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Spring 2010

Dr. Harold Larsen Retires

Dr. Harold Larsen announced his retirement effective April 30, 2010. Harold joined the Department of Horticulture and Landscape Architecture in 1985 as an Assistant Professor with his principal assignment as research and extension fruit pathologist based at the Western Colorado Research Center (WCRC) – Orchard Mesa. He was promoted to Professor in 2006 based upon his sustained record of outstanding achievement in his research, extension, and service contributions to the fruit industry in Western Colorado.

Harold has been a tireless supporter of and contributor to the fruit industry in Western Colorado. He has been actively engaged in the planning and conduct of the annual Western Colorado Horticultural Society Conference and served as the chair of the Mesa County Agricultural Coordinating Committee for four years.

Over his years at WCRC, Harold has stepped into many roles as programs and staffing changes created "gaps" in serving the industry or in the operations of the WCRC. Consider that Harold has expanded his work and expertise to become the center's horticulturalist, chief technology expert, Interim Manager for the three sites comprising the WCRC and being a key contributor to the viticulture program. Among his accomplishments, Harold has become respected for his scientific contributions leading to better understanding and management of the peach mosaic problem. He has been instrumental in providing timely and relevant information through FruitFacts and Code-A-Phone, developing and validating crop phenology models for various sites in Western Colorado, conducting workshops for the beginner and advanced fruit grower and generating production guides, instructional CD's and other educational materials through his creative use of exquisite, compelling images from his own photography.

Harold's retirement is raising questions that illustrate the scope and impact of his departure. "Where is Harold" to solve problems with peach mosaic; put on peach orchard management workshops; edit our annual report; solve staff computer hardware and software problems; synthesize cropping conditions as input to the fruit growers network; redesign, find funding, and upgrade an irrigation system; update growers guides; find speakers for the Western Colorado Horticultural Society annual meeting; and answer grower and homeowner questions? And the list goes on.

Now when we ask "Where's Harold," we hope he is fishing, camping, and hiking; traveling with his wife, Faith, to complete their journey to all 50 states by taking a cruise to Alaska; spending time with his daughters, Kedra and Kami, and son, Kade; and exploring, bonding, and sharing himself with his grandchildren, Micah, Talithah, Benjamin, and David.

Thank you, Harold, and best wishes from all of us.

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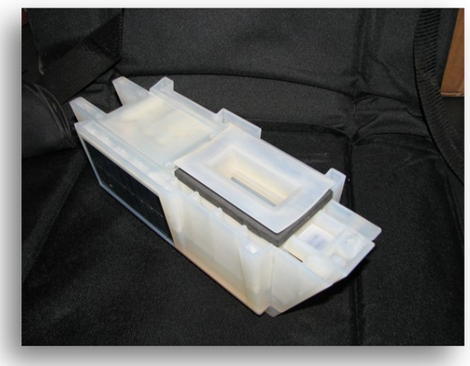
AGVA Units to be Evaluated in 2010 at WCRC-Fruita

The Automatic Gate Valve Actuator (AGVA) is a patent pending device that is attached to gated pipe and automatically opens and closes an individual gate using wireless technology via laptop computer. The AVGA was developed by clever people who live right here in western Colorado. During the 2010 growing season two studies will be conducted with the AGVA units: 1) Evaluate the performance of AGVA units in the laboratory and under field conditions, and 2) Evaluate AGVA units for increased water use efficiency under field conditions. This research will be conducted at the Colorado State University, Agricultural Experiment Station, Western Colorado Research Center (WCRC) at Fruita.

Increasing competition for water resources and demands for



irrigation practices that are environmentally friendly is ongoing motivation to use irrigation water more efficiently. Modernization and mobilization of advanced irrigation technology is essential to continued mitigation of local environmental issues and adoption of sustainable agricultural practices. In the USA, approximately 11 million (44,969 farms) of the 55 million irrigated acres (89,646 farms) are furrow irrigated and in Colorado, nearly 660,000 acres (6,578 farms) are furrow irrigated. Gated pipe continues to be widely used among many furrow-irrigated farmers today.

Surge irrigation was first introduced in 1979. It is the intermittent application of water to furrows in a series of on and off periods of similar or variable times. Fine Line Industries invention of the AGVA will advance the concept of surge irrigation. An AGVA unit is needed for each furrow. Thus, each furrow can be individually controlled using the AGVA unit that is assigned to that furrow. With the use of AGVA technology the concept of surge irrigation can now be targeted on a per furrow basis rather than a surge set that stretches across numerous consecutive furrows. Several types of irrigators will benefit from AGVA technology, including growers who have large crop production acreages, small and part-time landowners, and those irrigators with physical limitations.

Preliminary evaluation and data were collected at the WCRC - Fruita, Colorado on AGVA units during the 2009 growing season from several irrigations in corn and alfalfa. Field research with AGVA units will be conducted during the 2010 growing season by Principal Investigator Calvin H. Pearson at WCRC – Fruita. This research is made possible through a competitive grant obtained from the Bureau of Reclamation.

Manufacturing of AGVA units is targeted for 2010 and will create jobs in western Colorado and promote rural development and support agriculture locally and in other regions and states. It is envisioned in the near future that AGVA units would be linked with soil moisture and plant stress sensors to

use for irrigation scheduling that would lead to further increases in water use efficiency. It is also envisioned for the future that AGVA units can also be controlled via PDA and cell phone.

AGVA units offer the following prospects to improve irrigation water use efficiency:

- AGVA units will conserve water by applying water more uniformly on the field and in the amount needed to meet plant water needs.
- AGVA units will reduce the amount of tailwater and hence potential sediment loss by applying only the amount needed to meet plant water needs.
- Water use efficiency will be improved by the ability to easily and readily adjust stream head of individual furrows using AGVA units which will improve water conservation and water use efficiency by controlling the application and runoff/tailwater on a per furrow basis.

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Research Project Initiated in 2010 on Biomass and Bioenergy in Western Colorado

In December 2009, The Western Colorado Carbon Neutral Bioenergy Consortium (WCCNBC) was created as a partnership with CSU, Colorado Mountain College (CMC), The City of Rifle, and Flux Farm Foundation. Flux Farm is a nonprofit foundation based in Carbondale, Colorado. The Consortium was formed to investigate the ability of western Colorado to sustainably produce and process biomass for biofuels and carbon sequestration through applied, interdisciplinary, scientific investigation.

Energy is a critical component of modern life. It powers our businesses, heats and cools our homes, and provides services that enhance our quality of life. Our current energy paradigm in the U.S. is unsustainable. The move to lower carbon intensive energy production and consumption will require considerable innovations and investments with energy production that may transition from large, centralized facilities to small, distributed facilities.

The need for sustainably and domestically produced, energy dense, liquid biofuels for transportation, construction, and heating and cooling is critical, and their development is mandated. In 2007, The U.S. Energy Independence and Security Act was signed into law, which requires the production of 36 billion gallons of biofuels per year by 2022. To meet this mandate, current United States production of biofuels would need to more than triple from the 11.1 billion gallons produced in 2008. Given that the current biofuels paradigm largely relies on technology developed from previous scientific investigation, sizeable scientific innovations are needed to ensure the long-term sustainability in a biofuels-driven world.

Also in December 2009, WCCNBC was awarded a competitive grant from the Colorado Department of Agriculture's Advancing Colorado's Renewable Energy (ACRE) program to conduct the Consortium's first study - "Evaluation of Perennial Plant Species and Production Inputs for Sustainable Biomass and Bioenergy Production in Western Colorado". The grant proposal was prepared and submitted by Morgan Williams of the Flux Farm Foundation. This new research project will focus on the ability of the region to grow low-input, high-biomass, cellulosic perennial bioenergy crops, and will occur at three Colorado locations (Carbondale, Rifle, and Fruita) during the 2010 growing season. Field plot trials at Fruita and Rifle will be under the direction of Dr. Calvin Pearson, CSU Western Colorado Research Center Research Agronomist, and the trial at Carbondale will be managed by Morgan Williams of Flux Farm Foundation. The site at Rifle is located next to the new wastewater treatment plant for the City of Rifle.

The biomass crops produced at the three test sites will be converted to ethanol and butanol at CMC—Rifle, representing one of the state's first bioenergy processing facilities at a community college. At the CMC Rifle campus, Integrative Energy Technology Program Coordinator, Jon Prater, and Nephi Thompson, Assistant Professor of Science are currently building demonstration-scale cellulosic ethanol and butanol processing equipment that will allow for flexible testing of various biomass feedstocks and pretreatment processes.

Despite the many changes that have occurred over the years in western Colorado, agriculture continues to be a fundamental way of life in the region. While the oil and gas industry has bolstered the region's economic base, a downturn and softening of their activities have recently occurred. Given the risks commonly associated with boom-cycle economic development, there is a critical need for energy companies, non-profits, policy makers, municipalities, educational institutions, and local stakeholders to work together to promote the long-term economic, social, and environmental prosperity of the region. Invigorating the region's traditional agrarian sector by adopting innovative technologies and processes, such as bioenergy production and carbon sequestration, may be key to a successful long-term strategy.

The Consortium's study will look at the capacity of western Colorado to produce low-input perennial bioenergy crops such as switchgrass, orchardgrass, meadow brome, alfalfa, wildrye, wheat grass, and tall fescue. Western Colorado consists of nearly 4.25 million acres of pasture or idled cropland. While high alkaline soils, desert vegetations, heavy soils, variable precipitation, and cold injury are challenges for conventional crops, the opportunity exists to explore how the region's land resources might lend itself to the low-input growth of native and introduced perennial crops not usually considered for bioenergy production.

For more information about this article contact Dr. Calvin Pearson at calvin.pearson@colostate.edu or Morgan Williams at morgan@fluxfarm.com, or visit the website for the Western Colorado Carbon Neutral Bioenergy Consortium at www.wccnbc.org.

The Western Colorado Carbon Neutral Bioenergy Consortium

WCCNBC

Identification and Diagnosis of Fruit Virus/ Viroid and Vectors help minimize the production problem.

Stone fruits, grown in North America for some 300 years, had only five virus diseases until 1930, but after that 40 new virus diseases have been identified on peach, nectarine, plum, sweet cherry, sour cherry, apricot, almond, and many ornamental and wild species of the genus. Annually, U S crop loss of 45 million dollars can be expected from virus diseases alone. Peach Mosaic Virus, X-Disease, Plum Pox Virus incidences and the seven epidemics that wiped out orchards in different sections of the country keep us reminded of the importance of properly diagnosing plant viruses.

Latent viruses do not exhibit specific symptoms but cause significant yield reduction. Latent viruses are more perilous when more than one virus infection occurs in a single tree. Knowledge about the existence of such viruses is important for western Colorado fruit growers as frost or winter cold, high soil pH, drought, and nutritional deficiencies are very common problems for fruit growers in this region. Virus infection increases sensitivity of plants to such adverse conditions and to other pests and pathogens or vice versa. In addition, monitoring plant viruses is important as the existence of these viruses can be misinterpreted as problems such as weed competition, nematode damage, plant nutrition deficiency, and environmental factors. From a management perspective, these viruses are difficult to control as they get little attention compared to quarantined viruses.

During 2009, surveys of orchards were conducted to determine the existence of such viruses and the potential for spread of these viruses. Extensive surveys were conducted for the occurrence of plant viruses and molecular tests were conducted to identify viruses in collaboration with a USDA scientist in stone fruits and pome fruits. Results were presented to growers at the Western Colorado Horticultural Society meeting in 2010 in Grand Junction.

The surveys identified many viruses which have not been reported before in Colorado. In addition, many latent viruses (asymptomatic or symptomless) were also observed during the surveys and these latent viruses could be more serious than other symptomatic viruses. During the surveys, observation of multiple viruses in molecular tests from the asymptomatic trees indicated that the visual observations are not enough to detect viruses, especially the latent and multiple viruses. For example, one apple orchard exhibited reduced number and size of leaves with reduced and deformed fruit due to multiple virus infection. Infection in a single tree results in higher vulnerability of such trees to other problems such as cold or frost, high soil pH, nutritional and pest and disease attack. Such symptoms may be confused with physio logical disorders.

Figures, Cherry Rasp Leaf symptoms characterized by enations (leafy outgrowths or protuberances) on the lower surface of narrow deformed leaves (A), and declining trees (B) with multiple infection of CRLV, Cherry Virus A and Prunus Dwarf virus in one of the growers field in East Orchard Mesa, Western Colorado.

VIRUS STUDY PARTICIPANTS NEEDED

Dr. Ramesh Pokharel is conducting a Plum Pox Virus Survey and is looking for 25 stone fruit orchards to participate. He will be collecting samples at each orchard for observation and testing.
Please call 434-3264 ext. 203 if you are interested in participating.

In cherry, the survey identified nine different viruses in the Grand Valley with Cherry Rasp Leaf Virus (CRLV) (Figure A), the most common followed by Cherry Virus A. Multiple infections of different viruses were observed irrespective of symptoms severity. However, CRLV in addition to other viruses was observed in most of the declining trees (Figure B). Similarly, four viruses were observed in peach with Peach Latent Mosaic Viroid being the most commonly observed. In apple, six different viruses were observed with Apple Chlorotic Ringspot being the most common followed by CRLV causing Flat apple disease. In addition, plant parasitic nematodes, especially the dagger nematode that transmits many plant viruses including CRLV, were investigated because the control strategies for nematodes are easier than virus management strategies. Surveys of fruit orchards for plant parasitic nematodes found wide spread distribution (almost all orchards and vineyards) of dagger nematode with varying numbers (15-70 nematodes per 100 cc of soil) where one dagger nematode is enough to transmit CRLV.

Moreover, one should not ignore the direct feeding impact of dagger nematodes on the plant roots that may be a serious issue especially if there are higher numbers of dagger nematode associated with a tree. Whether the dagger nematode species reported from the Grand Valley is a vector of the virus is uncertain; thus, molecular identification of this nematode has been initiated in collaboration with a USDA scientist. Dagger nematode surveys will be continued by collecting soil samples from different fruit orchards in the valley and identifying the species via molecular tools. In addition, identification of resistant resources to this complex and other management studies for dagger nematode are ongoing.

Our effort to study plant viruses in grower's fruit orchards will continue at least for one growing season. However, monitoring of symptomatic orchards and trees for the possible virus and viroids association will be our priority for the virus study in the coming growing season in collaboration with USDA scientists.

In addition to monitoring orchards for virus diseases, we will also be conducting a Plum Pox Virus survey in the valley in collaboration with the Colorado Dept. of Agriculture to eliminate the possibility of Plum Pox Virus existence in our fruit growing areas. For further details contact rameshp@colostate.edu

Western Colorado Research Center

FRUITFACTS

FruitFacts is the email message service that provides information to the commercial growing community regarding insects, diseases, spraying and other relevant information to better manage their orchards and vineyards. This service replaces the Code-A-Phone recorded message system that Dr. Harold Larsen has provided. The information is also available on the CSU Agricultural Research Center website:

http://www.colostate.edu/programs/wcrc/pubs/research_outreach/fruitinfo.htm.

If you would like to subscribe please contact Donna Iovanni in our office at 434-3264 ext. 201 or by email at:

Donna.iovanni@colostate.edu. Provide your email address, name and phone number in the event Donna needs to reach you. Donna will add you to the e-mailing list.

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Quality Assurance in the Colorado Wine and Grape Industry

For some food products, the consumer is primarily concerned with sensory quality before price. This is especially true with fruit products, whether they be fresh or processed into value-added products. To this end, many of these products are subjected to quality assurance testing that stresses sensory characteristics of aroma, texture, and taste.

The aim of a quality assurance program is to continuously maintain and improve the quality of products. Initial standards are set, and adherence to standards is tested, to first make sure all products meet or exceed the standard. Then, a revised standard for even higher quality can be set, thus continuously raising the product quality. The initial aim of wine quality assurance is to ensure that all wines are "sound", that is, free of sensory faults in their appearance, aroma, or taste. This is considered the basic standard for wine in the marketplace. To add to this basic standard, later quality standards will be developed that address winemaking fidelity to sensory characteristics for specific wine grape cultivars (varietal wines) and for wine styles.

The Colorado wine and grape industry is instituting sensory testing of wines, as a first step toward a concerted quality assurance program for the industry. An outline has been written for a long-range and comprehensive plan for wine and grape total quality assurance in Colorado by the CSU Enology Program and the Colorado Wine Industry Development Board. The training for the initial wine sensory assessment program has been developed and carried out by the CSU Enology Program. The usual method for testing quality assurance of wine is with a sensory panel. Most food industry panels are trained in statistically measurable methods, such as Quantitative Descriptive Analysis (QDA). However, in most existing wine quality assurance systems, sensory panels are "hedonistic", that is, composed of expert panelists that judge according to the consensus of their experience, not to specific and statistically validated standards. Often, wines subjected to these hedonistic panels are also tested chemically and physically to detect clarity and a limited number of aromatic faults.

Under the voluntary Colorado Wine Sensory Quality Assurance program, the first step, of testing for presence or lack of aromatic faults, is now being set up. Wine sensory faults panelists have been trained to quantitatively identify individual fault chemicals in wines, using QDA methodology. Commercial Colorado wines will be tested this year. Wines tested by this faults panel will be given points based on their lack of or amount of fault chemicals. This panel, by a majority, can disqualify a wine for an excessive amount of any fault aroma or an excessive combination of several faults. In addition to the faults panel, a hedonistic panel will rate the wines on a 20 point scale. The scores from the two panels are combined, and the total points determine whether the wine is rated as commercially certified quality Colorado wine or not. Panelists will also confidentially submit comments and quality assurance tips on the wines to the individual wineries. Anonymous grouped statistics of the panels' results will be kept by the State Enologist. In addition to Colorado wines, similar wines from outside Colorado that are regarded as standards in their price range will be included in those tested by the panels. Later, the wines tested by the panels will be subjected to consumer testing, to assess relevance in the marketplace.

Later steps in the Colorado Wine and Grape Quality Assurance Program will include: grape quality standards at point of entry into the winery, wine quality standards by variety, style, and geographic location, and recognition of consistent quality within a winery, within wine grape cultivars (varietal wines), within wine styles, within a vineyard, and within geographic areas.

In addition to the quality assurance program, the CSU Enology Program is involved in outreach, research, and teaching to the Colorado Wine and Grape Industry through: site visits to existing and start-up wineries; email and phone consultations on winemaking and wine quality issues, research on GC/MS identification of aromatic chemicals in Colorado wines, enology classes at CSU main campus; and workshops and seminars throughout the state.

For more information about this article contact Dr. Stephen Menke at Stephen.menke@colostate.edu. or by phone at 970-434-3264 ext. 202.

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- AGVA units will be helpful to avoid overwatering and reduce deep percolation, and salt and selenium loading and other contaminants into water supplies that affect downstream users.
- AGVA units will be convenient and easy to use. This will add an exciting, new dimension to irrigating.

A variety of outreach activities/products are planned for 2010, including a WCRC annual report article, a Powerpoint presentation, a large format poster, and field tour during summer 2010 to allow attendees to see the AGVA units operating in the field.

For more information about this article contact Dr. Calvin Pearson at calvin.pearson@colostate.edu

FIELD DAY
WCRC-Orchard Mesa
July 8, 2010
3-7PM

The WCRC-Orchard Mesa staff will be hosting a Field Day with tours of the facility showcasing the many ongoing research projects at the facility on Thursday July 8 from 3 until 7 PM. Watch the website:
http://www.colostate.edu/programs/wcrc/pubs/information/comingevents.htm.

Pinto Beans for Sale

Western Colorado Research Center - Fruita grows agronomic crops-one is pinto beans. These are harvested, cleaned, sorted and bagged at the Fruita location. The 50# bags are available for sale at the Orchard Mesa and Fruita offices during regular business hours.

#1—50# bags are $27
#2—50# bags are $15