HUMATES AND HUMIC ACID

Recently there has been much promotion in Wisconsin of Humates or Humic acid as products that would increase yields in cranberry. These are typically available as two different types of products. One is a soil amendment that is in a granular form and the other is a liquid that is to enhance foliar nutrient uptake.

Humate and humic acid are naturally occurring materials. They are components of humus that is the portion of soil organic matter that is left after the initial decomposition. Since different soil have different organic matter contents and this is decomposed to different degrees, the amount of humus and humic acid varies in soils. Humus contains about equal portions of proteins, lignins and complex sugars. Humus is about 60% carbon, some oxygen, 5% oxygen and small amounts of sulfur and phosphorus. Humic acid is the medium sized portion of soil humus and cannot be dissolved by acid. Humus may increase a soil's cation exchange capacity (ability to hold and release cations such as K^+, Ca^{++}, or NH_4^+). *See sidebar on cation exchange capacity.* Over time humic acid will break down and release nitrogen.

Dr. Joan Davenport (Ocean Spray), C. DeMoranville (Univ. of Mass.) and J. Carpenter (Virginia Tech) tested both types of humate products and reported their results in the August 1995 Cranberries Magazine. This article will summarize their findings.

The following studies were conducted:

- A pot study using sand from both Wisconsin and Massachusetts. Sand was used because sandy soils are naturally low in humus.
- An aeroponic culture study where cranberry roots are misted with a liquid nutrient solution and no naturally occurring humates are present.
- Field studies using different rates of the liquid or granular product on a nutritionally poor site with and without supplemental fertilizers. *(Continued next page)*

CATION EXCHANGE CAPACITY

Cation exchange capacity (CEC) describes a soils ability to retain and release positively charged ions. Many essential plant nutrients are positively charged such as NH_4^+, K^+, Ca^{++}, Fe^{++}. Ions that are held in exchange sites resist leaching by water, but are subject to replacement by other positively charged ions. For example, if you apply ammonium sulfate fertilizer the ammonium ions may replace other ions such as Ca^{++} in the soil. Fertile soils have high CEC for their soil texture.

You can think of this being like your water softener. The resin is charged with sodium ions. As water goes through the resin the calcium in the water replaces the sodium on the resin and is kept out of the remainder of the plumbing.

Typical CEC values are:

Sands	1-5
Fine sandy loams	5-10
Loams & silt loams	5-15
Clay loams	15-30
Clays	>30

The treatments in the field study were a control, 400, 800 or 1200 pounds of granular humate per acre split in two applications at rough neck and fruit set. The liquid product was applied with or without a supplemental liquid NPK product supplying 15 lbs N/a.

At the end of the season the plots were evaluated for yield, mean berry weight and field and storage rot. The treatments had no effect on rot.

The treatments did have an effect on yield and mean berry weight. The treatment with the supplemental liquid fertilizer but without humate had the highest yield. The plots that received the 800 or 1200 lb/a rate of humate had the lowest yield. The 800 lb/a rate of humate had the lowest mean berry size.

The response to humate in this study was poor. The granular humate depressed yields at a location that was both sandy and nutritionally poor—where humate is supposed to have the best effect. When humate was added as a liquid to improve the uptake of foliar applied nutrients, yields were reduced. Exactly opposite the desired effect. For this location the foliar nutrients alone were the best choice. Dr. Davenport also reports two additional studies where humic acid supplements were included as treatments where they had no positive effect on yield.

In the pot study four rooted cuttings were planted in native sand or sand augmented with 100 or 300 lb/a humate. After 12 weeks there was no effect on plant growth measured as survival, fresh weight or dry weight of roots and/or shoots.

In the aeroponic study none of the plant weight (growth) factors were altered significantly by the humic acid treatments.

The conclusions from these studies are that granular humate and liquid humic acid did not have a positive effect on yield or plant growth. Therefore, there is no reason for growers to purchase and apply these products. In fact, under some conditions the humate products may have actually reduced yield and growth.

The authors of the study do not recommend applying humates to cranberries and neither do I. If someone recommends that you apply such a product to your cranberry marsh ask them for research data comparing yields with and without their product for the same year and location.

Teryl Roper, UW-Extension Horticulturist
This article was adapted from "Humates and humic acids as supplements for cranberry production" by J.R. Davenport, C. DeMoranville, J. Carpenter. Cranberries Magazine August 1995.

WHAT IS A WEED?

A weed is a plant whose virtues have not yet been discovered. A weed is just. . . out of place. Sometimes what we call a weed pest is someone else's crop. Take clover for example. It can be a real challenge for us in a cranberry bed, but for a forage crop farmer it is his livelihood.

Most recently we have been searching for the good qualities in some of our weeds. We believe that everything is there for a reason and not just to annoy us! Look at the beautiful "Bouncing Bet". It can be found along any highway with its white or pink flowers dancing in the breeze of passing cars. We have stopped and picked a bouquet and discovered the fragrance is most pleasant. A Readers' Digest book entitled "North American Wildlife" sheds more light on this one to two foot tall flower. Stating that it is five petaled, in dense clusters, leaves elliptical to lance shaped and it can by found anywhere. Now this particular species is also called soapwort and when it is mixed with water the bruised leaves of these European weeds produce a soapy lather that has been used since ancient times for laundry and bathing. Bouncing Bet came to North America with the colonists and went west with the pioneers, spreading quickly from their gardens along the way. Its cleansing action makes it a useful home remedy for poison ivy. As the book states, "Bouncing Bet is from the Pink Family (*Caryophyllaceae*) but the common name (Bouncing Bet) is an old fashioned name for a washerwoman.

We are seeing "Bouncing Bet" on many of our scouted marshes. It is nice to know that a Weed can have such favorable characteristics and be so beautiful at the same time.

The "control of nature" is a phrase conceived in arrogance, born of the Neanderthal age of biology and the convenience of man.

Rachel Carson

GYPSY MOTH PROGRAM UPDATE

An intensive burlap banding program is in place to survey possible infestations for caterpillars. Burlap band have been set at 75 sites in northeast Wisconsin. DNR surveyors visit the sites periodically, lifting up the burlap to expose caterpillars, their cast skins, pupae or other evidence of Gypsy Moth. Live caterpillars are then shipped to the UW-Madison quarantine facility where they are examined for evidence of parasitism or disease. Gypsy moth caterpillars or pupae have been found at nine locations in five northeast counties: Brown, Door, Manitowoc, Kewaunee, and Oconto. Most of the caterpillars were found beneath these burlap bands wrapped around tree trunks by surveyors to attract caterpillars. The six inch wide burlap bands provide shade and cool temperatures preferred by the late instar caterpillars as they seek places to rest during hot summer days.

The first adult male moth trapped in Wisconsin was found near Lake Geneva in Walworth County. (Information provided by WDATCP on July 27, 1996).

Jayne Sojka, Lady Bug IPM

SUMMER FIELD DAY

The Cranberry Summer Field Day will be held Wednesday August 7 at the McFarland Cranberry Company in Manitowish Waters. Marsh tours and exhibits will be held throughout the day. A WSCGA business meeting will be held in the afternoon. Drs. Dan Mahr, Patty McManus and Teryl Roper will be on hand to examine samples and to respond to questions. We hope to see you there.

I know of no pursuit in which more real and important services can be rendered to any country than by improving its agriculture, its breed of useful animals, and other branches of a husbandman's cares.

George Washington

ROUNDUP REMINDERS

Weed wiping with Roundup should be well underway by the time you read this article. Be sure to read the Roundup label before you begin an application. A few points warrant reminders.

- Coverage is the most important variable in Roundup efficacy. You must have excellent coverage of the weed leaf surface to get enough material into the plant to kill it completely. Dyes added to the wiping solution can help you tell where you have wiped.
- Increasing concentrations do not make Roundup more effective. Concentrations that are too high may be detrimental as they can kill the treated tissue before enough moves to the roots to kill the entire plant.
- Adding ammonium sulfate per the label specifications helps the active ingredient get into the plant cells and improves efficacy.
- Roundup requires a 6 hour rainfree period following application to move into plants. Don't apply if rain is imminent.
- Remember the 30 day preharvest interval.
- Keep the wiper surface free of debris. If part of the wiper surface is covered with dirt, leaves, etc. the herbicide can't get onto weed leaves.
- Remember the cut stump label for woody weeds. You can cut off the plant and treat the stump with a 50 to 100% solution.

Teryl Roper, Dept. of Horticulture, UW-Madison

I know of no occupation in life more barren of results than the permanent seeking of pleasure. Pleasure is a by-product of doing something that is worth doing. Therefore, do not seek pleasure as such. Pleasure comes of seeking something else, and comes by the way. The whole point of enjoying recreation is that it is not your permanent occupation. The man who is seeking pleasure as his main occupation in life never has any recreation because he can never turn to anything else.

A. Lawrence Lowell

SOIL PH

Cranberries require an acid soil and grow best with a soil pH between about 5.0 and 5.5, although I have seen cranberries grow at soil pH levels outside this range.

Soil pH is simply a way of expressing the concentration of free hydrogen ions (H^+) in the soil. pH ranges from 0 to 14. Each whole number increment represents a 10 fold change in the concentration of hydrogen ions. A soil with a pH of 4 has 10 times more free hydrogen ions than a soil with a pH of 5. A pH of 7 is neutral.

Soil pH is usually adjusted in agricultural settings by adding elemental sulfur. The sulfur is oxidized by soil bacteria and releases free hydrogen ions. Because the reaction is bacteria mediated the reactions can occur slowly. The reaction in the soil is:

$$2S + 3O_2 + 2H_2O \rightarrow 4H^+ + 2SO_4^{=}$$

The part of this reaction that acidifies the soil is the four hydrogen ions that are released, not the two sulfate ions. University recommendations are to apply no more than 500 pounds of elemental sulfur per year, preferably in a split application of 250 pounds each.

Soil can also be acidified by adding acids such as sulfuric acid (H2SO4) or hydrochloric (muriatic) acid {HCl}. However, these acids are very caustic and must be handled with care. ***We don't recommend using acids to modify soil pH because of the danger involved with their use.*** Muriatic acid contains chlorine that can be toxic to plants are high concentrations.

Sulfate containing fertilizers such as potassium sulfate (K2SO4) or ammonium sulfate have no effect on soil pH. However, when ammonium ions are taken up by plant roots the plant releases hydrogen ions in a 1 to 1 ratio and this may marginally reduce soil pH.

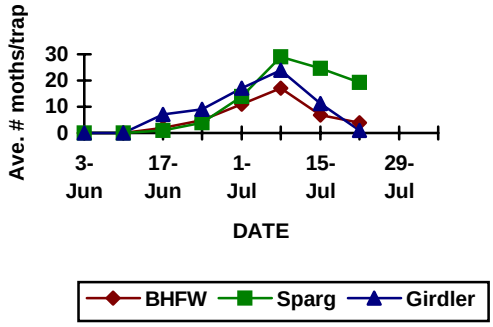
Teryl Roper, Dept. of Horticulture, UW-Madison

1996 Pheromone trap counts

Cranmoor area includes:	Adams, Portage and Wood counties
Warrens area includes:	Jackson, Juneau and Monroe counties
Northeast area includes:	Forest, Lincoln, Oneida, Price, and Vilas counties
Northwest area includes:	Barron, Burnett, Douglas, Rusk, Sawyer, and Washburn counties

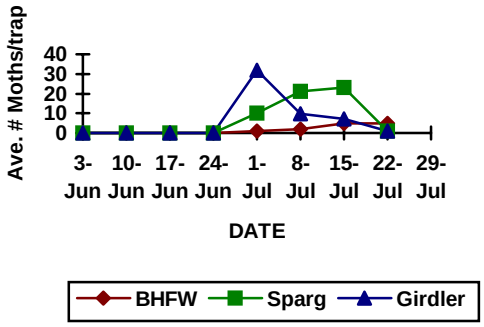
Please note that different regions may have different scales on the left axis. Doing this allows greater accuracy in determining actual values within a region. However, comparisons between regions are more difficult. Please use caution in making comparisons of these averages to trap counts on your marsh.

Northwest Area



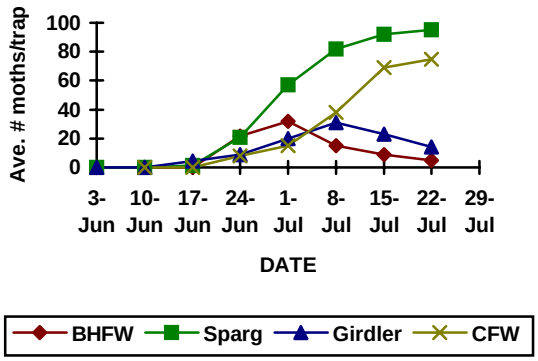
Means from 8 growers

Northeast Area



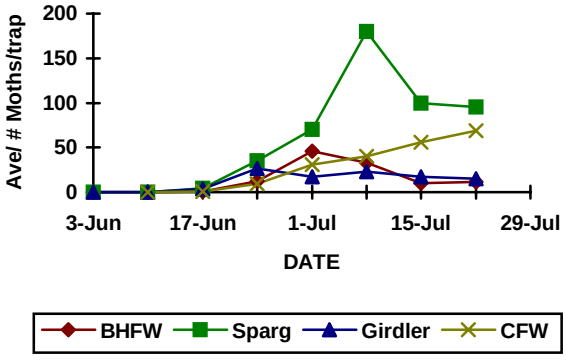
Means from 2 growers

Warrens Area



Means from 13 growers

Cranmoor Area



Means from 10 growers

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