7 Insect and Mite Management

Table 7.1.1. Efficacy ratings of pome fruit insecticides. *(Key is below Table 7.1.2)*

IR-AC	Trade Name (active ingredient)	AM	Aph	EAS	Int	GF	LH	OBL	PC	PP	RAA	RBL	Δ SB/ BMSB	SJS	TLM	TPB	WAA
4A	**Actara** (thiamethoxam)	1	1	3	1	—	3	0	3	3	3	0	2+/3	0	2	2	—
4A	**Admire Pro, Pasada, Sherpa** (imidacloprid)	1	3	—	—	—	3	—	—	2	3	—	2/2+	2	3	2	2
4A+ 6	***Agri-Flex** (abamectin & thiamethoxam)	1	3	3	1	—	3	0	3	3	3	—	—/1	—	3	1	—
6	***Agri-Mek, *Abacus, *Abba, *Epi-Mek** , ***Temprano** [a] (abamectin)	—	—	—	—	—	3	—	—	3	—	—	—/1	—	3	—	—
28	**Altacor** (chlorantraniliprole)	2	1	3	3	3	—	3	0	—	—	3	—/1	2	3	1	—
3A	***Asana** (esfenvalerate)	3	2	2	2+	3	3	2+	2	2	2	3	2+/2	1	3	3	1
4A	**Assail** (acetamiprid)	3	3	2	3	—	3	0	2	2	3	0	2+/3	2	3	2	2
22A	**Avaunt** (indoxacarb)	2	1	2	2	2+	3	0	3	—	0	2+	2+/1	0	2	2	—
UN	§**Aza-Direct**, §**Azatin,** §**Trilogy**(azadirachtin)	—	2	1	2	1	2	1	0	—	2	1	1/1	1	3	1	1
3A	***Battalion, *Decis** (deltamethrin)	2+	1	2+	2+	2+	3	2	2	3	2+	3	2+/—	1	3	2+	1
3	***Baythroid,** ***Tombstone** (cyfluthrin)	3	2	2	2+	3	3	2+	2	3	2+	3	3/2+	1	3	3	1
4A	**Belay** (clothianidin) w/ supplemental label	—	3	—	2+	—	3	—	?	3	3	—	—/3	—	3	—	—
9C	**Beleaf** (flonicamid)	—	3	—	—	—	—	—	—	—	—	—	2+/1	—	—	3	2
28	**Belt** (flubendiamide)	1	—	—	3	3	—	3	1	—	—	3	—/1	—	3	—	—
3A	***Bifenture, *Brigade, *Fanfare** (bifenthrin) [Pears only]	—	2+	—	2+	2+	—	—	2	2+	—	3	3/3	2	—	3	—
11	(Bt, *Bacillus thuringiensis* toxin): §**Biobit**, §**Deliver**, §**Dipel**, §**Javelin**, §**XenTari**	0	0	0	2	3	0	3	0	0	0	3	0/0	0	0	0	0
4A	**Calypso** (thiacloprid)	3	3	3	3	—	3	1	3	3	3	1	2+/2	2	3	1	2
—	§**Cyd-X** (codling moth granulosis virus) [b]	0	0	0	3	—	0	—	0	0	0	—	—	0	0	0	0
16	**Centaur** (buprofezin)	—	—	—	—	—	2	—	—	3	—	—	—/1	3	—	—	—
3A	(cyhalothrin): ***Warrior** ***LambdaCy, *Proaxis, *Silencer**	3	2	2	2+	3	3	2+	2	2	2	3	3/2+	1	3	3	3
3A	***Danitol** (fenpropathrin)	3	2	2	2+	3	3	2+	2	2	2	3	2+/3	1	3	3	1
5	**Delegate** (spinetoram)	2	0	—	3	3	—	3	2	3	—	3	—/1	—	3	—	—
1B	***Diazinon, *AG500, *AG600** (diazinon)	3	1	—	2	2	1	0	2	0	3	0	2+/1	2	1	1	3
1B	**Dimethoate** (dimethoate) [Pears only]	3	2	—	3	2	3	0	2	0	2	0	2/3	2	1	2	—
3A+ 4A	***Endigo** (cyhalothrin & thiamethoxam)	3	2	2	2+	3	3	2+	2	2	2	3	3/3	2	3	3	—
5	**§Entrust** (spinosad)	2	0	—	2	3	0	3	0	—	0	3	—	—	2	0	—
7C	**Esteem** (pyriproxyfen)	0	0	—	2	0	0	0	0	3	3	0	—/1	3	2	0	—

Table 7.1.1. Efficacy ratings of pome fruit insecticides. *(Key is below Table 7.1.2)*

IR-AC	Trade Name (active ingredient)	AM	Aph	EAS	Int	GF	LH	OBL	PC	PP	RAA	RBL	Δ SB/ BMSB	SJS	TLM	TPB	WAA
1B	**Imidan** (phosmet)	3	1	3	3	1	1	1	3	0	1	3	2/1	2	1	1	1
18	**Intrepid** (methoxyfenozide)	0	0	—	2	—	0	3	0	—	0	3	—/1	0	2	0	—
1A	***Lannate** (methomyl)	2	2	1	3	3	3	2+	2	0	1	3	3/3	2	3	1	1
3A+ 4A	***Leverage** (cyfluthrin & imidacloprid)	3	3	2	3	3	3	2+	3	2	3	3	2+/3	2	3	3	1
1B	**Lorsban, Nufos, Yuma** (chlorpyrifos) [c]	—	—	(3)	(2)	3	(1)	(3)	(3)	0	2	2	(2+/ 2+)	(3)	1	1	—
—	**§M-Pede** (insecticidal soap, potassium fatty acid)	0	2+	0	0	0	1	0	0	2	1	0	—/1	1	0	0	—
23	**Movento** (spirotetramat)	—	3	—	—	—	—	—	—	3	3	—	—/0	3	—	—	3
3A	***Mustang Max** (zeta cypermethrin)	?	2+	2+	2+	?	3	2+	?	2+	?	3	3/2	—	3	3	—
21A	**Nexter** (pyridaben)	—	0	—	—	—	2	—	—	3	—	—	—	—	—	—	—
—	"Oil, dormant": §**JMS Stylet,** §**Omni,** §**PureSpray** etc. (petroleum distillate)	—	2	—	—	—	—	—	—	2+	2	—	—	3	—	—	—
—	"Oil, summer": §**JMS Stylet** §**Omni,** §**PureSpray** etc. (petroleum distillate)	—	—	—	1	—	—	—	—	—	—	—	—	2	1	—	1
3A	(permethrin): ***Ambush**, ***Perm-Up**, ***Pounce** [c]	—	(2)	(2)	—	3	(3)	(2+)	(2)	2	2	(3)	(3/2)	1	(3)	3	—
21A	**Portal** (fenpyroximate)	—	—	—	—	—	?	—	—	3	—	—	—	—	3	—	—
6	***Proclaim** (emamectin benzoate)	0	0	—	2	3	0	3	1	2	0	3	—/1	0	3	0	—
3A	§**Pyganic, Pyrenone** [d] (pyrethrin)	—	—	—	—	—	—	—	—	—	—	?	—	—	—	—	—
15	**Rimon** (novaluron)	—	—	—	3	—	2	3	—	—	—	3	—/1	—	3	2	—
1A	**Sevin** (carbaryl)	2	1	2	2	1	3	2	2	0	1	1	2/2	2	1	1	1
—	**§Surround** (kaolin)	2	1	—	2	2	1	1	2	2	0	1	1/2	2	2	0	—
2A	***Thionex** (endosulfan) [a]	0	2	—	0	3	3	2	0	0	2	2	3/3	1	1	1	2
16+ 28	**Tourismo (**flubendiamide & buprofezin)	1	—	—	2+	3	—	3	1	2	—	3	—/1	2+	3	—	—
4A+ 28	**Voliam Flexi** chlorantraniliprole & thiamethoxam)	2	3	3	3	3	3	3	3	3	3	3	2+/3	2	2	1	—
3A+ 28	***Voliam Xpress** (chlorantraniliprole & cyhalothrin)	2	2	3	3	3	3	3	3	2	2	3	2+/2+	1	3	3	—
1A	***Vydate** (oxamyl) [a]	0	2	—	0	—	2	0	0	0	2	—	2+/2+	1	3	1	1
3A	***Warrior –** see cyhalothrin																

Table 7.1.2. Efficacy ratings of pome fruit miticides (and insecticides with miticide activity)

IRAC	**Trade Name** (active ingredient)	ERM	TSM	ARM	PRM
6	***Agri-Mek, *Abacus, *Abba, *Epi-Mek, *Temprano** etc. (abamectin)	3	2	3	3
UN	**Acramite** (bifenazate)	3	3	0	0
10A	**Apollo** (clofentezine)	3	1	1	1
UN	§**Aza-Direct**, §**Azatin,** §**Trilogy** (azadirachtin)	1	1	1	—
3A	***Danitol** (fenpropathrin) [e]	1+	—	—	—
23	**Envidor** (spirodiclofen)	3	3	3	3
20B	**Kanemite** (acequinocyl)	3	3	—	—
21A	**Nexter** (pyridaben)	3	2	2	2
—	"Oil, dormant": §**JMS Stylet,** §**Omni,** §**PureSpray** etc. (petroleum distillate)	3	—	—	2
—	"Oil, summer": §**JMS Stylet** §**Omni,** §**PureSpray** (petroleum distillate)	3	1	2	2
21A	**Portal** (fenpyroximate)	3	3	3	3
6	***Proclaim** (emamectin benzoate)	2	2	—	—
10A	**Savey, Onager** (hexythiazox)	3	1	1	1
—	**§Surround** (kaolin)	2	—	—	—
2A	***Thionex** (endosulfan)	—	—	2+	2
12B	**Vendex** (fenbutatin oxide, hexakis)	1+	2+	2	2
1A	***Vydate** (oxamyl)	2	2+	2+	2+
10B	**Zeal** (etoxazole)	3	3	0	0

KEY TO TABLES 7.1.1 AND 7.1.2

IRAC = Insecticide **R**esistance **A**ction **C**ommittee Mode of Action classification.

Arthopod pest populations are more likely to exhibit cross-resistance to pesticides within the same IRAC group number.

1A = Carbamates, 1B = Organophosphates, 2A = Organochlorines, 3A = Pyrethroids and pyrethrins, 4A = Neonicotinoids, 5 = Spinosyns, 6 = Avermectins, 7 = Juvenile hormone mimics, 9 = Homopteran feeding blockers, 10 = Mite growth inhibitors, 11 = Midgut disruptors, 12 = ATP inhibitors, 15 & 16 = Chitin inhibitors, 18 = Ecdysone agonists, 20 & 21 = Mitochondrial inhibitors, 22 = Sodium channel blockers, 23 = Acetyl CoA inhibitors, 28 = Diamides, UN = unknown.

Efficacy Ratings:

3 = Good, 2+ = Fair to Good, 2 = Fair, 1+ = Poor to Fair, 1 = Poor, 0 = Little or no effect, — = Unknown or not used for this pest.

? = Pest listed on label but no efficacy rating available. Results may depend on timing, dose, or pest density

( ) = Pesticide cannot be used at typical timing at which this pest is treated.

Pest Abbreviations:

AM = Apple maggot
Aph = Spirea aphid and apple aphid
ARM = Apple rust mite
BMSB = Brown marmorated stink bug
EAS = European apple sawfly
ERM = European red mite
GFW = Green fruitworms
Int = Internal Leps (Codling moth, Oriental fruit moth, & Lesser appleworm)
LH = White apple & Potato leafhoppers
OBL = Obliquebanded leafroller
PC = Plum curculio
PP = Pear psylla
PRM = Pear rust mite
RAA = Rosy apple aphid
RBL = Redbanded leafroller
SB = Brown, dusky brown, and green stink bugs
SJS = San Jose scale
TLM = Spotted tentiform leafminer
TPB = Tarnished plant bug
TSM = Twospotted spider mite
WAA = Woolly apple aphid

Footnotes

***** = Restricted-use pesticide; only certified applicators may purchase, use requires supervision of a certified applicator.

§ = Potentially acceptable in certified organic programs.

Δ = Efficacy ratings for stink bugs may not apply equally for all stink bug species. SB refers to brown, dusky brown, and green stink bugs. Brown marmorated stink bug has not damaged tree fruit crops in New England as of 2012, but has become an important pest of tree fruit and other crops in the Mid-Atlantic states. BMSB ratings from the *Pennsylvania Tree Fruit Production Guide*.

[a] Abamectin rated "Good" for control of Pearleaf blister mite. Thionex and Vydate rated "Fair".

[b] = Granulosis virus has good efficacy against codling moth, fair against oriental fruit moth, and is not effective on lesser appleworm.

[c] Chlorpyrifos (Lorsban, Nufos) cannot be used as canopy sprays after petal fall. Permethrin (Ambush, Perm-Up, Pounce) cannot be used for any application after petal fall. Efficacy ratings are for prebloom application, which may not be an optimum or typical threshold timing for control of the pests listed.

[d] Pyrethrin has much shorhter residual activity than alternative products.

[e] Danitol less effective against late season mite populations.

Table 7.1.3. Relative toxicity of pome fruit insecticides and miticides to beneficial arthropods.

		Beneficial Species			
Trade Name (active ingredient)	Honeybee[1]	*Amblyseius fallacis*[2]	*Typhlodromus pyri*[2]	*Stethorus punctum*[3]	*Aphidoletes aphidimyza*[4]
Acramite (bifenazate)	M	M	M	L	L
Actara (thiamethoxam)	M	L	L	L	L
Admire Pro, Pasada, Sherpa (imidacloprid)	H	L	L	M	L
***Agri-Flex** (abamectin/thiamethoxam)	M	M	M	M	L
***Agri-Mek, *Abacus, *Abba, *Epi-Mek, *Temprano** etc. (abamectin)	L	M	M	M	L
Altacor (chlorantraniliprole)	L	L	L	L	L
Apollo (clofentezine)	L	L	L	L	L
***Asana** (esfenvalerate)	H	H	H	H	M
Assail (acetamiprid)	L	M	L	M	M
Avaunt (indoxacarb)	M	L	L	L	L
§**Aza-Direct**, §**Azatin**, §**Trilogy** (azadirachtin)	M	L	L	L	L
***Battalion, *Decis** (deltamethrin)	M	H	H	H	M
***Baythroid, *Tombstone** (cyfluthrin)	H	H	H	H	H
Belay (clothianidin) w/ suppl. label	H	L	L	M	L
Beleaf (flonicamid)	L	L	L	?	?
Belt (flubendiamide)	L	L	L	L	L
***Bifenture, *Brigade, *Fanfare** (bifenthrin) [Pears only]	M-H	?	?	?	?
(Bt, *Bacillus thuringiensis* toxin): §**Biobit**, §**Deliver**, §**Dipel**, §**Javelin, §XenTari**	L	L	L	L	L
Calypso (thiacloprid)	L	L	L	M	L
§**Cyd-X** (granulosis virus) [a]	L	L	L	L	L
Centaur (buprofezin)	L	L	L	M	L
(cyhalothrin): ***Warrior *Lambda-Cy, *Proaxis, *Silencer**	H	H	H	H	H
***Danitol** (fenpropathrin)	H	H	H	H	H
Delegate (spinetoram)	L	M	M	L	L
***Diazinon, *AG500 *AG600** (diazinon)	H	M	M	M	H
Dimethoate (dimethoate) [Pears only]	H	H	H	M	H
***Endigo** (cyhalothrin & thiamethoxam)	H	H	H	H	H
§**Entrust** (spinosad)	L	L	L	L	L
***Envidor** (spirodiclofen)	H	L	L	M	?
Esteem (pyriproxyfen)	L	L	L	M	L
Imidan (phosmet)	H	L	L	L	M
§**M-Pede** (potassium fatty acid)	L	L	L	L	L
Intrepid (methoxyfenozide)	L	L	L	L	L
Kanemite (acequinocyl)	L	L	L	L	?
***Lannate** (methomyl)	H	H	H	M	H
***Leverage** (cyfluthrin/ imidacloprid)	H	H	H	H	H
Lorsban, Nufos (chlorpyrifos) [b]	H	M	M	L	L
§**M-Pede** (potassium fatty acid)	L	L	L	L	L
Movento (spirotetramat)	L	L	L	L	L
***Mustang Max** (zeta cypermethrin)	H	H?	H?	H?	?
Nexter (pyridaben)	H	M	L-M	M	M
"Oil, dormant": §**JMS Stylet,** §**Omni,** §**PureSpray** etc. (petroleum distillate)	L	?	?	L	L

Table 7.1.3. Relative toxicity of pome fruit insecticides and miticides to beneficial arthropods.

		Beneficial Species			
Trade Name (active ingredient)	Honeybee[1]	*Amblyseius fallacis*[2]	*Typhlodromus pyri*[2]	*Stethorus punctum*[3]	*Aphidoletes aphidimyza*[4]
"Oil, summer": §**JMS Stylet** §**Omni,** §**PureSpray** etc. (petroleum distillate)	L	L-M[a]	L-M[b]	L	L
(permethrin): ***Ambush**, ***Perm-Up**, ***Pounce** **[**b]	H	H	H	H	L
Portal (fenpyroximate)	L	L	L	M	?
***Proclaim** (emamectin benzoate)	H	L	L	?	?
§**Pyganic, Pyrenone** [c] (pyrethrin)	M	?	?	?	?
Rimon (novaluron)	M	L	L	H	?
Savey, Onager (hexythiazox)	L	L	L	?	?
Sevin (carbaryl)	H	M	L	H	H
§Surround (kaolin)	L	L	L	L	L
***Thionex** (endosulfan) [e]	M	L	L	M	M
Vendex (fenbutatin oxide, hexakis)	L	L	L	L	L
Voliam Flexi (chlorantraniliprole & thiamethoxam)	M	L	L	L	L
***Voliam Xpress** (chlorantraniliprole & cyhalothrin)	H	H	H	H	H
***Vydate** (oxamyl) [e]	M	H	H	L	M
Zeal (etoxazole)	L	M	M	L	L

KEY TO TABLE 7.1.3:

[1] Honeybee = *Apis mellifera*

[2] *A. fallacis* and *T. pyri* are mite predators of pest mites

[3] *S. punctum* is a ladybird beetle predator of mites.

[4] *A. aphidimyza* is an cecidomyiid fly larva predator of aphids.

Honeybee toxicity ratings:

L = Low; not hazardous to honey bees at any time. 1 hr to 1 day residual toxity
M = Moderate; not hazardous if applied either in evening or early morning when honey bees are not foraging, except during periods of high temperature. 3 hr to 1 day residual toxicity
H = High; hazardous to honey bees at any time. 1 day to 2 week residual toxicity.
? = unknown

Toxicity ratings for other beneficial species:

L = low impact on population (less than 30% mortality).
M = moderate impact on poppulati (between 30% and 70% mortality).
H = high impact on opulation (more than 70% mortality).

Footnotes:

[a] = low impact on immatures, moderate impact on eggs.
[b] = low impact on adults, moderate impact on eggs and immatures. Population recovery within 7 days.
[c] = Dependent on rate.

Information compiled from 48-hr residue tests, and in some cases field tests, at the NYS Agricultural Experiment Station. Pyrethroids and other pesticides with long residual periods have greater impact than those with a shorter residual.

Table 7.1.4. Activity spectrum of stone fruit insecticides.

Insecticide	IRAC‡	APB	Aphids	CFF	JB	OFM	PC	PTB/ LPTB	ΔSB/ BMSB	SWD	TPB	WFT
Actara	4A	—	2	2	2	—	3	—	2+/3	—	2	—
Admire Pro (imidacloprid)	4A	0	3	0	2+	0	1	0	2/2+	2	2	—
Altacor (chlorantraniliprole)	28	—	—	2	—	3	0	—	—/1	—	1	—
*Ambush, *Pounce (permethrin); except plums or apricots	3	—	—	3	—	2+	2	2	3/2	—	3	2
*Asana (esfenvalerate)	3	1	–	3	—	2+	2	3	2+/2	3	3	2
Assail (acetamiprid)	4A	—	3	3	3	3	2	—	2+/3	2	2	—
Avaunt	22	—	—	—	3	3	3	—	2+/0	—	2	—
§Aza-Direct, Azatin (azadirachtin)	18B	—	2	—	0	2	0	2	1/1	—	1	—
*Baythroid (cyfluthrin)	3	—	3	3	—	2+	2	3	3/2+	3	3	—
Belay (clothianidin) – peach only	4A	—	—	—	—	—	2+	—	—/3	—	3	—
Beleaf (flonicamid)	9C	—	3	—	—	—	—	—	2+/0	—	3	—
Belt (flubendiamide)	28	—	—	—	—	3	1	—	—/1	—	—	—
Centaur (buprofezin)	16	—	—	—	—	—	—	—	—/1	—	—	—
(cyhalothrin): *Warrior *Lambda-Cy, *Proaxis, *Silencer	3	3	1	3	3	1	2+	2	3	3/2+	--	3
*Danitol (fenpropathrin)	3	—	—	—	—	2-3	2	—	3/3	3	3	—
Delegate (spinetoram)	5	—	—	3	—	3	2	—	—/1	3	—	3
*diazinon	1B	—	1	3	—	1	2	0	2+/1	3	1	—
*Endigo (cyhalothrin & thiamethoxam	3A/4A	—	—	—	—	—	2	—	3/3	—	3	—
§Entrust (spinosad)	5	—	—	—	—	—	0	—	—	3	0	3
Imidan (phosmet); except sweet cherries	1B	—	1	3	1	2+	3	0	2/1	3	1	—
Intrepid	18	—	—	—	—	2+	0	—	—/0	—	0	—
*Lannate (methomyl) – peach only	1A	—	2	—	—	2	2	1	3/3	3	1	3
Leverage (cyfluthrin/imidacloprid)	3/4A	0	3	3	3	3	3	3	2+/3	3	3	—
Lorsban (chlorpyrifos) except apricots or plums	1B	3	2	3	—	—	(3)	3	(2/2+)	—	(1)	—
malathion	1B	—	2	1	1	1	2	0	—	2+	1	—
§M-Pede (insecticidal soap, potassium fatty acids)	—	0	2-3	0	0	0	0	0	—/1	—	0	—
Mustang Max (zeta cypermethrin	3A	—	—	—	—	—	—	—	3/2	3	3	—
Proaxis (gamma cyhalothrin)	3A	—	—	—	—	—	2	—	3/2+	—	3	—
Sevin (carbaryl)	1A	—	3	3	3	2	2	0	2/2	3	1	1
§Surround (kaolin)	—	—	—	1	2	1	2	2	—	1/2	—	0	—
Tourismo (flubendiamide/ buprofezin	28/16	—	—	—	—	3	1	—	—/1	—	1	—
Voliam Flexi (chlorantraniprole & thiamethoxam	4A/28	—	—	—	—	3	2+	—	2+/3	—	2+	
*Voliam Xpress (chlorantraniliprole/lambda-cyhalothrin)	3/28	2	3	3	3	3	3	3	2+/2+	—	3	2

Key on next page.

KEY TO TABLE 7.1.4:

Efficacy ratings:

— = unknown or does not apply in this case; **0** = Not effective; **1** = Poor; **1⁺** = Poor to Fair; **2** = fair; **2⁺** =Fair to Good; **3** = Good
( ) = Pesticide cannot be used at typical timing at which this pest is treated.
* Restricted-use pesticide; may be purchased and used only by certified applicators, or used by someone under the supervision of a certified applicator.
§ = Potentially acceptable in certified organic programs
‡ = IRAC (**I**nsecticide **R**esistance **A**ction **C**ommittee) Mode of Action Classification Group: Arthropod pest populations are more likely to exhibit cross-resistance to materials within the same group.
Δ = Efficacy ratings for stink bugs may not apply equally for all stink bug species. SB refers to brown, dusky brown, and green stink bugs. Brown marmorated stink bug has not damaged tree fruit crops in New England as of 2012, but has become an important pest of tree fruit and other crops in the Mid-Atlantic states. BMSB ratings from the *Pennsylvania Tree Fruit Production Guide*.

Key to pests:

APB = American plum borer
Aphids = Black cherry, green peach aphids
BMSB = Brown marmorated stink bug
CFF = Cherry fruit flies
JB = Japanese beetle
OFM = Oriental fruit moth
PC = Plum curculio
PTB/LPTB = Peach tree borer/Lesser peach tree borer
SB =Brown, Dusky brown and Green stink bugs (native species).
SWD = Spotted wing drosophila
TPB = Tarnished plant bug
WFT = Western flower thrips

Table 7.1.5. Cumulative degree-days for early season fruit phenology and arthropod pest events[1].

Pest Event or McIntosh Bud Stage (key events shaded)	[1]Average DD43 after McIntosh 50% Green Tip	Approximate Average Date 1970–2000					
		Middlefield CT	Greenville RI	Belcher-town MA	Hollis NH	South Burlington VT	Monmouth ME
***PPS** – egg laying starts on first days with high temperatures over 50F, not well correlated with cumulative DD43.	Rough average is about 7 days before GT	March 30	March 30	April 4	April 6	April 12	April 17
McIntosh 50% Green Tip	0	**April 6**	**April 6**	**April 11**	**April 13**	**April 19**	**April 24**
Plum – Swollen Bud	8	April 7	April 7	April 12	April 14	April 20	April 25
RBLR – 1st adult catch	23	April 10	April 11	April 16	April 17	April 24	April 28
Peach – Bud Burst	34	April 12	April 13	April 18	April 19	April 26	April 30
Green Fruitworm – peak flight	38	April 13	April 14	April 18	April 20	April 26	April 30
Pear – Bud Burst	39	April 13	April 14	April 19	April 20	April 26	April 30
STLM – 1st adult catch	42	April 14	April 14	April 19	April 21	April 27	May 1
Sweet Cherry – Bud Burst	45	April 14	April 15	April 20	April 21	April 27	May 1
Plum – Bud Burst	55	April 16	April 17	April 21	April 23	April 29	May 3
McIntosh Half Inch Green	56	**April 16**	**April 17**	**April 21**	**April 23**	**April 29**	**May 3**
Rosy apple aphid – 1st nymphs	68	April 18	April 19	April 23	April 25	May 1	May 4
Peach – Half Inch Green	73	April 18	April 19	April 24	April 25	May 1	May 5
STLM - 1st egglaying	87	April 20	April 21	April 26	April 27	May 3	May 6
Sweet Cherry – White Bud	99	April 22	April 23	April 27	April 29	May 5	May 8

Table 7.1.5. Cumulative degree-days for early season fruit phenology and arthropod pest events[1].

Pest Event or McIntosh Bud Stage (key events shaded)	[1]Average DD43 after McIntosh 50% Green Tip	Approximate Average Date 1970–2000					
		Middlefield CT	Greenville RI	Belcher-town MA	Hollis NH	South Burlington VT	Monmouth ME
Tarnished Plant Bug active	101	April 22	April 23	April 27	April 29	May 5	May 8
Plum – Green Cluster	102	April 22	April 23	April 28	April 29	May 5	May 8
Peach – Pink	108	April 23	April 24	April 28	April 30	May 6	May 9
Pear – Green Cluster	112	April 23	April 25	April 29	April 30	May 6	May 9
OBLR – larvae active	115	April 24	April 25	April 29	May 1	May 6	May 10
McIntosh Tight Cluster	116	**April 24**	**April 25**	**April 29**	**May 1**	**May 6**	**May 10**
Plum – White Bud	118	April 24	April 25	April 29	May 1	May 7	May 10
PPS – egg hatch begins	130	April 25	April 27	May 1	May 2	May 8	May 11
Sweet Cherry – Bloom	155	April 28	April 29	May 3	May 5	May 10	May 14
OFM – 1st adult catch	156	April 28	April 29	May 3	May 5	May 11	May 14
ERM – overwinterd egg hatch	163	April 29	April 30	May 4	May 6	May 11	May 14
Pear – White Bud	163	April 29	April 30	May 4	May 6	May 11	May 14
Peach – Bloom	173	April 30	May 1	May 5	May 7	May 12	May 15
McIntosh extended Pink	176	**April 30**	**May 1**	**May 5**	**May 7**	**May 12**	**May 15**
RBLR – 1st flight peak	176	April 30	May 1	May 5	May 7	May 12	May 15
Plum – Bloom	183	May 1	May 2	May 6	May 8	May 13	May 16
McIntosh King Bloom	213	**May 3**	**May 5**	**May 9**	**May 10**	**May 16**	**May 19**
STLM – 1st flight peak	215	May 4	May 5	May 9	May 10	May 16	May 19
Pear – Bloom	223	May 4	May 6	May 10	May 11	May 16	May 19
McIntosh Full Bloom	263	**May 8**	**May 9**	**May 13**	**May 14**	**May 20**	**May 23**
CM – set pheromone traps	263	Apple bloom					
OBLR – larval sample date	263	Apple bloom					
Sweet Cherry – Petal Fall	264	May 8	May 9	May 13	May 14	May 20	May 23
*MPB – egg hatch begins	266	May 8	May 9	May 13	May 15	May 20	May 23
Plum – Petal Fall	271	May 8	May 10	May 14	May 15	May 20	May 23
Peach – Petal Fall	285	May 9	May 11	May 15	May 16	May 21	May 24
LAW – 1st adult catch	291	May 10	May 11	May 15	May 16	May 22	May 25
Pear – Petal Fall	304	May 11	May 12	May 16	May 17	May 23	May 26
WAL – nymphs active	310	May 11	May 13	May 16	May 18	May 23	May 26
Sweet Cherry – Fruit Set	313	May 11	May 13	May 17	May 18	May 23	May 26
APB – 1st adult catch	324	May 12	May 14	May 17	May 19	May 24	May 27
OFM – 1st flight peak	326	May 12	May 14	May 18	May 19	May 24	May 27
*MPB – 50% egg hatch	330	May 13	May 14	May 18	May 19	May 24	May 27
McIntosh 95% Petal Fall	352	**May 14**	**May 16**	**May 19**	**May 21**	**May 26**	**May 29**
Plum – Fruit Set	353	May 14	May 16	May 19	May 21	May 26	May 29
Pear – Fruit Set	369	May 15	May 17	May 21	May 22	May 27	May 30

[1] See notes at the end of Table 7.1.6.

Table 7.1.6. Cumulative degree-days for late season arthropod pest events.

Pest Event or McIntosh Bud Stage (key events shaded)	[1]Average DD43 after McIntosh 50% Petal Fall	Approximate Average Date 1970–2000					
		Middlefield CT	Greenville RI	Belcher-town MA	Hollis NH	South Burlington VT	Monmouth ME
McIntosh 95% Petal Fall	0	**May 14**	**May 16**	**May 19**	**May 21**	**May 26**	**May 29**
ERM – start 1st gen. sampling. Threshold = 1 ERM per leaf.	Apple Petal Fall						
STLM – sampling window 1st gen. sapfeeding mines begins.	Apple Petal Fall						
CM – 1st adult catch	16	May 15	May 17	May 21	May 22	May 27	May 30
SJS – 1st adult catch	49	May 17	May 19	May 23	May 24	May 29	June 1
CFF – set traps	49	May 17	May 19	May 23	May 24	May 29	June 1
*MPB – 90% egg hatch	68	May 19	May 20	May 24	May 25	May 30	June 2
McIntosh Fruit Set	82	**May 20**	**May 21**	**May 25**	**May 26**	**May 31**	**June 3**
LAW – 1st flight peak	82	May 20	May 21	May 25	May 26	May 31	June 3
PC – apple cutting observed	82	May 20	May 21	May 25	May 26	May 31	June 3
PPS – hardshell stage	96	May 20	May 22	May 26	May 27	June 1	June 4
LPTB – 1st adult catch	111	May 21	May 23	May 27	May 28	June 2	June 5
SJS – 1st flight peak	177	May 25	May 27	May 30	May 31	June 5	June 8
***ERM** – end of 1st gen. optimum sample period	213	May 27	May 29	June 1	June 2	June 7	June 10
STLM – optimum sampling & control window ending	213	May 29	May 31	June 4	June 5	June 10	June 13
*OFM – 1st gen. treatment date	259	May 29	May 31	June 4	June 5	June 10	June 13
CM – 1st flight peak	312	June 1	June 3	June 6	June 7	June 12	June 15
APB – 1st flight peak	326	June 2	June 3	June 7	June 8	June 13	June 16
*RATB – egglaying begins	388	June 5	June 7	June 10	June 11	June 16	June 19
OBLR – 1st adult catch	430	June 7	June 8	June 12	June 13	June 18	June 21
***CM** – 1st gen. optimum single treatment date (3% egg hatch)	436	June 7	June 9	June 12	June 13	June 18	June 21
***PC** – end of movement from external sites into orchards	500	June 10	June 12	June 15	June 16	June 21	June 24
***ERM** – start 2nd gen. samplng. Threshold = 2.5 ERM per leaf	501	June 10	June 12	June 15	June 16	June 21	June 24
OBLR – 1st flight peak	518	June 11	June 13	June 16	June 17	June 22	June 25
PTB – 1st adult catch	592	June 14	June 16	June 19	June 20	June 25	June 28
STLM – start of 2nd flight	603	June 14	June 16	June 20	June 21	June 25	June 29
DWB – 1st adult catch	615	June 15	June 17	June 20	June 21	June 26	June 29
***ERM** – end of 2nd gen. optimum sample period	644	June 16	June 18	June 22	June 23	June 27	July 1
SJS – 1st crawlers appear	651	June 17	June 18	June 22	June 23	June 27	July 1
*RATB – egg hatch begins	697	June 18	June 20	June 24	June 25	June 29	July 3
*OBLR – egg hatch begins	776	June 22	June 23	June 27	June 28	July 3	July 6
*DWB egg hatch begins	818	June 23	June 25	June 29	June 30	July 4	July 8
*RATB – peak egglaying begins	876	June 26	June 27	July 1	July 2	July 6	July 10

Table 7.1.6. Cumulative degree-days for late season arthropod pest events.

Pest Event or McIntosh Bud Stage (key events shaded)	[1]Average DD43 after McIntosh 50% Petal Fall	Approximate Average Date 1970–2000					
		Middlefield CT	Greenville RI	Belcher-town MA	Hollis NH	South Burlington VT	Monmouth ME
***ERM** – 3rd gen. sampling. June threshold 2.5, July 5.0	895	June 26	June 28	July 2	July 3	July 7	July 11
LPTB – peak catch	897	June 26	June 28	July 2	July 3	July 7	July 11
OFM – 2nd flight begins	925	June 27	June 29	July 3	July 4	July 8	July 12
RBLR – 2nd flight begins	937	June 28	June 30	July 4	July 4	July 9	July 13
AM – 1st catch	980	June 30	July 1	July 5	July 6	July 11	July 14
OBLR – summ. larvae sample	1030	July 1	July 3	July 7	July 8	July 12	July 16
*ERM – end of 3rd gen. optimum sample period	1090	July 4	July 5	July 9	July 10	July 15	July 19
CM – 1st flight ending	1098	July 4	July 6	July 10	July 10	July 15	July 19
STLM – 2nd flight peak	1111	July 4	July 6	July 10	July 11	July 15	July 19
*OFM – 2nd gen first treatment	1135	July 5	July 7	July 11	July 12	July 16	July 20
DWB – peak adult catch	1219	July 8	July 10	July 14	July 15	July 20	July 24
LAW – 2nd flight begins	1237	July 9	July 11	July 15	July 16	July 20	July 24
*RATB – peak egglaying ends	1254	July 9	July 11	July 15	July 16	July 21	July 25
OFM – 2nd flight peak	1257	July 10	July 12	July 16	July 16	July 21	July 25
STLM – 2nd gen. sapfeeder mines, first sample	1293	July 11	July 13	July 17	July 18	July 22	July 27
*RATB – peak egg hatch begins	1301	July 11	July 13	July 17	July 18	July 23	July 27
RBLR – 2nd flight peak	1305	July 11	July 13	July 17	July 18	July 23	July 27
SJS – 2nd flight begins	1320	July 12	July 14	July 18	July 19	July 23	July 28
APB – 2nd flight begins	1331	July 12	July 14	July 18	July 19	July 24	July 28
STLM – 2nd gen. sapfeeder mines, second sample if needed	1443	July 16	July 18	July 22	July 23	July 28	August 1
CM – 2nd flight begins	1446	July 16	July 18	July 22	July 23	July 28	August 2
*OFM – 2nd gen., second trtmt.	1458	July 17	July 19	July 23	July 24	July 29	August 2
*STLM – 2nd gen. sapfeeder, third sample if needed	1753	July 27	July 29	August 3	August 4	August 9	August 14
DWB – peak egg hatch	1810	July 29	July 31	August 5	August 6	August 11	August 17
APB – 2nd flight peak	1821	July 29	July 31	August 5	August 6	August 12	August 17
SJS – 2nd flight peak	1841	July 30	August 1	August 6	August 7	August 13	August 18
CM – 2nd flight peak	1860	July 31	August 2	August 7	August 8	August 13	August 19
*RATB – peak egg hatch ends	1861	July 31	August 2	August 7	August 8	August 13	August 19
AM – peak flight	1907	August 1	August 4	August 9	August 9	August 15	August 21
***CM** – 2nd gen. optimum single treatment date (7% egg hatch)	1972	August 4	August 6	August 11	August 12	August 18	August 24
CMB – 2nd gen. crawlers	1974	August 4	August 6	August 11	August 12	August 18	August 24
OBLR –2nd flight begins	1982	August 4	August 6	August 11	August 12	August 19	August 24
STLM – 3rd flight begins	1983	August 4	August 6	August 11	August 12	August 19	August 24
***WALH** – 2nd gen. nymphs	1993	August 5	August 7	August 12	August 13	August 19	August 25
OFM – 3rd flight begins	2063	August 7	August 9	August 15	August 15	August 22	August 28

Table 7.1.6. Cumulative degree-days for late season arthropod pest events.

Pest Event or McIntosh Bud Stage (key events shaded)	[1]Average DD43 after McIntosh 50% Petal Fall	Approximate Average Date 1970–2000					
		Middlefield CT	Greenville RI	Belcher-town MA	Hollis NH	South Burlington VT	Monmouth ME
STLM – 3rd flight peak	2324	August 17	August 19	August 25	August 26	Sept. 4	Sept. 12
SJS – 2nd gen. crawlers	2326	August 17	August 19	August 25	August 26	Sept. 4	Sept. 12

Notes for Table 7.1.5 and Table 7.1.6.

1, Baskerville-Emin formula used to calculate degree-days with a 43F base.

* DD43 for these events are based on temperature model estimates from season-long hourly weather data from six New England orchard sites in 2011 and 2012. The average DD43 assocation for model output dates was used to translate these models into cumulative DD43 equivalents. For models for which the only difference is the base temperature, this correlation is strong. For mite development and other models based on other temperature relationships, the average DD43 correlation serves as a less precise but still useful estimate.

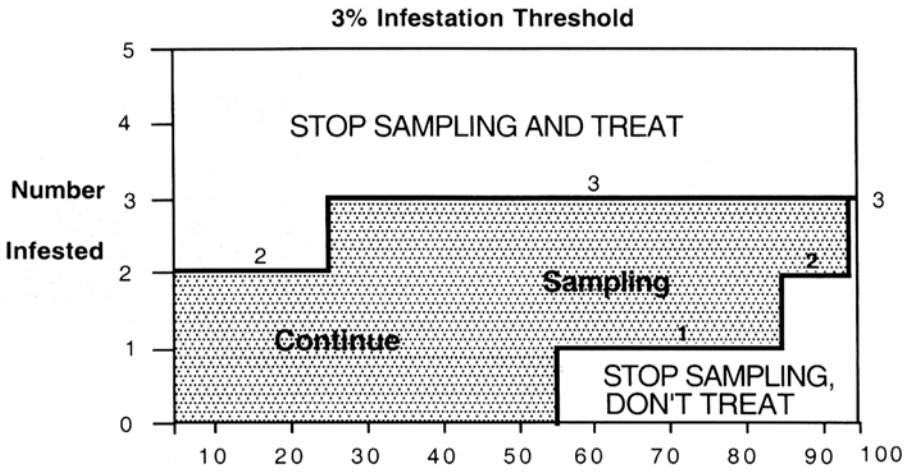
Abbreviations: AM = Apple maggot, APB = American plum borer, CFF = Cherry fruit fly, CM = Codling moth, CMB = Comstock mealybug, DWB = Dogwood borer, ERM = European red mite, LAW = Lesser appleworm, LPTB = Lesser peach tree borer, MPB = Mullein plant bug,
OBLR = Obliquebanded leafroller, OFM = Oriental fruit moth, PC = Plum curculio, PTB = Peach tree borer,
RBLR = Redbanded leafroller, SJS = San Jose scale, STLM = Spotted tentiform leafminer, WAL = White apple leafhopper.

Except as noted above for items with *, information in this table is drived from field observations by Dave Kain, Art Agnello et al. at the New York Agricultural Research Station in Geneva NY. Converting values to relative timing after McIntosh Green Tip and Petal Fall has been a reliable way to apply DD43 targets defined in Geneva NY to New England orchards for several indicator pests and bud stages. The same approach is applied here to a full list of pest and budstage events. However, differences in day length, non-linear responses to temperature extremes, and other site specific interactions can shift pest and tree phenology in addition to degree day accumulation. In some cases, the average McIntosh budstage model dates shown do not exactly match anecdotally reported observer average dates, but model budstage dates are displayed as reference points for estimates of other budstage and pest events. While subject to limitations, the table is a useful reference to forecast pest and tree phenology events at different New England sites for scheduling scouting and sampling.

Year to year variation in seasonal weather has a greater effect of +/– 0 to 12 days or more variation on the actual current year date. Comparing the date of the most recent McIntosh bud stage with the value shown for a nearby site in the table provides a simple and reasonably accurate way to adjust dates for the current year. For example, if the date of 95% McIntosh Petal Fall occurs 5 days earlier (or later) than the date shown, then subtract (or add) 5 days from subsequent dates displayed in the table to adjust for current year deviation. Looking ahead, estimated dates are based on climatic average temperatures. If the forecast is for above (or below) average temperatures, the expected date shifts earlier (or later).

Pesticide application and other management decisions should be made on direct observations.

Figure 7.1.1 - Obliquebanded Leafroller Sampling Form



- Examine 10 bud clusters (overwintering generation) or expanding terminals (1st summer generation) per tree for live OBLR larvae. For the 1st summer generation, sample at ~600 degree-days (43°F base) after the 1st moth flight in your area; if you do not have access to this information, use July 5 as an estimated best sample date in WNY (5-7 days earlier in ENY and Long Island).

- Sample every other tree starting with a random tree and continuing down the row. Remember that you are NOT counting OBLR larvae, but sites infested with LIVE OBLR. If trees are >10ft tall, try to include some samples from the upper canopy, or from watersprouts.

- If the total number of infested samples falls in the "Continue Sampling" zone, sample another tree. If the total falls in the "Stop Sampling, Don't Treat" zone, sampling is stopped and no treatment is recommended. If the total falls in the "Stop Sampling and Treat" zone, sampling is stopped and treatment is recommended. Refer to the Apple Pesticide Spray Table for a choice of pesticide materials.

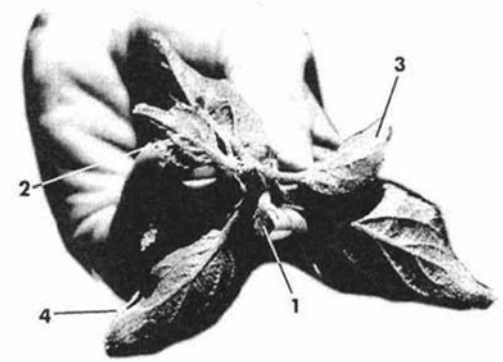
- Continue sampling until you REACH one of the boldface staircase lines in the chart above, or until you have examined a maximum of 100 clusters. If you reach the intersection of the two lines by the 100th sample, withhold treatment.

- If a no-treat decision is made for 1st summer generation larvae, resample again in 3-5 days (after approximately 100 DD more have accumulated). A second no-treat decision indicates that no treatment is recommended against this brood of OBLR.

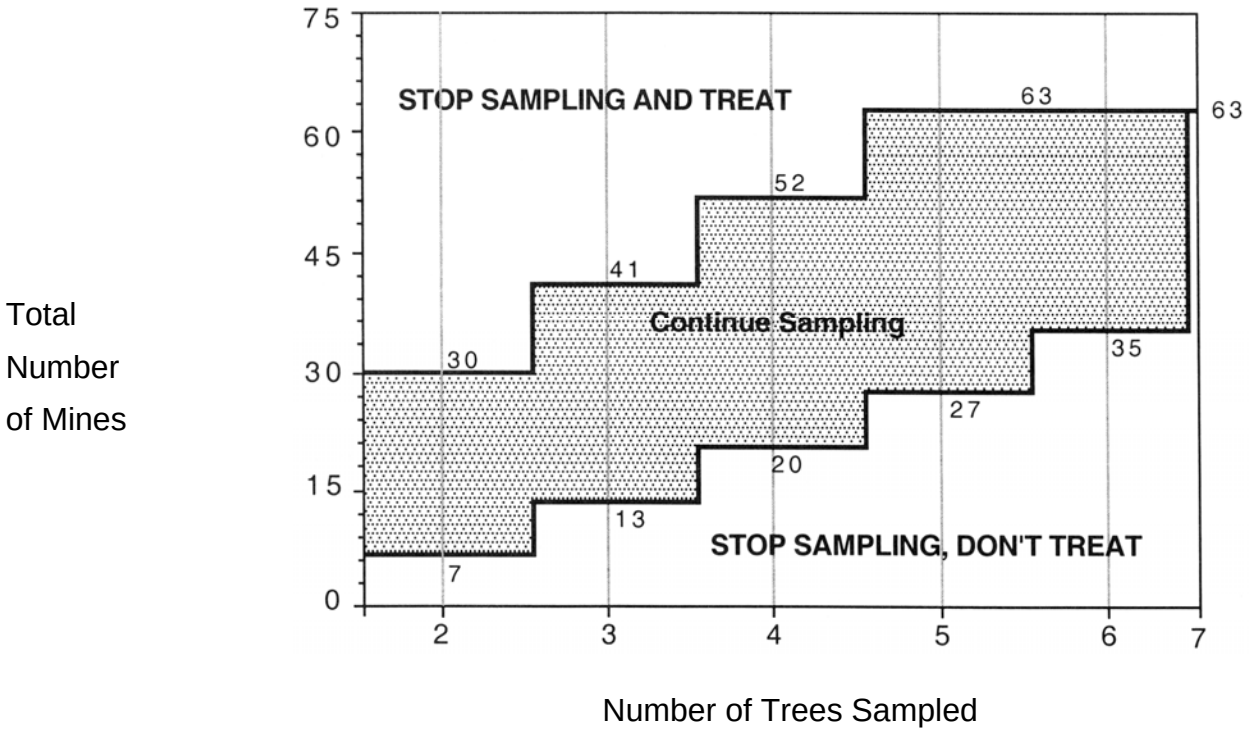
Use this table to keep track of your samples

Total Number Examined		# Infested	Total Number Examined		# Infested
10	……...	_____	60	……...	_____
20	……...	_____	70	……...	_____
30	……...	_____	80	……...	_____
40	……...	_____	90	……...	_____
50	……...	_____	100	……...	_____

Figure 7.1.2 - STLM Petal Fall Sampling Form



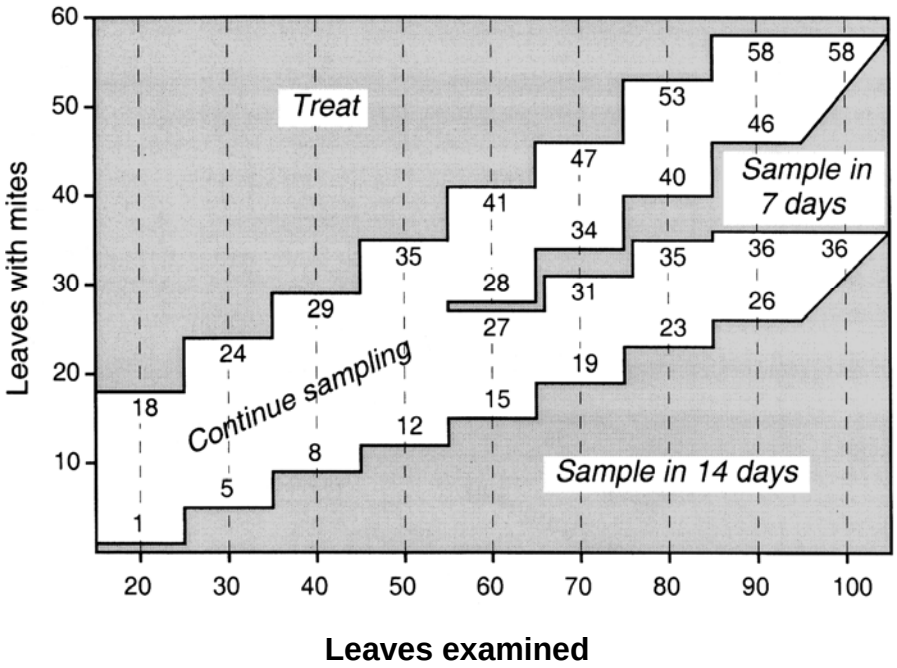
- If STLM eggs were not sampled during the pink or early bloom stage, a decision on 1st generation control can still be made by sampling sap-feeding mines at petal fall. After all the blossoms have fallen, start near one corner of the block, and go to every other tree until you have sampled enough trees to reach a decision. Select 3 fruit clusters from around the canopy of each tree sampled.
- Using a magnifier, count the mines on the undersides of the 2nd, 3rd, and 4th leaves in each cluster, counting leaves in the order they unfolded (see diagram at right).
- After 2 trees have been sampled, begin comparing the accumulated total number of mines found with the decision lines shown in the chart below for that number of trees.



- If the number of mines falls in the "Continue Sampling" zone, sample another tree. If the total is in the "Stop Sampling, Don't Treat" zone, sampling is stopped and no treatment is recommended. If the total is in the "Stop Sampling and Treat" zone, sampling is stopped and a treatment is recommended at petal fall. If 7 trees are sampled and the total number of mines equals 63, the population is below threshold.

Refer to the Apple Pesticide Spray Table for a choice of pesticide materials.

Figure 7.1.3 – Mite Sampling Chart
Threshold = 2.5 mites/leaf
(June 1 - 30)



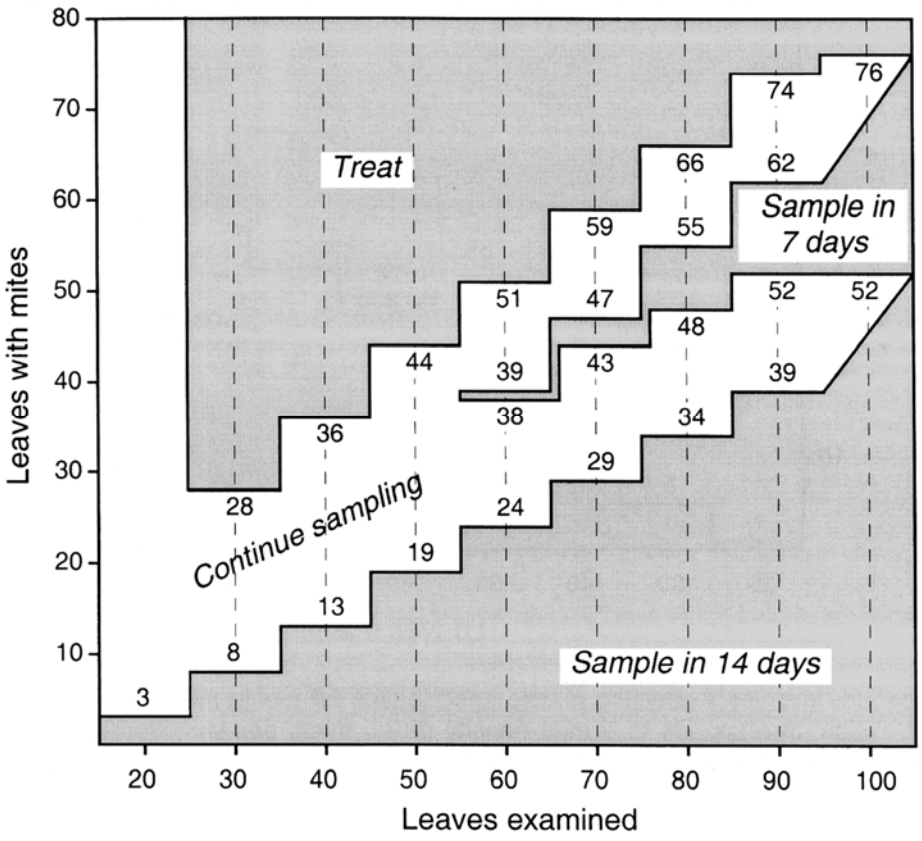
- This procedure involves examining middle aged leaves for motile mites (any stage except eggs). Use this chart, which corresponds to a mite density of 2.5 mites per leaf, from June 1 until June 30. You will not be counting mites, but will only determine whether they are present or absent on each leaf sampled.

- Starting with a random tree and sampling every other tree, collect 4 leaves in a plastic bag from each of 5 trees, choosing from each quadrant of the canopy. To make sure the leaves are of an intermediate age, pick them from the middle of the fruit cluster.

- Using a magnifier, examine the top and bottom surface of each leaf for motile mites, and keep track of the number of leaves containing motile mites. When all 20 leaves have been examined, compare this number with the numbers on the above decision guide. If the number of leaves with mites is equal to the values on the stairstep lines, the decision is the one shown in the area immediately below the value (example: For "29" after sampling 40 leaves, the decision is "Continue sampling"; for "8" the decision is to "Sample in 14 days").

- When the counts fall into any of the shaded regions, sampling is stopped and a decision is made to either treat, or else re-sample in 7 or 14 days. If the counts fall in the "Continue sampling" zone, take and examine more leaf samples in batches of 10 (5 per tree) until the counts fall into one of the shaded regions. If you reach one of the resample zones, the population is below threshold, and should remain so for at least the number of days stated. Return at the designated time and conduct another sample. If the -7 day" resample date falls during the 5.0 mites/leaf Threshold period, you can wait for a total of 14 days before resampling.

Figure 7.1.4 - Mite Sampling Chart
Threshold = 5.0 mites/leaf
(July 1 - 31)

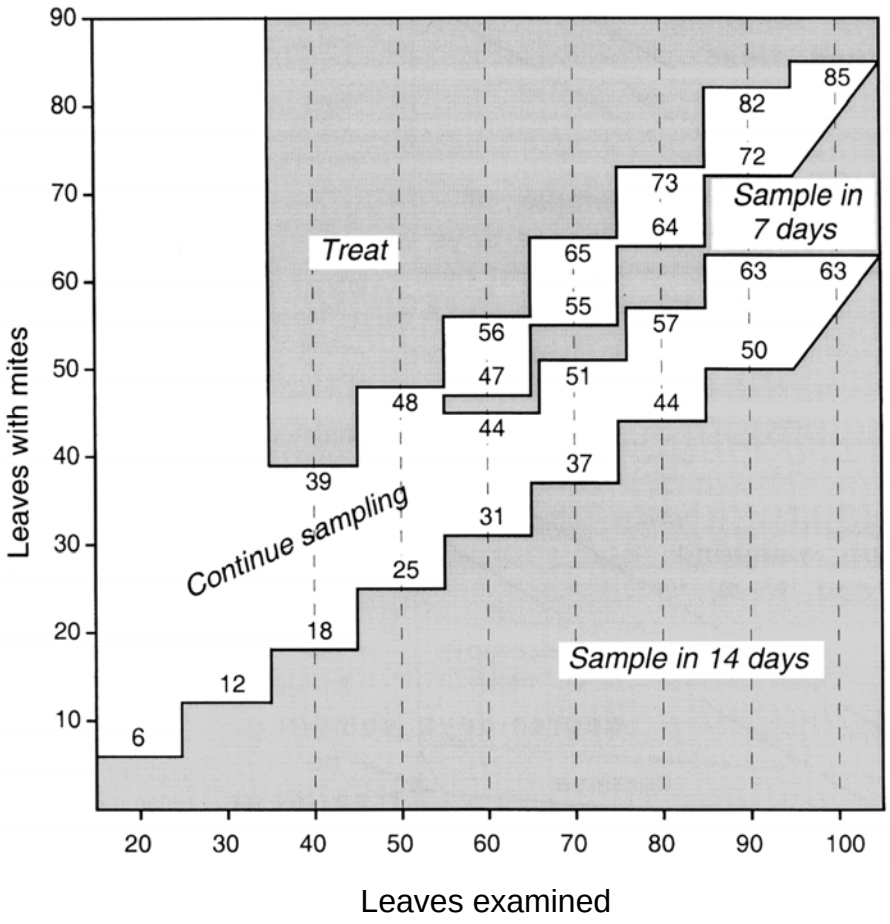


- This procedure involves examining middle aged leaves for motile mites (any stage except eggs). Use this chart, which corresponds to a mite density of 5.0 mites per leaf, from July 1 until July 31. You will not be counting mites, but will only determine whether they are present or absent on each leaf sampled.

- Starting with a random tree and sampling every other tree, collect 4 leaves in a plastic bag from each of 5 trees, choosing from each quadrant of the canopy. To make sure the leaves are of an intermediate age, pick them from the middle of the fruit cluster or foliar terminal.

- Using a magnifier, examine the top and bottom surface of each leaf for motile mites, and keep track of the number of leaves containing motile mites. When all 20 leaves have been examined, compare this number with the numbers on the above decision guide. If the number of leaves with mites is equal to the values on the stairstep lines, the decision is the one shown in the area immediately below the value (example: For "36" after sampling 40 leaves, the decision is "Continue sampling"; for "13" the decision is to "Sample in 14 days"). When the counts fall into any of the shaded regions, sampling is stopped and a decision is made to either treat, or else re-sample in 7 or 14 days. If the counts fall in the "Continue sampling" zone, take and examine more leaf samples in batches of 10 (5 per tree) until the counts fall into one of the shaded regions. If you reach one of the resample zones, the population is below threshold, and should remain so for at least the number of days stated. Return at the designated time and conduct another sample. If the "7 day" resample date falls during the 7.5 mites/leaf Threshold period, you can wait for a total of 14 days before resampling.

Figure 7.1.5 - Mite Sampling Chart
Threshold = 7.5 Mites/Leaf
(August 1 - 15)

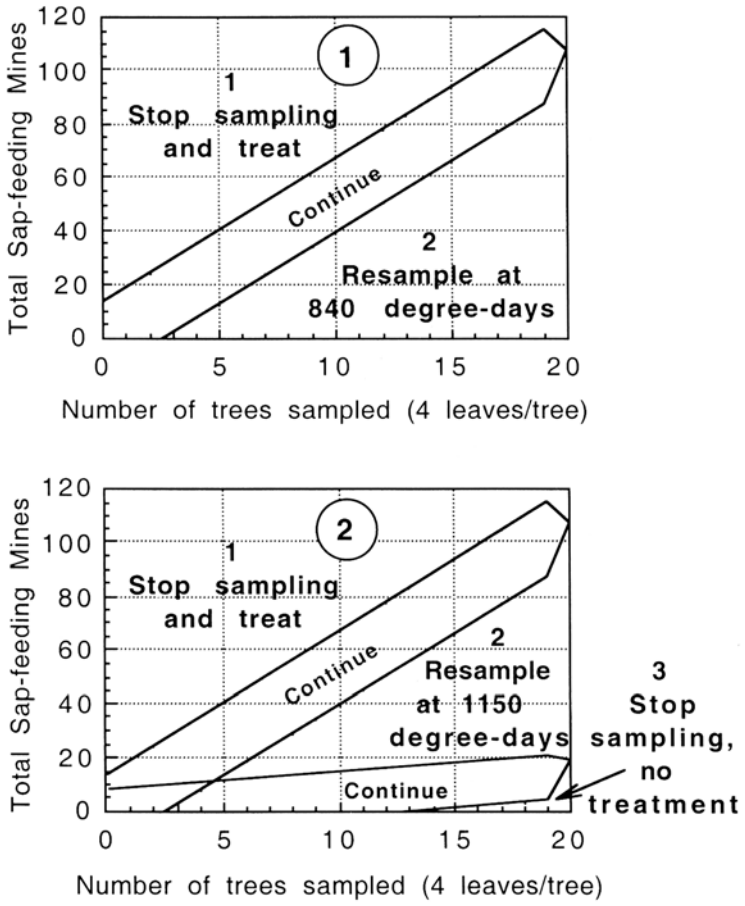


- This procedure involves examining middle aged leaves for motile mites (any stage except eggs). Use this chart, which corresponds to a mite density of 7.5 mites per leaf, from August 1-15. You will not be counting mites, but will only determine whether they are present or absent on each leaf sampled.

- Starting with a random tree and sampling every other tree, collect 4 leaves in a plastic bag from each of 5 trees, choosing from each quadrant of the canopy. To make sure the leaves are of an intermediate age, pick them from the middle of the fruit cluster or foliar terminal.

- Using a magnifier, examine the top and bottom surface of each leaf for motile mites, and keep track of the number of leaves containing motile mites. When all 20 leaves have been examined, compare this number with the numbers on the above decision guide. If the number of leaves with mites is equal to the values on the stairstep lines, the decision is the one shown in the area immediately below the value (example: For "39" after sampling 40 leaves, the decision is "Continue sampling"; for "18" the decision is to "Sample in 14 days"). When the counts fall into any of the shaded regions, sampling is stopped and a decision is made to either treat, or else re-sample in 7 or 14 days. If the counts fall in the .Continue sampling" zone, take and examine more leaf samples in batches of 10 (5 per tree) until the counts fall into one of the shaded regions. If you reach one of the resample zones, the population is below threshold, and should remain so for at least the number of days stated. Return at the designated time and conduct another sample. If the resample date falls after August 15, there should be no further need for additional samples or miticide sprays this season.

Figure 7.1.6 - STLM Summer Sampling Form



Because of variability in this pest's development from one site to the next, more than one sampling session may be needed to reach a treatment decision for 2nd generation STLM. The first sample should be taken at 690 degree-days (base 43°F) after the start of the 2nd moth flight (or approximately 25-30 days). In central MA, use July 9 as an approximate sampling date if you don't have access to pheromone trap catch data.

Start near one corner of the block and sample trees along a diagonal, moving toward the opposite corner of the block. At each tree, count all the **sap-feeding** mines on 4 mature terminal leaves randomly selected from around the outside of the canopy. Sampled leaves should be those located near the middle of the terminals. After sampling 3 trees, start comparing the accumulated total number of mines found with the appropriate chart for the sampling session and proceed as follows:

SAMPLING DONE AT 690-840 DD

If the number of mines falls in the "Continue" zone on **Chart 1**, sample another tree and check again. If the total is above this zone (area 1). sampling is stopped and a treatment is recommended. If the total is below this zone (area 2), stop sampling and sample the block again at approximately 840 DD (about 31 days) after the start of the 2nd flight.

SAMPLING DONE AT 840-1149 DD, IF NECESSARY

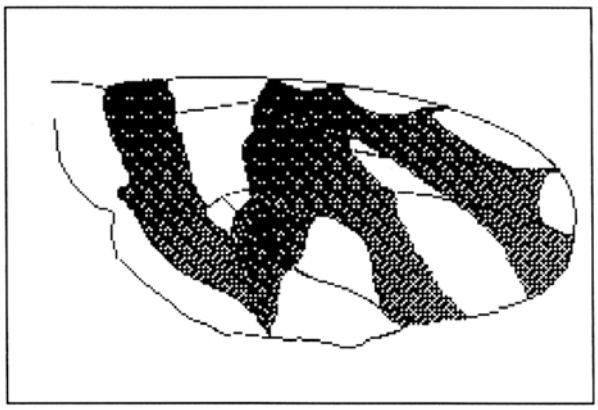
If it is necessary to sample the population a second time, refer to Chart 2 after sampling the 3rd tree. If the accumulated total falls in one of the "Continue" zones, sample another tree and check again. If the count falls in area 1, a treatment is recommended and no further sampling is necessary. If the count falls in area 2, stop sampling and sample the block again at approximately 1150 DD (about 42 days) after the start of the 2nd flight. If the count falls in area 3, treatment is not recommended and no further sampling is necessary.

SAMPLING DONE AT 1150 OR MORE DD, IF NECESSARY

If it is necessary to sample a third time, refer again to **S**, the same as in the first sampling session. This time, however, if the accumulated total number of mines falls in area 2, treatment is not recommended and no further sampling is required for this brood of STLM.

Refer to the Apple Pesticide Spray Table for a choice of pesticide materials if a treatment is elected.

Figure 7.1.7 – Apple Maggot Monitoring Form



On or before July 4, and possibly earlier in blocks with early harvest cultivars, hang 3 to 4 sticky red sphere traps per block in trees along the perimeter closest to an abandoned orchard or a stand of woods. If no abandoned trees or woodlands are nearby, choose the southern edge of the block. Use of supplementary apple volatile lures increases t he sensitivity of the traps and provides earlier warning of a developing threat from apple maggot (AM) damage. A layer of stickum about 1/8" thick provides extended stickiness without causing dripping off during hot weather. A thinner layer may not remain fully effective after 2-3weeks in the field.

Trap trees should be spaced at least 30 ft from each other. Place the traps in the outer canopy so that they are visible from outside the tree, at least 6 ft. high. Position the traps so that they are surrounded by fruit and foliage, but strip leaves as needed to create an open pocket at least 12 inches diameter around the trap to prevent foliage from sticking to it as the wind move branches, and to increase visibility. Ideally, there should be some fruit below the trap to capture female AM as they move from adjacent fruit.

No treatment is recommended until the trap catch threshold is reached. Check the traps 1-2 times per week for AM flies, which can be distinguished from similar species by the pattern of dark bands on their wings (right), a white spot on the thorax between the wings, and by a horizontal light colored stripe extending backward from the margin of the compound eyes.

If the cumulative average total of 5 AM flies per trap is reached (i.e. cumulative total of 15 AM on three baited traps, or 20 AM on four baited traps), a spray of a suitable insecticide is recommended immediately. After an insecticide application, the traps can be ignored for 7-14 days. The length of the residual period depends on the material used and the accumulation and intensity of rainfall after application. **If supplementary bait lures are NOT used, a lower threshold of 1 – 2 AM flies per trap is necessary.**

When residue from the previous application is considered to no longer be effective, remove AM, other insects and debris from the traps and begin resuming checking them to see when/if the threshold is reached again.

After about a month in the field traps may need to be recoated with stickum.

For most blocks, traps can be taken down at the end of August, but for blocks of late harvested cultivars with a history of AM damage, it may be useful to leave traps up until September 10 if it is feasible to make a late treatment if needed, or if detecting AM pressure in the block would otherwise be of use in harvest or marketing decisions.

Date checked	Number of AM Flies caught since last check or residue depletion	Cumulative Avg. AM caught per trap since last check or resiude depletion
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Figure 7.1.9. Average Timing for Apple Events for New England

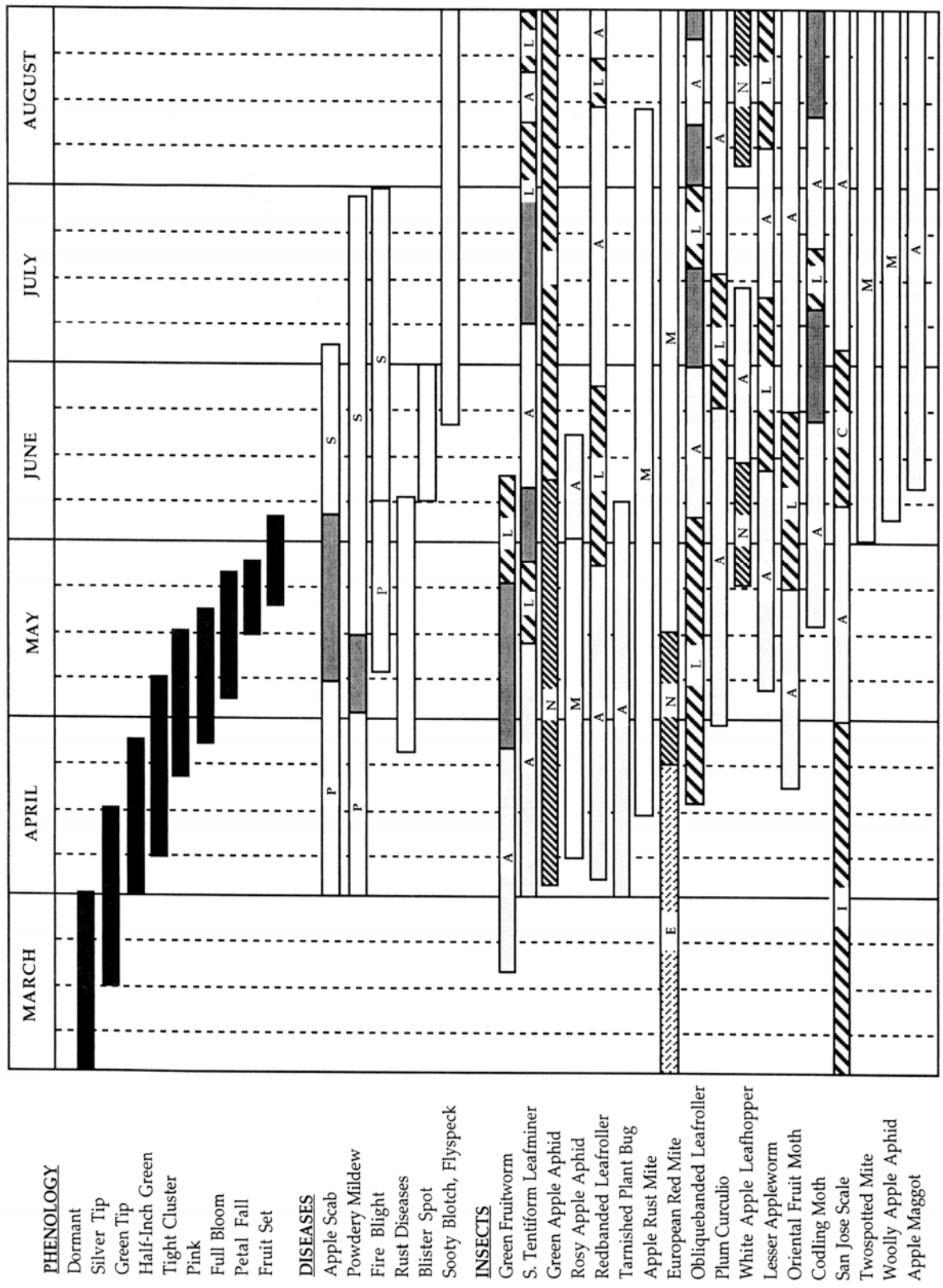
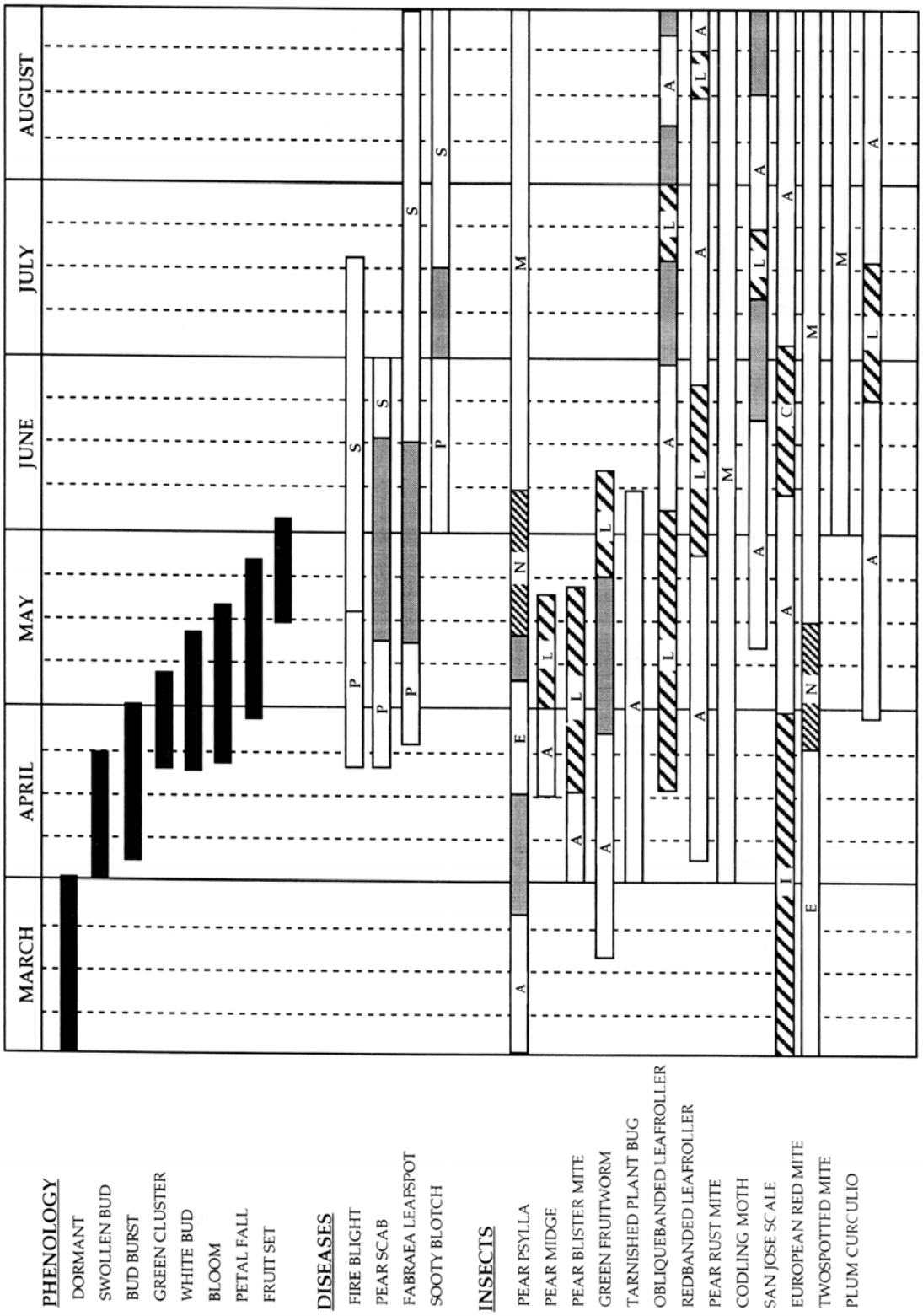


Figure 7.1.10. Average Timing for Pear Events for New England



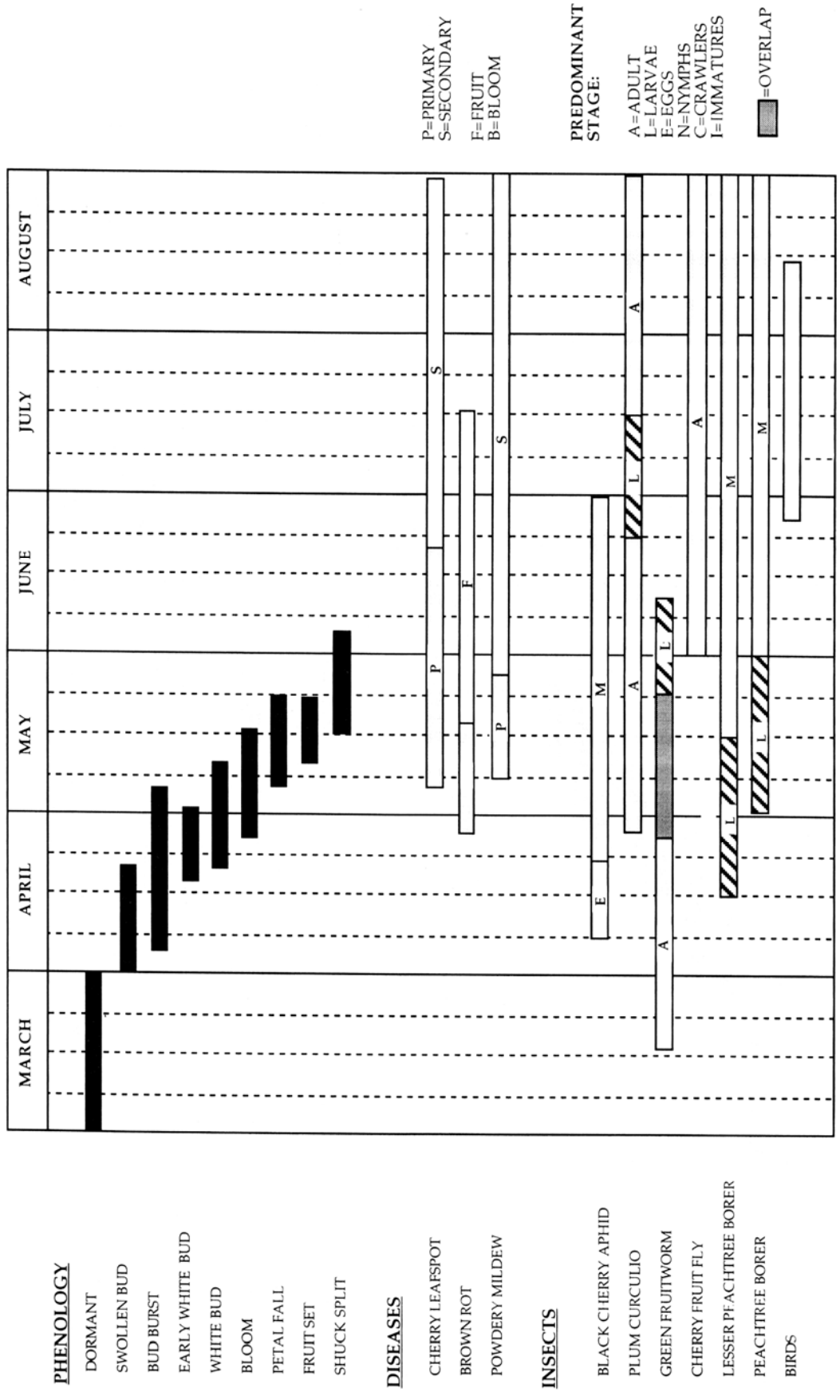


Figure 7.1.11. Average Timing for Cherry Events for New England

Figure 7.1.12. Average Timing for Peach Events for New England

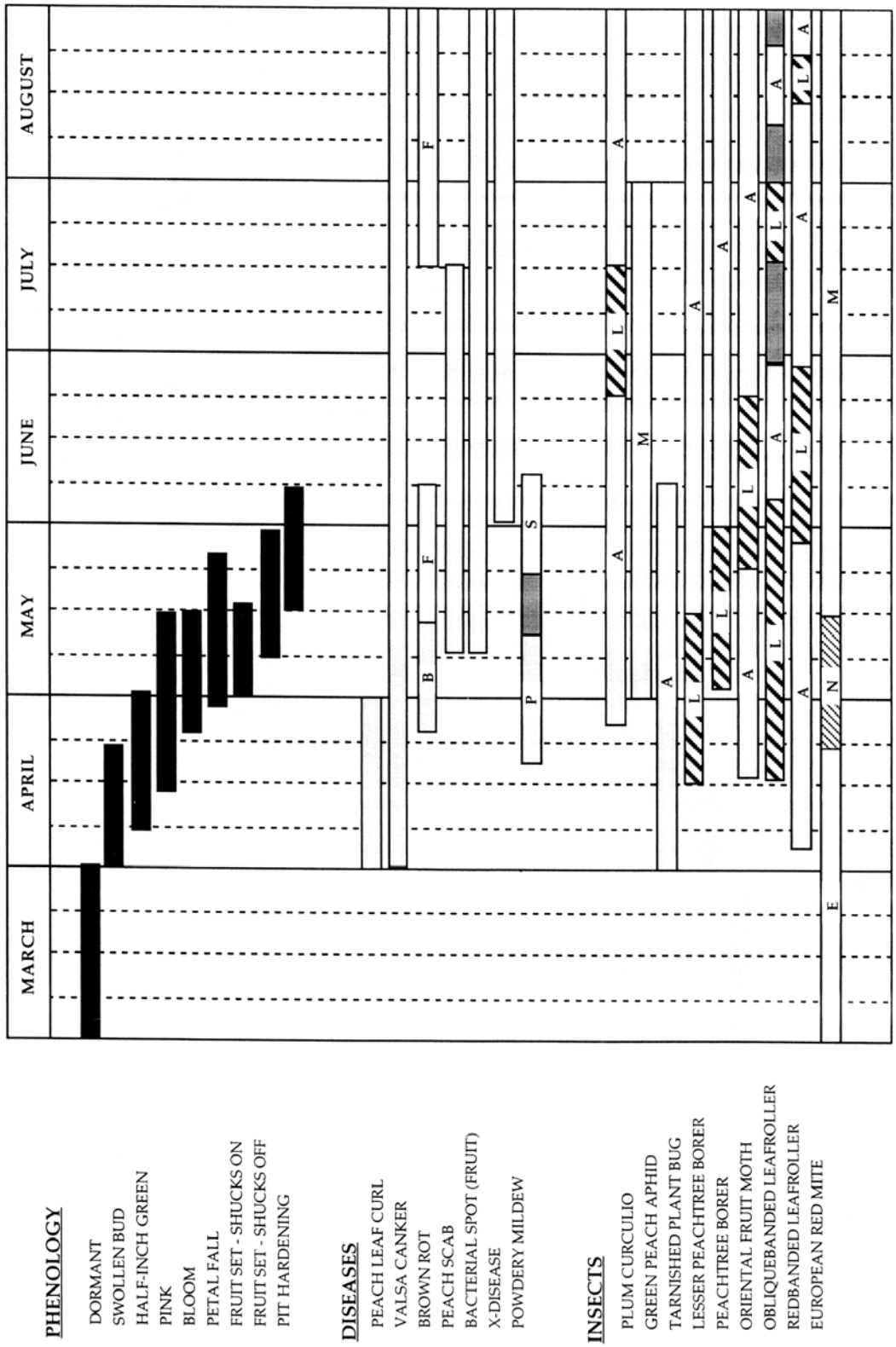


Figure 7.1.13. Average Timing for Prune and Plum Events for New England