



# Blueberry Newsletter

A newsletter from Michigan State University for the Michigan blueberry industry

April 20, 2010

Volume 4, Issue 3

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*Timely information for growers.*

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**MICHIGAN STATE UNIVERSITY**

## Blueberry news you can use

**Disease management**

There is a high risk of mummy berry shoot infection with rin in the forecast this coming weekend. Fungicide applications are advised.

**Insect management**

If you haven't done so already, put up cherry fruitworm traps this week. Cranberry fruitworm traps should be put up next week. Scout shoots for early-season leafrollers and beetles.

**Weed management**

April is an important time to apply pre-emergent herbicides.

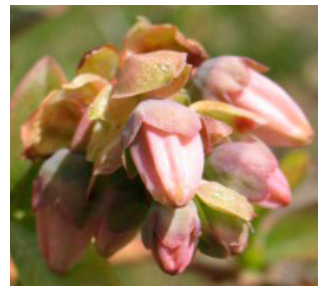
**Pre-Bloom Blueberry Meeting April 29, 6 to 8 PM, at Cornerstone Ag**

A pre-bloom blueberry grower meeting is scheduled for the evening of April 29. The meeting will be from 6 to 8 PM at Cornerstone Ag's packing facility. Cornerston Ag is located at 01240 57<sup>th</sup> Street, north of Phoenix Rd., east of Grand Junction. The focus of the meeting will be pest and disease control in the bloom and post-bloom period.

**Crop development**

In Van Buren County, Jersey in Covert is at early pink bud, and Blueray and Bluecrop in Grand Junction are at mid pink bud.

In Ottawa County, Blueray in Holland, and Rubel and Bluecrop and West Olive are at early pink bud.



Bluecrop in Grand Junction on April 19.



Blueray in Holland on April 19.

**GROWING DEGREE DAYS**

From March 1

	2010		Last Year	
	Base 42	Base 50	Base 42	Base 50
<b>Grand Junction, MI</b>				
4/12	328	166	174	65
4/19	419	218	234	95
Projected for 4/26	480	242	327	154
<b>West Olive, MI</b>				
4/12	275	126	111	32
4/19	351	165	165	58
Projected for 4/26	420	194	234	97

See <http://enviroweather.msu.edu> for more information.

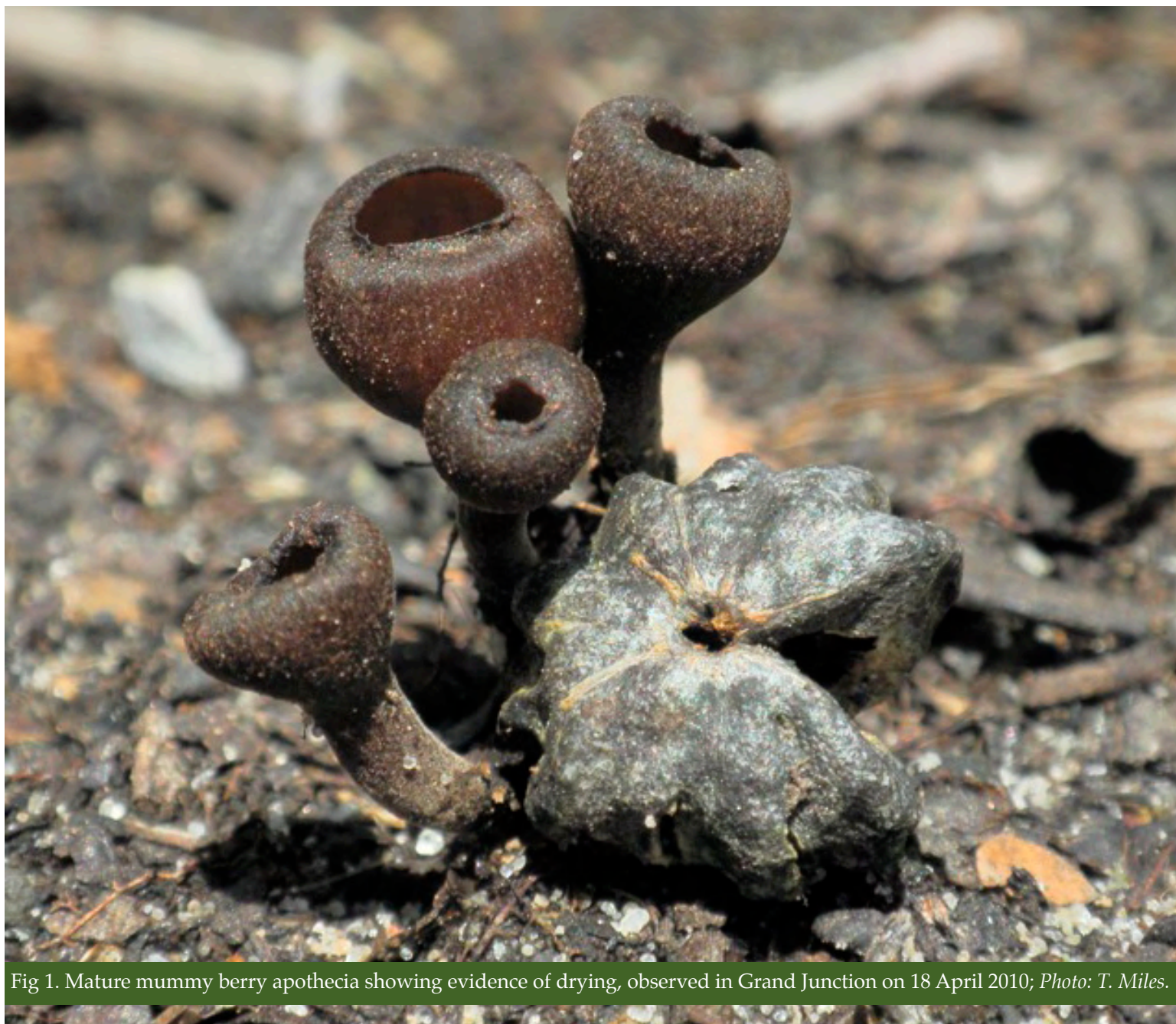


Fig 1. Mature mummy berry apothecia showing evidence of drying, observed in Grand Junction on 18 April 2010; Photo: T. Miles.

## Mummy berry apothecia affected by dry conditions

This week, apothecia were found in most scouted plots. The percentage of germinated mummies dropped from last week in two of the sites but increased in the West Olive site (from 28.1 to 40.6%). This difference is most likely due to the dryer nature of the former sites as compared to the wetter West Olive site. The highest number of apothecia was found at the West Olive site, averaging 39.1 apothecia per bush.

Many of the apothecia seen this week were dry in appearance, probably because of the lack of rain over the last two weeks (Figure 1). There was a wide range of cup sizes at all of the sites with apothecia, ranging from unopened to as

large as 11 mm in diameter (Figures 2 and 3). As the cups expand, apothecia will continue to release ascospores, which will lead to infection of newly developing plant tissue. If apothecia are present near the end of the week, there

*Continued next page.*



Fig 2. Healthy, mature apothecia observed near West Olive on 18 April 2010; Photo: T. Miles.



Fig 3. Fully expanded apothecial cup (11mm dia.) observed near West Olive on 18 April 2010; Photo: T. Miles.



will be a high risk of infection because rain is in the forecast, and temperatures are predicted to be between 40 and 60°F. Shoot strike symptoms typically appear about 12-14 days after the actual infection, depending on the temperature, so be on the lookout for shoot strikes in the next two weeks. For more information about mummy berry symptoms, biology, and management practices, check out the Mummy Berry Fact Sheet (<http://web2.msue.msu.edu/bulletins/Bulletin/PDF/E2846.pdf>). This week growers should continue to scout for mummy berry apothecia and consider fungicide treatment, particularly if long dew periods or rain is expected.

*Tim Miles & Annemiek Schilder  
Department of Plant Pathology  
Michigan State University*

**Table 1. Mummy berry ratings at the four scouted sites, April 2010.**

Farm	Date	Avg number of mummies on the ground*	% Germinated mummies**	Avg number of apothecia on the ground*	Max apothecia cup diameter (mm)
<b>VAN BUREN COUNTY</b>					
Covert	4/12	0.9	33.3	0.7	3
	4/18	not counted	0.0	0.0	n/a
Grand Junction	4/12	112.4	31.7	54.5	5
	4/18	not counted	12.5	22.1	9
<b>OTTAWA COUNTY</b>					
Holland	4/12	6.4	11.3	2.6	4
	4/18	not counted	7.8	0.6	5
West Olive	4/12	41.6	28.1	29.3	12
	4/18	not counted	40.6	39.1	11

\*Average of 10 bushes; \*\*Number of germinated mummies divided by the number of total mummies on 4/12.

## Risk of mummy berry infection

### Outlook for this week

At this time, mummy berry apothecia are easy to find and at fairly advanced stages of development in many blueberry fields. The lack of rain over the past two weeks has led to the apothecia drying up in some locations, and it is assumed that these apothecia produce fewer to no ascospores, depending on the extent of dehydration. *However, considering the susceptibility of blueberry shoots and the abundance of apothecia, any period with sufficient moisture now presents a risk of shoot infection.* Remember that rain, dew and irrigation water can all be a source of moisture for infection. Frost increases the risk of infection by injuring the tender leaf tissues allowing the fungus to penetrate faster. Applying overhead irrigation for frost protection may also increase the risk of infection by prolonging leaf wetness.

Shoot strike symptoms become visible 9-12 days after infection, depending on the temperature. The first shoot strikes were reported today in a blueberry field in Benton Harbor. These are likely the

result of infections that took place during the rainy period in the first week of April, which is extremely early compared to previous years. Be on the lookout for shoot strikes later this week. Once sporulating shoot strikes appear, flower infection can only occur if open flowers are present. The secondary spores (conidia) are spread by insects, including bees and flies, and do not require moisture to infect the flower pistil. In fact, good pollinating weather will be the main factor favoring mummy berry flower infection.

### Prediction model for mummy berry shoot infection

A prediction model for mummy berry shoot infection will be available soon on the Enviro-weather website (<http://www.enviroweather.msu.edu/homeMap.php>). The model, which was developed for lowbush blueberries, is based on leaf wetness and temperature requirements for shoot infection (see Table 2). Since the model is still under validation for highbush blueberries, it should be considered preliminary and as providing an indication of relative infection risk. The model will determine the risk of infection using weather data provided by the Michigan Automated

Weather Network (<http://www.agweather.geo.msu.edu/mawn/>). Weather stations are present throughout Michigan's main blueberry-growing area, including in Grand Junction, South Haven, Fennville, West Olive, Watervliet, and Benton Harbor. Environmental conditions are recorded every 5 minutes and are updated on the website every 30 minutes. Current and past weather data can be freely accessed online by clicking on the appropriate weather station location. If your farm is located between weather station locations, it is advisable to look at the weather data recorded by both weather stations. Always remember that weather conditions are variable so local observations on your own farm are the most accurate, particularly where rainfall and leaf wetness are concerned.

### How to use the mummy berry prediction model

Since the model will use past weather data, it will indicate if an infection period has occurred after a wetting event. An infection period is recorded when minimum wetness and temperature conditions for infection have been met, which is reached at 100% progress towards infection (Table 3).

Any additional wetness beyond the minimum required increases the progress towards infection over 100%. The longer the wet period, the greater the risk of infection. If an infection period has occurred, particularly if the indicated risk is moderate or high, a systemic fungicide spray (Indar or Orbit) can be applied within 24 to 48 hours to stop the infection in its tracks. Once a fungicide has been applied, consider the plants are covered for 7-10 days before you need to consult the model again to decide on your next spray. The model output will also indicate when

symptoms are predicted to appear (usually 9-12 days after infection). Of course, you can also apply a systemic or protectant fungicide before a predicted

rain event based on the local weather forecast. This is a good idea if several days of rain or windy conditions are predicted, such that it will be difficult to get into the field to apply a spray within the limited time frame after an infection period has occurred.

A frost event will increase the infection risk if it occurs within four days of an infection period. For instance, if the risk rating is low without frost, it may be moderate with frost. If overhead irrigation is applied for frost protection, you need to estimate the duration of leaf wetness yourself as well as the average temperature during the wetting period in order to assess the infection risk using the chart shown above (Table. 2).

*Annemiek Schilder  
Department of Plant Pathology  
Michigan State University*

**Table 2. Risk of mummy berry shoot infection under different temperatures and leaf wetness durations in lowbush blueberry.**

Wetness Duration (hours)	Mean temperature during wet period				
	35F	43F	50F	57F	65F
2	0	0	0	0	0
4	0	0	0	0	0
6	0	Low	Low	High	High
8	0	Moderate	High	High	High
10	Moderate	High	High	High	High
15	Moderate	High	High	High	High
24	High	High	High	High	High

*Data courtesy of Paul Hildebrand, Ag Canada, Nova Scotia*

**Table 3. Appearance of output from mummy berry risk model in Enviroweather.**

WetPeriod	Station	Start of Wetting Period	End of Wetting Period	Duration (Hrs.)	Avg. Temp(F)	Rainfall (inches)	Mummy berry risk	Wet hrs @ avg temp for 1st infection	Progress toward infection
1	Grand Junction	4/1/2010 6:10 AM	4/1/2010 8:20 AM	Wet: 2.3 Span: 2.3	51.4	0	None	6	38%
2	Grand Junction	4/3/2010 4:40 AM	4/3/2010 8:40 AM	Wet: 4.1 Span: 4.1	48.4	0	None	6	68%
3	Grand Junction	4/3/2010 11:50 AM	4/4/2010 9:15 AM	Wet: 15.8 Span: 21.5	43.9	0.43	High (Symptoms appear: )	6	217%
4	Grand Junction	4/4/2010 7:40 PM	4/5/2010 10:40 AM	Wet: 15.1 Span: 15.1	52.4	0.43	High (Symptoms appear: )	6	251%
5	Grand Junction	4/5/2010 9:20 PM	4/9/2010 6:20 AM	Wet: 64.8 Span: 81.1	48.9	1.04	High (Symptoms appear: )	6	881%
6	Grand Junction	4/9/2010 9:25 PM	4/10/2010 4:40 AM	Wet: 7.3 Span: 7.3	30.4	0	None	--	0%
7	Grand Junction	4/10/2010 7:35 AM	4/10/2010 8:45 AM	Wet: 1.3 Span: 1.3	38.9	0	None	8.83333333333333	13%
8	Grand Junction	4/11/2010 7:05 AM	4/11/2010 8:40 AM	Wet: 0.5 Span: 1.7	50.8	0	None	6	8%
9	Grand Junction	4/12/2010 12:05 AM	4/12/2010 12:20 AM	Wet: 0.3 Span: 0.3	41.9	0	None	7.16666666666667	5%
10	Grand Junction	4/12/2010 2:35 AM	4/12/2010 4:15 AM	Wet: 1.8 Span: 1.8	38.4	0	None	8.83333333333333	20%
11	Grand Junction	4/12/2010 8:30 PM	4/12/2010 8:50 PM	Wet: 0.3 Span: 0.4	61.5	0	None	6	4%
12	Grand Junction	4/12/2010 11:45 PM	4/13/2010 9:35 AM	Wet: 4.8 Span: 9.9	48.6	0.07	None	6	79%
13	Grand Junction	4/16/2010 4:15 AM	4/16/2010 8:00 AM	Wet: 3.8 Span: 3.8	59.3	0.02	None	6	63%



## Insect activity has officially started

With the warm weather over the past couple of weeks, insect activity has started, but is still low. During scouting on April 19, only one leafroller larva was seen during scouting of a Grand Junction farm, and very light feeding by leafrollers was seen at a farm in Holland. Very light spanworm feeding was seen in Grand Junction, and feeding by another early season pest, the flower feeding beetle *Hoplia trifasciatus* was seen at the Holland and Covert farms, but no beetles were observed. For more information on this pest, please see this [past issue of this newsletter](#). These levels of infestation and damage are well below the threshold of 2% damaged buds/shoots we consider an action threshold for control.

As temperatures increase over the coming weeks, we could see more [leafroller](#), [climbing cutworm](#), [spanworm](#) or flower beetle feeding. This emphasizes the need to walk your fields to look for early-season insect pests and determine whether there is a need for pest control.

Damage by spanworm, cutworms and other spring larvae is usually more obvious than the insect larvae, and it may be seen as complete bud removal or ragged feeding on the buds. A working threshold for control at this point in the season is 2% of the buds removed. Count 10 buds on 10 bushes spread through the field to pick up any hot-spots that exceed the 2 out of 100 threshold.

**Cherry fruitworm** traps were set on 4-15, and as of 4-19 no cherry fruitworm have been caught. We do not expect the flight for this pest to begin before this weekend, but growers and scouts should set CFW traps as soon as possible to be able to know when the flight of this pest starts. Traps and lures are available from the local company Great Lakes IPM, and many other monitoring trap suppliers. We use the Large Plastic Delta traps made from



Fig. 4 (above): *Hoplia* flower beetle feeding damage on 19 April 2010; Fig. 5 (below) leafroller feeding on 19 April 2010; photos: K. Mason.



corrugates plastic for our traps because these traps are able to withstand spring rains, irrigation, and even mechanical harvesters. These can also be reused for multiple seasons for the same pest so the higher initial cost is well worth it.



Fig 5. Cherry fruit worm (left) and the contaminant found in cherry fruitworm traps, *Pseudexentera vaccinii* (right).

Cranberry fruitworm traps should also be set in the next week to ensure you do not miss the start of the flight of that important pest. Check traps twice weekly until moths are caught and then traps should be checked as needed to set biofix for timing applications of crop protectants.

We have started to catch a moth in cherry fruitworm traps that is **not** cherry fruitworm. This “contaminant” moth is *Pseudexentera vaccinii* and is commonly caught in cherry fruitworm traps at this time of year. We have never found it to be a pest of any economic consequence to Michigan blueberries. The contaminant moth is ~½ inch long which is much larger than cherry fruitworm which is ~¼ inch long. Cherry fruitworm also have an iridescent banding pattern across the wings, whereas this contaminant moth has darker markings on a light gray background. See Figure 5 to help with identification.

*Keith Mason & Rufus Isaacs*  
 Department of Entomology  
 Michigan State University

Table 4. Insect scouting results

Farm	Date	CFW moths per trap	CBFW moths per trap	BBA % infested shoots	BBM adults per trap	JB per 20 bushes
<b>VAN BUREN COUNTY</b>						
Covert	4/15	set	--	--	--	--
	4/19	0	--	--	--	--
Grand Junction	4/15	set	--	--	--	--
	4/19	0	--	--	--	--
<b>OTTAWA COUNTY</b>						
Holland	4/15	set	--	--	--	--
	4/19	0	--	--	--	--
West Olive	4/15	set	--	--	--	--
	4/19	0	--	--	--	--

The Small Fruit Pathology lab at MSU is conducting a survey of the current state of blueberry virus problems in Michigan. We are offering to test, for free, blueberry plants that are exhibiting unusual symptoms that might be caused by a virus. **We will be ready to receive samples at the following twilight grower meetings: April 29, May 6, June 10 and June 17. You are invited to bring samples from your blueberry planting that you would like to be virus tested.** We will be testing for blueberry shoestring virus, blueberry leaf mottle virus, tomato ringspot virus, tobacco ringspot virus, peach rosette mosaic virus, blueberry scorch virus, and blueberry shock virus. If you have samples you want tested, please do the following:

1. **Make sure it is a fresh sample (sampled within 24 hours of the meeting) and kept refrigerated until leaving for the meeting. Placing the sample in a zip-lock bag with a moist paper towel usually works well.**
2. **Be sure to take symptomatic tissue. If tissue is necrotic, be sure to also include green tissue taken from near the necrotic tissue.**
3. **Write your name and contact information, as well as the variety of blueberry, on the sample bag. Include any other information you think is pertinent (e.g. how long the problem has been seen, etc). If you use email, please include an email address.**
4. **Place tissue from only one bush in each bag but feel free to bring multiple bags.**

We are particularly interested in:

- Blueberry leaf mottle virus: mottled and malformed leaves
  - Stunt: severely stunted, "bushy" bushes with shortened internodes
  - Scorch and shock: sudden and complete necrosis of flowers and leaves sometimes with twig dieback of 4-10 cm; necrotic, "scorched" blossoms are often retained over the summer. (Remember not to confuse with frost damage.)
  - Anything unusual for a healthy blueberry such as a mottle, mosaic, distortion, discoloration, necrosis, dieback etc.
- This is a win-win situation! You are able to get some free testing, and we are able to assess any future research needs.

Questions? Please feel free to contact:

Jerri Gillett (Research Assistant)

Email: [gillett@msu.edu](mailto:gillett@msu.edu)

Lab phone: 517-355-7539

Address: MSU, Attn: Jerri Gillett

105 CIPS

East Lansing, MI 48824

If you can't drop off your samples at one of the grower meetings, you may ship samples OVERNIGHT to arrive at the address above on any of the following days: April 29, May 6, June 10, or June 17. **Samples must arrive on one of these dates.**

## 2010 grower meetings

**APRIL 29 6:00PM**  
**Pre-bloom meeting - Van Buren County**  
 Location: Cornerstone Ag.  
 01240 57<sup>th</sup> Street, Grand Junction  
 Information: Mark Longstroth, 269-330-2790

**JUNE 10 6:00PM**  
**Pre-harvest meeting - Van Buren County**  
 Location: to be determined  
 Information: Mark Longstroth, 269-330-2790

**JUNE 24 6:00PM**  
**Weed Control Demo - Allegan County**  
 Location: Getzoff Farm  
 7093 116<sup>th</sup> St., Fennville  
 Information: Paul Jenkins, 517-648-5099

**MAY 6 6:00PM**  
**Pre-bloom meeting - Ottawa county**  
 Location: Carini Farms  
 15039 Port Sheldon Rd., West Olive  
 Information: Carlos Garcia, 269-260-0671

**JUNE 17 6:00PM**  
**Pre-harvest meeting - Ottawa County**  
 Location: Carini Farms  
 15039 Port Sheldon Rd., West Olive  
 Information: Carlos Garcia, 269-260-0671



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