



# Vegetable Crop Update

A newsletter for commercial potato and vegetable growers prepared by the University of Wisconsin-Madison vegetable research and extension specialists

No. 16 – August 12, 2013

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Aug 22 – UWEX-Langlade County Airport  
Research Station Field Day, Antigo, WI

**Vegetable Disease Update – Amanda J. Gevens, Assistant Professor & Extension Vegetable Plant Pathologist, UW-Madison, Dept. of Plant Pathology, 608-890-3072 (office), Email: [gevens@wisc.edu](mailto:gevens@wisc.edu). Vegetable Path Webpage: <http://www.plantpath.wisc.edu/wivegdis/>**

**Late blight status in WI and the U.S.: We had a few new late blight samples this past week – however – none from new counties.** Table 1 includes further details. **In the past week, MA, ME, NY, OH, and OR reported late blight on potato and/or tomato. The OR sample on potato was of the US-24 genotype; US-23 predominated other tested samples.** To date this production year, late blight has been reported in in FL, KY, LA, MA, MD, ME, MI, NJ, NY, OH, OR, PA, TN, WI, and WV. The website: <http://www.usablight.org/> indicates location of positive reports of late blight in the U.S. and provides further information on disease characteristics and management.

**Table 1.** Characterization of late blight from Wisconsin in 2013.

<b>County</b>	<b>Host</b>	<b>Genotype</b>	<b>Date of Confirmation</b>
Adams	potato	US-23	28 Jun
Juneau	potato	US-23	29 Jun
Sauk	tomato	US-23	2 Jul
Dunn	potato	US-23	29 Jul
Portage	potato	US-8/US-23	29 Jul/6 Aug
Brown	potato+tomato	US-23	6 Aug
Langlade	potato	US-23	6 Aug
Racine	tomato	US-23	8 Aug
Waushara	potato	US-23	8 Aug

As a reminder, US-8 is resistant to mefenoxam/metalaxyl fungicides and is an A2 mating type; US-23 is sensitive to mefenoxam/metalaxyl fungicides and is an A1 mating type.

## Current P-Day (Early Blight) and Severity Value (Late Blight) Accumulations

P-Day of  $\geq 300$  indicates threshold for early blight risk and triggers preventative application of fungicide. DSV of  $\geq 18$  indicates threshold for late blight risk and triggers preventative application of fungicide. Red text in table below indicates threshold has been met. NA indicates that information is not yet available as emergence has yet to occur. [http://www.plantpath.wisc.edu/wivegdis/contents\\_pages/pday\\_sevval\\_2013.html](http://www.plantpath.wisc.edu/wivegdis/contents_pages/pday_sevval_2013.html)

Location	Planted	50% Emergence	P-Day Cumulative (increase from 7/29)	DSV Cumulative (increase from 7/29)	Calculation Date
Antigo Area	Early 5/13	6/4	507 (67)	50 (6)	8/12/13
	Mid 5/22	6/17	430 (67)	42 (6)	8/12/13
	Late 6/7	6/29	332 (67)	20 (3)	8/12/13
Grand Marsh Area	Early 4/15	5/10	628 (69)	252 (49)	8/12/13
	Mid 5/1	5/21	594 (69)	252 (49)	8/12/13
	Late 5/15	6/5	503 (69)	225 (49)	8/12/13
Hancock Area	Early 4/20	5/15	696 (76)	86 (16)	8/12/13
	Mid 5/5	5/23	635 (76)	84 (16)	8/12/13
	Late 5/15	6/5	553 (77)	62 (16)	8/12/13
Plover Area	Early 4/22	5/17	617 (27)	169 (19)	8/8/13*
	Mid 5/7	5/30	537 (27)	145 (19)	8/8/13*
	Late 5/24	6/5	495 (27)	136 (19)	8/8/13*

\*Plover area weather station is having technical difficulties. Data could not be collected for determination of risk values for 8/12/13. We're working to correct the problem.

**DSVs and Late Blight:** From in-potato-field weather stations here in Wisconsin, we have exceeded initial threshold for Blitecast in all monitored locations. Accumulations of DSVs were moderate to low in most sites. However, in Grand Marsh, DSVs accumulated rapidly with maximum DSVs accumulated over the past 8 days – very promotive weather for late blight. I added some information in the above table to indicate increase in accumulated PDays and DSVs from previous week. A 5 to 7-day fungicide program is appropriate at this time given presence of pathogen in state and favorable weather. Cool nights are leading to very foggy mornings in many areas of the state which promote late blight.

In order to help better understand the epidemic at hand, **please submit samples to my lab** or work through your county agent and request that they send to me for genotyping. *Even if a sample has already been submitted from your county and determined to be US-23.* All we need to know is the county of sample origin. Identification of genotype at the county level would be very helpful in improving our understanding of this epidemic and potential future risks. Lab address is: Amanda Gevens, 1630 Linden Dr, Room 689, Plant Pathology Dept., University of Wisconsin, Madison, WI 53706. Please send infected leaves in a slightly inflated ziplock bag with no paper towel. Overnight shipping is best.

**PDays and Early blight:** P-Days have reached/surpassed the threshold of 300 in all plantings of potato in WI. Fungicide applications for the management of early blight are recommended at this time. Because of the dual risk of late and early blight, consider management options that control against both diseases. Symptoms of early blight are advancing in lower and mid-plant canopies throughout most of Wisconsin.

***Cucurbit Downy Mildew:*** has not been identified in Wisconsin at this time in commercial fields, home gardens, or our sentinel monitoring plots. **In the past week, many states reported cucurbit downy mildew including AL, GA, KY, MA, MI, NC, NJ, NY, PA, and WV.** In summary this year, AL, CT, DE, FL, GA, IN, KY, MD, MI, NC, NJ, NY, OH, PA, SC, TX, VA, WV, and Ontario Canada have reported cucurbit downy mildew across multiple cucurbit hosts. I will be keeping tabs on disease reports in the region and will provide updates in this newsletter. No forecasted risk of movement of spores from states reporting detects to Wisconsin at this time. Forecasts have the pathogen moving to the north and east of active sites at this time and we do not have inoculum sources to our direct south or west. The website: <http://cdm.ipmpipe.org/> offers up to date reports of cucurbit downy mildew and disease forecasting information.

The 2013 A3422 Commercial Vegetable Production in Wisconsin guide is available for purchase through the UW Extension Learning Store website: <http://learningstore.uwex.edu/Commercial-Vegetable-Production-in-Wisconsin2013-P540.aspx>

A pdf of the document can be downloaded or is available at the following direct link:  
<http://learningstore.uwex.edu/Assets/pdfs/A3422.pdf>



Vegetable Disease Update – Amanda J. Gevens, Assistant Professor & Extension Vegetable Plant Pathologist, UW-Madison, Dept. of Plant Pathology, 608-890-3072 (office), Email: [gevens@wisc.edu](mailto:gevens@wisc.edu). Vegetable Path Webpage: <http://www.plantpath.wisc.edu/wivegdis/>

**Late blight update:** In summary **this production season, late blight has been confirmed in 9 Wisconsin counties**, details specified in Table 1 below. Most recent determinations are indicated in red text.

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In order to help better understand the epidemic at hand, **please submit samples to my lab** or work through your county agent and request that they send to me for genotyping. *Even if a sample has already been submitted from your county and determined to be US-23.* All we need to know is the county of sample origin. Identification of genotype at the county level would be very helpful in improving our understanding of this epidemic and potential future risks. Lab address is: Amanda Gevens, 1630 Linden Dr, Room 689, Plant Pathology Dept., University of Wisconsin, Madison, WI 53706. Please send infected leaves in a slightly inflated ziplock bag with no paper towel. Overnight shipping is best.

**For further symptom and management information:**

**2013 WI organic tomato and potato late blight fungicides:**

<http://www.plantpath.wisc.edu/wivegdis/pdf/2013/Organic%20late%20blight%20control%202013.pdf>

**2013 WI commercial potato late blight fungicides:**

<http://www.plantpath.wisc.edu/wivegdis/pdf/2013/Potato%20Late%20Blight%20Fungicides%202013.pdf>

**Organic Vegetable Field Day Announcement – Date: Monday August 12, 2013**

**Dr. Erin Silva, Organic Vegetable Specialist, UW-Department of Agronomy**

Field Day Location:  
West Madison Agricultural  
Research Station  
8502 Mineral Point Rd,  
Verona, WI 53593  
PH(608) 262-2257

RSVPs Requested but not Required  
Please contact Erin Silva  
([emsilva@wisc.edu](mailto:emsilva@wisc.edu)) with RSVP's  
and questions

University of Wisconsin  
Organic Vegetable Field Day  
West Madison Agricultural Research Station

- 1:00– 1:15      Registration and Welcome – Walk to Fields**
- 1:15 – 1:35      Carrot Improvement for Organic Agriculture (*Phil Simon,*      **USDA)****
- 1:35 – 2:00      Organic potato Variety Trials and Mulching Studies (*Ruth*      **Genger, UW**  
*Plant Pathology)***
- 2:00 – 2:20      Producing Vegetables with Living Mulches (*Anne Pfeiffer, UW*  
*Horticulture)***
- 2:20 – 2:35      Organic No-till Vegetable Production  
(*Erin Silva, UW Agronomy)***
- 2:35 - 3:00      Organic Variety Trials: Sweet Corn, Leafy Greens, Winter      **Squash,**  
Carrots, and Snap Peas  
(*Erin Silva, UW Agronomy)***
- 3:15-3:30      Organic Raspberry High Tunnel Production  
(*Jesse Dahir-kanehl, UW Horticulture)***
- 3:40-4:00      Veggie Compass Cost of Production Tool  
(*Erin Silva, UW Horticulture)***



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## Disease Supplement #7 – August 9, 2013

Vegetable Disease Update – Amanda J. Gevens, Assistant Professor & Extension Vegetable Plant Pathologist, UW-Madison, Dept. of Plant Pathology, 608-890-3072 (office), Email: [gevens@wisc.edu](mailto:gevens@wisc.edu). Vegetable Path Webpage: <http://www.plantpath.wisc.edu/wivegdis/>

This supplement provides some clarification of fungicide label allowances for disease management in conventional potato systems.

There have been some questions on which **chlorothalonil** formulations have Special Local Needs use extensions for long season potatoes grown in Wisconsin. The table below summarizes the formulations and their allowable use rates.

<u>Fungicide Trade Name</u>	<u>Active Ingredients</u>	<u>Fungicide Groups</u>	<u>Manufacturer</u>	<u>Maximum Allowable Use</u>
<b><u>Bravo Ultrex</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>Syngenta</u>	<u>16.0 lb a.i./acre/year</u> <i>has WI Special Local Needs label expires 2017</i>
<b><u>Bravo Weather Stik</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>Syngenta</u>	<u>16.0 lb a.i./acre/year</u> <i>has WI Special Local Needs label expires 2017</i>
<b><u>Bravo Zn</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>Syngenta</u>	<u>16.0 lb a.i./acre/year</u> <i>has WI Special Local Needs label expires 2017</i>
<b><u>Chloronil 720</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>Syngenta</u>	<u>11.25 lb a.i./acre/year</u>
<b><u>Chlorothalonil 720 SC</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>Arysta LifeScience</u>	<u>11.25 lb a.i./acre/year</u>
<b><u>Echo 720</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>SipcamAdvan</u>	<u>16.0 lb a.i./acre/year</u> <i>has WI Special Local Needs label expires 2014</i>
<b><u>Echo 90DF</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>SipcamAdvan</u>	<u>11.25 lb a.i./acre/year</u>
<b><u>Echo Zn</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>SipcamAdvan</u>	<u>16.0 lb a.i./acre/year</u> <i>has WI Special Local Needs label expires 2014</i>
<b><u>Equus 500 Zn</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>MANA</u>	<u>11.25 lb a.i./acre/year</u>
<b><u>Equus 720SST</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>MANA</u>	<u>11.25 lb a.i./acre/year</u>
<b><u>Equus DF</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>MANA</u>	<u>11.25 lb a.i./acre/year</u>
<b><u>Initiate 720</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>Loveland</u>	<u>11.25 lb a.i./acre/year</u>
<b><u>Initiate Zn</u></b>	<u>chlorothalonil</u>	<u>M5</u>	<u>Loveland</u>	<u>11.25 lb a.i./acre/year</u>



**Mefenoxam and metalaxyl** fungicide formulations can effectively control sensitive strains of ‘water mold’ pathogens causing pink rot, late blight (US-23, US-22), and tuber rots. The table below provides some clarity on allowable uses.

<u>Fungicide Trade Name</u>	<u>Active Ingredients</u>	<u>Fungicide Groups</u>	<u>Manufacturer</u>	<u>Allowable Use</u>
<b><u>Ridomil Gold Bravo SC</u></b>	<u>chlorothalonil + mefenoxam</u>	<u>M5+4</u>	<u>Syngenta</u>	<u>Can be applied to foliage to row touch at 2.5 pt/acre. Pre-harvest interval (PHI) is 14 days.</u>
<b><u>Ridomil Gold MZ WG</u></b>	<u>mancozeb + mefenoxam</u>	<u>M3+4</u>	<u>Syngenta</u>	<u>Can be applied to foliage at up to 2.5 lb/acre. For late blight, up to 4 applications can be made, beginning preventatively. Subsequent applications should be separated by 14 days for control. Applications should end when rows touch. 3 applications can be made for storage rot control, separated by 14 day intervals. PHI is 3 days in WI.</u>
<b><u>Ridomil Gold SL</u></b>	<u>mefenoxam</u>	<u>4</u>	<u>Syngenta</u>	<u>In-furrow application only with Ridomil Gold SL. Label states, “you may need to follow this in-furrow application with a Ridomil pre-pack foliar application at tuber initiation” for storage rots.</u>
<b><u>Ridomil Gold/Copper</u></b>	<u>copper hydroxide + mefenoxam</u>	<u>M1+4</u>	<u>Syngenta</u>	<u>Can be applied to foliage to row touch for storage rots and late blight. For late blight control, tank mix 1 pack of Ridomil Gold Copper (5 lb. product)/2.5 acres plus base protectant such as mancozeb or chlorothalonil. Begin program before infection. Apply no later than when plant foliage meets in row. Can make up to 3 applications separated by 14 days. PHI is 14 days.</u>
<b><u>Ultra Flourish</u></b>	<u>mefenoxam</u>	<u>4</u>	<u>Syngenta</u>	<u>Can be applied to foliage at flowering at 6.4 fl oz/acre. And, can be applied 2 additional times as needed, separated by 14 days for control of storage rots. Tank-mix with base protectant such as chlorothalonil or mancozeb. PHI is 14 days.</u>
<b><u>MetaStar 2E</u></b>	<u>metalaxyl</u>	<u>4</u>	<u>LG International</u>	<u>Can be applied to foliage at flowering at 12.8 fl oz/acre. And, can be applied 2 additional times as needed, separated by 14 days for control of storage rots. Tank-mix with base protectant such as chlorothalonil or mancozeb. PHI is 14 days.</u>



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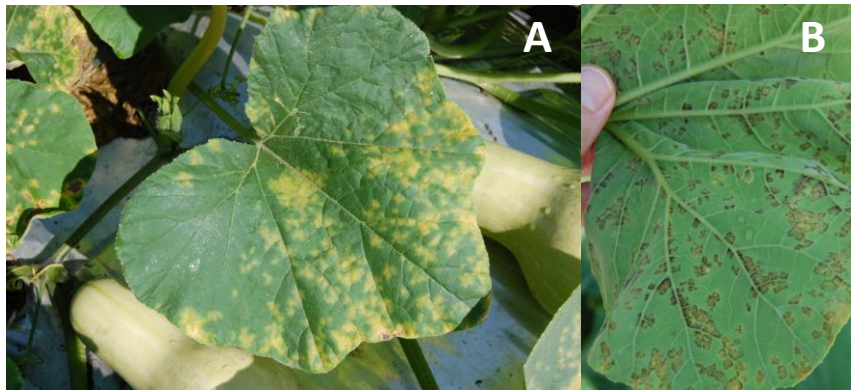
**Cucurbit Downy Mildew has been visually diagnosed in Jefferson County, Wisconsin this morning on melon and winter squash crops. Cucumbers grown on the same farm appear to be unaffected.**

I have had no additional reports of the disease on commercial, home garden, or sentinel cucurbits yet today, but suspect that the southern tier of Wisconsin may have received inoculum about one week ago. Growers of all cucurbits should carefully inspect their plants for symptoms shown below in Figure 1. Earliest symptoms may appear as slightly off-color or pale leaves, mimicking N deficiency. Check leaf undersides for most diagnostic pathogen signs – the dense brown, gray, sometimes purple masses of sporulation. If the bottom of the leaf looks ‘dirty’ in distinct patches and top of leaf has a yellow to brown discoloration in same patch – downy mildew may likely be involved. The pathogen can spread rapidly due to prolific spore production on leaf undersides (Figure 2).

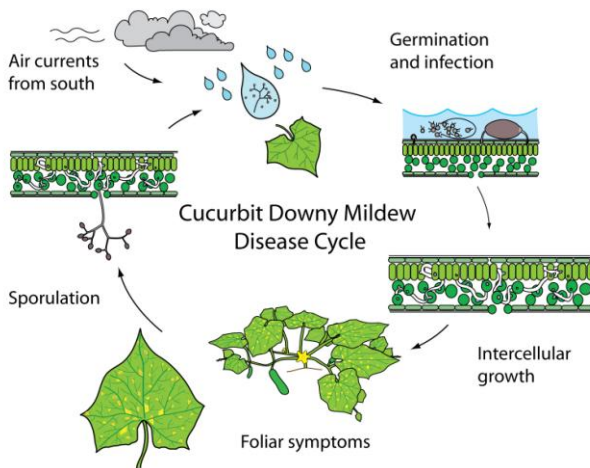
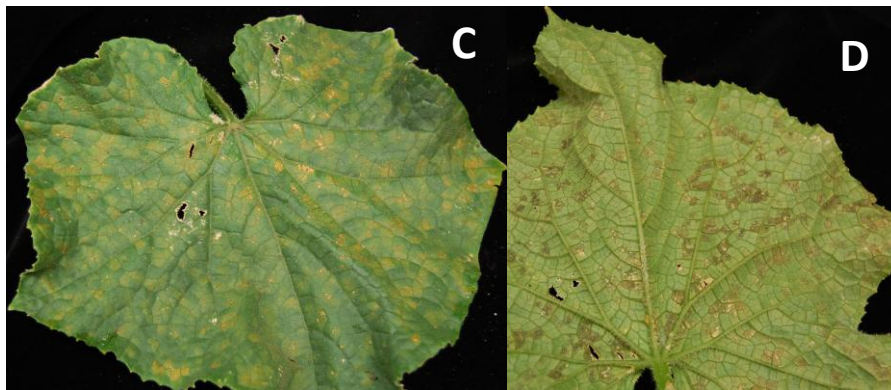
Reiteration from Newsletter #16 – August 12, 2013: In the past week many states reported cucurbit downy mildew on multiple hosts including AL, CT, DE, KY, MD, MI, NC, NY, OH, PA, and VA. In summary this year, AL, DE, FL, GA, MD, MI, NC, NJ, NY, OH, PA, SC, TX, VA, and Ontario Canada have reported cucurbit downy mildew across multiple cucurbit hosts. I will be keeping tabs on disease reports in the region and will provide updates in this newsletter. **Prior to this detection, there was no forecasted risk of movement of spores to Wisconsin at this time. However, it is important to recognize that the forecast is driven by reports of field infection. Since we now have the pathogen in the state within Jefferson County, it is likely that counties to its south may have been exposed and counties to the north and east of Jefferson are at risk of spore movement and downy mildew infection. With the addition of this report to the Cucurbit Downy Mildew Forecasting Center, forthcoming forecasts will include our inoculum source and map movement.** The website: <http://cdm.ipmpipe.org/> offers up to date reports of cucurbit downy mildew and disease forecasting information.

Early detection and management of this disease is critical. Please contact your UWEX county agent, crop consultant, or myself if you suspect downy mildew in cucurbits. Tentative diagnoses can generally be made based on good email pictures, but confirmed diagnoses will require physical sample to confirm sporulation by magnification or other technique. Samples can be sent to the Plant Disease Diagnostic Clinic or to the UW Vegetable Pathology Laboratory at 1630 Linden Dr. Rm. 689, Plant Pathology Dept., Univ. of Wisconsin, Madison WI 53706.





**Figure 1. Symptoms and signs of cucurbit downy mildew.** A. Yellow angular lesions on butternut squash. B. Dark brown pathogen sporulation on leaf underside of butternut squash. C. Yellow angular lesions on pickling cucumber. D. Dark brown pathogen sporulation on leaf underside of pickling cucumber.



**Figure 2. Disease cycle of cucurbit downy mildew (*Pseudoperonospora cubensis*).** The pathogen is not known to overwinter in Wisconsin. Pathogen may sporadically arrive mid- to late-season depending upon weather conditions and disease progress. Spores arrive typically from more southerly locations. Favorable weather includes wet and warm – cloudy conditions are very promotive to downy mildew. Infection and disease progress to observable lesions can occur in 3-5 days. New spores produced on leaf undersides can further spread to healthy crops within field and to other farms at distance on the wind.

**Once identified in a region, cucurbit downy mildew should be carefully managed with effective fungicides.** I have included fungicide recommendations for cucurbit downy mildew below – based on efficacy trials and recommendations of Dr. Mary Hausbeck at Michigan State University.

<b>CUCUMBER</b>	
<b>Fungicides applied BEFORE disease 7 day interval</b>	<b>Fungicides applied AFTER disease 5 day interval</b>
Gavel 75WG (5 day phi)	Presidio 4FL (2 day phi)
Presidio 4FL (2 day phi)	Previcur Flex 6SC (2 day phi)
Previcur Flex 6SC (2 day phi)	Ranman 3.6SC (0 day phi)
Ranman 3.6SC (0 day phi)	Tanos* 50WG (3 day phi)
Tanos* 50WG (3 day phi)	
Zampro 4.4SC (0 day phi)	
Alternate products and mix with either: mancozeb (ie: Dithane) OR chlorothalonil (ie: Bravo)	Alternate products and mix with either: mancozeb (ie: Dithane) OR chlorothalonil (ie: Bravo)
Use of the highest labeled rate of products is recommended. *NOTE: Tanos did not provide adequate control of downy mildew when used alone on cucumbers during a 2011 MI field trial.	

<b>OTHER VINE CROPS such as pumpkin, winter squash, melon, gourds, zucchini</b>	
<b>Fungicides applied BEFORE disease 7-10 day interval</b>	<b>Fungicides applied AFTER disease 7 day interval</b>
Gavel 75WG (5 day phi)	Presidio 4FL (2 day phi)
Presidio 4FL (2 day phi)	Previcur Flex 6SC (2 day phi)
Previcur Flex 6SC (2 day phi)	Ranman 3.6SC (0 day phi)
Ranman 3.6SC (0 day phi)	Tanos* 50WG (3 day phi)
Tanos* 50WG (3 day phi)	
Zampro 4.4SC (0 day phi)	
Alternate products and mix with either: mancozeb (ie: Dithane) OR chlorothalonil (ie: Bravo)	Alternate products and mix with either: mancozeb (ie: Dithane) OR chlorothalonil (ie: Bravo)
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Dr. Sally Miller, Vegetable Extension Pathologist with The Ohio State University offers a nice fact sheet on Cucurbit Downy Mildew control in organic production systems (link below). Unfortunately, cultivar resistant options are limited. Copper has been shown to have some efficacy when applied in advance of infection.

Organic Cucurbit Downy Mildew Control: <http://ohioline.osu.edu/hyg-fact/3000/pdf/3127.pdf>

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