruits (21.63 cm), significantly higher than Vietnam with a mean value of (15.07 cm) and Persian with a mean value of (14.22 cm). For fruit diameter, Vietnam produced the widest fruits (62.83 mm), followed by Dasher II with a mean value of (58.44 mm) and Persian with a mean value of (56.52 mm). Vietnam also had the highest fruits per plant (9.66) and the highest fruit yield with a mean value of (3.33 kg/plant), while Persian recorded the lowest values for both traits with a mean value of (6.00 mm and 1.67 mm respectively).

Table 4.2: Influence of Cucumber Varieties on Growth Fruit Length, Fruit Diameter, Fruit Yield

Varieties	FL (cm)	FD (mm)	FPP	FY (kg)
Dasher II	21.63	58.44	8.00	2.66
Vietnam	15.07	62.83	9.66	3.33
Persian	14.22	56.52	6.00	1.76
P of F	0.00	0.11	0.42	0.39
LSD	0.81	2.54	2.59	1.06

Key: FL = Fruit length, FD = Fruit diameter, FPP = Fruit/plant and FY = Fruit yield

DISCUSSION

The results indicates that Dasher II possesses faster vegetative growth, which may be attributed to higher genetic vigor and early canopy development, enhancing light capture and nutrient assimilation (Olaniyi *et al*., 2017). The observed progressive increase in plant height across all varieties is consistent with normal cucurbit growth patterns, where rapid vegetative elongation occurs in early to mid-growth stages before flowering (Akinbile *et al*., 2019). The slightly lower height in Persian variety may reflect inherent genetic differences in stem elongation and internode length, highlighting the importance of variety selection for optimal plant architecture in cucumber production.

The trends indicate that Vietnam and Dasher II varieties have strong mid- to late-season leaf expansion, which may enhance photosynthetic capacity and overall biomass accumulation, while Persian exhibits faster initial leaf emergence but slower late-season growth. These findings are consistent with reports that varietal genetics strongly influence leaf initiation rate and leaf area expansion, which are key determinants of vegetative vigor in cucumbers (Olowe *et al*., 2018; Ibrahim and Afolayan, 2020). The

steady increase in leaf number across all varieties reflects normal cucumber vegetative development, with leaves being produced sequentially at the apical meristem over the growth period.

The significant variation observed in days to first and 50% flowering among the cucumber varieties indicates clear genetic differences in their growth and reproductive behavior, a pattern widely reported in cucurbit breeding studies (Haque and Rahman, 2016). Vietnam consistently exhibited the earliest flowering, suggesting a shorter vegetative phase and faster shift to the reproductive stage. Early flowering has been associated with enhanced adaptability and earlier marketable yields, which is particularly beneficial in regions with shorter growing seasons (Khan *et al*., 2018). Dasher II, which showed the latest flowering in both DFF and D50, reflects a comparatively slower physiological development rate. Similar findings have been noted in late-maturing cucumber genotypes that require a longer period to attain reproductive readiness (Singh and Verma, 2020). Persian, which displayed intermediate flowering times, aligns with reports of moderately early-flowering cucumber types commonly found in semi-temperate environments (Adeniji *et al*., 2017). Although the differences in number of fruits per plant were statistically non-significant, the numerical superiority of Vietnam suggests that early flowering may favor fruit set and overall yield potential. Earlier flowering has been linked to more synchronized pollination and extended fruiting windows (Olanrewaju and Fagbayide, 2019). Conversely, the lower fruit production in Persian may be due to its slower flowering behavior or genotype-specific physiological constraints, as previously reported in late or intermediate cucumber varieties (Choudhary *et al*., 2015).

The significant variation among the cucumber varieties for fruit length suggests strong genetic influence on fruit elongation characteristics, a trend commonly reported in cucurbit germplasm evaluations (Haque and Rahman, 2016). Dasher II produced the longest fruits, indicating that it possesses superior genetic potential for elongated fruit types, which aligns with earlier findings highlighting variability in fruit morphology among improved cucumber hybrids (Adeniji *et al*., 2017). Although fruit diameter is statistically significant among the varieties, the numerical advantage of Vietnam suggests a tendency toward thicker fruits. This may be linked to varietal differences in sink strength and fruit wall development, traits previously associated with higher consumer preference in local markets (Khan *et al*., 2018). The non-significant differences in fruits per plant and fruit yield further support reports that yield components in cucumbers tend to show high environmental sensitivity and require larger population sizes to detect significant differences (Singh and Verma, 2020). Vietnam, despite not differing significantly in most traits, showed higher numerical performance for fruit diameter, fruits per plant, and overall yield. This pattern agrees with studies indicating that early and vigorous-flowering varieties often achieve better fruit set and improved yield potential (Olanrewaju and Fagbayide, 2019). Persian, which recorded the lowest values for most yield traits, may possess weaker reproductive efficiency or reduced assimilate partitioning to fruits, as similarly observed in other low-yield cucumber genotypes (Choudhary *et al*., 2015).

CONCLUSION

The experiment demonstrated that cucumber varieties differ significantly in their growth, flowering, and yield performance under the agro-ecological conditions of Mubi. Dasher II showed superior vegetative vigor and fruit length, indicating strong genetic potential for producing long-fruited cucumbers. Vietnam emerged as the best-performing variety in terms of early flowering, fruit diameter, fruits per plant, and overall fruit yield. Persian performed least effectively, making it less suitable for cultivation in the area. Therefore, Vietnam is recommended for farmers targeting early harvest and better fruit yield, while Dasher II is suitable for markets demanding longer fruits.

RECOMMENDATIONS

Based on the study the following recommendations were made:

i. Adoption of Vietnam Variety: Farmers in Mubi and similar agro-ecological zones should adopt Vietnam due to its superior yield and early flowering characteristics.
ii. Use of Dasher II for Long-Fruit Markets: Where fruit length is a major market preference, Dasher II is recommended due to its significantly longer fruits.
iii. Further Multi-Location Trials: It is recommended that these varieties be evaluated across multiple locations and seasons to confirm stability of performance.
iv. Soil Fertility and Irrigation Studies: Additional research comparing organic fertilizers, inorganic fertilizers, and irrigation regimes may improve yield potentials further.

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