

Appendix F

Accumulating Degree-Days for Timing Douglas-fir Tussock Moth First-Larval Sampling

(Based on Procedures by Wickman 1985, 1988)

Degree-Days are accumulated by using either a Biophenometer to measure degree-days directly, or by calculating accumulated Degree-Days by taking the maximum and minimum daily temperature and dividing by 2 to get the daily mean temperature, then subtracting 42 degrees F (5.5 degrees C) from this value and counting each degree above 42 degrees F as 1 Degree-Day. These computed values are then summed each day to obtain cumulative heat units for a site beginning at either April 1 or April 15 (Wickman 1985 and Wickman 1988, respectively).

In a study from 1983_1987 at the location "Y-Ridge" in the Blue Mountains (Walla Walla RD, Umatilla NF), Wickman (1988) accumulated Degree-Days as described above beginning April 15th and determined that an average of 599 plus or minus 5.3 Degree-Days were required to sample Douglas-fir tussock moth in the first instar based on these five years of data. Hence, on the average, tussock moth egg hatch should occur on Blue Mountains Analysis Units by the time approximately 600 Degree-Days have accumulated on any given site.

Literature Cited

Wickman, Boyd E. 1985. Comparison of a degree-day computer and a recording thermograph in a forest environment. Res. Note PNW-427. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment station. 6 p.

Wichman, Boyd E. 1988. Seasonal variation of degree-day accumulation in relation to phenology of western spruce budworm, Douglas-fir tussock moth, and host trees in northeastern OR: Res. Note PNW-RN-482. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 11p.

DEGREE DAY CALCULATIONS

Using the weather service in Pendleton, Ore. for record sources and several weather stations adjacent to the to the analysis units, calculations were done to determine accumulated Degree-Days as described by Wickman (1985,1988). Degree Days begin on April 15 and it is surmised that by the time 600 degree-days are accumulated, tussock moth egg hatch should occur. A degree day is calculated by taking the maximum and minimum daily temperature, dividing by 2 to get the daily mean temperature, then

subtracting 42 degrees from this value and counting each degree above 42 degrees as 1 degree day.

Weather stations (RAWS sites) used for this calculations were at Sparta Butte (T.8s, R.44e., Sec.9, 4278 feet), Alder Ridge, (T. 11N, R.46e, Sec.7, 4500 ft.), Coverdale, (T.4s, R. 47e, Sec. 31, 4600 ft.), Walla Walla Airport, (1204 ft.) and the City of Halfway (2800 ft.). Sparta is adjacent to the Eagle Analysis Unit, Alder Ridge is the closest to Pomeroy Analysis Unit, Coverdale is within the Imnaha Analysis Unit, Walla Walla is close to Mill Creek and Spangle Analysis Units, and Halfway is closest to the Pine Analysis Unit. Only one RAWS site (Coverdale) was within a spray block.

Degree Day Accumulations from April 15, 2000 to:

May 21 – Sparta, 264 degree days.

Alder Ridge, 193 degree days.

Coverdale, 220 degree days.

Walla Walla (city), 528 degree days.

Halfway (city), 403 degree days.

May 30 - Sparta, 326 degree days.

Alder Ridge, 252 degree days.

Coverdale, 302 degree days.

Walla Walla (city), no data

Halfway (city), 545 degree days (first egg hatch occurred in Pine A.U. at an elevation 1000 feet higher on May 25).

June 6 - Sparta, 406.5 degree days.

Alder Ridge, 334 degree-days.

Coverdale, 380 degree days.

Walla Walla (city), no data

Halfway (city) no data

First Egg hatch observed:

May 25, Pine A.U. at 3800 ft. elevation.

June 1, Eagle A.U. at 3900 ft. elevation.

June 1, Spangler A.U. at 3600 ft. elevation.

Compiled by Linda Collier.