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CODLING MOTH: COMPARISON OF DISPERSAL ABILITY OF LABORATORY REARED AND NATIVE MALES*

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Recapture of released irradiated (25 krad) and unirradiated laboratory reared and native codling moths, *Cydia pomonella* L., showed that both treated and untreated males dispersed equally. The optimum dispersal distance was ca. 30 m. Untreated native (wild) males were equally dispersed at ca. 70 m. Laboratory reared male codling moths do not have the same vigour for dispersal as the native males.

INTRODUCTION

Codling moths, *Cydia pomonella* L., used in sterile insect technique (SIT) are usually subjected to rearing and handling procedures as chilling, staining, irradiation, packaging, transportation and releases. Irradiation [1-6], chilling [7] and marking [8] resulted in the loss of vigour and competitiveness, based on such parameters as longevity, fecundity, fertility and mating.

In the SIT dispersal of the released insect is paramount, for the released moths must disperse to find the native females. This is especially so because to uniformly broadcast sterile insects over the entire area is not practical. Therefore, it is important to know how well treated laboratory reared moths disperse as compared with untreated laboratory reared and native moths, which is the object of this study.

MATERIAL AND METHODS

The test was conducted in an orchard of 'red and golden delecious' apples with 98 trees planted on a 6.25m grid. In the laboratory, moths were reared on immature apples at 26°C 60% R.H. and 16 hr. phorophase [2]. To obtain native moths, apples infested with codling moth larvae were collected from a local orchard and reared outdoors under natural environmental conditions. The larvae, in cocoons, were collected in cardboard strips and placed in the rearing trays for emergence. Moths were collected as described by Hutt *et al.* [9]. Moths were separated into three groups: laboratory reared, unirradiated; unirradiated natives; and one group (laboratory reared) treated with 25 krad of irradiation at a dose rate of 335 rad/min in ^{60}Co source. The dose was derived from a time-decay chart for ^{60}Co.

Wing traps [10] baited with 1 mg of synthetic sex pheromone, [8, 10]-dodecadien-1-01 [11] were hung as one per tree. 48 traps were positioned as shown in Fig. 1. Moths were marked with different colou-

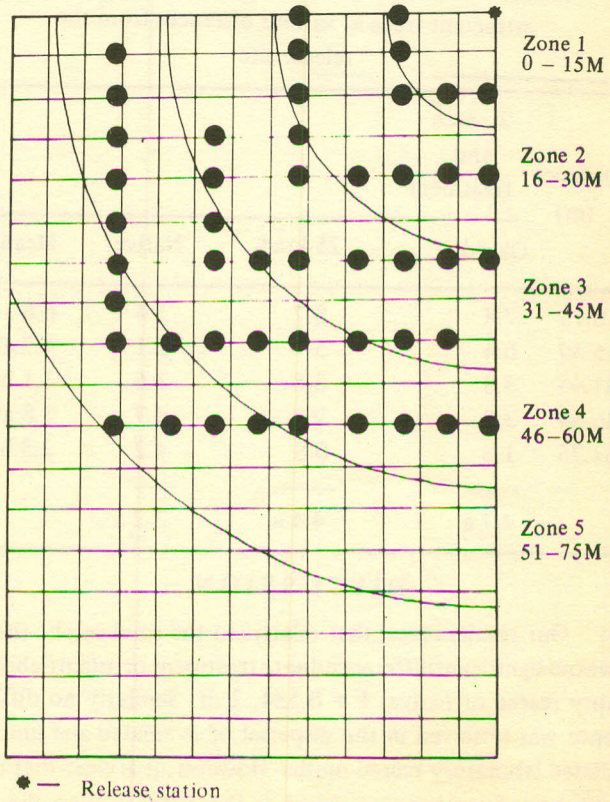

Fig. 1. Showing trap distribution of codling moth in five distance zones in the YARL apple orchard.

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red pigments [8] to distinnguish between released and native resident moths (un-marked). Five hundred irradiated and unirradiated and ca. 75 native months were released weekly for 6 weeks (July 16-August 29, 1980) between 7: 00-8:00 a.m. Catches were collected twice weekly and examined under BL to determine their source and treatment. The data were transformed to arcsin values for analysis.

RESULTS

The results on the percent catch of codling moth males when released and recaptured at various distances from the released point (Table 1) show that the pheromone traps caught 23.6, 21.9 and 16.0% of the laboratory reared unirradiated, laboratory reared irradiated (25 krad) and unirradiated native males respectively. The total percent catch, irrespective of the distance, was not significantly different in laboratory reared unirradiated, laboratory reared irradiated and native males. However, upto 45 m distance the laboratory reared irradiated males were significantly more vigorous than the native males, whereas beyond 45 m, the native males were comparatively more vigorous in dispersion than the laboratory-reared males.

Table 1. Percent catch of codling moth males in sex-attractant traps at various distances from the release site

Distance (m)	% catch and treatment			
	Okrad	25 krad	Native	Mean
0.15	7.8	8.7	3.4	6.6 a
16.30	6.4	5.7	2.1	4.7 ab
31.45	3.8	3.8	1.6	3.1 b
46.60	3.8	2.9	4.7	3.8 ab
61.75	1.8	0.8	4.2	2.3 b
	4.7 a	4.4 a	3.2 a	

DISCUSSION

Our results reveal that relative to the total catch, there was no significant difference due to treatment or origin (laboratory reared or native) F = 0.584, 2 df. Similarly no difference was observed in the dispersal of irradiated and unirradiated laboratory reared moths. However, it is clear that the number of catches diminished as the distance from the release point increased, which could be the result of dilution (more space per moth) or lack of vigour. The catches of native males suggest that it was not the dilution factor that caused reduced catches of laboratory reared males at the more distant point, but that there was also the vigour difference between laboratory reared and native males relative to dispersal. On the basis of these data it is concluded that laboratory reared moths could be uniformly distributed upto 45 m distance beyond which either we should have another release point so that the loss in vigour due to laboratory adaptations could be compensated or moths of competent vigour must be produced to avoid such pitfalls.

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