



Assessing the susceptibility of some maize hybrids to fall armyworm (*Spodoptera frugiperda*) infestation



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TWO FIELD experiments were conducted at the Desert Research Center station in Kharga Oasis, located in the New Valley Governorate within the Egyptian western desert, during the successive growing seasons of 2022 and 2023. The objective of these experiments was to evaluate the influence of maize sowing date on the susceptibility of seven maize hybrids to Fall Armyworm (FAW) infestation. The study tested the three distinct sowing dates (mid-July, first of August, and mid-August) and utilized seven maize hybrids from HyTech Company, namely: HT-2066, HT-2088, HT-2031, HT-2036, HT-1100, HT-1101, and HT-2055. The findings revealed remarkable variations in the performance of the maize hybrids and the levels of infestation. The results demonstrated significant discrepancies in the performance of the maize hybrids and the percentage of infestation. Specifically, hybrid SC-2088 exhibited the highest mean value of percentage of infestation by fall armyworm among all maize hybrids, reaching 39.32%. Conversely, hybrid HT-2066 showed the lowest mean value of infestation rate, recorded at 22.13%. Furthermore, it was observed that all maize hybrids exhibited the highest percentage of infestation during the first sowing date 15 th July, which reached 42.52%. Conversely, planting in 15 th August resulted in the lowest value infestation rate of 17.05%.

Keywords: Maize, *Spodoptera frugiperda*, infestation sensitivity, fall armyworm (FAW).

Introduction

Maize (*Zea mays* L.) is the world's second most widely distributed cereal crop after wheat. It occupies a preeminent position in Egypt's agricultural landscape as a summer-cultivated grain crop (Mohamed, 2025). Corn is regarded as a pivotal source of nutrition for both humans and animals, underscoring its critical role in Egypt's food security (Youssef et al., 2024). Maize is Egypt's second-largest cereal crop, serving as a field crop and a dietary staple (Hafez, and Abdelaal, 2015). In 2022, Egypt's maize production was estimated to be approximately 7.5 million metric tons (Abdelhamid et al., 2024 and FAO, 2024). It is grown for a variety of uses, including human consumption, feed for animals and poultry, the production of cooking oils and starches, and the fermentation sector. Additionally, maize is grown for silage and green fodder (Abdel-Lattif et al., 2018).

Agricultural pests have been demonstrated to exert a substantial deleterious effect on agricultural production and natural resources. *Spodoptera frugiperda*, commonly known as the fall armyworm (FAW), is a lepidopteran pest that has been documented to cause harm to over 350 plant species, resulting in substantial agricultural losses, particularly in maize crops. The first documented instance of FAW in the United States occurred in 1876, and since then, it has spread to Europe, Africa, India, and China (Gichuhi et al., 2020). *Spodoptera frugiperda* is a polyphagous pest that causes widespread damage, particularly to maize and sorghum crops, throughout Africa. This pest has demonstrated the capacity to produce multiple generations within a single mating season, exhibit rapid evolutionary changes, and is increasingly becoming an endemic pest worldwide. The classification of this pest as a class I crop pest

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underscores its potential threat to maize production and food security, with the potential for significant financial losses, as evidenced by its initial detection in China just one year after its discovery (Qi et al., 2024).

According to Goergen et al. (2016), the first documented occurrence of FAW was in West Africa in 2016, and it has since proliferated extensively across the continent (Day et al., 2017; Nagoshi et al., 2018). By 2018, FAW had been reported in most Sub-Saharan African nations (Rwomushana et al., 2018). In 2019, the Egyptian Ministry of Agriculture reported the presence of the pest on maize plants in Aswan governorate (Dahi et al., 2020; Youssef et al., 2024).

The observed migratory patterns of the fall armyworm in North America are indicative of its rapid proliferation in the African continent. The timing of this behavior corresponds with the seasonal northward movement of warmer temperatures and maize planting that occurs after the winter season, as well as air transportation facilities that support long-distance flights northward (Nagoshi et al., 2012). Genetic analysis has substantiated that the movement patterns of the fall armyworm were accurately predicted by projections utilizing a migration model based on these parameters (Westbrook et al., 2016). However, the migratory patterns of the fall armyworm in Africa remain uncertain due to substantial variations in temperature, agricultural practices, and wind patterns when compared to North America. This poses a significant obstacle to the creation of regional and area-wide strategies for sustainable pest management (Nagoshi et al., 2018).

Pesticides are among the most significant means of controlling FAW on a global scale. Despite their high efficiency against pests, pesticides pose a significant threat to human health and the environment. The unregulated use of pesticides has led to the development of insect resistance to certain chemicals. It is imperative to recognize that pesticides are not the sole solution for pest management; alternative approaches should be explored and implemented. One such approach involves the utilization of pest-resistant hybrids as a component of an integrated pest management strategy (Youssef et al., 2024).

Conversely, there is an urgent need to restructure agricultural crop cultivation to prioritize the development of hybrids that demonstrate high

tolerance to elevated temperatures and water stress resulting from drought conditions. To mitigate the consequences of erratic weather patterns, farmers should implement staggered sowing dates, while this approach may result in a reduction in grain weight, the number of grains per row, and the length of the cob, it offers a safeguard against climatic fluctuations (Norwood, 2001). Research conducted by Danaie (2007) and Beiragi et al. (2011) has demonstrated, through statistical evaluations, the substantial impact of sowing dates on plant height, grain weight, physiological maturity, and total leaf count. Ongoing field studies and observations have led to the refinement of thermal thresholds for various growth phases in maize.

Numerous investigations have revealed that the timing of maize planting has an impact on the speed and extent to which FAW populations establish themselves and spread within a maize crop. Consequently, the period during which maize is planted can significantly influence the vulnerability of the crop to FAW attack, affecting the subsequent severity of infestation (Clark et al., 2007; Cruz et al., 2008; Abd El mageed et al., 2022; Olyme et al., 2022). On the other hand, there are many studies that demonstrate the difference in the degree of sensitivity of maize hybrids to fall armyworm infection and their difference in resistance to infection (Baudron et al., 2018; Wightman, 2018; Matova et al., 2022; Ni et al., 2024).

The main objective of this investigation was to assess the impact of maize sowing date on the sensitivity of some maize hybrids to Fall Armyworm (*Spodoptera frugiperda*) infestation in the Kharga oasis of Egypt.

Materials and Methods:

The study site description

Two field experiments were conducted at the Desert Research Center station in Kharga Oasis, the New Valley Governorate (25.52° N and 30.61° E) during the successive growing seasons of 2022 and 2023 to evaluate the impact of maize sowing dates the sensitivity of seven different commercial maize hybrids to Fall Armyworm infestation.

The Kharga oasis has a tropical arid climate with average temperatures ranging from a minimum of 2°C in January to a maximum of 41°C in August. The highest recorded temperature was 52°C, the lowest was 2°C. The relative humidity is about 39%.

Table 1. Physical and chemical properties of the experimental soil in both growing seasons.

Season	Particles (%)			Texture	EC (ppm)	pH	P (ppm)	Available aions (meq/l)							
	Sand	Silt	Clay					N	K	Ca	Mg	CO ₃	HCO ₃	Cl ⁻	SO ₄
2022	77.3	15.4	7.3	sand	951	8.2	0.54	0.67	1.35	1.10	0.89	4.32	7.15	104.6	0.82
2023	78.5	14.9	6.6		936	8.1	0.65	0.84	1.44	1.23	0.78	4.13	6.87	95.9	0.71

Plant materials

Seven outstanding yellow and white maize hybrids (Table 2) were obtained from Misr Hytech Seed Company.

Table 2. The list of cultivation commercial hybrids in 2022 and 2023.

No.	Hybrid No.	Type
1	Hytech-2066	Single cross Yellow Hybrid (SCY).
2	Hytech-2088	Single cross Yellow Hybrid (SCY).
3	Hytech-2031	Single cross White Hybrid (SCW).
4	Hytech-2036	Single cross White Hybrid (SCW).
5	Hytech-1100	Three ways cross White Hybrid (TWCW).
6	Hytech-1101	Three ways cross White Hybrid (TWCW).
7	Hytech-2055	Single cross Yellow Hybrid (SCY).

Experimental Design and layout

According to recommendations from the Ministry of Agriculture, the Desert Research Center in Kharga ensured that all agronomic practices were standardized and uniformly applied across all treatments in both seasons. Phosphorus fertilizer (15.5% P₂O₅) was applied at a rate of 480 kg/ha immediately pre-sowing with soil preparation. A mineral nitrogen fertilizer in the form of ammonium nitrate (33.5% N) was used at a total rate of 700 kg/ha, divided into two equal applications. Additionally, potassium sulfate, (48% K₂O) was used as a potassium source at a rate of 120 kg K₂O/ha. Maize was planted using a drip irrigation system, with rows spaced 70 cm apart and 25 cm between hills along a line, each plot size was 21 m². Sowing was done at three dates in both seasons (15th July, 1st August and 15th August). The experiment was conducted using a split-plot design with four replications, where the main plots were assigned to the seven maize hybrids, while the sub-plots were designated for the different three sowing dates.

Studied Characters and Measurements

Samples harvesting was done when grain moisture content ranged between 20% and 30%. The percentage of plant infestation was determined using the three inner ridges of each experiment plot, and the mean percentage of infested plants was calculated from a sample of 10 plants. Grain yield (kg/ha) was calculated by harvesting plants in each experimental plot, as well as yield components, such as 100-grain weight (g), plant height (cm), ear height (cm), ear length (cm), and number of grains /rows, were measured in samples of ten plants.

Statistical Analysis

All data were analyzed using analysis of variance (ANOVA) at a 5% significance level to evaluate the main effects and their interactions. The least significant difference (LSD) test was performed to determine the significant differences between individual means. All statistical analyses were performed using the statistical program Co Stat 6.311 (2005).

Results**Maize Hybrids' Sensitivity to Fall Armyworm**

The data in Table 3 illustrates the effect of sowing dates and maize hybrids on the percentage of armyworm infestation. The results highlighted the variation in the infestation rates among all the planted hybrids, which could be attributed to the variation in the resistance of the planted hybrids and their susceptibility to infection as well as the sowing date.

The results show that the hybrids (HT-2031, and HT-1100) are the best hybrids in terms of resistance to armyworm infestation, as the infection rate in the first season reached 22.13% and 22.63% for both hybrids, respectively, while the first hybrid was more sensitive to infection, where the highest peak was recorded an infection rate of 45.99% with clear significant differences.

On the other hand, the lowest infection rate was recorded when maize was planted in mid-August (third date), reaching 24.19%, while the highest infection rate was recorded when maize was planted on the first of August, reaching 43.16%. When

studying the effect of the interaction between the sowing date and the hybrids used, it became clear that the best hybrid used was the **(SC-2031)** hybrid when planted in mid-August, as the infection rate

reached 11.38%, while the **(SC-2066)** hybrid recorded the highest infection rate ever when planted on the second date, which is the first of August.

Table 3. Effect of sowing date on the percentage of armyworm infestation maize (%) during the first season (2022).

Hybrid (B)	The first season (2022) Sowing date (A)			Mean (A)
	15 th July	1 st August	15 th August	
HT-2066	38.89	65.00	34.08	45.99
HT -2088	45.00	45.56	30.89	40.48
HT -2031	23.89	31.11	11.38	22.13
HT -2036	41.67	45.56	27.89	38.37
HT -1100	22.78	30.00	15.11	22.63
HT -1101	34.44	42.22	27.56	34.74
HT -2055	29.78	42.67	22.45	31.63
Mean (B)	33.78	43.16	24.19	
LSD (0.05)	(A)	1.23		
	(B)	2.19		
	(A*B)	2.87		

During the second season of experiments, significant differences were observed among the planted hybrids and the planting date (Table 4). However, the results showed that the fifth hybrid exhibited the highest resistance to infestation, with an infection rate of 21.1%, while the first hybrid was the most susceptible, with an infection rate of 41.37%. Additionally, the second season's results aligned with those of the first season in terms of planting dates. The third planting date (mid-August) recorded

the lowest infection rate at 22.64%, whereas the second planting date (August 1) exhibited the highest average infection rate at 44.48%. When studying the effect of the interaction between planting date and planted hybrids, the lowest average infection rate was recorded when the hybrid was planted in mid-August, reaching 12.12%, while the highest average infection rate was recorded in the first hybrid when planted on August 1st, reaching 63.31%.

Table 4. Effect of sowing date on the percentage of armyworm infestation maize (%) during the second season (2023).

Hybrid (B)	The second season (2023) Sowing date (A)			Mean (A)
	15 th July	1 st August	15 th August	
HT-2066	37.66	63.31	23.14	41.37
HT-2088	45.35	47.13	20.38	37.62
HT-2031	28.89	41.68	21.26	30.61
HT-2036	32.89	44.15	28.01	35.02
HT-1100	22.01	29.18	12.12	21.10
HT-1101	40.54	44.36	28.92	37.94
HT-2055	27.12	41.56	24.65	31.11
Mean (B)	33.49	44.48	22.64	
LSD (0.05)	(A)	0.44		
	(B)	1.69		
	(A*B)	2.12		

Maiz Hybrid Productivity

The table below (5) shows how the sowing date affects the production of various maize hybrids during the first season. The data demonstrates that

there were significant differences between the sowing date of maize hybrids, with (HT-2031) having the highest yield, with an average

productivity of 11.953 tons per hectare. The results also show that the optimal sowing date for maize hybrids was in mid-August, followed by mid-July, with a yield increase of 44.9% and 36.8% respectively, compared to early August, which recorded the lowest yields. The results also show the superiority of white maize hybrids, whether single or three ways cross, in terms of productivity, with clear significant differences between them and

yellow hybrids. When the effect of interaction was studied, the results did not differ much from what was previously mentioned, with the hybrid (HT-2031) recording the highest productivity ever when planted in mid-August, reaching 13.393 tons/ha, and the hybrid (HT-1101) recording the lowest productivity among the hybrids when planted in the first of August, reaching 5.972 tons/ha.

Table 5. Effect of sowing date on maize productivity (kg/ha) during the first season (2022).

Hybrid (B)	The First season (2022) Sowing date (A)			Mean (A)
	15 th July	1 st August	15 th August	
HT-2066	7399.00	5991.00	9084.50	7491.50
HT-2088	8290.00	6841.50	9187.50	8106.33
HT-2031	12714.00	8753.00	13393.00	11953.33
HT-2036	12620.67	8645.50	12717.00	11327.72
HT-1100	12119.00	9645.50	12944.50	11569.67
HT-1101	9863.67	5972.50	9897.50	8577.89
HT-2055	9514.50	7178.00	9626.50	8773.00
Mean (B)	10360.12	7575.29	10978.64	
LSD (0.05)	(A)	102.37		
	(B)	75.80		
	(A*B)	137.35		

The data in Table (6) show the impact of sowing date on the productivity of various maize hybrids during the second season. The findings reveal significant differences across maize hybrids based on their sowing dates, with (HT-2031) achieving the highest yield, with an average productivity of 11.741 tons per hectare. The statistics also show that the optimal sowing date for maize hybrids was mid-August, followed by mid-July, in contrast, the lowest yield was recorded for maize hybrids sown

on August 1st, with hybrid (HT-2066) producing only 7.186 tons per hectare. The findings also demonstrate a comparison between white and yellow maize hybrids in terms of productivity. Interaction data revealed that hybrid HT-2031 outperformed all other hybrids, achieving the highest recorded productivity of 13.80 tons/ha when planted in mid-August. In contrast, hybrid HT-2066 exhibited the lowest productivity, yielding 7.169 tons/ha when planted in first August.

Table 6. Effect of sowing data on maize productivity (kg/ha) during the second season (2023).

Hybrid (B)	The second season (2023) Sowing date (A)			Mean (A)
	15 th July	1 st August	15 th August	
HT-2066	7897.50	7168.50	10206.00	8424.00
HT-2088	9075.00	7897.50	10075.00	9015.83
HT-2031	12724.50	9419.00	13080.00	11741.17
HT-2036	11766.50	9794.50	11645.00	11068.67
HT-1100	11103.00	8729.50	11673.00	10501.83
HT-1101	10000.50	7402.00	10224.50	9209.00
HT-2055	10860.50	8075.00	11327.50	10087.67
Mean (B)	10489.64	8355.14	11175.86	
LSD (0.05)	(A)	95.89		
	(B)	111.23		
	(A*B)	122.95		

100 kernels weight (g.)

The results in Tables 7 and 8 illustrate the effect of both the hybrid and the sowing date on the weight of

100 kernels. Hybrid (HT-1100) showing superiority across both seasons, with an average weight of 100 kernels (37.09, 37.62 g) for both seasons,

respectively. In contrast, hybrid **HT-2088** recorded the lowest average kernel weight, measuring 29.77 g and 31.21 g across the two seasons.

The results, however, demonstrate significant difference in the performance of all hybrids based on the sowing date, with hybrids planted in mid-August outperforming those sown at other times. The average 100- kernel weight of hybrids planted in mid-August increased to 33.84 g and 35.10 g during the first and second seasons, respectively. In contrast, the lowest average weight was recorded when hybrids were planted on first August, at 30.67

g and 30.86 g for the first and second seasons, respectively.

When the interaction was analyzed, the results showed that hybrid (**HT-1100**) had the highest 100-kernel weight when planted in mid-August, averaging 39.89 g and 41.15 g in the first and second growing seasons, respectively. In contrast, hybrids **HT-2055**, along with the first and third hybrids, recorded the lowest 100-kernel weight (28.69 g) when planted in early August during the first season. Meanwhile, hybrid **HT-2088** exhibited the lowest 100-kernel weight (29.23 g) in the second season when it was shown in first August.

Table 7. Effect of sowing date on 100 kernels weight (g) during the first season (2022).

Hybrid (B)	The first season (2022) Sowing date (A)			Mean (A)
	15 th July	1 st August	15 th August	
HT-2066	30.25	28.96	31.36	30.19
HT-2088	29.98	28.96	30.36	29.77
HT-2031	36.15	33.44	37.25	35.61
HT-2036	31.28	30.38	32.32	31.33
HT-1100	37.27	34.12	39.89	37.09
HT-1101	32.36	29.87	33.56	31.93
HT-2055	31.98	28.96	32.15	31.03
Mean (B)	32.75	30.67	33.84	
LSD (0.05)	(A)	0.28		
	(B)	0.44		
	(A*B)	0.68		

Table 8. Effect of sowing date on 100 kernels weight (g) during the second season (2023).

Hybrid (B)	The second season (2023) Sowing date (A)			Mean (A)
	15 th July	1 st August	15 th August	
HT-2066	31.17	30.24	32.45	31.29
HT-2088	32.01	29.23	32.38	31.21
HT-2031	37.02	32.78	38.63	36.14
HT-2036	31.78	29.69	33.60	31.69
HT-1100	37.83	33.89	41.15	37.62
HT-1101	33.06	30.23	33.91	32.40
HT-2055	32.31	29.97	33.61	31.96
Mean (B)	33.60	30.86	35.10	
LSD (0.05)	(A)	0.19		
	(B)	0.27		
	(A*B)	0.39		

Plant height (cm)

The results in figure (1) showed the effect of sowing date, as well as various hybrids on plant height (cm) during 2022 and 2023 seasons. The data show variations in hybrid performance across different planting dates. Hybrid **HT-1100** achieved the

maximum plant height when planted in mid-August, reaching 236.67 cm and 231.67 cm in the first and second seasons, respectively. In contrast, hybrid **HT-2066** recorded the shortest plant height when sown in mid-July during both growing seasons.

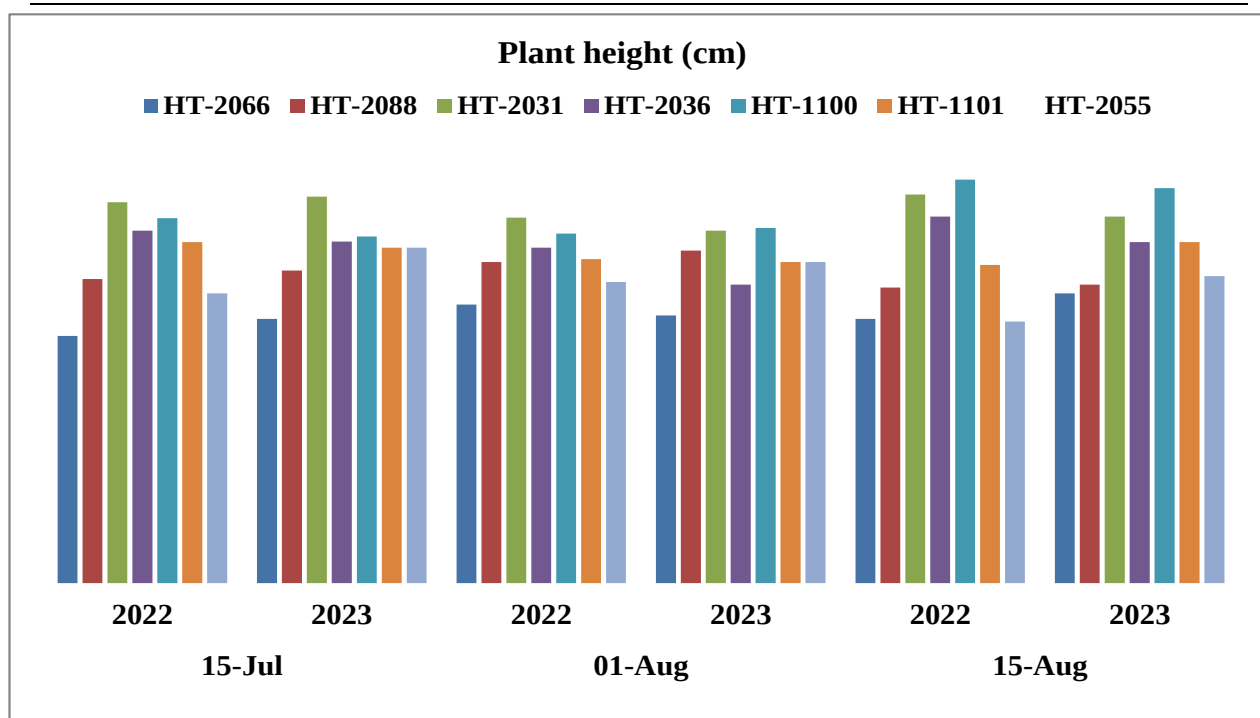


Fig. 1. Effect of sowing date on plant height (cm) of some maize hybrids in both growing seasons (2022 and 2023).

The results in Figure 2, demonstrate the effect of sowing date and various hybrids on ear height. The highest ear height in mid-July was obtained from by the third hybrid (HT-2031). On another hand the fifth hybrid (HT-1100) recorded the highest ear height during the other two sowing dates (in the first

and mid-August) in the two growing seasons. Generally, the highest ear height was 98.33 cm and 99.33 cm during the two seasons. While the lowest ear height of maize was 51.67 cm when the first hybrid (HT-2066) was planted during the first season when it was planted in first August.

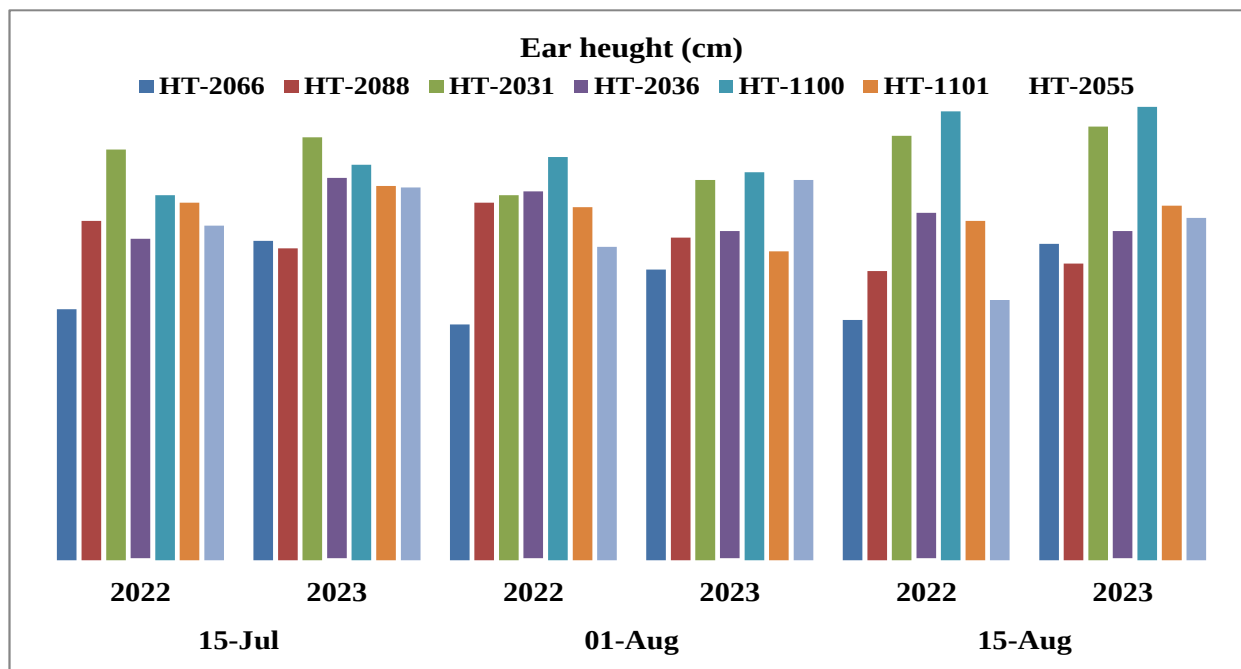


Fig. 2. Effect of sowing date on ear height (cm) of some maize hybrids in both growing seasons (2022 and 2023).

The hybrid (HT-1100) exhibited superiority in ear length during the three different planting dates with significant differences observed. It achieved the maximum average ear length when planted in mid-August, measuring 18.00 cm and 17.67 cm during

the first and second seasons, respectively. However, the results show that the hybrid (HT-1101) had recorded the shortest ear length when planted on the first of August, reaching 12 cm and 11 cm during the first and second seasons, respectively (fig. 3).

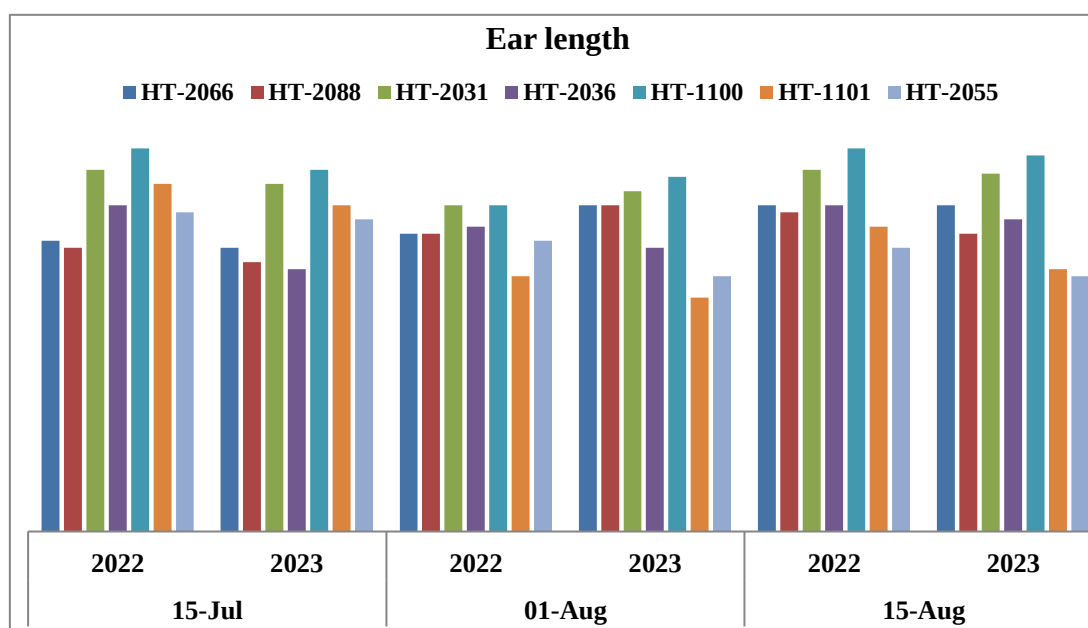


Fig. 3. Effect of sowing date on ear length (cm) of some maize hybrids in both growing seasons (2022 and 2023).

All maize hybrids exhibited varying responses to the sowing date, resulting in significant differences in their performance. The number of grains per row ranged from 13.3 to 38.67, with the highest values recorded for hybrids (HT-1100) and (HT-2031)

when sown in mid-August across the two growing seasons. Conversely, the lowest values were observed in hybrids (HT-2036) and (HT-1101) (Fig.4).

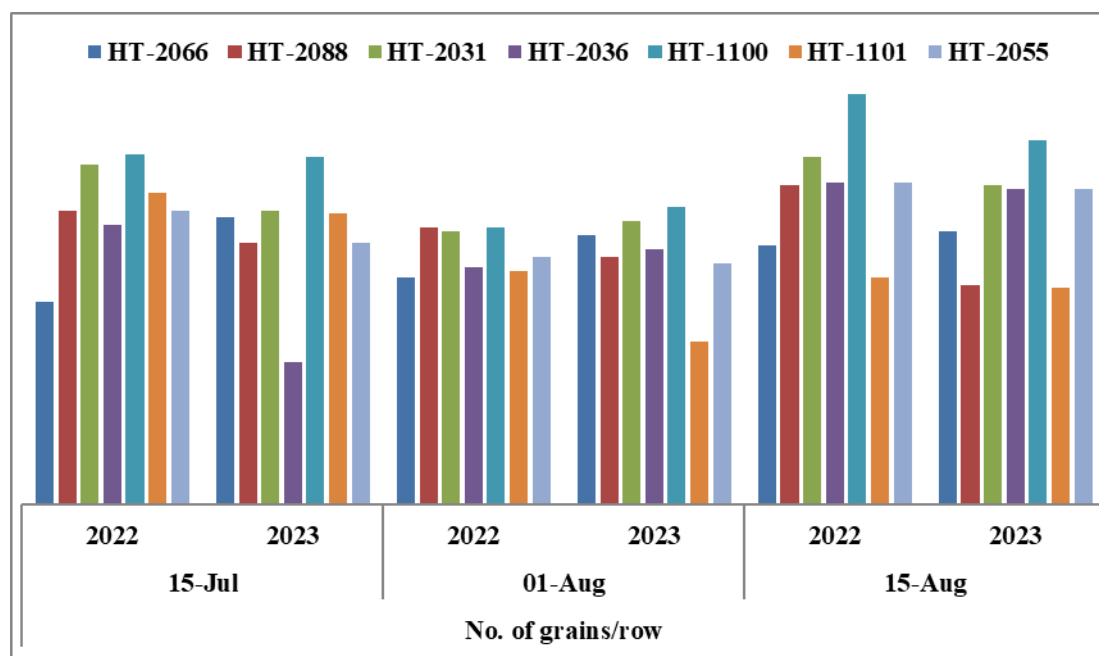


Fig. 4. Effect of sowing date on number of grains per row of some maize hybrids in both growing seasons (2022 and 2023).

Discussion

The timing of sowing significantly influences maize growth and development, primarily due to weather variability interacting with crop phenology and grain yield (Hussain *et al.*, 2016; Abbas *et al.*,

2019). Any alteration in the sowing date can affect the crop growth rate (CGR) and phenology, thereby impacting overall productivity (Abbas *et al.*, 2017; Parker *et al.*, 2017; Liaqat *et al.*, 2018).

Optimizing planting schedules is a crucial agricultural practice aimed at aligning the timing of crop phenological events with favorable weather conditions for optimal crop development (Choi *et al.*, 2017; Abbas *et al.* 2019). In respect to Mason *et al.* (2018); Zhou *et al.* (2017), showed that variability between seasons, particularly in temperature, growing degree days, photo-thermal units, and helio-thermal units, has a substantial impact on maize grain yield. Maize cultivation during spring or autumn affects both source and sink capacities.

Earlier sowing may reduce intercepted photosynthetically active radiation due to delayed leaf area development. Additionally, higher minimum and maximum temperatures associated with delayed sowing can further diminish the amount of intercepted radiation during the critical 15-day period surrounding anthesis. This reduction in available calendar time for crop development ultimately leads to lower grain yield and its components (Tariq *et al.*, 2018). Furthermore, cool nights during the grain filling stage may adversely affect radiation-use efficiency (Tsimba *et al.*, 2013; Nyagumbo *et al.*, 2017).

Grain yield in maize is primarily influenced by the number of kernels per unit area (Chapman, and Edmeades, 1999). Nevertheless, fluctuations in kernel weight can also impact overall crop yield (Zhou *et al.*, 2016). The accumulation of dry matter in the kernels is significantly influenced by growth conditions, particularly stresses such as temperature, drought, and precipitation during the grain-filling period. These factors, intensified by global climate change, further impact maize productivity (Borrás, and Gambín, 2010; Wang *et al.*, 2012).

To ensure a consistent maize yield, it is essential to understand the effects of weather conditions during the grain filling period on dry matter accumulation in kernels and the final kernel weight (KW) of maize. Numerous studies have explored the correlation between grain filling and environmental factors. It has been indicated that temperature serves as the primary climatic element affecting grain filling, with an optimal range of 27–32 °C during this phase (Commuri, and Jones, 1999). Nevertheless, temperatures exceeding 32 °C can reduce grain yield (Cairns *et al.*, 2012). Specifically, exposure to 35 °C may lead to kernel abortion, while prolonged exposure to 10 °C for

five consecutive days may hinder KW increase (Zhou *et al.*, 2017). Additionally, light intensity plays a crucial role in maize growth, influencing both yield and quality (Setter *et al.*, 2001). Drought stress during grain filling can significantly shorten this phase, thereby limiting kernel weight accumulation. However, When maize is planted at an inappropriate time, the plants are exposed to various environmental stresses during different growth stages, the most critical being the grain-filling period. This negatively affects the yield productivity (Li *et al.*, 2012; Zhou *et al.*, 2017).

Environmental factors, particularly temperature, significantly influence the growth and development of plants. Elevated summer temperatures, coupled with extended periods of drought, have highlighted the necessity for an advanced technological approach to maize cultivation, especially during the critical yield formation phase, to alleviate the adverse effects of these harsh climatic conditions. Each maize hybrid has an optimal sowing date, and any deviation from this date can lead to a significant yield reduction. (Sárvári, and Futó, 2000; Dahmardeh, 2012).

Conclusion

This research has demonstrated that planting time significantly influences the susceptibility of maize hybrids to Fall Armyworm infestations, as well as their overall productivity and its various components. The hybrids (SC-2031) and (TWC-1100) exhibited the best performance under late planting conditions (August 15), recording the lowest levels of armyworm infestation across different sowing dates throughout the both seasons, while the hybrid (SC-2066) experienced the highest average incidence. The least damage from infestation was observed with mid-August planting, averaging 24.19% and 22.64% in the first and second seasons, respectively. Conversely, the highest infestation rates and damage were recorded with early August planting, reaching 43.16% and 44.48%, respectively.

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