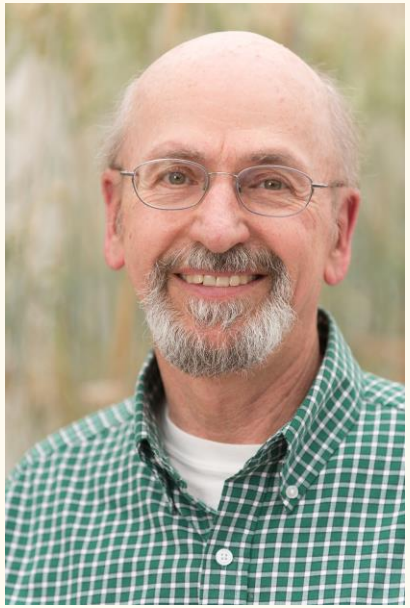


Expanding Learning Resources for Plant Genetic Resource Conservation and Use

Pat Byrne, Gayle Volk, and Peter Bretting

Colorado State University

USDA Agricultural Research Service

Translating Visionary Science to Practice

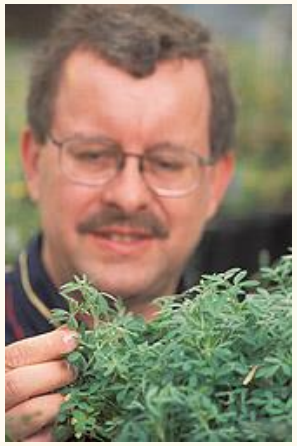
Presentation outline

- Need for additional learning resources
- History of this initiative
- Progress to date
- Future plans

Background

- Future progress in plant breeding depends on the availability of diverse genetic resources and associated information.
- Genebanks around the world serve essential functions by acquiring, maintaining, distributing, characterizing, and documenting a broad array of genetic resources.
- Among the challenges faced by genebanks in carrying out these functions is adequate training in the multiple skills required by curators and users of the genetic resources.

Need for more learning resources:
Retirements in National Plant Germplasm System



Gary Pederson
RL, Griffin, GA

LJ Grauke
Pecan, Somerville, TX

MaryLou Polek
Citrus, Riverside, CA

Joseph Postman
Pear, Corvallis, OR

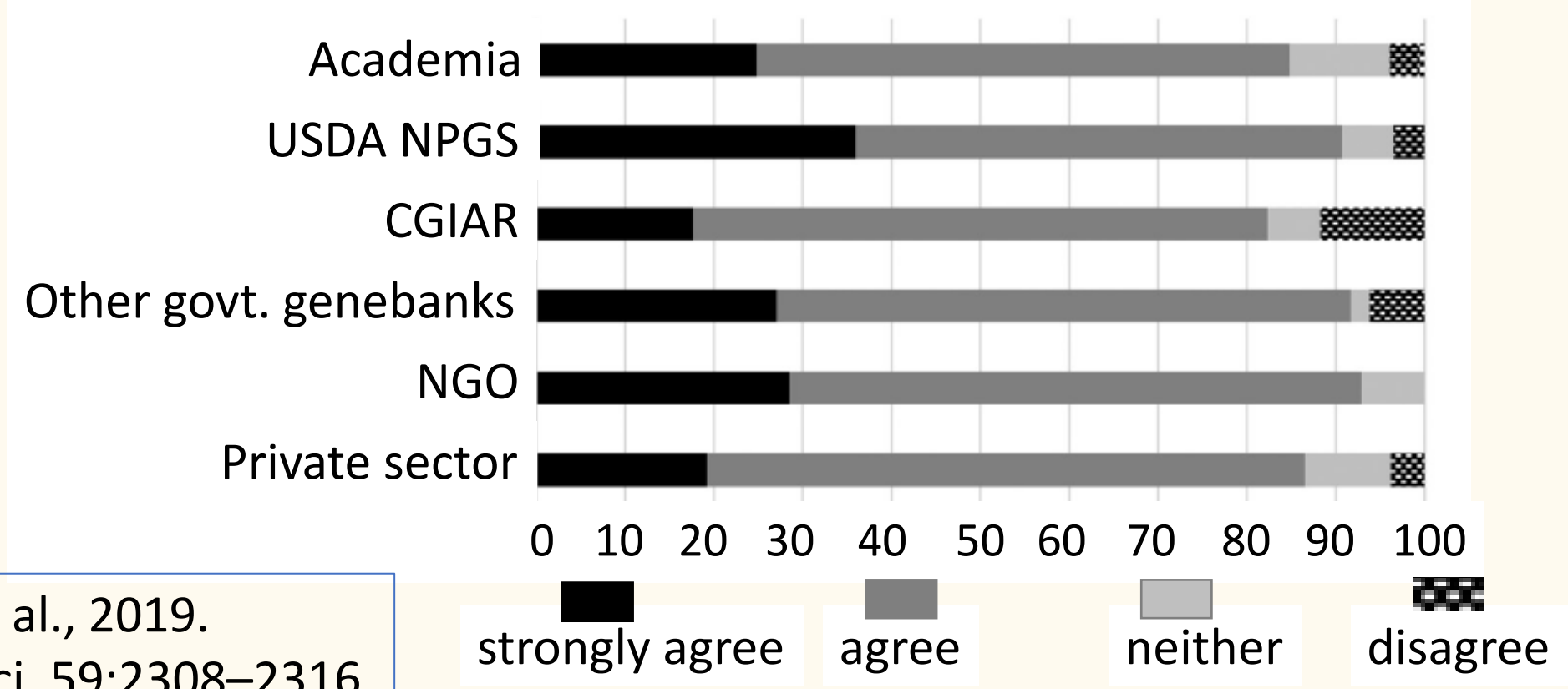
Randy Nelson
Soybean,
Urbana IL

Candy Gardner
Maize,
Ames, IA

Jinguo Hu
RL, Pullman, WA

Need for more learning resources: Online survey question

There is a shortage of high quality learning materials on plant genetic resources.

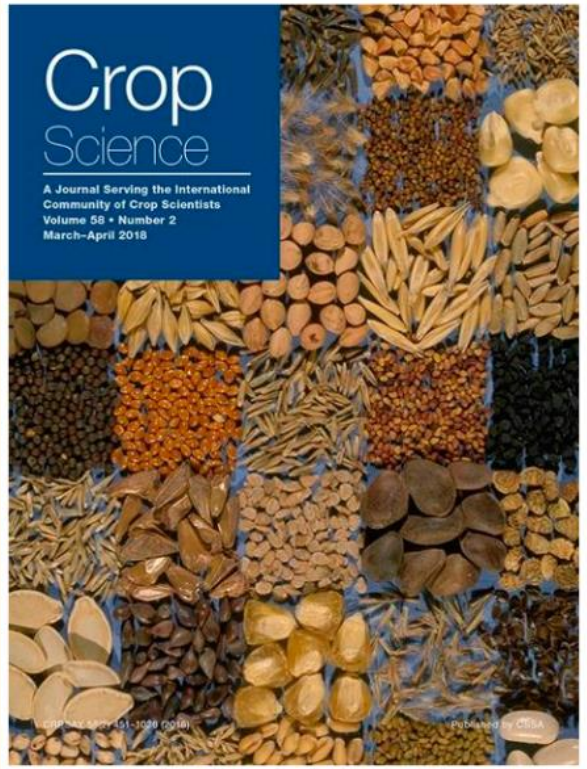


Volk et al., 2019.
Crop Sci. 59:2308–2316

In 2015, Plant Breeding Coordinating Committee recommended analysis of the health and sustainability of the NPGS

Sustaining the Future of Plant Breeding: The Critical Role of the USDA-ARS National Plant Germplasm System

P.F. Byrne,* G.M. Volk,* C. Gardner, M.A. Gore, P.W. Simon, and S. Smith



To make the NPGS even more relevant to plant breeding

- Optimize collections
- Improve phenotypic and genotypic information
- Enhance collaborative activities
  - ❖ *Training and Outreach Needs*

Byrne, Volk et al., 2018. Crop Sci. 58:451–468

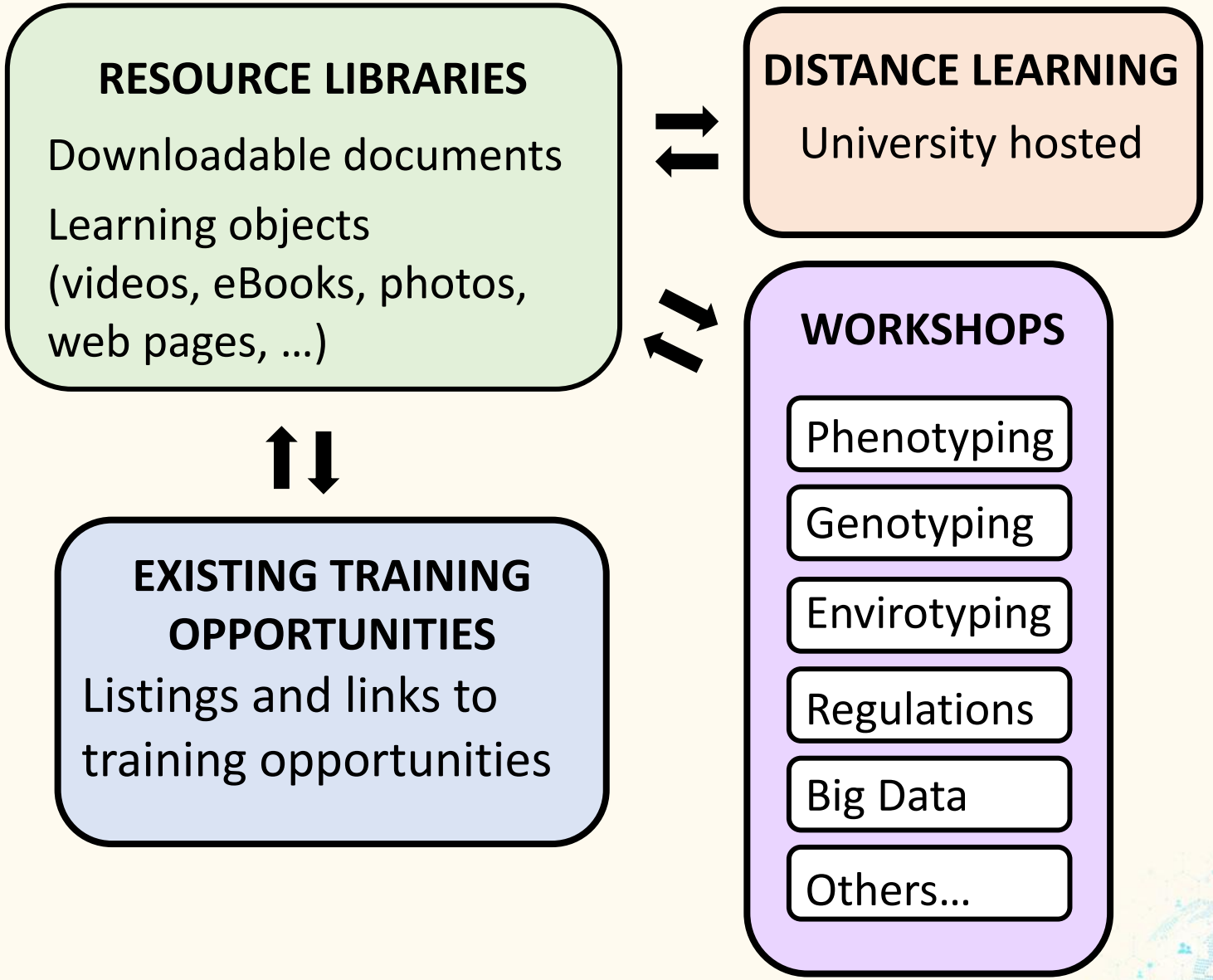
Planning Conference Co-Hosted by National Laboratory for Genetic Resources Preservation (NLGRP) and Colorado State University

April 24-26, 2018,
Fort Collins, Colorado

Photo: L. Guarino

- Funded by USDA-NIFA.
- 33 attendees represented USDA-ARS & NIFA, land-grant universities, seed industry, national genebanks of Canada and Mexico, botanic gardens, and The Crop Trust.

Workshop attendees proposed a versatile set of interconnected training resources.



Volk et al., 2019.
Crop Sci. 59:853-857

USDA-NIFA Higher Education Challenge (HEC) Grant Project (2020-2023):

Enhancing Educational Outcomes for Plant Genetic Resources Conservation and Use

Colorado State University

Pat Byrne, Maria Munoz-Amatriain, Jill Zarestky, and a Master's level Graduate Research Assistant

Walter Suza and a Master's level Graduate Research Assistant

USDA Agricultural Research Service

Gayle Volk (Fort Collins), Candy Gardner (Ames), Gary Kinard (Beltsville)

Consultant

Deana Namuth-Covert (Lincoln)

HEC project objectives include

1) Develop an organized series of learning resources (videos, ebook chapters, images, etc.) covering priority PGR topics.

2) Establish an online repository at USDA-GRIN to host, organize, and track usage of the developed content.

3) Develop and offer three 1-credit graduate-level online course modules at CSU on PGR conservation and their use in plant breeding.

4) Disseminate the developed materials broadly to communities of interest, including 1890 land-grant universities, Tribal Colleges, and Plant Breeding eLearning in Africa participants.

Progress to date

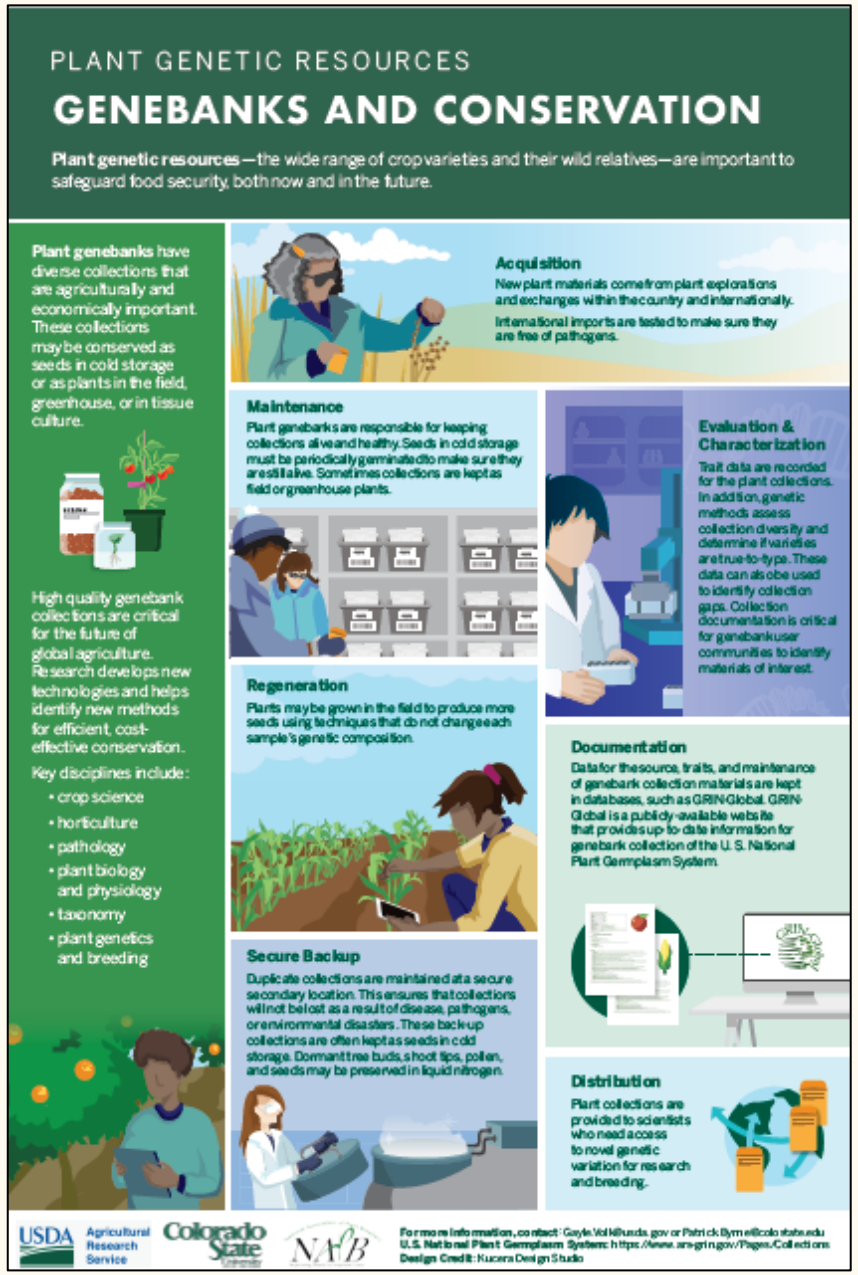
An online survey to assess training needs was conducted in March 2019.

- 425 usable responses were received
- Among the high priority topics identified were
  - Crop wild relatives
  - Gap analysis
  - Germplasm preservation
  - Phenotyping
  - Genotyping
  - Prebreeding
  - Intellectual property issues

Volk et al., 2019.
Crop Sci. 59:2308–2316

Two infographics were funded by the National Association of Plant Breeders

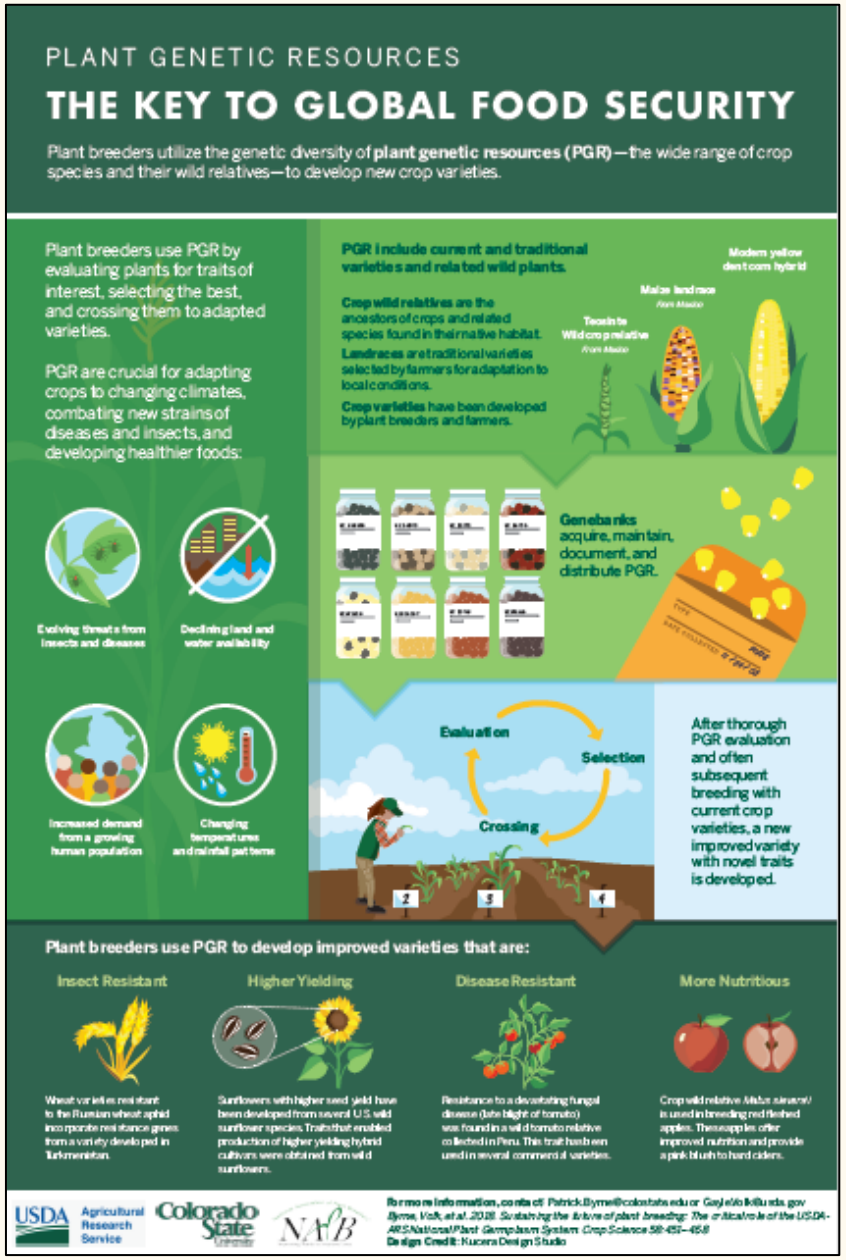
1) Conserving plant genetic resources



http://www.genebanktraining.colostate.edu/infographics.html

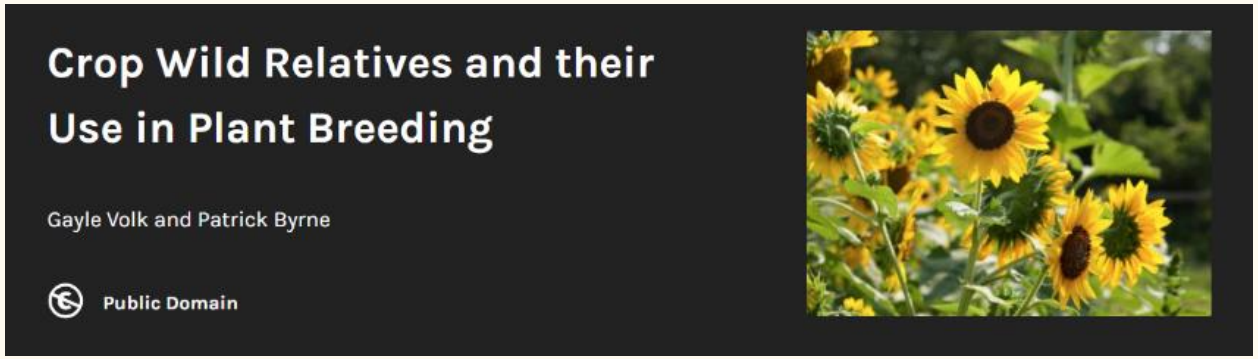
NAPB-funded infographics

2) Utilizing plant genetic resources

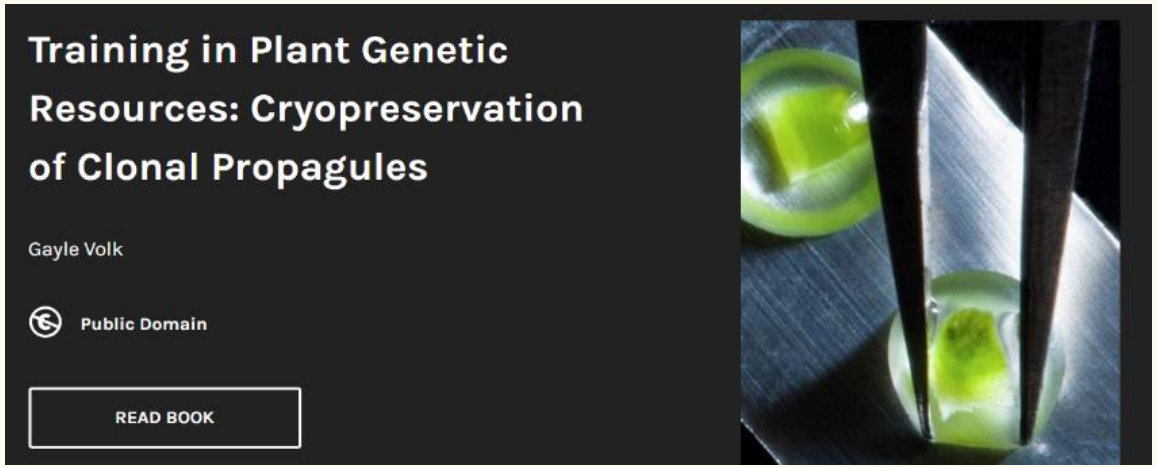


http://www.genebanktraining.colostate.edu/infographics.html

Two eBooks on crop wild relatives and cryopreservation were published



https://colostate.pressbooks.pub/cropwildrelatives/



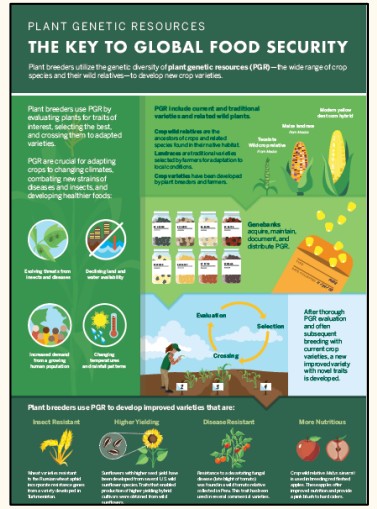
https://colostate.pressbooks.pub/clonalcryopreservation/

Coming in 2021-2022

- Virtual tours of the National Laboratory for Genetic Resources Preservation in Fort Collins and USDA's clonal repository in Davis, CA.
- Additional eBook chapters
- Online open-access repository of videos, eBooks, and images
- Graduate-level online courses at Colorado State University and through the Plant Breeding eLearning for Africa Program

In conclusion,

- An array of learning materials is being developed to meet multiple needs and reach various audiences.
- We need your help to describe and illustrate success stories, evaluation techniques, and novel methods.
- We hope these educational resources will be widely used in university courses and informal educational settings, thereby enhancing understanding of the importance of crop genetic diversity in global food security.



USDA National Institute of Food and Agriculture

USDA Agricultural Research Service

PROCINORTE CANADA - MEXICO - USA

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National Association of Plant Breeders NAPB Improving Plants to Improve Lives

Plant Breeding Coordinating Committee

Colorado State University

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