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不同授粉方法影響番木瓜品質產量及生產成本之研究

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摘　要

本計畫之目的在於找出台農二號網室木瓜母株之簡易有效授粉方法，期能省工降低生產成本。試驗結果顯示以100 ml水加200朵雄花之濃度對台農二號母株行噴霧授粉著果率達94.6%與普通人工授粉之著果率91.3%效果相近，而以蜜蜂、蒼蠅代替人工授粉著果率只達8.5%及0.16%，效果不佳。在果實重量、形狀、甜度、果肉厚度方面，噴霧授粉與普通人工授粉，兩者均優，無顯著差異。

每0.1 ha，植250株（約50%母株），普通人工授粉方法與噴霧授粉每二天授粉一次，需一工作1 hr，噴霧授粉只需21分鐘，約可節省工時65%。

前　言

番木瓜(*Carica papaya* L.)爲本省主要熱帶果樹之一，據82年台灣農業年報全省栽培面積約4,302 ha，主要以台農二號爲主。但台農二號不耐素病，必需於防蟲網室內栽培才能預防預毒素病之感染但附帶發生的問題也很多例如網室不耐强風，危害較嚴重，其中雌株於網室栽培無法自然授粉，必需以人工逐果授粉，果實才發育正常不致落果，如此十分浪費人力並增加木瓜之生產成本。因此本試驗即在探討簡易省易省工的授粉方法其能達到省工降低生產成本之目的。

材料與方法

本試驗以台農二號及佛里達種木瓜植株爲供試材料並進行四項不同處理授粉試驗方法：

試驗一、以水稀釋花粉行噴授粉

粉前一天收集佛羅里達木瓜雄株之花蕾置於塑膠袋，於入冰箱(4℃)，可保存數日便於取用，將佛羅里達雄花，加水放入果汁機，將花蕾打破，讓花粉釋出，時間約一分鐘（讓花粉釋出及可，不必打得粉碎），過濾、以簡易噴霧器（美容院或園藝用），噴至雌花柱頭上。濃度以100 ml水，分別加入80，100，120，140，200朵雄花成系列濃度。花粉水懸液用量，以一朵雌花，噴霧一次，噴霧器離雌花約10 cm，出水量約0.8 ml，100 ml噴125朵雌花。

試驗二、利用蜜蜂代替人工授粉試驗

以台農二木瓜及授粉樹相互種植，兩者種植比例爲10：1，於開花時釋放蜜蜂，0.03 ha大之網室放置一箱蜜蜂，任其自然授粉。

試驗三、利用蒼蠅代替人工授粉試驗

以台農二號木瓜及授粉樹相互種植，兩者種植比例爲10：1，於開花時釋放蒼蠅，0.03 ha大之網室每週釋放蒼蠅約5,000隻，任其自然授粉。

試驗四、以滑石粉稀釋花粉，行噴粉授粉

將100朵雄花花藥取下，加10 g滑石粉混合稀釋，以噴粉器授粉

試驗五、以普通人工授粉方法對照

將佛羅里達雄花花瓣撥開，直接將花粉沾在雌花柱頭上，以一朵雄花，授一朵雌花。

結果與討論

授粉結果（表一）以100 ml水加200朵雄花，噴霧授粉著果率達94.6%與普通人工授粉粉著果率91.3%，效果相當。其他以水稀釋花粉之系列濃度因花粉數不足，著果率較差且果實較小。以滑石粉稀釋花粉，行噴霧授粉著果率60%，效果不理想，欲取得花粉頗費工。蜜蜂及蒼蠅著果率分別8.5%及0.16%效果不佳。

表一、不同授粉方法對網室台農二號母瓜發育之影響

Table 1. Effect of different pollinating methods on the Tainung No. 2 papaya male tree development in net house

Pollinating methods	Concentration	Development status of fruit				No. of fruit treatment
		Good	Fair	Poor	Droping fruit	
		(%)	(%)	(%)	(%)	
Labor pollination	One male flower mating with one female one	91.3	4.0	3.8	1.0	827
Honey bee pollination	1 box bee with 0.03 ha	8.5	11.7	20.2	73.1	591
House fly pollination	500 house fly relese at 0.03 ha per week	0.2	0.2	68.0	28.7	550
Dust pollination	10g talcum+100 pieces of male flower	60.0	12.6	25.3	2.1	95
Spray pollination	100ml water+80 pieces male flower	54.7	23.6	19.7	2.0	203
Spray pollination	100ml water+100 pieces male of male flower	50.4	16.4	30.2	2.2	232
Spray pollination	100ml water+120 pieces male of male flower	60.6	23.9	13.7	1.8	226
Spray pollination	100ml water+140 pieces male of male flower	71.9	12.9	14.3	1.0	210
Spray pollination	100ml water+200 pieces male of male flower	94.6	3.2	1.5	0.7	743

Good: fruit shape full.
Fair: fruit shape slight, fruit having marketing value.
Poor: fruit shape thin no marketing value.

在果實重量、甜度、果肉厚度方面（表二），以100 ml加200朵花噴霧授粉與普通人工授粉兩者均優，無顯著差異。種子數目與果實重有中度正相關，其直線方程式爲$Y = 0.04824 \times -134.785$，$R = 0.756$，而果實重與種子數目對甜度無影響。噴霧授粉之花粉在水中會慢慢沉澱，使用時需時常搖動噴霧器。花粉在水中4hr內仍活力，因此花粉水懸液最好在4 hr內用完。噴霧授較普通人工授粉需要較多的雄花爲能於開花初期充分供應雄花，授粉樹應提找早種植，或留用上年的授粉樹。

表二、不同授粉方法對網室台農二號母瓜品質之影響

Table 2. Effect of different pollinating methods on the Tainung No. 2 papaya quality in net house

Pollinating methods	Concentration	Fruit average weight (g)	Flest sweet (Brix %)	Flesh thick (cm)	No. of seed per fruit
Labor pollination	One male flower mating with one female one	1029	12.5	2.0	898
Honey bee pollination	1 box bee with 0.03 ha	712	10.7	2.1	196
House fly pollination	500 house fly relese at 0.03 ha per week	514	12.3	1.9	218
Dust pollination	10g talcum+100 pieces of male flower	1050	12.0	2.2	589
Spray pollination	100ml water+80 pieces male flower	788	12.1	1.9	422
Spray pollination	100ml water+100 pieces male of male flower	742	12.3	2.0	365
Spray pollination	100ml water+120 pieces male of male flower	837	12.0	2.0	534
Spray pollination	100ml water+140 pieces male of male flower	794	12.3	2.0	442
Spray pollination	100ml water+200 pieces male of male flower	1084	12.3	2.2	716

普通人工授粉每二天授粉一次，0.1 ha（約50%母株）需一人工作1 hr而噴霧授粉只需21分鐘，節省授粉工時65%，可降低生產成本，稍緩農村勞力不足之問題。

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Effect of Different Pollination Methods on the Yield, Quality and Product Costs of Papaya

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ABSTRACT

The purpose of this program was to search for simple pollination method to save the product costs for papaya in the net house. The experiment method are involved : (1) More flower of florida variety diluted with different amount of water obtained its pollen by breaking floral with fruit press then making a serial concentration, the pollination was conduetcd by spraying with sprayer (2) Pollinating agent such as honey bee, house-fly was released only. (3) Labor pollination served as check.

The results indicated that two hundred pieces male flowers added to 100ml of water pollinated to Tainung No. 2 male tree, the fruit bearing rate reached as high as 94.6% which was colsed to 91.3% of labor pollination, while the fruit bearing rate was only 8.5% and 0.16% respective by for honey bee and house fly, the efficiency was bad. There was no signifieant difference in weight, shape, sweet degree and thick of fruit between spray pollination and labor one.

A man worked for 1 hr to complete one time of pollination every two days intervals approxinately 250 plants (about 50% male tree) planted in 0.1 ha however, it took 21 minute by spraying at same acreage 65% of labor costs can save. It can solve the shortage of labor problem in farm village.

Key words: *Carica papaya* L. pollination.