A NEW MULTIFUNCTIONAL SPRAY ADJUVANT

ROSS MCLEAN

KEY Chemicals Ltd, Auckland, New Zealand.

Forecast rain or showers often stop operators spraying due to the risk of significant "wash-off" before the required drying period. Rain can affect already dried spray deposits of certain pesticides to such an extent, that growers re-apply them following a wet spell (Fuller pers. comm.). Certain spray oils or adjuvants with surfactant properties are often used to increase pesticide efficiency by aiding wetting of plant surfaces thereby improving coverage or uptake, or reducing the "rain free period" required for pesticide effectiveness (Cumberland *et al* 1970; Lane and Park 1984; Zabkiewicz and Gaskin 1982). Many surfactants, however, increase the problem of in-tank foam during refilling and are reported to contribute to crop damage, especially fruit finish (Martin pers. comm.).

Locally, a new multifunctional spray adjuvant (SF) emulsion including di-1-p-menthene, nonyl phenol ethylene oxide condensate and antifoam (SPRAYFAST its RAINFAST), was used in tankmix with sprays to test for rainfastness of glyphosate (Round up) and glufosinate ammonium (Buster) herbicides and fruit finish from a season long programme of insecticides and fungicides on kiwifruit and apples.

Rainfastening test:

Treatments were applied in a single plot (2 × 10m) crossover layout, by precision 2m hand boom applying 200 litres/ha. Artificial rain was applied by hand boom: light = 0.625mm in 30 minutes; moderate = 1.25mm in 30 minutes. Timing differences were due to trial logistics. Visual field assessment results expressed as percent reduction in weed control compared to the rainfree treatments are shown in Table 1. Where SF was added there were no differences in weed control between rain free and rain treated areas. Without SF considerable reduction in percent weed control occurred in the rain treatments.

TABLE 1: Effect of SF on rainfastening of glyphosate and glufosinate ammonium, expressed as percent reduction in weed control compared with rain free treatments. Assessed 19, 29 and 40 days after treatment.

Rain intensity	Light rain#			Moderate rain #		
Assessment date	30Nov	10Dec	21Dec	30Nov	10Dec	21Dec
Treatment						
gylphosate		Rain after 70 min			Rain after 115 min	
3.3 litres/ha	20%	10%	*	20%	40%	50%@
glyphosate		Rain after 27 min			Rain after 72 min	
3.3 litres/ha + SF 500ml	0%	0%	0%	0%	0%	0%
glufosinate		Rain after 33 min			Rain after 117 min	
8.8 litres/ha	10%	5%	0%	30%	50%	50%
glufosinate		Rain after 40 mins			Rain after 120 min	
8.8 litres/ha + SF 500ml	0%	0%	0%	0%	0%	0%

@ = white clover predominated; * = drought patch, vegetation died out; # = after spray was touch dry. Species were mixed grasses and broadleaves, including: white clover *(Trifolium repens)*, ryegrass *(Lolium perenne)*, prairie grass *(Bromus unioloides)*, cocksfoot *(Dactylis glomerata)*.

Fruit finish tests:

Treatments were applied by hand wand to run-off on kiwifruit and apples. SF was included at rates up to more than six times the likely commercial dose (60ml/100 litres), with a programme of insecticides and fungicides, from petalfall in kiwifruit (Hayward) and from early fruitset in apples (Golden delicious) at approximately 14 day intervals until harvest.

Apples at harvest: 50 random fruit/replication (four) were individually examined for fruit finish. No ill effects on fruit finish could be found from any SF treatment. It appeared that applying SF alone, at 100ml and 200ml/100 litres, progressively reduced the russet caused by the grower's spray programme (Table 2). Increasing the dose to 400ml had an effect similar to 100ml. Addition of effectively twice the recommended doses of pesticides (grower treatment oversprayed with SF plus captan (Captan 80WP) and chlorpyriphos (Lorsban 50WP) appeared to increase the levels of russet, but increasing the SF to 200ml/100 litres reduced this russet (Table 2).

TABLE 2: Effect of treatments on russet on apples at harvest (Total 200/treatment)

Treatment: rate /100 litres	Number Severe	Moderate	Low
Grower's programme	52	101	47
SF 100ml	44	100	56
SF 200ml	25	95	80
SF 400ml	47	95	58
SF 100ml + captan 125g	44	55	101
SF 200ml + captan 125g	37	122	41
SF 400ml + captan 125g	42	109	49
SF 100ml + chlorpyriphos 100g	44	92	64
SF 200ml + chlorpyriphos 100g	26	128	46
SF 400ml + chlorpyriphos 100g	50	101	49
SF 100ml + captan 125g + chlorpyriphos 100g	63	88	49
SF 200ml + captan 125g + chlorpyriphos 100g	33	127	40
SF 400ml + captan 125g + chlorpyriphos 100g	42	104	54

Kiwifruit: Kiwifruit vines received the same rates of SF per 100 litres as the apples, through the same equipment. Pesticide applications generally followed the grower's export programme. At harvest treated vines (four replicates) were strip-picked and all fruit separately graded for visible spray residues, overall fruit finish and water stain. There were no differences between the grower's programme and any treatments on assessed factors.

SF mixed easily with water and the antifoam action was confirmed. SF is reported to be compatible with most sprayable pesticides, plant growth regulators and foliar nutrients. SF has been reported to significantly improve the control of potato blight by mancozeb and the control of cereal fungal diseases by triadimefon (Anon 1987). It has "tolerance exempt" residue status, and so withholding periods for the admixed pesticides were followed. Local trials to determine the enhancement of herbicides on perennial weeds continue.

REFERENCES

Anonymous, 1987. Product Support Data, Mandops (UK) Ltd.

Cumberland, G.L.B., Matthews, L.J. and Honore, E.N., 1970. Weed control in maize. *Proc. 23rd NZ Weed and Pest Control Conf.:* 31-36.

Lane, P.M.S. and Park, O.L., 1984. Gorse control with glyphosate. *Proc. 37th NZ Weed and Pest Control Conf.:* 194-196.

Zabkiewicz, J.A. and Gaskin, R.E., 1982. 2,4,5-T uptake by gorse — dependence on foliar development and herbicide formulation. *Proc. 35th NZ Weed and Pest Control Conf.:* 145-148.