

Weed Control with Callisto® in Cranberries

Jed Colquhoun and Jack Perry
University of Wisconsin - Madison

What is Callisto? Callisto is a new herbicide registered for use in cranberry production. It is available on a supplemental label to the full Section 3 label (the label that is attached to the herbicide container). The supplemental and full Section 3 label must be in possession of the user at the time of application, and all directions, restrictions and precautions on the EPA-approved Section 3 label must also be followed. Be sure to check with your state regulatory agency or appropriate Extension personnel to make sure that Callisto is registered on cranberry in your state.

How does Callisto work?

The active ingredient in Callisto is mesotrione. Mesotrione is an

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Ed Pappas Joins Company as Manager of Research & Development



Ed Pappas

Ed Pappas began work for Clement Pappas & Co., Inc. on April 2nd as Manager of Research and Development. Ed is the son of Peter Pappas and joins three other 3rd generation family members already working in the company, including brother Clement and cousins Aleni Pappas and Dimitri Pappas. Following the pattern set by his brother and two cousins, Ed is joining the company after building an impressive educational and work resume before joining the family business.

Ed graduated from Colgate University in Hamilton, New York in 2001 with a degree in English and Chemistry. After college, he moved to Boston, MA where he began work as an analytical chemist for Charles River Laboratories, a contract pharmaceutical laboratory. After three years working as an analytical chemist, Ed decided to begin a Master's degree program at Rutgers University in food science. While working towards his Master's degree, and after having a research paper accepted for publication, he switched his program to immediately begin work on his PhD. He is now finishing up the last phases of his research and working on his doctoral thesis as he begins his new job with Pappas. Ed's doctoral thesis, stated simply, examines different processing and storage variables and how they affect the color and nutraceutical value of cranberry juice. (As a guess, Clement Pappas and Company supplied product for his research studies.)

Apparently, hard work is agreeable with Ed. While taking classes and conducting research on his doctoral degree, he also worked part and full time for three years at Hagelin & Co., Inc., a flavor and fragrance manufacturer located in Branchburg, New Jersey. Interestingly, Hagelin & Co., Inc., like Clement Pappas is also a privately owned family business. Ed's work at Hagelin was also as an analytical chemist. While there, he set up and formalized a Quality Control department within the company. Ed's experience in a laboratory environment started early. He worked 8 different summers in the Clement Pappas New Jersey plant. In seven of those summers, he worked in the lab.

In his current role at Pappas, Ed is part of a team that develops new formulas for various customers. It is a busy role, with more than 40 formulas developed in the last month alone.

Ed is married, as of six months ago. He and his wife, Alexis are settling in the Philadelphia area. ☺

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HPPD-inhibitor herbicide that blocks the synthesis of pigments, called carotenoids, that protect the chlorophyll or light-capturing portion of the plant. Mesotrione is taken up by plant roots and shoots, and is translocated or “piped” in the plant’s vascular system to the site of action.

Plants that tolerate mesotrione, such as cranberry and corn, use enzymes to breakdown the herbicide into metabolites that are no longer toxic to the plant. In the case of mesotrione, the breakdown enzyme is called cytochrome P450. Occasionally, tolerant plants can be injured when the enzyme is not able to rapidly metabolize the herbicide. There are two situations when this may occur: 1) when plants are stressed by cool weather, drought, or other poor growing conditions; and, 2) when the enzyme is inhibited by other pesticide products. For instance, some organophosphate and carbamate insecticides inhibit the cytochrome P450 enzyme, thus injury may occur in some plants when mesotrione is applied before or after these insecticides (see Section 3 label for details).

Symptoms of Callisto are usually fairly obvious (Figure 1). The lack of carotenoid pigment leads to a



Figure 1. Severe (left), moderate (middle), and mild (right) Callisto symptoms.

bleaching of plant tissue. More severe symptoms appear white, moderate symptoms are often pinkish, and mild symptoms may appear as dark or yellowish speckles. Some moderately tolerant plants may outgrow the bleaching damage and resume normal growth. Sensitive species eventually dry down to a brown, desiccated carcass.

Callisto use in cranberry: research observations

Note: This summary is based on field research experiences in Wisconsin. Please read the supplemental and Section 3 labels for use rates, directions and precautions.

- *Use rates and application timings.* In general terms, weed control in research trials has been best when Callisto was applied to emerged but young weeds (early post-emergence). Late post-emergent applications, or

combinations of two applications (with at least 14 days between applications; see label for maximum use rates), can also be useful. Keep in mind that it is hard to stop a freight train: late season control of weeds that are well-established and/or reproductive is very difficult and may require higher herbicide rates than early post-emergent applications. In new plantings, Wisconsin research suggested that lower rates adequately controlled weeds and could be a good starting point. Please see the label for application timings based on cranberry growth stages for both bearing and non-bearing vines.

- *Avoid applications to stressed plants.* Do not apply if the cranberry vines are stressed by drought, rapidly fluctuating temperatures, previous injury, or other factors.
- *Use a calibrated sprayer.* The Callisto use rate is much lower than several other herbicides registered on cranberry, therefore, a small deviation in the dose could result in crop damage or illegal application rates. Be sure to apply with a recently calibrated sprayer. Do not apply aerially or with a wick wiper. ☞


Figure 2. Examples of weeds controlled by Callisto, including sedges (left), rushes (middle), and yellow loosestrife (right).



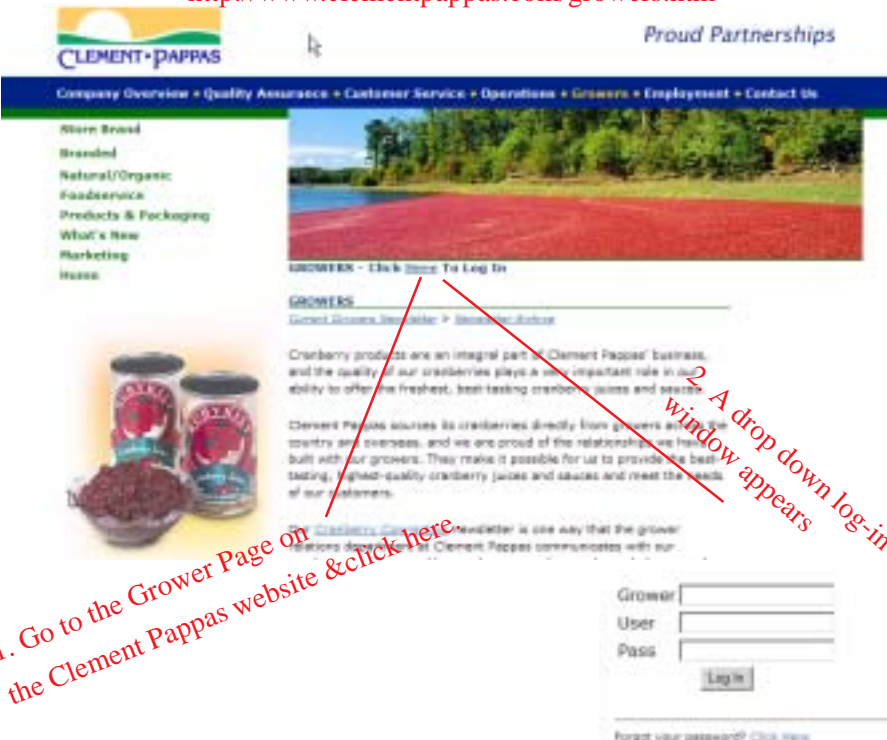
Grower Account Information Now Available at [clementpappas.com](http://www.clementpappas.com)

Clement Pappas cranberry growers can now access their account information online, 24 hours a day. This web access should prove to be especially useful during harvest to get the latest delivery information from the receiving station, including quantity delivered and the QC results. A number of growers have already logged onto the website. If you have not logged on yet, all you need to do is send your email address to Brooke Peterson at bpeterson@clementpappas.com. You will receive a response from “grower accounts” with a temporary password. To log onto the site, you will need that password and your Clement Pappas grower number. Once you’re logged in, you will be obliged to change your password (to another password that is guaranteed to be easier to remember than the auto-generated one you will receive by email). Here’s how to get started:

1. Go to [Clementpappas.com](http://www.clementpappas.com)
2. Click on the “Growers” link
3. On the Grower page, click on the log-in button
4. Answer the Grower (number), User (owner) and Password query and click the log-in button.

In addition to grower delivery information, payment information is also available on the website. 

<http://www.clementpappas.com/growers.htm>



1. Go to the Grower Page on the Clement Pappas website & click here.


2. A drop down log-in window appears

Pesticide Application Record Keeping

Every year, in the spring time, growers get a reminder from Clement Pappas to maintain good pesticide application histories on all cranberries that will be delivered to Pappas. Consider this a reminder to do just that! Of course, this means only applying registered materials according to the label and observing the necessary pre-harvest intervals. We always scrutinize these application histories to ensure compliance before accepting any deliveries. Additionally, each year we do a random pre-harvest sampling of cranberry beds and perform laboratory analyses of the

fruit to ensure only registered materials are used and any residues are within the legal tolerance.

The efforts just described help to support Clement Pappas Company’s adoption of a “Safe Quality Food” (SQF) program. This program is a fully-integrated food safety and quality management protocol. It is based on a number of previous food safety and quality programs (e.g. HACCP, Codex, ISO and Quality Management Systems) and managed by the Food Marketing Institute. Clement Pappas’ participation in this stringent program ensures the food we

produce is safe. Participation in the program is being driven by some of our largest customers. Very large retailers want to assure their customers that the food they buy is safe. Some of the largest food retailers are adopting the SQF program as a standard. As a major juice and beverage company, we will participate, which, in turn, puts additional pressure for compliance on our suppliers (e.g. Growers). We already have safe guards in place, as described in the first paragraph. The SQF program just reminds us how important it is to keep doing a good job at what we are already doing. 

Important Changes Made to the 2008 Pesticide Charts

If you have not already received a copy, call the Cranberry Institute (508 759-6855) for a copy of the 2008 Pesticide Chart for your area. The following are some important changes and comments to note in this year's charts:

MA, WI, NJ

- This year the chart contains two new insecticides: Avaunt® and Assail®, a new herbicide: Callisto® and a new fungicide: Indar®.
- Delegate is a new product which is a replacement for SpinTor®.
- Please check the REI (re-entry interval) because some changes have been made this year.

MA & WI

- Please note that Diazinon 14G is registered only in Massachusetts and Wisconsin. This state label will run out at the end of this year and we don't expect it to be renewed.

Wisconsin

- Tank mixing of Orthene® 97 is allowed for water-based Diazinon only.
- There are still restrictions where Intrepid® can be used. We are working with the regulatory agencies to reduce these restrictions but progress is slow. ☹



Brooke Peterson and Rob Hiller in the Clement Pappas booth at the Wisconsin Cranberry Growers' Association annual meeting trade show

Cranberry Juice Market News

The following comments are from our Marketing Department.

In today's world of cranberries, there are a variety of cranberry juices that are manufactured by National Brand and Private Label companies. The entire Cranberry Juice category as a whole is up +1.9% with Private Label representing a share of 22.3%. Listed below are a few of the most popular types of Cranberry Juices:

- Regular Cranberry Juice continues to have steady growth. 64oz Private Label Cranberry is the #2 selling item.
- Lite Cranberry Juice has maintained popularity perhaps due to consumers becoming more health conscious. Diet Ocean Spray continues to experience substantial growth and already has a 4.9% share of the market. This creates a great opportunity for Private Label to pursue. Private Label is currently only selling "Lite" items. Diet is a different segment that provides consumers more options. Lites are made with low-calorie sweeteners and typically are 2/3 fewer calories than regular cranberry juice, where Diets contain a lower percentage of juice content and are only around 5 calories per 8oz serving.
- 100% Cranberry Juice is a category that has maintained stability by growing 6.3% over the last 52 weeks. Private Label has been a strong contributor representing a share of 19.8% and is currently the #2 selling brand. Analyzing the latest five year trend, 100% Cranberry and Blends continue to experience growth.
- Organic Cranberry Juice is an item that is also growing in popularity due to consumer health awareness. When analyzing our sales against SPINS, the leading provider of syndicated data for the Natural Products Industry (but does not report on Private Label sales), Clement Pappas 64oz Organic 100% Cranberry Juice Blend outperforms SPINS #1 seller by over 400,000 units.
- 100% Pure Cranberry is another item that is beginning to become popular and Clement Pappas has become a leader in bringing this product to Market in a 32oz size.

The Cranberry is recognized as a Superfruit, which is defined as a fruit that has nutrients and antioxidants which provide health benefits. Other examples of Superfruits are Pomegranate, Blueberry and Acai. The introduction of the Pomegranate created a huge opportunity for Cranberry and consequently Private Label developed a Cranberry/ Pomegranate which is doing well. ☹

Fertilizer Timing 101

Early summer, which is all but upon us, is the time to begin intensively managing the fertility of cranberry beds. Which fertilizer? How much? When? – are questions of intense interest..... for a couple of reasons. Number one; growers want to maximize the response to the application. Number two; fertilizer prices and the fuel needed to fertilize is going through the roof. With these thoughts in mind, the following comments are gleaned from University Research and Extension workers. Since University research and extension personnel have the responsibility to be unbiased and “scientific”, their observations and recommendations are especially valuable.

NITROGEN (N)

According to Teryl Roper from the Univ. of WI, the optimum timing for applying Nitrogen is; budbreak, peak bloom, fruit set, and pre-harvest, with the optimal rate being about 20 pounds per acre.

Cranberries are shallow rooted plants, so multiple applications are logical. Incidentally, any N from lightning is nitrate nitrogen (NO_3), a molecular form not available to cranberries. Besides, this nitrogen source has been present in all fertility studies and should not be considered as part of the 20 lb requirement. Many growers have their own particular timings that they swear by and some of these growers get excellent yields- two comments here: If your neighbor consistently gets above average yields and he's very particular about his fertilizer timing, pay attention. Number two, use leaf and soil analyses and knowledge of your own site, including soil type to guide you. Measuring N level in the plant is more useful than soil analysis.

PHOSPHORUS (P)


Phosphorus is an element that is important as an essential macro-element. It is getting the most attention however because of the potential to be an environmental pollutant. Phosphorus and nitrogen runoff can cause algal blooms in nearby lakes and streams. Having said this, P is relatively immobile in the soil. A logical way to avoid over-fertilizing with P is to use fertilizer formulations with less P (e.g. N-P-K of 14-14-14 vs. 6-24-24). To limit negative environmental impact and to save money, it is important to recognize that research shows no response to added P fertilizer beyond 20 lbs per acre/ year. This is about 45 lbs of P_2O_5 / acre/ year. Generally, the yearly dose of P should be applied in 2-3 doses beginning in late spring. The standard Bray test for soil phosphorus is unreliable for cranberries. Foliar analysis is better. Teryl Roper and others are working on development of a more reliable soil test.

POTASSIUM (K)

Recent University of Wisconsin research is now being focused on Potassium. Potassium nutrition is even more difficult to sort out in cranberries than P. Unlike P, K is leachable and so light frequent applications are more important than several large applications. 60-100 lbs/ acre of K_2O appears sufficient. High K was correlated with decreased calcium, magnesium, and iron. Research also shows that yield, fruit number, fruit size and fruit color do not vary by rate of K application. In fact, very high K applications (240 lbs K_2O / acre) reduced yield in one trial.



Conclusions:

1. Applying more than the recommended amounts of N, P, or K will not increase yield, but will cost more money and is not good for the environment. The old adage, “If a little bit is good, more is better” doesn't apply.
2. Cranberries are a very shallow rooted plant without large biomass in which to store nutrients. Therefore, smaller, more frequent applications are the way to go.
3. Timing N applications around budbreak, peak bloom, fruit set, and pre-harvest is recommended. P timing is less critical, partly because P is not very mobile in the soil. While K application timing is less critical, other than to say that it is mobile in the soil and smaller more frequent applications are better.
4. More in-depth information on cranberry nutrition is available on-line at the University of [Wisconsin Cranberry Crop Management Library](#). 

Upcoming Events:**May 20, 2008**WSCGA Weed Management Workshops.
AM- Wisconsin Rapids, PM- Plainfield.Please contact Jane Anderson by phone at 715 423-2070, ext. 2 or email: janea@wctc.net to register. No charge.**August 13, 2008**WI State Cranberry Growers' Association Summer Meeting, Field Day & Trade Show
Wisconsin Cranberry Discovery Center, Warrens, WI**August 19, 2008**

Cape Cod Cranberry Growers' Association Summer Meeting & Field Day

August 21, 2008

American Cranberry Growers' Association Summer Meeting, New Jersey

August 21-22, 2008

Cranberry Institute Summer Meeting, New Jersey (following ACGA Summer Meeting)

Clement Pappas & Co., Inc.
One Collins Drive, Suite 200
Carneys Point, NJ 08069