Tucson Area Agricultural Centers

The College of Agriculture is fortunate to have two agricultural centers in the Tucson valley, the Campus Agricultural Center (CAC) and the West Campus Agricultural Center (WCAC). The proximity of these two centers to the hub of University activity and to a very large population of service clients is of great strategic importance to the evolving mission of the College. Recent shifts toward providing services to campus-based biotechnology researchers and to a growing urban clientele have dramatically enhanced the value of the city-based agricultural centers to the University and surrounding community.

By providing field sites that are conveniently close to campus laboratories, these centers give the College a competitive edge for recruiting and retaining some of the finest researchers in the modern life sciences. The well-equipped facilities offer easy access for students of all ages to gain practical experience and education in many agricultural disciplines. The central location of these centers is also vital to fulfilling the service mission of the College’s Extension programs. With their growing contribution to the character and economic diversity of the community, these centers are a valuable and appreciated feature of the Tucson landscape.

Campus Agricultural Center

Elevation: 2,300' Location: 3 miles north of the University

Founded in 1909, this 185-acre center on Campbell Avenue has aged gracefully and has continuously maintained its vitality in the course of the past century. The latest wave of research in molecular biology has increased the need for campus-based researchers to have ready access to their animal and plant field sites. The center houses horse, sheep, and beef cattle operations. The dairy research group is currently conducting comparative studies between Holstein cattle and a newly acquired Brown Swiss herd. Field research focuses on issues such as crop protection, fruit variety trials, arid-adapted landscape plants, weed control, water conservation, production of plant-derived agricultural chemicals, irrigation engineering, and soil science.

Center personnel maintain 50 greenhouses that are segregated into four facilities according to function. These greenhouses serve instructors, students, and researchers who work in both basic and applied sciences. Greenhouse-based research includes biological pest control, plant genetics, cotton physiology, urban horticulture, pesticide efficacy, plant molecular biology research, disease control, natural resource conservation, and controlled environment agriculture. Greenhouse teaching activities are closely tied to the research programs.

Instruction and extension services are integrated with various facilities on the farm. The Meats Technology Laboratory houses two classrooms, an auditorium, and a show arena. Here students from the 4-h to the Ph.D. level have an opportunity to share in the latest developments in food processing and animal husbandry. In the adjacent Horse Center, students get hands-on training in animal reproduction as they provide horse breeding services to the public. Instruction in agricultural education and biosystems engineering takes place at a well-equipped shop/ laboratory complex. At the center of local extension service is the Pima County Cooperative Extension Building. Among numerous extension programs is the
Garden Center, an agricultural park that provides a workshop and training site for garden clubs and school children.

The Karsten Desert Turfgrass research facility supports the Southwest’s growing turfgrass industry (see spotlight). Insect resistance to pesticides and advanced pest control techniques are studied at two entomology laboratories. Other facilities include an animal pathology lab, a wildlife research area, and the Arizona Crop Improvement Association.

**Spotlight: Karsten Turfgrass Facility**

The Karsten Turfgrass Research Facility, located at the Campus Agricultural Center, focuses primarily on the study of turf varieties and their growth requirements in dry climates. The site features six acres of turfgrass research plots, two weighing lysimeters, (soil water measurement tanks installed underground), a greenhouse, and a building with an analytical laboratory, growth chamber room, conference center and repair shop.

The two weighing lysimeters, each filled with 100,000 pounds of sand and mounted on scales, enable researchers to evaluate the activity of water, chemicals and other substances in the soil. The results have implications for the management of turf, water and wastes or residues. Each tank has 90 sampling ports along the sides, equipped with devices to collect soil solutions and to gauge water content. Through laboratory analysis, these samples can be analyzed to determine how quickly chemicals, contaminants, microbes and viruses move through the soil.

Faculty and graduate students investigate such factors as the water use of various turfgrass species; irrigation techniques, and the effects of municipal waste water as an irrigation water source. Results from these studies have demonstrated that turfgrass is a "favorable system" for using non-potable water sources, and that turf root systems use most of the nutrients that are added to the soil.

Different species of grass are grown and evaluated for adaptation to desert conditions. These grasses range from commercially available cultivars to experimental grasses which are observed for turfgrass qualities and stress tolerant attributes. One such grass is saltgrass, which can tolerate salt levels between ½ to 1 ½ times that of sea water. Researchers screen plants for turf habit and prepare select plants for genetic improvements using biotechnology protocols to make dwarf plants for lawns.

New improved bermudagrass cultivars for lawns, which are sold as seed, are currently under evaluation for water use and drought tolerance. Stress tolerance techniques for heat, drought and salinity are used in the lab, greenhouse and field to find better grasses for arid climates. Other tests include turf establishment and grass rotation studies, special cultural management techniques, and mowing height studies for different grass types.

The Karsten Facility also hosts field days, training events, and tours for the various clientele and research groups involved in turfgrass management.

**West Campus Agricultural Center**

Elevation: 2,290'  Location: 5 miles northwest of the University campus

This 72-acre farm has experienced significant change in recent years. The Arizona State Veterinary Diagnostic Laboratory was completely rebuilt, providing additional space and greatly improved facilities. This laboratory provides services to veterinarians, animal owners, and governmental agencies for the diagnosis of disease problems of livestock, companion animals, zoo and wild species. (See spotlight). The WCAC Aquaculture Pathology complex was recently expanded with the dedication of a new laboratory building to be used for the study of viral and bacterial pathogens of farm-raised and wild shrimp. The southern Arizona site offers isolation from commercial fisheries, which is necessary for the safe study of these diseases (See spotlight). New research programs in the plant sciences now dominate the field research plots. Investigations regarding the mechanisms controlling the
regulation of plant genes, the synthesis of seed storage proteins, the selection of water-use efficient cotton lines, the development of whitefly populations, and the production of vegetable oils are closely linked to the laboratory work performed on campus. A long-term project examining the use of reclaimed water and water harvesting for irrigation in agroforestry production was recently installed by the Office of Arid Lands Studies. This center has also become one of the main field sites for the USDA’s honey bee research.

This farm continues to provide support to the College’s animal sciences programs by serving as a site for preparing feed and raising cattle. The facility is irrigated entirely with reclaimed water, and research animals are provided water from two domestic wells.

Spotlight on the Arizona Veterinary Diagnostic Laboratory (AzVDL)
This laboratory provides services to veterinarians, animal owners and federal and state agencies for the diagnosis of disease problems of livestock, companion animals, zoo and wild species. Facilities include modern bacteriology, virology, toxicology and pathology laboratories as well as necropsy rooms for small and large animals. Diagnostic faculty members participate in applied research studies involving disease problems of agricultural significance and field investigations of range livestock problems referred by practicing veterinarians.

The Arizona Veterinary Diagnostic Laboratory has been accredited by the American Association of Veterinary Laboratory Diagnosticians as a full-service veterinary diagnostic laboratory for all species. This lab is now one of 36 such accredited labs in the U.S. and Canada. A section of the Department of Veterinary Science and Microbiology, the laboratory is supported by a combination of state funds and user fees. It is located in the West Campus Agricultural Center, and is open to the public Monday through Friday from 8:00 a.m. to 5:00 p.m.

A quarterly publication, the AzVDL Newsletter, is available in hard copy or online at the url listed at left.

Spotlight on the Aquaculture Pathology Laboratory
The Aquaculture Pathology Program is located in the Department of Veterinary Science and Microbiology. Its main research and diagnostic services pertain to shrimp diseases, particularly those caused by viruses. Faculty and graduate students work at both an on-campus diagnostic laboratory and at a quarantine facility/wet lab equipped with self-contained artificial sea-water systems for breeding stock, maintained at the West Campus Agricultural Center in Tucson. The UA provides expert assistance in a variety of diagnostic techniques, including histological identification of disease processes, electron microscopic examination of newly described disease agents, as well as other standard diagnostic methods.

As part of the Gulf Coast Marine Shrimp Farming Consortium, which includes five other institutions, the UA is working to provide a healthy seed stock supply for the shrimp industry, to assist in disease control, and to address the environmental aspects and regulations of shrimp aquaculture for continued growth of the U.S. industry. The geographic location of the UA, isolated from coastal waters, provides an ideal site for the study of shrimp diseases because it reduces to near zero the risk of accidental introduction of pathogens into the aquatic environment.

In May, 1994, the laboratory was designated one of only two reference laboratories in the world for crustacean pathogens by the Office of International Epizootics headquartered in Paris, France.
Santa Rita Experimental Range

Elevations from 2900' to 5200' Location: 35 miles south of Tucson

This is the oldest experimental range in the U.S. and possibly the world. Range research began here in 1903. The range includes 50,811 acres, almost 80 square miles, plus an additional 751-acre headquarters area located in Florida Canyon, adjacent to the range. The SRER is used exclusively for ecological research and education, to develop information that can be used to manage semiarid rangelands for long-term productivity. The range is devoted to research that explores ways to manage rangelands for multiple uses.

Range research data from the last 95 years is currently being entered into SRER’s web site (http://ag.arizona.edu/SRER). This web site will improve international access to research data and will further enhance SRER’s reputation as one of the world’s premier ecological research sites. With over 460 published studies conducted on the range to date and with a vast file of associated climatological and photographic records, the value and rarity of this longstanding outdoor laboratory increase with each passing decade.

Research on this unique facility has involved ecology and physiology of desert grassland plants and wildlife, brush control, plant introduction and reseeding, runoff and erosion control, range livestock nutrition and behavior, livestock/wildlife interactions, the International Biome Program, remote sensing, seismic/geophysical imaging, and insect studies. The range is used as a research and education center for schools and groups from around the world. It is currently used by four branches of the USDA, five departments from the University of Arizona, several other universities, and by a wide variety of groups who use the Florida Canyon Headquarters as a center for educational workshops and outdoor studies.

Resident staff members are all volunteers. Grazing fees and cabin rentals to the range’s clientele provide operational funds.

Marana Agricultural Center

Elevation: 1,960' Location: 28 miles north of the University

The convenience of conducting large scale field research projects within a half-hour’s drive of the main campus is the chief strength of this facility. The present research program at Marana includes work on both long and short staple cotton, small grain varieties, sorghum hybrids, and new crops used as sources of latex, food, and vegetable oil. Because much of the 190 cultivated acres is infested with verticillium wilt fungus, this farm has been a primary center for research on the disease by cotton breeders, agronomists and plant pathologists.

Current research projects focus on a wide range of issues, such as cotton management techniques, testing of commercial transgenic (genetically altered) cotton lines, cotton breeding, evaluating the benefits and risks associated with sewage sludge applications, optimizing the use of farm equipment, testing the survival of fish in irrigation canals, crop protection techniques, and the monitoring of lightning strikes using a specialized antenna that is linked to a network of atmospheric sensors in the Tucson area. Operational funds for this facility are raised through the sale of commodities produced on site.
Maricopa Agricultural Center (MAC)
Elevation: 1,175’ Location: 4 miles east of Maricopa

The Maricopa Agricultural Center facilitates the production and dissemination of information about arid-region agriculture. Located near Casa Grande in Pinal County, this 2,100 acre center is unique among experimental farms because it is divided into two farms: a research farm and a demonstration farm. The research farm includes 430 acres devoted to short and long staple cotton, small grains, alfalfa, vegetables, melons, and alternative crops such as buffalo gourd, jojoba, guayule, lesquerella, hibiscus, agave, kenaf, seed crops, turf and fish. Cotton research and breeding is a major emphasis.

The Demonstration Farm operates as a 1460-acre commercial farm. It receives no state or federal funding. All revenues must come from the sale of commodities and through funds from farm programs available to any commercial grower. This farm serves as a facility to demonstrate the commercial viability and manageability of promising research results and technologies. This has helped in transferring information from small research plots to the large commercial farms in Arizona.

All fields are laser-leveled and extensive soil mapping has been done to establish a soil texture and depth database. The Center is entered into the Universal Transverse Mercator which is a geopositioning data set for precisely finding any coordinates on the farm. Extensive records are kept on cropping patterns, cultural operations and yields to assist in making management decisions, determining most suitable fields for conducting research projects and keeping track of production costs.

The Bartley P. Cardon Research Building is the headquarters for the laboratories and offices of the resident faculty, staff, cooperating USDA scientists and industry scientists. Other facilities include an irrigation research laboratory, equipment repair and fabrication shop, a wide range of storage facilities, short and long staple cotton gins, and greenhouses.

The center has developed an 80-acre state-of-the-art irrigation research facility equipped with underground pipelines. Eight 4-acre fields have electricity to aid field instrumentation and remote data collection. Fish production has been integrated with crop production on the farm, allowing the multiple use of water resources. This has proven to be a cost effective way to increase food production with irrigated cropping systems.

MAC is a place where university and USDA scientists come together with industry scientists and growers for the purpose of transferring technology to increase production efficiency, manage air, soil and water resources efficiently and to protect the environment for the benefit of producers and consumers.

Spotlight on Cotton Field Day at the Maricopa Agricultural Center

Every October the Maricopa Agricultural Center holds the state Cotton Field Day to inform growers and industry representatives of the latest findings in cotton research. Participants tour the test plots, browse through the poster session, attend a symposium on current issues Arizona growers face, and talk informally with UA researchers and extension agents throughout the day.

“The field day is not just for the researchers at MAC,” says resident director Bob Roth. “We involve all the researchers and county agents to make it a state event.” (The Safford Agricultural Center holds a local Cotton Field Day about a week before, and each county usually has local cotton field days.) All aspects of cotton research are on display, including variety trials, fertility studies, water usage, pest control (insect and weed), nematode studies, breeding trials, defoliation practices, planting dates and irrigation termination dates.

“We also have a lot of trials that are conducted by commercial companies doing their own testing on-station, and by the USDA,” Roth says.

The event regularly draws about 800 participants involved in cotton production throughout the state.
Citrus Agricultural Center
Elevation 1,233’ Location: 25 miles northwest of Phoenix in Maricopa County

This 40-acre facility is used mainly for research but also to demonstrate the latest varieties and methodology in growing and maintaining citrus, deciduous trees and vine crops. Research includes variety evaluation, nutrition, water use and requirements, frost protection, rootstock evaluation, pest and disease control, organic growing methods, and dwarfing techniques.

Citrus varieties for research include Kinnow mandarins; Fairchild tangerines; Campbell Oldline valencias; Minneola tangelos; Redblush, Texas Star, Flame and Rio Red grapefruit; and Parent Washington, U of A number 2, Fukumoto and Fisher navel oranges. These varieties are budded on various rootstocks that are represented on commercial farms in Maricopa County. They are irrigated using one of the three types of irrigation systems: flood, high pressure drip or microjet, or the low pressure bubbler system that is demonstrated on the farm.

Deciduous nuts and fruits include pecans, almonds, pistachios, apples, peaches, apricots, figs, nectarines, pears, berries (blackberries, raspberries, boysenberries, and blueberries), grapes, jujube, jojoba, and date palms.

A 1.5 million gallon water storage pond is used to raise fish (tilapia, catfish and koi) and for irrigation purposes.

Safford Agricultural Center
Elevation: 2,954’ Location: 2 miles east of Safford

This agricultural center provides research and service to farmers in a wide area that includes Graham, Greenlee and Cochise counties. Located just outside Safford in Graham County, this 63-acre agricultural center has been a performance testing site in the long staple cotton breeding program for more than 30 years. Solving problems in cotton is a particular focus; variety testing for a number of field crops is another.

Crops under study include long and short staple cotton, durum and winter wheat, barley, amaranth, alfalfa, beans, fruit trees, pecans and pistachios. Acreage is also planted to kenaf, an alternative paper and fiber crop, and vernonia, an oilseed. The station cooperates closely with the New Mexico Crop Improvement Association in testing New Mexico Acala cotton varieties throughout southeastern Arizona.

The center was deliberately selected for its problem soils—both saline and alkaline—and saline well water, to enable research specific to local needs to be conducted on-site. Researchers focus on determining the crops and crop varieties that may be economically produced under these conditions.
Yuma Agricultural Center
The Yuma Valley Farm—elevation 100’ Location: 4 miles west of Yuma
The Yuma Mesa Farm—elevation 165’ Location: 4 miles east of Yuma

This center includes two locations, valley and mesa, to take advantage of the different low desert conditions and soil types in southwestern Arizona. Both sites are irrigated with Colorado River water. The center also includes seven resident faculty from five academic departments, who conduct research and outreach programs throughout the low desert region of Arizona. Additionally, faculty and research scientists from the main campus in Tucson, from USDA-ARS facilities throughout the western U.S., and the private sector, also conduct research on this facility. This center has a staff of approximately 40 individuals and includes research technicians and specialists, office and clerical personnel, and farm personnel.

Programs conducted on the 274-acre Valley Farm emphasize a diversified range of crops, including cotton, small grains, and vegetables. Programs with vegetables include such crops as lettuce, cole crops (broccoli, cabbage, cauliflower), and others. This farm is located four miles west of Yuma.

Programs on the 240-acre Mesa Farm are primarily aimed at citrus production. However, programs on this facility include deciduous fruit production, vegetable production, and alfalfa production. This facility is located approximately four miles south of Yuma.

Both facilities include office and laboratory buildings, greenhouse structures, and farm shop facilities. Research conducted at the center includes the biology and management of insects, the biology and management of crop diseases, weed ecology and control, seed and crop physiology, cultivar and rootstock development and evaluation, and soil, water and nutrient management.

The V Bar V Ranch
Elevations range from 3200 to 7000’ Location: Near Camp Verde

This newest agricultural center, established in 1995, addresses environmental, wildlife and domestic livestock issues applicable to Arizona and the Southwest. The historic V Bar V is a 57-pasture grazing allotment that runs about 30 miles east from Camp Verde along the Mogollon Rim. It varies between four and five miles in width and spans Coconino and Yavapai counties. Slightly more than 40 acres is private land, with the remainder held under lease from the U.S. Forest Service.

The variations in elevation allow the UA College of Agriculture to expand its experiment station network to include higher elevation ecosystems. In addition to 550 cattle, the ranch is also home for a wide variety of wildlife, ranging from mammals, birds and fish to reptiles and amphibians. Vegetation zones, including high desert chaparral, pinyon-juniper woodland, and pine forest, are typical of those on most of the commercial ranches in central and northern Arizona.

The V Bar V is a fully operating, working ranch. Research involves an applied approach to problem-solving, rather than laboratory studies in basic science. Current studies focus on three main areas: cow herd management; range and watershed activities, and wildlife interactions, particularly with elk. Annual natural resource tours are open to the public; a self-guided auto tour is also available.