Elm Leaf Beetle

Pyrrhalta luteola (Müller)
Coleoptera: Chrysomelidae

Dahlsten, D. L.; Rowney, D. L.; Lawson, A. B. 1998. IPM helps control elm leaf beetle. *California Agriculture* 52: 17-23.

Objective: To develop a monitoring system for *P. luteola* for control decision-making.

Abstract: The elm leaf beetle, *Pyrrhalta luteola* (Müller), is one of the most important urban elm, *Ulmus* spp., pests in the USA and Canada. Most damage is caused by larval feeding, which skeletonizes the leaves. Recently, monitoring methods have become an integral part of the Integrated Pest Management (IPM) program for *P. luteola.* A monitoring program was developed from 1984-1993 in California, which predicts damage levels based on the occurrence of egg clusters on eight elm branch terminals in the lower crown of each tree sampled.

Sampling Procedure: Refer to Table 1 to determine the number of trees to be sampled depending on surrounding elm densities. Sample trees should be selected randomly for the first sample, and then resampled again on each sample date. Collect one 30-cm branch tip from both the inner and outer crown in four cardinal directions (n = 8). Remove samples during peak egg deposition (233 and 903 degree-days °C) for generations 1 and 2).

Record damage ratings by visual estimation of adult and larval defoliation on each branch terminal sampled from a scale of 0-10, where 0 equals 0% defoliation and 10 equals 100% defoliation. In locations having one generation per season, damage is assessed at the end of the season in the fall. For locations having greater than one generation per season, damage is rated for each generation. A damage threshold of 4 (40% defoliation) was established for the first generation. If 45% or less of samples have viable egg clusters present, then damage at the end of that generation will be tolerable and control is not warranted (probability of error = 10%). In the second generation, a maximum of 30% defoliation is acceptable. Weekly monitoring, beginning at approximately 50 degree-days (°C) before the predicted peak egg deposition for each generation and continuing for an additional week, was recommended.

Notes: Degree-day predictions for peak egg deposition are based on a lower developmental threshold of 11 °C with accumulations beginning March 1. The corresponding predictions for each generation may vary with location. This method can also be used to estimate egg parasitism rates for evaluating the effectiveness of a biocontrol program.

Table:

Table 1. Suggested sample size for elm leaf beetle egg cluster monitoring on English elm in stands of different sizes. Eight locations per tree are sampled: north, east, south and west; inner and outer crown.

Total trees	Sample trees	Samples/tree	Samples/ segment	Total samples	Trees (%)
3	3	40	5	120	100
4	4	32	4	128	100
5	5	32	4	160	100
6	6	24	3	144	100
7	6	24	3	144	86
8	7	24	3	168	88
9	8	16	2	128	89
10	8	16	2	128	80
11	8	16	2	128	73
12	8	16	2	128	67
13	8	16	2	128	62
14	8	16	2	128	57
15	8	16	2	128	53
16	9	16	2	144	56
17	9	16	2	144	53
18	9	16	2	144	50
19	9	16	2	144	47
20	9	16	2	144	45
21	9	16	2	144	43
22	10	16	2	160	45
23	10	16	2	160	43
24	10	16	2	160	42
25	10	16	2	160	40
26	10	16	2	160	38
27	10	16	2	160	37

28	10	16	2	160	36
29	10	16	2	160	34
30	10	16	2	160	33
40	12	16	2	192	30
50	15	16	2	240	30
60	15	16	2	240	25

Criteria: (1) Minimum of 128 branches should be sampled. (2) Minimum of 25% of the trees should be sampled.