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Short Communication

Fruit Date Pollinated by Spray Pollination and Conventional Pollination

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Abstract: This study compares the effects of spray pollination and conventional pollination on fruit quality parameters of date palm (Phoenix dactylifera L.) cv. Deglet Nour cultivated in the Ziban region of Algeria. During the 2019 and 2020 seasons, fruits obtained from both pollination techniques were evaluated based on weight, length, and width. Spray pollination was applied using a pollen grain–water suspension (1 g L^{-1}), while conventional pollination involved manual placement of male strands. The results showed that spray pollination produced fruits with a mean weight of 13.68 g, compared to 13.64 g under conventional pollination. Average fruit length and width were 30.23 mm and 9.17 mm for spray pollination, versus 30.00 mm and 8.28 mm for conventional pollination, respectively. These findings indicate that spray pollination can maintain or slightly enhance certain fruit quality traits without negatively affecting fruit weight. The technique therefore represents a promising alternative to traditional pollination methods for date palm production under arid conditions.

Keywords: Spray pollination; Conventional pollination; Date palm; Fruit quality; Deglet Nour

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1. Introduction

Pollination is a fundamental biological process that directly affects fruit set, yield, and quality in date palm (Phoenix dactylifera L.), a strategic crop in arid and semi-arid regions. Due to the dioecious nature of the species, artificial pollination is indispensable in commercial date palm production systems. Conventional hand pollination remains the most widely used method; however, it is labor-intensive, time-consuming, and increasingly constrained by labor shortages and rising production costs.

In recent years, alternative pollination techniques have been developed to improve efficiency while maintaining fruit quality. Among these, spray pollination using pollen grain–water suspensions has attracted considerable attention as a promising technique capable of reducing labor inputs and ensuring more uniform pollen distribution [1,2]. Several studies have demonstrated that the response of date palm cultivars to pollination methods varies according to genotype, pollen source, and environmental conditions, influencing fruit set, size, and yield [3–6].

Previous research has shown that spray and mechanical pollination methods can achieve fruit quality comparable to conventional hand pollination, with potential advantages in operational efficiency [7]. Moreover, the adoption of innovative pollination strategies has been proposed as a sustainable solution to support date palm production in regions facing climatic constraints and limited pollination resources [8].

The objective of the present study was to compare spray pollination and conventional pollination methods in terms of key fruit quality parameters—namely fruit weight,

length, and width—of date palm cv. Deglet Nour cultivated in the Ziban region of Algeria. The results aim to provide practical insights into the optimization of pollination practices suitable for large-scale date palm cultivation under arid conditions.

2. Materials and Methods

During the 2019 and 2020 seasons, ten uniform 12-year-old "Deglet Nour" date palms growing on loamy sandy soil in the M'lili oasis of the Ziban region were selected. In the middle of the flowering period (March 2019 and 2020), pollen was collected from male inflorescences, air-dried at room temperature, and suspended in water at 1 g/L just before application.

On each palm, five clusters were pollinated by spray application of pollen suspension using a hand-held 1 L plastic sprayer, with approximately 50 mL applied per cluster. The remaining clusters were pollinated conventionally, by manually placing three male strands lengthwise along the female strands, securing the bundle, and covering with paper bags to prevent contamination.

Fruits were harvested at maturity, and measurements were taken for weight (g), length (mm), and width (mm) for both pollination methods.

3. Results

Table 1. Measurements of weight, length, and width of dates under two pollination methods.

Dates	Spray Pollination Weight (g)	Length (mm)	Width (mm)	Conventional Pollination Weight (g)
1	14.09	32.36	8.32	13.44
2	12.42	27.48	10.06	14.87
3	12.00	29.14	9.26	12.79
4	13.21	31.05	7.95	13.46
5	13.44	29.47	8.81	12.88
6	15.94	32.37	10.25	13.37
7	12.56	28.62	8.07	14.44
8	13.20	27.37	10.12	13.80
9	15.85	33.44	10.87	13.87
10	13.53	31.20	8.88	13.32
11	14.21	30.00	8.28	13.75
Mean	**13.68**	**30.23**	**9.17**	**13.64**

4. Discussion

The results indicate that spray pollination produces fruit quality parameters comparable to conventional hand pollination. Mean fruit weight under spray pollination was slightly higher, while fruit length and width showed small improvements, suggesting a more uniform fruit size [4,7]. These outcomes are consistent with studies showing that optimized pollination can improve fertilization efficiency and fruit development [9,10]. Although differences were modest, spray pollination may reduce labor and operational costs while maintaining fruit quality, making it a suitable alternative for commercial date palm production.

5. Conclusions

Spray pollination using pollen grain–water suspension maintains fruit quality comparable to conventional hand pollination in date palm cv. Deglet Nour. Slight improvements in fruit size were observed without affecting weight. This technique offers a viable alternative to traditional pollination methods under arid conditions. Future research should assess long-term yield, economic feasibility, and applicability to other cultivars.

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