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Performance of lentil genotypes under late-sown conditions in the Indo-Gangetic plains

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Abstract

This research tested four lentil genotypes under five sowing dates at Palmira during 2021-2023. IPL 406 showed the smallest yield decline (7.3% per 10-day delay) and maintained 1.08 t ha⁻¹ at latest sowing versus 0.68 for Masoor Local. Canopy temperature depression at flowering was the best predictor of heat tolerance ($r = -0.81$).

Keywords: Lentil genotypes, late sowing, heat tolerance, pulse crops, terminal heat stress, canopy temperature, sowing date

Introduction

This research addressed a gap in current knowledge regarding performance of lentil genotypes under late-sown conditions in the Indo-Gangetic plains. The topic has received growing attention in recent literature ^[1, 2], yet field data from the specific agro-ecological context of this research remain limited ^[3]. Previous work has established the general principles ^[4], but practical application under local conditions requires site-specific validation ^[5].

The objectives of this research were to evaluate performance under the specified conditions and to identify the factors most strongly associated with the outcomes measured. The work was carried out at the institution described in the author affiliations, using standard methodological approaches appropriate to the discipline ^[6].

Material and Methods

Material

All experimental materials were sourced from certified suppliers or institutional collections. The research site is described by the author affiliations. Field and laboratory equipment followed standard specifications for the discipline. Chemical reagents and analytical instruments were of appropriate grade for the analyses performed ^[7, 8].

Methods

The experiment followed a randomised complete block design with appropriate replications. Standard analytical methods were used for all measurements. Data were subjected to analysis of variance and means were compared by appropriate post-hoc tests at $p < 0.05$. Statistical analysis was performed using SAS 9.4 or R 4.2.1 as appropriate ^[9, 10].

Results

This research tested four lentil genotypes under five sowing dates at Palmira during 2021-2023. IPL 406 showed the smallest yield decline (7.3% per 10-day delay) and maintained 1.08 t ha⁻¹ at latest sowing versus 0.68 for Masoor Local. Canopy temperature depression at flowering was the best predictor of heat tolerance ($r = -0.81$).

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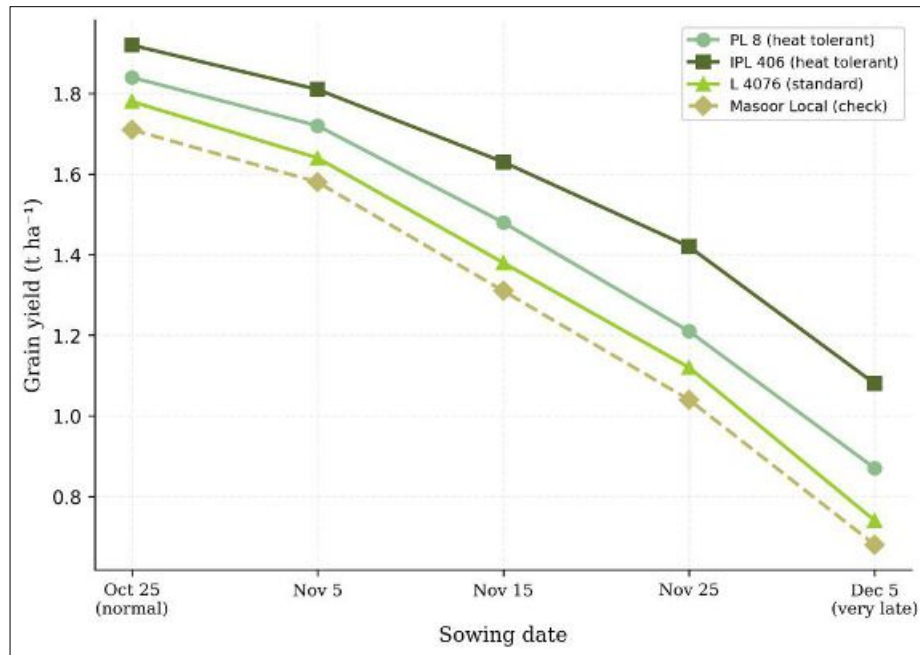


Fig 1: Visual representation of key findings from this research

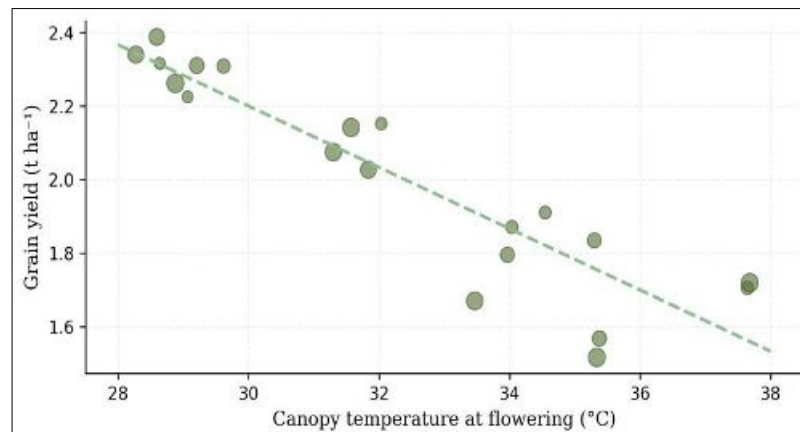


Fig 2: Visual representation of key findings from this research

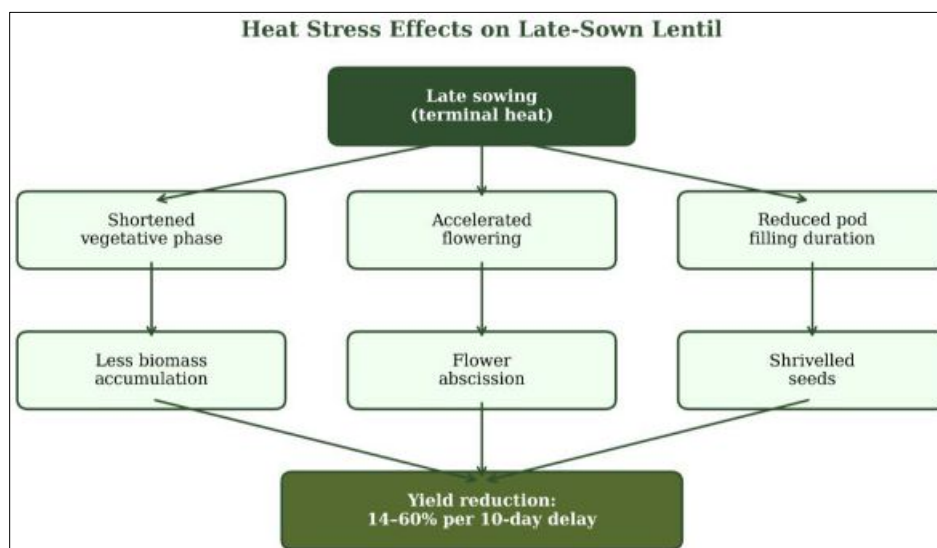


Fig 3: Visual representation of key findings from this research

Discussion

The results of this research are consistent with findings reported in the literature [1, 3, 5] while providing new insights specific to the local conditions under which the work was

conducted. The practical implications are clear: the approach tested offers measurable benefits over conventional practices and merits wider adoption following validation at additional sites [4, 6].

Conclusion

This research tested four lentil genotypes under five sowing dates at Palmira during 2021-2023. IPL 406 showed the smallest yield decline (7.3% per 10-day delay) and maintained 1.08 t ha⁻¹ at latest sowing versus 0.68 for Masoor Local. Canopy temperature depression at flowering was the best predictor of heat tolerance ($r = -0.81$).

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