

Elm Leaf Beetle

Pyrrhalta (=Xanthogaleruca) *luteola* (Müller)

Coleoptera: Chrysomelidae

Dahlsten, D. L.; Rowney, D. L.; Tait, S. M. 1994. Development of integrated pest management programs in urban forests: the elm leaf beetle (*Xanthogaleruca luteola* (Müller)) in California, USA. *Forest Ecology and Management* 65: 31-44.

Objective: To develop a pest management program for *P. luteola* in stands of urban elms based on degree-day accumulation above 11°C.

Abstract: Elm leaf beetle, *Pyrrhalta* (=Xanthogaleruca) *luteola* (Müller), is one of the most important pests of urban elms, *Ulmus* spp., in the U.S. and Canada. Larvae injure the host tree by skeletonizing leaves.

An integrated pest management program for *P. luteola*, based on degree-day (DD) accumulation above 11°C, was developed for urban English elms (*Ulmus procera* Salisb.) in northern and central California. The authors were unable to develop a model predicting defoliation damage at the end of the season based on peak egg densities present in the spring. Each generation of *P. luteola* varies in its potential to defoliate elms and should be monitored separately. Egg masses on English elms should be sampled around 275DD and 870DD for the first and second generations, respectively. Presence-absence sampling of egg masses on 30-cm branch terminals is sufficient to determine if populations of *P. luteola* warrant control measures. If the proportion of samples with first-generation egg masses is >0.45, then the expected damage should be >40% and in the acceptable range with an error probability of 10%. If the proportion of samples with second-generation egg is >0.30, then the expected damage should be >40% and in the acceptable range with an error probability of 10%. The damage threshold of 40% was based on experience with homeowners and tree managers. Suggested sample sizes for differently sized stands are presented, and foliar treatment, if warranted, can be based on degree-day accumulation as well. If control is warranted, apply treatments when early instar larvae peak, around 350DD (base 11°C) for the first generation and 1,100DD (base 11°C) for the second generation. While management decisions for *P. luteola* can be timed using degree-day accumulation, elms should still be sampled to confirm the presence of this pest before treatment.

Sampling Procedure: Beginning March 1, monitor degree-day accumulation above the threshold temperature of 11°C. Adult *P. luteola* activity peaks at around 250DD. Sample *P. luteola* egg masses on elms around 275DD and 870DD for first and second generations, respectively. Refer to Table 3 to determine the appropriate number of trees to sample within each stand, based on the total number of trees within a stand. Randomly sample 30-cm branch terminals from the lower crown of each tree in all four cardinal directions. Examine each branch terminal for the presence of egg masses and tally the number of terminals with egg masses present. If the proportion of samples with first-generation egg masses present is >0.45, then the expected

damage should be >40% and in the acceptable range with an error probability of 10%. If the proportion of samples with second-generation egg masses present is >0.30, then the expected damage should be >40% and in the acceptable range with an error probability of 10%.

Consider applying foliar treatments if the proportion of samples with egg masses exceeds 0.45 or 0.30 for the first and second generation of *P. luteola*, respectively. If control is warranted, apply treatments when early instar larvae peak, around 350DD (base 11°C) for the first generation and 1,100DD (base 11°C) for the second generation.

Notes: This research was conducted in northern and central California and the degree-day accumulation correlated to oviposition and peak density of young larvae may not be valid in other areas. Use these recommendations with caution until validated in other regions.

Table

Table 3. Suggested sample size for elm leaf beetle egg clusters on English elm in different size stands^a

Total trees in stand	Trees sampled	Samples per tree	Samples per segment	Total samples	Percentage of trees sampled
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

^aCriteria: (i) minimum of 128 branches; (ii) minimum of 25% of trees sampled; (iii) eight trees or more sampled if possible.

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