

Vouchers for treehoppers (Hemiptera: Membracidae) collected in Benton, Josephine, and Yamhill Counties, Oregon

Daniel T. Dalton¹, Richard J. Hilton², Dennis D. Kopp³, and Vaughn M. Walton¹

¹Department of Horticulture, Oregon State University

²Southern Oregon Research and Extension Center, Oregon State University, Central Point, OR

³Volunteer Curator, Smithsonian National Museum of Natural History, Washington D.C.

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Abstract

Treehopper insect populations (Hemiptera: Membracidae) were surveyed in 2018 in Benton, Josephine, and Yamhill Counties, Oregon to determine their potential roles in the epidemiology of Grapevine red blotch virus. *Stictocephala basalis* and *Tortistilus albidosparsus* were identified through a taxonomic assessment of samples collected by hand near vineyards and in a natural area. Historical presence of *Spissistilus festinus* in the Willamette Valley is discussed. Voucher specimens were deposited in the Oregon State Arthropod Collection and at the United States National Museum of Natural History.

Introduction

Investigations into potential insect vectors of Grapevine red blotch virus (GRBV) began at Oregon State University in 2016 as a result of scientific breakthroughs in the identification and spatial dynamics of the virus (Al Rwahnih et al. 2013, Dalton et al. 2019). Viruses that are vectored by insects are typically transmitted by a narrow taxonomic group (Whitfield et al. 2015). The insect species *Spissistilus festinus* (Say) (Hemiptera: Membracidae: Smiliinae: Ceresini) was determined to be a competent vector of GRBV under greenhouse conditions (Bahder et al. 2016).

Museum specimens/records

Historical records showed the presence of *Sp. festinus* in viticultural regions of northwest Oregon, but the most recent finding documented in the Oregon State Arthropod Collection (OSAC) occurred in 1980, and specimens of *Sp. festinus* from southwest Oregon were also decades old (Table 1).

Field Surveys

Insect trapping surveys were conducted in regions of the Willamette Valley and the Illinois Valley, Oregon, in 2018. The goal was to determine whether populations of potential insect vectors of GRBV are currently present in areas of commercial wine grape production. Treehoppers were collected in four Willamette Valley sites and one site near Cave Junction, Oregon. Representative specimens were sent to Dr. Dennis Kopp, Volunteer Curator of Hemiptera at the Smithsonian National Museum of

Table 1. Historical specimens of *Spissistilus festinus* in the Oregon State Arthropod Collection.

Specimen#	Locality	County	Date	Collector	Latitude	Longitude
0000001540	Unity	Baker	10-Jun-1955	Joe Schuh	44.438° N	118.192° W
0000001541	Corvallis	Benton	25-Apr-1937	C. G. Thompson	44.570° N	123.275° W
0000001542	Corvallis	Benton	25-May-1937	C. G. Thompson	44.570° N	123.275° W
0000001543	Corvallis	Benton	02-07 May-1937	C. G. Thompson	44.570° N	123.275° W
0000001544	Corvallis	Benton	10-May-1930	Itol Wilcox	44.570° N	123.275° W
0000001545	Valley of the Rogue Park	Douglas	20-May-1972	Musgrave	42.409° N	123.134° W
0000001546	Applegate	Jackson	11-May-1969	Paul Oman	42.257° N	123.169° W
0000001547	Griffin Creek	Jackson	3-May-1956	Schuh & Vertrees	42.278° N	122.936° W
0000001548	Sams Valley	Jackson	1-May-1970	Oman	42.492° N	122.975° W
0000001549	Warm Springs	Jefferson	25-Apr-1977	Oman	44.792° N	121.326° W
0000001550	Grants Pass	Josephine	8-Aug-1941	S. C. Jones	42.439° N	123.328° W
0000001551	Dodson	Multnomah	27-Jul-1923		45.605° N	122.038° W
0000001552	Forest Grove	Washington	19-May-1938	S. E. Crumb Jr.	45.519° N	123.130° W
0000001553	Forest Grove	Washington	7-Apr-1938	S. E. Crumb Jr.	45.519° N	123.130° W
0000001554	Forest Grove	Washington	6-Aug-1918	J. M. Langston	45.519° N	123.130° W
0000001555	McMinnville	Yamhill	15-Apr-1980	K. Fender	45.204° N	123.183° W
0000001556	McMinnville	Yamhill	1935	K.M. & D. M. Fender	45.204° N	123.183° W

Natural History (USNM), Washington D. C., USA, who identified them to species based on external morphology and characters on the male genitalia. In the Willamette Valley, individuals of *Stictocephala basalis* (Walker) (Figure 1) were collected by hand as late-instar nymphs in a natural area near Corvallis, Benton County, and reared to the adult stage for species identification. In Yamhill County, specimens of *St. basalis* were collected as nymphs and adults in three commercial vineyards using hand and vacuum sampling techniques. Examples of *Tortistilus albidosparsus* (Stål) (Figure 2) were collected as nymphs and adults at one of the Yamhill County vineyards. In Josephine County, adult examples of *T. albidosparsus* were found and were the only species collected. No populations of *Sp. festinus* were discovered at these sites in 2018.

This paper serves to document the deposition of exemplar specimens for these species in a public research collection. Specimens were assigned unique identifiers that were then printed as human-readable and 2D matrix codes on acid free labels affixed to the specimens. In total 34 specimens were deposited in the OSAC on 3 December 2019 (Accession OSAC_AC-2019-12-18-01-001) and 8 specimens were deposited at the USNM (Table 2).

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Figure 1. Oregon State Arthropod Collection (OSAC) voucher specimens of *Stictocephala basalis*. a. female, OSAC_0001229084; b. male, OSAC_0001229119, abdomen removed. Scale bar= 1 mm.

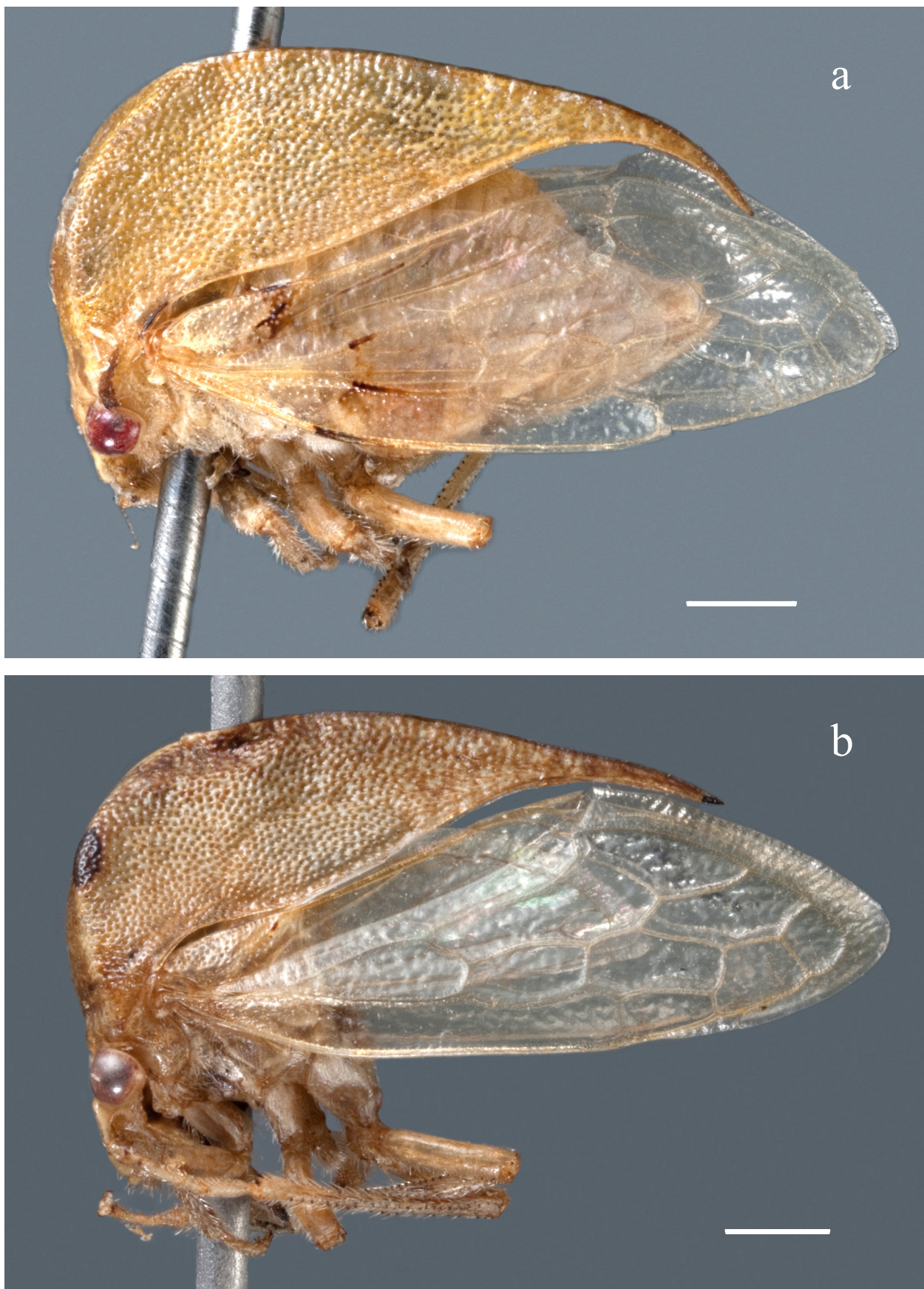


Figure 2. Oregon State Arthropod Collection (OSAC) voucher specimens of *Tortistilus albidosparsus*. a. female, OSAC_0001229096; b. male, OSAC_0001229095, abdomen removed. Scalebar = 1 mm.

Table 2. List of treehopper voucher specimens collected in in Benton, Josephine, and Yamhill Counties, Oregon, USA and identified to species by Dr. Dennis Kopp in 2019. Specimens were designated with unique Oregon State Arthropod Collection (OSAC) identification number and deposited into OSAC on 3 December 2019.

OSAC Identifier	Species	Sex	Date	Plant Host	Collector	County (USA: Oregon)	Latitude	Longitude
1229081*	<i>Stictocephala basalis</i>	female	9 - 13 July	<i>Daucus carota</i> (nymph)	D. Dalton	Benton	44.573° N	123.330° W
1229082	<i>Stictocephala basalis</i>	female	9 - 13 July	<i>Daucus carota</i> (nymph)	D. Dalton	Benton	44.573° N	123.330° W
1229083	<i>Stictocephala basalis</i>	male	9 - 13 July	<i>Daucus carota</i> (nymph)	D. Dalton	Benton	44.573° N	123.330° W
1229084	<i>Stictocephala basalis</i>	female	9 - 13 July	<i>Daucus carota</i> (nymph)	D. Dalton	Benton	44.573° N	123.330° W
1229085	<i>Stictocephala basalis</i>	female	9 - 13 July	<i>Daucus carota</i> (nymph)	D. Dalton	Benton	44.573° N	123.330° W
1229086*	<i>Stictocephala basalis</i>	male	9 - 13 July	<i>Daucus carota</i> (nymph)	D. Dalton	Benton	44.573° N	123.330° W
1229087	<i>Stictocephala basalis</i>	male	9 - 13 July	<i>Daucus carota</i> (nymph)	D. Dalton	Benton	44.573° N	123.330° W
1229088	<i>Stictocephala basalis</i>	female	9 - 13 July	<i>Daucus carota</i> (nymph)	D. Dalton	Benton	44.573° N	123.330° W
1229089	<i>Stictocephala basalis</i>	male	9 - 13 July	<i>Daucus carota</i> (nymph)	D. Dalton	Benton	44.573° N	123.330° W
1229090	<i>Stictocephala basalis</i>	male	9 - 13 July	<i>Daucus carota</i> (nymph)	D. Dalton	Benton	44.573° N	123.330° W
1229091	<i>Tortistilus albidosparsus</i>	female	July-Sept	unknown	D. Dalton	Yamhill	45.300° N	123.108° W
1229092	<i>Tortistilus albidosparsus</i>	male	July-Sept	unknown	D. Dalton	Yamhill	45.300° N	123.108° W
1229093	<i>Tortistilus albidosparsus</i>	female	July-Sept	unknown	D. Dalton	Yamhill	45.300° N	123.108° W
1229094	<i>Tortistilus albidosparsus</i>	female	July-Sept	unknown	D. Dalton	Yamhill	45.300° N	123.108° W
1229095	Uncertain ID	male	July-Sept	unknown	D. Dalton	Yamhill	45.300° N	123.108° W
1229096	Uncertain ID	female	July-Sept	unknown	D. Dalton	Yamhill	45.300° N	123.108° W
1229097*	<i>Tortistilus albidosparsus</i>	female	July-Sept	unknown	D. Dalton	Yamhill	45.300° N	123.108° W
1229098*	<i>Tortistilus albidosparsus</i>	male	July-Sept	unknown	D. Dalton	Yamhill	45.300° N	123.108° W
1229099	<i>Stictocephala basalis</i>	male	10-Jul	<i>Daucus carota</i> (nymph)	D. Dalton	Yamhill	45.300° N	123.108° W
1229100	<i>Stictocephala basalis</i>	male	10-Jul	<i>Daucus carota</i> (nymph)	D. Dalton	Yamhill	45.300° N	123.108° W
1229101	<i>Tortistilus albidosparsus</i>	female	16-Jul	<i>Vitis vinifera</i>	D. Dalton	Josephine	42.105° N	123.583° W
1229102	<i>Tortistilus albidosparsus</i>	male	16-Jul	<i>Vitis vinifera</i>	D. Dalton	Josephine	42.105° N	123.583° W
1229103	<i>Tortistilus albidosparsus</i>	female	16-Jul	<i>Vitis vinifera</i>	D. Dalton	Josephine	42.105° N	123.583° W
1229104*	<i>Tortistilus albidosparsus</i>	female	16-Jul	<i>Vitis vinifera</i>	D. Dalton	Josephine	42.105° N	123.583° W
1229105	<i>Tortistilus albidosparsus</i>	female	16-Jul	<i>Vitis vinifera</i>	D. Dalton	Josephine	42.105° N	123.583° W
1229106	<i>Tortistilus albidosparsus</i>	female	16-Jul	<i>Vitis vinifera</i>	D. Dalton	Josephine	42.105° N	123.583° W
1229107	<i>Tortistilus albidosparsus</i>	male	16-Jul	<i>Vitis vinifera</i>	D. Dalton	Josephine	42.105° N	123.583° W

Table 2 (continued). List of treehopper voucher specimens collected in in Benton, Josephine, and Yamhill Counties, Oregon, USA and identified to species by Dr. Dennis Kopp in 2019. Specimens were designated with unique Oregon State Arthropod Collection (OSAC) identification number and deposited into OSAC on 3 December 2019.

OSAC Identifier	Species	Gender	Date	Plant Host	Collector	County (USA:Oregon)	Latitude	Longitude
1229108*	<i>Tortistilus albidoparsus</i>	male	16-Jul	<i>Vitis vinifera</i>	D. Dalton	Josephine	42.105° N	123.583° W
1229111*	<i>Stictocephala basalis</i>	female	June-Sept	unknown	D. Dalton	Yamhill	45.325° N	123.158° W
1229112	<i>Stictocephala basalis</i>	female	June-Sept	unknown	D. Dalton	Yamhill	45.325° N	123.158° W
1229113	<i>Stictocephala basalis</i>	male	June-Sept	unknown	D. Dalton	Yamhill	45.325° N	123.158° W
1229114	<i>Stictocephala basalis</i>	female	June-Sept	unknown	D. Dalton	Yamhill	45.325° N	123.158° W
1229115	<i>Stictocephala basalis</i>	male	June-Sept	unknown	D. Dalton	Yamhill	45.325° N	123.158° W
1229116	<i>Stictocephala basalis</i>	male	June-Sept	unknown	D. Dalton	Yamhill	45.325° N	123.158° W
1229117*	<i>Stictocephala basalis</i>	male	June-Sept	unknown	D. Dalton	Yamhill	45.325° N	123.158° W
1229118	<i>Stictocephala basalis</i>	female	June-Sept	unknown	D. Dalton	Yamhill	45.325° N	123.158° W
1229119	<i>Stictocephala basalis</i>	male	June-Sept	unknown	D. Dalton	Yamhill	45.325° N	123.158° W
1229120	<i>Stictocephala basalis</i>	female	June-Sept	unknown	D. Dalton	Yamhill	45.325° N	123.158° W
1229121	<i>Stictocephala basalis</i>	female	12-Jul	under <i>Crataegus</i> spp. (nymph)	D. Dalton	Yamhill	45.297° N	123.092° W
1229122	<i>Stictocephala basalis</i>	male	12-Jul	under <i>Crataegus</i> spp. (nymph)	D. Dalton	Yamhill	45.297° N	123.092° W

* specimens deposited at the Smithsonian National Museum of Natural History, Washington, D. C.

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