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Thrips (Thysanoptera) collected from *Solanum dulcamara* (Solanales: Solanaceae) in Washington and Idaho

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Bittersweet nightshade, *Solanum dulcamara* L. (Solanales: Solanaceae), is a native plant in parts of Europe and Asia. It was introduced and is established in the eastern, north-central, and Pacific Northwest regions of the USA. It is commonly found in grasslands and meadows and occurs most frequently in riparian areas, wetlands, and deciduous forests (Waggy 2009). We report here various thrips (Thysanoptera) species collected from samples of *S. dulcamara* in Washington and Idaho.

Patches of *S. dulcamara* were found along irrigation canals and ponds near cultivated areas. Samples were taken with a D-Vac sucking device (Model 24, Rincon-Vitova Insectaries, Inc., Ventura, California) from the entire above-ground portions of the plants from Jun to Nov in 2012 and in Aug and Oct in 2013 (Table 1). *Solanum dulcamara* grows using other plants as support. Seventeen species of surrounding plants were identified, including *Elaeagnus angustifolia* L. (Rosales: Elaeagnaceae), *Typha* sp. (Poales: Typhaceae), *Asclepias syriaca* L. (Gentianales: Apocynaceae), and *Salix* sp. (Malpighiales: Salicaceae). The D-Vac tube was placed over the plant patch for approximately 10 s. Subsamples were taken depending on the size of the patch. Insects collected in the mesh bag were placed on dry ice for transport to the laboratory. Only adults were sorted and identified to species. However, thrips larvae of unidentified species were observed on the plants from Colfax in Jun

2013, Moses Lake in Jul and Aug, Mesa (new) in Jun, and Mattawa in Jun and Sep. Thrips were extracted under stereomicroscopy in 90% ethyl alcohol. Adults were mounted in Canada balsam for identification using the procedures in Wirth & Marston (1968) and the keys in Hoddle et al. (2012). Vouchers of each species were deposited at the North Florida Research and Education Center, University of Florida, Quincy, Florida.

Adults of 8 species of thrips from 3 families were collected (Table 2). Species of Thripidae included the phytophagous *Caliothrips fasciatus* (Pergande), *Chirothrips aculeatus* Bagnall, *Frankliniella occidentalis* (Pergande), *Thrips hawaiiensis* (Morgan), and *Thrips tabaci* Lindeman. Both *F. occidentalis* and *T. tabaci* are worldwide pests of many crops, and they are vectors of the plant viruses in the genus *Tospovirus* (Bunyaviridae) (Hoddle et al. 2012). *Solanum dulcamara* is a confirmed host for *Tomato spotted wilt virus* (Parrella et al. 2003), and *F. occidentalis* is a confirmed vector of this tospovirus species to *S. dulcamara* (Stobbs et al. 1992).

Adults of 2 species of Phlaeothripidae were collected (Table 2). *Haplothrips verbasci* (Osborn) reproduces on the stems and flowers of *Verbascum thapsus* L. (Lamiales: Scrophulariaceae) (Comegys & Schmitt 1965; Hoddle et al. 2012; Wilbur et al. 2013). This plant species was identified growing near *S. dulcamara* in eastern Washington.

Table 1. Sample locations, coordinates, sampling dates, and plant stage.

Site name	Coordinates	2012	Plant stage ^a	2013	Plant stage ^a
Twin Falls, ID	42.4992583°N, 114.1540361°W	14 Jun	Flo		
	42.4978139°N, 114.1535000°W	10 Jul	Flo & Fru		
Mesa (old), WA	46.5882556°N, 119.0003111°W	28 Jun	Flo	24 Aug	Flo & Fru
		17 Jul	Flo		
		16 Aug	Flo		
		4 Nov	Flo & Fru		
Mesa (new), WA	46.5764861°N, 119.0092806°W	2 Aug	Flo	26 Oct	Flo & Fru
		4 Nov	Fru		
Colfax, WA	46.8475280°N, 117.4788700°W	27 Sep	Flo & Fru		
		6 Oct	Fru		
Moses Lake, WA	46.9928306°N, 119.6851833°W			24 Aug	Fru
	46.9986389°N, 119.6847917°W				
Mattawa, WA	46.7089806°N, 119.9451500°W	4 Sep	Flo	24-Aug	Flo & Fru
				26 Oct	Flo & Fru
Sacajawea, WA	46.2035470°N, 119.0471290°W	4 Nov	Fru		

^aFlo = flowering, Fru = fruiting

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Table 2. Species of thrips and total numbers of adults found sampling *Solanum dulcamara* patches in Idaho and Washington.

Thrips species	Sampling places ^a						
	TF	MO	MN	CX	ML	MT	SJ
<i>Aeolothrips fasciatus</i>	3	2		1			
<i>Caliothrips fasciatus</i>	1	4	1	1	1	46	
<i>Cephalothrips monilicornis</i>	4	7	1	1			1
<i>Chirothrips aculeatus</i>		1					
<i>Frankliniella occidentalis</i>	9	2				2	2
<i>Haplothrips verbasci</i>			2				
<i>Thrips hawaiiensis</i>		1					
<i>Thrips tabaci</i>						1	

^aTF = Twin Falls, MO = Mesa (old), MN = Mesa (new), CX = Colfax, ML = Moses Lake, MT = Mattawa, SJ = Sacajawea

Cephalothrips monilicornis (Reuter) reproduces on the leaves of various Poaceae (Hoddle et al. 2012). Four species of Poaceae were identified growing close to *S. dulcamara*. *Aeolothrips bicolor* Hinds in the family Aeolothripidae was collected. Insects in the order Thysanoptera are mainly phytophagous or mycophagous, and obligate predation is limited to only several lineages (Mound 2005). Species of *Aeolothrips* are predatory on small insects including other species of thrips.

A host plant is one on which an insect can reproduce (Mound 2013), and more research is needed to determine which species of thrips utilize *S. dulcamara* as a host plant. Our results suggest that the plant is potentially a source of economically important thrips invading crop fields.

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Summary

Bittersweet nightshade, *Solanum dulcamara* L. (Solanales: Solanaceae), was sampled at numerous locations in Washington and Idaho. Adults of 8 species of thrips (Thysanoptera) from 3 families were collected, including the worldwide plant pests *Frankliniella occidentalis* (Pergande) and *Thrips tabaci* Lindeman (Thripidae), which are vectors of

the serious plant viruses in the genus *Tospovirus*. *Aeolothrips fasciatus* Hinds (Aeolothripidae), a predator of small insects, also was collected.

Key Words: bittersweet nightshade; Pacific Northwest; Thripidae; Phlaeothripidae; Aeolothripidae

Sumario

Un muestreo de plantas hierba mora o dulcamara, *Solanum dulcamara* L. (Solanales: Solanaceae), fue realizado en varias localidades de Washington y Idaho. Adultos de ocho especies de trips (Thysanoptera) fueron colectados, incluidas las especies *Frankliniella occidentalis* (Pergande) y *Thrips tabaci* Lindeman (Thripidae) que son vectores de virus del género *Tospovirus* en cultivos agrícolas a nivel mundial. También se colectó *Aeolothrips fasciatus* (L.), especie que es depredadora de pequeños insectos.

Palabras Clave: hierba mora; dulcamara; Noroeste del Pacífico; Thripidae; Phlaeothripidae; Aeolothripidae

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