

2011 Insect Report



Utah Department of
Agriculture and Food

PLANT INDUSTRY

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UDAF Plant Industry Thanks Partners of the Insect Program:
USDA/APHIS-PPQ
Fruit Ad hoc Committee
USU Plant Pest Diagnostics Lab
Utah Nursery and Landscape Association
Dept Homeland Security USCIS
National Plant Board
USDA FS Forest Health Protection



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Protecting Utah Agriculture

Utah agricultural industries are valued at over a billion dollars annually, with about 22% of the state's land in agricultural production. The mission of the Utah Department of Agriculture and Food (UDAF) is to "Promote the healthy growth of Utah agriculture, conserve our natural resources and protect our food supply." Managing insects is essential to this mission. Although most insects are beneficial, pest infestations can be devastating, and UDAF Plant Industry has been addressing insect issues since pioneer agriculture began here 160 years ago. Some economic estimates of losses to U.S. food crops due to pests approach 40%. Both newly introduced insects and outbreaks of endemic species can cause sudden losses much like a natural disaster. Trends that contribute to this potential include erratic weather patterns and climate change, intensive monoculture farming methods, and global commerce, which commonly transports materials of risk great distances. The UDAF Plant Industry Insect Program aims to protect Utah agriculture, food, and quality of life from losses due to insects.

Goals and Strategies of the Insect Program

Prevention and Protection

Insects are transported in various ways, often unintentionally. Using quarantines and inspections can guard against new pests. Surveillance of insects with outbreak potential allows protection of resources at risk.

Early Detection

Using strategic detection and diagnostic networks, trap and survey technology to detect pests as early as possible minimizes insect damage and cost of eradication or control. UDAF Plant Industry annually surveys and traps over 10,000 locations statewide and works with partners nationwide to best use these tools.

Insect Control

There are many effective tools for insect control and more being developed. UDAF Plant Industry uses survey methods, predictive models, and economic thresholds that inform action using chemical pesticides, biological controls, or cultural methods.

Public Education

Raising awareness of how insect pests are introduced and the consequences of outbreaks can facilitate early detection efforts and protect resources. Teaching Integrated Pest Management principles can also help protect beneficial insects and increase environmental stewardship.

Accomplishments and Highlights

The UDAF Plant Industry Insect Program has been highly effective at detecting insect problems and taking appropriate action. Currently nine insect and plant quarantines in conjunction with trapping and inspection programs have prevented pests such as European corn borer and red imported fire ant from inhabiting Utah. UDAF Plant Industry monitors endemic populations of grasshoppers and Mormon crickets to suppress outbreaks and protect crops. Exotic pest introductions with high economic potential have been met with treatment programs to eradicate, including the gypsy moth (successfully eradicated) and Japanese beetle (in progress).



Photo: © 2007 Bee Master of Las

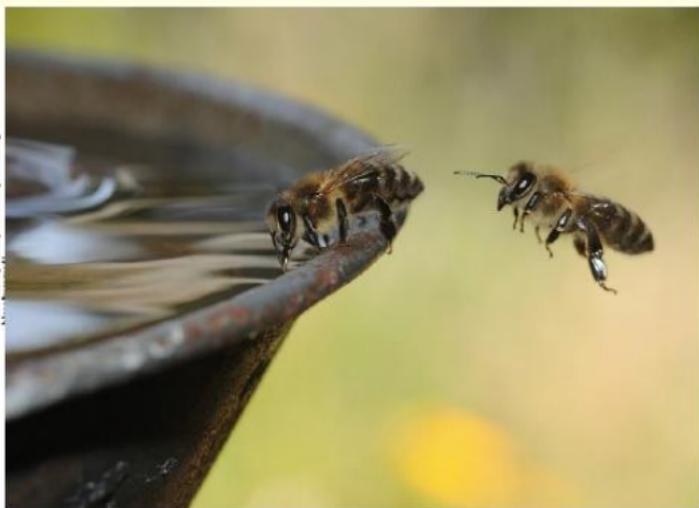


Africanized Honey Bee - UDAF Plant Industry

In 1956, African honey bees were imported from Africa to Brazil by biologist Warwick E. Kerr. He was attempting to hybridize African bees with honey bees from Brazil to increase honey production and to create bees that were better adapted to the tropics of Brazil. A research assistant accidentally released the African queens into the surrounding environment where they bred with local honey bees to form hybridized honey bees. These hybridized bees are Africanized honey bees (AHB), or “killer bees.” They made their way north and by 1990, they reached southwest Texas. After that, the bees migrated east and west, mostly west into New Mexico, Arizona, and California. The bees tend to like the conditions typical of the desert southwest.

AHB are slightly smaller in size, will live in smaller cavities, and will swarm more times per year compared to European honey bees. They will aggressively defend their hives but may attack unprovoked. They will follow people or animals a much further distance from the hive and may sting thousands of times per attack. Even so, this insect has been unfairly sensationalized in the media; education efforts have decreased panic and stinging incidents nationwide. These bees are typically found next to water sources such as rivers, streams, lakes, canals, and man-made sources. It is thought that these water sources are the highways in which the bees migrate.

Pollinator Protection



Apiary Program - UDAF Plant Industry

Utah, the “Beehive State,” is home to over 800 registered beekeepers that produce over a million pounds of honey annually. Honey bees are key pollinators of many crops throughout the state, from large-scale orchards and farms to backyard fruit trees and gardens.

The ability of UDAF Plant Industry to work closely with municipalities to update regulations to allow urban bee keeping is reflected in the record increase of new beekeepers along the Wasatch Front and in rural areas. Newly registered beekeepers are up nearly 800% from just five years ago and increased by 267 new beekeepers in 2011. To help protect Utah’s bee industry, UDAF Plant Industry monitors the movement of nearly 1,000 truck loads of bees that move through Utah on their way to pollination contracts across the United States.

The health of Utah’s bees is vital to our communities and farmers. The numerous diseases, parasites, and illnesses that affect our colonies are important concerns for UDAF Plant Industry. The state bee inspector and numerous county bee inspectors inspected 1,300 hives for overall health in 2011. Of these, one hive was destroyed to prevent the spread of disease. Through media contacts and general public inquires, UDAF Plant Industry fields approximately 300 calls annually regarding bees. Because of these inquiries, UDAF Plant Industry raises awareness about the importance of beekeeping to the ecosystem and agriculture.



Photo: Andrew Forbice: <http://www.cmgf.com/>

Apple Maggot and Cherry Fruit Fly - Fruit Ad hoc Committee / UDAF Plant Industry

The apple maggot (*Rhagoletis pomonella*), also known as the “railroad-worm,” and the cherry fruit fly (*R. indifferens*), are both picture-wing flies native to North America. Both insects have become major pests of fruit trees in the U.S. and Canada. The UDAF Plant Industry program began in 1985 with the discovery of apple maggot in abandoned and non-commercial cherry orchards in Utah County. Approximately 600 traps are monitored annually during the growing season, and apple maggot catches have decreased from 10 in 2002 to 0 in 2010.

There are approximately 300 commercial fruit growers in Utah, with a commercial value of an estimated \$17 million annually. All fruit marketed for export must be free from all apple maggot and cherry fruit fly injury, so thorough and effective control measures are necessary. This program allows Utah fruit growers to export fruit to states.

In addition to trapping, this program provides commercial growers with information to improve insecticide spray timing. Accurately timed sprays result in the following: better control, smaller amounts of pesticides being used, less environmental impact, and lower production costs. Without proper control, these insects could cause serious damage to all tree fruit grown in the state.



Siberian Moth - UDAF Plant Industry / USDA APHIS PPQ

Siberian moth (e.g., *Dendrolimus pini* and *D. sibiricus*) poses a significant threat to Utah's forests and related industry. Due to an increase of shipments of containerized cargo and the movement of plant material into Utah, there is a need to monitor for the presence of Siberian moth and other exotic defoliators. Exotic defoliators cause dramatic devastation across landscapes by defoliating over 500 tree species, mostly conifers but also deciduous species. The forests and climate of Utah are suitable habitat. Siberian moth has a high potential to be transported via commerce because females can deposit eggs in crevices on containers, pallets, and ships. Adults are readily attracted to artificial lights and have been observed in Russian Far East ports.

Using pheromones specific to these pests, UDAF Plant Industry traps for early detection. Traps were baited with pheromones for target species and placed in high-risk areas of the state. Trapping areas included shipping vectors such as railroads and highways, landing points including airports and military bases, areas where large quantities of plant debris are collected, and any high risk areas recommended by U.S. Customs and Immigration Service and USDA APHIS-PPQ. Two hundred traps were set for each species in 2011; none of these species were detected.

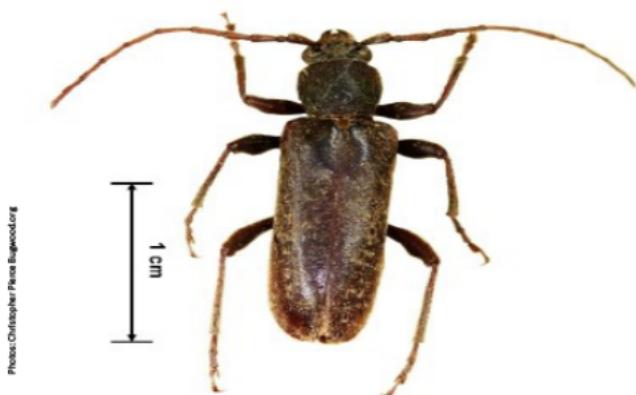


Cereal Leaf Beetle - Utah State University Biology Department, Ted Evans Lab/ UDAF Plant Industry

The cereal leaf beetle (CLB; *Oulema melanopus*), has been spreading across the U.S. for about 50 years. In Utah, it was first recognized in Morgan County in 1984, where it was causing economic damage on barley, oats, and wheat. Since then, it has infested the cooler, moister counties in Utah. The CLB prefers irrigated fields of oats, wheat, and barley. In 1984, UDAF Plant Industry began annual statewide surveys for this pest, in part to satisfy the requirements of the California Cereal Leaf Beetle Quarantine, so that Utah growers could export to California. In 2011, the survey included Utah's counties with hay and cereal export potential.

In general, CLB levels were lower than in years past, probably due to successful release of a biological control agent, the wasp *Tetrastichus julis*, which parasitizes and kills the CLB larvae. Utah State University Department of Biology continues to release this biological control species, and past CLB surveys have determined that all counties positive for CLB also have substantial levels of these parasitoids. The parasitoids population stays highest when growers tolerate sub-economic levels of CLB. In contrast, the parasite population is set back substantially with each chemical application to control CLB.

Early Detection - Rapid Response



UGA2154045

Chinese Long Horn Beetle - UDAF Plant Industry / USDA APHIS PPQ / USCIS

The Chinese Long Horn beetle (CLHB; *Trichferrous campestris*) attacks healthy or slightly stressed trees of many important species. It prefers to attack mature trees, killing the trees or causing significant loss of vigor, loss of wood marketability (because of the boreholes) and/or reduced fruit yields in the case of orchards. The pest also has the potential to damage urban forests. Nevertheless, the relative importance of CLHB in damaging forest trees, trees in natural environments, orchard trees, and amenity trees has not been evaluated in any detail beyond the observation that the preferred hosts are fruit or amenity trees (*Malus* and *Morus*).

A survey for the CLHB and other exotic wood boring beetles was conducted in Utah in 2011. Three Lindgren funnel traps were placed at each of 10 sites in South Salt Lake City, which targeted stone and machinery importers. The lures used were ethanol, ethanol with alpha-pinene, and *Ips* tri-lure. In total, 420 samples containing 3,963 beetles were identified by Clinton Burfitt. No specimens of CLHB or other new exotic species were detected.

Urban Habitat Protection



Emerald Ash Borer - USDA APHIS PPQ

Emerald ash borer (EAB; *Agrilus planipennis*) is native to Asia, but it was discovered in Michigan in 2002. Since then, it continues to spread rapidly to states and provinces in and around the Great Lakes region in Canada and the USA. It was likely introduced by way of wood packing materials from Asian cargo. EAB quickly killed many millions of ash trees (*Fraxinus* sp.) in these areas, and can now be easily spread from infested areas by transporting infested trees, logs, or especially firewood. In its native ecosystem in Asia, this insect exists in balance with competitors, natural predators, and pathogens. It does not cause economic damage in this setting. However, in North America, without these balancing factors, EAB has caused rapid death to all ash species it attacks. Symptoms include crown dieback initially, which progresses until the tree is bare. Epicormic shoots, splitting bark, increased woodpecker damage, serpentine galleries, and D-shaped exit holes are the subsequent symptoms of EAB infestation.

In addition to Utah's many ornamental ash trees in urban landscapes, there are two native ash species that are part of the forest ecosystem. All of these species would be vulnerable to EAB attack, causing economic and aesthetic losses in urban areas and ecological impacts in natural areas. In 2011, USDA APHIS PPQ placed 50 baited traps in 20 counties, targeting high-risk ash trees in decline. No EAB was detected.

Fruit Industry - Early Detection



Orchard Commodity - Utah State University Biology Department, Cory Stanley, Ricardo Ramirez / Utah Plant Pest Diagnostics Lab

Utah's fruit industry is valued at \$17 million and occurs on approximately 7,000 acres. In 2011, Utah State University surveyed for pests that could devastate the eight different tree fruits and six different berries grown by at least 370 operations in Utah. There is a substantial risk of introduction of these several insect pests that are of regulatory concern.

In 2011, a survey for eight exotic species of regulatory concern and economic importance in Utah was conducted at 37 orchards and fruit stands. Targeted species were European grapevine moth (*Lobesia botrana*), plum fruit moth (*Cydia funebrana*), light brown apple moth (*Epiphyas postvittana*), false codling moth (*Thaumatotibia leucotreta*), summer fruit tortrix moth (*Adoxophyes orana*), Egyptian cotton worm (*Spodoptera littoralis*), old world bollworm (*Helicoverpa armigera*), and spotted wing drosophila (*Drosophila suzukii*).

During June, July, and August 2011, appropriate traps for each target species were placed in sweet cherry, tart cherry, apple, and peach orchards; in raspberry and blackberry fields; and at fruit stands. Samples were collected from all traps every 1 to 4 weeks, depending on trap type, and lures were replaced every 1 to 12 weeks, depending on lure requirements. All traps were removed during September and October.



Photos: Chromon, University ofSCA, Birmmsh

European Corn Borer - UDAF Plant Industry

This highly adaptable pest attacks over 200 plant species. During its early history in the United States, the European corn borer (*Ostrinia nubilalis*) spawned one generation yearly. By the late 1930s, a two-generation per annum European corn borer mushroomed swiftly and became a dominant pest in the central Corn Belt. It continued spreading in all directions, with the southernmost populations spawning 3 and 4 generations per year. UDAF Plant Industry administers a quarantine for small grains and other agricultural crops that may contain the European corn borer to prevent this destructive insect from entering Utah.

UDAF Plant Industry coordinates a European corn borer trapping program. This program consists of approximately 100 traps placed each year in chief corn producing areas of eight counties. The counties included are Cache, Box Elder, Weber, Davis, Utah, Sevier, Sanpete, and Emery. No new records of the European corn borer were found in Utah in 2011.

Invasive Species - Early Detection



Photo: http://www.achteromitting.com/p/verloper_37romatich.htm

Gypsy Moth - UDAF Plant Industry / USDA APHIS PPQ / USDA FS FHP

Gypsy moth (GM; *Lymantria dispar*) is established in the eastern U.S. Because their egg masses are laid on virtually any substrate, they are often moved long distances to new territory. Utah's arid climate and mountainous terrain have a high potential for GM infestation and subsequent mass deforestation. Because Utah is not part of the contiguous range of GMs in the Eastern U.S., a program of GM prevention and eradication is the most cost effective and beneficial strategy. GM was first found in Utah in 1988. Since then, UDAF Plant Industry has been the lead agency in the administration of a major survey and control program. When populations are found, they can be treated and effectively eradicated before damage occurs. UDAF Plant Industry has successfully eradicated GM twice using the bacterium *Bacillus thuringiensis* var. *kurstaki* (*Btk*) and continues to monitor for new introductions.

The 2011 Utah Gypsy Moth Program placed 2,050 detection traps using the GMWest model BioSIM. This model integrates climate and elevation data to predict the probability of GM establishment. Two male moths were caught in 2008, and from 2000 to 2009, the GM detection program has trapped 15 single males in individual pheromone traps. In every case, further delimitation surveys have produced negative results.

Early Detection / Eradication



Japanese Beetle - UDAF Plant Industry / USDA APHIS PPQ

The Japanese beetle (JB; *Popillia japonica*) is a highly ruinous plant pest causing damage and increased control costs. It has swept through most of the eastern United States. Adults attack more than 300 species of plants, including numerous trees, ornamental shrubs, vines, fruits, flowers, vegetables, garden crops, weeds, and field crops. Larvae are serious pests of lawns, other grasses, and nursery stock. Because the larvae are easily shipped with nursery stock and soil, JB is a serious threat to Utah's \$124 million nursery and floriculture economy and has been part of UDAF Plant Industry detection trapping since 1993. When a JB infestation was discovered in Orem, Utah, in 2006, the infestation was delimited using pheromone baited traps, and an eradication plan was devised. The eradication approach was based on containment, trapping, turf, and foliar treatments. Partnerships were established with the Orem City Mayor, county commissioners, APHIS-PPQ, Orem residents, EPA, health officials, extension agents, nurseries, and landscapers using media and open house events to educate and prepare the community for eradication efforts.

Cropland - Rangeland Habitat Protection



Mormon Cricket and Grasshopper - UDAF Plant Industry / USDA APHIS PPQ

For the past eight years, disaster declarations by the governor have focused resources (administered through UDAF Plant Industry) to provide relief from major infestations of Mormon crickets (*Anbrus simplex*) and grasshoppers (various genera). In 2011, cooperative grasshopper treatment programs were conducted to protect vulnerable crop and rangeland habitat in Sanpete County. The UDAF Plant Industry shared costs with farmers and ranchers that had infestations of grasshoppers on private land. An estimated 50,000 acres was treated to control grasshoppers on private and public land in 2011. Private grasshopper treatments occurred in the following counties: Carbon, Iron, Juab, Millard, Sanpete, Sevier, and Tooele.

2011 survey results indicate that Mormon cricket populations are increasing in Beaver, Juab, and Millard counties. Ground application of carbaryl occurred in Beaver and Millard counties to protect cropland. Mormon cricket infested acreage increased 54% from 2010. Aerial treatment programs are expected in 2012 to protect crop and rangeland habitat in Beaver, Juab, and Millard counties.

Fruit Industry - Export Program



Plum Curculio - UDAF Plant Industry / Utah State University / Fruit Ad hoc Committee

Utah's fruit industry is valued at approximately \$14 million annually, with over 370 operations growing at least 6,885 acres of cherries, peaches, apples, cane berries, and other fruits. Plum curculio (PC; *Conotrachelus nenuphar*) is a pest of stone and pome fruits and is native to eastern North America. In 1999, it was detected in home and yard fruit trees in Brigham City.

The presence of PC in Brigham City is sustained by unmanaged fruit trees located in residential areas. Unmanaged fruit trees serve as a reservoir for populations of this insect. Each year Utah State University and UDAF Plant Industry, in conjunction with Brigham City, send out an informational pamphlet to educate home owners about this insect and how to manage or remove the fruit trees.

Twelve orchards that grow cherries, peaches, and apples in Box Elder and Weber counties were surveyed for the presence of PC. Traps designed to trap PC with an specific lure were placed at each site. Traps were serviced every four weeks from late May to early September. 43 Plum Curculio were detected in 2011.

Public Health - Nuisance



Photo: April Noble, Bugwood.org



Photo: Murray S. Blum, Bugwood.org

Imported Fire Ant - Utah State University Department of Biology, James Pitts Lab / USDA APHIS PPQ

Imported fire ants are both a public health risk and an economic threat. They are federally quarantined pests not known to occur in Utah, but easily introduced in infested soil. Imported Fire ants are in neighboring southern states, and adults migrate by flying to new territory. They were first introduced to the southern U.S. in the 1930s from South America. Imported Fire ants can feed on many agricultural crops, including corn, soybean, and fruit trees. The aboveground mounds make cultivation, irrigation, and harvesting almost impossible. Imported fire ants can infest urban areas and become a nuisance that deters outside activity. Not only are imported fire ant mounds unattractive, ants are aggressive and sting humans and other animals. UDAF Plant Industry uses quarantine enforcements, port of entry inspections, and public education to keep Utah free of imported fire ants. Annual surveys to detect introductions of red imported fire ant (RIFA; *Solenopsis invicta*) and the black imported fire ant (BIFA; *S. richteri*) focus on Washington County, the most suitable climate and habitat in Utah.

Utah State University sampled 19 sites in 2011; representative ants from 14 genera were collected. During this survey, RIFA or BIFA was not detected at any of the sites. A native *Solenopsis* species, *S. xyloni*, was detected at 14 of the sites, its presence indicates RIFA/BIFA have not yet established in Washington County, Utah. The Argentine ant, *Linepithema humilis*, was collected at one site.

Invasive Species - Habitat Restoration



Biological Control of Invasive Plants - Utah Weed Supervisor Association, Jerry Caldwell / USDA APHIS PPQ

Noxious weeds are spreading at an alarming rate across the western United States, including Utah. Although the exact acreage is unknown, 100% of Utah's counties are severely infested by at least one of the state-designated 18 noxious weeds. The negative impacts of weeds are well known and profound. Noxious weeds can create monocultures that eliminate diverse plant communities. Watersheds dominated by noxious weeds tend to be less efficient in absorbing and storing water resulting in increased soil erosion. Noxious weeds can diminish forage production for all classes of herbivores and reduce habitat for small birds and animals. In addition, many noxious weeds are poisonous or injurious to animals.

The biological control of noxious weeds remains a cost effective and environmentally friendly method of preserving range habitat from invasive species. In 2011, the Utah Weed Supervisor Association received CAPS funding. Normally this funding would be used to purchase biological control agents to help restore critical habitat. Due to congressional appropriation delays, the funding for this program came too late in the year for effective distribution of control agents. Alternatively, equipment was purchased to construct five insectaries. These sites will serve as reservoirs for select biological control agents and will be available for Cooperative Weed Management Areas to collect and distribute throughout Utah. Funds were also used for outreach to landowners, which included education about bio-control agents.

Early Detection Rapid Response



Photo: Darrell Bradford, UDAF Forest Service, Forest Health Protection

Wood Borer Survey - UDAF Plant Industry / USDA FS Forest Health Protection

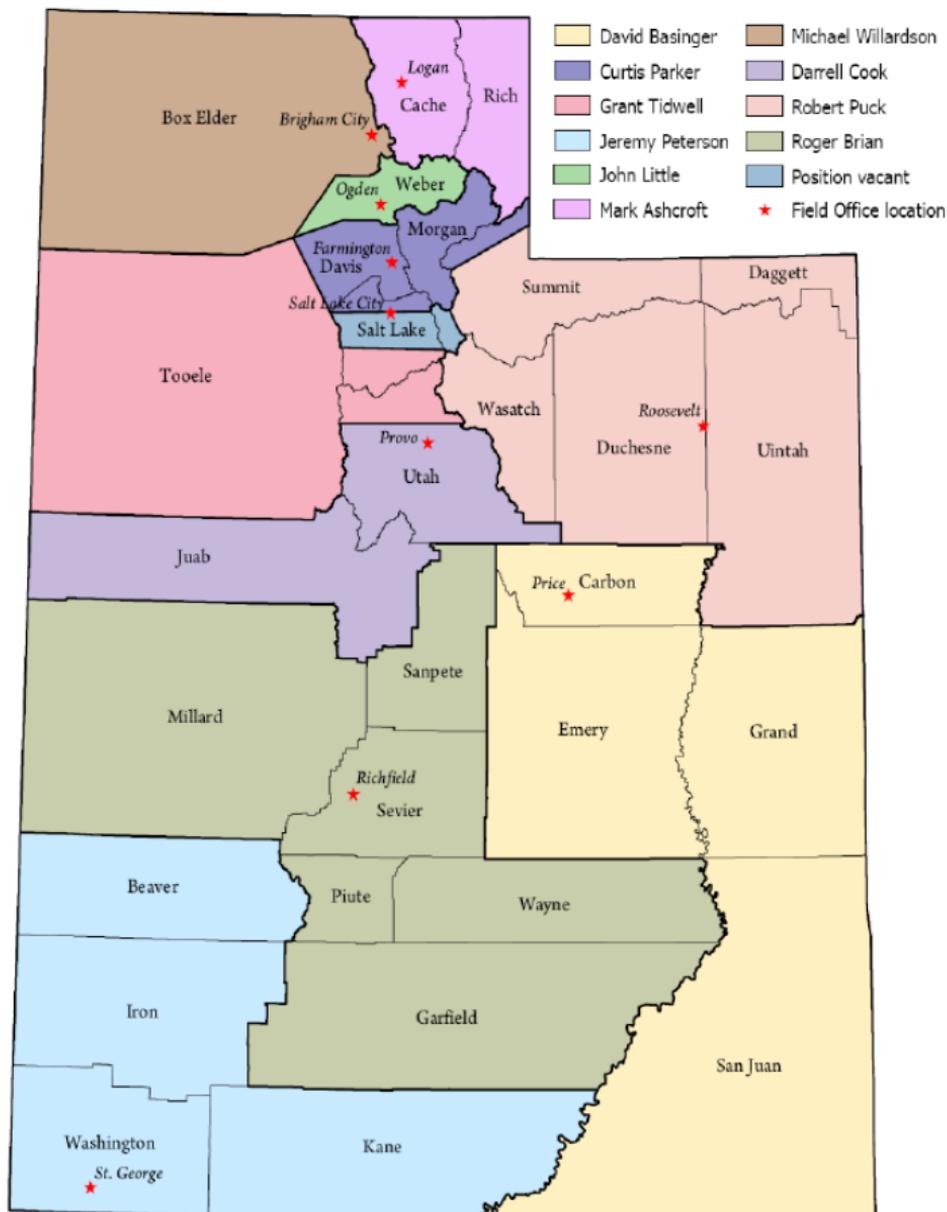
Bark beetle damage is a conspicuous reality in the forests of the Western United States. Several exotic species of wood borers have been detected throughout North America in the past decade. Some invasive species of wood borers have caused devastating tree mortality and subsequent loss of critical habitat. Exotic wood borers are being transported by the global movement of soft and hardwood packing material. These materials are used by foreign exporters to transport commodities, such as; glass, machinery, stone, tile, and plumbing fixtures. International efforts have succeeded in creating policy that requires the treatment of these materials. However, introductions of exotic wood borers continues to occur.

Invasive species survey is a critical component of the early detection and rapid response (EDRR) model. In 2011, the UDAF Plant Industry received Forest Service, Forest Health Protection funding to place traps that are designed to attract a variety of wood boring beetles. Forty-five Lindgren funnel traps were placed at 15 different sites in the Wasatch Mountain Range. The traps were baited with the following combination of lures: *Ips complex* lure, ethanol and a-pinene lures, and a-pinene lure. Approximately 3,500 individual specimens were identified to species, with no new exotic species detected. Trap contents were screened by UDAF Plant Industry personnel, identifications were made by UDAF Plant Industry State Entomologist, Clinton Burfitt, and Oregon Department of Agriculture Entomologist Jim Labonte.



UDAF Plant Industry Compliance Specialist Districts

January 2012



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Useful Utah Invasive Species Web Resources:

2011 Plant Industry Insect Report

<http://ag.utah.gov/divisions/plant/index.html>

Utah Plant Pest Diagnostics Lab

<http://utahpests.usu.edu/uppd/>

Utah Cooperative Agricultural Pest Survey

<http://utahpests.usu.edu/caps/>

Utah Horticultural Association

<http://www.utahhort.org/>

Honey Bee Resources

<http://utahpests.usu.edu/bees/>

Utah Weed Supervisors Association

<http://www.utahweed.org/>

Utah Nursery and Landscape Association

<http://www.utahgreen.org/>

UDAF Insect and Quarantine Program

<http://ag.utah.gov/divisions/plant/insect/index.html>

Grazing Improvement Program

<http://ag.utah.gov/divisions/grazing/index.html>

Summary of Invasive and Native Pests Risk

Africanized Honey Bee	Potential to disrupt Utah's \$2.1 million honey industry, health risks to humans and livestock
Apple Maggot, Cherry Fruit Fly, and Spotted Wing Drosophila	Fruit industry pest, potential to devastate Utah's \$14 million fruit industry
Cereal Leaf Beetle	Potential to reduce Utah's \$529 million small grain and field crop industry
Emerald Ash Borer	Threat to kill all ornamental and native ash trees in Utah
European Corn Borer	Potential to devastate Utah's \$51.3 million corn harvest
Gypsy Moth	Potential to destroy Utah's watersheds, coniferous forests, and residential landscapes
Japanese Beetle	Potential to damage Utah's \$20 million sod industry, \$124 million nursery and floriculture industry, and \$18 million fruit industry
Mormon Cricket and Grasshopper	Potential to significantly reduce Utah's \$529 million forage crop industry
Red Imported Fire Ant	Economic damage caused in the US exceeds \$5 billion, public health risk