Field Tests and Laboratory Bioassays of Residues of Newer Insecticides Against Apple Maggot

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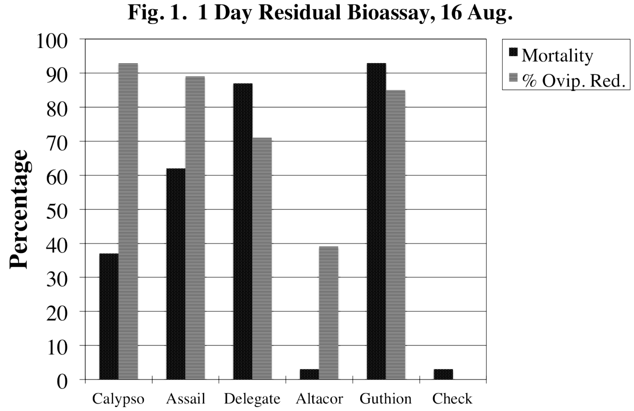
Field plots were set up along the edge of a commercial block of Jonagold apples in Wayne Co that was next to a large unsprayed abandoned orchard that was heavily infested with apple maggots (AM). Insecticides (treatments and rates shown in Table 1) were applied with an airblast sprayer calibrated to deliver 100gpa to 9 tree plots. Treatments were replicated three times, and arranged in a randomized complete block design. Sprays were applied weekly on 19 July, 26 July, 1 August, 8 August, 16 August, and 23 August. Before treatments began apples that were used in the laboratory bioassays were covered with brown paper bags to protect them against being sprayed with insecticides and to prevent AM damage. Each week bags were removed from 5 apples/replication of each treatment and brought back into the laboratory after residues had aged for 1,7, or 15 days. The apples were placed in a clear, quart plastic container and two gravid AM females were placed in each container. Mortality of females and the number of punctures on each apple were counted after 48 hours. One-hundred apples/replication were examined for AM punctures, stings (,5mm deep) , and internal tunnels on 20 August and 23 September.

Table 1. Apple maggot damage in field plots.

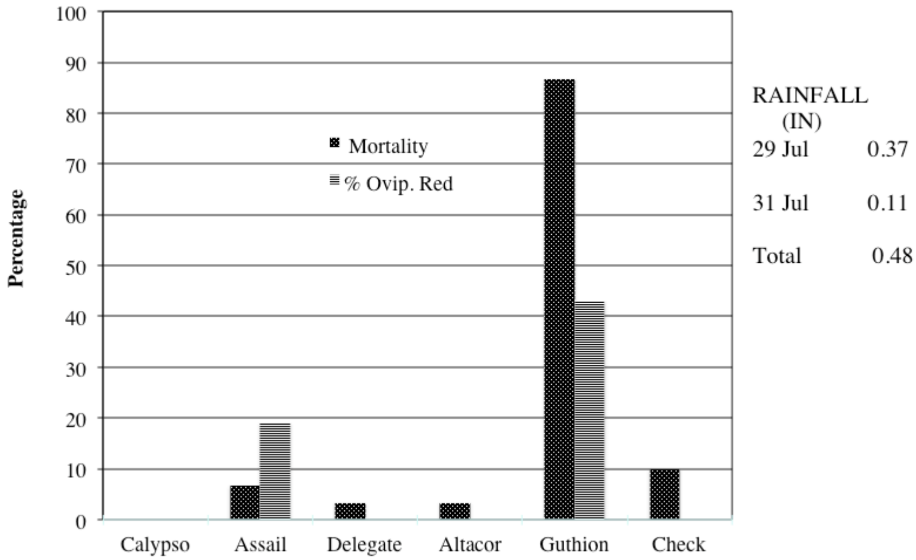
Treatment	Rate/A	% stings		% Tunnels	
		Pre-Harvest Aug 23	Harvest Sept. 23	Pre-Harvest Aug. 23	Harvest Sept. 23
Calypso 4F	8.0 oz	17.7 a	24.3 a	7.0a	2.7 b
Assail 30SG	8.0 oz	2.0 c	16.0 ab	2.0 c	2.0 b
Delegate 25W	7.0 oz	11.0 bc	14.3 ab	11.0 bc	12,3 b
Altacor 35W	4.5 oz	24.7 b	10.3 b	24.7 b	25.3 ab
Guthion 50W	3.0 lbs	4.7 bc	16.0 ab	4.7 bc	10.0 b
Untreated	0.0	6.7 a	4.7 b	47.3 a	51.3 a

Fig. 1. 1 Day Residual Bioassay, 16 Aug.



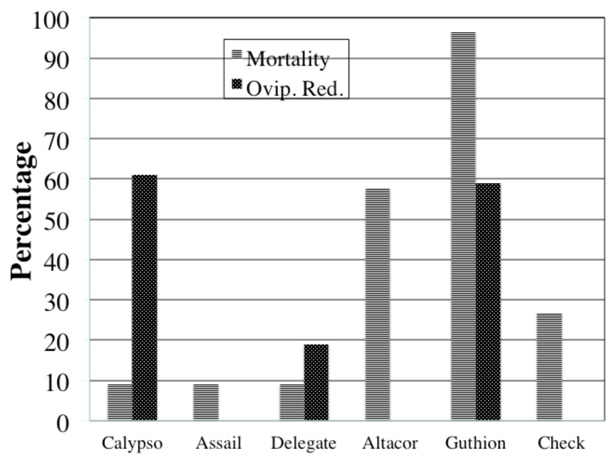
AM pressure was very high in the test orchard and Calypso, Assail, and Guthion has the lowest numbers of tunnels at harvest There was very little difference in the percentages of tunnels during the pre-harvest count (Aug. 23) compared to the harvest counts (Sept. 23), although the percentage of stings generally increased in most of the treatments. (Table 1). Just after sprays were applied ,Guthion was the most effective material both in killing flies and reducing oviposition (Fig. 1). Calypso effectively reduced AM oviposition, but killed less than 40% of the flies.

Fig. 2. 7- Day Field Residual Exposure, Jul 28-Aug. 1



Seven day old Guthion residues were also the most effective in laboratory bioassays both in killing flies and reducing oviposition (Fig.2) Seven day residues of the other materials were ineffective in this bioassay. Fifteen day old residues of Guthion were still effective in killing

Fig. 3. 15 day Residual Bioassay, 16-31 Aug.



flies in laboratory bioassays, but only reduced oviposition by less than 50% (Fig. 3). Calypso was as effective in reducing oviposition, but killed less than 50% of the flies. Residues of Assail and Delegate did not kill flies or effectively reduce oviposition. Altacor killed over 50% of the flies, but did not decrease oviposition.

Two laboratory bioassays were conducted for each time interval (1,7, and 15 days) at different times during the summer. The relative effectiveness of residues for each compound varied between bioassays, particularly for the 7 and 15- day intervals. Differences were apparently not due to rainfall, but could have been caused by other variables.