

# A Survey of Apple Tree Defoliators in Whatcom County, Northwestern Washington State, 1994-1995

1994/1995 Project Report - Washington State Department of Agriculture

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## INTRODUCTION

A number of exotic fruit tree pests new to the United States were found in northwestern Washington State between 1985 and 1991. These introduced pests included the apple ermine moth, *Yponomeuta malinellus* (L.) (Lepidoptera: Yponomeutidae), the cherry bark tortrix, *Enarmonia formosana* (Scopoli) (Lepidoptera: Tortricidae), and another leaf-roller (the 'Golden' Tortrix) *Croesia holmiana* (Schiff.) (Lepidoptera: Tortricidae).

Detection of these pests by the Washington State Department of Agriculture (WSDA) prompted investigation of the potential for occurrence of other exotic pests in the area. Apple trees, an important component of the region's agricultural base, were surveyed throughout Whatcom county during the spring and summer of 1994 and 1995. Whatcom county is the site of the first U.S. detections of the apple ermine moth and cherry bark tortrix, and is the westernmost county in the U.S. which borders on Canada (British Columbia). This survey was a cooperative effort of the WSDA and the U. S. Department of Agriculture (USDA), with field activities were funded by the USDA Cooperative Agricultural Pest Survey (CAPS) program.

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## PROJECT OBJECTIVE 1994-1995

Determine what unknown apple defoliating insects are present in Whatcom county by collecting leaf-feeding larvae and pupae from apple leaves, rearing them to the adult stage, and identifying them to species.

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## DEFOLIATOR SURVEY

### Methods

Larvae and pupae of apple leaf feeding pests were collected throughout Whatcom county, and reared to the adult stage in individual 3 oz. or 1 pint plastic containers. Larvae were reared on either fresh apple foliage or modified McNeil's artificial diet provided by the Washington State University - Wenatchee Treefruit Research and Extension Center. Emerged adult insects were killed by freezing and pinned along with associated pupal case and larval exuvia for curation and ID. Rearing space in Bellingham was provided by the Western Washington University entomology lab, where specimens were kept at 70<sup>o</sup> - 78<sup>o</sup> F under natural daylight. A few common and distinctive defoliating species (e.g. tent caterpillars) were recorded as present on apple leaves but not reared.

Specimen identification was provided or coordinated by Dr. Steven Passoa, National Lepidoptera Identifier with the USDA Animal and Plant Health Inspection Service (APHIS). Species new to the United States were confirmation by the USDA Systematic Entomology Laboratory (SEL).

## Results

Twenty-seven species of moths (Lepidoptera) were reared and/or identified from Whatcom county apple trees. Twenty-two of the species have been identified at least to genus at this date, and are listed by genus, common name, and family in Table 1.. The five undetermined species, which are not listed in Table 1, are in the moth families; Geometridae (2 species), Noctuidae (1 sp.), Tortricidae (1 sp.), and Yponomeutidae (1 sp.).

Most of the species identified in this survey are endemic (native) or are exotic species known historically to be established in Washington State. However, seven species were detected for the first time in the U.S. or Washington State by this survey. These new finds are also noted in Table 1. (\*New to..).

Table 1. Apple Defoliator Species in Whatcom County, Washington - 1994 / 1995.

| Scientific Name                              | Common Name                           | Family         | *New to |
|--|---------------------------------------|----------------|---------|
| <i>Acleris (hastiana group)</i>              | <b>a tortrix moth</b>                 | Tortricidae    |         |
| <i>Acleris nivisellana</i> (Walsingham)      | <b>apple leaf twister moth</b>        | Tortricidae    |         |
| <i>Acleris variegana</i> (Denis & Schiff.)   | <b>garden rose tortrix moth</b>       | Tortricidae    |         |
| <i>Batodes (Ditula) angustiorana</i>         | <b>a tortrix moth</b>                 | Tortricidae    |         |
| <i>Chloroclystis rectangulata</i> (L.)       | <b>green pug moth</b>                 | Geometridae    | *WA     |
| <i>Choreutis pariana</i> (Clerck)            | <b>apple &amp; thorn skeletonizer</b> | Choreutidae    |         |
| <i>Croesia holmiana</i> (L.)                 | <b>'golden' tortrix</b>               | Tortricidae    | (*WA)   |
| <i>Egira (Xylomyges) rubrica</i> (Harvey)    | <b>a cutworm moth</b>                 | Noctuidae      |         |
| <i>Halycidota maculata</i>                   | <b>spotted tussock moth</b>           | Arctiidae      |         |
| <i>Hedya nubiferana</i> (Haworth)            | <b>green budworm</b>                  | Tortricidae    | *WA     |
| <i>Hyphantria cunea</i> Drury                | <b>fall webworm</b>                   | Arctiidae      |         |
| <i>Lithophane (antennata)</i> (Walker)       | <b>green fruitworm</b>                | Noctuidae      |         |
| <i>Malacosoma fragilis</i> (Stretch)         | <b>western tent caterpillar</b>       | Lasiocampidae  |         |
| <i>Malacosoma disstria</i> Hübner            | <b>forest tent caterpillar</b>        | Lasiocampidae  |         |
| <i>Operophtera brumata</i> (L.)              | <b>winter moth</b>                    | Geometridae    |         |
| <i>Pandemis heparana</i> (Denis & Schiff.)   | <b>dark fruit tree tortrix</b>        | Tortricidae    | *US     |
| <i>Pandemis cerasana</i> (Hübner)            | <b>barred fruit tree tortrix</b>      | Tortricidae    | *US     |
| <i>Phyllonorycter (elmaella)</i> Dog. & Mut. | <b>western tentiform leafminer</b>    | Gracillariidae |         |
| <i>Recurvaria nanella</i> (Hübner)           | <b>lesser budmoth</b>                 | Gelechiidae    | *WA     |
| <i>Swammerdamia pelicaria</i> (Retz.)        | <b>a yponomeutid moth</b>             | Yponomeutidae  | (*WA)   |
| <i>Spilonota ocellana</i> (Denis & Schiff.)  | <b>eyespotted budmoth</b>             | Tortricidae    |         |
| <i>Yponomeuta malinellus</i> Zeller          | <b>apple ermine moth</b>              | Yponomeutidae  |         |

The biology and economic status of endemic (native) species and exotic species introduced to the region earlier this century or before are presented elsewhere in the technical and pest management literature. For species new to Whatcom county, a brief summary of origin, biology, current abundance in Whatcom county, and known distribution or detection status is presented in Table 2.

Table 2. Apple Pests New to Whatcom County, Washington.

**green pug moth** - Geometridae: *Chloroclystis rectangulata* (L.)

This new pest is an early, persistent European pest of apple, pear, cherry and other fruit trees. Larvae attack buds, blossoms, and leaves from March to June. Damage to blossoms causes considerable deformation of fruit. Larvae were common in Whatcom County apple blossoms both years of this survey, which recorded the pest for the first time in the Pacific Northwest. It is new to North America, discovered a few years prior to this survey in Eastern Canada and the northeastern U.S.

**'golden' tortrix** - Tortricidae: *Croesia holmiana* (L.)

This tortricid moth is a common pest of many fruit trees and ornamental plants in Europe and Asia, where it is considered a minor problem. Spring and summer larval feeding affects only leaves. First reported in British Columbia, Canada, in 1977, this pest has been collected in large numbers in survey traps (for other pest species) throughout the Puget Sound area since the mid-1980's. Larvae were very common on apple trees throughout Whatcom county. This pest is not known to occur anywhere else in North America.

**green budworm** - Tortricidae: *Hedya nubiferana* (Haworth)

This European leafroller is also found in the Eastern U.S. and Canada. Considered a minor pest in Europe, the literature notes the pest as sometimes abundant in unsprayed orchards. Overwintering larvae feed on opening leaf and blossom buds in spring, and may also bore into and kill new branch tips. First described from B.C. in 1914, a few specimens reared from apple leaves in Whatcom County in 1994 are the first known detections in the Western U.S.

**dark tortrix moth**- Tortricidae: *Pandemis heparana* (Denis & Schiff.)

Larvae feed on many trees and shrubs, including apple, pear, plum, and some berries. Typical leafroller damage in spring mostly affects leaves, but flower and fruit feeding can cause loss or blemishes. Native to Europe and Asia, it is a significant economic fruittree pest in Japan, but considered a minor pest in Europe. The first North American detection was in British Columbia in 1978, and specimens submitted from this survey are the first known from the U.S..

**barred fruit tree tortrix** - Tortricidae: *Pandemis cerasana* (Hübner)

This is another European species of *Pandemis*, similar in appearance and biology to *P. heparana*, but considered more of an economic pest. Blossom and fruitlet damage from large populations produce blemished fruit of apple, pear, cherry, plum, and other fruit crops in Europe. Also first found in British Columbia in 1978, Whatcom county specimens are similarly the first in the U.S.. This species is not known to occur anywhere else in North America.

**lesser bud-moth** - Gelechiidae: *Recurvaria nanella* (Hübner)

Larvae of this pest feed on leaves and blossoms of apple, plum, and many other fruit trees in early spring. Originally from Europe, where it is a destructive pest, the lesser bud-moth was also introduced into the Northeastern U.S. in the late 1700's. It is now common in apple buds before bloom in much of the East. It was first recorded as a pest of apples in British Columbia in the 1950's. Specimens reared from apple leaves in Bellingham in 1994 may be the first from the Western U.S.

**Swammerdamia pelicaria** - Yponomeutidae: *Swammerdamia pelicaria* (Retzius)

The distinctive larvae of this pest feed on the upper surface of apple and hawthorn leaves in early and late summer. It is native to Europe and Asia, where it is not considered an important pest. This pest was probably first recorded in Bellingham in 1942, and later in B.C. in 1979, although changes in species name confuse the first records. It is included in these summaries because, other than the single 1942 collection record, no other information on its presence or populations in Washington exist. Larvae are now common on apple and hawthorn leaves in Whatcom County in early and late summer. The Washington / British Columbia population of this pest is the only known infestation in North America.

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