



WESTVEG NEWS

The University of Arizona-Cooperative Extension

Western Vegetable Quality

November 2003

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Coming Next Issue:

Applying Methyl Jasmonate to Enhance Quality of Fresh-Cut Vegetables.

1. Coming Events:

14th Desert Crops Workshop

Enhance your knowledge and look at what's new in research on desert crops! The 14 annual desert crops workshop will be held from 8 am to 3 pm at the Barbara Worth Golf Resort and Convention Center, 2050 Country Club Drive, Holtville on December 3, 2003.

This year the program is very diverse including sixteen 20-minute presentations by researchers from the University of California, The University of Arizona and USDA-ARS, Salinas. Four of the presentations will address different topics on citrus. Three presentations will provide information on cantaloupes, one will address onion disease management and one sweet corn production. The program contains several presentations that provide diverse information on leafy vegetables.

California and Arizona continuing education credits have been applied for. More information may be requested by contacting Tom Turini at: taturini@ucdavis.edu, ph.: (760) 352-9474.

See you there!

24th Annual International Irrigation Show

November 18-20, 2003; San Diego Convention Center, San Diego, CA. For additional information, visit their website at http://www.irrigation.org/ia_show.htm

11th Annual Fertilizer Research and Education Program Conference

November 20, 2003; Edison AgTAC, Tulare, CA. For additional information, visit their website at <http://www.cdfa.ca.gov/is/frep>

2. Selenium fertilization on Vegetables Battle Against Cancer.

Vegetables with a high selenium content may be an effective means to promote health in our society. Can this information be used for adding value to crop vegetables from the Desert, if we discovered that vegetables from western USA show the highest amount of selenium?

Several studies have linked deficient levels of selenium in the diet with heart disease, cystic fibrosis, schizophrenia and notably with cancer. For example, a randomized clinical trial in the United States showed that selenium supplementation decreased the incidence of prostate, lung and colorectal cancer.

In countries where the incidence of this type of diseases is low the diet provides adequate levels of selenium. The Greek diet, for example, is rich in marine products, which provide adequate amounts of selenium. In Japan selenium levels in the diet have been declining while cancer mortalities have increased with the “westernization” of their diet.

Increased consumption of vegetables has been suggested to be one of the best ways to add selenium to the diet, but this is only achieved if selenium is available in the soil. In northern Mexico, selenium in vegetables account for 30% of the daily intake. Researchers from the Institute for Environmental Studies of the University of South Florida recently indicated that selenium fertilization does not affect germination of seeds and that in the case of lettuce, 95.5% of the selenium is retained in the edible portion. In some countries selenium fertilization is already a common practice. In Finland, selenium has been added to fertilizers since the early 1980's.

The encouraging news for the Western Vegetable industry is that several journal papers have shown that vegetables, and agricultural crops in general, from the USA have higher selenium content than produce from Europe, Australia and New Zealand. We suspect this is true with commodities from areas such as the Sonoran Desert. Selenium content appears to be low in farm soils east of the Mississippi river and in the Northwest. In some areas of the Southwest elevated levels of selenium in water sources can actually be a problem. However, toxic levels of selenium in vegetables seem to be very unlikely.

Some watermelons are now showing the line: “best source of lycopene” on the label. Perhaps we will be able to add to the label of vegetables from the western USA: “best source of selenium.”

3. Applications of Reflective Films in the Desert.

In times when growers are looking for efficient technologies to increase yield with minimal investment, or to reduce production costs, we might ask ourselves if reflective mulching can be of any benefit for vegetable production in the desert. From several reports we have learned that reflective mulching may or may not reduce insect infestation, but how about yield and quality? Has anyone out there tried reflective mulching on melons in the Desert?

Reflective films have been used in the commercial production of carnations in Japan since the late 80's. Faster growth and higher production have been obtained because the mulch reflects over 30% of the downward light according to Japanese researchers. In addition, plants grown with reflective films had higher CO₂ fixation and larger amount of assimilation products translocated to roots and leaves than in regular mulches. In South

Carolina and Georgia peach growers are starting to use reflective mulch to increase redness of the fruits.

James Stapleton and Charles Summer from the University of California Davis-Kearney Agricultural Center have conducted a series of studies using reflective films for production of cucurbits during the last few years. Although their work has focused on evaluating the films as insect repellents, it is interesting to note that they obtained an increase of muskmelon production of 100% compared to an untreated control (both control and mulched treatment did not have insecticides applied). In another study, the control included insecticide applications and they obtained an increase in yield of 60 to 105% in zucchini squash. A study conducted by researchers from the University of Tennessee showed that the number of bees and wasps was nearly twice as high in the reflective mulch area than in the control, which could partially explain the higher yields obtained in the melon and zucchini squash studies.

Results like those above indicate that reflective mulching could be economically feasible for Desert growers, particularly, when market price is high or for organic production. For example, the use of reflective mulch during late fall could allow higher yield and quality because the extra light intensity in the plant's surroundings may accelerate growth and development of the plant, while temperature in the soil would normally be 6-8 °F higher. This however, needs to be confirmed. The costs of implementing this technology (including installation and removal of the mulch) ranges between \$350 and \$500 per acre. Thus, economic benefits, which may be seen in the reduction of water and pesticide usage, weed control and increases in yield, should exceed those figures. Two common reflective mulches used commercially may be seen at: www.repelgro.com or www.sonoco.com. If you want to share any experience with reflective films, we really would like to learn about it. This fall, at the Yuma Agricultural Center, we are conducting a study on the effect of reflective film combined with calcium application, on yield and quality of muskmelons grown during late fall.

4. The Journal Magnifier:

- Controlled Atmosphere is Effective as Quarantine Treatment of Lettuce

Fumigation of lettuce with methyl bromide at ports of entry in countries with strict phytosanitary regulation like Japan is a recurrent nightmare for exporters. Methyl bromide causes severe damage to the lettuce quality and its use will be banned in the near future. Fortunately, a recent study indicates that there is hope with more benign treatments.

The Journal of Economic Entomology recently published a study by Liu Yong-Biao from USDA-ARS, Salinas, CA who evaluated the effect of vacuum and controlled atmospheres on insect mortality and quality of lettuce. Controlled atmosphere containing 6% carbon dioxide, for 4 days at 10 C, caused 100% mortality of aphids and 99.5% of leafminers. Moreover, the quality of the lettuce was not affected by this treatment. The study also showed that vacuum atmosphere was effective in controlling insects. It was recommended that the focus of further studies be on controlled atmosphere systems because the vacuum system is more difficult to implement. It appears that coming studies will target more diverse pest species under controlled atmospheres containing low carbon dioxide and low oxygen because. Levels of carbon dioxide higher than 10% cause injury to lettuce but it tolerates oxygen as low as 0.5%.

In 2001, U.S. exports of lettuce to Japan were valued at \$9.2 million, up 53 percent from the previous year. Is possible that all this lettuce came from Arizona and California.

Safe alternatives to methyl bromide like controlled atmosphere may boost the lettuce export industry.

5. Ask the specialist:

- Is Potassium Permanganate Effective in Reducing Ethylene in the Environment

It seems that the questions we are receiving in this section are exclusively about products that potentially reduce the action of ethylene in produce...

Unlike 1-MCP (see September *WestVeg News* issue), that prevents the action of ethylene by competing for the same binding site in the fruit or vegetable, potassium permanganate actually removes the ethylene from the produce surroundings. Potassium permanganate oxidizes ethylene to carbon dioxide and water.

The main factor that enhances the efficacy of this treatment is the type of material which is impregnated with the potassium permanganate. This material needs to have a large surface area and it needs to be highly permeable to gases. Some of the inert matrixes used are zeolite, alumina and limestone, cement and silica gel, vermiculite, pumice and brick. Different materials may be used for different uses. For storage of vegetables, potassium permanganate can be used in filter systems and particularly in sachets for individual units or boxes. Two common products may be seen at: www.ethylenecontrol.com and www.purafil.com.

Potassium permanganate has been used commercially for long time. It has extended the shelf life of a number of products including strawberries, bananas, mangos, tomatoes, pears and melons. However, the performance of potassium permanganate in removing ethylene, and extending shelf life, may vary depending on external conditions. Several factors, including ripening stage and potential pathogens, often reduce the benefits of using potassium permanganate.

Editor: Jorge Fonseca

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