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We're on the Web!
www.colostate.edu/programs/wcrc

2011 Horticultural Society Meeting

Look forward to talking to you at our booth at the meeting. We'll have slides related to several of our on-going projects and a National survey for apple growers. The first 10 people to complete the survey on apple varieties and rootstocks receive a gift.

Upcoming Events

Don't forget to check our website: http://www.colostate.edu/programs/wcrc/pubs/information/comingevents.htm frequently. We list seminars and workshops being held in the area by AES and Extension personnel that might be of interest to you. We will hold our public pruning workshop in March but the date is not yet available.

Colorado State University

Western Phytoworks

Western Colorado Research Center

Update on Agricultural Experiment Station
Lee Sommers, AES Director

The focus of future programs at the Western Colorado Research Center (WCRC) has been the primary area of emphasis during the past year. Our program emphasis takes on greater importance when you consider the fiscal challenges that are facing higher education in Colorado which includes our off-campus AES research centers as well as CSU extension programs. One significant impact of the budget reductions is the pending closure of the Western Colorado Research Center-Rogers Mesa site located at Hotchkiss. The AES is committed to maintaining and hopefully expanding WCRC programs at Orchard Mesa and Fruita. The loss of research and extension programs at Rogers Mesa increases the importance of assessing the needs of clientele in western Colorado and filling vacant positions at WCRC-Orchard Mesa to address the needs identified.

To assess the needs of clientele in western Colorado, a series of meetings were held in late August at Craig, Grand Junction, Delta, and Gunnison. The meetings also involved Nathan Moreng, Western Region Director for CSU Extension, since it is critical that we have a coordinated approach to our CSU programs in agriculture and natural resources. The result of these meetings was the identification of four potential areas of program emphasis: 1) fruit production and orchard management; 2) cropping systems emphasizing alternative crops; 3) livestock production emphasizing grazing and policy issues; and 4) soil sustainability and crop production. To follow-up on these suggestions, an email survey was distributed to over 400 constituents in October. The results of the survey indicate that fruit production and orchard management was the #1 priority of clientele. We are currently reviewing the survey results and are discussing next steps. We sincerely appreciate the input from those individuals who attended the August meetings and responded to the email survey. More detailed information will be shared in a presentation at the Hort Society meeting in January.

Western PhytoWorks is a publication of the CSU Western Colorado Research Center, 3168 B 1/2 Road, Grand Junction, CO 81503-9621.

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Field Day-July 8, 2010
Story page 4

Bob Hammon discussing the impact of plastic mulch in reducing Beet Curly Top Virus in tomato.

FIELD DAY AT WESTERN COLORADO RESERCH CENTER

Western Colorado Research Center at Orchard Mesa hosted a field day on July 8, 2010 for local growers. The field day kicked off with introductory remarks by Dr. Lee Sommers, Director of the Colorado Agricultural Experiment Station, followed by field visits to several experimental plots of grapes and fruits. Dr. Sommers talked about new developments and changes in agricultural research on the western slope.

Grape production: Dr. Horst Caspari explained the wine grape variety trial established in 2008. This trial is part of a nationwide network of variety trials involving 23 states. At WCRC-OM, 18 "new" varieties – where "new" means new to Colorado - are evaluated for both their viticultural performance as well as their wine quality. The majority of those varieties originate from southern France, Spain, Portugal, and Italy. This trial is partially funded through grants from USDA (Viticulture Consortium West).

The second grape trial visited was a trellis / training system evaluation with Syrah. Dr. Caspari explained the performance of Syrah evaluated on 6 different trellis systems, from a very simple single-wire trellis to a very elaborate system called Lyre. The establishment costs for those trellis systems differ almost twofold, yet during the first four years the production of the Lyre has been 53 % higher than the next-best system.

Tree fruit production: Dr. Ramesh Pokharel discussed the ongoing tree fruit research activities at WCRC. Several fruit pathology research studies, targeted to different management aspects of important stone fruit diseases, were visited.

The ongoing research on Cherry Rasp Leaf Virus and its vector, the dagger nematode, which began in 2005 indicates that the virus is non-existent in Bing cherry grafted on Mazzard rootstock with a Z-citation inter-stem. The absence of virus infection suggests that this variety/rootstock/inter-stem combination either slows down virus development or is resistant to dagger nematode or cherry rasp leaf virus. In another ongoing field and pot experiment, CRLV development was found slower in Gisela series rootstocks than other rootstocks.

Two further sweet cherry projects evaluate training systems and varieties. Dr. Pokharel discussed the impact of cherry training systems on fruit yield and quality with a special focus on an Upright Fruiting Offshoots (UFO) training system. The UFO is a new training system reported to have higher yields than conventional systems. The performance of Early Robin grafted to Gisela 3 rootstock is being investigated when trained as Tall Spindle (TS), Kym Green Bush (KGB), and Upright Fruiting Offshoots (UFO). The second study aims at finding suitable cherry varieties under UFO for western Colorado conditions. Ten varieties trained in the UFO system are being evaluated.

Another study is targeted to find a solution to Cytospora canker, an important disease of stone fruits and apple. A whole-system approach is being used to develop information for soil health, plant health and chemical /non-chemical management strategies. To date, peach trees in wood mulch (soil health) and trees sprayed with Actigard (plant health) are larger than control trees and should produce better plants with little or no diseases, higher yields, and larger fruits.

A project funded through a grant from EPA aims to find alternatives to soil fumigants currently used to mitigate replant problems. These soils fumigants are very toxic, difficult to apply, and at times may not provide sufficient control of replant problems. This project integrates the use of bio-fumigation and soil solarization in a peach replant study.

A third peach study with 18 different rootstocks aims to identify a rootstock or a combination of rootstocks that are better suited to the local soil conditions than the rootstocks currently used.
Two apples rootstock experiments - Gala apples grafted on 31 promising rootstocks for wide tree spacing, and Honey Crisp grafted on 34 rootstocks for close tree spacing - are planted as part of nationally coordinated NC140 trials. The objective of both studies is to increase apple productivity in the region by identifying rootstocks for both wide and close tree planting systems that are better suited to the local soil conditions than rootstocks that are currently used.

The new berry evaluation studies are directed toward evaluating different berry crops as potential alternative crops to increase farm income in western Colorado. Crops under evaluation for their adoptive performance are edible Honey Suckle (7 different accessions), Jostaberry, Gogiberry, Gooseberry cv. Black Velvet, Blackberry cv. Chester, Akeberi cv. Deep Purple, Huckleberry cv. Evergreen, Jujube cvs. Lang and Li, Raspberry cv. Meeker, Pomegranate cvs. Pink Stain and Sweet, and Black current cv. Titsnia Black.

Vegetable production: Dr. Pokharel discussed the potential of growing vegetables such as okra, melons, eggplant and gourds as alternative crops for small land holders. Mr. Bob Hammon explained the effect of different plastic mulches on beet curly top viruses (BCTV) in tomato, a study that has been ongoing at WCRC since 2008. In each year, virus incidence has been lower in tomatoes grown on reflective plastic mulch compared to red or black plastic mulches. In 2008, 12 % of tomatoes grown on red plastic were lost to BCTV, but only 2 % on reflective plastic were lost. BCTV is transmitted exclusively by beet leafhoppers in the field, and the reflective mulch is an effective deterrent to leafhopper landing during the early part of the growing season.

Wine sensory evaluation: Finally, the field tour ended with a discussion of the enology program at WCRC. Dr. Stephen Menke explained his efforts on wine sensory evaluation programs. He further stated the purpose of this training session is to separate the taste and aroma components of some foods and wines by specific exercises, and then see how to evaluate wine and food interactions by changes in these components.

Dr. Pokharel explaining the CRLV study.

Dr. Caspari discusses trellising and new varieties.

Yellow peach syndrome, an increasing concern to the growers

Peach trees with yellow leaves are a common sight in western Colorado. This yellow peach syndrome (YPS) is characterized by interveinal chlorosis caused by deficiencies of micronutrients such as iron, zinc and manganese. Iron deficiency is common in leached soils and also in calcareous soils derived from limestone. Shoots with yellow cast and " mottle leaf" followed by dieback of twigs, poor and/or delayed bloom and small fruit of low quality as a result of zinc deficiency are quite common in early summer. On the other hand, manganese causes a herringbone pattern in basal leaves only but not in terminal leaves. Similar chlorosis may either be caused by high lime content in the soil (lime induced chlorosis symptoms) or high soil pH. Iron, zinc, and manganese may be present in the soil, but not be available to plants due to soil conditions. Abundance of a particular micronutrient in the soil does not itself ensure a higher availability for plant use which is determined by soil condition. A high soil pH means that these micronutrients are less soluble, so that crops may exhibit micronutrient deficiencies. Calcareous soils with a high pH have poor availability of iron, manganese, copper and zinc. Leaf samples with YPS collected in grower orchards had deficiencies of iron, manganese and zinc in most all cases. Despite the fact, growers often use only iron to correct YPS without analyzing symptomatic tissues. Given the magnitude of deficiencies in the impertinence of limiting factor in grower's samples mentioned above, an application of a single nutrient does not correct this problem. The use of chelated micronutrient fertilizers or micronutrient sprays may provide a temporary remedy. However, other options such as change in soil management and/or use of host resistance/tolerance may provide the most sustainable solution to this problem. Peach rootstocks such as Titan Hybrids, Garner, Cadman, Barrier, Viking and Hansen are better suited for calcareous soils. In our previous tests, Slap, Julio, and Cadman were better performing rootstocks, and other rootstocks are currently being tested in a peach trial at WCRC. Some of these rootstocks are also considered to be cold tolerant which is an important aspect for us in western Colorado.

At the WCRC Orchard Mesa site, we do not observe peach trees with YPS in those blocks where annual sulfur application is made. We believe that applied sulfur is helping to reduce the soil pH attributing to trees with no YPS. At the same time, we are suspecting that the applied sulfur is being leached out from the root zone by excessive irrigation. Hence, we have initiated a study to evaluate the interaction between irrigation management and sulfur application. In addition, we are also studying other measures to lower the soil pH.

Yellow peach syndrome has also been observed to be associated with a change in irrigation pattern/ faulty irrigation pattern (inappropriate amount and duration). A change in irrigation pattern affects the root physiology. A lack of oxygen may result from excessive water application, thereby inhibiting root formation and nutrient absorption. We have visited several growers' fields with YPS and have suggested an appropriate irrigation management technique.

However, other possible causes for YPS such as phytopthora and X diseases caused by mycoplasma should not be ignored as they are found to cause confusing symptoms, especially in peach and cherry. These pathogens are already known to exist in western Colorado. We are trying to rule out these pathogenic causes, especially X diseases caused by mycoplasma associated with such YPS to make sure that yellow peaches are nutrient related. For further information contact Ramesh Pokharel at rameshp@colostate.edu

Trees in the front show yellow peach syndrome and those in the back do not show such symptom.

Local Weather Data Available on the Internet

The weather affects all of us, which makes for daily conversation for most people. Local weather data are useful for a variety of applications including irrigation water scheduling and application for farmers, homeowners, golf course managers, and others. Archived weather data are also useful to compare weather events for different time intervals, such as comparing different days, months, or years.

For many years weather data were collected and reported by USDA-ARS personnel at the Western Colorado Research Center (WCRC) at Fruita. When the USDA-ARS facility in western Colorado was closed in late 1989 weather data were no longer available at WCRC-Fruita. In 1991, the CSU Agricultural Experiment Station authorized the purchase of an automated weather station for WCRC-Fruita. Shortly after the purchase and installation of the weather station it became part of the Colorado Agricultural Meteorological Network (CoAgMet). The weather station at Fruita has now been in operation for nearly 20 years.

CoAgMet is a network of automated weather stations scattered across Colorado collecting hourly and daily weather data. At its inception in the early 1990's CoAgMet was a joint venture by plant pathology research and extension specialist (Dr. Howard Schwartz) and the USDA-ARS water management unit (Dr. Harold Duke). At that time, the automated weather data from CoAgMet were used primarily to predict disease outbreaks in onions, dry beans, and potatoes and for irrigation water scheduling.

After a number of years, the Colorado Climate Center (Dr. Nolan Doesken) at CSU took over the management of CoAgMet and they now provide oversight of daily weather data acquisition and data quality management and data posting on the Internet. CoAgMet remains a network of collaboration and cooperation with various local, state, and federal entities. Initially, data transmission from the weather station at Fruita was by cellular phone, but several years ago data transmission was changed to a dedicated hard-wired phone line.

The weather data collected and computations for Fruita are maximum temperature, minimum temperature, vapor pressure, solar radiation, precipitation, wind speeds and gusts, wind direction and wind run, soil temperatures, relative humidity, growing degree days, and two models of reference evapotranspiration.

The data are accessed regularly by various people

Automated weather station located at the Western Colorado Research Center at Fruita that has been in operation for nearly 20 years.

such as: golf course managers, farmers, researchers, extension agents, homeowners, and others, including people who live locally and others who live outside the area and state.

The website for CoAgMet and the weather station at Fruita is available at www.ccc.atmos.colostate.edu/~coagmet . A similar weather station is also located at the Western Colorado Research Center at Orchard Mesa. The weather stations at Fruita and Orchard Mesa are two of the 64 automated weather stations located across the state. CoAgMet is currently seeking support for many of the automated stations across Colorado that are supported and used by diverse stakeholders. If you use and value these data, please consider being one of CoAgMet's many sponsors and collaborators.

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