

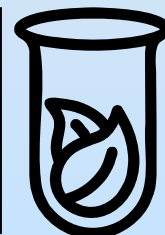


Critical Role of ARS Plant Scientists in Feeding and Fueling the Nation

Dr. Antoinette A. Betschart
ARS Associate Administrator

National Workshop on the Future of Education in
Plant Pathology and Related Disciplines

Crystal City, VA
March 19, 2009



“Transforming And Sustaining Education In Agriculture Requires
An Ongoing **Commitment** With
Strong **Leadership** From Many With
A Strong **Commitment In Agriculture.**”

“The Time To Act Is **Now.**”

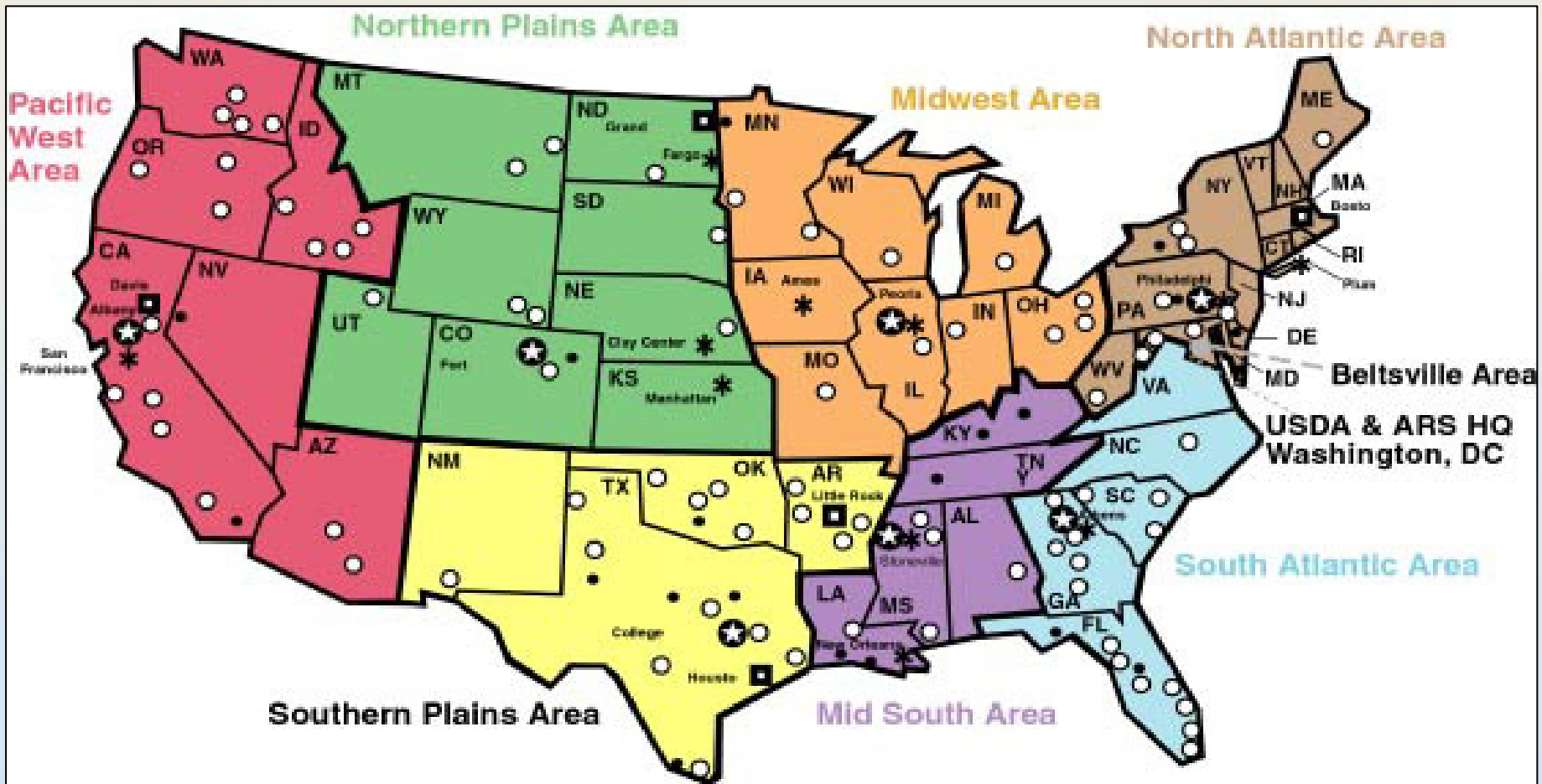
“The Changing Needs Of Students, Universities, Society, And
The Environment **Will Not Wait.**”

Transforming Agricultural Education for a Changing World

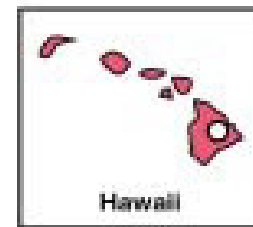
NAS 2009



ARS Locations



- ⊙ Area
- * Research Centers
- Human Nutrition Centers
- Research Locations
- Research Worksites



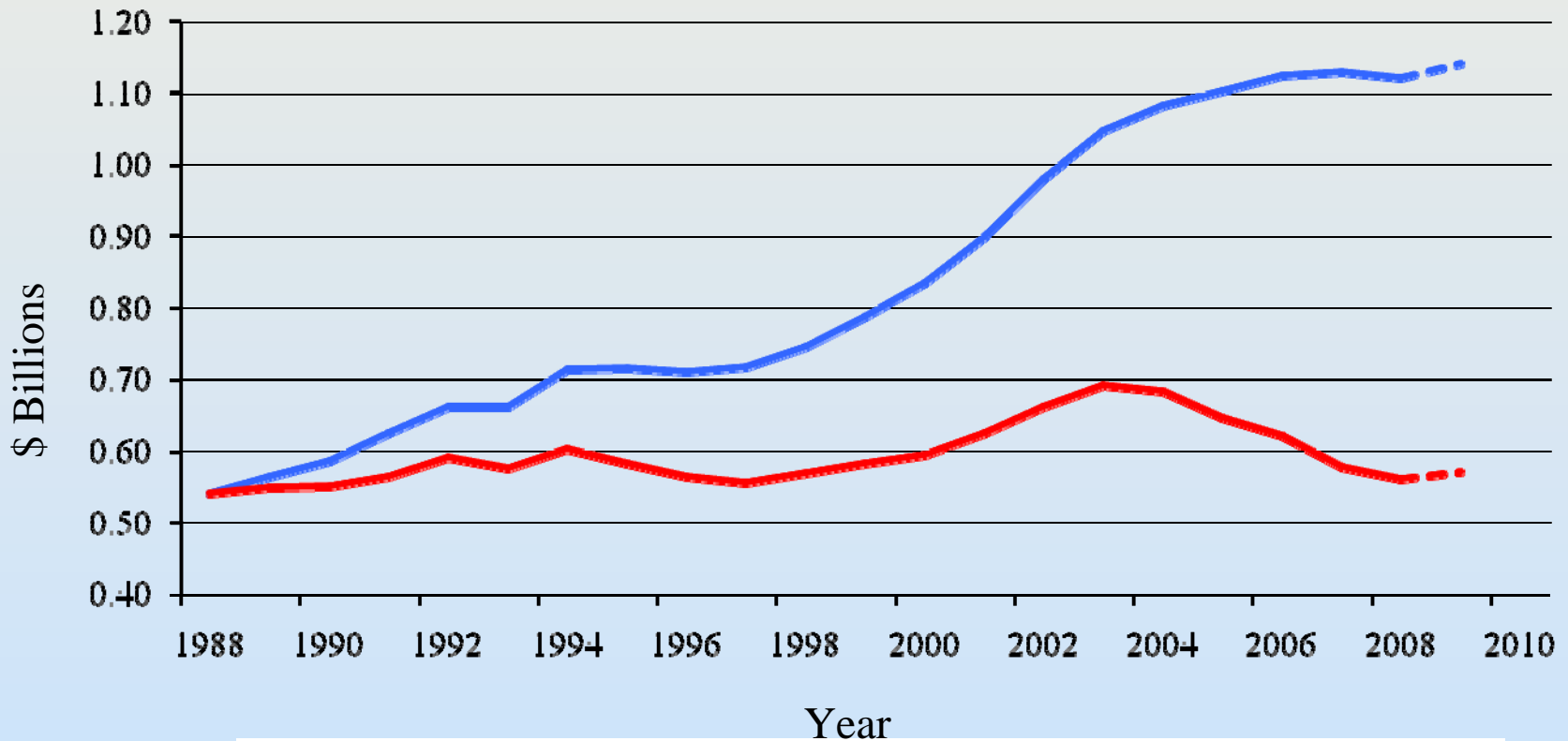
Trends in ARS Plant Scientists

	<i>FY 2000</i>	<i>FY 2008</i>	<i>Change</i>
Research Scientists			
<i>Pathologists</i>	131	158	+27
<i>Physiologists</i>	163	134	-29
<i>Geneticists</i>	179	232	+53
<i>Agronomists</i>	58	67	+9

Agricultural Research Service

Appropriations History

FY 1988-2009



— Appropriations

— Appropriations (Adjusted for Inflation)



Growing the Profession

Plant Scientists

	<i>FY 2000</i>	<i>FY 2008</i>	<i>Change</i>
Students (STEP*)			
<i>Pathologists</i>	6	0	-6
<i>Physiologists</i>	3	0	-3
<i>Geneticists</i>	7	0	-7
Students (SCEP**)	38	34	-4
Post-docs			
<i>Pathologists</i>	13	16	+3
<i>Physiologists</i>	23	13	-10
<i>Geneticists</i>	26	29	+3
<i>Agronomists</i>	3	8	+5

*STEP – Student Temporary Employment Program

**SCEP – Student Career Experience Program

What ARS is Doing

Employ

- Largest public employer of plant pathologists and biologists in the U.S.
- > 60 postdocs/year in plant pathology, genetics, and plant sciences

Mentor/Train/Develop

- Through public and private partnerships
- >120 MS and PhD's in plant breeding (2001–2008)
- Sabbaticals, visiting scientists, industry exchanges, undergraduate research

Challenges for the Future

- 🌿 National: food security/national security, water, exotic and emerging crop diseases, bioenergy, climate change, food safety, environmental protection, invasive species
- 🌿 Global: population increases, demographic changes, globalization

Challenges for Plant Pathologists

Plant Pathologists

- Critical to meet future challenges
- Highly competitive profession
- Fewer agricultural science degrees
- Emphasis mainly on fundamental science
- Critical to safeguard pathogen culture collections

What ARS Is Looking For

Relevant Research Directed to Solve Problems

Interpersonal competencies

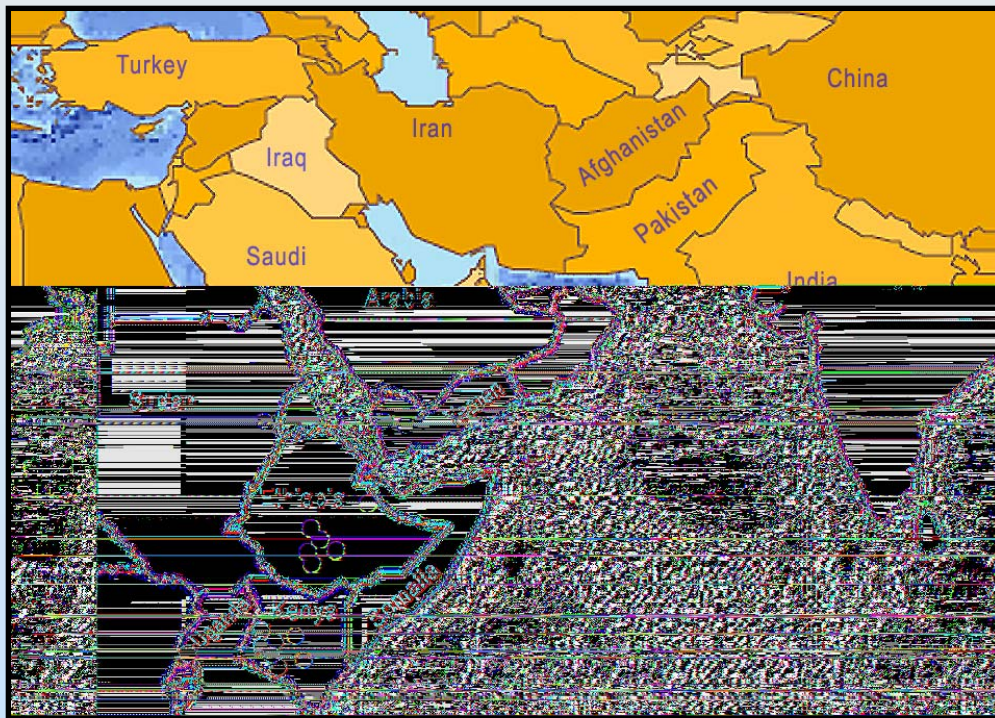
- Interdisciplinary team skills
- Outreach – producers, growers

Scientific competencies

- Hypothesis, experimental design, critical analysis
- Multidisciplinary curriculum
- Crop production, agronomics

Plant Science Research Requires Teams... Pathologists Are Key

☞ Ug99 - a wheat stem rust mutant that threatens the world's grain supply



 Dr. Yue Jin, ARS Plant Pathologist



- *Provides critical cereal rust expertise on Ug99 for the Borlaug Global Rust Initiative*

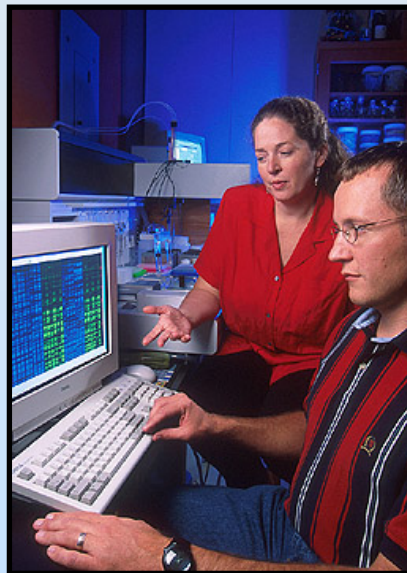


- *Identifies rust races and wheat resistance genes in the U.S.*
- *Leads international research team (Njoro, Kenya)*

Combating Ug99 Requires Collaboration of Unprecedented Scope and Scale

ARS Ug99 Team

- Plant Pathologists
- Plant Breeders
- Molecular Scientists/Genotyping
- Cereal Chemists
- Computation Biologists/Modeling



ARS Partnerships to Combat Ug99

National

- APS National Planning Workshop for Ug99 (2008)
- National Wheat and Barley Improvement Committees
- Universities/Federal agencies (APHIS, CSREES, NSF, USAID)

International

- Borlaug Global Rust Initiative
- International Centers (CIMMYT, ICARDA)
- Durable Rust Resistance in Wheat (Cornell University, Gates Foundation)



ARS Scientists Hired on the Ug99 Team

Eric Jackson, **Plant Pathologist (Molecular Biologist)**

- Developing new molecular methods to measure Ug99 infection
- ARS postdoc with Mike Bonman, Aberdeen, ID



Michael Pumphrey, **Plant Geneticist**

- Integrating Ug99 resistance genes from wild relatives
- Component leader of international project
- ARS supported PhD (SCEP), Manhattan, KS



**The illiterate of the 21st century
will not be those
who cannot read or write,
but those
who cannot learn, unlearn and relearn.**

Alvin Toffler

Future Shock