

# VEGETABLE CROPS HOTLINE

A newsletter for commercial vegetable growers prepared by the  
Purdue University Cooperative Extension Service

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## IN THIS ISSUE

- AN INTEGRATED PEST MANAGEMENT PROGRAM FOR CUCUMBER BEETLES ON MUSKMELONS
- AIM HERBICIDE LABELED FOR ROW MIDDLE USE IN VEGETABLE CROPS
- WIREWORM DAMAGE ON VEGETABLES AND MELONS
- ANNOUNCEMENTS AND UPCOMING EVENTS

**AN INTEGRATED PEST MANAGEMENT PROGRAM FOR CUCUMBER BEETLES ON MUSKMELONS - (Frankie Lam)**  
- The striped and spotted cucumber beetle adults (Figs. 1 and 2) are vectors of the bacterium that cause bacterial wilt of muskmelon and cucumber. The bacteria, which are transmitted to muskmelon during the adult feeding process, multiply in the plant vessels, and stop the water-flow, which resulting in sudden and permanent wilt of a vine (Fig. 3) or the entire plant (Fig. 4). The wilting symptoms appear two to six weeks after the plant is infected. Once a plant is infected with the bacteria, nothing can be done to save it. When the symptoms of bacterial wilt appeared on plants, it was already too late to manage the beetles and control the disease.



Fig. 1. Striped cucumber beetles. (Photo by Frankie Lam)



Fig. 2. Spotted cucumber beetle. (Photo by Frankie Lam)



Fig. 3. Sudden and permanent wilt of a vine (lower right) is an early symptom of bacterial wilt on muskmelon. (Photo by Frankie Lam)



Fig. 4. Late symptom of bacterial wilt on muskmelon. (Photo by Frankie Lam)



The early-season adult populations are economically important for the management of cucumber beetles and bacterial wilt. The basic way to avoid the bacterial wilt disease is to prevent the beetles from feeding on the plants. Managing the cucumber beetles on muskmelons is intensive because muskmelons are highly susceptible to bacterial wilt and very little feeding damage can be tolerated. Heavy infestation of the early-season populations might decrease plant stands and have yield loss more than 20 percent on early-planted muskmelons.

Field studies of muskmelons were conducted at Southwest Purdue Agricultural Center near Vincennes in the past to investigate the optimal time for direct scouting cucumber beetles, developed an alternative sampling technique for the beetles, and determined the efficacy of insecticides for managing the beetle populations. The results of these studies indicated that the cucumber beetles are most active from noon to early afternoon and yellow sticky trap (Fig. 5) can be used as an alternative sampling method for cucumber beetles on muskmelons. Thus, for direct counting the adult beetles on plants, the optimal time to scout the beetles in field is from 11 AM to 3 PM. Scouting early in the morning or late afternoon would under estimate the beetle numbers in field. For the detail procedures to use yellow sticky traps for sampling the beetles on muskmelons, please read the article, *Using Sticky Traps to Sample Cucumber Beetles on Muskmelons*, in the Vegetable Crops Hotline No. 445 (March 14, 2005).



Fig. 5. Yellow sticky traps for sampling cucumber beetle on muskmelon. (Photo by Frankie Lam)

Pesticide trials in the past years have shown that an application of soil insecticide before or at planting might control the cucumber beetle populations, have low incidence of bacterial wilt, and high yield on early-planted muskmelons. The soil insecticides that are commonly used for the management of the beetles are carbofuran and imidacloprid. The application of carbofuran, Furadan 4F at 2.4 fluid oz/1000 linear ft. or

row, incorporated into the top 3-4 inches of soil at planting gives some early season control of cucumber beetles. Furadan 4F is available in Indiana under a Special Local Needs registration, and the user must have a copy of the supplemental label. The use of Furadan though beneficial, should not be relied upon for control during heavy, early-season beetle infestation, or for more than few weeks after transplanting. In addition, the duration of control depends upon several factors including:

1. The interval between when Furadan is applied and when transplants are set in the field: More than 2-3 weeks between these two will severely limit the usefulness of Furadan for beetle control.
2. The rate of plant growth: If plants are growing rapidly, the Furadan will be quickly taken up by the rapidly growing plant and will become "diluted" and, therefore, less effective.
3. Amount of rainfall: Because Furadan is water soluble, rain may leach the insecticide out of the soil rapidly, even if plastic mulch is present.

Imidacloprid (Admire) can be applied in several different ways for the control of cucumber beetles; such as a preplant narrow band centered on the plant row 14 or fewer days before planting, as an in-furrow spray at or below seed level, as a post-seeding drench, transplant drench, or hill drench, or delivered through drip or trickle irrigation. Like Furadan, imidacloprid is taken up by the roots and moves to all parts of the plant. Which application method is the best will depend upon the particular situation on your farm. Imidacloprid at the 16-24 fl. oz./A rate has shown "good" beetle control and significantly high yield on a muskmelon insecticide trial conducted at our Center.

The foliar insecticides that are labeled for the control of cucumber beetles are: Ambush, Asana, Capture, Danitol, Diazinon, Endosulfan, Lannate, Phaser, Pounce, Sevin, and Thiodan. Growers should be aware that use of some foliar insecticides regularly may have detrimental effect on natural enemies and may increase problems with aphids and mites on melons; spray the field only when the beetle number reached the economic threshold. Check the Midwest Vegetable Production Guide (ID-56) <[www.entm.purdue.edu/entomology/ext/targets/ID/index.htm](http://www.entm.purdue.edu/entomology/ext/targets/ID/index.htm)> for insecticide control of the beetles. Read the label carefully before the application of insecticide.

Based on the results of past studies, an integrated management program for cucumber beetles on muskmelons is developed and recommended (Fig. 6). Theoretically the key for the management of cucumber beetles and bacterial wilt on muskmelons is to apply soil insecticides before or during the transplant of melons and to sample the field regularly. Spray the field when the beetle number is at or above the economic threshold (on an average of one beetle per plant for direct count or 20 beetles per trap for yellow sticky trap method). For the first four weeks after melons are transplanted or if the beetle number is above the threshold, scout the beetles

2-3 times weekly; after the 4<sup>th</sup> week that the melons were transplanted or if the beetle number is below the threshold, scout the beetles 1-2 times weekly until harvest. If beetle populations are high, such as more than 20 beetles per plant, then insecticide may be applied in a 5-day interval. This is because weekly sprays may not be enough to suppress the beetle population and avoid the infection of bacteria. When the initial surge of beetles declines, and the second generation of beetles has not yet emerged, there is little reason to spray insecticides until the second generation of adults appears.

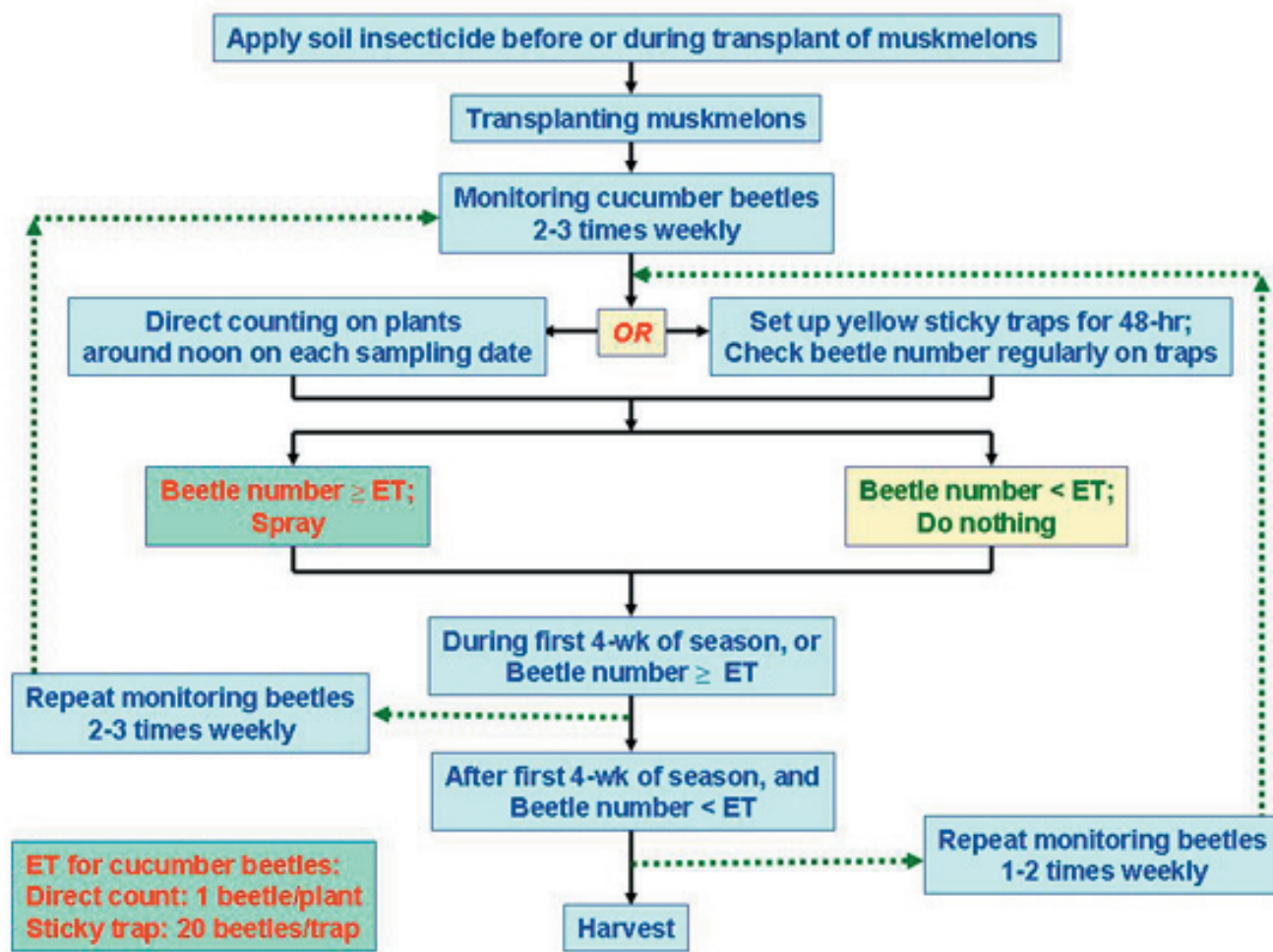


Fig. 6. A recommended integrated pest management program for cucumber beetles on muskmelons.

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**AIM HERBICIDE LABELED FOR ROW MIDDLE USE IN VEGETABLE CROPS – (Liz Maynard)** - Aim has received a label for use on many vegetable crops as a burndown herbicide before planting and as a row middle application if applied with a hooded sprayer. A hooded sprayer has shields covering the top and four sides of the spray pattern to prevent any spray from contacting any portion of the crop. Aim is effective on small emerged broadleaves. Rather than listing every crop on which Aim is registered, the label lists the EPA crop groups for which these types of application are allowed. Vegetable crop groups on the label and examples of vegetables in those groups are shown in Table 1. The maximum rate for row middles is 1.98 fl. oz. of Aim EW or Aim EC (1.24 oz. Aim or 0.031 lb. a.i.) per broadcast acre per application. The total applied to row middles after crop emergence should not exceed 4.4 fl. oz. Aim EW or Aim EC (2.68 oz. Aim or .064 lb. a.i.) per acre for the entire season. Aim has been available for use in sweet corn for several years. Lower rates and drop nozzles or directed sprays are recommended for use in sweet corn to avoid crop injury.

The active ingredient in Aim is carfentrazone-ethyl. It is a contact herbicide with no residual activity. It kills weeds by interfering with the synthesis of chlorophyll, leading to a buildup of compounds that cause disruption of cell membranes, resulting in cell death. Herbicides with similar mechanisms of action include Spartan (sulfentrazone) and the diphenyl ethers Blazer (acifluorfen), Goal (oxyfluorfen), and Reflex (fomesafen). Aim has low toxicity to mammals and birds and moderate toxicity to fish.



Where does this material fit into vegetable production? For killing weeds that have emerged in a stale seedbed or no-till operation prior to planting, it has the advantage of being quicker acting than glyphosate, less hazardous than paraquat, and requiring less material than Scythe (pelargonic acid). Unlike glyphosate, it will not control grasses or move into belowground parts of perennial weeds. Unlike paraquat, it will not control grasses.

For killing weeds in row middles once the crop is present, these same comparisons with glyphosate, paraquat, and Scythe apply. In addition, Aim is labeled on a wider range of crops than paraquat. If some herbicide accidentally contacts the crop, Aim, paraquat or Scythe would affect only the contacted area, while glyphosate would move to, and affect, other parts of the plant. Compared to Sandea, which is labeled in row middles for several vegetable crops and over the top for a few, Aim should provide better control of small lambsquarters and nightshade. Aim's effectiveness against nightshade would also be an advantage over Sencor (labeled for tomatoes). Disadvantages of Aim compared to Sandea or Sencor include lack of ragweed control and lack of residual activity.

For both preplant and row middle applications, Aim may be tank-mixed with other labeled materials to broaden the weed control spectrum. Be sure to read and follow all label instructions for all materials.

Of course, killing weeds in a stale seedbed or row middles can be accomplished with cultivation; it does not require herbicides. A future article will discuss the pros and cons of using cultivation versus herbicides for controlling weeds in these situations.

**Table 1. LIST OF VEGETABLES ON AIM HERBICIDE LABEL**

EPA Crop Grouping	Examples of Vegetables Included
1. Root and tuber vegetables	Potato, carrot, radish, beet, horseradish, sweet potato, turnip, parsnip
2. Leaves of root and tuber vegetables	Turnip greens, beet greens
3. Bulb vegetables	Green onion, dry bulb onion, garlic
4. Leafy (non-brassica) vegetables	Celery, head lettuce, leaf lettuce, parley, endive, radicchio, swiss chard, rhubarb, spinach
5. Brassica and leafy vegetables	Broccoli, Brussels sprouts, cabbage, cauliflower, kale, kohlrabi, mustard greens
6. Legume vegetables	Snap beans, dry beans, peas, southern peas
7. Fruiting vegetables (non-cucurbit)	Eggplant, pepper, tomatillo, tomato
8. Cucurbit vegetables	Cucumber, muskmelon, pumpkin squash, watermelon
9. Herbs and Spices	Basil, chives, culantro, dill, oregano, thyme, rosemary

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#### WIREWORM DAMAGE ON VEGETABLES AND MELONS

- (Frankie Lam) - During the winter and spring meetings some growers in southern Indiana mentioned that last season they had wireworm problems in their melon fields. Wireworms attack seeds of corn, beans, peas; tubers of potatoes; and roots of turnips, sweet potatoes, carrots, radish, sweet corn, cabbage, cucumber, tomato, watermelon, and many other vegetables. When crops are planted on land that has been in sod for several years, wireworm damage on crops may be severe in the first few years.

Wireworms (Fig. 1) are larvae of click beetles (Fig. 2). Decision to use insecticides for wireworm management must be made prior to planting. One to four weeks before planting, follow the procedures below to set bait traps for wireworms.

1. Pre-soaking an equal amount of untreated corn and wheat seeds in water for 24 hours.
2. Dig a hole in the field with six inches deep and four inches wide.
3. Put one cup of the seed mixture in the hole, then fill the hole and mound a "soil dome."



**Fig. 1.** Wireworm. (Photo by Frankie Lam)



**Fig. 2.** Click beetle. (Photo by Frankie Lam)

4. Cover the mound with an 18-inch-square black plastic mulch, and cover the edges with soil to hold the plastic sheet down.
5. Place one trap for each acre or at least ten traps in the field.
6. After one week or a few days before planting, remove the plastic and soil covering the bait and count the number of wireworm at each trap.
7. An average of one wireworm per trap, application of soil insecticide should be considered before seeding or transplanting crops.

Growers with questions of setting up the bait traps or wireworm management, please call me at the Southwest Purdue Agricultural Program at (812) 886-0198.

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### \*\*\*ANNOUNCEMENTS AND UPCOMING EVENTS\*\*\*

**PURDUE EXTENSION HELPS ENTREPRENEURS GET COOKING** - (*Kay Hagen*) - The Purdue University Cooperative Extension Service will hold a workshop on April 22 in Indianapolis for entrepreneurs interested in starting a specialty food business in Indiana. The event will take place from 8 a.m. to 4:30 p.m. at the Indiana Farm Bureau Building, 225 S. East St. Experts from around the state will discuss marketing; business planning; product and process development; and food ingredients, regulations and safety.

Shirley Vargas, a supervisor from the Indiana State Department of Health, will speak about food regulations. Linda Wood, of the Southeast Indiana Small Business Development Center, will talk about business planning, and Michigan State University's Laura Bix will cover packaging considerations for specialty foods. There also will be question-and-answer periods and an opportunity to speak with presenters.

The Indiana State Department of Health, Indiana Small Business Development Center and Indiana Farm Bureau are co-sponsoring the workshop with Purdue Extension. Cost to attend is \$75 and includes an information binder, refreshments and lunch. Registration is required before April 15. To register, mail a check or money order made payable to Purdue University to Carolyn Hunst, 403 W. State St., West Lafayette, IN 47907. Registrations should include the participant's name, address, phone number, e-mail and fax number.

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**SPECIALTY AG MARKETING WORKSHOP** - (*Timi Jo Jordan*) - Three one-day workshops will offer insights on the trends, market requirements and marketing tools needed to help break into agricultural specialty markets. The workshops, co-sponsored by the Purdue University Cooperative Extension Service, will take place April 15 at Hilger's Farm Restaurant in Fort Wayne, Ind., June 10 at the Purdue Extension office in Noblesville, Ind., and Aug. 5 at the Clark County 4-H Center in Charlestown, Ind.

Early registration is \$15 if received by April 1 for the Fort Wayne workshop, by May 27 for the Noblesville workshop and by July 22 for the Charlestown workshop. After the early registration deadlines, the cost is \$20. The registration fee includes lunch and snacks. To register, contact Patt Sheahan at (765) 494-4310, [shehanp@purdue.edu](mailto:shehanp@purdue.edu). The Purdue Small Farms and Sustainable Agriculture Team, Purdue's Department of Agricultural Economics, Purdue Extension and the USDA-RMA are co-sponsoring the workshops. For more information on the workshops, contact Corinnie Alexander at (765) 494-4249, [cealexan@purdue.edu](mailto:cealexan@purdue.edu). A workshop brochure is available online.

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### **PRODUCE INDUSTRY TRADE SHOW** - (*Liz Maynard*)

- Chicago will be overflowing with the latest in produce marketing trends on April 30 - May 3 at the United Produce Expo and Conference. And that's not all. The All Things Organic Trade Show, the Fancy Food Show, the US Food Export Showcase, and the Food Marketing Institute Show will all be held at the same location and time. I attended for one day last year and felt it was a great chance to see current trends in vegetable packaging and marketing. Some snapshots of the 2004 show are available on the web at: [faculty.pnc.edu/emaynard/nwch/veg/prod-expo04/index.htm](http://faculty.pnc.edu/emaynard/nwch/veg/prod-expo04/index.htm). I hope some of you will be able to attend!

See the following Web sites for more information, or call UFFVA at: (202) 303-3400

- Produce Show <[www.uffva.org/produceshow](http://www.uffva.org/produceshow)>
- All Things Organic Trade Show <[www.organic-expo.com](http://www.organic-expo.com)>
- Food Marketing Institute <[www.fmi.org](http://www.fmi.org)>
- Fancy Food Shows <[www.specialtyfood.com/do/fancyFoodShow/LocationsAndDates](http://www.specialtyfood.com/do/fancyFoodShow/LocationsAndDates)>
- US Food Export Showcase <[www.nasda.org/nasda/nasda/Usfes/index.html](http://www.nasda.org/nasda/nasda/Usfes/index.html)>

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### **EPA LAUNCHES NEW SPANISH WEB SITE - NEWS BRIEF**

- (*Antonio Castro-Escobar, Michigan Department of Agriculture*) - The U.S. Environmental Protection Agency has launched a new consolidated Spanish Web site as part of its ongoing effort to provide environmental information both in Spanish and English.

The new site compiles EPA's Spanish language materials on a wide variety of areas from lead poisoning prevention to controlling asthma triggers, recycling to proper management of pesticides. The site was developed through a series of focus groups to respond to the environmental needs and interests of Hispanics.

To view EPA's Spanish site, visit: [www.epa.gov/espanol](http://www.epa.gov/espanol)..

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### **SELLING TO RESTAURANTS WORKSHOP** - (*Steve Leer*)

- More and more farmers and chefs are now teaming to sell, buy and serve local food. Learn more about this growing trend at a workshop Saturday (4/9), at the Mustard Seed Market & Café, Montrose location, 3885 W. Market St., Akron, Ohio.

Sponsored by the Ohio Ecological Food and Farm Association (OEFFA) and Ohio State University's Organic Food and Farming Education and Research (OFFER) program, "How to Make a Living Selling to Local Restaurants and Supermarkets" features practical information on how farmers, chefs and produce buyers can work together effectively.

The featured speaker is Amy Trubek, executive director of the Vermont Fresh Network. She will talk about ways to create those partnerships.

The program will include a question-and-answer session with several local chefs and several local farmers who are successfully selling to markets and restaurants. Workshop hours are 8:30 a.m. to 1:30 p.m. Registration, which is \$20 for OEFFA members and \$25 for nonmembers, includes a packet of information, a continental breakfast and an afternoon snack. For more information, call (614) 421-2022.

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**VALUE ADDED GRANTS** - The Value-Added Producer Grants are available to independent producers, agricultural producer groups, farmer or rancher cooperatives, and majority-controlled producer-based business ventures interested in a competitively-awarded grant to fund one of the following two activities: (1) planning activities needed to establish a viable value-added marketing opportunity for an agricultural product (e.g. conduct a feasibility study, develop a business plan, develop a marketing plan); or (2) acquire working capital to operate a value-added business venture that will allow producers to better compete in domestic and international markets. Awards will be made on a competitive basis. Applications must be received no later than May 6, 2005. Detailed information about application and program requirements will be included in the March 7, 2005 publication of the *Federal*

Register available online at <[www.rurdev.usda.gov/rbs/coops/vadg.htm](http://www.rurdev.usda.gov/rbs/coops/vadg.htm)>

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**HYDROPONIC SHORT COURSE** - (Candace Pollack) - Ohio State University Extension Agricultural Business Enhancement Center (ABE) will hold a short course and workshop April 20-22 in Waldo, Ohio, to show interested parties how to be profitable in the hydroponic greenhouse business. The event is also sponsored by the Great Lakes Hydroponic Association.

Program topics will include how to implement food safety protocols, hiring and retaining a good labor force and learning what it takes to be a successful hydroponic grower and business manager.

Shari Plimpton, program manager-industry outreach for the Center for Innovative Food Technology / EISC, Inc., will lead the discussion on food safety. Bernie Erven of Erven HR Services LLC will conduct the session on increasing the retention rates and productivity of a greenhouse workforce. Both sessions will be held on April 20.

From April 21-22, focus will center on marketing, greenhouse financing, production techniques, greenhouse design and organic vegetable production. A tour of the VanScoy Farms LLC, a new one-acre hydroponic tomato greenhouse, will also be part of the short course and workshop. The tour will take place the afternoon of April 22.

Registration for the event is \$150 for Great Lakes Hydroponic Association members, \$200 for non-members, and \$75 for students. For more information or to register, contact Carol Packer or Mary Donnell at the ABE Center at (419) 354-6916 or e-mail [packer.19@osu.edu](mailto:packer.19@osu.edu), or [donnell.8@osu.edu](mailto:donnell.8@osu.edu). Additional information can be found by logging on to <[www.oardc.ohio-state.edu/hydroponics](http://www.oardc.ohio-state.edu/hydroponics)>.

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