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Weekly Update on Pest and Crop Development

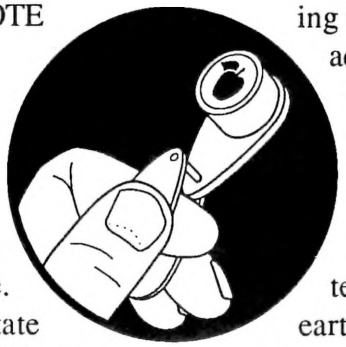
F R U I T J O U R N A L

April 13, 1992 VOLUME 1 Geneva, NY

INSECTS

PEAR THRIPS

INSECT OF NOTE
(Art Agnello)



❖❖Every year, more is heard about this once uncommon pest, so perhaps some space should be devoted to it here. Maple foliage in some parts of the state routinely show foliar damage from this tiny insect, and reports from New England blame it for reduced fruit set in apples. The pear thrips is an unusual insect about 1/20 inch long, with fringed wings and assymetrical mouthparts. The adult pear thrips is slender and brown, with short antennae and a swelling behind the head; the wings are long and narrow, with fringes of long hairs. Young pear thrips are small and white with red eyes. ("Thrips" is the term used for either one insect or several.) The mouthparts consist of a pair of stylets for puncturing plant tissue, plus a cone with a rasp-like surface, which is used for roughening the wound and then sucking up the juices.

Pear thrips, originally from Europe, were introduced into California at the turn of the century, where they demonstrated a taste for plums, cherry, apple, and pear; other hosts are basswood, birch, beech, ash, and of course, maples. It is the adult thrips that appears on host trees in great numbers and does the most destructive damage. Generally speaking, they arrive just before or while the fruit buds are opening. They enter the bud, or start feeding on the bud tip and gradually work themselves in. Eggs are laid under the bud scales, petals and sepals, on stems and in other succulent flower and leaf parts. The larvae feed voraciously for about 3 weeks, adding to the damage already caused by the adults. After the larval feeding period has finished (early June in N.Y.), they drop off the tree and enter the ground, often to depths of a foot or more, where they enter a diapause stage until fall. Sometime in September or October, they pupate in their earthen cell, and remain until the adults emerge the next April. Under natural conditions, the duration of a single adult's life probably covers a period of 4-6 weeks.

On fruit trees, feeding is usually concentrated on the tender flower parts, which gives the blossom buds a shriveled, scorched appearance, or causes them to fall off completely. Because much of this insect's life is spent underground, control of the susceptible stages is very difficult. Insecticides have been suggested by some, but their necessity has not been substantiated in New York. The following is not intended as advice to treat for thrips, but as a synopsis of what's known about pesticide efficacy. On fruit trees, an oil spray is effective against the egg-laying adults as they emerge, timed between the bud burst and green cluster stages of pear and plum (usually the 2nd or 3rd week of April). This can be a prudent treatment to apply in any case, as a preventive measure against other pests such as mites or pear psylla. Some insecticide treatments have been tested in Connecticut, and pink bud sprays of nearly anything - from malathion and Guthion to Vydate and Asana - seem to work well. However, since pear thrips is not on the labels of these products, you could not legally make an application solely against this insect. If you are spraying for a labelled pest, you may achieve incidental control.

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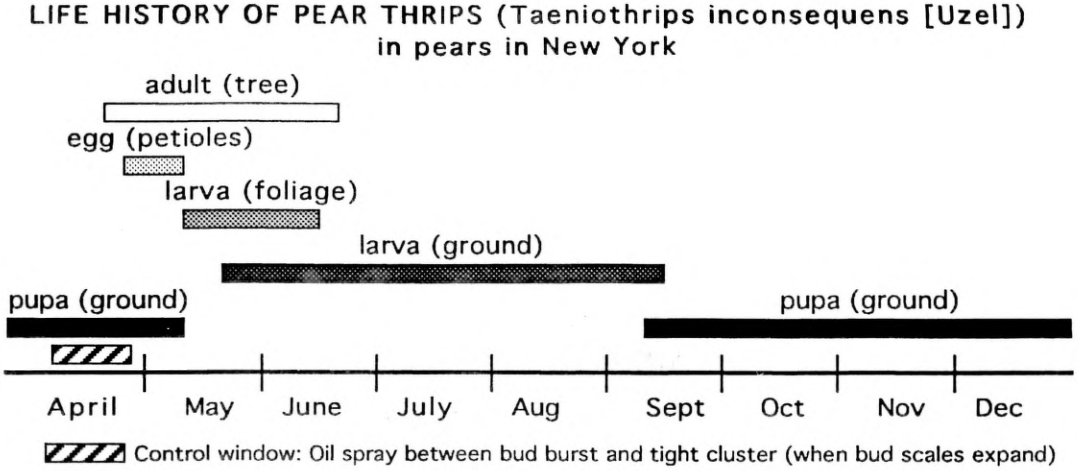

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DISEASES

APPLE SCAB

UNDERSTANDING AND INTERPRETING APPLE SCAB ASCOSPORE MATURITY DATA

(Wayne Wilcox)

❖❖Thefirst requests for scab ascospore maturity counts have already come in, and we have dutifully reported them according to the annual ritual. However, the longer I stay involved with this game, the more concerned I am that these numbers are relatively meaningless or even harmful unless they're viewed within some sort of context (remember the phrase about "lies, damned lies, and statistics"). So, as long as we're going to keep reporting and referencing these numbers, let's at least stop a minute and think about what they really mean.

UNDERSTANDING THEM. Every week, Ron Nevill (my technician) collects a batch of scabby leaves from an unsprayed McIntosh block here at Geneva, brings them back to the lab, and conducts two different tests:

(1) A standard quantity of leaves is immersed in water, then the scab fungus is allowed to discharge ascospores for 1 hr into a petri dish. These spores are then counted under the microscope, and the number of spores per low power (LP) field is reported. By comparing data from week to week, this gives a good measure of the relative number of spores that are ready to shoot during an upcoming rain. The only problem is that you can't figure out how many spores will be released over the entire season (thus, what percentage of the season's inoculum is represented by each discharge test) until the season is over and you add up all the numbers. However, these figures are fairly consistent from year to year, so we usually have a pretty good idea what constitutes a "low" and a "high" shoot (see table page 4).

(2) Twenty individual fruiting bodies (pseudothecia) are removed at random from different leaves, squashed on a microscope slide, and Ron counts the number of asci in each of five maturity categories, according to how they look under the microscope: categories 1-3 are

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rated as immature, those in category 4 are rated as mature, and those asci that have already discharged their spores are placed in category 5. The problem here is that asci in category 4, which are always reported and thought of as "mature and ready to shoot", only APPEAR to be so. In actual fact, ascospores turn brown and look like they're ready to shoot—i.e., they become "morphologically mature"—about 1-2 weeks before they're ready to shoot. (Anybody wishing to delve into all the gory details on this should see a recent journal article by D. Gadoury, et al., Plant Dis. 76: 277-282). So, are morphological maturity ratings exaggerating the threat early in the season? Is there a better way of assessing initial inoculum availability?

Below, I've summarized the data from our ascospore maturity determinations at Geneva over the last 4 years. These include the percentage of asci rated as "mature" (morphologically) and those that had already discharged their ascospores, as determined by the microscopic examination of squashed fruiting bodies as described above. Also included are the data from the ascospore discharge tests, expressed as we report them each week (spores/LP field, 1 hr shoot) and as a cumulative percentage of the season's total catch through the date in question.

Finally, for each assessment date I've also provided the number of degree days (base 32°F) accumulated after the first date of McIntosh green tip. About 10 yr ago, Gadoury and MacHardy in New Hampshire provided data suggesting that (i) the first mature ascospores are ready to shoot at green tip; (ii) maturation continues slowly for the next 175-225 degree days [base 32°F] after green tip; then (iii) the vast majority of spores mature rapidly after this point. This model has never been tested or used extensively outside of New England, but it may have promise.

INTERPRETING THEM. Three major points stand out:

(1) As stated above, spores that look mature early in the season often aren't ready to shoot. For example, in 1990, 16% of the spores appeared to be mature at green tip, but only 1% were actually ready to shoot. Similarly, 19% of the spores were rated as "mature" (category 4) in our sampling last Thursday (4/9/92), but we got no shoot in our discharge test.

(2) As predicted by the Gadoury/MacHardy model, actual spore maturity (as measured by the ability of spores to discharge) proceeded slowly for the first 175-225 degree days (base 32) after green tip, then advanced rapidly. This start of rapid maturation usually coincided with the tight cluster stage of McIntosh bud development. The model was much less accurate in predicting apparent (morphological) maturity, which it was not designed to do.

(3) Neither tree phenology nor the model was a good predictor of when most ascospore inoculum was depleted. This may be due to differences in rainfall patterns during the various years or to inaccuracies in our sampling methods. It is quite possible that our figures overstate the threat late in some seasons, judging by some other workers' spore-trapping studies. For instance, our sampling method does not adequately account for the decomposition of overwintering leaf litter or the possibility of spore entrapment by orchard grass.

LAST WORDS. We'll continue to collect and report ascospore data as in the past, partly because it's expected and partly because we can learn from them. However, be careful in how you interpret these figures. Accumulated number of degree days since green tip and tree phenology are probably better indicators of primary inoculum availability than our morphological maturity (category 4) ratings; I'll try reporting both this year and see how it goes.

Finally, don't forget that maturity percentages are MUCH less important than the base level of inoculum in a particular orchard. The number of ascospores immediately available in an orchard with 0.1% leaf scab last fall and 30% of its spores mature is exactly the same as in an orchard with 3% leaf scab last fall and only 1% ascospore maturity!❖❖

				% of Asci		Ascospore discharge test	
Year	Date	Phen[a]	DD (32)[b]	"Mature"	Discharged	Spores/LP field	Cumulative %
'88	4/14	GT	0	5	<1	6	1
	4/21	QIG	52	11	1	11	3
	4/28	HIG	123	13	2	4	4
	5/5	TC	212	14	3	29	10
	5/20	BL	583	22	37	83	24
	5/26	PF	764	18	48	118	45
	6/2		999	18	71	94	63
	6/9		1184	10	84	154	90
	6/16		1414	10	90	73	100
'89	4/21	GT	0	2	0	0	0
	4/27	QIG	61	3	0	0	0
	5/5	HIG	188	7	1	27	5
	5/11	TC	283	13	4	20	8
	5/18	P	425	47	8	149	34
	5/26	BL	684	46	26	230	73
	6/1	PF	865	39	45	96	90
	6/7		1073	11	86	52	98
	6/16		1350	2	98	9	100
'90	3/29	GT	0	6	0	0	0
	4/5	GT	55	16	1	13	1
	4/12	QIG	96	31	2	28	4
	4/19	HIG	151	25	5	35	8
	4/26	TC	287	37	7	64	14
	5/4	BL	545	-	7	217	36
	5/10	BL	656	45	23	214	57
	5/17	PF	810	31	42	24	60
	5/24		954	25	56	112	71
	5/24		1152	19	71	86	79
	6/8		1399	13	82	178	97
	6/14		1586	9	91	35	100
'91	4/4	GT	0	9	0	0	0
	4/11	HIG	189	33	5	44	4
	4/18	TC	268	21	3	90	12
	4/25	TC	348	22	6	84	20
	5/2	P	529	30	27	114	31
	5/9	BL	662	31	43	146	44
	5/16	PF	865	29	50	150	58
	5/23		1076	33	47	243	80
	5/30		1362	28	62	146	94
	6/6		1607	16	79	72	100

[a] Approximate phenological stage of McIntosh trees at Geneva: GT = green tip, QIG = 1/4" green, HIG = 1/2" green, TC = tight cluster, P = pink, BL = bloom, PF = petal fall

[b] Accumulated number of degree days (base 32°F) since green tip

FIELD NOTES

Hudson Valley Lab, Highland (Dave Rosenberger, Dick Straub):

Apple (McIntosh) phenology:
Silver tip - 4/7; Green tip - 4/13

Apple scab ascospore maturity as of Friday, April 10:

Immature:	98.7%
Mature:	1.3%
Empty asci:	0.0%

Tower shoot:
1 spore (Threshold for commercial concern is usually considered 60-100 spores in the tower discharge test.)

In the Hudson Valley, the lack of snow cover during the winter and dry leaf litter during the past few weeks have contributed to slow development of scab ascospores in the leaf litter. Cold weather is predicted for the beginning of this week. We anticipate that no significant apple scab ascospore discharge is likely to occur in the Hudson Valley until at least April 20.

Pheromone Trap Catches:
-Green Fruitworm: 4/7 - 1; 4/9 - 1
-Psylla adults active on 4/5; 1st eggs seen on 4/7
-Oil for psylla has been going on with copper sprays since 4/9.

PHENOLOGIES (Geneva)

Apple, Pear, Cherry, Peach, Plum: **all dormant**

PHEROMONE TRAP CATCHES
Number/Trap/Day, Geneva NY

	4/6	4/9	4/13
Green Fruitworm	0	0	0
Redbanded Leafroller	0	0	0
Spotted Tentiform Leafminer	0	0	0

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1-4/13)	52	13
	Ranges:	
Green fruitworm 1st adult catch	41-143	9-69
Green fruitworm peak flight	64-221	19-108
Spotted tentiform leafminer 1st adult catch	73-433	17-251
Tarnished plant bug adults present, active	71-536	34-299
Redbanded Leafroller 1st adult catch	32-480	17-251
Apples at Green Tip	39-147	19-61
Pears at Bud Burst	68-237	33-117

Note: For current information in your area of the state, check PEST STATUS under FRUIT on CENET.

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