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數種農藥對白殭菌之影響【科學短訊】

蘇智勇

*通訊作者E-mail :

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Abstract

摘要

稀釋 500、1000及1500 倍的殺蟲劑：四季靈、新好年丹及富速靈；殺草劑：巴拉刈、年年春及斯統普；殺菌劑：普拔克、阿特菌及包你好等進行本試驗。包你好完全抑制白殭菌的生長，普拔克次之，巴拉刈最小。其他種類農藥亦能部分抑制，而各類藥劑在不同濃度下抑制作用互異。

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科 學 短 訊

數 種 農 藥 對 白 殭 菌 之 影 響

蘇 智 勇

高雄區農業改良場

(接受日期: 民國77年5月20日)

摘 要

稀釋 500、1000 及 1500 倍的殺蟲劑: 四季靈、新好年丹及富速靈; 殺草劑: 巴拉刈、年年春及斯統普; 殺菌劑: 普拔克、阿特菌及包你好等進行本試驗。包你好完全抑制白殭菌的生長, 普拔克次之, 巴拉刈最小。其他種類農藥亦能部分抑制, 而各類藥劑在不同濃度下抑制作用互異。

白殭菌 (*Beauveria bassiana*) 對許多農業害蟲均有防治效果 (Al-Hassan *et al.*, 1980; Fargues *et al.*, 1980; Champlin *et al.*, 1981), 但許多學者已證實有些農藥可抑制白殭菌的生長 (Clark *et al.*, 1982; Saito, 1984; Gardner and Storey, 1985), 故使用白殭菌防治時, 應避免能抑制它的農藥混合或交互使用, 否則會令其失去防治害蟲的效果。本文的目的在於汰選能抑制白殭菌生長的農藥, 以避免摻合使用, 供應用白殭菌防治害蟲時的參考。

將 PDA 培養基溶解後, 冷卻至 45°C, 分別加入稀釋 500、1000 及 1500 倍的四季靈 (Tokuthion 50% EC, O-ethyl-o-(2,4-dichlorophenyl)-S-n-propyl-dithiophosphate)、新好年丹 (Marshal 48.34% EC, 2,3-dihydro-2,2-dimethyl-7-benzofuranyl ((dibutylamino) thio) methylcarbamate) 及富速靈 (Mevinphos 25% EC, 2-methoxycarbonyl-1-methylvinyl dimethylphosphate) (殺蟲劑); 巴拉刈 (Paraquat 24% L, 1,1'-dimethyl-4,4'-bipyridylium dichloride)、年年春 (Glyphosate 41% L, Isopropylamine salt of N-(phosphonomethyl) glycine) 及斯統普 (Stomp 34% EC, N-(1-ethylpropyl-3,4-dimethyl-2,6-dinitro-benzenamine) (殺草劑); 普拔克 (Previcur 70% L, Propyl-(3-(dimethylamine)-propyl-carbamate-monohydrochloride)、阿特菌 (Terrazole 25% EC, 5-ethoxy-3-trichloromethyl-1,2,4-thiadiazole) 及包你好 (Sporatak 25% EC, N-propyl-N-2(2,4,6-trichloro-phenoxy) ethyl-1-carboxamide) (殺菌劑) 等。在直徑 9 cm 的培養皿做成平板, 俟凝固後, 各接上白殭菌絲塊一塊, 對照組不加任何農藥, 共 10 個處理, 三重複。接着移到 25°C 定溫箱中培養, 接種後 4、7 及 10 天量菌落直徑之大小 (田, 1961), 所得資料, 用 Duncan's multiple range test 分析其顯著性。

殺草劑中巴拉刈稀釋 1500 倍對白殭菌幾乎無抑制作用, 斯統普稀釋 500 倍次之, 其他的處理均有不同的抑制效果; 再者年年春 > 斯統普 > 巴拉刈的抑制功能。殺蟲劑中以四季靈稀釋 500 倍及 1500 倍, 新好年丹稀釋 1000 倍及 1500 倍及富速靈稀釋 1000 倍及 1500 倍的抑制作用較小, 而四季靈稀釋 1000 倍, 新好年丹稀釋 500 倍及富速靈稀釋 500 倍抑制成效稍大, 但與對照組呈顯著差異。殺菌劑中包你好的稀釋 500~1500 倍均能完全抑制白殭菌的生長, 其次為普拔克, 最後為阿特菌, 均與對照組呈顯著差異 (表一)。本試驗所採用之藥劑中, 以殺菌劑 > 殺蟲劑 > 殺草劑, 故使用白殭菌防治害蟲, 需注意選用混合藥劑或避免混用。

表一 不同濃度的殺草劑、殺蟲劑及殺菌劑對白殭菌菌絲生長之影響

Table 1. Effect of pesticides at various dilutions on the mycellial growth of *Beauveria bassiana*

Pesticide	Dilution	Diameter of colony (mm)		
		4 days	7 days	10 days
Herbicide				
Paraquat 24% L	500	7.5	14.0	19.0 cd
Paraquat 24% L	1000	8.0	19.0	20.0 c
Paraquat 24% L	1500	9.5	22.5	26.0 ab
Glyphosate 41% L	500	4.0	8.5	12.5 f
Glyphosate 41% L	1000	6.0	11.0	13.0 ef
Glyphosate 41% L	1500	4.0	10.0	14.5 def
Stomp 34% EC	500	8.0	13.5	23.5 b
Stomp 34% EC	1000	4.5	12.5	14.5 def
Stomp 34% EC	1500	8.0	14.5	16.5 d
Control		11.5	20.5	27.0 a
Insecticide				
Tokuthion 50% EC	500	6.0	8.0	16.5 b
Tokuthion 50% EC	1000	4.0	7.5	15.0 bc
Tokuthion 50% EC	1500	5.0	8.5	16.5 b
Marshal 48.34% EC	500	4.0	10.5	12.0 d
Marshal 48.34% EC	1000	3.5	7.0	16.5 b
Marshal 48.34% EC	1500	5.0	12.5	17.5 b
Mevinphos 25% EC	500	4.5	12.0	13.5 cd
Mevinphos 25% EC	1000	5.0	9.5	16.0 b
Mevinphos 25% EC	1500	5.5	12.0	16.5 b
Control		12.0	26.5	29.0 a
Fungicide				
Previcura 70% L	500	2.0	3.0	6.3 d
Previcura 70% L	1000	0.0	3.0	6.0 d
Previcura 70% L	1500	6.5	7.0	9.0 c
Terrazole 25% EC	500	8.0	9.0	11.0 c
Terrazole 25% EC	1000	6.0	10.0	12.0 c
Terrazole 25% EC	1500	7.0	11.0	16.5 b
Sporatak 25% EC	500	0.0	0.0	0.0 e
Sporatak 25% EC	1000	0.0	0.0	0.0 e
Sporajak 25% EC	1500	0.0	0.0	0.0 e
Control		14.5	24.5	30.0 a

Means followed by the same letter are not significantly different by Duncan's multiple range test ($p=0.05$).

巴拉刈稀釋 500~1500 倍對白殭菌菌絲的生長之抑制作用均不大，而與 Gardner and Storey (1985) 所指的巴拉刈 (0.6~6.1 mg a. i./ml) 具顯著抑制作用有不同的結果；年年春稀釋 500~1000 倍均能中度抑制菌絲生長與其他的研究所指出的結果不謀而合。同時他們亦指出多種殺草劑如 Acifluorfen, Oxyfluorfen, Alachlor, Dichofop, Dinoseb, Fluazifop 及 Metalachlor 等均有抑制作用，但 Oryzalin 却對白殭菌菌絲生長無抑制功能 (Gardner and Storey, 1985)。四季靈、新好年丹及富速靈均可抑制菌絲生長而程度而異；Saito (1984) 報告加保利 (Carbaryl)、Cyhexatin 有抑制作用，而歐殺松 (Acephate)、納乃得 (Methomyl) 及培丹 (Cartap) 的抑制作用最小。BHC (0.04~0.5%)，Enclrin (0.05~0.5%)，Malathion (0.5%) 能完全抑制，而 Dimecron (0.04~0.5%) 抑制最小 (Urs *et al.*, 1967)。Azinphos-Methyl 及 Carbofuran 能中度抑制菌絲生長，而 Permethrin 能完全抑制 (Clark *et al.*, 1982)。由上得知不同的殺蟲劑因種類及濃度不同，而與抑制作用與否關係相當密切。殺菌劑而言，四氯異苯晴及鋅乃浦有頗強的抑制效果；氫氧化銅的抑制力最小 (Saito, 1984)。本試驗結果顯示包你好完全抑制菌絲生長，而普拔克及阿特菌亦有甚強的抑制功效。Loria *et al.* (1983) 指出鋅錳乃浦對白殭菌最毒，Teddars (1981) 亦認為 Triphenyltin hydroxide 最毒，但 Sulfur 及 Dinocap 的毒性最小。綜合上述使用白殭菌防治害蟲就必須加以選擇何種農藥可以配合，那些農藥絕對不可混合或交互應用，應該加以重視，才不會造成浪費又無效。

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**THE EFFECT OF CERTAIN PESTICIDES ON
*BEAUVERIA BASSIANA***

Chich-Yeong Su

*Kaohsiung District Agricultural Improvement Station,
Pingtung, Taiwan, Republic of China*

The effects of Tokuthion, Marshal, Mevinphos, Paraquat, Glyphosate, Stomp, Previcura, Terrazole and Sporatak at dilution of 500 x, 1,000 x and 1,500 x on mycellial growth of the white muscardine fungus, *Beauveria bassiana*, were studied by culturing tests. The results indicated that Sporatak 25% EC was the most toxic and Previcura was the second. Sporatak inhibited the fungal growth by the all dilutions tested. Paraquat was the most innocuous in the all concentrations. The others varied in effect on the fungus. Tokuthion, Marshal, Mevinophoa, Glyphosate, Stomp and Terrazole partly inhibited the fungal growth. Different concentrations of pesticides had different degrees of effects on the growth and sporulation of the fungus.