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#### Plate 1



1a) Climbing cutworm, *Abagrotis* sp., larva feeding on grape bud and (inset) *A. orbis* adult moth



1c) Cutworm larva (4th instar) damage to grape bud resembling adult click beetle damage



1e) Click beetle adult feeding on grape bud and (inset) click beetle adult



1b) Invasive lesser yellow underwing, *Noctua comes*, adult cutworm moth and (inset) larva



1d) Cutworm damage to young shoot



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1 f) Raucus root weevil, *Otiorhynchus raucus*, and (inset) ragged feeding damage to grape bud

This publication is a companion to the *Best Practices Guide for Grapes for British Columbia Growers*, BC Wine Grape Council, Peachland, BC (www.bcwgc.org). Please refer to that publication for information relating to the biology and management of insect and mite pests of grapes in BC.

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2a) Virginia creeper leafhopper, Erythroneura ziczac, adult



2c) Virginia creeper leafhopper eggs



2e) Western grape leafhopper nymph



2g) Grapes spotted with leafhopper excrement



2b) Virginia creeper leafhopper nymphs



2d) Western grape leafhopper, Erythroneura elegantula, adult



2f) Leafhopper feeding damage to leaves



2h) Hieroglyphic or poplar sharpshooter, *Neokolla hieroglyphica*, occasionally feed on grape shoots



3a) Lateral shoot damaged by treehopper feeding showing red discolouration of leaves, and (inset) close-up of damage



3c) Immature cottony maple scale, *Neopulvinaria innumerabilis* 



3e) European fruit lecanium scale, Parthenolecanium corni



3g) Whitefly nymph



3b) Minor cicada, *Platypedia minor*, occasionally lay eggs into new canes, causing scarring or cracking



3d) Adult female cottony maple scale with cottony egg masses being attended by ants



3f) Grapes infested with grape mealybug, *Pseudoccocus* maritimus, and (inset) close-up of adults



3h) Whitefly adult



4a) Grape phylloxera, *Daktulosphaira vitifoliae*, adults and eggs on grape roots



4c) Phylloxera galls on leaf of hybrid grape



4e) Grape leaf rust mite, *Calepitrimerus vitis*, under bud scales in spring (left) and greatly magnified adult (right)



4g) Adult two-spotted spider mite, Tetranychus urticae



4b) Phylloxera-induced galls on grape roots



4d) Grape erineum mite or grape leaf blister mite, *Colomerus vitis*, leaf galls



4f) Grape leaf rust mite damaged shoot (left) in spring and undamaged shoot (right) from the same variety and block



4h) Adult European red mite, Panonychus ulmi



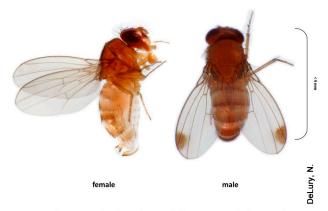
5a) Western flower thrips, *Frankliniella occidentalis*, adult and (inset) nymph



5c) Scarring of fruit by early-season thrips feeding



5e) Apple flea beetle, *Haltica foliacea*, adults on leaves of a young grapevine showing feeding damage



5g) Female spotted wing drosophila, *Drosophila suzukii*, (left) and male (right)



5b) Thrips damage to shoot and leaves in late summer



5d) Grape leaf shredded by western grape rootworm, *Bromius obscurus*, and (inset) adult beetle



5f) Snailcase bagworm, *Apterona helix*, larva and (inset) casebearer moth larvae and pupa, *Coleophora* sp.



5h) The invasive European paper wasp, *Polistes dominula*, (right) and wasp damage to grapes (left)

#### **CALENDAR OF GRAPE PEST DEVELOPMENT**

				NDAR OF GRAPE P			1			
Approximat	e dates:	April	May		June	July	August	Sept	October	November
				Grapevin	e Growth Stages					
Pest species	Dormant	Bud development	Shoot & infloresce	nce development	Flowering	Berry developm	ent	Ripening		Senescence
Climbing cutworm	early instar larvae on ground east a set of a se									
Virginia	adults in leaf litter adults on leaves adults = 2 <sup>nd</sup> generation adults									
creeper &	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■									
Western	Image: Sector and S									
grape	■ ■ ■ ■ ■ ■ ■ ■ ■									
leafhopper	■ ■ ■ 2 <sup>nd</sup> gen. nymphs ■ ■									
Soft scale <sup>1</sup>	nymphs	or adults on trunk under bark	or on cordons and spurs					nym	phs migrate to	o old wood <b></b>
	■ ■ ———— eggs under ♀ ———— ■ ■									
	E E E E E E E E E E E E E E E E E E E									
Creans	e	gg masses under loose bark						eggs	s on fruit & bai	'k 💻
Grape	a a summary crawlers then nymphs on new shoots									
mealybug <sup>2</sup>	• • • • • • • • • • • • • • • • • • •									
Crana	eggs on b	ark; nymphs winter on roots	• •				•• • wing	ed ♀ leave	soil & lay egg	s on bark of vines 🖛
Grape	a adults from nymphs a a a a a adults feed on leaves & form leaf galls									
phylloxera <sup>2</sup>	nymphs can migrate to nearby roots (or up trunks); continuous cycling of generations on roots									
Grape erineum	ac	lults under bud scales					-		adults move	back to buds
mite	• • • • • • • • • • • • • • • • • • •									
Grape leaf rust mite		adults							<b>=</b> adul	ts to cordon/trunk 🖛
		adults/eggs o	on buds							
	nymphs migrate to leaf tissue and complete several generations									
Spider	ERM eggs	on canes/trunks, TSSM ♀ und	ler bark					adults to	canes/trunk/ba	ase of vine
mites <sup>3</sup>				multiple genera	tions of nymphs and a	dults on foliage			•	
Thrips <sup>4</sup>		<ul> <li>adults on non-grape hosts</li> </ul>			WFT damage leaves/flowers	GT	damage leaves/st	noots 🔳 💻	<ul> <li>overwinterin</li> </ul>	g adults in debris 🕳
				<ul> <li>adults &amp; nymphs fee</li> </ul>	d on leaf, flower & fruit	tissues of vines				
Wasps		adult $\bigcirc$ overwinter							nated ♀ find	shelter for winter
				■ ♀ adult builds nest in	spring - worker popula	ation and nest gradua	ally increase			
C1			design of the second second	and the second						

Stage in life cycle that causes damage to grape plants in red type or red bar -----

<sup>1</sup>Multiple species with different timing of life stages

<sup>3</sup>Includes European Red Mite (ERM) and Two-Spotted Spider Mite (TSSM)

<sup>2</sup>Crawler stages of these pests potentially spread grapevine viruses

<sup>4</sup>Includes Western Flower Thrips (WFT) and Grape Thrips (GT)

Please refer to Management Guide for Grapes for Commercial Growers, BC Wine Grape Council (www.bcwgc.org), for details on biology and management.