



VEGETABLE IPM MESSAGE

JULY 11, 2002

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CROP CONDITIONS

Sweet corn is showing up in farmstands and farmers markets across the state, as early plantings reach maturity. Cucumbers, peas, lettuce, summer squash and zucchini, radishes, broccoli, cabbage, and carrots are also being harvested. Snap beans are ready or nearly ready for harvest. Pumpkins and winter squash are vining and setting fruit, and growers are squeezing in the final cultivation before vines take over. Late plantings of cabbage, turnips, cucumbers, lettuce and brassica greens are going in. Corn planting is about over. Soils have been dry and growers have been irrigating wherever possible. Rainfall of 0.1 to 0.5 inches reached most of the state on Tuesday night, along with a welcome change to low humidity and cooler temperatures. The Southeast remains very dry.

It is possible that last week's heat wave may affect fruit set in certain crops. Losses occur in tomato, pepper and vine crops when daytime temperatures are in the mid 90's and nighttime temperatures that fail to drop below 80. However, most of the state reported daily low's of in the high 50's or 60's last week, despite daytime highs of 90-98° F, so the effects may be slight. In tomatoes and peppers, high temperatures lead to infertile pollen and the failure of flower to properly pollinate. In cucurbits, high temperatures decrease female flowers and limit bee flights, both resulting in no fruit set. Now that temperatures have dropped, fruit set will resume. Yields from these crops will probably be about average, although you may notice a few days later this summer when yields seem to drop of before picking up a few days later. Snap beans in flower will not recover from the heat. A second fruit set will occur as temperatures cool, which

may result in a split set that reduces yield significantly (*Adapted from W. NYS Veg. Update, C.R. MacNeil & Julie Kikkert.*)

REMINDER: UMASS FIELD DAY, SOUTH DEERFIELD RESEARCH FARM, TUESDAY JULY 16, 5-7:30

The field tour will feature the following topics: Managing cucumber beetle and bacterial wilt in pumpkin; Flea beetle management in brassica crops; Specialty vegetable crops, with over 60 varieties of "new" vegetable crops that are being evaluated for their suitability to Massachusetts conditions, and their potential for sales in Asian, Latino, Portuguese and other ethnic markets in Massachusetts; New specialty potato varieties and cultural techniques for producing early potatoes; a demonstration trial of dry land and paddy rice; and Trickle irrigation systems, including techniques for filtering and injecting fertilizer and pesticides. Registration is at 5 pm. Refreshments will feature a light buffet of Asian, Latino, Portuguese dishes, featuring the specialty vegetable crops that are being grown at South Deerfield this summer. One contact hour of Pesticide Applicator Re-certification credit will be given.

For more information contact: Ruth Hazzard (413) 545-3696.

Directions: From I-91 north take exit 24; turn right at end of ramp onto Rts 5 & 10 North. From I-91 south, take exit 24 and turn left at the end of the ramp onto Rts 5 & 10 North. Go north on 5 & 10 a few hundred yards to the traffic light and turn right onto Rt. 116 (toward Amherst). Proceed about one mile through another light and turn left (north) onto River Rd. just before the bridge over the Connecticut River. Go north on River Rd. past a housing development and left through the gate onto the Research Farm. Look for signs. From the Amherst-Sunderland-Hadley

area, cross the Connecticut River on Rt. 116 and turn right onto River Rd. just beyond the bridge.

NORTHEAST ORGANIC FARMING ASSOCIATION 28TH ANNUAL SUMMER CONFERENCE: AUGUST 9, 10, 11, 2002

This four-day event takes place at Hampshire College, Amherst, Massachusetts. New this year is a pre-conference led by Joel Salatin. This will be an eight-hour intensive workshop on incorporating livestock and plant-animal symbiotic relationships in food production. The pre-conference is limited to 200 participants and will be held on the afternoon of Thursday, August 8 and the morning of Friday, August 9. Salatin, who practices this whole farm planning in Virginia, also will give the conference's keynote address on Friday evening.

The main event begins Friday afternoon and lasts through Sunday. Throughout the weekend, more than 150 adult workshops offer practical and visionary information on a wide range of topics, including basic and advanced organic farming and gardening, animal husbandry, homesteading, herbs and flowers, practical skills, sustainable building, land care, food safety and politics, organic activism, nutrition and health care, spirituality and more.

Concurrent with the adult workshops are a children's conference, a preteen conference, and a teen conference, all of which offer fun, age-appropriate workshops and plenty of social time for kids 2-17. The NOFA summer conference takes pride in its dedication to being an intergenerational event. There are many entertainment events, and onsite dorms and camping.

There is no deadline for adult registration (Walk-ins accepted), but the deadline to register for the children's, preteen and teen conference is August 2. For more information or registration contact: Dennis or Audrey Cronin at (508) 799-2278 or nofareg@juno.com; or Julie Rawson & Jack Kittredge at (978) 355-2853 or jackkitt@aol.com. More details can be found at <http://ma.nofa.org/conferences/summer.html>

UMASS DIAGNOSTIC CLINIC SEEKS PHYTOPHTHORA SAMPLES.

Research is underway at UMass to identify different strains of **Phytophthora blight** of pepper and cucurbits that occur in Massachusetts. Rob Wick and Bess Dicklow are looking for samples of Phytophthora and will come to your farm to collect the sample. Any time an infected soil is saturated by a heavy rain, new outbreaks of this disease may occur in pepper or vine crops. If you see fruit or crown rot, contact the Disease Diagnostic Lab at 413-545-1667. Symptoms on the pepper plants include the typical water-soaked, dark brown stem lesions on the lower stem which extend upward several inches.

-R Wick and B. Dicklow

PEPPERS

It is a good time to scout peppers for **bacterial leaf spot (BLS)**. Hot humid weather with night temperatures stay above 70 degrees F is ideal for bacterial leaf spot development. You should scout all pepper fields that contain varieties that are not resistant to BLS. Look for several plants in a row that have numerous brown leaf spots. Spray non-resistant plants with copper every 7-10 days if the disease is found. Resistant BLS varieties can usually fight off the initial infection without copper sprays, but should be sprayed if the disease is present and environmental conditions are extremely favorable for disease development (meaning, a heat wave with night temperatures continually above 70). Crop rotation is important to help prevent BLS because the disease survives on the residue of infected crops.

Check for **aphids** on the undersides of leaves. Natural enemies generally keep aphids under control in peppers. If you find greater than 10 aphids per leaf (based on sampling 4 leaves/plant on 25 plants) a spray is warranted. Avoid broad-spectrum cover sprays, which result in outbreaks of aphids.

Adapted from J. Boucher. UConn & J. Mishanec, Cornell

TOMATO

Watch for symptoms of **early blight** and **late blight** in tomato (see last week's newsletter on late blight). The hot humid conditions of the past week have been favorable for both diseases, and the drier cooler weather is welcome. **TOM-CAST update:** 10 DSV's accumulated in the past week, bringing the total to 56. We recommend fungicides at intervals of 15 DSV's. Counting back from 7/10, it took 11 days to reach that threshold. Thus, fungicide applications at 10-12 day intervals are recommended at this time.

DSV update: DSV VALUES, June 26–July 10, 2002 SOUTH DEERFIELD RESEARCH FARM

Date	DSV's/Day	Date	DSV's/Day
June 26	0	July 4	2
June 27	1	July 5	2
June 28	2	July 6	1
June 29	3	July 7	1
June 30	1	July 8	1
July 1	0	July 9	1
July 2	2	July 10	2
July 3	2	Cumulative DSV's since May 24	56 DSV's
		Days to reach 15 DSV's	11

-- S. DeGray, R Hazzard

CRUCIFERS

Diamondback moths (DBM) and **imported cabbage worms (ICW)** are hatching out and are likely to be above thresholds in many fields. **Cabbage loopers (CL)** have been spotted in New York State. When scouting for worms, be sure to look beneath the leaves and on the inner most portions of the plants. Look for feeding damage as well as for caterpillars. Tiny feeding holes are often easier to spot than the small worms. Apply controls when caterpillars are small, and direct materials at the

undersides of leaves as much as possible. Use at least 50 gal/A of water to achieve better spray coverage, and use a spreader-sticker.

A **threshold of 15%-infested plants** (an 'infested' plant has at least one caterpillar of any species) is recommended for any heading cabbage, broccoli, and all leafy greens. Before the cupping stage, in cabbage and broccoli, use a threshold of 35% plants infested. These thresholds provide a clean crop at harvest.

A good comparison of "worm" insects at various life stages can be found at the following website (click on images to enlarge) <http://www.ces.ncsu.edu/depts/ent/notes/Vegetables/veg012e/cwcompho.htm>.

Imported Cabbageworm: The larva is a slow-moving, velvety-green caterpillar, which grows through a series of five stages, or instars, to a length of 1 1/4 inches. Larger caterpillars have a delicate yellow line that runs lengthwise down the center of their bodies. Small larvae feed on the undersides of outer leaves after hatching. Larger larvae are more mobile and are often found in the florets of broccoli or feeding on the heads of cabbage. Larvae may also move to neighboring plants.

Diamondback Moth larvae grow through four instars to a length of 1/3-inch. They are light green; tapering to points on both ends and appearing scalloped or segmented along the edges of their bodies. During the first two instars, the larvae have black heads, which later lighten to match their green bodies. They can be distinguished from other caterpillar pests by their habit of wiggling frantically when touched or disturbed. They may also drop from the plant and suspend themselves on a silken thread until the disturbance passes. The larval stage lasts from two to four weeks, depending upon temperatures. Pupae are found attached to the undersides of crop foliage and appear to be thinly veiled under a fine, net-like silken cocoon.

The **cabbage looper** caterpillar is light green, with wavy white or light yellow lines down the back and sides. Full-grown larvae reach 1 1/2 to 2 inches. At rest or when disturbed, cabbage loopers of any size will raise the middle of their body in a characteristic "loop" shape. Eggs are round, light green or

yellow, and laid underneath the foliage. Feeding tends to create ragged, large holes in foliage, on both frame leaves and heads.

New Products for Caterpillars: In the area of caterpillar control there are several new products available in addition to those, which have been labeled for a long time. It is possible to get excellent control of the three major caterpillar pests using low-risk products that are safe to handle and conserve beneficial insects (which do have an impact in suppressing aphids and caterpillars). It is also easier now to rotate among different types of products, to prevent selecting for resistance to any single product. The cost of the new products listed below ranges from \$7 to \$20 per acre, depending on whether high or low rates are used, compared to \$5 to \$12 per acre for synthetic pyrethroids, \$5 to 21 for carbamates, and \$3 to \$17 for Bt products.

The four new materials listed below have been shown in research trials to provide very good control of cabbage looper and diamondback moth as well as imported cabbageworm. The exception is that Confirm tends to be weak in diamondback moth control. Consult the *2002-2003 New England Vegetable Management Guide* for additional products.

SpinTor 2SC (Spinosad) has been registered for several years, and is receiving positive reports from growers who have used it in brassicas, peppers and sweet corn. It has low toxicity to mammals and birds and was registered as Reduced Risk material. Spinosad is derived from naturally-occurring soil organism. It has two modes of action: as a nerve poison (by contact with treated surfaces) and a stomach poison (by ingestion of treated surfaces). It has a broad range of activity, including some beetles (**Colorado potato beetle**), most caterpillars, **leafminers**, and **thrips** (including thrips in crucifers). Rates of 3 oz per acre are effective against caterpillars in brassicas (cost is about \$4.30 per oz).

Avaunt (indoxycarb) was registered in 2000, under the Reduced Risk track. It has new chemistry, which is active against several insect groups. In brassicas (including broccoli, tight headed cabbage, and cauliflower) it has excellent activity against all the caterpillar pests. Indoxycarb must be ingested;

after ingestion, feeding stops rapidly. The restricted entry interval is 12 hours and preharvest interval for most vegetables is 3 days. It is also registered for whorl application vs. European corn borer and fall armyworm in sweet corn.

Confirm 2F (Tebufenozide) was one of the first insect growth regulators (IGR) to be registered for use on vegetable crops. It was designated a reduced risk material and targets caterpillars. It has a general use label, with specific activity against a wide range of caterpillar pests on fruiting vegetables, virtually all leafy vegetables, brassicas, and mint. Tebufenozide mimics the natural insect hormone (ecdysone) that induces molting in insects. It must be ingested to be effective. Once ingested, feeding stops within 24 hours and a premature molt is induced. Death takes several days. It has a long residual period (10-14 days).

Proclaim (Emamectin benzoate) is a selective insecticide for caterpillars, derived from a metabolite of a bacteria (*Streptomyces avermitilis*), hence one of the general category called avermectins. This is a restricted use product. It is active against some of the more difficult-to-control caterpillars and those that have developed resistance to other products such as **beet** and **fall armyworm**, cabbage loopers, and diamondback moth. Proclaim is labeled for head and stem brassicas but not brassica leafy greens.

-R. Hazzard

WANT TO TRY NEW BRASSICA SPECIES THIS FALL?

We are looking for growers in Massachusetts or Connecticut who would be interesting in trying some new brassica species on their farm. We will provide the seed and growing information. The grower will be asked to grow the crop, test it in any of their usual marketing channels, and report back to us on the results. The grower will also receive \$150 for participating in the project.

The variety of brassica that you try must be a variety that you have not grown in recent years. It can be any kind of brassica; does not have to be a brassica species for Asian markets.

You may contact Frank Mangan (978-422-6374) and he will tell you more about the project and help you choose a variety that will be appropriate for your farm. We have funding for about 10 growers.

-F. Mangan and R. Hazzard

SPECIALTY CROPS SERIES:

AMARANTH (AMARANTHUS SPP.)

Other names: Chinese Spinach (English), Hin Tsai (Chinese), Rau Den (Vietnamese), Phak Khom (Thai), Chambirum (Korean), Callaloo (English-speaking Caribbean). Amaranth is a diverse genus with about 60 different species. Many are important in agriculture and can be divided into four groups:

1. Grain. *Amaranthus* species were an important grain in the New World. It was a staple grain among the Aztecs before the arrival of the Conquistadors. It is believed that the Spaniards outlawed its cultivation because it was an important part of religious ceremonies of the Aztecs. For this reason it has not been grown in Mexico as a grain crop for centuries; however, there are still indigenous peoples in the Andes of South America that cultivate amaranth as a grain crop. Research and Extension projects in the U.S. have evaluated amaranth as a “new” grain crop for U.S. farmers with some success.



Cultivated Red Amaranth, *A. tricolor* (above), growing next to pigweed, *A. retroflexus* (below), at the UMass Research Farm.

2. Vegetable. Amaranth species are also grown in various regions of the world as a leafy green. The tender leaves are cooked like spinach and are considered to have high nutritional value. It is popular among many different ethnic groups,

including peoples from the Caribbean (where it is called callaloo), India, and East Asia.

3. Decorative.

Horticulturists often use ornamental varieties of amaranth in gardens and landscapes (see picture).



Decorative Amaranthus

4. Weeds. Pigweed (*A. retroflexus*) is an important weed in Massachusetts. There are some growers who harvest this weed and sell it in ethnic markets. Before selling this weed, it is important to see if the ethnic groups you are selling to will accept this species.

How to grow Amaranth. Amaranth grows well in warm weather. Order specific varieties for amaranth greens (Green Leaf or Red Leaf). Direct seed in warm soil up to one inch in depth, and thin 4 to 6 inches apart. Young succulent leaves can be harvested after 5 or 6 weeks. Use the cut-and-come-again method to harvest throughout the season. Refrigerate after harvest.

Seed Sources. Amaranth seeds can be obtained from: Evergreen Y.H. Enterprises, P.O. Box 17538, Anaheim, CA 92817, www.evergreenseeds.com; Johnny’s Selected Seeds, 184 Foss Hill Road, Albion, Maine 04910, www.johnnyseeds.com; Siegers Seed Co., 13031 Reflections Drive, Holland, MI 49424, www.siegers.com; and Stokes, P.O. Box 548, Buffalo, NY 14240, www.stokeseeds.com.

--Tim Andenmatten

YARDLONG BEAN (VIGNA UNGUICULATA)

Other names: Asparagus bean (English), Dau Gok (Chinese), Dau Que (Vietnamese), Tau-Fug-Yao (Thai). Yardlong bean produces long pods 14 to 30 inches long. Like pole bean, yardlong bean can grow 6 to 8 feet tall. Yardlong bean is a

tropical/subtropical plant grown throughout Asia. The "yard-long" claim is valid under the best conditions. Mild temperatures will produce bean pods 1 to 2 feet in length. Yardlong varieties are identified by the color of the mature seed. Some varieties are sensitive to day-length and will not grow well in our latitude. The cultivar Liana has been bred to be day-length neutral.

Growing yardlong bean. Yardlong bean should have a long warm growing season. They are extremely tolerant to heat and humidity. In full sunlight, sow seeds 2 to 4 inches apart at a depth of 1 inch. Thin seedlings to 6 inches within the row. Plant rows between 3 and 4 feet apart. Provide supports 6 to 8 feet high. Time to harvest is 60 days. Pick crisp and tender pods.

Seed sources: Evergreen Y.H. Enterprises, P.O. Box 17538, Anaheim, CA 92817, www.evergreenseeds.com; Johnny's Selected Seeds, 184 Foss Hill Road, Albion, Maine 04910, www.johnnyseeds.com; Siegers Seed Co., 13031 Reflections Drive, Holland, MI 49424, www.siegers.com

--Tim Andenmatten

EGGPLANT

Watch for **Colorado potato beetle larvae**, which can damage leaves, flowers and young fruit. Apply controls *before* larvae reach the last instar, which does the most damage. See previous newsletters for details on insecticides.

TOBACCO: BLUE MOLD IS HERE

Blue Mold has been confirmed in Massachusetts and Connecticut. All tobacco crops should be considered at risk for the disease. Growers can use Acrobat MZ as a protectant fungicide. Be sure to obtain the best possible coverage and treat at intervals and rates specified on the label. Once infection has occurred, it is very difficult to control this disease and the crop can quickly become worthless.

--John Howell & Rob Wick

RESEARCH UPDATE: PRE-SIDEDRESS NITRATE TEST IS EFFECTIVE FOR FALL CABBAGE

A pre-sidedress nitrogen test is an in-season test used to determine if additional nitrogen should be applied to a crop during the growing season. Use of the test avoids the use of excess nitrogen fertilizers, thus eliminating potential run-off and provides cost savings in labor and chemicals. It is especially useful in soils that are high in organic matter or have had a cover crop or manure turned under before planting. This test has been used successfully with corn, potatoes, peppers and some cucurbits. This research update looks at its use in fall cabbage. The test was done in 27 fields throughout the Northeast. The fields had been previously planted with sweet corn that was disked in after harvest. Five-week-old cabbage transplants were planted in the soil the last week of July or the first two weeks of August. PSNT tests of NO₃-N were taken two weeks after planting.

Results showed that the critical soil concentration of NO₃-N levels was 24 ppm NO₃-N. In other words, if your individual soil test reveals a number greater than 24 ppm NO₃-N than further applications of nitrogen fertilizer are unnecessary and will not increase yields. If your individual soil test reveals a number less than 24 ppm NO₃-N than the addition of nitrogen will increase yields. This critical number is the same number used for both sweet corn and field corn and is only slightly higher than the number used for celery and lettuce. The usual nitrogen recommendation in the Mid-Atlantic States is for 112 to 168 ppm N/ha. If a PSNT shows NO₃-N concentrations are less than 9 ppm than adding a full complement of fertilizer is recommended. If your soil test reveals a number in the range of 10 to 23 ppm, then you could reduce the amount of nitrogen you apply by as much as 25 to 50%.

Note: This research was conducted in the state of New Jersey, Connecticut, Delaware, and New York. Also, this is just a summary of the work. This is not an implied endorsement.

Original Source: Heckman, J.R., T. Morris, J.T. Simms, J.B. Sieczka, U. Krogmann, P. Nitzsche, and D. Ashley. 2002. HortScience. 37(1):113-117.

Adapted by Anne Carter UMass Veg. Crops Management & Food Systems.

CUCURBITS

Symptoms of **bacterial wilt** are showing up in vine crops. Look for wilted leaves or vines, or for scorched margins or leaf tips.

New leaves may be stunted, brown and poorly formed.

Symptoms that you see now are the result of infection that occurred 2-4 weeks ago when cucumber beetles fed on young plants. It cannot be remedied at this point. In trials at South Deerfield, in plots where beetles were not controlled, we are losing plants rapidly. We are growing a **powdery-mildew** tolerant variety, which happens to also be very susceptible to wilt (Merlin).

Vine crops, especially pumpkins and winter squash, are less susceptible to wilt at later growth stages so it is not necessary to

kill every **cuke beetle** in the field! After flowering, beetles tend to feed in flowers and do little damage to the crop. Only if leaf or fruit damage is severe is it necessary to continue controls after flowering. Occasionally late in the season we see fruit damage from beetle feeding if numbers are high.

Watch for **angular leaf spot** on pumpkins and squash. This is a bacterial disease and it is not surprising to see on wet years.

Often it is seen in older leaves, and new growth is unaffected.

The best control is copper sprays. Check your fields for brown or tan small angular spots on the leaves. As the disease progresses, those spots dry up and fall out leaving ragged holes in the leaf.

Powdery mildew is being reported on summer squash in eastern New York. Again, with the hot, stressful weather, this disease can become a problem on mid season summer squash. If a second block is ready, it may be advisable to move to another planting of summer squash when an early planting has problems. Disk in the abandoned field up to avoid letting the disease spread to other vine crops.

--RVH, Adapted from J. Mishanec, Cornell

SWEET CORN

Captures of **European corn borer** moths are very low, indicating that the first flight is pretty much over. **Corn earworm** is also low throughout the state. Most locations are below the threshold of 2 moths/week. **No silk sprays are needed where ECB is below 5 moths' week and CEW is below 2 moths per week.** If CEW is 3 or more, use a 6-day schedule on silk (see chart).

However, it is important to **scout pre-tassel corn for ECB.** Reported infestations are variable, ranging from 2 – 45%. Check you own fields! These are the tail end of caterpillars from the first flight.

Watch for **sap beetles.** These are small, black beetles a little less than a quarter inch in length. They feed anywhere there is damage to the plant and often infest ECB feeding sites in tassels or ears. They may infest ears, causing silk clipping and depositing eggs which hatch into small white larvae. We usually do not see them till later in the summer when we have bird damage in the corn. Avoid creating piles of rotting discarded fruit and vegetables on your farm, which provide an excellent breeding site. There is no set threshold for sap beetles. If you are finding them and you feel you need to control them, check the *New England Vegetable Management Guide* for recommended materials.

CORN EARWORM THRESHOLDS

Moths/Night	Moths/Week	Spray Interval
0 - 0.2	0 - 1.4	no spray
0.2 - 0.5	1.4 - 3.5	6 days
0.5 - 1	3.5 - 7	5 days
1.0 - 13.0	7 - 91	4 days
over 13	Over 91	3 days

Note: spray intervals can be lengthened by one day if daily maximum temperatures were below 80° F for the previous 2-3 days.

Sweet Corn Trap Captures and Scouting Data July 4-11, 2002

Town	Date	ECB Z1	ECB E2	TOTAL ECB	CEW	FAW	% PT
		Iowa	New York				
Berkshire Region							
N. Bennington, VT	July 4	1	2	3	-	-	-
Sheffield, MA	July 9	2	2	4	-	-	-
Conn. River Valley North to South							
Walpole, NH	July 10	0	1	1	-	-	7
Plainfield, NH	July 10	2	16	18	0	0	9
Westminster, VT	July 10	0	0	0	-	-	8
South Deerfield	July 9	0	0	0	-	-	-
Sunderland	July 10	0	3	3	-	-	-
Hadley	July 10	5	0	5	-	-	-
Hadley	July 10	3	2	5	0	0	6
Feeding Hills	July 10	1	4	5	0	0	20
East/Central MA, North to South							
North Andover	July 6	21	4	25	1	0	40
Ipswich	July 5	4	1	5	3	0	30
Lancaster	July 11	0	0	0	0	0	45
Still River	July 10	3	5	8	0	0	-
Concord	July 8	6	1	7	1	0	36
Leicester	July 9	0	1	1	0	0	26
Northbridge	July 9	1	0	1	1	0	40
Belchertown	July 10	3	2	5	-	-	-
Dighton	July 11	1	3	4	2	-	-
Rehoboth	July 11	0	0	0	1	-	-
Sharon	July 11	-	-	-	2	-	-

Vegetable IPM Newsletter, Ruth Hazzard, Editor and Stephanie DeGray, Assistant Editor. The *Vegetable IPM Newsletter* is published weekly from May to September and includes contributions from the faculty and staff of the UMass Extension Vegetable Program, other universities and USDA agencies, growers, and private IPM consultants. Authors of articles are noted; author is R. Hazzard if none is cited.

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