

桃樹銹病防治藥劑之室內篩選法

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桃樹銹病 (病原菌：*Tranzschelia discolor*) 為世界性之桃樹病害⁽¹⁰⁾，亦為本省常見的桃樹病害之一⁽⁴⁾。桃樹銹病菌以葉片為主要感染對象，罹病葉片的背面會產生大量的夏孢子堆，至於冬孢子則較為罕見⁽⁴⁾。由於銹病會導致桃樹提前落葉，對植株養分蓄積及樹勢生長均有不利的影響^(5,8,10)，實有必要加以防治。根據研究報告，桃樹銹病之防治仍以施用藥劑最為簡便、有效^(3,6)。因此，有效藥劑之篩選乃為本病防治上的首要工作。一般對於能大量產孢 (sporulation) 或形成菌核 (sclerotium) 之病原真菌進行有效藥劑之室內篩選時，多以藥劑對孢子或菌核發芽的抑制率作為指標^(2,7,9)。雖然這些方法尚能獲致篩選有效藥劑的目的，但因其試驗條件與田間實際狀況差別較大，往往造成二者在使用濃度上的差異，有待改進。至於絕對寄生性病原真菌的防治藥劑篩選，則尚缺乏有關之報告。本研究之方法是模擬田間噴藥的狀況，於室內進行藥劑篩選，其目的在建立絕對寄生性病原真菌防治藥劑之室內篩選方法，藉供日後相關試驗之參考。

試驗中所用之銹病菌係於民國八十年元月採自台中縣東勢鎮種植之脆桃 (三月桃)。從這些已暫停管理及噴藥的桃樹上，採取葉背均勻佈滿銹病菌夏孢子堆的葉片，攜回研究室。將這些桃樹葉片之葉背朝上，以透明膠帶固定在 A4 影印紙上備用。供試藥劑則選取「植物

保護手冊」⁽¹⁾所列之各種作物銹病防治藥劑計 13 種 (表一)。將這些藥劑依其推薦濃度製成藥液，並加展著劑「出來通」(Triton CS-7) 3000 倍。各供試藥劑以塑膠製手壓噴霧器分別噴灑在上述之桃樹葉背上；另以噴水處理作為對照。經藥劑處理後之葉片置於走廊通風處晾乾。經 12 小時後，以移植環刮取葉片上的銹病菌夏孢子，塗佈於直徑 9 公分之水瓊脂 (2% water agar) 平板上。由於本菌夏孢子於 16°C 經 12 小時後可達最高之發芽率 (作者，未發表資料)，因此，將這些水瓊脂平板置於 16°C 之定溫箱中；經 12 小時後取出，於光學顯微鏡下計數孢子發芽率。每處理 4 重覆，每重覆計數 200 個孢子。

室內試驗結果顯示，在供試的 13 種銹病防治藥劑中，以四氯異苯睛 (Chlorothalonil 75% WP) 1000 倍的抑制效果最佳，與不施藥之對照相比，抑制率達 95.3%；其次為菲克利 (Anvil 5% FP) 1,500 倍，抑制率為 52.4%；再次為免賴得 (Benomyl 50% WP) 抑制率為 33.6%；其餘各種藥劑之效果與不噴藥之對照相較，差異不顯著 (表二)。在這項試驗結果中，最為有效的藥劑如四氯異苯睛亦在初步的田間試驗中獲得良好的殺菌效果，其對田間桃樹銹病菌夏孢子的發芽抑制率較之不噴藥的對照可達 83.5% (作者，未發表資料)。

由於本試驗所採用之方法與田間實際應用

之情況較為類似，而篩選之結果亦在田間獲得驗證。因此，上述試驗結果，可以作為銹病防治時，選擇適當藥劑及其濃度的可靠依據。此實為縮短藥劑篩選時間，簡化篩選步驟，提供了良好的範例。

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表一、室內篩選防治桃樹銹病之藥劑

Table 1. Fungicides used for screening against peach rust fungus

Fungicide	Chemical name	Formulation ¹⁾	Manufacturer
Anvil	(RS)-2-(2, 4-dichlorophenyl)-1-(1H-1, 2, 4-triazol-1-yl) hexan-2-ol	5% FP	ICI
Benomyl	Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate	50% WP	Du Pont
Bitertanol	β -([1, 1-biphenyl]-4-yloxy)- α -(1, 1-dimethylethyl) 1H-1, 2, 4-triazole-1-ethanol	28% EC	Bayer
Chlorothalonil	Tetrachloro-isophthalonitrile	75% WP	Sunko
Fenarimol	α -(2-Chlorophenyl)- α -(4-chlorophenyl)-5-pyrimidine-methanol	12% WP	Elanco
Mancozeb	Mn ⁺² 16%, Zn ⁺² 2%, Ethylenebis-dithiocarbamate ion 62%	80% WP	Rohm & Haas
Oxycarboxin	5, 6-dihydro-2-methyl-1, 4-oxathiin-3-carboxanilide-4, 4-dioxide	75% WP	Uniroyal
Quazatin	1, 1'-Iminodi (octamethylene)-diguandine triacetate	25% S	Sanlih
Sapxin	N, N'-[1, 4-piperazinediyl-bis-(2, 2, 2-trichloroethyl-diene)]-bis-formamide 14% N-Tridecyl-2, 6-dimethyl-morpholine 16%	30% EC	BASF
TI 833	3'-Isopropoxy-2-methylbenzimidazolecarbamate 55% Methyl-2-benzimidazolecarbamate 20%	75% WP	Ihara
Triadimenol	1-(4-chlorophenoxy)-3, 3-dimethyl-1-(1H-1, 2, 4 triazole-1-yl)-butanol-2	23% EC	Bayer
Triclopyr	1-(4-Chloro-phenoxy)-3, 3-dimethyl-1-(1H-1, 2, 4-triazol-1-yl)-2-butanone	5% WP	Dow
Triforine	N, N'-1, 4-Piperazinediyl-bis-(2, 2, 2-trichloroethyldiene)-bis-formamide	18.6% EC	Shell Agrar

¹⁾ FP: Flowable powder, WP: Wettable powder, EC: Emulsifiable concentrate, S: Solution.

表二、桃樹銹病菌夏孢子經殺菌劑處理後之結果

Table 2. Experimental results of urediniospore of *Tranzschelia discolor* after fungicides treatment¹⁾

Fungicide	Dilution rate	Urediniospore germination (%) ²⁾	Inhibition rate (%) ³⁾
Chlorothalonil	1000	2.8a	95.3
Anvil	1500	28.3b	52.4
Benomyl	1500	39.5bc	33.6
Triforine	750	41.8bcd	29.7
Oxycarboxin	1600	45.5bcd	23.5
Bitertanol	2000	48.5cd	18.5
Quazatin	800	48.8cd	18.0
Sapxin	1000	49.3cd	17.1
Mancozeb	500	49.5cd	16.8
Triclopyr	600	49.5cd	16.8
Fenarimol	5000	50.5cd	15.1
TI 833	1500	56.3cd	5.4
Triadimenol	2000	57.3cd	3.7
Control (Water)	—	59.5d	—

¹⁾ After a period of 12 hr treatment, the urediniospores were spread to 2% water agar, incubated at 16°C for 12 hr, and examined for germination percentage.

²⁾ Numbers in the column are means of four replicates with 200 urediniospores per replicate. Values followed by different letters are significantly different according to Duncan's multiple range test, P = 0.01.

³⁾ Inhibition rate = $[1 - (\text{germination rate of each treatment} \div \text{germination rate of control})] \times 100$.

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ABSTRACT

Duan, C. H., Tsai, W. H., and Tu, C. C. 1992. An efficient laboratory test for screening fungicides against *Tranzschelia discolor* from peach. Plant Prot. Bull. 34:70-73. (Taiwan Agricultural Research Institute, Wufeng 41301, Taichung County, Taiwan, R.O.C.)

The inhibition effect of thirteen fungicides on the germination of urediniospores of peach rust fungus were evaluated by an efficient procedure applicable in the laboratory. Leaves with urediniospores were taken from the diseased trees and sprayed with various fungicide solutions in the laboratory. The leaves were left air-dried for 12 hours before the urediniospores were collected and subsequently spread on petri dishes with 2% water agar. Germination percentages of urediniospores were counted after incubation period of 12 hours at 16°C. Results of this investigation showed that Chlorothalonil 75% WP had the best effect to inhibit the target fungus.

(Key words: fungicide screening, peach, *Tranzschelia discolor*)