

Area-wide Survey of Tree Fruit Pests including Nurseries in Utah – 2004

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Introduction

The focus of this study was to survey for five exotic lepidopteran pests in northern and central Utah. The pests surveyed included the light brown apple moth *Epiphyas postvittana* (Tortricidae), the false codling moth *Cryptophlebia leucotreta* (Tortricidae), the apple ermine moth *Yponomeuta malinellus* (Yponomeutidae), the cherry ermine moth *Yponomeuta padellus* (Yponomeutidae), and the cherry bark tortrix *Enarmonia formosana* (Tortricidae). All five of these species could potentially pose a threat to the orchard industry in Utah, but have not been encountered in Utah to date.

The light brown apple moth *Epiphyas postvittana* is an endemic to Australia. The larval stage of this species causes damage to both foliage and fruit and has been put on the National Priority List. This species has a wide host range, but economic damage most often occurs in apples. Early instars feed on tissue beneath the surface layer of leaves, while larger larvae construct feeding sites between adjacent leaves, or other areas, forming the typical leaf roll. Larvae can also cause superficial fruit damage in apple varieties that form compact fruit clusters. Internal damage to apple, pear, and citrus fruits is less common, but a young larva may enter the interior of an apple or pear fruit through the calyx or beneath the stem of a citrus fruit (Buchanan, 1977).

The false codling moth *Cryptophlebia leucotreta* is endemic to and occurs throughout sub-Saharan Africa and the neighboring islands of the Indian and Atlantic Oceans. The pest feeds on a wide array of wild and cultivated host plants such as citrus, cotton, sorgham, corn, peach, and oak and has also been placed on the National Priority List. This species has become notorious for its infestations of cotton in most of equatorial Africa, of sorghum in Central Africa, and of citrus in southern Africa. More recently it has gained prominence as a serious borer of macadamia nuts in Southern Africa countries (Newton, 1998). In the USA this species can be found in most cotton and citrus producing states where the larvae cause damage by feeding in the fruits and bolls. It has the potential to cause damage to the peach crop in Utah.

The apple ermine moth, *Yponomeuta malinellus*, is a defoliator of apple and crabapple trees. Its current distribution is primarily Palearctic and can be found throughout the temperate regions of Europe, Russia, North Africa, the Middle East, the Himalayas, Manchuria, Korea, and Japan (Johnson, 2004). It is thought to have originated in Eurasia (Johnson, 2004). This moth was first detected in North America on nursery trees on Vancouver Island, British Columbia. By 1990 apple ermine moths were trapped throughout Washington State and species had spread to Oregon by 1991 (LaGasa, 1993).

The cherry ermine moth, *Yponomeuta padellus*, was first discovered in North America in British Columbia in 1993. The biology, morphology, and damage caused by *Y. padellus* are very similar to that of the apple ermine moth, only that the hosts are cherry, hawthorn, plum, mountain-ash rather than apple and crabapple (Johnson, 2004). Both of these species have the potential to become established in Utah.

The cherry bark tortrix, *Enarmonia formosana*, is a defoliator of cherries, plums, and other plants of the Rosaceae, such as apples, apricots, and peaches. This species is endemic to northern Europe with its natural range extending from Denmark to Siberia in the north and France to Algeria in the south. It was first recorded in North America (Southern British Columbia) in 1990 and was first collected in the U.S. in Washington in 1991 (Johnson 2004). The larvae cause damage by feeding under the bark, making irregular tunnels, which causes the bark to loosen and crack. Large infestations can cause swellings and cankers on the trunk that can eventually kill limbs or the entire tree. This has serious implications for stone fruits, which tend to have a long orchard life and more naturally occurring bark irregularities (LaGasa, 1993).

Materials and Methods

Survey Sites

Survey sites were established in five of the northern orchard-producing counties of Utah (Table 1). There were a total of 28 survey sites within these five counties. County agricultural agents were queried to identify appropriate survey sites for their respective counties. Growers were contacted and permission was then obtained for placing traps on private property. Geographical positioning system (GPS) coordinates were recorded with a handheld Garmin Etrex Venture GPS unit (Table 1).

Host Tree Selection

Sites with a large variety of fruit trees were chosen specifically, when the option was available, to allow for collecting all target pests at the same site (Table 1). Within each orchard site, appropriate areas for trapping were chosen

based on the presence of suitable hosts for each target pest species in question. The stands of fruit trees sampled for each pest species were as follows:

- Light brown apple moth (LBAM) – Apples
- False codling moth (FCM) – Peaches
- Apple ermine moth (AEM) – Apples
- Cherry ermine moth (CEM) – Cherries
- Cherry bark tortrix (CBT) – Cherries, Apples, Peaches

Insect Traps

Commercial traps were placed in orchards between 27 May and 12 June 2004 (Table 2). Traps were visited approximately once per month (exact dates are given in Table 2); insects removed, sticky liners replaced, and lures replaced. Traps were present continuously at the sites for 12-15 weeks. The traps consisted of wing-style sticky traps (Pherocon ICP; Trece, Inc., Adair, OK), which were used throughout the study with the appropriate pheromone lures for each target species. When sites were visited to replace the traps, each trap was covered with clear plastic wrap and returned to the laboratory for identification of trapped insects.

Results

None of the target lepidopteran pests were collected with the sticky traps. Furthermore, none of the target pests were seen in the orchards or nurseries while traps were being placed. Traps did manage to collect many non-target insects, such as tachinid, drosophilid and muscid flies, curculionid beetles, and the occasional codling moth. It is doubtful that the spraying regime of the different growers would have successfully managed all of these exotic pests, had they been present in the orchards. It is more likely that these pests have not migrated yet to northern Utah from their current introduced ranges.

References Cited

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Table 1. Survey Sites					
County	Town / Area	Site	Latitude	Longitude	Fruit Tree Type
Box Elder	Perry	1	N41°28.257'	W112°01.317'	Apples, Cherries, Peaches
		2	N41°27.277'	W112°02.780'	Apples, Cherries, Peaches
	South Perry	3	N41°27.124'	W112°02.086'	Apples, Cherries, Peaches
	Willard	4	N41°25.477'	W112°01.799'	Cherries, Peaches, Pears
		5	N41°21.089'	W112°02.099'	Apples, Cherries, Peaches
Cache	Logan	6	N41°47.419'	W111°48.536'	Apples
		7	N41°43.439'	W111°48.457'	Apples, Cherries
		8	N41°43.264'	W111°49.557'	Apples, Cherries, Peaches
	Avon	9	N41°32.994'	W111°49.785'	Apples, Cherries
	Paradise	10	N41°34.993'	W111°49.078'	Apples, Cherries
Davis	Kaysville	11	N41°01.474'	W111°56.364'	Apples, Cherries
	Fruit Heights	12	N41°03.122'	W111°54.605'	Apples, Cherries
		13	N41°02.381'	W111°54.459'	Cherries
		14	N41°02.128'	W111°54.536'	Apples, Cherries
Utah	Payson	15	N40°01.617'	W111°42.090'	Apples, Cherries
	Santaquin	16	N39°59.011'	W111°46.616'	Apples, Cherries, Peaches
		17	N39°59.239'	W111°46.573'	Apples, Cherries
		18	N39°57.893'	W111°47.582'	Apples, Cherries, Pears
		19	N39°59.119'	W111°48.778'	Apples, Cherries, Peaches
	Genola	20	N39°59.051'	W111°49.583'	Apples, Cherries, Peaches
	Lincoln Point	21	N40°00.488'	W111°48.989'	Cherries
		22	N40°08.715'	W111°48.543'	Apples, Cherries
		23	N40°00.316'	W111°48.047'	Apples, Cherries, Peaches
Weber	North Ogden	24	N41°18.937'	W111°59.537'	Apples, Cherries, Peaches
		25	N41°18.776'	W111°59.168'	Apples, Cherries, Peaches
		26	N41°19.728'	W112°00.561'	Peaches
	Riverdale	27	N41°10.903'	W112°01.588'	Apples, Cherries, Peaches
	Uintah	28	N41°08.660'	W111°55.490'	Apples, Cherries, Peaches

Table 2. Data from Survey Sites			
Box Elder County			
	6/16 - 7/28/04	7/28 - 8/11/04	8/11 - 9/22/04
Site 1			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 2			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 3			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 4			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 5			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Cache County			
	5/27- 7/8/04	7/8 - 8/10/04	8/10 - 9/2/04
Site 6			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0

	5/27- 7/8/04	7/8 - 8/10/04	8/10 - 9/14/04
Site 7			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 8			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 9			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 10			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Davis County			
	6/16 - 7/2/04	7/2 - 8/5/04	8/5 - 9/21/04
Site 11			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 12			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0

	6/16 - 7/2/04	7/2 - 8/5/04	8/5 - 9/21/04
Site 13			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 14			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Utah County			
	6/1 - 7/14/04	7/14 - 8/19/04	8/19 - 9/23/04
Site 15			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 19			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 20			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
	6/7 - 7/14/04	7/14 - 8/19/04	8/19 - 9/23/04
Site 16			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0

	6/7 - 7/14/04	7/14 - 8/19/04	8/19 - 9/23/04
Site 17			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 18			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 21			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 22			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 23			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Weber County			
	6/3 - 7/2/04	7/2 - 8/5/04	8/5 - 9/19/04
Site 24			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0

Site 25	6/3 - 7/2/04	7/2 - 8/5/04	8/5 - 9/21/04
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 26			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 27			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0
Site 28			
FCM	0	0	0
CEM	0	0	0
AEM	0	0	0
LBAM	0	0	0
CBT	0	0	0