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EFFECTS OF PLANTING TIME AND PLANTING SYSTEM ON THE GROWTH AND YIELD OF SELECTED GARLIC GERMPLASM

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Mustafa Rahman

Dept. Of Horticulture, Bangladesh Agricultural University, Bangladesh

ABSTRACT

Garlic (*Allium sativum*) is an important bulb crop known for its culinary and medicinal uses. The growth and yield of garlic can be influenced by various factors, including planting time and planting system. This study aimed to investigate the effects of planting time and planting system on the growth and yield of selected garlic germplasm. The experiment was conducted using a randomized complete block design with three replications. Four different planting times (early, mid, late, and very late) and two planting systems (conventional flatbed and raised bed) were evaluated. Growth parameters such as plant height, number of leaves, and bulb diameter were recorded, along with yield parameters such as bulb weight, bulb diameter, and bulb quality. The results indicated that planting time significantly affected the growth and yield of garlic, with early and mid-planting times resulting in higher growth parameters and yield compared to late and very late planting times. Similarly, the planting system influenced the growth and yield, with the raised bed system showing better results compared to the conventional flatbed system. These findings provide valuable insights into optimizing garlic cultivation practices by considering the appropriate planting time and planting system to enhance growth and maximize yield.

KEYWORDS

Garlic, *Allium sativum*, planting time, planting system, growth parameters, yield parameters, germplasm, bulb weight, bulb diameter, bulb quality.



INTRODUCTION

Garlic (*Allium sativum*) is a widely cultivated bulb crop known for its distinct flavor and medicinal properties. It is an essential ingredient in various cuisines and has been used traditionally for its health benefits. The growth and yield of garlic can be influenced by several factors, including planting time and planting system. Optimizing these factors is crucial to maximize garlic production and ensure quality bulb development. This study aims to investigate the effects of planting time and planting system on the growth and yield of selected garlic germplasm.

Planting time refers to the specific period when garlic cloves are planted in the field. It plays a crucial role in determining plant establishment, growth, and subsequent yield. The appropriate planting time ensures favorable environmental conditions, including temperature and photoperiod, for optimal plant growth. Additionally, planting time can affect the overall duration of the crop cycle and influence the final bulb size and quality.

Planting system refers to the arrangement and management practices employed during garlic cultivation. Different planting systems, such as conventional flatbed and raised bed systems, offer varying advantages in terms of soil moisture management, nutrient availability, weed control, and overall plant growth. Selecting an appropriate planting system can contribute to improved growth, yield, and bulb quality.

Understanding the effects of planting time and planting system on garlic growth and yield is crucial for farmers and researchers seeking to optimize garlic cultivation practices and enhance productivity. By exploring the interactions between planting time, planting system, and garlic germplasm, valuable

insights can be gained to improve garlic production systems.

METHOD

Germplasm Selection:

Several garlic germplasm lines are selected based on their adaptability and potential yield under the local growing conditions.

Germplasm lines with diverse genetic backgrounds are chosen to capture a range of characteristics and traits.

Experimental Design:

The experiment is set up using a randomized complete block design with three replications.

Each replication consists of different combinations of planting time and planting system treatments.

Planting Time:

Four planting time treatments are selected: early, mid, late, and very late, based on local climatic conditions and phenological stages of garlic.

Garlic cloves are planted in each treatment at the designated time following recommended practices.

Planting System:

Two planting systems are evaluated: conventional flatbed and raised bed systems.

In the conventional flatbed system, garlic cloves are planted directly in prepared flatbeds with traditional spacing and row arrangements.

In the raised bed system, raised beds are prepared with improved soil structure and drainage, and garlic cloves

are planted using appropriate spacing and row arrangements.

Field Management:

Standard agronomic practices are followed, including irrigation, weed control, pest and disease management, and fertilizer application based on soil analysis and recommended rates.

Data Collection:

Growth Parameters: Plant height, number of leaves, and bulb diameter are recorded at regular intervals throughout the crop growth period.

Yield Parameters: At harvest, bulb weight, bulb diameter, and bulb quality attributes (such as bulb color, firmness, and uniformity) are measured.

Statistical Analysis:

Collected data is analyzed using appropriate statistical methods, such as analysis of variance (ANOVA) and mean separation tests.

The effects of planting time and planting system on growth parameters and yield parameters are evaluated.

Data Interpretation:

The results are interpreted to assess the effects of planting time and planting system on garlic growth and yield.

The significance of observed differences in growth parameters and yield parameters among the treatments is discussed, highlighting the impact of planting time and planting system on garlic performance.

RESULTS

The results of the study indicated significant effects of planting time and planting system on the growth and yield of selected garlic germplasm. Both factors influenced various growth parameters and yield parameters, providing valuable insights into optimizing garlic cultivation practices.

Regarding planting time, early and mid-planting times demonstrated superior effects on garlic growth and yield compared to late and very late planting times. Plants from early and mid-planting times exhibited taller plant height, higher number of leaves, and larger bulb diameter. These growth parameters are indicators of healthier plant development and better bulb formation. In contrast, late and very late planting times resulted in reduced growth and smaller bulb size. This can be attributed to unfavorable environmental conditions, such as high temperatures or changes in photoperiod, during critical growth stages.

In terms of planting system, the raised bed system outperformed the conventional flatbed system in promoting garlic growth and yield. Garlic plants grown in the raised bed system displayed taller plant height, increased number of leaves, and larger bulb diameter compared to those grown in the conventional flatbed system. The raised bed system offers improved soil structure, better drainage, and enhanced nutrient availability, which create favorable conditions for root development and nutrient uptake. These factors contribute to enhanced growth and higher yield in garlic plants.

DISCUSSION

The findings of this study highlight the importance of selecting appropriate planting time and planting system for garlic cultivation. Early and mid planting

times provide a favorable start to the crop's growth, allowing garlic plants to establish strong root systems and achieve optimal growth during critical stages. Late and very late planting times, on the other hand, subject garlic plants to less favorable conditions, resulting in stunted growth and reduced yield.

The raised bed system offers advantages over the conventional flatbed system due to improved soil conditions and better moisture management. The raised beds provide enhanced drainage, preventing waterlogging, and allow for better aeration. The improved soil structure also facilitates root penetration and nutrient uptake, leading to improved growth and yield.

The results of this study align with previous research on garlic cultivation and support the notion that proper timing and suitable planting systems significantly influence garlic performance. By selecting appropriate planting time and utilizing the raised bed system, garlic growers can optimize their cultivation practices and maximize crop productivity.

CONCLUSION

This study concludes that planting time and planting system have substantial effects on the growth and yield of selected garlic germplasm. Early and mid-planting times promote better growth and yield compared to late and very late planting times, emphasizing the importance of timely planting for successful garlic cultivation. The raised bed system exhibits superior performance over the conventional flatbed system, providing improved soil conditions, enhanced drainage, and better nutrient availability for garlic plants.

The findings of this study have practical implications for garlic growers, allowing them to make informed

decisions regarding planting time and planting system selection. Optimal planting time and the adoption of the raised bed system can contribute to higher yields, healthier plants, and improved overall garlic production.

Further research can focus on investigating additional factors influencing garlic growth and yield, such as cultivar selection, irrigation management, and nutrient optimization. By continuously improving garlic cultivation practices, farmers can enhance crop productivity and contribute to sustainable garlic production systems.

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