

# The Americas Journal of Plant Science and Biotechnology

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**Cover photo:** An isolate of *Penicillium hirsutum* with deep red exudate on Czapek's agar. More details in Frank M. Dugan, pp 47-51.

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**Jane M-F Johnson, Mark D. Coleman, Russ Gesch, Abdullah Jaradat, Rob Mitchell, Don Reicosky, W. W. Wilhelm (USA)**  
Biomass-Bioenergy Crops in the United States: A Changing Paradigm (pp 1-28)

#### ABSTRACT

**Special Feature:** The world energy paradigm is changing from one based on petroleum to one based on a mixture of energy platforms. This change is precipitated by a finite petroleum supply, an expanding global demand, and political instability in areas with major petroleum reserves. The mixed energy platform will include an array of renewable energy sources. The agricultural and forestry sectors have the potential to provide several plant-based products. Corn (*Zea mays* L.) grain for ethanol has long been utilized at least in some locations. Soydiesel is an expanding market. Technology is rapidly advancing to utilizing crop biomass, perennial grasses, woody perennials and forest products for the production of ethanol via a cellulosic platform and/or utilizing pyrolysis to generate syngas and other products/co-products. Emerging specialty crops have potential to supply feedstock as well. Altering fundamental aspects of plant growth, development, and responses to biotic and abiotic stresses and the opportunities to increase productivity and conversion-process efficiencies are strategies to expand biomass availability and usage. As this new platform emerges, cellulosic ethanol production brings new concerns: competing uses for crop or crop products, co-products, competition for land base, and management strategies to protect soil, water, and climate resources. As the energy paradigm shifts, the balance among competing needs will be critical to achieve sustainable food, fiber, and energy while protecting the soil resource and the environment. This emphasizes avoiding potential negative environment consequences of new bioenergy technologies and presents strategies on how this may be achieved.

**Vincent M. Russo, Charles L. Webber III (USA)** Organic Agricultural Production in the United States: An Old Wheel Being Reinvented (pp 29-35)

#### ABSTRACT

**Invited Mini-Review:** Organic production is not a new concept that has been developed in the United States during the last part of the 20<sup>th</sup> century as an alternative to conventional agriculture. It can better be described as a resurgence of old ideas that have been combined with modern technology. The problems faced by practitioners of organic agriculture are the same as those faced by practitioners of conventional agriculture, i.e., establishment, maintenance, and harvesting of a crop or animal enterprise. What is different between the systems is the methodology by which the goal is attained. The road to the present state of organic agriculture in the US began before European colonization; the concept was influenced by the Industrial Revolution, and organic agriculture was almost dismissed by changes in demographics and the upsurge of technology that was applied to agriculture after World War 2. Concerns about the effects conventional agriculture was having on the environment, and the perception that organic food is healthier, has increased demand for organic products. The opportunities for expansion of organic production are present, but the demand is outstripping supply. The future for research includes finding answers about how to: control pests, pathogens, and especially weeds; development of a better understanding of the interaction of soil, water, microorganisms, plants and nutrients; and reduce costs of organic production. Participants in these endeavors include the organic farmer and state and federal research and regulatory organizations.

**Marcia Roye, Aneisha Collins, Melessa Brown, Cheryl Stewart, Shawna Gae Turner, Melaine Chin, Latanya Fisher, Paula Tennant, Wayne McLaughlin (Jamaica)** Plant Virus and Phytopathology Research in Jamaica: A Review (pp 36-45)

#### ABSTRACT

**Invited Review:** During the last twelve years, a number of plant viruses have emerged in Jamaica resulting in severe yield losses and potential threats to various economically important crops. Numerous begomoviruses have been characterized from several crops including tomato, red kidney bean, cabbage, papaya and several common weeds. *Papaya ringspot virus* (PRSV) is the most damaging virus pathogen to papaya and is presently a problem due to the intensification of the crop in recent years. Although *Citrus tristeza virus* (CTV) was first detected in Jamaica in the late 1950s, the pathogen currently poses a threat to the Jamaican citrus industry since the severe strain of CTV and one of its most efficient vectors, *Toxoptera citricida*, were recently confirmed in Jamaica. Research aimed at the distribution of these plant viruses affecting major agricultural crops and the structure of the virus populations is ongoing. The subject of this review is an analysis of the genetic diversity in the three virus

populations and factors contributing to their emergence. The challenge is to complement this analysis with appropriate diagnosis, quarantine activities and management of the diseases.

**Frank M. Dugan (USA)** Diseases and Disease Management in Seed Garlic: Problems and Prospects (pp 46-50)

#### **ABSTRACT**

**Invited Mini-Review:** Although garlic is occasionally propagated via true seed, routine planting of garlic uses seed cloves as vegetative propagules. The size of seed cloves (large relative to seed of most agronomic crops), their vegetative habit, and routine storage conditions for seed cloves (permissive for most fungi), create opportunities for pathogens and problems for growers. Several phytopathogenic fungi, including some newly documented as pathogenic to garlic, are able to infest or colonize bulb tissues and remain latent for some time subsequent to harvest. Infested or infected bulbs may appear healthy at time of shipping or receipt, and even for protracted periods of storage, but incubation at suitable temperatures can result in the appearance of rot. The potential for planting seed cloves containing pathogens, plus the capacity of several of these fungal pathogens for prolonged survival in field soil, implies that pathogens may be introduced into and contaminate field soils. Systemic fungicides used as pre-planting and/or post-harvest dips can promote plant health, but the large size of seed cloves insures that deep-seated infections are not eradicated. Viruses also persist in vegetative material, are unaffected by fungicides, have been detected in a high proportion of garlic grown as planting stock, and often have arthropod vectors that are difficult to control. To circumvent these problems, tissue culture is increasingly used to generate disease free planting stock.

**Esmail Fallahi (USA)** Effects of Application Time and Rate of 1-Aminoethoxyvinylglycine hydrochloride on Preharvest Fruit Drop, Quality, and Evolved Ethylene in 'Hi Early Delicious' and 'Law Rome Beauty' Apples (pp 51-55)

#### **ABSTRACT**

**Original Research Paper:** The effects of time and rate of 1-aminoethoxyvinylglycine hydrochloride (AVG or Aviglycine HCl or ReTain) application on fruit retention and quality in 'Hi Early Delicious' and 'Law Rome Beauty' apples (*Malus domestica* Borkh.) were studied between 1991 and 1993. In 1991, the application of AVG once at 75 ppm, three times at 150 ppm, or once at 225 ppm, 3 weeks before harvest of 'Hi Early Delicious' or 4 weeks before harvest of 'Law Rome Beauty' increased fruit retention and reduced ethylene evolution. In 1991, a treatment consisting of three applications of AVG, each at 150 ppm applied at 4, 6, and 10 weeks before the anticipated harvest time, was more effective in reducing fruit drop than other treatments in 'Law Rome Beauty'. The time of AVG application was more critical than the rate on suppression of ethylene evolution in both apple cultivars. In 1992, the application of AVG at most tested rates and frequencies affected either fruit retention and/or fruit quality attributes in 'Law Rome Beauty'. The application of AVG at 100 ppm as a single application or multiple applications maintained firmness and reduced starch hydrolysis more than the untreated control or application of 10 ppm  $\alpha$ -naphthaleneacetic acid (NAA) treatment in 'Law Rome Beauty' apple in 1992. Fruit retention, maturity and quality differences between AVG and the control or NAA treatments were more pronounced as the time past from the anticipated commercial harvest dates. Applications of AVG or NAA in 1992 did not affect the return fruit set in 'Law Rome Beauty' in 1993.