Mating Disruption/SIR

Checkmate Rate Study

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Checkmate-CM (Consep, Inc.) was evaluated using rates of 120, 160 or 200 dispensers per acre (d/a). The experimental design consisted of large unreplicated blocks either with pheromone plus insecticides as needed or insecticides only. Tests were conducted in one northeast Oregon, three Yakima valley and two northcentral Washington locations. Capture of males in pheromone traps and levels of fruit injury were used to evaluate the effectiveness of CM control in test orchards. Methods were as previously described for comparison of Isomate C+, ClDeTRAK and Checkmate.

The effectiveness of three rates of Checkmate, 120, 160 and 200 d/a, all applied twice, was directly compared at six sites (Table 1). There was no apparent relationship between application rate and either moth capture in pheromone traps or fruit injury. At site BR (northeastern Oregon) where initial CM pressure was very low, moth captures in traps were low in all three pheromone treated orchards and no supplemental insecticides were used for CM control (Table 1). However, fruit injury was found in the 120 and 200 d/a orchards, all of it developing at the end of the second generation. Moth captures in all 17 of the other Checkmate treated orchards were high enough to warrant at least one supplemental OP treatment. Moreover, despite these sprays, greater than 1% damage was recorded in 13 of the 17 orchards. Not surprisingly, the highest levels of damage were found at sites with the highest CM pressure as indicated by moth catch and fruit injury in non-pheromone treated orchards. Average seasonal catches in conventional orchards at the three Yakima sites (MV, JR and PO) were 62.5, 110.3 and 206.0 moths/trap, respectively. Three insecticide sprays failed to keep CM injury below 2.5% at all three sites (Table 1). Checkmate treated orchards at these sites received two or three OP sprays as well, yet in 10 of 11 cases incurred greater than 2% damage.

Table 1. Comparison of codling moth catch and fruit injury in apple orchards treated with Checkmate pheromone dispensers at three rates and/or organophosphate (OP) insecticides, Washington, 1995.

				Average (maximum) catch/trap per generation[2]					
	Treatment[1]			Standard lure		High load lure		% fruit injury each generation	
Site	Dispenser	Rate (d/a)	OPs	First	Second	First	Second	First	Second
JR	Checkmate	120	2	6.0 (14)	16.3 (26)	18.8 (31)	28.5 (83)	1.2	1.5
	Checkmate	160	2	9.8 (25)	38.5 (77)	21.5 (32)	55.3 (88)	1.8	2.4
	Checkmate	200	1	0.3 (1)	6.3 (14)	9.5 (18)	10.8 (22)	0.5	0.9
	None	0	3	23.0 (26)	87.3 (133)			1.7	2.7
MV	Checkmate	120	2	1.3 (2)	9.8 (26)	10.3 (26)	9.8 (22)	0.2	0.3
	Checkmate	160	2	3.0 (6)	12.8 (19)	12.0 (24)	27.0 (60)	0.5	1.4
	Checkmate	200	3	9.8 (16)	4.5 (10)	28.5 (37)	8.3 (22)	0.6	1.9
	None	0	3	22.0 (48)	40.5 (72)			0.8	1.7
PO	Checkmate	120 (G)	3			49.0 (54)	88.0 (109)	5.5	21.9
	Checkmate	120 (E)	3			36.8 (47)	40.0 (59)	3.4	2.0
	Checkmate	120 (W)	3	4.0 (5)	12.5 (21)	22.1 (36)	20.8 (39)	1.3	1.2
	Checkmate	160	3	21.3 (27)	40.5 (58)	26.3 (54)	59.0 (67)	5.0	6.2
	Checkmate	200	3	19.3 (39)	37.3 (77)	45.0 (55)	53.3 (64)	4.0	0.9
	None	0	3	96.0 (128)	110.0 (159)			3.9	0.8
DA	Checkmate	120	2	8.5 (9)	9.0 (16)	5.0 (7)	4.0 (8)	0.2	0.2
	Checkmate	160	1	2.0 (4)	2.5 (3)	5.0 (4)	2.5 (3)	0.4	1.4
	Checkmate	200	2	6.5 (7)	6.0 (7)	19.5 (25)	10.0 (11)	0.1	0.2
	None	0	2	6.0 (6)	1.0 (1)			0.0	0.0
HU	Checkmate	120	1	5.0 (9)	4.5 (6)	5.5 (11)	1.5 (3)	0.2	0.4
	Checkmate	160	1	2.5 (5)	6.0 (10)	1.0 (2)	1.0 (2)	0.1	1.6
	Checkmate	200	2	2.5 (3)	2.0 (4)	5.0 (8)	13.5 (26)	0.3	1.1
	None	0	4	17.3 (36)	19.3 (32)			0.0	0.1
BR	Checkmate	120	0	0.5 (2)	0.5 (2)	0.8 (1)	0.3 (1)	0.0	0.5
	Checkmate	160	0	0.0	0.3 (1)	0.0	1.5 (4)	0.0	0.0
	Checkmate	200	0	0.3 (1)	0.5 (1)	0.8 (2)	0.3 (1)	0.0	0.4
	None	0	0	1.3 (3)	1.5 (3)			0.0	0.0

[1]All pheromone treatments were applied twice.

[2]Capture of moths in Pherocon 1CP traps baited with codlemone at a dosage of 10 mg (pheromone treated orchards) or 1 mg (non-pheromone treated orchards). Traps were placed within the mid or upper fruiting canopy of the tree in non-pheromone and pheromone treated orchards, respectively.