

新開發玉米田區節水栽培探討

An Investigation of Water-Efficient Cultivation in Newly Developed Maize Fields

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摘要

玉米為臺灣重要的作物，玉米栽培所需水量依生育期不同而異，在生育初期須保持適當水分，開花期所需水量最多。在面對氣候變遷之灌溉供水壓力，探討節水灌溉為當前重要議題。

本文利用農業部農田水利署於台南市大內區新開發的灌溉試驗推廣教育中心之試驗場種植食用玉米，比較傳統畦溝灌溉與穿孔管灌溉方式之節水效益。因本試驗區之土壤質地含大量礫石，無法以機械化耕種，只能利用人工耕作，致使玉米的產值與產量受影響。由試驗結果顯示穿孔管灌溉水量只為畦溝灌溉的 57.6%，可節省 42.4% 的灌溉水量。由農藝性狀調查可知穿孔管灌區之株高與稈徑均高於畦溝灌溉區，兩種灌溉方式之玉米穗長、無皮穗重、百粒重有顯著性差異，而穿孔管灌溉區的平均百粒重約為畦溝灌溉區的 1.12 倍，但因穿孔管灌溉區之面積為畦溝灌溉區之 1.36 倍，換算成每公頃產量則穿孔管灌溉區為畦溝灌溉區之 99.1%，兩者無顯著性差異。

關鍵詞：新開發田區，食用玉米，畦溝灌溉，穿孔管灌溉

Abstract

Maize is an important crop in Taiwan, with its water requirements varying across different growth stages. Adequate soil moisture is essential during the early vegetative stage, while the highest water demand occurs during the flowering stage. In light of increasing irrigation water stress due to climate change, exploring water-saving irrigation strategies has become a critical issue.

This paper was conducted at the Irrigation Experiment and Extension Education Center recently established by the Irrigation Agency of the Ministry of Agriculture in Danei District, Tainan City. Edible maize was cultivated to compare the water-saving efficiency between traditional furrow irrigation and perforated pipe irrigation. Due to the high gravel content in

the soil of the experimental site, mechanized farming was not feasible, and all field operations had to be conducted manually, which adversely affected maize yield and economic value. Experimental results showed that the total irrigation water used in the perforated pipe system was only 57.6% of that used in furrow irrigation, achieving a 42.4% reduction in water use. Agronomic trait analysis indicated that plant height and stem diameter were greater in the perforated pipe irrigation plots than in those with furrow irrigation. Significant differences were observed in ear length, husk-free ear weight, and 100-kernel weight between the two irrigation methods. The average 100-kernel weight in the perforated pipe plots was approximately 1.12 times that of the furrow plots. However, since the perforated pipe irrigation area was 1.36 times larger than the furrow irrigation area, the calculated yield per hectare in the perforated pipe plots was 99.1% of that in the furrow plots, indicating no significant difference in overall yield per unit area.

Keywords: newly developed farmland, edible maize, furrow irrigation, perforated pipe irrigation