from starting new infestations. The half bins can be fumigated if they have to be distributed to stone fruit growers before all the overwintered insects have emerged. Of course, no bins should be imported before early July in order to avoid introducing overwintered insects.

In conclusion, it seems that the greatest danger of codling moth reinfesting the Similkameen Valley after discontinuance of sterile moth release would be through importation of boxes of apples and pears for the fruit stand trade. Incipient infestations could be suppressed or avoided by fumigating the empty boxes and by localized release of sterile moths. At this time the numbers of imported bins are so small that they are unlikely to contribute to codling moth reinfestation.

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MITES AND INSECTS COLLECTED FROM VINEYARDS IN THE OKANAGAN AND SIMILKAMEEN VALLEYS, BRITISH COLUMBIA[1]

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ABSTRACT

Five species of mites and 122 species of insects were collected from leaves, stickyboards and beating trays in 14 vineyards in 5 different areas in southern British Columbia between May and October 1972. Two mite species and 5 insect species are potential economic pests in British Columbia but only one insect species, the Virginiacreeper leafhopper, **Erythroneura ziczac** Walsh requires control measures.

INTRODUCTION

A survey of vineyards in the Okanagan and Similkameen Valleys was made in 1972 to determine the species of insects and mites present, their distribution, parasites and predators.

METHODS

Mites and insects were collected from yellow stickyboards hung in vineyards, from grape leaves examined under a binocular microscope and from beating trays. In each vineyard and for each variety the samples consisted of 10 leaves collected randomly, one beating tray count from each of 10 vines and one yellow stickyboard hung on the top trellis wire. Samples were taken and stickyboards changed at weekly intervals from 30 May to 6 October. Insects were mounted or pinned and sent to taxonomists at the Biosystematics Research Institute, Ottawa, for identification. Mites were identified by us along with R. S. Downing and T. K. Moilliet of the Research Station, Summerland, British Columbia. Varieties of grapes sampled were Foch and Bath at Westbank; Campbell Early, Patricia, Himrod, and Sheridan at Kelowna; Riesling, Bath, Diamond and S-10878 at Oliver; Foch at Cawston; S-9549, Diamond and numerous experimental varieties at Summerland.

[1] Contribution No. 403, Research Station, Summerland, B.C.

Insects and Mites Collected in Vineyards in the Okanagan and Similkameen Valleys, British Columbia, 1972

Species	Nos.	Locality	Collection Method	Month Collected
ACARINA				
Phytoseiidae				
Typhlodromus pyri Scheuten	370	Kelowna	leaves	May-Sept.
Typhlodromus occidentalis (?)	36	Westbank, Summerland Oliver, Cawston	leaves	May-Oct.
Tetranychidae				
Tetranychus urticae Koch	33	Westbank, Summerland	leaves	July-Oct.
Panonychus ulmi (Koch)	250	Kelowna, Westbank, Summerland	leaves	June-Oct.
Tydeidae				
Tydeus sp	954	All areas	leaves	May-Oct.
COLEOPTERA				
Anobiidae				
Coelostethus quadrulus LeC	1	Kelowna	board	July
Anthicidae				
Anthicus sp.	2	Oliver	tray	July-Aug.
Lappus nitidulus LeC.	4	Kelowna, Westbank	tray	July
Buprestidae				
Anthaxia deleta LeC.	1	Kelowna	board	July
Anthaxia sp.	12	Kelowna, Summerland	board	June
Carabidae				
Bembidion mutatum Gemm. & Har.	1	Cawston	board	June
Bradycellus californicus LeC.	1	Cawston	board	June
Lebia guttula LeC.	1	Westbank	tray	June
Lebia viridis Say	1	Kelowna	board	June
Chrysomelidae				
Crioceris duodecimpunctata (L.)	1	Oliver	board	Sept.
Epitrix tuberis Gentner	1	Westbank	board	June
Phyllotreta sp.	2	Cawston, Oliver	tray	June & Aug.
Cleridae				
Phyllobaenus humeralis Say or near	9	Cawston	board	July
Coccinellidae				
**Cycloneda polita* Csy.	1	Vernon	board	Sept.
Hippodamia convergens Guerin	3	Kelowna, Westbank, Cawston	board	June
Hippodamia quinquesignata (Kirby)	6	Kelowna	board	June & Aug.
Microwesia sp.	4	Kelowna, Westbank, Summerland	board, tray	Aug.
Scymnus sp.	1	Cawston	board	June
Stethorus sp.	3	Kelowna, Westbank, Summerland	board, tray	July-Sept.
Curculionidae				
Brachyrhinus sulcatus (F.)	2	Kelowna, Westbank	tray	July & Oct.
Miccotrogus picirostris (F.)	1	Summerland	board	July
Sitona cylindricollis Fahr.	1	Westbank	tray	Oct.
Dermestidae				
Cryptorhopalum sp.	1	Summerland	board	July
Elateridae				
Agriotes ferrugineipennis LeC.	1	Cawston	board	June

*Collected at Vernon, B.C. at single sampling.

Cardiophorus edwardsi Horn	3	Summerland, Cawston	board	June
Dalopius sp.	1	Oliver	board	June
Limonius infuscatus Mots.	5	Westbank	board	April
Melanotus longulus oregonensis LeC.	2	Westbank, Summerland	board	June-July
Lathridiidae				
Lathridius minutus L.	1	Cawston	tray	June
Melandryidae				
Anaspis atrata Champion	3	Summerland	tray	June
Anaspis sp.	2	Kelowna, Summerland	board	June-July
Melyridae				
Anthocomus sp. nr. *nigrinus* Fall	2	Summerland	board	July
Eurelymis atra LeC.	1	Kelowna	board	June
Listrus sp.	1	Summerland	board	July
Malachius antennatus R. Hopp.	1	Summerland	board	June
Mordellidae				
Mordella atrata Melsheimer	5	Kelowna, Westbank, Summerland	board	July
Scarabidae				
Onthophagus nuchicornis L.	1	Summerland	board	Aug.
Tenebrionidae				
Coelocnemis californica Mann.	1	Westbank	soil at base of grapevine	Nov.
COLLEMBOLA				
Entomobryidae				
Entomobrya sp. perhaps *nivalis* (L.)	17	Oliver	tray	Aug.
Willowsia buskii Lubbock	7	Kelowna	tray	July
DIPTERA				
Ceratopogonidae				
Atrichopogon sp.	1	Oliver	tray	Oct.
Forcipomyia sp.	1	Summerland	tray	June
Chironomidae				
Ablabesymia sp.	2	Summerland	tray	Sept.
Chironomus sp.	1	Westbank	tray	Sept.
Dicrotendipes sp.	2	Westbank, Summerland	tray	Sept.
Micropsectra sp.	1	Westbank	tray	Sept.
Parachironomus sp.	1	Westbank	tray	Sept.
Phaenopsectra sp.	1	Summerland	tray	Sept.
Tanytarsus sp.	1	Westbank	tray	June
Dolichopodidae				
Chrysotus sp.	1	Kelowna	board	June
Drosophilidae				
Drosophila sp.	1	Summerland	tray	June
Ephydridae				
Philygria opposita Lw.	1	Summerland	tray	Sept.
Sciaridae				
Bradysia sp.	15	all areas	tray	June-Oct.
Conioscinella sp.	3	Summerland, Cawston	tray	July & Sept.
Thaumatomyia glabra var.	2	Kelowna, Oliver	tray	June & Aug.
EPHEMOROPTERA				
Baetis sp. ?	1	Westbank	tray	Aug.
HEMIPTERA				
Anthocoridae				
Orius tristicolor (White)	9	Kelowna, Westbank Summerland	board tray	June-Sept.

Lygaeidae				
Geocoris bullatus (Say)	1	Summerland	board	July
Nysius ericae (Schilling)	13	Summerland, Cawston	board	June-July
Rhyparochromus chiragra californicus Van D.	12	Oliver, Cawston	board	July-Aug.
Sphragisticus nebulosus (Fallen)	1	Summerland	board	Aug.
Miridae				
Campylomma verbasci (Meyer)	1	Kelowna	board	Aug.
Ceratocapsus sp.	1	Summerland	board	July
Deraeocoris (Camptobrochis) *brevis* (Uhler)	19	Kelowna, Oliver	board tray	July
Ilnacorella sulcata Kngt.	7	Westbank, Oliver	board	Aug.
Lygus columbiensis (Kngt).	1	Oliver	tray	June
Lygus desertus (Kngt.)	1	Oliver	tray	Aug.
Lygus elisus (Van D.)	1	Oliver	board	Aug.
Plagiognathus obscurus Uhler	2	Summerland	tray	July
Prepops sp.	1	Oliver	tray	Aug.
Nabidae				
Nabis ferus (Linn.)	67	all areas	tray	Aug.-Oct.
Neididae				
Neides muticus (Say)	2	Westbank, Oliver	tray	Aug.-Sept.

HOMOPTERA

Aphididae				
Esigella sp.	5	Summerland	tray	Sept.
Cicadellidae				
Aceratagallia sp.	1	Missing when specimens returned from Ottawa		
Erythroneura ziczac Walsh	5000 +	all areas	tray, leaves, board	June-Oct.
Euscelidius schenki (Kirsch.)	1	Summerland	tray	June
**Helochara communis* Fitch	1	Vernon	board	Sept.
Osbornellus borealis DeL. & Mohr	1	Kelowna	tray	Sept.
Stenocoelidia lineata (Baker)	1	Summerland	tray	Aug.
Coccoidea				
Lecanium sp. prob. *coryli* L.	200+	All areas	leaves	July-Sept.
Phylloxeridae				
Phylloxera vitifoliae (Fitch)	450+	Kelowna, Westbank, Oliver	board	Aug.
Psyllidae				
Psylla pyricola (Forster)	1	Summerland	tray	Sept.
Psylla sinuata group	3	Oliver	board	Aug.

HYMENOPTERA

Bethylidae				
Goniozus sp.	1	Summerland	tray	June
Braconidae				
Bracon xanthonotus (Ashm.)	1	Summerland	tray	Sept.
Lysiphlebus sp.	1	Kelowna	tray	Sept.
Orgilus sp	1	Summerland	tray	Oct.
Praon sp.	1	Summerland	tray	Sept.
Torymidae				
Torymus sp.	1	Summerland	tray	Oct.
Encyrtidae				
Aphycus maculipes How.	65	Oliver, Cawston	board, tray	Aug.
Aphycus sp.	1	Kelowna	tray	Sept.
Copidosoma bakeri How.	1	Oliver	tray	Aug.
Microterys sp.	1	Oliver	tray	Aug.
Ooencyrtus nr. *clisiocampae* (Ashm.)	1	Kelowna	tray	Aug.

Eulophidae				
Euplectrus platyhypenae How.	2	Summerland	tray	Oct.
Eurytomidae				
Harmolita sp.	1	Westbank	board	June
Figitidae				
Anacharis nr. *marginata* (Prov.)	1	Oliver	tray	Aug.
Ichneumonidae				
Campoletis argentifrons (Cress.)	2	Kelowna	board	June
Cremastus incompletus (Prov.)	2	Cawston	board	June
Diplazon laetatorius Fab.	1	Oliver	board	July
Itoplectis quadricingulata (Prov.)	1	Westbank	tray	Sept.
Mesoleiini	1	Oliver	board	Aug.
Stenomacrus sp.	1	Summerland	board	July
Symplecis sp	1	Cawston	board	June
Mymaridae				
Anagrus epos Girault	475	all areas	board	July-Sept.
Polynema sp.	1	Oliver	tray	Aug.
Platygasteridae				
Platygaster sp.	1	Kelowna	tray	June
Proctotrupidae				
Proctotrupes rufigaster Prov.	1	Cawston	board	July
Pteromalidae				
Habrocytus sp.	1	Summerland	tray	Sept.
Sphegigaster (poss. n. sp.)	1	Summerland	tray	Sept.
Scelionidae				
Telenomus sp. A + B	6	Oliver	board	July
Trissolcus sp. A	1	Kelowna	tray	June
Trissolcus sp. B	1	Westbank	tray	June
Trichogrammatidae				
Oligosita sanguinea sanguinea Girault	1	Oliver	board	July
LEPIDOPTERA				
Lyonetidae				
Bucculatrix sp. prob. *salutatoria* Braun	150	Summerland, Oliver Cawston	tray	Sept.
Lyonetia sp.	1	Oliver	tray	July
NEUROPTERA				
Chrysopidae				
Chrysopa oculata Say	1	Summerland	board	July
Raphidiidae				
Agulla adnixa (Hagen)	4	Summerland	board	June
PSOCOPTERA				
Psocidae				
Lachesilla pedicularia (L.)	12	Oliver, Cawston	tray	Sept.
Psocus sp. nr. *oregonus*	1	Summerland	tray	Sept.
THYSANOPTERA				
Thripidae				
Frankliniella tritici (Fitch).	9000+	all areas	leaves, board, tray	June -Oct.

RESULTS

A total of 122 species of insects representing 54 families was collected by the three sampling methods. Six of these species are grape pests in the Okanagan-Similkameen area but only one, the Virginiacreeper leafhopper, *Erythroneura ziczac* Walsh which causes leaf and fruit injury requires control measures. The grape phylloxera, *Phylloxera vitifoliae* (Fitch), although important in other grape growing regions, has not yet been determined to be an economic problem in British Columbia. Other potential grape pests which at present cause only minor injury and do not warrant control measures in British Columbia are the flower thrips *Frankliniella tritici* (Fitch); a lecanium

scale, *Lecanium* species probably *coryli* L., which may heavily infest grape vines (Phillips 1965); the black vine weevil, *Brachyrhinus salcatus* (F.) and the clickbeetle *Limonius infascatus* (Mots.).

Several predaceous insects were collected by each sampling method and two parasites were reared from their hosts, *Anagrus epos* Girault the egg parasite of the Virginia-creeper leafhopper and *Aphycus maculipes* How., which parasitizes *L. coryli*. Six species of Coccinellidae were collected including a *Stethorus* sp. which is predaceous only on mites. Other predaceous insects were three Hemiptera, *Neides muticus* (Say), *Nabis ferus (Linn.)*, and *Orius tristicolor* (White) which feed on thrips, aphids and other small insects; and two *Neuroptera*. *Agulla adnixa* (Hagen) and *Chrysopa oculata* Say, which attack a wide range of insects.

Five species of mites were found on the leaf samples. The twospotted spider mite, *Tetranychus urticae* Koch, and the European red mite, *Panonychus ulmi* (Koch), are potential economic pests. The other three species are mite predators with one, *Typhlodromus pyri* Scheuten, having been recorded only once previously in the Okanagan Valley (Downing and Moilliet 1971). Another phytoseiid, *Amblyseius andersoni* Chant found in 1974 on grape leaves from Westbank, had not been recorded previously in the Okanagan Valley (Chant and Hansell 1971).

The majority of insects collected from the boards and beating trays were not directly associated with grape plants, but originated from cover crops or native plants near vineyards. For example, 150 specimens of *Bucculatrix salutatoria* Braun whose host is the sagebrush, *Artemisia tridentata* Nutt., were taken from beating trays.

Vineyard pests not encountered in the 1972 survey are several species of cutworms, a Pulvinaria scale and the grape erineum mite, *Eriophyes vitis* (Pgst.). These pests have been found in separate isolated vineyards in the Okanagan-Similkameen area.

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