Section IV
Cereal Crop Pests

DETECTION SURVEY AND POPULATION MONITORING OF CEREAL LEAF BEETLE IN OREGON, 2001

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Introduction Cereal leaf beetle (CLB) was first found in Oregon in 1999 in Malheur Co near the Idaho border. Now the beetle has spread into nine counties in the West and five counties in East Oregon. The purpose of this study was to monitor the continuous spread and population levels of CLB and to determine its phenology in Oregon. The information gained will clarify quarantine issues and aid us in developing biocontrol programs.

Methods We monitored the spread of CLB using the generally accepted protocols of the Western States workgroup, by surveying the counties found negative during previous years. Our goal was to survey a maximum of 20 fields, preferrably production fields with oats, wheat, or barley, distributed evenly in each county. Alternate sites included grass-seed fields, pastureland, and rangeland. Where possible, irrigated fields were selected. In counties where fields were not available, a variety of tall roadside grasses were surveyed. A total of 120 sweeps (4 sets of 30) with a 15" insect sweep net were done at each survey site. Technicians looked for both larvae and adults from each sweep sample and recorded the number of each life stage, the host, location, date, and any other relevant information.

The phenology and population studies initiated in 2000 were continued in 2001. We conducted biweekly samplings of CLB in four infested counties, two on the east side of the Cascade Mountains (Union, Malheur) and two on the west (Multnomah, Washington) in 2001. Because of apparent climatic differences between the east and west sides of the mountains, we suspect that CLB's phenology may differ between the two regions in the state. Where possible, two CLB positive fields per county, each containing different spring cereal grains were sampled. To maximize phenological data and establish a population baseline early, fields of winter grain crops adjacent to or near spring grains were sweep net-sampled to monitor overwintered CLB adults before they moved to spring cereal crops to lay eggs. Biweekly sampling began at the first sign of adults in the spring and continued with egg, larvae, and adults again through the summer until CLB were no longer detected. Spring grain fields were sampled by dividing a field, or a rectangular portion of a very large field, into 9 subplots. Within each subplot, a sample near the center was taken using a 1/2 meter sq quadrat. The quadrat was randomly tossed over rows of

grain. Usually a quadrat enclosed 3 to 4 rows of grain, 1/2 meter each. Because of many grain stems in a quadrat, we chose to sample CLB from just one row. All CLB life stages on stems in one 1/2 meter row were visually inspected, counted, and recorded separately. Egg, larval, and adult stages of CLB can all be easily observed on grain stems or leaves. Larval instars were distinguished by head capsule widths. Late season field-edge grasses and nearby corn fields were also checked for summer/overwintering adults.

Results CLB was found in three additional western counties and one eastern county in 2001 (Fig. 1). In eastern Oregon, a single positive barley field was located in Wallowa County near the town of Joseph where one CLB larva was found. On the west side, one adult was found in one oat field in Benton County near Philomath, one larva was found in one oat field near Junction City in Lane County, and one adult and four larvae were collected from two wheat fields in the northern half of Polk County. Table 1 gives a comparison of the field, county, and host information from the 2000 and 2001 surveys. In 2001, 47% of the fields surveyed were oats and wheat, while it was 65% in 2000. Many species of grasses were sampled including barley, rye, corn, fescues, timothy, orchard grass, quack grass, millet, and others. Pearl millet was found as a host for CLB in OR for the first time in 2001. It is interesting to note that although Umatilla Co. was positive in 1999, CLB was not detected there in either 2000 or 2001.

In western Oregon, adults were first seen on 4/24 and last seen on 8/28 (Fig. 2). Adults are likely out several weeks earlier, at least in small numbers. Adults were seen as early as 4/11 in 2000, and one adult was collected from a Lindgren funnel trap (from an unrelated survey) in Hillsboro on 3/15 of 2001. In western Oregon, adults were absent in the field only during a brief period of about 2-3 weeks in June. Eggs were first seen on 4/24 on winter wheat and last seen on 7/6. Eggs laid early enough on winter grains can probably complete development before the crops are harvested. Larvae were present from 5/9 (1st instar) to 8/1 (4th instar). On the east side, adults, eggs, and 1st instar larvae were first observed on 5/9. Adults were last seen on 8/2. As in 2000, a late start on collecting data in 2001 on the east side likely resulted in a late first appearance of adults and eggs. CLB has one generation a year. All life stages overlap considerably in spring and summer on spring cereal crops. Beginning in early July, the summer adults emerge and quickly move into adjacent fields of corn or other green grasses to feed before overwintering. Sampling needs to be started earlier in eastern Oregon to get a better picture of how conditions there differ from the west side. Field irrigation likely plays a part in the success of CLB in climatically dry areas.

Population numbers for each life stage from all fields in each county were averaged for a given date. Figure 3 shows the relative population numbers for each county sampled. On the east side, Malheur Co. had the highest number of eggs, but Union Co. appeared to have higher numbers overall for peaks of each life stage. The highest population numbers overall on the west side were in Washington Co. as they were in 2000.

Conclusion In 2001, CLB spread into four new counties, increasing the total number of infested counties in the state to 14. Now five counties in the east and nine in the west are infested with CLB. The four counties studied for phenology and populations seem to have slightly increased population levels compared with 2000. One important goal for 2002 could be to start the monitoring much earlier on the east side to get a clearer picture of CLB phenology there and how it compares to the west.

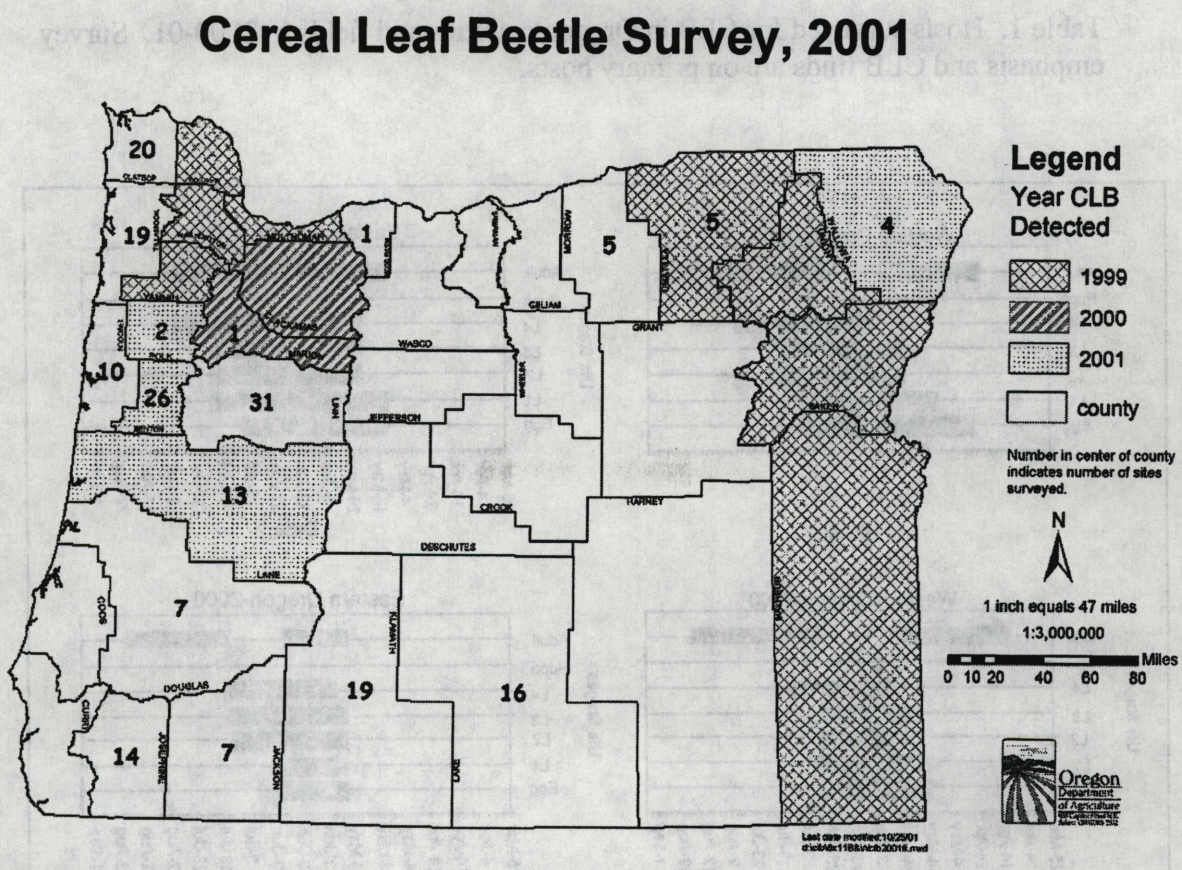

Figure 1. Oregon counties where CLB was detected from surveys during the last three years and the number of sites surveyed per county in 2001.

Hosts	No. Counties Surveyed		No. Fields Surveyed		No. CLB Positive Sites	
	2000	2001	2000	2001	2000	2001
Oats	16	9	138	45	4	2
Wheat	23	8	196	49	2	2
Barley	11	5	30	16	1	1
Rye	6	2	18	6	0	0
Corn	5	4	21	18	0	0
Grasses	18	9	84	64	0	0

Table 1. Hosts surveyed for CLB in Oregon counties and fields in 2000-01. Survey emphasis and CLB finds are on primary hosts.

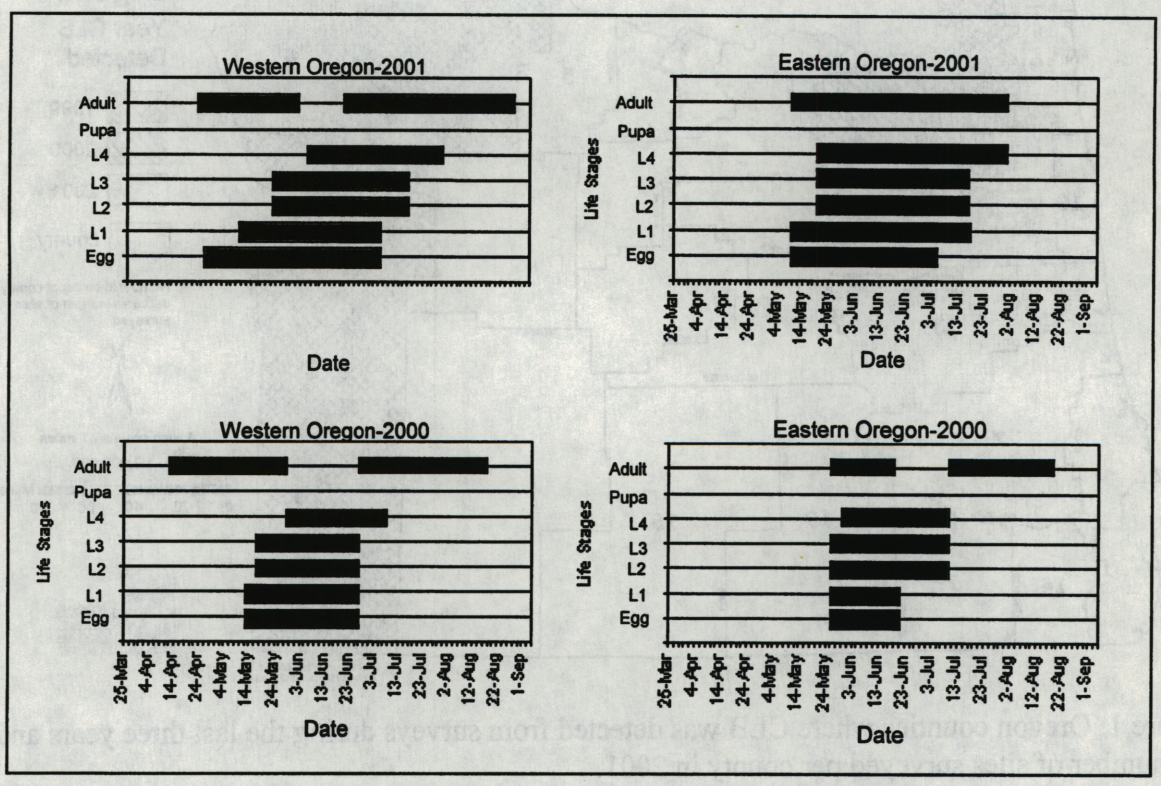

Figure 2. Phenology of CLB in Western and Eastern Oregon, 2000 and 2001.

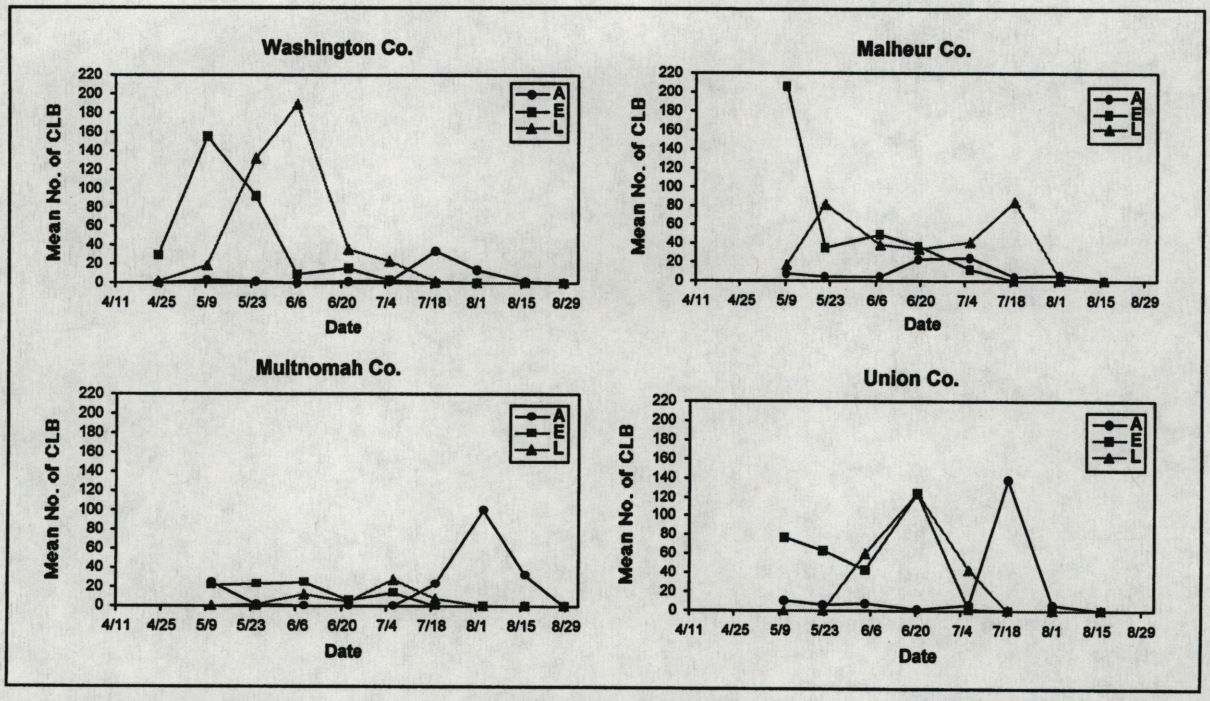

Figure 3. Mean CLB population levels in each sampled county. A=adults, E=eggs, L=larvae.