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Plant Protection Division, Pest Program
Washington State Department of Agriculture

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2008 Washington State Surveys for Apple Clearwing Moth, an Old World Bark-feeding Sesiid New to North America

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Background

Figure 1. Mating Adult Apple Clearwing Moths

The first established population of the apple clearwing moth (ACM), *Synanthedon myopaeformis* Borkhausen (Lepidoptera: Sesiidae) (Figure 1.) in North America was identified in 2005, in British Columbia, Canada. Since then, distribution of ACM has been determined to include areas east and west of the Cascade Mountains in southern B.C. as well as in Whatcom County in Northwestern Washington State, the first U.S. occurrence of this exotic species.

ACM is a European pest of apple and other Rosaceous trees, damaging host plants via larval feeding in the bark on the trunk and branches. Larval development usually takes two years in our climate, and attacks are usually associated with entry sites around pruning wounds, mechanical damage, or graft unions. Larval frass is kept in larval galleries (not extruded) and external signs of infestation may be inconspicuous.

In 2008, two USDA APHIS Cooperative Ag Pest Survey (CAPS) surveys were funded to determine the extent of ACM occurrence in Washington State.

2008 Project Objectives

1. **Delimit the currently infested area in Northwestern Washington.**
2. **Detect ACM presence in selected counties and at commercial nurseries that imported foreign apple stock in recent years.**

Project Methods and Materials

Pherocon 2® type (diamond) sticky-traps were used, baited with pheromone-lures provided by the USDA APHIS Otis Methods Development Center. Lures consisted of 1 mg of Z3,Z13-18:AC (peach tree borer lure) on a hexane-rinsed grey septa, and were changed every four weeks or less.

Pheromone-lure-baited traps were placed at a total of 603 locations statewide, including; Whatcom County and contiguous counties south to King, Okanogan County, bordering on known ACM-infested areas of B.C., Canada, and at commercial nurseries with a history of importation of foreign apple stock (Table 1). Trap sites were in roadside, residential yard, or commercial apple trees (*Malus spp.*). Traps were placed in May or June and inspected about every two to three weeks until late August or September.

Table 1. 2008 ACM Traps

County	# of Trap Sites
Whatcom	113
Skagit	136
Snohomish	60
King	60
Okanogan	52
Douglas	7
Grant	115
Franklin	17
Yakima	39
Benton	4
Survey Total	603

All field data in this survey was recorded on Treo650® cellphones with PalmOS® capability, using SmartList® vers.3.0 and Cetus vers.2.1 connected by Bluetooth® to a PalmOne® GPS receiver and sent to WSDA managing offices via email (as attachments).

Project Results and Discussion

ACM was not detected in any location outside of Whatcom County in this 2008 survey. Distribution of sites trapped in Eastern and Western Washington is presented in Figures 2 and 3 respectively.

In Whatcom County, ACM adults were captured in the northeastern portion of the populated area of the county, with total moths captured at positive sites ranging from 1 to a high of 53 (Figure 3).

Examination of apple trees at positive ACM sites in Whatcom County did find ACM larvae present in callous tissue around corky graft-unions on abandoned orchard trees (Figure 5), which is consistent with larval damage seen in B.C., Canada.

Identification of clearwing moths captured in this survey was somewhat complicated by the diversity of species attracted to the peachtree borer lure used in this survey, several of which are similar in overall appearance. Species captured are listed in Table 2, and among the non-target species recorded, the Birch and alder borer, which is the most similar species (to ACM), was also the most abundant.

Table 2. Sesiid Species Collected in 2008 ACM Survey

Genus	Species	Common Name	Total Collected
Sesia	*tibialis*	Cottonwood crown borer	140
Synanthedon	*albicornis*	Willow stem borer	13
Synanthedon	*culiciformis*	Birch and alder borer	508
Synanthedon	*exitiosa*	Peachtree borer	96
Synanthedon	*myopaeformis*	Apple clearwing moth	260
Synanthedon	*novaroensis*	Douglas-fir pitch moth	354
Synanthedon	*polygoni*	Buckwheat root borer	43
Synanthedon	*scitula*	Dogwood borer	1

A single specimen of the eastern apple tree pest, Dogwood borer (*Synanthedon scitula*), was also detected at one of the nursery sites surveyed, and followup detection/delimiting survey is planned for the site. Dogwood borer , native to Eastern North America, is not known to occur in the west.

Diagnostic resources for identification of ACM and the various non-target species collected in this survey are included as appendices at the end of this report, as are larger format versions of survey maps.

Figure 2. 2008 Eastern Washington ACM Survey Sites

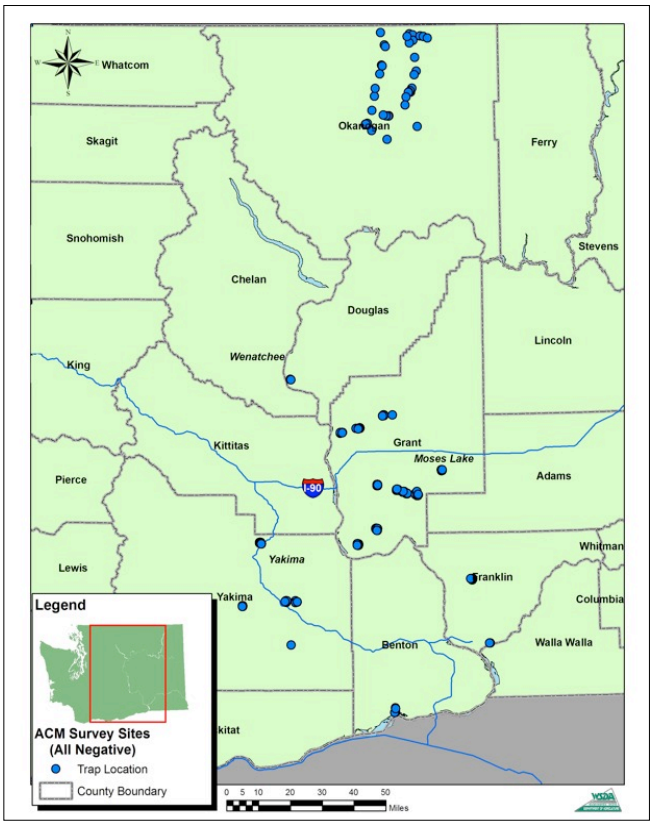
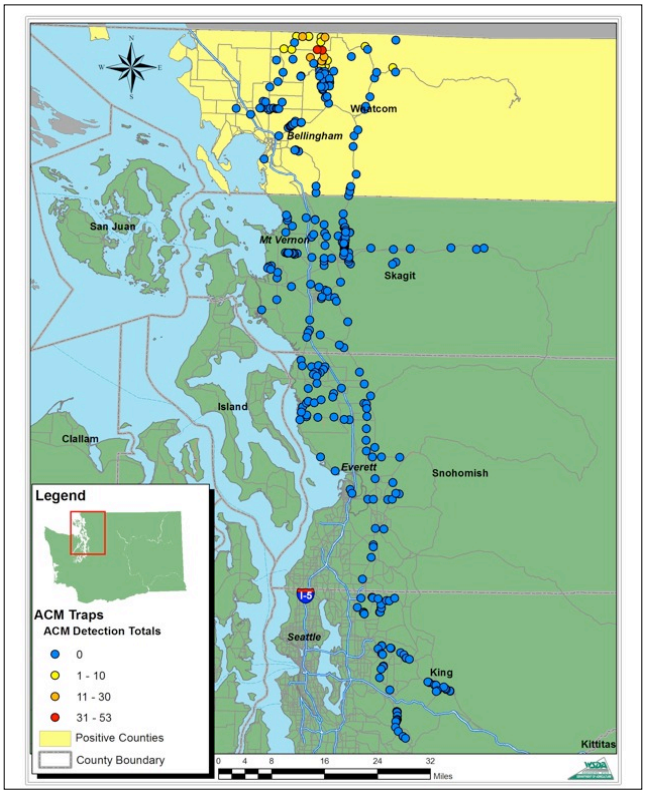


Figure 3. 2008 Western Washington ACM Survey Sites



Pertinent Literature / References

Eichlin, T.D., and W.D. Duckworth, 1988. *Sesioidea: Sesiidae in* Dominick, R. B., et al., *The Moths of America North of Mexico*, fasc. 5.1

ACM in B.C., Canada;
http://www.agf.gov.bc.ca/cropprot/tfipm/clearwing.htm

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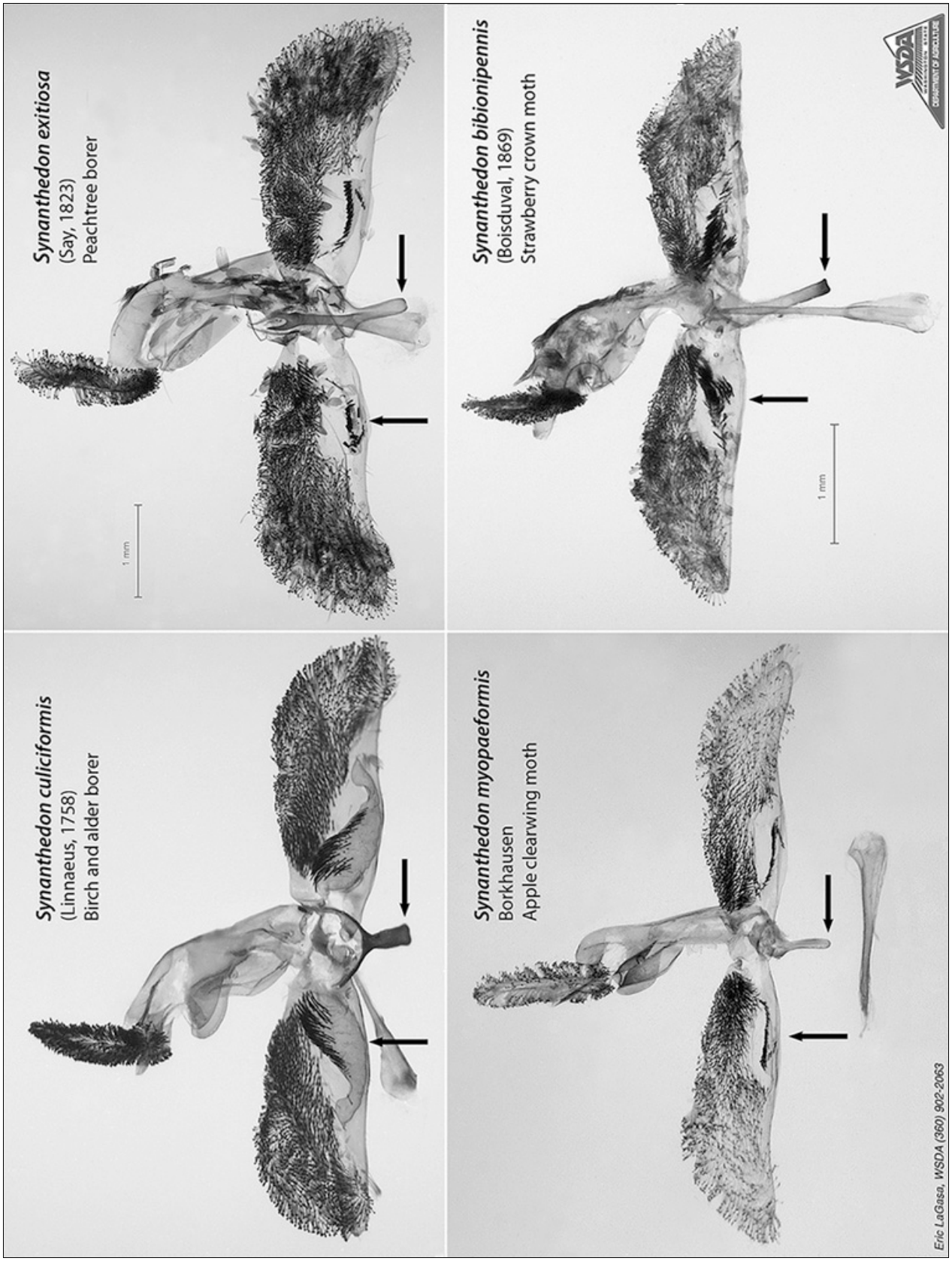
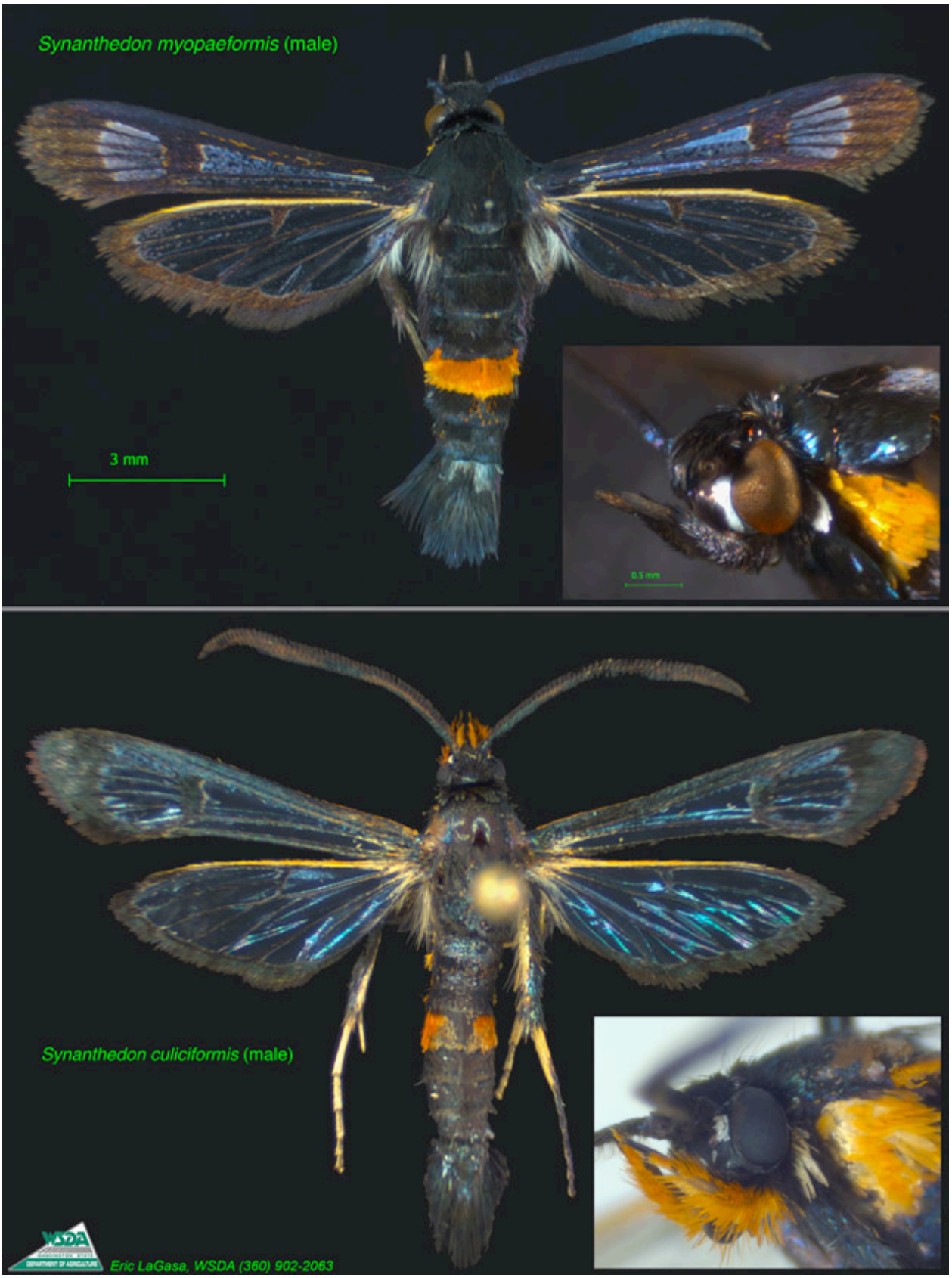
Appendix 1. Synanthedon species male genitalic identification characters.



Appendix 2. *Synanthedon myopaeformis* and *S. culiciformis* (male) identification characters.



Appendix 3. 2008 Washington State Apple Clearwing Moth Survey Sites