

7. Mating Disruption/SIR

PHEROMONE EMISSION RATES: ISOMATE C+ DISPENSER

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Pheromone release rates: The rate of pheromone loss in field-aged Isomate C+ dispensers was estimated by gravimetric and residual analyses. Twenty-five new dispensers and 25 1-year old dispensers were weighed, then placed in apple trees at the Tree Fruit Research and Extension Center (TFREC) in a manner that provided uniform exposure to sunlight. The 1-year old sample consisted of dispensers that were applied to an orchard in Orondo, WA, in 1995. The initial placement of dispensers at TFREC was followed by collecting, weighing and reapplying them weekly over a period of 140 days. In addition, release rates on days 0, 39, 73 and 112 were determined by residual analysis. The pheromone remaining on these dates in five old and five new dispensers was analyzed by GLC (Joan Fisher, Scenturion, Inc.)

Dispensers applied in 1996 released a substantial amount of pheromone throughout the season. The amount of product released fluctuated between 0.4 and 2.1 mg/d, depending on weather conditions (Fig. 1). The highest release rates occurred during the hottest part of the summer, between days 70 and 110 post-application. These results were similar to those observed in 1995. The more startling finding was the relatively high rate of pheromone release from the 1-year old dispensers (Fig. 1). At least 0.4 mg/d was released during most of the first 16 weeks (112 d) of the season. The 1995 dispenser appeared to be especially sensitive to low temperatures, releasing very little pheromone early in the spring and during the two coolest weeks in the summer.

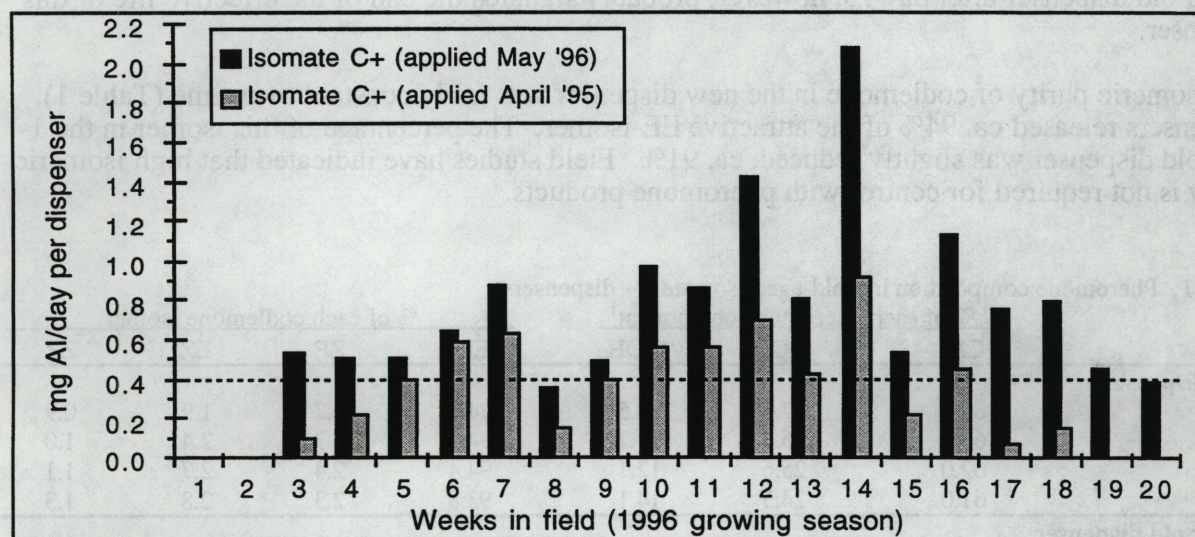


Figure 1. Pheromone emission rate of Isomate C+ dispensers.

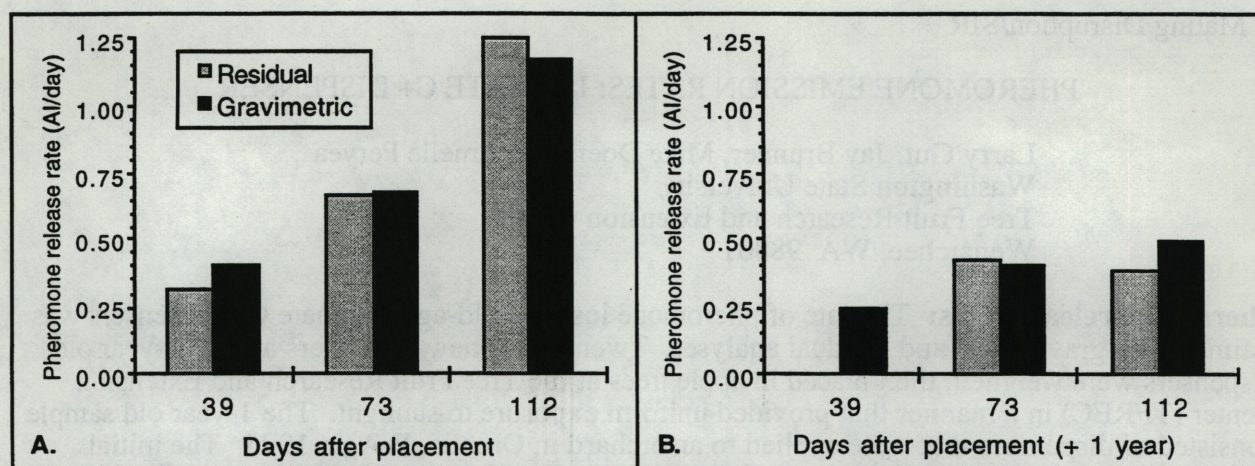


Figure 2. Comparison of gravimetric and residual estimates of pheromone emission rates from new and 1-year old Isomate C+ dispensers.

Dispenser analysis: Residual analysis of field-aged dispensers confirmed the reliability of the gravimetric technique for measuring release rates and provided more detailed information about changes in pheromone composition during the season. Similar estimates of pheromone emission rates were obtained by residual or gravimetric analysis (Fig. 2). Aging new dispensers in the field gradually changed the composition of the pheromone blend. The percentage of codlemone in new dispensers declined from 66% on day 0 to 61% on day 112 (Table 1). The pheromone blend in the 1-year old dispenser on days 39 and 73 was similar to the blend in the new dispenser on days 39 to 112 (Table 1). A major change in pheromone composition in the old dispenser occurred between days 73 and 112, with a decline in the percentage of codlemone from 60% to 37%. The importance of the slight blend change that occurred in the new dispenser on the efficacy of the pheromone treatment is unclear. Other research has indicated that codlemone alone is as effective as the three-component blend. The dramatic reduction in codlemone in the 1-year old dispenser after day 73, however, probably signaled the end of the effective life of this dispenser.

The isomeric purity of codlemone in the new dispenser was fairly constant over time (Table 1). Dispensers released ca. 94% of the attractive EE-isomer. The percentage of this isomer in the 1-year old dispenser was slightly reduced, ca. 91%. Field studies have indicated that high isomeric purity is not required for control with pheromone products.

Table 1. Pheromone composition in field-aged Isomate C+ dispensers.

Day	% of each pheromone component ¹			% of each codlemone isomer			
	CM	12OH	14OH	EE	ZE	EZ	ZZ
New dispenser							
0	65.9	27.6	6.5	94.9	2.2	1.9	0.9
39	63.0	26.0	11.2	94.2	2.3	2.4	1.0
73	62.0	25.6	12.1	94.4	2.4	2.7	1.1
112	61.0	24.5	14.1	93.8	2.3	2.8	1.3
1-year old dispenser							
0							
39	64.8	24.2	11.0	90.6	3.0	4.7	1.7
73	60.2	22.2	17.6	90.7	2.8	4.2	2.4
112	36.3	18.1	45.7				

¹ CM-codlemone, 12OH-dodecanol, 14OH-tetradecanol.