scaffolds

Update on Pest Management and Crop Development

FRUIT JOURNAL

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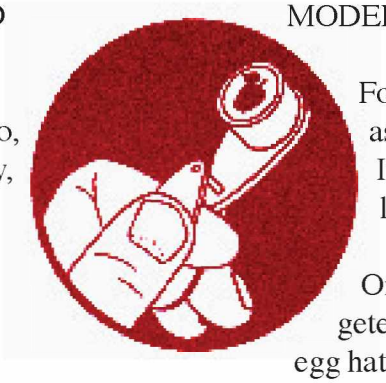
INSECTS

IT'S ABOUT TIME

ORCHARD RADAR DIGEST (Art Agnello, Entomology, Geneva)



❖❖ Geneva Predictions:

Roundheaded Appletree Borer

RAB peak emergence: June 12.

RAB egglaying begins: June 7. Peak egglaying period roughly: June 27 to July 12.

Codling Moth

Codling Moth development as of June 1: 1st generation adult emergence at 35% and 1st generation egg hatch at 0%.

1st generation 3% CM egg hatch: June 8 (= target date for first spray where multiple sprays needed to control 1st generation CM).

1st generation 20% CM egg hatch: June 15 (= target date where one spray needed to control 1st generation codling moth).

Obliquebanded Leafroller

1st generation OBLR flight, first trap catch expected: June 10.

San Jose Scale

First generation SJS crawlers appear: June 20.

Spotted Tentiform Leafminer

2nd STLM flight begins around: June 17.

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MODEL BUILDING

Following are the available readings as of today.

Insect model degree day accumulations:

Oriental Fruit Moth (Apples - targeted spray application at 55–60% egg hatch, predicted at 350–375 DD base 45°F after biofix):

Location	Biofix	DD (as of 5/25)
Geneva	April 27	442
Albion	May 4 *	347
Appleton (South)	May 4 *	299
Sodus	May 4 *	295
Williamson	May 4 *	337

* (estimated)

continued...

IN THIS ISSUE...

Codling Moth (targeted spray application at newly hatching larvae, predicted at 250–360 DD base 50°F after biofix):

Location	Biofix	DD (as of 5/25)
Sodus	May 14	163
Williamson	May 14	176
Albion	May 15	170
Geneva	May 18	153

Plum Curculio (spray coverage required until 308 DD base 50°F after biofix; i.e., McIntosh petal fall):

Location	Biofix	DD (as of 5/25)
Sodus	May 15*	150
Geneva	May 18	153
Albion	May 18	152

* (estimated)

[NOTE: Consult our mini expert system for arthropod pest management, the
NEWA Apple Insect Models Degree Day Calculator:
http://newa.nrcc.cornell.edu/newaModel/apple_pest
Find accumulated degree days for the current date with the
Degree Day Calculator:
http://newa.nrcc.cornell.edu/newaLister/dday
Powered by the NYS IPM Program's NEWA weather data and ACIS, Northeast Regional Climate Center] ❖❖

THE BUGS IN THE HOOD

HUDSON VALLEY INSECT PEST MANAGEMENT UPDATE
(Peter Jentsch, Entomology, Highland)

❖❖ With regards to weather for this week, predictions call for highs in the low 70s and night temperatures moving into the low 50s, with a chance of showers during the latter part of the week. Given the cool temperatures and recent rainfall we've experienced, many farms will need to recover with an insecticide during this period. If two inches of rainfall have fallen or if 10–14 days have passed since insecticide applications (depending on weathering and rates), effective residue is lacking and orchards will need additional protection.

Pear psylla began its second generation in earnest last week. Most hardshell nymphs have emerged as adults, with significant egg laying and newly emerging nymphs being found in threshold numbers. Most pear orchards are now in need of psylla management if this has not already been done. Warming temperatures will encourage the movement of remaining plum curculio (PC) adults into orchards, making later varieties (smaller fruit)

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such as Delicious, Fuji, and Gala very susceptible to damage. Egg laying by PC will continue through the week in southern farms, while northern orchards in the Hudson Valley will require protective residual coverage through the middle of June (see HV predictions for end of PC migration below).

Both codling moth (CM) and San Jose scale (SJS) will require management this week if these insects have been problematic in the past. In the case of SJS, control sprays should be considered in orchard blocks with SJS-injured fruit in last season's harvest. Codling moth management would be required if 5 moths per trap per week are captured (using the Pennsylvania thresholds). If complete orchard applications are made for PC using OPs, pyrethroids, Leverage 2.7SC or Calypso, then emerging CM larvae should be adequately controlled in Hudson Valley sites. However, in western NY orchards with less susceptible populations of CM, additional measures may be required. Further information on these pests follows:

Dates predicted for completion of PC immigration period in Hudson Valley locations:

Location	PF Dates (NEWA)	308 DD prediction
Warwick	10 May	7 June
Campbell Hall	11 May	8 June
Milton	12 May	8 June
Marlboro	14 May	8 June
Highland	14 May	8 June
Red Hook	15 May	10 June
Hudson	17 May	10 June
Altamont	21 May	15 June

Plum curculio (PC)

At the Highland station as of May 25, 200.9 degree days (DD, base 50°F) have accumulated since petal fall. PC movement into orchards is predicted to be essentially over by 308 DD, which we expect to occur on the 8 June (based on the Skybit extended forecast). Once 308 DD have accumulated, there will be no need for additional applications for PC provided sufficient insecticide residue has been on the fruit up to this date. Given the substantial rainfall over the past week, many orchards will need additional applications before the completion of PC emergence in the mid- to upper Hudson Valley. If codling moth is not a concern and complete control of PC has been achieved with prior whole-orchard applications, then a border-row application specifically targeting PC can be made in place of a whole-orchard spray.

Insecticides for PC Mgt.	Rate	Re-entry (hours)	PHI days
*Asana XL (esfenvalerate)	4.8–14.5 fl oz/A	12	21
*Baythroid (cyfluthrin)	2.4–2.8 fl oz/A	12	7
*Danitol (fenpropathrin)	16 fl oz/A	24	14
*Guthion (azinphos-methyl)	2–3 lb/A	14 days (at 2 lbs.)	14
*Imidan (phosmet)	2.13–5.33 lb/A	72	7
*Leverage (cyfluthrin/imidacloprid)	4.4–5.1 fl oz/A	12	7
*Warrior 1CS (lambda-cyhalothrin)	2.6–5.1 fl oz/A	24	21
†*Calypso (thiacloprid)	4–8 fl oz/A	12	30
†Actara (thiamethoxam)	4.5–5.5 oz/A	12	35
Avaunt (indoxacarb)	5–6 oz/A	12	14

*Restricted use; †Not for use in Nassau and Suffolk Counties.

San Jose Scale (SJS)

Based on Skybit data, 417.1 DD have accumulated to date. The 1st generation of SJS should emerge after 500 DD have accumulated since March 1. We expect this to occur on the 5th of June in Highland (using the Skybit extended forecast). Insecticides for SJS should be applied shortly after this date for residue to be on the trees when crawlers emerge.

We have observed good results for SJS management with the use of 1% oil as a dilute application, or a foliar application of Lorsban, during the pre-bloom period. In orchards where this approach was taken, observation of nymph emergence should be conducted to ensure appropriate SJS control. Use black electrical tape on infested limbs with a coating petroleum jelly (or else double-sided carpet tape) to trap the nymphs, to provide easy recognition (Fig. 1).

Fig. 1. San Jose scale nymphs on apple limb.

Coverage is critical for scale management, and delayed management beyond the pre-bloom period will require more than a single application directed at the nymphs as they emerge. Two applications at 4-5 oz/A of Esteem plus 0.25% oil as nymphs emerge, applied on a 14-day interval, should provide adequate control. Alternative choices (using the same schedule) include Leverage, Assail, Calypso, Provado, Imidan, Guthion, or Sevin.

Codling Moth (CM)

The first flight of 1st generation CM adults occurred in Highland on May 11. CM hatch occurs about 220 DD (base 50°F) after the first catch. This year CM hatch started on May 27 in Highland. The use of codling moth traps set at a minimum spacing of 1 trap per 5 acres, placed throughout the orchard, will give you a basis for decision making regarding CM. An average of 5 adults per trap per week is a proposed provisional threshold to justify the need for treatment. Some insecticides with the greatest efficacy against this insect include:

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Insecticides for CM Mgt.	Rate	Re-entry (hours)	PHI days
*Asana XL (esfenvalerate)	4.8–14.5 fl oz/A	12	21
*Baythroid (cyfluthrin)	2.0–2.4 fl oz/A	12	7
*Danitol (fenpropathrin)	16 fl oz/A	24	14
*Guthion (azinphos-methyl)	2–3 lb/A	14 days (at 2 lbs.)	14
*Imidan (phosmet)	2.13–5.33 lb/A	72	7
*Lannate 2.4L (methomyl)	1.5–3.0 pt/A	72	14
*Leverage 2.7SC (cyfluthrin/imidacloprid)	3.6–4.4 fl oz/A	12	7
*Warrior 1CS (lambda-cyhalothrin)	2.6–5.1 fl oz/A	24	21
†*Calypso (thiacloprid)	4–8 fl oz/A	12	30
Assail (acetamiprid)	4.0–8.0 oz/A	12	7
Delegate (spinetoram)	4.5–7.0 oz/A	4	7

*Restricted use; †Not for use in Nassau and Suffolk Counties.

Pear Psylla

The second generation of pear psylla nymphs have been observed in Highland for the past week at or above threshold in unmanaged pears. This generation can cause considerable damage to foliage and fruit in the form of phytotoxicity from concentrated sugars exuded by the nymphs as they feed. The standard insecticide for this generation has traditionally been Agri-Mek+0.25% oil. If Agri-Mek+oil is used, it should be delayed until the 1st adults of the 2nd generation appear, about 10 days to about 2 weeks post-PF. AgriMek+oil becomes less effective as foliage hardens off; the use of 0.25% v/v horticultural spray oil allows it to penetrate the foliar waxy cuticle and translocate within the leaf for optimum uptake by feeding nymphs. Agri-Mek has been used successfully in multiple applications of 20 oz/A beginning 10–14 days after petal fall with a follow-up application 21 days later, as per label requirements, totaling no more than 40 oz/season. The later application is targeted at new foliage preferred by nymphal psylla populations. Agri-Mek has excellent efficacy against pear rust mite, which I might add, is building to high numbers at the Hudson Valley research farm.

In the Mid-Hudson Valley, the first of 2 Agri-Mek applications has been applied in most pear orchards by this point. Cool temperatures and recent rainfall have provided ideal conditions for uptake of Agri-Mek into the succulent foliage. In the southern to mid-Hudson Valley, we are rapidly moving past the ideal window for Esteem applications, as this material has greater efficacy against the egg and early stage nymphs, being less effective as nymphs move into the later instars.

The use of the neonicotinoids Actara, Assail, Calypso (in combination with 0.25–1% oil for increased efficacy), the spinetoram-based material Delegate, or the combination insecticide Leverage (imidacloprid, the a.i. in Provado, plus cyfluthrin, the a.i. in Baythroid), or Provado alone can also be used in place of Agri-Mek for second generation. As with the neonicotinoids, improved activity of Delegate may be achieved by the addition of an adjuvant such as horticultural mineral oil or penetrant rates of LI-700.

We have found Actara to be an excellent choice against psylla adults as they emerge. It is also very effective against the emerging nymphs. However, peak adult emergence occurred earlier this week in Highland, with heavy egg laying well under way. In more northerly orchards, the management of adults with Actara is still a viable option. Applications against the majority of adults will offer a greater reduction of the adult and subsequent nymph populations.

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In addition to using chemical control, considerable reductions of 2nd generation psylla can be made by suckering of water sprouts and shoots. This should be done near the completion of egg laying by adults, since they oviposit primarily on new foliage. It may be more effective just prior to the 2nd Agri-Mek application, which in many southern orchards will be occurring in Mid-June. Removal of shoots can be done using pruners or simply by 'ripping them off' the scaffold limbs prior to stem hardening. Removal of shoots not only reduces emerging nymph populations, but also allows for better coverage of insecticides and fungicides applied for the control of Fabraea leaf spot.❖❖

PERFECTLY CLEAR

I'LL BE SE-SIING YOU
(Art Agnello, Entomology, Geneva)

❖❖ In NY, there are two species of sesiid (clear-wing) moths that attack peaches — the peachtree borer (PTB), *Synanthedon exitiosa*, and the lesser peachtree borer (LPTB), *S. pictipes*. The adult borers are striking clear-winged moths with yellow and steel-blue body markings. The adults of these insects have from one to four yellow-orange stripes across the abdomen, depending upon species and sex. The PTB enters the tree near soil level and does not require the presence of wounds or breaks in the bark for entry, but the LPTB nearly always enters the tree at a pruning scar, canker, mechanical injury, or winter-injured area. The LPTB additionally attacks cherries, causing the same type of injury in the upper trunk and scaffold branches of these trees. Both species pass the winter as borers inside the tree, and in the spring emerge as moths that lay eggs on or in the trunk during the summer. The LPTB moth emerges first, in late May, and the PTB doesn't show up until mid-June; both stay active (laying eggs) through August. When the borer stages hatch, the PTB tends to crawl down the tree to soil level and burrow in there, but the LPTB will move to the nearest injured area, which may be on the lower trunk or just as easily up in the scaffold limbs. LPTB completes its development in one year, but some PTB larvae take two years to develop, so any control measure a grower would elect will require repeating for at least 2–3 years.

Injury is caused by larval feeding on the cambium and inner bark of the trunk close to the soil level (PTB) or on the upper trunk and lower scaffold branches (LPTB). Occasionally, larger roots are also attacked by PTB. Areas attacked often have masses of gum, mixed with frass, exuding from the bark. All ages of trees are injured. Young trees are at times completely girdled and subsequently die. Older trees are often so severely injured that their vitality is lowered and they are rendered especially susceptible to attack by other insects or by diseases. Although both species may be found in infested trees, younger plantings and those not afflicted by extensive cankers or other bark splits are attacked primarily by PTB.

Control is difficult, owing to the concealed habit of the larvae. Growers have traditionally relied on one or more coarse insecticide sprays (e.g., Asana, Assail, Lorsban, Proaxis, Thionex, Warrior) of the trunks and lower scaffold branches to deter egg laying and kill newly established larvae. Because this is a labor-intensive measure that often fails to completely control these pests, many growers choose not to elect treatment, or else do an incomplete job, with the intention of getting what they can out of a planting until infestations combine with other peach production factors to warrant tree removal. However, there is a good alternative in the form of pheromone mating disruption (MD) tools for the control of these perennial pests.

Isomate-LPTB is a twist-tie pheromone dispenser labeled for use against both of these species in all NYS stone fruits. They are placed in the trees at a rate of 100–250 ties/A at or before the first flight,

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with higher rates (200–250) recommended if PTB is the more prevalent species in the orchard; 100/A will suffice against populations of predominantly LPTB. In 2000 and 2001 we conducted trials on the efficacy of Isomate-LPTB with and without the addition of directed trunk sprays in peaches, and after 2 years we saw that the pheromone dispensers completely suppressed trap catches of both PTB and LPTB for both seasons, compared with relatively heavy flights noted in the non-disrupted comparison blocks, showing that this pheromone treatment was highly successful in disrupting the chemical communication of males and females of these two species.

These trials provided sufficient evidence that mating disruption alone is able to provide adequate protection from borer infestations in commercial orchards, giving growers an effective non-chemical alternative to trunk sprays for managing this pest complex in their stone fruit plantings. Growers interested in this approach should be placing the pheromone ties during these next 1–2 weeks, before the LPTB flight gets solidly under way statewide. ❖❖

DISEASES

ON SECOND THOUGHT

DEALING WITH SECONDARY APPLE SCAB

(Dave Rosenberger, Plant Pathology, Highland)

❖❖ Primary scab lesions have appeared on early terminal leaves in some orchards in the Hudson Valley. These scab infections occurred during the first half of May, with most probably occurring between 1 and 9 May just after trees reached full bloom. Prebloom weather was relatively dry with good spray windows ahead of the three or four primary scab infection periods that occurred during April. At the Hudson Valley Lab, we recorded no leaf wetting between 23 and 30 April. McIntosh trees in the Hudson Valley reached full bloom around 30 April. Hot weather in late April (four consecutive days with highs >85°F) caused rapid flower development and leaf expansion. Terminal shoots in some blocks had developed two or three leaves by 2 May.

How did scab get through our fungicides? Early May was punctuated with a few misty rains that finally culminated with significant rainfall on 5–6 May when we received 1.2 inches of rain. Leaf wetting periods were recorded on 14 of the first 16 days in May. The intermittent wetting that occurred from 1 to 4 May probably allowed scab to become established on some newly emerged terminal leaves because the drizzle on those days provided enough wetting for scab infections but not enough rainfall to redistribute residues from mancozeb sprays applied at pink (26–29 April). The accumulation of 135 hr of wetting between 1 May and 9 May favored establishment of scab infections despite intermittent dry periods. Some orchards may have been inadequately protected through the substantial rains that occurred 5 through

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8 May. (Note: The old-fashioned string wetness recorders that we use registered about 75% more wetting hours between 1 and 9 May than the less-sensitive electronic NEWA stations in Clintondale and Marlboro.)

Several crop consultants have reported that orchards sprayed with Captan in early May generally have little or no scab, whereas orchards protected primarily with mancozeb fungicides did not fare as well. These observations fit well with data showing that mancozeb has greater residual activity through heavy rains than does Captan, whereas Captan apparently redistributes more effectively than mancozeb fungicides under light rain and drizzle conditions. Combining mancozeb and captan in the same tank can ensure protection against both extremes.

I have not seen good test comparisons for all possible combinations involving other fungicides, but a research trial last year showed that Flint redistributes better than mancozeb fungicides. Therefore, I suspect that early May applications that involved combinations of Flint plus mancozeb or Sovran plus mancozeb would have performed just as well as Captan-mancozeb combinations under our light-rain conditions in early May.

How do we get rid of it? Where scab has appeared on early terminal leaves, growers have several options for attacking the problem. Where SI fungicides are still effective, secondary spread can be shut down by making back-to-back applications about 7 to 10 days apart using combinations of either Nova plus captan or Inspire Super plus captan. (Mancozeb could be substituted for captan in these mixes if summer oils will be applied with Agri-Mek in the near future.) If, however, an SI was used at petal fall and normal scab lesions still appeared on terminal leaves, then probably the SI fungicides are no longer reliable in that orchard.

Where some level of SI resistance is suspected or known to exist, the following are options:

1 - Inspire Super plus Captan-80 at 4 lb/A (or the equivalent dose of a different captan formulation) will provide the "kick" of a more powerful 2nd generation SI plus the strong protection provided by Captan. Inspire Super can definitely suppress scab that is not controlled by Rubigan or Nova, but it will not provide complete eradication of scab in SI-resistant orchards. It's worth a try if no SIs have been used earlier this year, but I would choose a different option if other SIs were applied earlier and scab has still shown up in the block.

2 - Dodine (available as Syllit 3.4F) can be very effective for shutting down scab epidemics if dodine-resistant scab is not present. However, applying Syllit is risky unless the absence of dodine resistance has been documented with a lab test. Growers who opt to try Syllit in blocks that were not recently tested for resistance should use it in combinations with mancozeb, Flint, or Sovran. (The label warns that Syllit is not compatible with Captan and also that it can cause russetting on Golden Delicious.) The Syllit label calls for using 4.5 pt/A for post-infection sprays. However, the original dodine formulation was Cyprex 65W and the standard post-infection recommendation for that product when scab appeared in orchards was two applications about 7 to 10 days apart using 2.25 lb/A or 12 oz of Cyprex 65W per 100 gal of dilute spray. That rate is equivalent to roughly 3.5 pt of Syllit 3.4F per acre. The high label rate for Syllit (4.5 pt/A) might be advantageous in orchards that are slightly shifted for dodine resistance. However, I suspect that two applications of Syllit 3.4F at 3 to 3.5 pt/A, when combined with mancozeb, Flint, or Sovran, will get the job done in orchards where dodine is still effective.

3 - Combining a stroby fungicide (Flint or Sovran) with Captan is, in a sense, the most logical approach to fighting scab outbreaks because no scab populations in the US have thus far been shown to have resistance to Sovran or Flint. Sovran and Flint will not "burn out" lesions the way that the SI

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fungicides did prior to SI resistance, so don't expect lesions sprayed with these compounds to develop the red "burnt out" appearance that has been associated with scab lesions inactivated by SI fungicides, benomyl, or dodine. Nevertheless, Sovran and Flint effectively shut down spore production in sprayed lesions, so using them reduces inoculum released from the existing lesions and thereby reduces the probability that some spores will escape fungicide coverage and cause fruit scab. Again, a mancozeb fungicide could be substituted for captan in the stroby combination sprays if oil will be applied with insecticides or miticides in the near future. Stroby/mancozeb combinations may also do better than stroby/captan combinations in areas that are under high pressure for rust diseases since rust galls will continue to release spores for several more weeks. However, where scab is the primary target, captan will almost always outperform mancozeb when it comes to protecting fruit and new leaves from apple scab.

4 - Finally, one might opt to use full rates of captan alone (e.g., Captan-80 at 4–5 lb/A) on a 7–10 day schedule until summer heat reduces viability of the apple scab conidia. Captan is an excellent protectant, but it will not provide the antisporulant and/or post-infection activity that is available with the earlier options in the absence of fungicide resistance.

Fruit and developing leaves are still very susceptible to scab infections during the first part of June, so good fungicide coverage should be maintained for the next several weeks where primary scab has appeared. Risks from further scab infections will decline significantly in later June when terminal growth slows, fruit are larger, and weather gets hotter. Temperatures in the upper 80s significantly reduce the viability of scab conidia. However, scab on terminal leaves can become active again in late summer, so orchards with scab in early June may also need an extra fungicide spray during the last few weeks prior to harvest to prevent pinpoint scab from appearing on fruit after harvest. ❖❖

INSECT TRAP CATCHES
(Number/Trap/Day)

Geneva, NY

	5/26	5/28	6/1
Redbanded leafroller	2.0	1.3	1.5
Spotted tentiform leafminer	2.5	0.8	0.5
Oriental fruit moth	0.5	0.8	0.6
Lesser appleworm	0.5	0.8	0.1
Codling moth	1.8	1.0	1.0
San Jose scale	500	12.5	0.6
American plum borer	0.6	0.5	0.5
Lesser peachtree borer	0.6	0.0	0.5
Peachtree borer	–	–	0.0
Pandemis leafroller	–	–	0.0
Obliquebanded leafroller	–	–	0.0

Highland, NY

	5/26
Redbanded leafroller	0.3
Spotted tentiform leafminer	3.6
Oriental fruit moth	2.3
Lesser appleworm	12.9
Codling moth	3.1
Lesser peachtree borer	0.6
Obliquebanded leafroller	0.0
Dogwood borer	0.6*
Peachtree borer	0.0

* first catch

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–6/1/09):	733	414
(Geneva 1/1–6/1/2008):	685	370
(Geneva "Normal"):	700	381
(Geneva 1/1–6/8 Predicted):	851	486

Coming Events:	Ranges (Normal ±StDev):	
Obliquebanded leafroller pupae present	601–821	328–482
Redbanded leafroller 1st flight subsides	567–873	313–549
American plum borer 1st flight peak	617–953	336–576
Black cherry fruit fly 1st catch	702–934	380–576
Codling moth 1st flight peak	593–1017	325–603
Rose leafhopper adult on multiflora rose	689–893	366–498
Spotted tentiform leafminer 1st flight subsides	666–944	366–572
European red mite summer eggs hatch	737–923	424–572
Pear psylla summer adults present	737–885	428–526
Pandemis leafroller 1st catch	766–914	432–522
Obliquebanded leafroller 1st catch	827–939	475–567

NOTE: Every effort has been made to provide correct, complete and up-to-date pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly, and human errors are possible. These recommendations are not a substitute for pesticide labelling. Please read the label before applying any pesticide.

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