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Research Article

Research Exploring Greenhouse Environment Control over the Last 50 Years

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ABSTRACT

Research exploring greenhouse environment control over the last 50 years has led to significant advancements in understanding the effects of environmental factors on plant growth and productivity. This article provides a comprehensive review of the research conducted over the last 50 years, including the methodology, results, and implications for the future of greenhouse agriculture. The studies involve monitoring and controlling various environmental factors in a greenhouse or growth chamber to create optimal growing conditions for plants. The results indicate that optimal growing conditions vary depending on the plant species and growth stage. Continued research in this area is necessary to address the challenges of climate change and food security and to promote sustainable agriculture.

KEYWORDS

Greenhouse, environment control, plant growth, productivity, methodology, temperature, humidity, CO₂, light, supplemental lighting, CO₂ enrichment, energy consumption, sustainable agriculture, climate change, food security.

INTRODUCTION

Over the past 50 years, there has been a significant growth in greenhouse agriculture, as it provides a controlled environment for plants to grow in regions

with adverse weather conditions. The controlled environment provides a unique opportunity to study the effects of various environmental factors on plant

growth and productivity, leading to the development of sophisticated greenhouse environment control systems. A better understanding of these factors has allowed for optimal growth conditions for various plant species, resulting in increased productivity and quality of produce. However, greenhouse agriculture is an energy-intensive process and contributes to the carbon footprint. Therefore, the sustainable production of food in a controlled environment is a growing challenge. This article provides a comprehensive review of the research conducted over the last 50 years exploring the effect of various environmental factors on plant growth and productivity, and how the results could be applied to promote sustainable agriculture.

METHODOLOGY

The research reviewed in this article involves a broad range of methodologies, including experimental studies, field trials, and modeling approaches. The studies typically involve monitoring and controlling various environmental factors in a greenhouse or growth chamber to create optimal growing conditions for plants. Environmental sensors and controllers are used to monitor and regulate temperature, humidity, light, CO₂ levels, and other factors in real-time. The research is often conducted over an extended period to assess the effects of environmental factors on plant growth and productivity.

RESULTS

The research conducted over the last 50 years has led to significant advancements in understanding the effects of environmental factors on plant growth and productivity. The results indicate that optimal growing conditions vary depending on the plant species and growth stage. However, in general, plants grow best under moderate temperatures (20-25°C), high humidity

(60-70%), and moderate CO₂ levels (800-1000 ppm). Light intensity and duration also play a critical role in plant growth and productivity, with different plant species requiring different light conditions. Additionally, the research has identified the use of supplemental lighting and CO₂ enrichment as effective methods for increasing plant growth and productivity.

Implications

The research conducted over the last 50 years has significant implications for the future of greenhouse agriculture. The advancements made in understanding the effects of environmental factors on plant growth and productivity have allowed greenhouse farmers to optimize growing conditions, reduce energy consumption, and minimize waste. The research has also highlighted the importance of continued innovation and research in greenhouse environment control to address the challenges of climate change and food security.

CONCLUSION

In conclusion, research exploring greenhouse environment control over the last 50 years has led to significant advancements in understanding the effects of environmental factors on plant growth and productivity. The results have allowed greenhouse farmers to optimize growing conditions, reduce energy consumption, and improve product quality. Continued research in this area is necessary to address the challenges of climate change and food security and to promote sustainable agriculture.

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