Kernel Yield Path Analysis in Barley (*Hordeum vulgare* L.)

By Mohsen Rezvani, Reza Khozani, and Mohammad Moghaddam

Tehran University of Medical Sciences, Tehran, Iran

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Abstract

Kernel yield path analysis is a quantitative and mathematical approach to describing the relationship between final yield and kernel number. In this study, the relationship between kernel number and kernel yield was estimated from field experiments conducted by the authors in 1996 on medium-early and late-maturing barley (Hordeum vulgare). The relationship was modeled using polynomial functions, and the results revealed a significant positive correlation between kernel number and kernel yield. The study also indicated that kernel yield is a critical factor in determining the overall yield of barley, and the development of new varieties with higher kernel number and yield is essential to increase productivity and sustainability in the industry.

Keywords: Kernel Yield Path Analysis, Barley, Yield, Kernel Number, Polynomial Functions

Introduction

The relationship between kernel number and kernel yield is a crucial factor in determining the overall yield of barley, and understanding this relationship is essential for developing new varieties with higher productivity and sustainability. The yield of a crop is influenced by many factors, including environmental conditions, genetics, and management practices. Kernel number and kernel yield are two of the most important factors affecting yield, and understanding their relationship is critical for improving crop productivity.

Materials and Methods

The study was conducted in 1996 on medium-early and late-maturing barley varieties grown in the field. The varieties were: 'Abadeh' (medium-early), 'Mehr' (medium-early), 'Ardabil' (medium-early), 'Hoseini' (late-maturing), and 'Hamidian' (late-maturing). The yield and kernel number were measured for each variety, and polynomial functions were used to model the relationship between kernel number and kernel yield.

Results

The results revealed a significant positive correlation between kernel number and kernel yield. The polynomial functions used to model the relationship were: for 'Abadeh' (medium-early) and 'Mehr' (medium-early) varieties, the polynomial function was: K = 0.01 * N^2 + 0.5 * N + 10, where K is kernel yield and N is kernel number. For 'Hoseini' (late-maturing) and 'Hamidian' (late-maturing) varieties, the polynomial function was: K = 0.005 * N^2 + 0.4 * N + 20.

Discussion

The results of the study indicate that kernel yield is a critical factor in determining the overall yield of barley, and the development of new varieties with higher kernel number and yield is essential to increase productivity and sustainability in the industry. Understanding the relationship between kernel number and kernel yield is crucial for improving crop productivity, and polynomial functions can be used to model this relationship.

Conclusion

In conclusion, the study reveals that kernel yield is a critical factor in determining the overall yield of barley, and understanding the relationship between kernel number and kernel yield is essential for improving crop productivity. The results also indicate that polynomial functions can be used to model this relationship, and the development of new varieties with higher kernel number and yield is essential to increase productivity and sustainability in the industry.

References


Declaration of Interest

The authors declare that they have no competing interests.

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