

PERFORMANCE OF GARDEN CRESS(*Lepidium sativum. L*) ACCESSIONS AS INFLUENCED BY NITROGEN FERTILIZER RATES IN NORTHERN GUINEA SAVANNA OF NIGERIA.

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Abstract

Two experiments were conducted in 2019 and 2020 dry seasons at the Teaching and Research Farm of Samaru College of Agriculture, Ahmadu Bello University Zaria (11° 11' N, 07° 38' E, and 686m above sea level) which is located in the northern Guinea Savanna ecological zone of Nigeria, to determine the best garden cress cultivar suitable to northern guinea savanna and optimum Nitrogen fertilizer rate for better performance of the vegetable. The treatments consisted of two accessions of garden cress (HALIM and EX-JABA) and four level of nitrogen fertilizer (0, 30, 60 and 90 kgNha⁻¹) which factorially combined and laid out in a randomized complete block design. The treatments were replicated three times. The results obtained indicated HALIM accessions recorded the highest number of leaves plant⁻¹, number of branches plant⁻¹, fresh biomass and dry biomass. The use of 90 kgNha⁻¹ recorded the highest value for the aforementioned growth character and vegetable yield (kg ha⁻¹). It can therefore be concluded that HALIM accessions performed better than EX-JABA in terms of growth characters, while application of 90 kgNha⁻¹ produced the best growth and yield of garden cress.

KEYWORDS: Garden cress, Cultivar, Nitrogen fertilizer, growth and yield characters.

INTRODUCTION

Garden cress (*Lepidium sativum* .L) is a leafy vegetable that belongs to the family Brassicaceae, which include cabbage, turnip, watercress and mustard among others. In Nigeria, the crop is mostly grown in northern part of the country it where is popularly known as Lansir or Lapsur by the natives (Hausa, Fulani, Kanuri and other minor tribes).

Though, the clear origin of garden cress is not known, it is possibly believed to have originated from Northern – East Africa, particularly Iran (Datta *et al.*, 2011; Asfaw and Demissew, 2009).

Ethno-medicinal uses of garden cress leaves include its use as salad, cooked with vegetables, curries and also used as fodder for cattle (Moser *et al.*, 2009; Patel *et al.*, 2009). The leaves are

stimulant, diuretic, used in scorbutic disease and hepatic complaints (Raval and Pandya, 2009). Anon.(1962) indicated that garden cress is one of such food stuff that abounds not only in nutrient but also in health enhancing phytochemicals. This has been the reason why tradition, folklore and indigenous medicine, all advocated garden cress for finding succor from one or the other ailment.

Likewise, in Nigeria, most of household's and vegetable vendors prepare the leaves to be consumed raw in form of salad by mixing it with grinded groundnut cake and salt or sugar and other vegetables (tomato, onion and pepper).

Garden cress being an annual leafy crop, it can virtually grow in all kind of soils and climatic condition except in temperate region of the

world. However, the major constraint in the production of the crop faced by farmers in Nigeria is the continuous usage of local cultivars in which the yield potential is unknown to farmers, coupled with poor storage facilities which is partly responsible for post harvest losses in most perishable horticulture crops garden cress inclusive. Therefore, the use of improved cultivars with shorter duration (in term of seed production) more biomass, better shelf life and a better yield potential could maximize farmers income.

On the other hand, nitrogen fertilizer plays a vital role in enhancing growth and development of vegetable crops generally, which eventually translate to better yield at harvest. Although the excessive or lower application of nitrogen fertilizer is a common agricultural practice observed by most vegetable growers especially in Nigeria affect the performance of garden cress at growth and development stages.

Despite the nutritive value and market potential of the crop to farmers involve in its production and the vendor's. The production of the crop did not spread to most parts of Nigeria probably due to lack of improved seeds suitable to various region of the country and optimum nitrogen fertilizer rate that could improve the yield of garden cress.

It is based on the aforementioned problems that this study was proposed to investigate;

- The best garden cress accessions suitable for northern guinea savanna.
- The optimum nitrogen fertilizer rate for better growth and yield of garden cress.

Materials and Methods

The experiment was conducted in 2019 and 2020 dry seasons at the Teaching and Research Farm of Samaru College of Agriculture, Ahmadu Bello University Zaria (11° 11' N, 07° 38' E, and 686m above sea level) which is located in the Northern

Guinea Savanna zone of Nigeria. The field was cleared and irrigated to soften the soil then harrowed twice and made into sunken beds after which it was marked out into plots. The plot size was 1 x 1m with 0.5 m spacing between the plots and 1m spacing between replications. The gross plot was 1m² and the net plot was 0.5 m². EX-JABA (local) and HALIM (exotic) were the two accessions of garden cress sown using drilling method at 25cm x 10cm (inter and intra row spacing) according to the treatments. The treatments consisted of two accessions of garden cress (HALIM and EX-JABA) and four levels of nitrogen fertilizer (0, 30, 60, and 90 kg N ha⁻¹) which were factorially combined and laid out in a randomized complete block design (RCBD). The treatments were replicated thrice. Five plants were randomly selected and tagged from the net plot for periodic observation. Data on number of leaves and number of branches plant⁻¹ were observed and recorded. Fresh biomass was determined by weighing the whole fresh plant using an electronic mettler balance (E2000) while the dry biomass was determined by weighing the whole dried plant after being oven dried to a constant weight. Vegetable yield was collected after harvesting all the plants from each of the net plot (the soil particles that cling to the plant was removed) and weighed using E2000 electronic mettler balance. The values obtained were converted to kg ha⁻¹ and recorded. The data collected were subjected to Analysis of Variance (ANOVA) using General Linear Model (GLM) of the Statistical Analysis System package (SAS, 2004) and the means were separated using the Duncan's Multiple Range Test (5% probability level) Duncan (1955).

Results

The response of garden cress accessions to nitrogen fertilizer rates on number of leaves plant⁻¹, number of branches plant⁻¹, fresh biomass, dry biomass and vegetable yield (kg ha⁻¹) during 2019 and 2020 dry season at Samaru is presented in Table 1. HALIM garden cress accessions significantly produced higher, number of

leaves plant⁻¹, number of branches plant⁻¹, fresh biomass and dry biomass than EX-JABA in the year 2020. In 2019 accession had no significant effect on the growth characters and yield of the lines of the vegetable. Application of 90 kgNha⁻¹ significantly produced the highest number of leaves plant⁻¹, number of branches plant⁻¹, fresh biomass, dry biomass and vegetable yield (kg ha⁻¹) while the least growth and yield of the vegetable were recorded from the control. In 2020, HALIM produced significantly more leaves, higher fresh biomass and dry biomass than EX-JABA while the accession had no significant effect on the number of branches per plants, highest dry biomass and vegetable yield. While the application of 60 kg N ha⁻¹ which is significantly at par with 90 kg N ha⁻¹ produced significantly highest number of branches per plant and fresh biomass. **Discussions**

The values recorded from HALIM garden cress accessions supersede that of EX-JABA in terms of number of leaves plant⁻¹, number of branches plant⁻¹, fresh and dry biomass. This could be attributed to more branching pattern that is genetically peculiar to HALIM accessions which assist in optimum solar radiation reception efficient photosynthesis, production of more assimilate for physiological functions. Abey *et al.* (2002) opined that different crop varieties possess varying genotypic and phenotypic traits which probably led to the differences in growth characters even though the varieties were grown under the same environmental condition. This is also in line with the findings of Abubakar *et al.* (2017) who reported that characteristic of SUPER LONGO 2000 and MAXIMUS varieties was due to their genetic makeup that made them response differently to the same environmental condition. Also in a research work on radish varieties conducted by Abdullahi and AbdulMutulib (2016) reported that climatic condition and soil type of the experimental site at

the time of the trial plays a vital role in this varietal disparity.

Among the major essential nutrient require by the plant for their normal growth, development and yield, the role of nitrogen is essential component of protein, nucleic acids, chlorophyll and many important enzymes (Singh *et al.*, 2003). According to Chen *et al.* (2004) nitrogen is very essential for the growth of leafy crops. The application of nitrogen consistently produced the highest growth and yield. This could be due to the significant role the nitrogen played in photosynthesis for the production of assimilate which was used for maintenance and production of growth characters and yield.

Therefore, plots under the application of 90 kgNha⁻¹ performed better in term of growth and yield attributes because the fertilizer was adequately applied, even through most of the fertilizer consumed by weed did not affect the performance of the plant compared to the other rates. This is in line with the finding of Umar *et al.* (2017) who stated that NPK fertilizer, generally, has its most profound influence on the vegetative development of crops. When supplied in adequate quantity ensures healthy plant growth which is manifested by the increased vigor, size and deeper green colour of the foliage.

Conclusion

This study revealed that HALIM accessions performed better than EX-JABA in terms of growth characters. While application of 90 kgNha⁻¹ produced the best growth and yield characters of garden cress, hence the above findings are recommended as good agronomic practices for the production of garden cress especially in northern guinea savanna zone of Nigeria.

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