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Trials of miticides against twospotted mite and broad mite on fuchsias with comments on phytotoxicity

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Abstract

The potency of acaricides against broad mite (*Polyphagotarsonemus latus* (Banks)) and twospotted mite (*Tetranychus urticae* Koch) was assessed on potted fuchsias (*Fuchsia×hybrida* Hort. ex Vilm.) in southern Queensland. Single applications of bromopropylate (0.75 g/L), dicofol (0.5 g/L) and oxythioquinox (0.13 g/L) reduced the motile stages of both species by more than 80%. Against *T. urticae* cyhexatin (0.2 g/L), fluvalinate (0.09 g/L), propargite (0.6 g/L) and methidathion (0.5 g/L) caused more than 80% mortality. Clofentezine (0.3 g/L) and dienochlor (0.3 g/L) were less effective and dimethoate (0.3 g/L) was ineffective. Dicofol (0.5 g/L) plus tetradifon (0.2 g/L) in two trials caused reductions of 65.5% and 93.5% in *T. urticae*. Endosulfan (0.7 g/L) was used only against *P. latus* and caused 100% mortality while dienochlor (0.3 g/L), fluvalinate (0.09 g/L) and propargite (0.6 g/L) reduced numbers by 71.8%, 68.3% and 55.6% respectively.

The phytotoxicities of most of these chemicals and some commonly used insecticides were assessed in a series of trials covering all seasons. Acephate (1.0 g/L), clofentezine (0.3 g/L), dienochlor (0.3 g/L), fluvalinate (0.09 g/L), methamidophos (0.6 g/L) and permethrin (0.1 g/L) caused negligible damage. Dicofol (0.5 g/L) plus tetradifon (0.2 g/L) and endosulfan (0.7 g/L) caused slight phytotoxicity. Bromopropylate (0.75 g/L) and diazinon (1.0 g/L) caused distinct phytotoxicity. Cyhexatin (0.2 g/L), oxythioquinox (0.13 g/L) and propargite (0.3 g/L) caused severe phytotoxicity and were not acceptable.

INTRODUCTION

Fuchsias (*Fuchsia×hybrida* Hort. ex Vilm.) grown at Mt Tamborine in southern Queensland are commonly infested with twospotted mite (*Tetranychus urticae* Koch) and broad mite (*Polyphagotarsonemus latus* (Banks)). *T. urticae* causes distortion, bronzing and fall of leaves while *P. latus* causes distortion of the young growth. Stock plants kept in the open throughout the year are subject to mite damage mainly during summer. Fuchsias destined for sale are taken as cuttings and are grown in pots in the open from April onwards. In the two years before the trials, mites were not a problem on these small plants during winter. Serious damage occurred on the stock plants and on the small potted fuchsias which remained unsold from October onwards despite frequent applications (every 5 to 7 days) of the miticide bromopropylate.

Chemical control of *P. latus* has been reported with dicofol (Jeppson *et al.* 1975), oxythioquinox (Nakasuga 1978; Brown and Junes 1983), sulphur (Jeppson *et al.* 1975; Brown and Jones 1983), a mixture of dicofol plus tetradifon (Cross and Bassett 1982), endosulfan (Jeppson *et al.* 1975; Das and Singh 1977; Anon. 1980) and chlorpyrifos (Brown and Jones 1983). In extensive trials with *T. urticae* on strawberries, cyhexatin consistently gave the best control while amitraz, dienochlor, dinobuton, fenbutatin oxide, oxythioquinox and propargite were usually effective (Gould and Jessop 1981). Poe (1973) found cyhexatin, oxythioquinox and propargite consistently effective. Dicofol was either ineffective or gave highly variable results due to resistance (Poe 1973; Gould and Jessop 1981).

In this study the effectiveness of a number of chemicals for control of *P. latus* and *T. urticae* was compared by assessing their potency in the field. The phytotoxicity of the successful miticides, plus a range of common insecticides, was also tested.

MATERIALS AND METHODS

Tests for miticide efficacy

Four spray trials were conducted on potted fuchsias at Mt Tamborine from March 1984 to August 1984. In Trials 1, 3 and 4 plants were in the open throughout whilst in Trial 2 they were placed in a shade house after treatment. *P. latus* was present in Trial 1 and *T. urticae* in Trials 2, 3 and 4. The experimental design was a randomised block with five or six replicates, each composed of a single potted plant.

Varieties used were as follows:

Trial 1—Pink Darling and Quasar;
Trial 2—Groovy and Winston Churchill;
Trial 3—Voodoo;
Trial 4—Display, Voodoo, Winston Churchill and mixed varieties.

The fuchsias were arranged in blocks according to variety.

Chemical treatments are detailed in Table 1 to 4. The formulations used were:

bromopropylate	500 g/L	emulsifiable concentrate
clofentezine	500 g/kg	wettable powder
cyhexatin	600 g/L	suspension concentrate
dicofol	240 g/L	emulsifiable concentrate
dienochlor	480 g/L	suspension concentrate
dimethoate	400 g/L	emulsifiable concentrate
endosulfan	350 g/L	emulsifiable concentrate
fluvalinate	240 g/L	suspension concentrate
methidathion	400 g/L	emulsifiable concentrate
oxythioquinox	250 g/kg	wettable powder
propargite	300 g/kg	wettable powder
tetradifon	75 g/L	emulsifiable concentrate

The chemicals were applied using a knapsack spray and care was taken to obtain complete coverage. Prostrate varieties were raised so that the underside of the leaves could be sprayed. Plants were watered and the foliage allowed to dry before the chemicals were applied. They were then left for at least one day before they were watered again. Water was trickled into the pots, wetting the foliage as little as possible until the post-treatment count. Four to seven days after chemical treatment 10 leaves in Trial 1 and five leaves in subsequent trials were taken at random from each plant. The leaves were examined microscopically as soon as they were picked and the number of live mites on each leaf counted. In Trials 3 and 4 the survivors were classified as belonging to one of the three life stages, larva, nymph or adult.

Tests for phytotoxicity

Most of the preceeding chemicals plus four commonly-used insecticides were tested for phytotoxicity. Formulations of the additional insecticides used were:

acephate	750 g/kg	wettable powder
diazinon	800 g/L	emulsifiable concentrate
methamidophos	580 g/L	emulsifiable concentrate
permethrin	500 g/L	emulsifiable concentrate

Phytotoxicity was assessed on potted plants in four trials (A, B, C, D), one during each season under conditions previously described.

Trial A was an extension of the second miticide trial above with cyhexatin (0.2 g/L) added to the six chemicals in Table 2 and applied to two varieties (Groovy and Winston Churchill). Five plants of each variety were treated with each chemical. Trial A was conducted in autumn and no plants were flowering. Trial B was conducted in winter with half the varieties in flower. Overall, 10 varieties were treated with 12 chemicals (Table 4). Trial C was undertaken in summer when all plants were flowering and 10 varieties were treated with 10 chemicals (Table 5). In Trials B and C two plants of each variety were treated with each chemical and four plants with water. Trial D was conducted in spring with all plants in flower and three plants of each of five varieties were treated with seven chemicals as shown in Table 6. Three plants of each variety were also sprayed with water.

In all trials chemicals were applied using a knapsack spray and phytotoxicity was assessed after seven days. In Trials B and C, chemicals were reapplied after seven days at double the recommended rate, to obtain information on safety margins, and the plants re-examined after a further 10 to 13 days. In Trial D a second spray at the recommended concentration was applied after 10 days and the fuchsias were re-examined after another seven days.

RESULTS AND DISCUSSION

Miticide efficacy

Trial 1. Broad mite (*P. latus*)

Bromopropylate, dicofol and endosulfan did not differ significantly in their high level of control with oxythioquinox also being very effective (Table 1). In the endosulfan treatment there were no live mites on the 60 leaves examined. Although dienochlor, fluvalinate and propargite reduced numbers significantly compared to the control they were inferior to the first group.

Table 1. Trial 1, populations of broad mite per ten leaves 6 days after being sprayed with various miticides

Chemical treatment (g/L a.c.)	No. motile mites		% reduction in numbers compared to control
	Arithmetic mean	Transformed mean*	
Endosulfan (0.7)	nil	0.71*a*†	100.0
Dicofol (0.5)	1.8	1.42*ab*	95.8
Bromopropylate (0.75)	2.2	1.52*ab*	94.9
Oxythioquinox (0.13)	4.8	2.06*b*	88.9
Dienochlor (0.3)	12.2	3.44*c*	71.8
Fluvalinate (0.09)	13.7	3.50*c*	68.3
Propargite (0.6)	19.2	4.32*c*	55.6
Control (water only)	43.2	n.a.‡	
LSD $P = 0.05$		1.14	

* Data analysed using $\sqrt{x + 0.5}$ transformation. The control was significantly different from all other treatments ($P < 0.01$) and was excluded from subsequent analysis to reduce variation.

† Means followed by the same letters are not significantly different.

‡ n.a. = not applicable.

Trial 2. Twospotted mite (*T. urticae*)

The mite population was relatively low and all chemicals significantly reduced mite numbers (Table 2). There were no significant differences between chemicals.

Trial 3. Twospotted mite

All chemicals except dienochlor significantly reduced total mite populations. However, fluvalinate and oxythioquinox were the most effective, with reductions of more than 95% compared to the control (Table 2). All chemicals except clofentezine reduced the numbers of adult mites (Table 3). Most chemicals eliminated the immature stages present when they were applied. Thus no nymphs were recorded in five of the eight treatments. After seven days there were very few larvae on leaves treated with fluvalinate or oxythioquinox. Clofentezine was also effective in reducing the number of larvae. Although dicofol plus tetradifon significantly reduced larval numbers, control was poor. The number of larvae on plants treated with dienochlor was not significantly different from the controls. In the 18 hours following spraying 2 mm of rain fell. Similar light falls occurred over the next 2 days followed by heavier rain. Rainfall may dissolve or dislodge pesticide residues (Hartley and Graham-Bryce 1980) thereby reducing their effectiveness. This may explain the relatively poor performances of dicofol plus tetradifon and of dienochlor although the latter has previously failed in a field trial on roses (N. Gough, unpub. data 1984).

Trial 4. Twospotted mite

Total mite numbers were significantly reduced by all chemicals except dimethoate (Table 2). When the control was excluded from the analysis of variance to reduce variation (LSD (P=0.05)=1.24) the dicofol plus tetradifon mixture was significantly better than tetradifon alone. All chemicals except dimethoate and tetradifon reduced the number of adults (by over 75%) and all except dimethoate reduced the number of nymphs by more than 90% (Table 3). Dimethoate was ineffective against all stages. Tetradifon significantly reduced the numbers of larvae and nymphs but not adults.

Phytotoxicity

Trial A (autumn)

Fluvalinate caused very slight distortion of foliage (this did not appear in later trials). Oxythioquinox caused slight distortion of growing points and young tips and cyhexatin caused pronounced distortion of the young developing leaves.

Trial B (winter)

Minimum temperatures during the observation period were near freezing on 10 of the 20 days. Reaction to the cold included bluing or bronzing of the leaves and this made the assessment of phytotoxicity difficult. Under these conditions several chemicals caused leaf damage to Rosebud (Table 4). Cyhexatin and oxythioquinox damaged the foliage, buds and flowers of a number of varieties and were considered unacceptable. Propargite caused bud and flower burn.

Trial C (summer)

High temperatures during the period of observation caused severe burning of some varieties. Untreated plants of Sheryl Ann were so affected that no assessment of phytotoxicity was possible. Application of sprays at the recommended rate resulted in the appearance of necrotic areas on some buds. Bromopropylate, diazinon and endosulfan caused damage to several varieties (Table 5). Dicofol plus tetradifon marked one variety. Buds of La Campanella, Rosebud, Red Radar and Southgate were very susceptible to damage. Doubling the strength of the chemicals in summer greatly increased their phytotoxicity (Table 5).

Table 2. Populations of twospotted mite per five leaves 4 days (Trial 2) or 7 days (Trials 3 and 4) after being sprayed with various miticides

Chemical treatment (g/L a.c.)	Trial 2			Trial 3			Trial 4		
	No. motile mites		% reduction in numbers compared to control	No. motile mites		% reduction in numbers compared to control	No. motile mites		% reduction in numbers compared to control
	Arithmetic mean	Transformed mean*		Arithmetic mean	Transformed mean*		Arithmetic mean	Transformed mean*	
Bromopropylate (0.75)	0.8	1.09*a*†	92.6	14.6	1.011*b*	80.6	5.2	1.72*a*	89.0
Fluvalinate (0.09)	0.8	1.04*a*	92.6	2.8	0.409*a*	96.3			
Oxythioquinox (0.13)	0.8	1.04*a*	92.6	3.2	0.513*a*	95.8			
Propargite (0.6)	1.2	1.17*a*	88.8	14.0	1.035*b*	81.4			
Cyhexatin (0.2)	2.2	1.55*a*	79.6	20.2	1.078*b*	73.2			
Dienochlor (0.3)	2.2	1.53*a*	79.6	38.3	1.454*bc*	49.1			
Clofentezine (0.3)				22.0	1.287*b*	70.8			
Dicofol+tetradifon (0.5 + 0.2)				26.0	1.301*b*	65.5	1.9	1.39*a*	93.5
Methidathion (0.5)							3.0	1.72*a*	89.7
Dicofol (0.5)							6.0	2.28*a*	79.5
Tetradifon (0.2)							7.8	2.67*a*	73.3
Dimethoate (0.3)							18.8	4.26*b*	35.6
Control (water only)	10.8	3.22*b*		75.3	1.851*c*	29.2	5.22*b*		
LSD P = 0.05		0.91			0.457			1.36	

* Data analysed using $\sqrt{x + 0.5}$ transformation or

** long (x + 1) transformation.

† Means followed by the same letters are not significantly different (P = 0.05).

Table 3. Life stages in populations of twospotted mite per five leaves 7 days after being sprayed with various miticides in Trials 3 and 4

Chemical treatment (g/L a.c.)	Trial 3						Trial 4					
	Mean no. adults		Mean no. nymphs		Mean no. larvae		Mean no. adults		Mean no. nymphs		Mean no. larvae	
	Arithmetic mean	Transformed mean*	Arithmetic mean	Transformed mean*	Arithmetic mean	Transformed mean*	Arithmetic mean	Transformed mean*	Arithmetic mean	Transformed mean*	Arithmetic mean	Transformed mean*
Fluvalinate (0.09)	nil	0.71*a*†	nil	0.71*a*	2.8	0.409*a*						
Bromopropylate (0.75)	nil	0.71*a*	nil	0.71*a*	14.6	1.011*cd*	1.2	1.18*a*	0.3	0.88*a*	1.7	1.38*a*
Oxythioquinox (0.13)	0.2	0.80*ab*	nil	0.71*a*	3.0	0.506*ab*						
Propargite (0.6)	0.5	0.94*ab*	nil	0.71*a*	13.5	0.999*cd*						
Dienochlor (0.3)	1.5	1.37*ab*	nil	0.71*a*	37.0	1.429*de*						
Cyhexatin (0.2)	3.7	1.64*ab*	0.8	0.98*a*	15.7	0.863 *abc*						
Dicofol + Tetradifon (0.5 + 0.2)	3.8	1.76*b*	0.7	0.99*a*	21.5	1.216*cd*	1.2	1.18*a*	nil	0.71*a*	0.7	1.03*a*
Clofentezine (0.3)	11.5	3.28*c*	1.7	1.22*a*	8.8	0.909*bc*						
Methidathion (0.5)							0.7	1.18*a*	0.5	0.94*a*	1.8	1.43*a*
Dicofol (0.5)							1.7	1.42*a*	0.3	0.85*a*	4.0	1.59*a*
Tetradifon (0.2)							3.5	1.84*ab*	0.8	1.05*a*	3.5	1.64*a*
Dimethoate (0.3)							3.0	1.85*ab*	6.8	2.48*b*	9.0	3.04*b*
Control (water only)	14.5	3.76*c*	8.2	2.49*b*	52.7	1.692*e*	7.8	2.82*b*	11.7	3.28*b*	9.5	2.96*b*
LSD *P* = 0.05		0.96		0.81		0.475		1.14		0.85		1.19

* Data analysed using $\sqrt{x + 0.5}$ or

** log (x + 1) transformation.

Table 4. Synopsis of phytotoxicity of insecticides and miticides applied during winter to 10 varieties* of fuchsias at recommended rate and then after 7 days, at twice this rate

Chemical treatment (g/L a.c.)	Comments on phytotoxicity†	Commercially acceptable
Acephate (1.0 and 2.0)	ld Rosebud	Yes
Bromopropylate (0.75 and 1.5)	ld Rosebud; td Sheryl Ann & Tuonela	Yes
Cyhexatin (0.2 and 0.4)	Moderate to severe ld Peppermint Stick, Sheryl Ann, Voodoo. Severe fd.	No
Diazinon (1.0 and 2.0)	ld Rosebud	Yes
Dicofol (0.5 and 1.0) plus tetradifon (0.2 and 0.4)	ld Rosebud	Yes
Dienochlor (0.3 and 0.6)	bd La Campanella	Yes
Endosulfan (0.7 and 1.3)	ld (bronzing) Tuyonela	Yes
Fluvalinate (0.1 and 0.2)	No phytoxtoxicity	Yes
Methamidophos (0.6 and 1.2)	ld Rosebud; fd to several varieties	Yes
Oxythioquinox (0.13 and 0.26)	Severe bd, fd to many varieties. Widespread ld.	No
Permethrin (0.1 and 0.2)	bd La Campanella	Yes
Propargite (0.6 and 1.2)	Severe bd La Campanella, fd to many varieties, ld Rosebud	Undecided

* Varieties used: Display, England, La Campanella, Lisa, Peppermint Stick, Rosebud, Sheryl Ann, Southgate, Tuonela, Voodoo.

† bd = bud damage, fd = flower damage, ld = leaf damage, td = damage to expanding tips.

Unless otherwise specified damage indicated above was slight but definite.

Trial D (spring)

In this trial diazinon caused distinct phytotoxicity (Table 6), as it had done previously, but was considered acceptable. Oxythioquinox and propargite were definitely unacceptable. The other chemicals were commercially acceptable. This trial was free from the effects of extreme temperatures. One millimetre of rain fell within 18 hours of initial spraying and 10 mm within the next 24 hours. Despite light rainfall soon after spraying, symptoms of phytotoxicity were obvious 7 days after the first spray with most chemicals. Damage caused by propargite developed more slowly and was obvious only after the second spray.

DISCUSSION AND CONCLUSIONS

In these trials both species of mites were controlled very effectively by bromopropylate and oxythioquinox. Dicofol alone reduced numbers of *P. latus* by 95.8% and *T. urticae* by 79.5%. Dicofol plus tetradifon reduced *T. urticae* populations by 65.5% and 93.5% in two trials. These results contrast with trials on field roses where the mixture was superior in controlling *T. urticae* (N. Gough, unpub. data 1984). Cross and Bassett (1982) and others recommend the dicofol plus tetradifon mixture for use against *P. latus* but Jeppson *et al.* (1975) state that tetradifon is ineffective in the control of tarsonemids. The inclusion of tetradifon in the mixture would be mainly for its effectiveness against *T. urticae.*

Endosulfan was used only against *P. latus* and its caused complete mortality. It was considered unlikely that endosulfan would be very effective against *T. urticae* (e.g. Patel *et al.* 1982). Fluvalinate was extremely toxic to *T. urticae* (as found by Price 1981), but it was not as effective against *P. latus.* Propargite reduced *T. urticae* populations by more than 80% but was less effective against broad mite in agreement with Brown and Jones (1983). Cyhexatin and clofentezine were also effective against *T. urticae* but were surpassed by some previously mentioned chemicals. A single application of clofentezine killed larvae and eggs (as found by Bryan *et al.* 1981) but adults remained alive. Dienochlor was very variable against *T. urticae* and only moderately effective against *P. latus.*

Table 5. Synopsis of phytotoxicity of insecticides and miticides applied during summer to 9 varieties* of fuchsias at recommended rate and then, after 7 days, at twice this rate

Chemical treatment (g/L a.c.)	Comments on phytotoxicity†	Commercially acceptable at recommended strength
Acephate (1.0)‡ then at 2.0	No definite phytotoxicity. fd to Display, La Campanella, Lisa, Peppermint Stick	Yes
Bromopropylate (0.75) then at 1.5	bd to La Campanella, Red Radar, Southgate. fd & bd to La Campanella; fd to Display, Red Radar; bd to Lisa.	Yes
Clofentazine (0.3) then at 0.6	No definite phytotoxicity. bd,fd to Display, very slight damage to Peppermint Stick, Red Radar.	Yes
Diazinon (1.0) then at 2.0	bd to Rosebud, Southgate, Tuonela. Slight to severe bd or fd on most varieties	Yes (with caution)
Dicofol (0.5) + tetradifon (0.2) then 1.0 plus 0.4	Moderate bd to Red Radar. bd to Display, Peppermint Stick; fd to Display, Peppermint Stick, Red Radar	Yes
Dienochlor (0.3) then 0.6	No phytotoxicity. bd to Red Radar, Voodoo; fd to Display, Peppermint Stick.	Yes
Endosulfan (0.7) then 1.3	bd to Rosebud, Red Radar. bd to La Campanella, Peppermint Stick, Red Radar; fd Lisa, Peppermint Stick, Red Radar	Yes
Fluvalinate (0.1) then 0.2	No definite phytotoxicity. bd to Red Radar; fd to La Campanella, Southgate.	Yes
Methamidophos (0.6) then 1.2	td Peppermint Stick. Slight to moderate bd, fd on most varieties.	Yes
Permethrin (0.1) then 0.2	No definite phytotoxicity. bd to Rosebud; fd to Peppermint Stick, Red Radar, Rosebud.	Yes

* Varieties used: Display, La Campanella, Lisa, Peppermint Stick, Red Radar, Rosebud, Southgate, Tuonela, Voodoo.

† bd = bud damage, fd = flower damage, td = damage to expanding leaf tips.

‡ The top line in each couplet refers to phytotoxicity caused by recommended dosage, the bottom line to that caused by double dosage.

Unless otherwise specified, damage indicated above was slight but definite.

Bromopropylate had been used continuously in the nursery for at least two years. The good control demonstrated by bromopropylate suggested that resistance had not yet developed to a level which would inviolate its use.

The effect of formulation on phytotoxicity was not specifically investigated. The current work was confined to testing each chemical in a commercially available formulation. Phytotoxicity varied with variety and increased markedly when the materials were applied at twice the normal dose rate. It was most severe under hot conditions. In some varieties with large soft flowers (e.g. Southgate and Sheryl Ann) or with leaves suceptible to cold damage (e.g. Peppermint Stick, Rosebud and Sheryl Ann) it was difficult to distinguish phytotoxicity from weather damage. This difficulty would be partly overcome it a variety such as La Campanella, with its small, compact white buds and flowers was always included in phytotoxicity trials. La Campanella has the disadvantage that its leaf tips may yellow in cold weather. So it cannot be recommended as a standard for all conditions. Useful chemicals causing minor blemishes should not be rejected unconditionally as these marks may be no worse than weather damage.

Table 6. Phytotoxicity of insecticides and miticides applied during spring to fuchsias at recommended strengths in two sprays 10 days apart

Chemical treatment (g/L a.c.)	Variety					Commercially acceptable at recommended rate
	La Campanella	Pacquese	Rosebud	Voodoo	Winston Churchill	
Acephate (1.0)	0	0	fd	0	0	Yes
Diazinon (1.0)	ld*	0	Severe ld on small area, fd.	ld	0	Yes (with caution)
Endosulfan (0.7)	ld	0	fd	bd, fd, ld	0	Yes
Methamidophos (0.6)	bd	0	ld	0	0	Yes
Oxythioquinox (0.13)	Severe bd, fd	fd, ld	bd, severe fd	Widespread bd, ld	Severe bd	No
Permethrin (0.1)	0	0	0	0	0	Yes
Propargite(0.3)	Severe ld	0	ld	Severe ld	Severe bd,fd	No

* bd = bud damage, fd = flower damage, ld = leaf damage, 0 = no phytotoxicity.
Unless otherwise specified damage indicated above was slight but definite.

Damage to leaves, buds and flowers should be considered separately. Chemicals causing distortion of young leaves and growing tips (e.g. cyhexatin) are not acceptable as damage may persist for long periods. Moderate to severe bud damage is also unacceptable. Slight flower damage is acceptable as damaged flowers can be removed before sale and will soon be replaced. For example, bromopropylate has been used for some years in a successful fuchsia nursery despite causing flower and bud damage under some conditions.

Despite the occurrence of rain within a few hours of the completion of spraying in Trial 3 many chemicals performed well (Table 2). These results are valuable for this trial is not unlike outdoor nursery conditions where rainfall is common and overhead sprinklers are used. Chemicals which worked well here (e.g. fluvalinate) are likely to be very effective in nurseries.

Many fuchsia growers do not have the capability to monitor populations of both *T. urticae* and *P. latus*. Bromopropylate (0.75 g/L) and dicofol (0.5 g/L) plus tetradifon (0.2 g/L) seem therefore the best chemicals for use as schedule sprays as they control both species and have a relatively low phytotoxicity when used outdoors. Bromopropylate was completely successful against both mite species on a commercial scale when good coverage was achieved in the nursery. Endosulfan (0.7 g/L) is suitable for use against *P. latus* and fluvalinate (0.09 g/L) against *T. urticae*. Both are also effective insecticides. Clofentezine and dienochlor are non-phytotoxic but their potency in these trials was either variable or they were less immediately effective than the chemicals mentioned above. Their potential for control of *T. urticae* on ornamental plants is being examined in a series of longer term schedule trials.

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