Agricultural Research, Development & Education Center (ARDEC)

AES Research Center Conference

Presented by Jennifer Bornhoft
ARDEC Operations Manager
February 2015
ARDEC Staff
11 Full-Time Employees
Dedicated to a 24/7, 365 day operation

• ARDEC Crop Operations
  ❖ Chris Fryrear, 23 years at ARDEC
    Manager of ARDEC Plant Science Operations
  ❖ William Folsom, 5 Years at Horticulture Field Research Farm
    Manager of ARDEC Horticulture Farm
  ❖ Mark Collins, 14 years at ARDEC, Primary Research Crop Ops
  ❖ Karl Whitman, 4 years at ARDEC, Primary Bulk Crop Operations
  ❖ Gabe Whitman, 4 years at ARDEC, Primary Bulk Crop Operations

The ARDEC team is highly skilled and diversified and we cross train in many disciplines to meet the varied needs of the research center
ARDEC Staff...Continued

• ARDEC Livestock Operations
  ❖ Jesse French, 4 years at ARDEC Livestock Unit Manager
  ❖ David Escobar, 4 years at ARDEC Feedlot Manager
  ❖ Brian Brigham, 1 year at ARDEC Feed Intake Unit Manager & Research Assistant
ARDEC Staff...Continued

• ARDEC Main Site

  ❖ Brenda Williams, 5 years at ARDEC
    Office and Event/Tour Coordinator

  ❖ Jennifer Bornhoft, 6 years at ARDEC
    Operations Manager & Accountant

  ❖ Bob Bee, 12 years at ARDEC
    Shop mechanic for all operations
ARDEC Plant Science Facility

- Managed by Chris Fryrear
  - Dr. Frank Peairs, Faculty Liaison
- 4 permanent staff for management, research and bulk crops
- 3-4 students, hourly summer labor
  - Grounds maintenance, spraying, irrigation, harvest, improvement projects
- 888 cultivatable acres (~1,000 acres deeded)
  - Mostly all irrigated
  - Used for research, bulk crop production and grazing
  - Grain corn, silage corn, alfalfa/grass hay, sudex, barley, oats, canola and peas devoted to the livestock unit. Not sold at market
  - Pinto beans and wheat sold as a cash crop
- Additional Infrastructure (not supported by CSU Facilities Management):
  - General Processing Building with ARDEC staff offices, processing and drying rooms, labs and researcher work rooms
  - Bulk Storage, Fertilizer Storage and Chemical Storage
  - Machine shed and outdoor storage for PI and ARDEC equipment/vehicles
  - Mechanic Shop and Foundation Seed Headquarters
  - Multiple grain bins for commodity storage
  - 70’ x 11’ certified truck scale for plant and animal programs
  - 18 irrigation wells, 3 linear sprinklers, 3 center pivot sprinklers, gated pipe and siphon tubes

Relocated and opened in current location north of Fort Collins in 1993
ARDEC Plant Science
Current Research

25 + active faculty and research users

• Measurement of greenhouse gas emissions in various crops
• Sugar beet research
• Strip till vs. conventional till
• Entomology research of corn root worm, spider mites, stem sawflies
• Bio-char and reduced irrigation treatments
• Honeybees: crop drought stress, nutrient quality and honeybee health
• Wheat breeding program
• Dry Bean breeding program
• Weed research
• Precision agriculture
• CoAgMet weather station and related research
• EPA well monitoring research

Colorado State University
COLLEGE OF AGRICULTURAL SCIENCES
ARDEC Livestock Unit Facility

- Managed by Jesse French
  - Dr. Kraig Peel, Faculty Liaison
- 3 permanent staff for all livestock operations
- 6-8 students (average) hourly labor plus graduate students, interns and volunteers
- 155 head of registered Hereford and Angus, Resident Instruction (RI) beef cows
- 800 head capacity feedlot for cattle
- 200 head Feed Intake Unit for cattle (feed efficiency)
- Sheep research facility with individual pens and 30 head RI flock
- Swine farrowing and finishing unit
- Additional Infrastructure (supported by CSU Facilities Management):
  - Metabolism/Research Building with stalls, labs and work rooms
  - Commodity sheds and open feed storage, Corn roller mill
  - Central Mix Building with feed truck, skid loader, scales and supplements
  - Working Facility Building for cattle handling and processing
  - Palpation Shed for breeding programs
  - Cow/Calf Building for teaching and calving
  - Shop with tools, equipment and supplies

Livestock Unit Established in 1999
**ARDEC Livestock Unit**

**Current Research**

14 + active faculty and research users

- Micronutrient study, 400 head steers
- Cracked corn study with Kansas State University, 400 head feeders utilizing corn roller mill
- All heifer, no cow to study self sustaining system
- Wagyu beef finishing rations and effect on carcass quality
- Molybdenum concentrations levels in water with EPA. Individual pen research with steers.
- Artificial Insemination (AI) synchronization study on ARDEC cow herd
- Nose flap study regarding effect on ARDEC weaned calves
- Fistulated steers for nutrition research and education programs
- Constructed Wetlands project spanning multiple departments
- Ultrasound classes and labs on multiple species
- Livestock judging classes and labs on multiple species
- Feed Intake Unit research to identify an animals ability to produce more with less feed due to growing population and less ag resources

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**Colorado State University**

**College of Agricultural Sciences**
ARDEC Horticulture Field Research Farm

- Managed by William Folsom
- Integrated into ARDEC operations in 2011 from Department of Horticulture
- 1-2 students, hourly summer labor
- 65 acre horticulture facility 3 miles south of ARDEC main site
- 80% of land used for research
- Irrigation via 3 irrigation wells and 1 linear sprinkler (25 acres), solid set, gated pipe and drip.
- (2) Cravo retractable greenhouses
- 10.8 acres USDA organic certified land
- 7 High Tunnels (organic)
- Research shed, open equipment/tool shed, office space
ARDEC Horticulture Field Research Farm

Current Research

12 + active faculty and research users

- Invasive species management and adaptive strategies
- Pollination
- Plant evaluation (annual & perennial) for Rocky Mountains and High Plains area
- High altitude revegetation
- Integrated pest management of all arthropods affecting horticulture
- Research on herbicide resistant weeds
- Precision agriculture weed research
- Gene flow in winter wheat
- Development of model for species and genotype specific carbon and water elimination
- Turfgrass physiology, ecology and management
- Genetic factor controlling size and shape of leaves and drought resistance in maize
- Turf grass water use and conservation adaptation
- Development of fertilizers and soil fertility to optimize plant and human nutrition while protecting environmental quality
- High tunnel soil fertility
- Community Supported Agriculture (CSA)

Colorado State University
College of Agricultural Sciences
Challenges and To-Do’s

- Funding of capital improvements and repairs needed for aging facilities, machinery/equipment/vehicles and infrastructure
- Engage collectively to develop a sustainable, multi-year plan for plant and animal program needs, recognizing resources and constraints
- Recognizing and retaining personnel (our most valued asset)
- Meeting the growing and changing needs of plant and animal science research, extension and education programs, including sufficient rotational acreage and grazing lands, in an urban region
- Meeting commodity feed and grazing needs for animal science programs at ARDEC while managing risk and sustainability
- Evaluation of the optimum size for the ARDEC cow herd as well as potential expansion of the feedlot, working facility and/or Feed Intake Unit
- Expanding crop research (i.e. organic crops, industrial hemp)
- Always mindful of water conservation and environmental stewardship
Highlights

- CoBank Center for Agricultural Education at ARDEC ($3.3M project)
  - Colorado FFA Foundation donors largely funded. CSU will own the building and ARDEC will manage. A new home for the FFA Hall of Fame. Facility will be adjacent to the ARDEC Conference Center and will enhance the Agricultural Education program CSU. Construction begins Feb 2015 and expected to host classes in fall 2015.

- Trimble Navigation collaboration with ARDEC since 2011. We continue to expand on opportunities available to all faculty, staff and students interested in research and data of GPS and UAV technology on machinery, equipment and irrigation systems.

- Fiber optic, wireless and data service upgrade for the ARDEC facility, a 4 year project recently completed. We now have ample bandwidth and strong connectivity required for research, data management, security/fire and operational needs.

- We are proud to host many classes, labs, tours and events at ARDEC. Our annual events include production bull sale, Ag Adventure, Ram Camp, AI schools, livestock sales, livestock judging events, field days, Ag Literacy, Ag in the Classroom, Colorado AgrAbility, Ag Mechanics, Extension seminars and workshops, many tours for CSU faculty, staff, students along with public and private stakeholders and prospective students.