**Journal of Agriculture, Environmental Resources and Management**
ISSN2245-1800(paper) ISSN 2245-2943(online)
8(4)1-800; **April** .2026; pp45- 55
www.saerem.com

# Impact of Priming Methods on Growth and Seed Yield of Maize in Umudike, Abia State

**[1]Okoronkwo. C. M., [2]Ofor, M. O., [2]Anyanwu, C. P. and [2]Dialoke, S. A.**

[1]Department of Crop and Horticultural Sciences, Michael Okpara University of Agriculture, Umudike, Abia State. [2]Department of Crop Science and Technology, Federal University of Technology, Owerri, Imo State.
Corresponding author's email: nonomaduchris@gmail.com

**Abstract**

*Experiment was conducted at the research farm of Michael Okpara University of Agriculture, Umudike in 2023 and 2024 early planting seasons to study the impact of priming methods (hydropriming, halopriming, osmopriming, hormopriming and unprimed) on growth and seed yield of five maize varieties in field conditions. Treatment combinations were laid out in 5 x 5 factorial arrangements in randomized complete block design replicated thrice. Data obtained were subjected to a two-way ANOVA and significant means were separated using LSD at $p < 0.05$. Impact of priming method showed significant influence on plant girth at 6 and 12 WAP (2023), 3, 9 and 12 WAP (2024); leaf area at 6 WAP (2023); plant height at 3 and 9 WAP (2023), 6 WAP (2024); tassel length (2023); 1000 seed weight, number of cobs/plant, cob girth, cob length, seed weight/cob, number of rows/cob and number of seeds/cob in 2024 respectively; seed yield t/h and fresh ear weight/plot/ear in both years. Hormopriming and osmopriming produced maximum number of seeds/plot and 1000 seed weight in 2024; seed weight/cob, cob girth, seed yield t/ha, fresh ear weight/plot in both years, longest plant girth, broadest leaves (2023), longest plant (both years)and tassel length (2023). Bende white had the highest seed yield t/ha followed by Oba super 6. Glycerol followed by cytokinin had more impact on growth of maize while cytokinin followed by glycerol had more impact on seed yield than other priming methods in field conditions.*

**Key words: Maize, priming methods, growth, seed yield, variety**

**Introduction:** Maize ranks the third most important cereal under global cultivation following wheat and rice (Zalama and Kishk, 2017; Tian *et al.,* 2014). Its genetic plasticity has made it the most widely cultivated crop as well as one of the dominant cereal crops in the country from the wet evergreen climate of the forest zone to the dry ecology of the Sudan savanna (Kamara *et al*., 2020). Savanna regions of Africa have the comparative advantage and the greatest potential of its productivity due to lower incidence of pest and diseases, and higher solar radiation (Udensi and Omovbude, 2018). Nigeria is among the top ten (10) maize producers in Africa (FAOSTAT, 2014) and smallholder farmers are the major producers, each cultivating an average of 0.65ha (Anon, 2017). According to FAO (2025) about 16.3 million metric tons of maize was produced in 2025, making Nigeria the currently highest producer of maize in Africa. Maize is an important staple food used in sustaining human life or feed for livestock as well as industrial raw materials (kumari *et al*., 2017). Its grain is a rich source of starch (72%), vitamins A and B (3 – 5%), proteins (10%), oil content (4.8%), fiber (5.8 %), sugar (3.0%) and ash (1.7%) (Khan *et al*., 2016). Being photoperiod insensitive, it can be grown any time of the year, giving greater flexibility to fitting into different cropping patterns.

Maize production faces a lot of challenges, of which poor seed quality is one of them. The seeds rural farmers plant often do not meet the standards needed for healthy crops, and this creates a cascade of problems ranging from low germination, uneven growth, week seedlings, low plant density and poor seed yield (Okoronkwo *et al*., 2026). Weak or damaged seeds may not sprout, leaving gaps in the field that reduce plant density. Also, seeds that are genetically mixed or contaminated produce plants of different heights and maturity, making management (fertilizer, irrigation, pest control) less efficient. Even if the plants survive, they often produce smaller ears or lower-grade seed, which hurts both food supply and income (Okoronkwo *et al*., 2026). Poor seed quality can be enhanced through priming which is a potential technique for promoting seedling establishment by soaking seeds in solutions (organic or inorganic), there by slightly hydrating them without allowing the protrusion of radicals. Seed Technologists had through priming derived means of obtaining faster and more uniform germination, early seedling vigour, efficient nutrient uptake etc. which in turn result to higher yield of maize (Okoronkwo *et al*., 2026). Therefore, the objective of this report was to enhance growth and seed yield of five maize varieties through priming methods (hydropriming, halopriming, osmopriming, hormopriming and unprimed), so as to select the best method in field conditions.

**Materials and Methods**: The study was carried out at the Research Farm of Michael Okpara University of Agriculture, Umudike (Alt. 122 m above sea level, lat. 05°29'N and long. 07°32'E) in April to July 2023 and 2024 cropping seasons. The annual rainfall is 2000 − 3000 mm with temperature ranges between 21−33°C and relative humidity of about 75 – 90%. Soil texture of the experimental sites was sandy loam (Okoronkwo *et al*., 2026). The experiment was a 5 x 5 factorial arrangement fitted into a randomized complete block design (RCBD) in three replicates. Factor A consisted of four priming methods and unprimed and factor B consisted of five varieties of maize. Each treatment was planted in an experimental plot size of 4.0 m x 2.25 m comprising 25 cm intra row and 75 cm inter row spacing, making a total of 48 stands per plot and 53,333 plants per hectare. The data obtained were subjected to a two-way analysis of variance and significance difference between treatment means were separated using LSD at $P \leq 0.05$.

**Results and Discussion: Impact of priming method and variety on growth of maize:** Priming treatments increased growth parameters as seen in taller plants, bigger seeds, etc. when compared to plants from unprimed seeds. This is because priming enhanced emergence rate of seeds, which caused early crop growth and establishment, thereby impacting overall plant growth (Abdulkareem *et al*., 2024). Primed seeds significantly produced higher growth characters compared to unprimed seeds due to priming triggers metabolic and physiological changes, initiate earlier replication of DNA, increased RNA and protein synthesis, greater ATP availability, repair of deteriorated seed parts and reduced leakage of metabolites (Hasanović *et al*., 2025; Diya *et al*., 2024) which enhances faster embryo growth, and increasing stand establishment under stress and non-stress conditions.

**Plant girth (cm):** Priming significantly increased plant girth ($p \leq 0.05$) at 3 and 12 WAP in 2023, and 3, 9, and 12 WAP in 2024 (Table 1). In 2023, plant girth ranged from 4.89 cm (unprimed) to 5.55 cm (water) at 6 WAP, and 6.19 cm (unprimed) to 6.87 cm (water) at 12 WAP while in 2024, it ranged from 3.61 cm (unprimed) to 4.03 cm (cytokinin) at 3 WAP; 6.51 cm (unprimed) to 7.12 cm (glycerol) at 6 WAP; and 6.82 cm (unprimed) to 7.37 cm (glycerol) at 12 WAP. Priming consistently improved girth by enhancing speed and synchrony of germination (Hamidi *et al*., 2013), producing stronger seedlings. The increase was linked to improved osmotic nutrient uptake, which boosted cell division, elongation, and multiplication in the stem cambium. Similar results were reported in papaya (Ramteke *et al*., 2015), karonda (Bhavya *et al*., 2017), and kainth (Kaur *et al*., 2022). $KNO_3$ treated maize had lower girth than glycerol, cytokinin, and water treatments. This may be due to salt toxicity causing reduced enzymatic activity and protein synthesis (Yohannes and Abraham, 2013), or altered hormone regulation and nutrient uptake (Özkorkmaz and Öner, 2022). Plant girth varied significantly among varieties at 3 WAP in both years and at 6, 9, and 12 WAP in 2024. Bende White consistently had the highest girth: 5.84 cm at 6 WAP in 2023; 4.14 cm at 3 WAP, 6.83 cm at 6 WAP, 7.41 cm at 9 WAP, and 7.69 cm at 12 WAP in 2024. Oba 98 and Kapam 6 also performed well at specific stages. Sammaz 27 was lowest at 6 WAP in 2023 (5.06 cm), while Oba 98 and Kapam 6 were lowest at other stages in 2024. These differences reflect inherent genetic traits and adaptability (Jatana *et al*., 2024). Significant interaction occurred at 9 and 12 WAP in 2024, showing a positive combined effect. Bende White primed with $KNO_3$ gave maximum girth (8.18 cm at 9 WAP, 8.53 cm at 12 WAP), followed by Oba 98 with water (7.47 cm at 9 WAP) and Bende White with glycerol (7.95 cm at 12 WAP). This suggests $KNO_3$ priming enhanced girth in Bende White, likely through improved nutrient uptake and stress tolerance (Okoronkwo *et al*., 2026a and Rehman *et al*., 2024).

**Number of leaves per plant :** Priming method did not significantly improve number of leaves ($p \geq 0.05$) at any stage (3, 6, 9, and 12 WAP) in both years, though primed maize produced more leaves (Table 2). This agrees with Dawadi *et al*. (2023) who found no significant difference in maize leaf number at 30, 45, and 75 DAS. However, it contrasts with Patel *et al*. (2023) and Anonymous (2018), who reported that priming significantly increased number of leaves. Variety significantly affected number of leaves ($p \leq 0.05$) at 9 WAP in 2023 and at 3, 6, 9, and 12 WAP in 2024. In 2023 at 9 WAP, Bende White had the highest number of leaves (10.51) while Oba Super 6 had the least (9.07). In 2024, values ranged from 8.37 (Oba 98) to 9.00 (Bende White) at 3 WAP; 11.20 (Oba Super 6) to 12.13 (Bende White) at 6 WAP; 11.98 (Kapam 6) to 13.29 (Bende White) at 9 WAP; and 10.54 (Oba 98) to 11.80 (Oba Super 6) at 12 WAP. The differences in Bende White and Oba Super 6 suggest distinct growth patterns due to genetic factors influencing leaf development (Onwudiwe *et al*., 2025; Lawson and Gbaraneh, 2024). A significant interaction occurred at 9 WAP, where Oba Super 6 had significantly more leaves than other varieties. This indicates Oba Super 6 is a high-performing variety well-suited for Umudike conditions (Onwudiwe *et al*., 2025).

**Leaf area ($cm^2$) of maize:** A significant increment ($p \leq 0.05$) was observed in leaf area due to priming at 6 WAP in 2023 (Table 3). Primed maize varieties had broader leaves when compared to unprimed varieties. Hormopriming (cytokinin) recorded the highest mean values (383.39 $cm^2$), followed by hydro priming (345.80 $cm^2$) and then osmopriming (glycerol) which recorded 339.74 $cm^2$ while the lowest mean value was recorded from unprimed (266.73 $cm^2$). Larger leaf area produced by primed varieties was as a result of faster germination, better establishment and improved seedling vigor due to production of hormones triggered by priming which influence all growth leading to larger leaves. This is in accordance with Kaur *et al*. (2022) and Palepad *et al*. (2017) report. Variety significantly ($p \leq 0.05$) affected leaf area at 3 WAP only in 2024. Kapam 6 had the broadest leaves (105.40 $cm^2$) followed by Oba super 6 (102.42 $cm^2$) while Sammaz 27 (90.740 $cm^2$) had the narrowest leaves followed by Bende white (95.24 $cm^2$). Variation observed among the varieties showed genetic differences influencing leaf development. Notably, Oba

Super 6 had a significantly higher leaf area compared to other varieties (Onwudiwe, 2025).

**Plant height (cm) of maize:** Priming method significantly increased plant height ($p \leq 0.05$) at 3 and 9 WAP in 2023 and 6 WAP in 2024 (Table 4). At 3 WAP 2023, height ranged from 21.73 cm in unprimed to 28.35 cm with glycerol. At 9 WAP 2023, it ranged from 102.19 cm unprimed to 127.78 cm with cytokinin. At 6 WAP 2024, glycerol gave 120.03 cm vs 94.89 cm for unprimed. The taller plants from priming were linked to more vigorous seedlings and an energetic start to growth. This was attributed to increased respiration and carbohydrate metabolism in seedlings from primed seeds (Ali *et al.,* 2016; Banerjee *et al*., 2020), as well as increased cell replication at meristematic regions, higher auxin metabolism, cell plasticity, enhanced photosynthesis, and rapid cell elongation and enlargement (Bharti *et al*., 2024). Glycerol priming produced the tallest plants at 3 WAP (2023) and 6 WAP (2024), likely due to its osmotic effects and improved water uptake (Onwudiwe *et al*., 2025). Cytokinin treatment gave the tallest plants at 9 WAP (2023) through cell multiplication and elongation in the cambium tissue of the intermodal region, as cytokinin promotes metabolic processes (Kaur *et al*., 2022). Similar results were reported by Yadav *et al*. (2018) in custard apple and Hota *et al*. (2018) in jamun. However, priming had no significant effect on plant height at 6 and 12 WAP in 2023 and at 3, 9, and 12 WAP in 2024. This aligns with Dawadi *et al*. (2023), who found no significant influence of priming on maize height at 15, 45, 60, and 75 DAS, and with Tian *et al*. (2014) who also reported no significant effect of priming on maize height. Maize varieties showed significant variation in plant height ($p \leq 0.05$), confirming genetic differences among them. Tallest plants were produced by Bende White (201.91 cm) followed by Oba 98 (176.96 cm) at 12 WAP in 2023; Oba super 6 (40.67) at 3WAP, Bende white (212.96 and 231.35) at 9 and 12 WAP in 2024. Sammaz 27 produced the shortest plant in both years. This demonstrated that each variety has genetically growth pattern that determine or influences how tall it will grow under similar environmental conditions (Yang *et al*., 2025).

**Tassel length (cm) of maize:** Priming method (2023) and variety (2023 and 2024) significantly ($p \leq 0.05$) increased tassel length while interaction had no significant ($p \geq 0.05$) influence (Table 5). Maize soaked in glycerol solution (44.23 cm) had the longest tassel followed by maize soaked in water (43.77 cm). Shortest tassel was produced from unprimed maize (39.77 cm). Mean values for longest tassel among the varieties was recorded from Bende white (45.32 cm and 48.24 cm), followed by Kapam 6 (43.54 cm) in 2023 and Oba super 6 (45.68 cm) in 2024 while least was recorded from Sammaz 27 (40.04 cm and 46.11 cm) in both years (Okoronkwo *et al*., 2026). These findings suggested genetic differences influencing tassel development, with glycerol priming potentially enhanced growth. Research supports that maize tassel spindle length is a quantitative trait influenced by multiple genes and environmental factors (Xu *et al.*, 2025; Liu *et al*., 2023).

**Impact of priming method and variety on seed yield and yield characters:** Priming method resulted to positive increment in seed yield and its contributing characters of maize seeds varieties. Primed seeds significantly produced higher yield characters compared to unprimed seeds. Similar results were also obtained by Amin and Morteza (2015) and Ahammad *et al*. (2014). **1000 seed weight (g)** : Priming method, variety, and their interaction significantly affected 1000 seed weight ($p \leq 0.05$) only in 2024 (Table 5). Osmo-priming with glycerol (225.30 g) and hydro-priming with water (215.87 g) significantly increased 1000 seed weight. This is attributed to early initiation of germination processes, leading to better seed development and heavier seeds. Osmo- and hydro-priming have been reported to increase maize seed weight, as primed seeds tend to produce larger and heavier seeds. Similar results were found in rice with osmo-priming (Detmann *et al*., 2012), likely due to greater accumulation of sugars and proteins from enhanced photosynthesis and translocation to the seed. These findings are supported by Okoronkwo *et al*. (2026) in maize, Li *et al.* (2018) in purple wheat and Bharti *et al*. (2024) in coriander. Bende White (272.10 g) and Sammaz 27 (219.45 g) produced heavier seeds than other varieties under similar conditions (Lawson and Tobin-West, 2025). This reflects genetic differences among varieties that influence seed weight (Cao *et al*., 2024; Xu *et al*., 2025). Studies confirm that seed weight is a complex trait controlled by genetic makeup and environment (Liu *et al*., 2023). The combination of Bende White + glycerol gave the highest 1000 seed weight (338.05 g), which differed significantly from Bende White + cytokinin (288.05 g) and Bende White + water (269.24 g). The lowest value (178.94 g) was from Oba Super 6 + $KNO_3$ (Zawar *et al*., 2025; D'Agate and Lake, 2024). This indicates glycerol priming enhanced seed weight in Bende White, possibly through improved metabolic processes and nutrient mobilization. Overall, seed priming with specific compounds can improve maize development and production (Dawadi *et al.*, 2023).

**Cob girth (cm) :** Priming significantly increased cob girth ($p \leq 0.05$) in 2024. Glycerol gave the highest mean cob girth (13.83 cm), while unprimed had the lowest (13.34 cm). Similar increases with primed seeds were reported by Sharma *et al*. (2014) and Raza *et al*. (2013). Variety significantly affected cob girth ($p \leq 0.05$) in both years (Table 7), showing differences in cob size traits. Bende White consistently had the largest cob girth (15.90 cm in 2023; 15.71 cm in 2024), followed by Oba 98 and Oba Super 6 (13.20 cm) in 2023 and Sammaz 27 (13.41 cm) in 2024. Kapam 6 and Sammaz 27 had the smallest in 2023 (12.70 cm), and Oba Super 6 in 2024 (12.84 cm). This reflects Bende White's inherent genetic superiority for cob girth, which is stable across environments (Lawson and Tobin-West, 2025). The priming × variety interaction was significant ($p \leq 0.05$) in 2024. Bende White produced the largest cob girth when primed with water (16.26 cm), followed by $KNO_3$ priming (15.95 cm). The smallest girth (12.30 cm) was from Oba Super 6 unprimed. This indicates variety-specific responses: Bende White responded best to hydro-priming, Oba Super 6 improved with hydro-priming, Kapam 6 performed best cytokinin, and Oba 98 and Sammaz 27 were better with osmo-priming (Timsina and Marahatta, 2024). Dawadi *et al*. (2023) also found a significant priming effect on cob girth, ranging from 46.39 cm (control) to 48.87 cm (0.5% $ZnSO_3$), which is higher than the present range of 12.30 cm (unprimed) to 16.26 cm (Bende White + water).

**Number of cobs per plot:** Number of cobs per plot was not significantly affected ($p \geq 0.05$) by priming method, variety and interaction in 2023 (Table 6). Priming significantly ($p \leq 0.05$) increased number of cobs per plot with seeds primed with cytokinin and glycerol (40.67 respectively) having maximum number of cobs per plot while unprimed maize (30.47) produced the least mean value in 2024. This means that these two priming methods can be used for treating maize seeds for this trait (Raza *et al*., 2013) in Umudike. The influence of variety on number of cobs per plot in 2024 showed significant ($p \leq 0.05$) variation. Bende white (42.33) and Oba Super 6 (39.80) showed their superiority over other varieties for this trait while Oba 98 produced minimum mean value. Many researchers had reported that priming can increase number of cobs per plot e.g., Ahammad *et al*. (2014) reported that seeds primed with water had higher number of cobs than non-primed. Also, Farnia and Shafie (2015) reported that priming with specific treatment increased number of cobs per plant.

**Cob length (cm):** Priming significantly influenced cob length ($p \leq 0.05$) only in 2024 (Table 6). $KNO_3$ gave the longest cobs (14.83 cm), followed by cytokinin (14.54 cm), while unprimed produced the shortest (13.93 cm). This agrees with Rahman (2016) but differs slightly from Timsina and Maratta (2024), who found that $KNO_3$ treated maize, gave the lowest cob length, though still higher than untreated. Variety significantly affected cob length ($p \leq 0.05$) in both years. Bende White (14.99 cm) and Oba 98 (14.85 cm) had the longest cobs in 2023 and 2024 respectively. Sammaz 27 consistently had the shortest cobs in both years (12.71 cm, 13.83 cm). This indicates genetic differences among varieties influence cob development. The interaction was significant ($p \leq 0.05$). Bende White + $KNO_3$ produced the longest cobs (15.60 cm), followed by Oba 98 + water (15.31 cm), Kapam 6 + cytokinin (15.25 cm), and Oba 98 + glycerol (15.22 cm). Dawadi *et al*. (2023) also reported a significant effect of priming on cob length, ranging from 15.55 cm (control) to 21.99 cm (PL-3300 primed with cow urine), which is higher than the present range of 12.72 cm (Sammaz 27 + water) to 15.60 cm (Bende White + $KNO_3$).

**Seed weight per cob (g) of maize:** Priming significantly influenced seed weight per cob ($p \leq 0.05$) in 2024. Cytokinin (52.55 g) gave the highest means followed by glycerol (48.53 g), while unprimed was lowest (43.48 g). Cytokinin and glycerol likely enhanced seed weight through improved metabolic processes and nutrient mobilization (Diya *et al.,* 2024; Azzam *et al*., 2022). Variety significantly affected seed weight per cob ($p \leq 0.05$) in both years (Table 6). Bende White had the highest in 2023 (49.55 g) and Sammaz 27 in 2024 (49.39 g), followed by Oba 98 (40.63 g in 2023, 48.41 g in 2024). Sammaz 27 was lowest in 2023 (34.07 g) and Kapam 6 in 2024 (46.40 g). These differences reflect both inherent genetic traits and variety-specific responses to priming (Okoronkwo *et al*., 2026). Sammaz 27's contrasting performance across years highlights genotype × environment interaction (GEI), where some varieties are predisposed to heavier seeds while others perform better under specific conditions (Bocianowski *et al*., 2024; Ma *et al.*, 2024). The interaction was significant ($p \leq 0.05$) in 2024. Oba 98 + cytokinin gave maximum seed weight per cob (59.40 g), followed by Sammaz 27 + cytokinin (56.67 g). The lowest was Kapam 6 unprimed (38.00 g). This shows priming effectiveness depends on variety, with some varieties responding better to specific priming treatments (Onwudiwe *et al*., 2025).

**Number of rows per cob of maize:** Priming method was significant only in 2024. Cytokinin (13.40) and water (13.22) gave higher means, while unprimed had the lowest (13.14). Cytokinin priming is known to enhance yield components like rows per cob by improving sink strength and nutrient mobilization (Onwudiwe *et al*., 2025). Variety significantly influenced number of rows per cob ($p \leq 0.05$) in both years, showing inherent genetic differences. Bende White consistently had the highest mean (13.73 in 2023, 13.70 in 2024), followed by Oba Super 6 (13.17, 13.58), indicating genetic traits favoring more rows. Kapam 6 (12.18) and Oba 98 (12.69) had the lowest means in 2023 and 2024 respectively. This aligns with Onwudiwe *et al.* (2025). The interaction was significant in 2024. Bende White + water gave the highest rows per cob (14.44), followed by Bende White + $KNO_3$ (14.24), Bende White + glycerol (14.24), and Oba Super 6 + cytokinin (14.24), showing variety-specific responses to priming (Onwudiwe *et al*., 2025). Kapam 6 performed best with glycerol (13.64), Oba 98 and Oba Super 6 with cytokinin, and Sammaz 27 with $KNO_3$ compared to other priming methods (Okoronkwo *et al*., 2026).

**Number of seeds per cob of maize:** Number of seeds per cob was significantly ($p \geq 0.05$) influenced by variety, priming method and interaction in 2024 (Table 7). Maximum mean number of seeds per cob was obtained from Oba super 6 (386.71), followed by Oba 98 (381.67) while the minimum number was obtained from Bende white (265.30). For priming method, highest mean number of seeds per cob was got from maize primed with $KNO_3$ (358.92) followed by water (347.55) and then cytokinin (338.58) (Okoronkwo *et al*., 2026). Lowest mean number cob was got from seeds primed with glycerol (332.75) followed by unprimed (332.75). Highest number of seeds was obtained from interaction between Oba 98 and cytokinin (481.15), followed by Oba super 6 and water (458.59). The lowest was obtained from Bende white primed with cytokinin (215.95) and unprimed (226.18) respectively. Rahman (2016) reported similar finding in okra. Higher number of seeds (kernel) ranging from 450 (control) to 603 (PL-3300 primed with cow urine) was obtained by Dawadi *et al*. (2023) which was higher than 277.02 (unprimed) to 481.15 (Oba 98 primed with cytokinin reported by this finding.

**Seed yield (t/ha) of Maize:** Priming method significantly increased seed yield ($p \leq 0.05$) in both 2023 and 2024, showing a reliable beneficial effect on productivity. Unprimed maize consistently had the lowest seed yield (1.32 t/ha in 2023, 1.49 t/ha in 2024). Cytokinin gave the highest seed yield (2.07 t/ha in 2023, 2.37 t/ha in 2024), followed by glycerol (1.84 t/ha, 2.18 t/ha). Cytokinin's effect is linked to its role in regulating growth and cell division, which strongly influences seed yield (Sharma *et al*., 2022). Variety had no significant effect in 2023 but was significant in 2024 ($p \leq 0.05$). This suggests 2024 environmental factors favored certain varieties and enhanced variation. In 2024, Bende White (2.25 t/ha) had the highest yield followed by Oba Super 6 (2.11 t/ha), while Sammaz 27 was lowest (1.79 t/ha) (Okoronkwo *et al*., 2026). The variety × priming interaction was not significant in 2023 but significant in 2024 ($p \leq 0.05$), indicating that priming effects depended on variety and were expressed under 2024 conditions. Priming effectiveness in maize is variety-specific. Bende White performed best with KNO3, while Kapam 6, Oba 98, Oba Super 6, and Sammaz 27 did best with cytokinin. Other priming methods reduced yield in those varieties. This highlights the need for variety-specific priming to optimize maize yield (Okoronkwo *et al*., 2026a and Onwudiwe *et al*., 2025)

**Conclusion:** Priming significantly increased plant girth at 6 and 12 WAP in 2023 and 3, 9, and 12 WAP in 2024; leaf area at 6 WAP in 2023; plant height at 3 and 9 WAP in 2023 and 6 WAP in 2024; and tassel length in 2023. Water (2023), glycerol, and cytokinin (2024) primed seeds gave the largest girth. Glycerol and cytokinin produced the broadest leaves, tallest plants in both years, and longest tassels in 2023. Bende White + $KNO_3$ combination gave maximum plant girth. Variety showed significant differences in plant girth at 3 WAP in both years and 6, 9, and 12 WAP in 2024; number of leaves at 9 WAP in 2023 and 3, 6, 9, and 12 WAP in 2024; leaf area at 3 WAP in 2024; plant height at 12 WAP in 2023 and 3, 9, and 12 WAP in 2024; and tassel length in 2023. Bende White and Oba 98 consistently had larger girth and more leaves in 2023, while Bende White and Oba Super 6 had more leaves in 2024. Oba Super 6 and Kapam 6 had broader leaves. Bende White and Oba Super 6 were taller, and Bende White and Kapam 6 had longer tassels compared to others. Priming also significantly improved yield traits. Cytokinin and glycerol gave the highest seeds per plot, heaviest 1000-seed weight and seed weight per cob, largest cob girth, and highest seed yield t/ha in 2024. $KNO_3$ and cytokinin produced the longest cobs, with Bende White + $KNO_3$ and Kapam 6 + cytokinin best in 2024. Bende White + glycerol, then cytokinin, gave heaviest 1000 seed weight; Oba 98 and Kapam 6 + cytokinin also had heaviest seeds. Bende White + water and $KNO_3$ gave biggest cobs, most rows per cob, and more seeds per cob. Oba 98 + cytokinin and Oba Super 6 + water also had more seeds per cob. Bende White followed by Oba Super 6 consistently had highest seed yield t/ha. Overall, glycerol then cytokinin most influenced growth, while cytokinin then glycerol most influenced seed yield.

**References**


Abdulkareem, Y. J., Muhammad, A. N., Alaba, N. I., Shuaib, M. B. and Musa, A. G. (2024). Impact of seed priming using potassium dihydrogen phosphate on seedlings emergence, growth and yield of Bambara groundnut (*Vigna subterranea* (L) Verdc.). *Journal of Agriculture and Environment, 20* (1), 239-251. https://www.ajol.info/index.php/jagrenv.

Ahammad, K. U., Rahman, M. M., Molla, M. A. M. and Azam, M. G. (2014). Impact of hydropriming and soil moisture regimes on yield and yield components of maize (*Zea mays* L.). *Bangladesh J. Agril. Res. 39*(3), 505-513.

Ali, A. A., Iqbal, A. and Iqbal, M. A. (2016). Forage maize (*Zea mays* L.) germination, growth and yield get triggered by different seed invigoration techniques. *World Journal of Agricultural Sciences, 12*(2), 97-104.

Amin, F. and Morteza, S. (2015). Effect of bio-priming on yield and yield components of maize *(Zea mays* L.) under drought stress. *Bull. Env.Pharmacol. Life Sci., 4* (4), 68-74.

Anon (2017). Maize: Enhancing the livelihoods of Nigerian farmers. Sahel reports 14.

Anonymous (2018). Annual report kharif-2018 of AICRP on forage crops and utilization, Odisha University of Agriculture and Technology, Bhubaneswar Centre.

Azzam, C. R., Zaki, S. S., Bamagoos, A. A., Rady, M. M., and Alharby, H. F. (2022). Soaking Maize Seeds in Zeatin-Type Cytokinin Biostimulators Improves Salt Tolerance by Enhancing the Antioxidant System and Photosynthetic Efficiency. *Plants, 11*(8), 1004.

Banerjee, S., Jana, K., Mondal, R., Mondal, K. and Mondal, A. (2020). Impact of seed priming on growth and yield of hybrid maize-lathyrus sequence under rainfed situation. *Current Journal of Applied Science and Technology, 39*(1):126-136.

Bharti, A., Sharma, R., Mehta, D. K. and Vinay. (2024). Impact of different priming agents on plant growth, fresh leaf yield, seed yield and economics of seed production in coriander. *Vegetable Science, 51*(2), 264-268.

Bhavya, N., Naik, N., Kantharaju, V. and Nataraj, K. H. (2017). Studies on Impact of different pre-sowing treatments on germination of karonda (*Carrisa carandas* L.) seeds. *Journal of Pharmacognosy and Phytochemistry 6*, 352-354.

Bocianowski, J., Nowosad, K. and Rejek, D. (2024). Genotype-environment interaction for grain yield in maize (*Zea mays* L.) using the additive main effects and multiplicative interaction (AMMI) model. *J Appl Genetics 65*, 653–664 https://doi.org/10.1007/s13353-024-00899-4

Cao, X., Lu, H., Zhao, Z., Lian, Y., Chen, H., Yu, M., Wang, F., Sun, H., Ding, D., Zhang, X., Chen, X., and Tang, J. (2024). Mining Candidate Genes for Maize Tassel Spindle Length Based on a Genome-Wide Association Analysis. *Genes, 15*(11), 1413.

D'Agate, L. A. and Lake, M. W. (2024). Seed priming with melatonin improves drought tolerance in maize. *Journal of Emerging Investors* https://doi.org/10.59720/23-097

Dawadi, E., Chaudhary, S., Karki, A. and Dhungana, S. (2023). Efect of seed priming on growth and yield parameters of maize. *Peruvian Journal of Agronomy, 7*(3), 252-262.

Detmann, C. K., Araujo, W. L., Martins, S. C., Sanglard, L. M., Reis, J. V., Detmann, E., Rodrigues, F. A., Nunes-Nesi, A., Fernie, A. R. and DaMatta, F. (2012). Silicon nutrition increases seed yield, which, in turn, exerts a feed-forward stimulation of photosynthesis rates via enhanced mesophyll conductance and alters primary metabolism in rice. *New Physiologist, 196*, 752-762. https://doi.org/10.1111/j.1469-8137.2012.04299.x.

Diya A., Beena R. and Jayalekshmy V. G. (2024). Physiological, Biochemical and Molecular Mechanisms of Seed Priming: A Review . *Legume Research. 47*(2): 159-166.

FAO. (2025). Food and Agriculture Organization Statistics. Available: www.fao.org/faostat

FAOSTAT (2014). Food and Agricultural Organization of the United Nations (FAO). FAO Statistical Data base, from http://faostat.fao.org

Farnia, A. and Shafie, M. (2015). Effect of bio-priming on yield and yield components of maize (*Zea mays* L.) under drought stress. *Bulletin of Environment, Pharmacology and Life Sciences, 4* (4), 68-74.

Hamidi, R., Pirasteh-Anosheh, H. and Izadi, M. (2013). Impact of Seed Halo-priming Compared with Hydro-priming on wheat Germination and Growth. *Intl. J. Agron. Plant. Prod. 4* (7), 1611-1615.

Hota, S. N., Karna, A. K., Jain, P. K. and Dakhad, B. (2018). Impact of gibberellic acid on seed germination, growth and survival of jamun (Syzygium cumini L. Skeels). *Pharma Innovation Journal 7*, 323-326.

Kamara, A.Y., Kamai, N., Omoigui, L. O., Togola, A., Ekeleme, F. and Onyibe, J. E. (2020). Guide to Maize Production in Northern Nigeria: Ibadan, Nigeria. pp 1-18.

Kaur M, Singh V, Singh M and Kaur G (2022). Effect of seed priming on seed germination and growth of kainth. *Environ Sci Arch 1*(STI-1), 41-47.

Khan, A. Z., Imran, A. M., Khalil, A., Gul, H., Akbar, H. and Wahab, S. (2016). Impact of fertilizer priming on seed germination behavior and vigor of maize. *Pure and Applied Biology, 5*(4), 744-751.

Kumari, N., Kumar- Rai, P., Bara, B. M., Singh, I. (2017). Impact of halo priming and hormonal priming on seed germination and seedling vigour in maize (*Zea mays* L.) seeds. *Journal of Pharmacognosy and Phytochemistry, 6*(4), 27-30.

Lawson, T. S. and Gbaraneh, L. D. (2024). Comparative Assessment of the Effect of Three Plant Spacing on the Performance of Maize (*Zea Mays* L.) Varieties in the Humid Tropics of Port Harcourt, Rivers State, Nigeria. *Asian Plant Research Journal 12* (6):96-107.

Lawson, T. S. and Tobin-West, M. D. (2025). Influence of Two Seasons and Spacing on Yield Performance of Maize (*Zea mays* L.) Varieties in Humid Tropics, Rivers State. *Agriculture Archives: an International Journal*. DOI: https://doi.org/10.51470/AGRI.2025.4.2.62.

Li, X., Lv, X., Wang, X., Wang, L., Zhang, M. and Ren, M. (2018). Impacts of abiotic stress on anthocyanin accumulation and seed weight in purple wheat. *Crop and Pasture Science, 69*, 1208-1214. https://doi.org/10.1071/CP18341.

Liu, P., Yin, B., Gu, L., Zhang, S., Ren, J., Wang, Y., Duan, W. and Zhen, W. (2023). Heat stress affects tassel development and reduces the kernel number of summer maize. *Front. Plant Sci*. 14:1186921. doi: 10.3389/fpls.2023.1186921

Ma, C., Liu, C., and Ye, Z. (2024). Influence of Genotype × Environment Interaction on Yield Stability of Maize Hybrids with AMMI Model and GGE Biplot. *Agronomy*, *14*(5), 1000. https://doi.org/10.3390/agronomy14051000

Okoronkwo, C. M., Ofor, M. O., Anyanwu, C. P. and Dialoke, S. A. (2026). Impact of priming methods and diatomaceous earth on seed quality of maize in Umudike, Abia State. A Dissertation submitted to the Postgraduate School, Federal University of Technology, Owerri. Pp 106-115.

Onwudiwe, N., Oroka, F. O., and Obiazi, C. C. (2025). Comparative performance of maize varieties under tropical conditions in Abraka, Delta State, Nigeria. *Journal of Current Opinion in Crop Science, 6*(3), 157–163.

Özkorkmaz, F. and Öner, F. (2022). Effects of potassium nitrate ($KNO_3$) on germination properties of maize (*Zea mays* indentata L.) plant under salt stress. *SPEC Journal of Agricultural Sciences, 6*(4) 806-815.

Palepad, K. B., Bharad, S. G. and Bansode, G. S. (2017). Impact of seed treatments on germination, seedling vigour and growth rate of custard apple (*Annona squamosa*). *Journal of Pharmacognosy and Phytochemistry* 6, 20-23.

Patel, H. K., Rathod, P. H., Ravald, C. H. and Dudhat, D. H. (2023). Impacts of seed priming on fodder yield of maize. *Int. J. Plant Soil Sci*., *35*(24) 41-48.

Rahman, Z. (2016). Effect of priming on growth, yield and seed quality of okra (*Abelmoschus esculentus* L) *varieties.* A Thesis submitted to the Institute of Seed Technology, Sher-e-Bangla Agricultural University, Dhaka. Pp. 1-79.

Ramteke, V., Dhpaithankar, Mahantesh, K., *et al*. (2015). Seed germination and seedling growth of papaya as influenced by GA3 and propagation media. *International Journal of Farm Sciences 5*, 74-81.

Raza, S. H., Shafiq, F., Chaudhary, M. and Khan, I. (2013). Seed invigoration with water, ascorbic and salicylic acid stimulates development and biochemical characters of okra (*Ablemoschus esculentus* (L.) Moench) under normal and saline conditions. 15, 486-492.

Rehman, B., Zulfiqar, A., Attia, H., Sardar, R., Saleh, M. A. *et al*. (2024). Seed Priming with Potassium Nitrate Can Enhance Salt Stress Tolerance in Maize. *Phyton-International Journal of Experimental Botany*, *93(8)*, 1819–1838.

Sharma, S., Kaur, P. & Gaikwad, K. (2022). Role of cytokinin in seed development in pulses and oilseed crops: Current status and future perspective. *Frontiers in Genetics 12*(13), 940660.

Tian, Y., Guan, B., Daowei, Z., Junbao, Y., Guangdi, L. and Yujie, L. (2014). Responses of Seed Germination, Seedling Growth, and Seed Yield Traits to Seed Pretreatment in Maize (*Zea mays* L.). *The Scientific World Journal*, 2014, 1-8. doi: 10.1155/2014/834630

Timsina, D. and Marahatta, S. (2024). Assessment of different seed priming agents on germination and biomass production of hybrid maize at Rampur, Nepal Deepika. *Cogent Food and Agriculture*, *10*(1), 2415388.

Udensi, E. U. and Omovbude, S. (2018). Influence of plant spacing on weed suppression and maize performance in the humid forest Agro-Ecology of Southeastern Nigeria. *Nigerian Journal of Agriculture, 49* (1), 32-39.

Xu, B., Zhao, C., Yang, G., Zhang, Y., Liu, C., Feng, H., Yang, X., Yang, H. (2025). Genotyping Identification of Maize Based on Three-Dimensional Structural Phenotyping and Gaussian Fuzzy Clustering. *Agriculture*, *15*(1), 85.

Yadav, R. S., Sharma, T. R., Pandey, S. K. and Maske, G. (2018). Impact of GA3 and cow urine on germination and morphology of custard apple. *International Journal of Chemical Studies 6*, 1131-1134.

Yang, X., Wu, P., Cui. W., Alimu, D., Wang, K. and Ren, J. (2025) Genome-wide association studies and genomic selection for leaf-related traits in maize. *Front. Plant Sci*. 16:1669346. doi: 10.3389/fpls.2025.1669346

Yohannes, G. and Abraha, B. (2013). The role of seed priming in improving seed germination and seedling growth of maize (*Zea mays* L.) under salt stress at laboratory conditions. *African Journal of Biotechnology*, *12*(46), 6484-6490.

Zalama, M. T. and Kishk, A. M. S. (2017). Evaluation of Seed Germinability and Field Emergence of Some Maize (*Zea mays*) Hybrids Under Salinity Stress Conditions. *Journal of Plant Production, Mansoura Univ.*, *8*(5), 649-656.

Zawar, S., Akbar, M. M., Aziz, M., Yonas, M. W., Hassannejad, S. and Rahimi, M. (2025). Silicon seed priming enhances maize germination, biomass, and vigor under simulated drought stress. *Springer Nature. https://doi.org/10.1007/s12633-025-03473-7*

**Table 1. Influence of priming method and variety on plant girth (cm) of maize**

| | Plant Girth 2023 | | | Plant Girth 2024 | | | |
|---|---|---|---|---|---|---|---|
| **Treatment** | **6 WAP** | **9 WAP** | **12 WAP** | **3 WAP** | **6 WAP** | **9 WAP** | **12 WAP** |
| **Variety (A)** | | | | | | | |
| Bende white | 5.84 | 6.27 | 6.91 | 4.14 | 6.83 | 7.41 | 7.69 |
| Kapam 6 | 5.34 | 6.16 | 6.59 | 3.95 | 6.11 | 6.58 | 6.81 |
| Oba 98 | 5.45 | 6.10 | 6.87 | 3.65 | 6.20 | 6.83 | 7.05 |
| Oba Super 6 | 5.09 | 5.88 | 6.40 | 3.87 | 6.16 | 6.71 | 6.99 |
| Sammaz 27 | 5.06 | 5.70 | 6.38 | 3.81 | 6.19 | 6.74 | 6.97 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Priming (B)** | | | | | | | |
| Unprimed | 4.89 | 5.66 | 6.19 | 3.61 | 5.94 | 6.51 | 6.82 |
| Cytokinin | 5.51 | 6.17 | 6.77 | 4.03 | 6.34 | 7.03 | 7.25 |
| Glycerol | 5.52 | 6.18 | 6.81 | 4.01 | 6.56 | 7.12 | 7.37 |
| $KNO_3$ | 5.30 | 5.86 | 6.50 | 3.79 | 6.31 | 6.66 | 7.01 |
| Water | 5.55 | 6.23 | 6.87 | 3.98 | 6.34 | 6.95 | 7.06 |
| **Mean** | **5.36** | **6.02** | **6.63** | **3.88** | **6.30** | **6.85** | **7.10** |
| $LSD_{0.0.5}$ for A | 0.45 | ns | ns | 0.29 | 0.41 | 0.35 | 0.33 |
| $LSD_{0.0.5}$ for B | 0.45 | ns | 0.50 | 0.29 | ns | 0.35 | 0.33 |
| $LSD_{0.0.5}$ for A x B | Ns | ns | ns | Ns | ns | 0.78 | 0.73 |

| **Variety** | **Unprimed** | **Cytokinin** | **Glycerol** | **$KNO_3$** | **Water** |
|---|---|---|---|---|---|
| | **Plant Girth at 9 WAP (AXB) in 2024** | | | | |
| Bende white | 7.32 | 7.09 | 7.56 | 8.18 | 6.89 |
| Kapam 6 | 6.34 | 6.79 | 6.64 | 6.31 | 6.8 |
| Oba 98 | 6.38 | 7.29 | 7.24 | 5.74 | 7.49 |
| Oba Super 6 | 6.24 | 6.68 | 7.03 | 6.53 | 7.04 |
| Sammaz 27 | 6.26 | 7.29 | 7.13 | 6.51 | 6.52 |
| | **Plant Girth at 12 WAP (AXB) in 2024** | | | | |
| Bende white | 7.41 | 7.44 | 7.95 | 8.53 | 7.13 |
| Kapam 6 | 6.77 | 6.92 | 6.77 | 6.43 | 7.16 |
| Oba 98 | 6.8 | 7.48 | 7.58 | 6.13 | 7.23 |
| Oba Super 6 | 6.55 | 6.94 | 7.13 | 7.03 | 7.27 |
| Sammaz 27 | 6.57 | 7.48 | 7.4 | 6.92 | 6.49 |

**Table 2. Influence of priming method and variety on number of leaves of maize**

| | **Number of leaves 2023** | | | **Number of leaves 2024** | | |
|---|---|---|---|---|---|---|
| **Treatment** | **6 WAP** | **9 WAP** | **12 WAP** | **3 WAP** | **6 WAP** | **12 WAP** |
| **Variety (A)** | | | | | | |
| Bende white | 7.49 | 10.51 | 11.20 | 9.00 | 12.13 | 11.25 |
| Kapam 6 | 7.21 | 9.40 | 10.67 | 8.38 | 11.42 | 10.61 |
| Oba 98 | 7.13 | 9.49 | 10.60 | 8.37 | 11.20 | 10.54 |
| Oba Super 6 | 7.00 | 9.07 | 10.49 | 8.44 | 11.80 | 11.80 |
| Sammaz 27 | 6.87 | 9.13 | 10.27 | 8.53 | 11.22 | 11.21 |
| **Priming (B)** | | | | | | |
| Unprimed | 6.78 | 9.27 | 10.27 | 8.42 | 11.56 | 11.05 |
| Cytokinin | 7.22 | 9.87 | 11.16 | 8.68 | 11.40 | 11.17 |
| Glycerol | 7.11 | 9.67 | 10.60 | 8.53 | 11.67 | 11.37 |
| $KNO_3$ | 7.07 | 9.33 | 10.49 | 8.40 | 11.71 | 10.99 |
| Water | 7.52 | 9.47 | 10.71 | 8.69 | 11.44 | 10.83 |
| **Mean** | **7.14** | **9.52** | **10.64** | **8.54** | **11.56** | **11.08** |
| $LSD_{0.0.5}$ for A | Ns | 0.89 | Ns | 0.46 | 0.66 | 0.92 |
| $LSD_{0.0.5}$ for B | Ns | Ns | Ns | Ns | ns | Ns |

| | | | | | | |
|---|---|---|---|---|---|---|
| $LSD_{0.0.5}$ A x B | Ns | Ns | Ns | Ns | ns | Ns |

| **Variety** | **Unprimed** | **Cytokinin** | **Glycerol** | **$KNO_3$** | **Water** | **Mean** |
|---|---|---|---|---|---|---|
| | **Number of Leaves 9 WAP in 2024** | | | | | |
| Bende white | 12.44 | 13.22 | 13.33 | 13.44 | 14.00 | 13.29 |
| Kapam 6 | 11.78 | 11.89 | 11.67 | 12.56 | 12.00 | 11.98 |
| Oba 98 | 12.33 | 12.00 | 12.44 | 11.11 | 12.33 | 12.04 |
| Oba Super 6 | 13.00 | 12.67 | 12.67 | 12.56 | 13.22 | 12.82 |
| Sammaz 27 | 12.44 | 12.78 | 13.00 | 12.00 | 11.67 | 12.38 |
| Mean | 12.40 | 12.51 | 12.62 | 12.33 | 12.64 | |
| $LSD_{(0.05)}$ for A | | 0.47 | | | | |
| $LSD_{(0.05)}$ for B | | Ns | | | | |
| $LSD_{(0.05)}$A x B | | 1.04 | | | | |

**Table 3. Influence of priming method and variety on leaf area of maize**

| | **2023 Leaf area ($cm^2$)** | | | | **2024 Leaf area ($cm^2$)** | | | |
|---|---|---|---|---|---|---|---|---|
| **Treatment** | **3 WAP** | **6 WAP** | **9 WAP** | **12 WAP** | **3 WAP** | **6 WAP** | **9 WAP** | **12 WAP** |
| **Variety (A)** | | | | | | | | |
| Bende white | 41.39 | 371.31 | 414.57 | 477.05 | 95.24 | 429.70 | 509.92 | 451.00 |
| Kapam 6 | 43.22 | 335.53 | 398.74 | 473.81 | 105.40 | 383.44 | 441.02 | 433.46 |
| Oba 98 | 46.57 | 338.51 | 424.34 | 490.84 | 82.89 | 360.27 | 450.13 | 476.31 |
| Oba Super 6 | 43.91 | 294.48 | 401.46 | 467.67 | 102.42 | 404.93 | 472.14 | 462.51 |
| Sammaz 27 | 44.24 | 304.62 | 392.75 | 448.38 | 90.74 | 364.48 | 435.41 | 436.53 |
| **Priming (B)** | | | | | | | | |
| Unprimed | 33.16 | 266.73 | 346.87 | 422.12 | 89.63 | 364.02 | 453.49 | 442.27 |
| Cytokinin | 47.95 | 383.39 | 459.08 | 507.05 | 98.12 | 413.36 | 459.49 | 471.16 |
| Glycerol | 46.68 | 339.74 | 414.54 | 512.76 | 96.88 | 390.28 | 461.52 | 446.40 |
| $KNO_3$ | 41.75 | 308.79 | 390.87 | 445.46 | 95.47 | 369.33 | 463.64 | 425.83 |
| Water | 49.80 | 345.80 | 420.51 | 470.35 | 96.58 | 405.83 | 470.47 | 474.15 |
| **Mean** | **43.87** | **328.89** | **406.37** | **471.55** | **95.34** | **388.56** | **461.72** | **451.96** |
| $LSD_{0.0.5}$ for A | Ns | ns | ns | ns | 15.95 | ns | Ns | Ns |
| $LSD_{0.0.5}$ for B | Ns | 266.73 | ns | ns | Ns | ns | Ns | Ns |
| $LSD_{0.0.5}$ A X B | Ns | ns | ns | ns | Ns | ns | Ns | Ns |

**Table 4. Influence of priming method and variety on plant height of maize**

| | **Plant height (cm) 2023** | | | | **Plant height (cm) 2024** | | | |
|---|---|---|---|---|---|---|---|---|
| **Treatment** | **3 WAP** | **6 WAP** | **9 WAP** | **12 WAP** | **3 WAP** | **6WAP** | **9 WAP** | **12 WAP** |
| **Variety (A)** | | | | | | | | |
| Bende white | 25.17 | 88.07 | 118.79 | 201.91 | 39.48 | 112.44 | 212.96 | 231.35 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Kapam 6 | 26.39 | 87.58 | 120.51 | 170.44 | 39.09 | 110.27 | 196.04 | 205.38 |
| Oba 98 | 26.84 | 97.84 | 119.36 | 176.96 | 36.45 | 107.56 | 190.86 | 203.61 |
| Oba Super 6 | 26.76 | 83.09 | 118.94 | 174.80 | 40.67 | 114.73 | 198.95 | 215.00 |
| Sammaz 27 | 26.07 | 82.33 | 119.48 | 162.15 | 36.66 | 111.66 | 189.13 | 204.22 |
| **Priming (B)** | | | | | | | | |
| Unprimed | 21.73 | 73.29 | 102.19 | 161.91 | 36.10 | 94.89 | 184.60 | 203.62 |
| Cytokinin | 27.54 | 96.98 | 127.78 | 188.82 | 40.62 | 115.85 | 200.71 | 214.30 |
| Glycerol | 28.35 | 93.16 | 125.30 | 185.45 | 38.95 | 120.03 | 201.84 | 214.30 |
| $KNO_3$ | 25.30 | 88.27 | 117.70 | 173.04 | 38.09 | 113.36 | 201.34 | 212.96 |
| Water | 28.29 | 87.22 | 124.11 | 177.04 | 38.60 | 112.54 | 199.44 | 214.37 |
| **Mean** | **26.25** | **87.78** | **119.42** | **177.25** | **38.47** | **111.33** | **197.59** | **211.91** |
| $LSD_{(0.05)}$ for A | Ns | ns | ns | 19.50 | 3.24 | ns | 13.10 | 9.51 |
| $LSD_{(0.05)}$ for B | 3.10 | ns | 14.66 | ns | ns | 14.25 | Ns | Ns |
| $LSD_{(0.05)}$ A x B | Ns | ns | ns | ns | ns | ns | Ns | Ns |

**Table 5. Influence of priming method and variety on tassel length, 1000 seed weight and cob girth of maize**

| | Tassel length (cm) | | 1000 Seed Weight (g) | | Cob girth (cm) | |
|---|---|---|---|---|---|---|
| **Treatment** | **2023** | **2024** | **2023** | **2024** | **2023** | **2024** |
| **Variety (A)** | | | | | | |
| Bende white | 45.32 | 48.24 | 208.40 | 272.10 | 15.90 | 15.71 |
| Kapam 6 | 43.54 | 44.82 | 177.50 | 206.77 | 12.70 | 12.99 |
| Oba 98 | 41.56 | 44.73 | 179.60 | 192.09 | 13.20 | 13.04 |
| Oba Super 6 | 41.14 | 45.68 | 183.50 | 183.19 | 13.20 | 12.84 |
| Sammaz 27 | 40.04 | 46.11 | 166.40 | 219.45 | 12.70 | 13.41 |
| **Priming (B)** | | | | | | |
| Unprimed | 39.77 | 45.04 | 161.70 | 210.25 | 13.30 | 13.34 |
| Cytokinin | 43.61 | 46.63 | 198.00 | 212.47 | 13.30 | 13.63 |
| Glycerol | 44.23 | 45.71 | 200.00 | 225.30 | 13.50 | 13.83 |
| $KNO_3$ | 40.24 | 46.16 | 171.00 | 209.73 | 13.70 | 13.49 |
| Water | 43.77 | 46.05 | 184.60 | 215.87 | 13.80 | 13.69 |
| **Mean** | **42.32** | **45.92** | **183.08** | **214.72** | **13.52** | **13.60** |
| $LSD_{0.05}$ for A | 2.96 | 2.29 | Ns | 2.68 | 0.57 | 0.08 |
| $LSD_{0.05}$ for B | 2.96 | ns | Ns | 2.68 | ns | 0.08 |
| $LSD_{0.05}$ A x B | Ns | ns | Ns | 5.99 | ns | 0.18 |

| | **Unprimed** | **Cytokinin** | **Glycerol** | **$KNO_3$** | **Water** |
|---|---|---|---|---|---|
| | **Interaction for 1000 Seed Weight (g) in 2024** | | | | |
| **Bende white** | 229.72 | 288.84 | 338.05 | 234.66 | 269.24 |
| **Kapam 6** | 187.25 | 211.91 | 213.75 | 199.75 | 221.22 |
| **Oba 98** | 190.82 | 186.30 | 182.06 | 202.60 | 198.68 |
| **Oba Super 6** | 204.40 | 182.62 | 181.07 | 178.94 | 168.93 |
| **Sammaz 27** | 239.05 | 192.66 | 211.60 | 232.69 | 221.26 |
| | **Interaction for Cob Girth (cm) in 2024** | | | | |
| **Bende white** | 15.62 | 15.16 | 15.58 | 15.95 | 16.26 |

| | | | | | |
|---|---|---|---|---|---|
| **Kapam 6** | 12.93 | 13.42 | 12.79 | 12.57 | 13.23 |
| **Oba 98** | 12.99 | 13.07 | 13.47 | 12.80 | 12.85 |
| **Oba Super 6** | 12.30 | 13.21 | 12.73 | 12.70 | 13.25 |
| **Sammaz 27** | 12.84 | 13.28 | 14.60 | 13.43 | 12.88 |

**Table 6. Influence of priming method and variety on number of cobs, cob length and seed weight per cob of maize**

| | **Number of cobs/plot** | | **Cob length (cm)** | | **Seed weight/cob (g)** | |
|---|---|---|---|---|---|---|
| **Treatment** | **2023** | **2024** | **2023** | **2024** | **2023** | **2024** |
| **Variety (A)** | | | | | | |
| Bende white | 31.53 | 42.33 | 14.99 | 14.31 | 49.55 | 46.93 |
| Kapam 6 | 38.33 | 36.80 | 14.01 | 14.29 | 39.11 | 46.40 |
| Oba 98 | 41.33 | 29.13 | 13.76 | 14.85 | 40.63 | 48.41 |
| Oba Super 6 | 37.93 | 39.80 | 14.37 | 14.50 | 38.67 | 46.68 |
| Sammaz 27 | 37.80 | 33.07 | 12.71 | 13.83 | 34.07 | 49.39 |
| **Priming (B)** | | | | | | |
| Unprimed | 32.27 | 30.47 | 13.94 | 13.93 | 38.52 | 43.48 |
| Cytokinin | 41.33 | 40.67 | 14.08 | 14.54 | 45.79 | 52.55 |
| Glycerol | 40.80 | 40.67 | 14.14 | 14.26 | 40.64 | 48.53 |
| $KNO_3$ | 36.33 | 35.47 | 13.70 | 14.83 | 37.49 | 46.81 |
| Water | 36.20 | 33.87 | 13.96 | 14.21 | 39.58 | 46.44 |
| **Mean** | **37.39** | **36.23** | **13.97** | **14.35** | **40.40** | **47.56** |
| $LSD_{0.05}$ for A | Ns | 5.12 | 1.24 | 0.05 | 7.72 | 1.71 |
| $LSD_{0.05}$ for B | Ns | 5.12 | ns | 0.05 | ns | 1.71 |
| $LSD_{0.05}$ A x B | Ns | ns | ns | 0.11 | ns | 3.83 |

| | **Unprimed** | **Cytokinin** | **Glycerol** | **$KNO_3$** | **Water** |
|---|---|---|---|---|---|
| | **Interaction for Cob Length (cm) in 2024** | | | | |
| **Bende white** | 14.45 | 13.25 | 13.82 | 15.60 | 14.44 |
| **Kapam 6** | 13.49 | 15.25 | 14.11 | 14.61 | 14.02 |
| **Oba 98** | 13.86 | 15.09 | 15.22 | 14.78 | 15.31 |
| **Oba Super 6** | 13.88 | 14.71 | 14.45 | 14.86 | 14.57 |
| **Sammaz 27** | 13.99 | 14.41 | 13.69 | 14.31 | 12.72 |
| | **Interaction for Seed Weight per Cob (g) in 2024** | | | | |
| **Bende white** | 50.67 | 41.33 | 43.33 | 52.00 | 47.33 |
| **Kapam 6** | 38.00 | 54.67 | 52.67 | 46.67 | 40.00 |
| **Oba 98** | 43.33 | 59.40 | 50.67 | 42.00 | 46.67 |
| **Oba Super 6** | 41.40 | 50.67 | 46.67 | 43.33 | 51.33 |
| **Sammaz 27** | 44.00 | 56.67 | 49.33 | 50.07 | 46.87 |

**Table 7. Influence of priming method and variety on number of rows per cob, number of seeds per cob, seed yield per plot of maize**

| | Number of Rows/Cob | | Number of Seeds/Cob | | Seed Yield (t/ha) | |
|---|---|---|---|---|---|---|
| **Treatment** | **2023** | **2024** | **2023** | **2024** | **2023** | **2024** |
| **Variety (A)** | | | | | | |
| Bende white | 13.73 | 13.70 | 283.98 | 265.30 | 1.70 | 2.25 |
| Kapam 6 | 12.18 | 13.18 | 306.78 | 338.16 | 1.68 | 1.92 |
| Oba 98 | 13.03 | 12.69 | 314.26 | 381.67 | 1.81 | 1.62 |
| Oba Super 6 | 13.17 | 13.58 | 335.36 | 386.71 | 1.64 | 2.11 |
| Sammaz 27 | 12.45 | 12.96 | 293.78 | 340.65 | 1.45 | 1.79 |
| **Priming (B)** | | | | | | |
| Unprimed | 13.04 | 13.14 | 277.02 | 334.69 | 1.32 | 1.49 |
| Cytokinin | 12.67 | 13.40 | 344.01 | 338.58 | 2.07 | 2.37 |
| Glycerol | 12.69 | 13.20 | 319.09 | 332.75 | 1.84 | 2.18 |
| $KNO_3$ | 13.04 | 13.15 | 293.96 | 358.92 | 1.47 | 1.85 |
| Water | 13.12 | 13.22 | 300.09 | 347.55 | 1.59 | 1.79 |
| **Mean** | **12.91** | **13.22** | **308.98** | **342.50** | **1.66** | **1.94** |
| $LSD_{0.05}$ for A | 0.63 | 0.05 | Ns | 4.42 | ns | 0.31 |
| $LSD_{0.05}$ for B | Ns | 0.05 | Ns | 4.42 | 1.32 | 0.31 |
| $LSD_{0.05}$ A x B | Ns | 0.12 | Ns | 9.87 | ns | 0.69 |

| | **Unprimed** | **Cytokinin** | **Glycerol** | **$KNO_3$** | **Water** |
|---|---|---|---|---|---|
| | **Interaction for Number of Rows/Cob in 2024** | | | | |
| **Bende white** | 13.44 | 12.14 | 14.24 | 14.24 | 14.44 |
| **Kapam 6** | 12.84 | 13.34 | 13.64 | 12.84 | 13.24 |
| **Oba 98** | 13.64 | 13.84 | 12.44 | 11.39 | 12.16 |
| **Oba Super 6** | 12.94 | 14.24 | 13.24 | 13.64 | 13.84 |
| **Sammaz 27** | 12.84 | 13.44 | 12.44 | 13.64 | 12.44 |
| | **Interaction for Number of Seeds/Cob in 2024** | | | | |
| **Bende white** | 226.18 | 215.95 | 284.66 | 334.41 | 265.30 |
| **Kapam 6** | 385.97 | 270.62 | 322.37 | 352.57 | 359.29 |
| **Oba 98** | 359.19 | 481.15 | 400.71 | 312.85 | 354.47 |
| **Oba Super 6** | 345.04 | 358.08 | 344.54 | 427.29 | 458.59 |
| **Sammaz 27** | 357.08 | 367.11 | 311.44 | 367.51 | 300.11 |
| | **Interaction for Seed Yield (t/ha) 2024** | | | | |
| **Bende white** | 2.07 | 1.87 | 2.25 | 2.76 | 2.29 |
| **Kapam 6** | 1.37 | 2.4 | 2.19 | 1.84 | 1.77 |
| **Oba 98** | 1.16 | 2.51 | 1.91 | 1.23 | 1.27 |
| **Oba Super 6** | 1.39 | 2.66 | 2.41 | 2.07 | 2.03 |
| **Sammaz 27** | 1.47 | 2.42 | 2.11 | 1.38 | 1.58 |