Vegetable Crop Insects
By Joanne Whalen, DE Extension IPM Specialist  
jwhalen@udel.edu

Cole Crops
As soon as plants are set in the field, be sure to sample for cabbage looper and diamondback larvae. A treatment will be needed before larvae move into the hearts of the plants. In recent years, we have seen more Harlequin bug activity in cole crops. In general, most of the "worm" materials are not effective on Harlequin bugs. The pyrethroids have provided control in years past.

Lima Beans
We continue to find low levels of spider mites in isolated fields in Kent and Sussex counties. Be sure that you continue to sample for mites in your routine sampling each week. Early detection and control before populations are exploded is necessary to achieve effective control. We continue to see an increase in stinkbug and plant bug populations. As soon as pin pods are present, be sure to watch carefully for plant bug and stinkbug adults and nymphs. As a general guideline, treatment should be considered if you find 15 adults and/or nymphs per 50 sweeps. Also be sure to begin sampling for corn earworm. A treatment will be needed for corn earworm if you find one corn earworm larva per 6 foot-of-row.

Melons
Continue to scout all melons for aphids, cucumber beetles, and spider mites. We continue to see rind feeding from cucumber beetle adults and a variety of caterpillars. If beet armyworm is in the mix, it is important to select a material that is effective on this insect (refer to the Commercial Vegetable Recommendations) – The pyrethroids do not provide effective control.

Peppers
At this time of year, corn borer, corn earworm, beet armyworm and fall armyworm are all potential problems in peppers. So be sure to select the material that will control the complex of insects present in the field. Sprays will be needed on a 7 to 10-day schedule once pepper fruit is ¼ – ½ inch in diameter for the complex of worms present. Be sure to check local moth catches in your area by calling the Crop Pest Hotline (instate: 1-800 345-7544; out of state: 302 – 831-8851) or visit our website at: http://agdev.anr.udel.edu/trap/trap.php

At this time, you will also need to consider a treatment for pepper maggot. We are starting to find aphids in fields and populations can explode quickly, especially where beneficial insect activity is low. As a general guideline, treatment may be needed if you find one or more aphids per leaf and beneficial activity is low.

Snap Beans
Sprays are needed at the bud and pin stages on processing beans for corn borer control. An earworm spray may also be needed at the pin stage. You will need to check our website for the most recent trap catches to help decide on the spray interval between the pin stage and harvest for processing snap beans. Once pin pods are present on fresh market snap beans, a 7 to 10-day schedule should be maintained for corn borer and corn earworm control: http://agdev.anr.udel.edu/trap/trap.php http://extension.udel.edu/ag/insect-management/insect-trapping-program/ecb-and-cew-moth-catch-thresholds-for-processing-snap-beans/.

Sweet Corn
Be sure to sample all fields from the whorl through pre-tassel stage for corn borers, corn earworms and fall armyworm. A treatment should be considered when 12-15% of the plants are infested in the whorl stage. Since fall armyworm feeds deep in the whorls, sprays should be directed into the whorls and multiple applications are often needed to achieve control. The first silk sprays will be needed as soon as ear shanks are visible. Be sure to check both blacklight and pheromone trap catches for silk spray schedules since the spray schedules can quickly change. Trap catches are generally updated on Tuesday and Friday mornings You can also call the Crop Pest Hotline (in state: 1-800-345-7544; out of state: 302-831-8851) or at: http://agdev.anr.udel.edu/trap/trap.php http://extension.udel.edu/ag/insect-management/insect-trapping-program/action-thresholds-for-silk-stage-sweet-corn/)
**PEST ALERT**

Kudzu Bug Discovered on Maryland

Alan W. Leslie
Ph.D. Candidate, Entomology
University of Maryland

Go to the LAMP lab

Alan Leslie and Veronica Johnson at the University of Maryland, Entomology “Lamp Lab” have found the invasive insect known as the kudzu bug in Anne Arundel, Calvert, and Prince George’s Counties on kudzu vines.

To help keep everyone informed of their searches, the Maryland Kudzu Survey Website has been launched; This website will help disseminate information on the insect as it is collected.

University of Maryland
Potato Late Blight Advisory

By Kate Everts, Vegetable Pathologist,
University of Delaware and University of Maryland;
keverts@umd.edu

Reminder: we do not have active late blight in Maryland at this time.

Late blight forecasts are being generated for eight locations across Maryland based on the programs Blightcast and Simcast. The information below indicates the current spray interval that Simcast has recommended for the week of August 12th. Simcast requires information on specific fungicide applications in a field. Therefore, I am reporting the Simcast spray interval as a guideline only. The spray intervals in Table 1, are based on the assumption that chlorothalonil, which has a 5-day spray interval, was used. Table 2 shows the residual activity of some other common fungicides used for potato late blight. If you have sprayed something other than chlorothalonil, find the product in the table and adjust your spray interval accordingly.

There are numerous fungicides now labeled for late blight control. See the 2013 Commercial Vegetable Production Recommendations, Maryland

Table 1 Late Blight Disease Severity Value (DSV) Report

<table>
<thead>
<tr>
<th>Location</th>
<th>DSV</th>
<th>Simcast spray interval recommendation*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorchester Co.</td>
<td>249</td>
<td>5-day</td>
</tr>
<tr>
<td>Germantown</td>
<td>302</td>
<td>6-day</td>
</tr>
<tr>
<td>Clinton</td>
<td>302</td>
<td>6-day</td>
</tr>
<tr>
<td>Owings</td>
<td>272</td>
<td>5-day</td>
</tr>
<tr>
<td>Severn</td>
<td>305</td>
<td>5-day</td>
</tr>
<tr>
<td>White Marsh</td>
<td>missing</td>
<td>5-day</td>
</tr>
<tr>
<td>Mechanicsville</td>
<td>272</td>
<td>5-day</td>
</tr>
<tr>
<td>Oakland</td>
<td>396</td>
<td>4-day</td>
</tr>
</tbody>
</table>

*Spray interval recommendation is based on production of a susceptible cultivar and application of a protectant fungicide such as chlorothalonil. A 50% emergence date of May 1 was estimated for Dorchester Co., Clinton, Owings, Severn, Mechanicsville, and White Marsh. A 50% emergence date of May 5 was estimated for Germantown, and May 10 for Oakland.
Cucurbit Downy Mildew
By Kate Everts, Vegetable Pathologist,
University of Delaware and University of Maryland
keverts@umd.edu

Until this past week, the only cucurbit crop with downy mildew in the area was cucumber. However this past week I have confirmed downy mildew on watermelon, cantaloupe, butternut squash, and giant pumpkin, including hubbard squash. This means that all cucurbits should be protected with a targeted fungicide spray. For specific details see: http://extension.udel.edu/ag/vegetable-fruit-resources/commercial-vegetable-production-recommendations

We have good products available for this disease. Organic growers are strongly advised to use copper applications to slow the spread of this disease in their production fields.

In addition, keep good powdery mildew materials in your spray program. Powdery mildew has also moved into the area.

<table>
<thead>
<tr>
<th>Product</th>
<th>Efficacy on Downy Mildew</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presidio (43)</td>
<td>excellent</td>
</tr>
<tr>
<td>Ranman (21)</td>
<td>excellent</td>
</tr>
<tr>
<td>Zampro</td>
<td>excellent</td>
</tr>
<tr>
<td>Revus (40)</td>
<td>good in alternation or tank mix</td>
</tr>
<tr>
<td>Previcur Flex (28)</td>
<td>? (the pathogen may be developing resistance)</td>
</tr>
<tr>
<td>Tanos (11 + 27)</td>
<td>good in alternation or tank mix</td>
</tr>
<tr>
<td>Curzate (27)</td>
<td>good in alternation or tank mix</td>
</tr>
</tbody>
</table>

Figures A and B.

Downy mildew lesions on pumpkin are initially seen on the upper surface as angular water soaked or yellow spots (A) that are limited by the leaf veins. The angular nature of the lesions is especially evident on the lower leaf surface where sporulation occurs (B). Look for grey angular lesions on the under surface of leaves after dewy nights. Lesions will expand and become necrotic over time.

Management of downy mildew should use the following products tested in our area. Select two that are in different FRAC code groups, and alternate them and tank-mix with a protectant such as chlorothalonil or Gavel.

Unusual Virus Found in Maryland Pumpkin Field
By Jerry Brust
IPM Vegetable Specialist, UME
jbrust@umd.edu

Last week I was in a pumpkin field that had foliar symptoms of a Potyvirus (fig. 1), but also had some other strange foliar symptoms (fig. 2). Foliar samples were sent off to Agdia, Inc. (Elkhart, IN) for virus testing. All samples tested positive for a potyvirus (most likely watermelon mosaic virus), while one field tested positive for a virus called Melon necrotic spot virus (MNSV). MNSV is in a family of viruses called carmoviruses, which have been reported worldwide, primarily in hydroponic and greenhouse cucurbit production. The virus is soil borne, which means it stays in the soil and is vectored by a soil inhabiting chytrid fungus, Olpidium sp. Chytrids are primitive root fungi that infect roots but usually do not cause serious damage on their own. When the fungus releases spores into the soil, the virus attaches itself to the outer shell of the spore. Then when the spore germinates and penetrates a healthy root, it transmits the virus into the plant. The virus can also be transmitted to other plants mechanically, such as when plant leaves rub together or during harvest activities. The virus can also be transmitted through infected seed. Symptoms of MNSV begin as tiny, clear, round spots, usually on the youngest leaves. These spots gradually enlarge, becoming brown in the centers (fig. 2). Eventually, the brown spots expand and coalesce to the point that they resemble a foliar disease such as anthracnose (figs. 2 and 3).
MNSV has been found on most cucurbits such as watermelon, cantaloupe, squash, pumpkin, and cucumber usually under greenhouse situations. Although found on pumpkin, very little is known about this virus in field production. It was found in about 10% of the pumpkin fields in Oklahoma in 2011. At this point in time we do not think it presents much of a problem, except in certain scenarios. Growers who grow pumpkins (or any cucurbit) in a field on a very short rotation (1-2 years) or keep their own seed may have a greater chance for MNSV infection, which may show as virus-like or other odd unexplained foliar symptoms in the field early in the growing season, producing weaker plants and reduced yield. If a grower had a situation like this it would be important for them to take a sample and test it for the presence of viruses. Longer rotations may be warranted if MNSV was found.

BMSB and SWD Update for Central & Western Maryland
By Bryan Butler, Principal Agent, UME Carroll County & Mid-Maryland Tree Fruit Agent

BMSB numbers and damage this season have not been as intense as we might have thought as we went into winter last year. However, things may be getting ready to change in the next few weeks. It has seemed this season that BMSB has been looming on the borders and in wooded areas since June but in the last couple of weeks all stages of BMSB have really been on the rise in corn and on wild hosts in the borders. Every once in a while they seem to be moving into orchards and other crops but, with all the moisture we have experienced this season, the population seems to be dispersed on many host plants. Monitoring the perimeters has shown some fairly large numbers in corn and an increased interest in soybeans but damage has not appeared to be significant in horticultural crops that are being well managed. It appears to me from what I see in my travels and talking to people in the area, this is really a pest that will behave very specifically to different locations. Some locations always seem to have more pressure than others but it appears that there is almost always tremendous variation from site to site and from week to week. This will make the management of this pest even more challenging than other pests because we will not be able to make broad statements like “now is the time to spray for BMSB” management, it will need to be site specific.

As we move into the end of the 2013 season, and as the number of crops in the fields begin to decrease, it is important to remember BMSB numbers tended to increase in the 2008-2012 seasons and 2013 will most likely be following the same trend. That could mean trouble for late crops. We have seen increasing BMSB captures in light traps and baited pyramid traps in many locations. In addition, bugs have been found in orchard blocks near woodlots in one location – likely moving in from wild hosts. At WMREC, numbers in fall raspberries and apples are definitely on the rise.

This information is presented simply to encourage everyone to be vigilant in terms of scouting your specific location and cautioning not to rely too much on what is going on in other areas, especially considering the value of the late crops.

As far as SWD, this pest appears to have become ubiquitous where we have been sampling. Based on last year’s monitoring, numbers will continue to increase through the late fall. It will be important to keep a close
There is no question this is a pest that we will have to deal with in the long term and it certainly does not make any of our lives easier. However, I do not think this is going to be catastrophic to soft fruit production. I feel this way because I have observed this season when SWD has appeared to flare up in fruit, that after closely examining the circumstances there have been reasons that predisposed the crop to infestation, i.e. absence of insecticides or allowing the crop to over ripen, and when the larva in the fruit were reared out, many of them were not SWD but rather other fruit flies that have been around a long time. I have also had to dissect fruit to look more closely than I ever have before to find the larva in the fruit and wonder if there has been a certain number of fruit fly larva in the fruit in seasons past that went undiagnosed. And possibly the most encouraging news to me from this year’s monitoring program has been that samples of strawberries, sweet cherries, tart cherries, black raspberries, blackberries, and blueberries collected from eight farms have revealed no or very low numbers of SWD in the fruit.

Rotational Planning and Cover Crops
By Gordon Johnson,
DE Extension Vegetable & Fruit Specialist;
gejohn@udel.edu

Vegetable growers should take time to revisit their rotations and plans for the next growing season. Decisions on fall rotational crops or cover crops will need to be made soon.

Start by listing your goals. Some goals for vegetable rotations include:

- **Returning organic matter to the soil.** Vegetable rotations are tillage intensive and organic matter is oxidized at a high rate. Cover crops help to maintain organic matter levels in the soil, a critical component of soil health and productivity. Brassicas and winter legumes provide the most biomass followed by ryegrasses and then rye.

- **Providing winter cover.** By having a crop (including roots) growing on a field in the winter you recycle plant nutrients (especially nitrogen), reduce leaching losses of nitrogen, reduce erosion by wind and water, and reduce surface compaction and the effects of heavy rainfall on bare soils. Cover crops also compete with winter annual weeds and can help reduce weed pressure in the spring.

- **Providing fall and early winter cover and then winter killing.** The use of winter killed cover crops are very useful when early spring (March or April) plantings of vegetable crops such as potatoes, peas, cole crops, early sweet corn, or early snap bean crops are being planned. By winter killing, cover crop residue is more manageable and spring tillage and planting can proceed more quickly.

- **Reducing certain diseases and other pests.** Cover crops help to maintain soil organic matter. Residue from cover crops can help increase the diversity of soil organisms and reduce soil borne disease pressure. Some cover crops may also help to suppress certain soil borne pests, such as nematodes, by releasing compounds that affect these pests upon decomposition. One system would be planting mustards in August or early September, tilling them into the soil to provide some biofumigation in October, and then planting a small grain crop for winter cover. Spring planted mustards can also work ahead of later spring planted vegetables.

- **Providing nitrogen for the following crop.** Leguminous cover crops, such as hairy vetch or crimson clover, can provide significant amounts of nitrogen, especially for late spring planted vegetables. Hairy vetch is particularly well suited for no-till systems and can provide full nitrogen requirements for crops such as pumpkins and partial requirements for crops such as sweet corn, tomatoes, or peppers.

- **Improving soil physical properties.** Cover crops help to maintain or improve soil physical properties and reduce
compaction. Roots of cover crops and incorporated cover crop residue will help improve drainage, water holding capacity, aeration, and tilth. The use of large tap rooted cover crops such as forage radish or oilseed radish are particularly well adapted to these uses.

- **Setting up windbreaks in the fall for spring planted vegetables.** Small grain crops will overwinter and grow tall enough in to provide wind protection for spring planted vegetables. Rye has been the preferred windbreak because tall types are still available and it elongates early in the spring. While barley is also early, tall varieties are not generally available. Wheat and triticale are intermediate and later.

- **Developing no-till, bio-strip-till, and bio-bed preparation systems.** There is much opportunity to increase the amount of no-till and bio-tillage systems. The key will be selecting the right cover crop for the desired system. Rye, crimson clover, subclover, tillage radish, spring oats, and other cover crops have been used successfully for no-till vegetables. One innovative system that uses a combination of winter killed covers and standard covers is bio-strip-till. In this system, a high biomass cover crop such as rye or vetch is planted with strips of forage or oilseed radish in rows where spring planting will occur. Another system uses rye strips with forage radish planted where the beds will be next year.

  Cover crop planting windows vary with crop and timely planting is essential to achieve the desired results. There are many cover crop options for late summer or fall planting including:

**Small Grains**

Rye is often used as a winter cover as it is very cold hardy and deep rooted. It has the added advantage of being tall and strips can be left the following spring to provide windbreaks in crops such as watermelons. Rye makes very good surface mulch for roll-kill or plant through no-till systems for crops such as pumpkins. It also can be planted later (up to early November) and still provide adequate winter cover. Wheat, barley, and triticale are also planted as winter cover crops by vegetable producers.

Spring oats may also be used as a cover crop and can produce significant growth if planted in late August or early September. It has the advantage of winter killing in most years, thus making it easier to manage for early spring crops such as peas or cabbage. All the small grain cover crops will make more cover with some nitrogen application or the use of manure.

To get full advantage of small grain cover crops, use full seeding rates and plant early enough to get some fall tillering. Drilling is preferred to broadcast or aerial seeding.

**Ryegrasses**

Both perennial and annual ryegrasses also make good winter cover crops. They are quick growing in the fall and can be planted from late August through October. If allowed to grow in the spring, ryegrasses can add

significant organic matter to the soil when turned under, but avoid letting them go to seed.

**Winter Annual Legumes**

Hairy vetch, crimson clover, field peas, subterranean clover, and other clovers are excellent cover crops and can provide significant nitrogen for vegetable crops that follow. Hairy vetch works very well in no-till vegetable systems where it is allowed to go up to flowering and then is killed by herbicides or with a roller-crimper. It is a common system for planting pumpkins in the region but also works well for late plantings of other vine crops, tomatoes and peppers. Hairy vetch, crimson clover and subterranean clover can provide from 80 to well over 100 pounds of nitrogen equivalent. Remember to inoculate the seeds of these crops with the proper Rhizobial inoculants for that particular legume. All of these legume species should be planted as early as possible – from the last week in August through the end of September to get adequate fall growth. These crops need to be established at least 4 weeks before a killing frost.

**Brassica Species**

There has been an increase in interest in the use of certain Brassica species as cover crops for vegetable rotations.

Rapeseed has been used as a winter cover and has shown some promise in reducing the levels of certain nematode in the soil. To take advantage of the biofumigation properties of rapeseed you plant the crop in late summer, allow the plant to develop until early next spring and then till it under before it goes to seed. It is the leaves that break down to release the fumigant-like chemical. Mow rapeseed using a flail mower and plow down the residue immediately. Never mow down more area than can be plowed under within two hours. Note: Mowing injures the plants and initiates a process releasing nematicidal chemicals into the soil. Failure to incorporate mowed plant material into the soil quickly, allows much of these available toxicants to escape by volatilization.

Turnips and mustards can be used for fall cover but not all varieties and species will winter over into the spring. Several mustard species have biofumigation potential and a succession rotation of an August planting of biofumigant mustards that are tilled under in October followed by small grain can significantly reduce diseases for spring planted vegetables that follow.

More recent research in the region has been with forage radish. It produces a giant tap root that acts like a bio-drill, opening up channels in the soil and reducing compaction. When planted in late summer, it will produce a large amount of growth and will smother any winter annual weeds. It will then winter kill leaving a very mellow, weed-free seedbed. It is an ideal cover crop for systems with early spring planted vegetables such as peas. Oilseed radish is similar to forage radish but has a less significant root. It also winter kills. Brassicas must be planted early – mid-August through mid-September – for best effect.
Mixtures
Mixtures of rye with winter legume cover crops (such as hairy vetch) have been successful and offer the advantage, in no-till systems, of having a more rapidly decomposing material with the longer residual rye as a mulch. Other winter legume-small grain, winter legume-Brassics, small grain-Brassica, and small grain-winter legume-Brassica combinations have been successful.

Cereal Cover Crop Seeding Rates
What is Acceptable?
By Bob Kratochvil
Agronomic Crops Specialist, UME
rkratoch@umd.edu

Maryland’s Cover Crop Program is viewed as the most successful water quality improvement initiative in the Chesapeake Bay region. Low seed germination was widespread in 2008 as a result of the severe Fusarium outbreak in the region. Low seed germination is again an issue for 2013 as a result of sporadic Fusarium outbreaks in some areas and some pre-harvest sprouting caused by the rainy harvest experienced this year. The Program’s recommended seeding rates for cereals are: rye (112 lb or 2 bu/acre); wheat (120 lb or 2 bu/acre) and barley (120 lb or 2½ bu/acre). The question that many are asking is: How do I attain an acceptable stand when the germination of my seed lot is below the standard of 80%? MDA is recommending that you contact your Extension office to get assistance regarding what an acceptable stand is. This article will hopefully help you adjust to low germination cereal cover crop seed.

University of Maryland Extension recommends that farmers planting cereals for commodity production use a seeds/ft² approach which allows compensation for seed lot size variation. The Maryland Cover Crop Program mandates volume rates (2 bu/a for rye and wheat; 2½ bu/a for barley) when any of these species are planted as a cover crop. A two-year study that was funded by MGPUB compared cover crop performance of these three species when planted at volume and three seeds/ft² treatments. The results of that research are the basis for the following cover crop seeding rate recommendations for the cereal species. Examples of seeding rates for low germination seed lots for the three cereal species are provided in the Recommendations below.

Summary of Research Findings
• Two years of research indicated that the seeding rates for cereal species used as cover crops can be less than the volume rates described by the current Maryland Cover Crop Program regulations.
• This research indicated that seeding rates for the cover crop program should be defined as seeds/ft² because this method accounts for the variations in seed size that can occur among species and for different seed lots within a species.
• Regardless of species planted, when a seeds/ft² method is used, it is important to know both the seed size and germination of the seed lot to be used.
• Planting cereal cover crops at a seeds/ft² rate should result in cost-savings because a lesser amount of seed would be required. An exception would occur when seed size for the species used is exceptionally large.
• Amount of N uptake that will occur will vary by amount of residual N present at a location.
• Amount of N uptake will generally be greater for earlier planted cereal cover crops than for later planted cereal cover crops.

Recommendations
• The following seeding rate recommendations require that cereal cover crops be planted using a tillage practice that incorporates the seed into the soil, i.e. planting with a grain drill or broadcasting seed followed by incorporation with either a vertical tillage implement or a disk. The goal is to establish as uniform a stand as possible.
• Rye cover crop should be planted at 30 - 35 viable (adjusted for seed lot germination) seeds/ft². Example: a rye seed lot with 85% germination would require 35 - 41 seeds/ft² to be planted. Low germination example: a rye seed lot with 75% germination would require 40 - 47 seeds/ft² to be planted.
• Wheat cover crop should be planted at 20 - 25 viable seeds/ft². Example: a wheat seed lot with 90% germination would require 22-28 seeds/ft² to be planted. Low germination example: a wheat seed lot with 70% germination would require 29 - 36 seeds/ft² to be planted.
• Barley cover crop should be planted at 24 - 30 viable seeds/ft². Example: a barley seed lot with 90% germination would require 27 - 33 seeds/ft² to be planted. Low germination example: a barley seed lot with 75% germination would require 32-40 seeds/ft² to be planted.
**WMREC Horticultural Crops Twilight**

**When:**
Wednesday, August 21, 2013 - 5:00pm to 7:30pm
Add to Calendar: [iCalendar](#) [Outlook](#) [Google](#) [Yahoo](#)

**Where:**
Western Maryland Research and Education Center
University of Maryland Extension
18330 Keedysville Road
Keedysville, MD 21756
United States

Sandwiches and refreshments will be provided.
Registration is not required, but will help us to plan for handouts and refreshments.
Please RSVP to 410-386-2760/888-326-9645 or e-mail mabott@umd.edu

Questions? Contact Bryan

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**WyeREC Horticultural Crops Twilight**

**When:**
Wednesday, August 28, 2013
5:00 pm – 7:30 pm

**Where:**
Wye Research and Education Center
211 Farm Lane
Queenstown MD 21658

Sandwiches and refreshments will be provided.
Registration is not required, but will help us to plan for handouts, food and drinks. Reply to: Debby Dant, 410-827-8056 X115, ddant@umd.edu or Michael Newell, 410-827-7388, mnewell@umd.edu

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**Vegetable & Fruit Headline News**

A bi-weekly publication for the commercial vegetable and fruit industry available electronically in 2013 from April through September on the following dates: March 21; April 18; May 9 & 23; June 6 & 20; July 11 & 25; August 15; September 12.

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**Article submission deadlines for 2013:** March 20; April 17; May 8 & 22; June 5 & 19; July 10 & 24; August 14; September 11.

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