



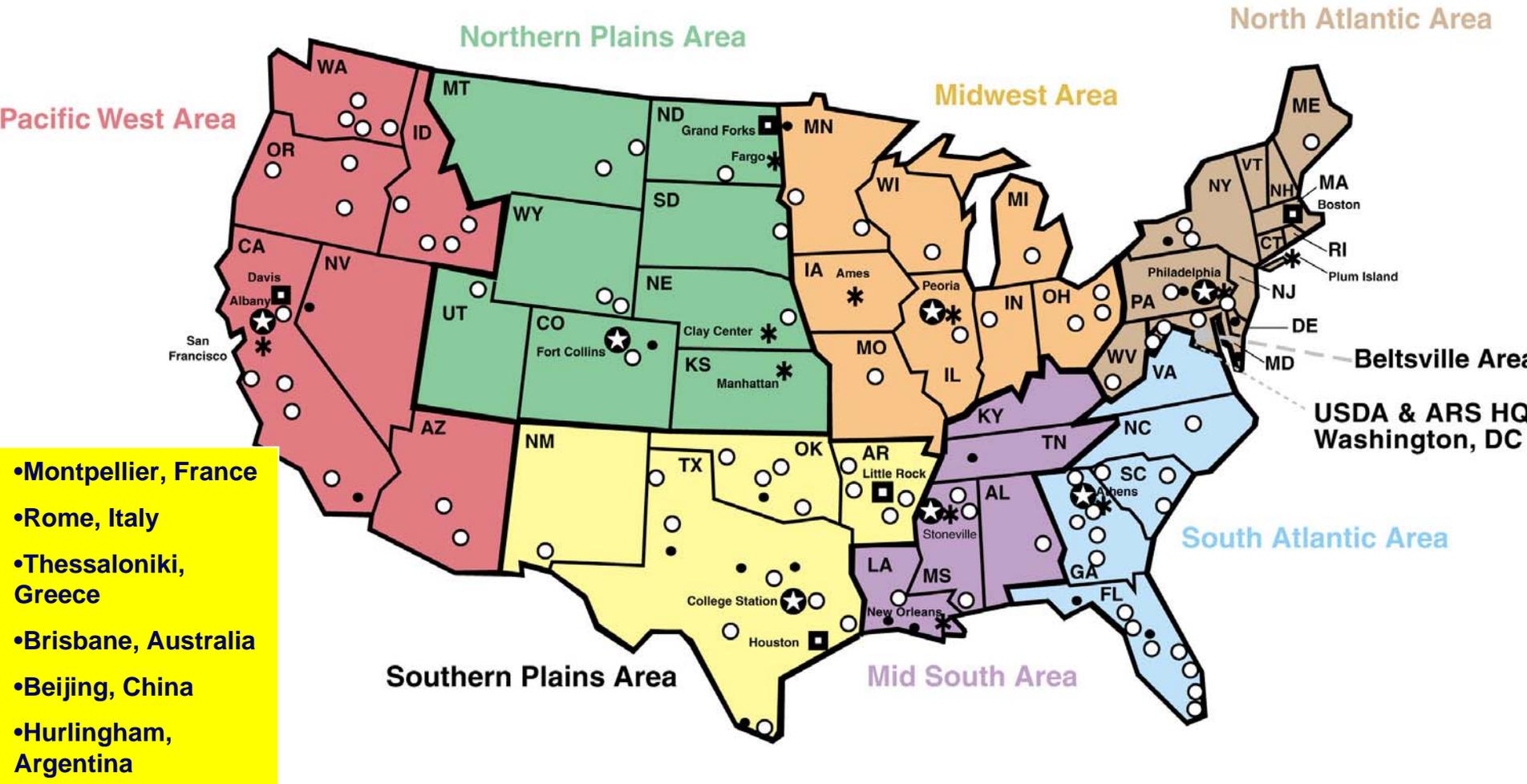
National Program 305 Crop Production Where Have We Been?



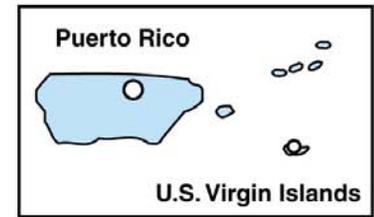
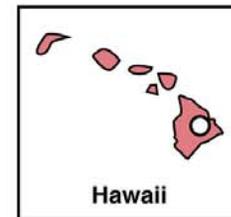
Profile of the Agricultural Research Service

- Scientific research arm of USDA
- Farm-to-table research scope
- Information and technology transfer
- National Programs
- 1,100+ projects
- FY06 Budget—\$1.1 billion
- 9,000+ employees
- 2,500+ scientists
- 100+ laboratory locations
- International collaboration
- Partnerships with other Federal agencies, universities and industry





- ★ Area
- ✱ Research Centers
- ▣ Human Nutrition Centers
- Research Locations
- Research Worksites



ARS Mission

ARS conducts research to develop and transfer solutions to agricultural problems of high national priority and provide information access and dissemination to:

- ensure high-quality, safe food, and other agricultural products
- assess the nutritional needs of Americans
- sustain a competitive agricultural economy
- enhance the natural resource base and the environment, and
- provide economic opportunities for rural citizens, communities, and society as a whole.



How Do We Meet Our Mission?

➤ Through National Programs

- A National Program is a set of research projects directed toward **common goals** to solve agricultural problems of **high** National priority.
- National Programs are outcome driven, e.g., “A safer food supply”



ARS National Programs

Animal Production

Food Animal
Production (101)

Animal Health (103)

Veterinary, Medical,
and Urban

Entomology (104)

Aquaculture (106)

Natural Resources

Water Quality &
Management (201)

Soil Resource
Management (202)

Air Quality (203)

Global Change (204)

Rangeland, Pasture
& Forages (205)

Manure &
Byproduct
Utilization (206)

Integrated
Agricultural
Systems (207)

Bioenergy & Energy
Alternatives (307)

Crop Production

Genetic Resources,
Genomics and
Genetic
Improvement (301)

Plant Biological &
Molecular
Processes (302)

Plant Diseases (303)

Crop Protection &
Quarantine (304)

**Crop Production
(305)**

Methyl Bromide
Alternatives (308)

Human Nutrition

Human Nutrition
(107)

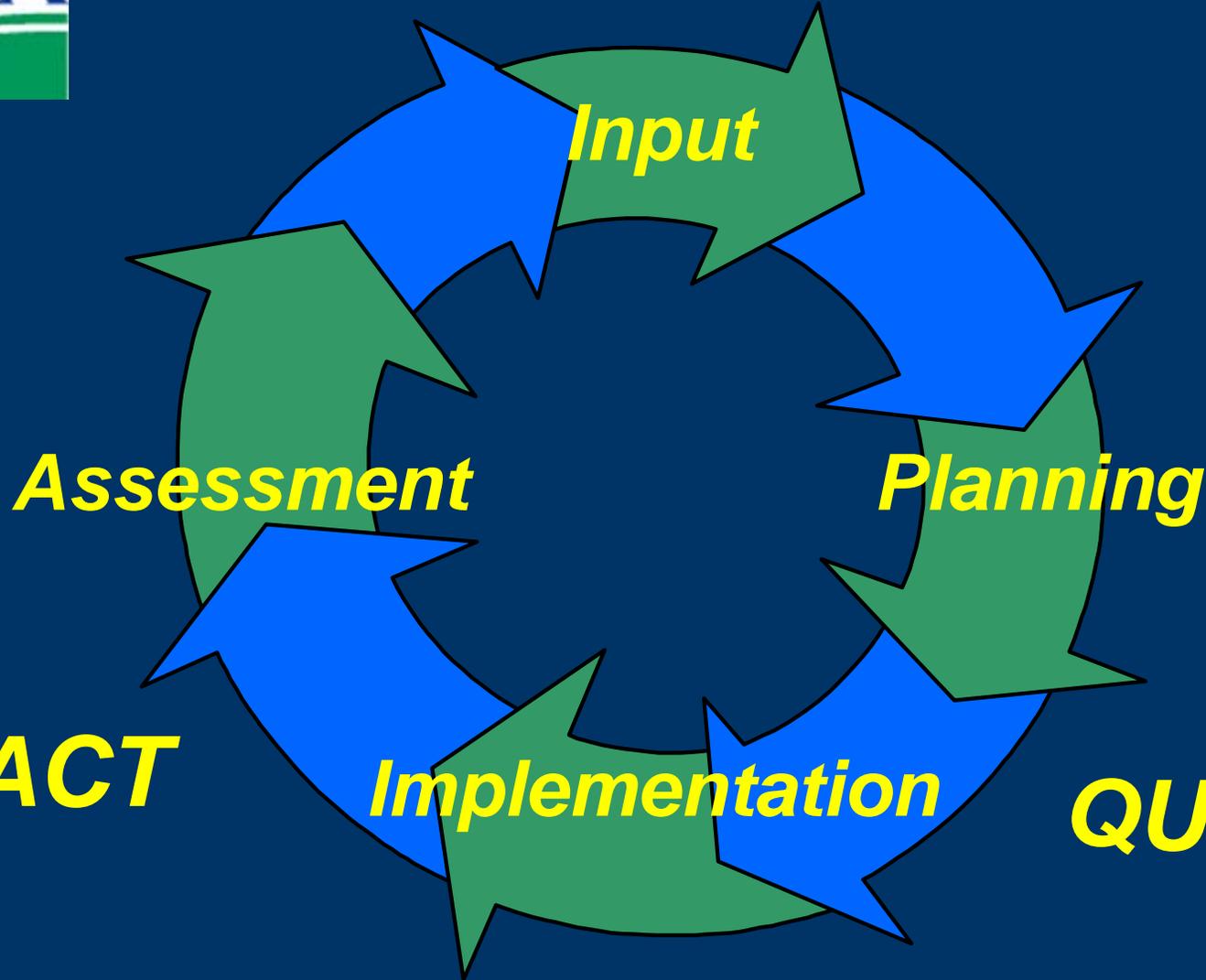
Food Safety
(Animal & Plant
Products) (108)

Quality and
Utilization of
Agricultural
Products (306)





RELEVANCE



ARS National Program System

USDA- ARS Input

Executive and
Legislative Branch



**ARS
Program &
Budgeting
Priorities**

Customers,
Partners &
Stakeholders



Agency
Scientists
&
Managers



Scientific Communities



NP 305 National Program Staff Team



In the Beginning
Scott Cameron
Kevin Hackett
Don Erbach

Now
Sally Schneider
Kevin Hackett



NP 305 MISSION

Develop and transfer sound, research-derived knowledge that will result in the economical production of food and fiber crops and products that are safe for consumption and use, while preserving environmental quality





- **24 projects primarily NP305**
- **17 projects secondarily NP305**
- **Total of 62 Scientist-Years (primary + secondary)**
- **23 locations (primary + secondary)**

Commodities in NP305

- Bees
- Berries and Cane Fruits
- Grapes
- Apple
- Stonefruit
- Pecan
- Trees & Forests
- Ornamental Trees
- Cut Flowers
- Potted Plants
- Bedding & Garden Plants
- Turf
- Beans
- Cucurbits
- Onions & Garlic
- Peppers
- Corn
- Wheat
- Cotton
- Sugar Cane
- Soybean
- Peanut





NP 305 RESEARCH COMPONENTS

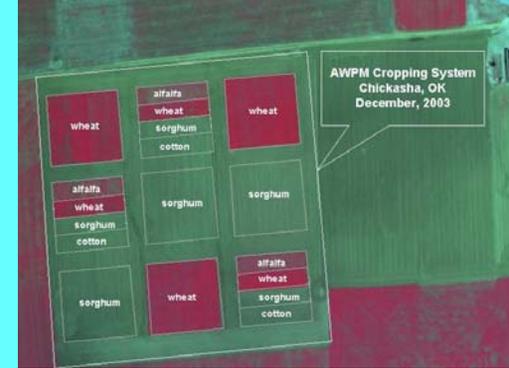
- I. Integrated Production Systems**
- II. Agroengineering, Agrochemical, and Related Technology**
- III. Bees and Pollination**





Component I

Integrated Production Systems



Component II

Agroengineering, Agrochemical, and Related Technology



Beltsville, MD

- **Small Fruit Crops in Sustainable Production Systems**
 - S. Wang, 20%, Plant Physiology
 - Vacant, 40%, Plant Pathology
- **Accomplishments**
 - Prohexadione-CA reduced fall runners & advanced branch crown formation in strawberry
 - Advanced Matted Row approach for strawberry
 - Increased atmospheric CO₂ increased phytonutrients and antioxidants in strawberry
 - Methyl jasmonate enhanced levels of anthocyanins and antioxidants in raspberry



Kearneysville, WV #1

- **Small Fruit Production Systems**
 - F. Takeda, 100%, Horticulture
- **Accomplishments**
 - Modified rotatable cross-arm trellis systems for trailing blackberries extends the harvest season in the eastern U.S.
 - New transplant propagation system extends the harvest season by producing strawberry plants that flower and fruit in the fall in the eastern U.S.



Kearneysville, WV #2

- **Integrated Orchard Management & Automation for Deciduous Tree Fruit Crops**

- D. Glenn, 100%, Soil Science
- T. Tworkoski, 100%, Plant Physiology
- T. Leskey, 100%, Entomology
- M. Brown, 100%, Entomology
- S. Miller, 100%, Horticulture
- Vacant, 50%

- **Recent Accomplishments**

- Surround WP Crop Protectant – Particle film coating
 - Insect & weed control, sunburn& freeze protection
- IPM strategies for tree fruit production systems
- Development new peach tree forms to increase yields
- Mechanical harvesting system for cherries
- Apple cultivar evaluations
- Apple conveyor system
- Apple bin filling device



Byron, GA

- **Pecan Cultivation and Disease Management**

- Bruce Wood (90%), Horticulture
- Charles Reilly (100%), Plant Pathology

- **Accomplishments**

- Nickel deficiency in pecan
 - Mouse-ear, little-leaf, replant
 - Diagnosis
 - Management



Florence, SC



- **Enhancing the Sustainability of Cotton Production in the Southeast USA**
 - P. Bauer, 40%, Agronomy
 - B. Campbell, 100%, Genetics
 - J. Novak, 10%, Soil Science
- **Accomplishments**
 - Conservation tillage for cotton in southeast US
 - Open-end spinning performance of cotton
 - Cotton cultivar testing



New Orleans, LA

- **New & Improved Cultural Practices for Sustainable Sugarcane Production and Environmental Protection**
 - R. Johnson, 100%, Agronomy
 - R. Viator, 100%, Plant Physiology
- **Accomplishments**
 - Green-cane harvest of sugarcane
 - residue blanket reduces yield in ratoon crop
 - Precision agriculture techniques for sugarcane



Lane, OK

- **Yield & Quality of Vegetable Crops in Conventional & Organic Production Systems**

- V. Russo, 100%, Plant Physiology
- C. Webber III, 100%, Agronomy



- **Accomplishments**

- Integrated production systems for veggies – organic & conventional



Morris, MN

- **Biological & Management Strategies to Increase Cropping Efficiency in Short-Season & High-Stress Environments**

- A. Jaradat, 20%, Agronomy
- D. Archer, 10%, Genetics

- F. Forcella, 70%, Agronomy
- R. Gesch, 60%, Plant Physiology
- S. Papiernik, 20%, Soil Science

- **Accomplishments**

- SeedChaser, SolarCalc, WeedCast, WeedEm, WeedTurf, WheatScout
- Production system for cuphea



Cuphea – A new oilseed crop that the ARS in Morris MN has helped develop

2005 marked the first-ever commercial field production of Cuphea in the US

Davis, CA

- **Sustainable Floriculture Production**
 - C. Jiang, 100%, Plant Physiology
- **Accomplishments**
 - Identified key gene that controls leaf abscission
 - Evaluated new sleeve materials coated with a chlorine-based N-halamine technology to reduce botrytis infection during transport and storage



Corvallis, OR

•Production Systems to Promote Yield & Quality of Grapes in the Pacific Northwest

- J. Tarara, 100%, Horticulture
- J. Lee, 100%, Food Technology
- K. Shellie, 100%, Horticulture

•Accomplishments

- Environmental triggers causing sunscald in 'Merlot' grapes
- Trellis tension monitor for yield estimation and crop monitoring in grapes



Dawson, GA

- **Develop & Transfer Irrigated & Non-irrigated Peanut Management Systems and Technology**
 - R. Sorenson, 100%, Agronomy
 - R. Nuti, 100% Agronomy
- **Accomplishments**
 - Surface vs. sub-surface drip irrigation
 - Planting row pattern and orientation



Wooster, OH #1

- **Biological, Microclimate, & Transport Processes Affecting Pest Control Application Technology**

- H. Zhu, 100%, Agricultural Engineering
- M. Reding, 10%, Entomology
- C. Krause, 10%, Plant Pathology

- **Accomplishments**

- Improved air-assist pesticide sprayer for dense canopied nursery crops
- Software that estimates drift potential for spray pesticide applications
- Monitoring system for water & fertilizer for pot-in-pot containerized production systems



Wooster, OH #2

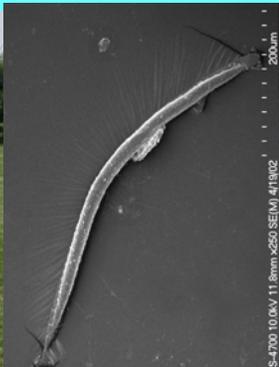
- **Improving Crop Protection Technology for Horticulture Crops**

- R. Derksen, 100%, Agricultural Engineering
- C. Krause, 10%, Plant Pathology
- Vacant, 100%



- **Accomplishments**

- Model to predict impact of sprayer components on the viability of insecticidal nematodes
- New application technologies that improve pesticide efficacy & reduce pesticide rates



Wooster, OH #3

- **Develop Improved Technologies for Soil-less Greenhouse Plant Production to Minimize Water, Labor, Agrochemical inputs & Environmental Impacts**
 - J. Locke, 100%, Plant Pathology
 - J. Frantz, 100%, Horticulture
 - C. Krause, 70%, Plant Pathology
- **Accomplishments**
 - “Virtual Grower” software to design greenhouses
 - Proteins responsive to boron stress



College Station, TX

•Aerial Application Technology for Crop Production & Protection

- W. Hoffman, 100%, Agricultural Engineering
- Y. Lan, 100%, Agricultural Engineering
- B. Fritz, 100%, Agricultural Engineering
- D. Martin, 100%, General Engineering
- J. De Dios Lopez, 100%, Entomology
- J. Westbrook, 50%, Meteorology



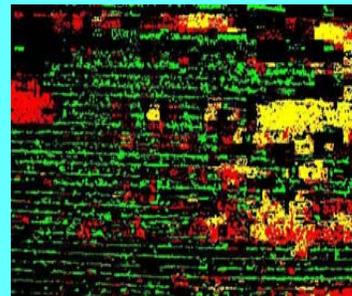
•Accomplishments

- Nozzle atomization models for helicopter and fixed-wing aircraft spray applications
- Demonstrated that wind speed was the primary factor influencing transport & fate of aerial applied spray
- Validated model to predict impact of environmental & equipment parameters on spray deposition and movement



Stoneville, MS

- **Development of Pesticide Application Technologies for Spray-Drift Management and Targeted Spraying**
 - S. Thomson, 90%, Agricultural Engineering
 - J. Williford, 50%, Agricultural Engineering
 - J. Hanks, 20%, Agricultural Engineering
 - Vacant, 100%, Misc.
 - Vacant, 100%, Misc.
- **Accomplishments**
 - Variable-rate aerial application systems

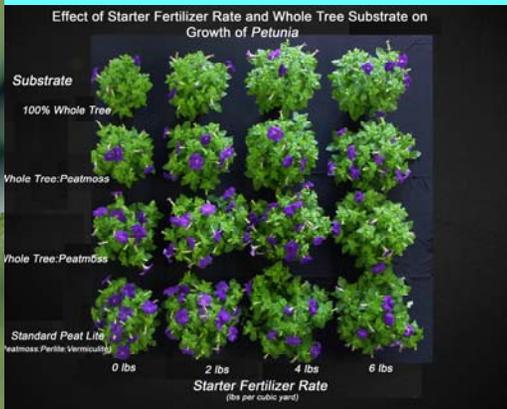




New Projects



- **Development of Integrated Systems for Subtropical/Tropical Fruit Crop Production – Mayaquez, Puerto Rico**
- **Southeastern Production Systems for Small Fruits, Ornamentals, and Vegetables – Poplarville, MS**



Contributing Projects

Location	Title	Primary NP
Davis, CA	Sustainable Management of Grapevine Diseases & Weeds	303
Albany, CA	Biologically based Integrated Management of Weeds on Western Rangeland Watersheds	304
Maricopa, AZ	Evaluation, Improvement, and Development of New/Alternative Industrial Crops	301
College Station, TX	Ecologically-based Management of Boll Weevils & Post-eradication Crop Pests	304
Lubbock, TX	Harvesting & Ginning Processes to Enhance the Profitability of Stripper Cotton	306



Contributing Projects

Location	Title	Primary NP
Stillwater, OK	Areawide Pest Management Program for Russian Wheat Aphid & Greenbug	304
New Orleans, LA	Developing Integrated Weed & Insect Pest Management Systems for Efficient & Sustainable Sugarcane Production	304
Stoneville, MS	Develop Soybean Genotypes & Management Systems for Early Season & Stress Environments	301
Stoneville, MS	Genetic-physiological Team Research to Improve Production, Fiber Quality, and Competitive Ability of Cotton	301
Stoneville, MS	Critical Biological Factors Determining Weediness	304



Contributing Projects

Location	Title	Primary NP
Stoneville, MS	Weed Biology & Ecology, & Development of Sustainable Integrated Weed Management Systems for Cotton, Soybean, Corn	304
Stoneville, MS	Augmentative Bioherbicide Strategies for Control of Invasive Weeds	304
Morris, MN	Soil Carbon cycling, Trace Gas Emission, Tillage & Crop Residue Management	204
Tifton, GA	Sustainable Systems for Integrated Pest Management & Conservation & Enhancement of Natural Enemies	304
Beltsville, MD	Management of Cover Crops for Enhancement of High Value Cropping Systems	207



Select Accomplishments from Contributing Projects

- Distribution of and management for armellaria root rot on grape
- Production systems for guayule and lesquerella
- Cover crop management system for date production
- Early planting system for cotton



NP305 Customer Workshop Bee Program: Where We've Been

K. Hackett

February 20, 2007



Introduction

Component III: Bees and Pollination

History of the Bee Program: 1999-Present

Customer Meeting: November 19-20, 1999, College Park, Maryland

Proposed Bee Lab Closings for FY03



ARS BUDGET AND LAB IDENTITY

	Funding (\$)		
	1999	2006	Lab Identity
Bee Lab			
Baton Rouge	\$1,392,200	\$2,294,700	
Beltsville	1,926,500	2,061,400	Honey Bee Breeding
Tucson	1,003,800	1,124,300	Honey Bee Disease
Weslaco	1,289,300	1,879,300	Honey Bee Health
Logan	986,700	1,594,500	Honey Bee IPM
			Non-Apis Bees
Subtotal permanent	\$6,598,500	\$8,954,200	(36% increase permanent)
Other Labs			
Fargo	0	64,600	Non-Apis Bee Overwintering
Gainesville	0	208,400	Honey Bee Pheromones
Montpellier	0	95,000	Honey Bee Hive Environment
Subtotal temporary	0	\$368,000	
Total	\$6,598,500	\$9,322,200	(41% increase in effort)

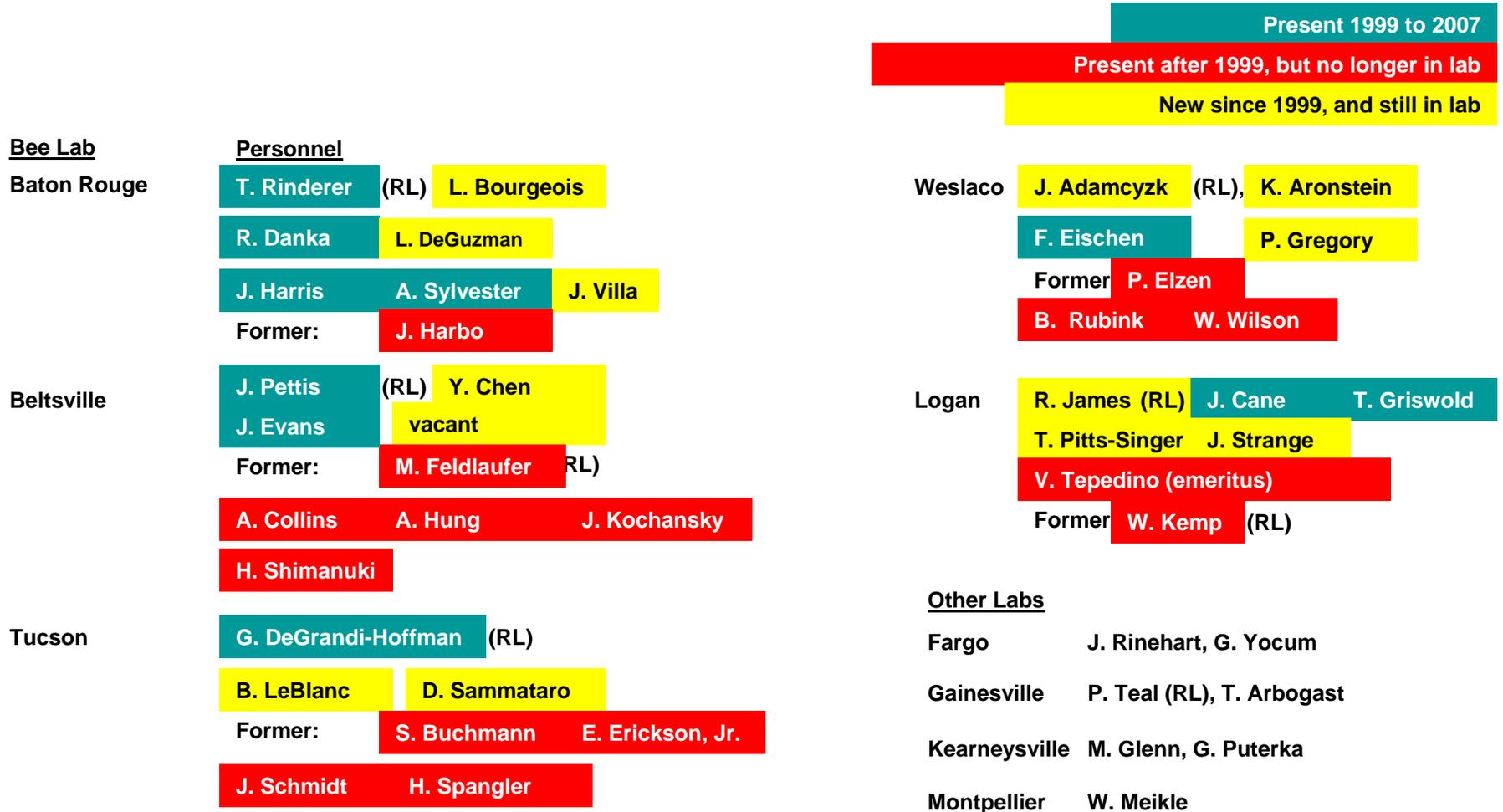
One Time Allocations

Bee Sequencing \$750,000 (USDA/REE)
\$7,000,000 (NIH)

Almond Study \$76,000 (ARS Administrator's Account)

CHANGES IN PERSONNEL SINCE 1999

ARS Bee Research Budget and Personnel



RESEARCH AT THE BATON ROUGE LAB

Scientist

Research Focus

T. Rinderer (RL)

Russian Bee Breeding & Management

L. Bourgeois

Marker-assisted Selection; Molecular Biology

R. Danka

Mite Resistance Breeding
Russian Bee Pollination

L. DeGuzman

Russian Bee: Mite Resistance Mechanisms
Small Hive Beetle Incidence in Mite-resistant Colonies

J. Harris

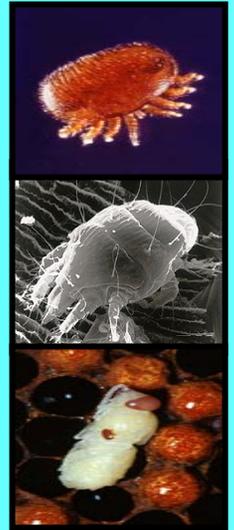
Mite Resistance (including VSH Trait) Breeding

A. Sylvester

Molecular Biology: Chalkbrood

J. Villa

Tracheal Mite Resistance



RECENT ACCOMPLISHMENTS

- o SMR/VSH Trait
- o Russian Bee



RESEARCH ROLES AT THE BELTSVILLE LAB

Scientist

Research Focus

J. Pettis (RL)

IPM

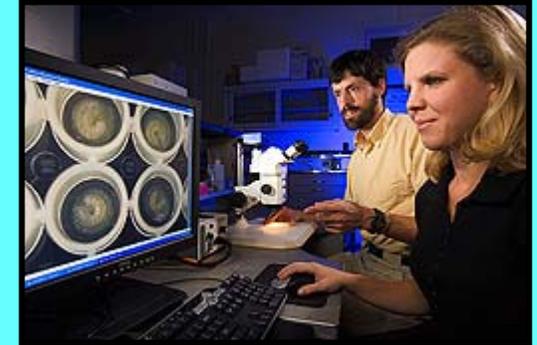
Y. Chen

Viruses, and Varroa Impact

J. Evans

Genomic Tools for Disease Management

Vacant (vice-Collins) Germplasm Preservation and Honey Bee Stock



RECENT ACCOMPLISHMENTS

- o Germplasm Preservation
- o Varroa Control: Beltsville Screen Insert and Formic Acid Gel
- o Small Hive Beetle: Control in Honey Houses
- o American Foulbrood Control: FDA Approval for Tylosin;
Cross-protecting Bacteria
- o Importance of Varroa as a Virus Vector



RESEARCH ROLES AT THE TUCSON LAB

Scientist

Research Focus

G. DeGrandi-Hoffman (RL)

Africanized Honey Bee: Population Dynamics
Varroa: Control w/ Pheromones as Miticides
Pollination (oilseed crops to replace petroleum)
Pollination: Transgenic Crops

B. LeBlanc

Nutritional Chemistry

D. Sammataro

Varroa: Biology and IPM

RECENT ACCOMPLISHMENTS

- o Pollen Substitute Diet
- o 2-Heptanone for Varroa Control
- o Management of European Honey Bees in Africanized Honey Bee Areas



RESEARCH ROLES AT THE WESLACO LAB

Scientist

Research Focus

J. Adamczyk (RL)

Integrated Resistance Management: Varroa & SHB

K. Aronstein

Genomics, especially Immune Response to Chalkbrood

F. Eischen

Varroa: Control
Pollination: Almonds

P. Gregory

Bee Health During Migratory Beekeeping

RECENT ACCOMPLISHMENTS

- o Immune Response to Infection
- o Slow Release Thymol for Varroa Control



RESEARCH ROLES AT THE LOGAN LAB

Scientist

Research Focus

R. James (RL)

Alfalfa Leafcutting Bee: Chalkbrood Control
Alafalfa Leafcutting Bee: Immunity to Fungi
Disease Control in Other Non-Apis Bees, e.g., BOB

J. Cane

Blue Orchard Bees for Almond Pollination
New Pollinators for Small Fruits & Berries
Pollination for Land Restoration

T. Griswold

New Pollinators: Biology and Systematics
Diversity of Wild Bees in the U.S.

T. Pitts-Singer

Alfalfa Leafcutting Bee: Pollenball Control
Alfalfa Leafcutting Bee: Management
Chemically-mediated Nesting Behavior in Bees

J. Strange

Bumble Bee Pollinators: Tomato, Blueberry
Bumble Bee Pollinators: Decline of Native Species

RECENT ACCOMPLISHMENTS

- o Chalkbrood Disease: Epidemiology and Control
- o Management of Blue Orchard Bee
- o Pollination: Restoration of Wildlands
- o New Pollinators and Systematics



RESEARCH ROLES AT NON-BEE LABS

Other Labs

Fargo, ND

G. Yocum
J. Rinehart

Bee Physiology (Diapause): ALB, BOB
Bee Physiology (Diapause): ALB, BOB

Gainesville, FL

P. Teal
T. Arbogast
M. Carroll (post doc)
B. Torto (visiting scientist)

Honey Bee: Small Hive Beetle & Varroa Traps
Honey Bee: Small Hive Beetle Population Dynamics
Honey Bee: Varroa Pheromones
Honey Bee: Pest Pheromones

Kearneysville, WV

M. Glenn/G. Puterka

Project Ended: Varroa Control by Sugar Esters

Montpellier, France

W. Meikle

Honey Bee: Varroa Control with Hive Fungi
Honey Bee: Hive Weight Dynamics

RECENT ACCOMPLISHMENTS

- o Small Hive Beetle Trap
- o Sugar Esters for Varroa Control





Thank you!

