



## Genebank Training Update

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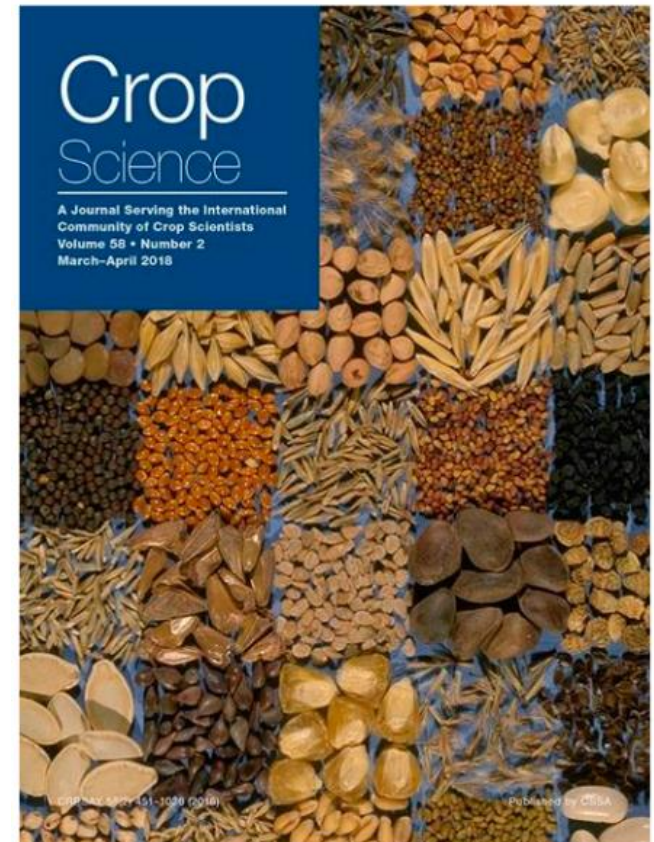
In 2015, Plant Breeding Coordinating Committee recommended analysis of the health and sustainability of the NPGS

## 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

### Making the NPGS even more relevant to plant breeding

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



# Need for a Training Program in Plant Genetic Resources Management

- About 30% of NPGS staff will be eligible to retire within the next 5 years.
- NPGCC discussed this at the May 2017 meeting.
- Volk and Byrne submitted a grant proposal to USDA-NIFA for a workshop to discuss training for the next generation of PGR managers, researchers, and students.





## Plant Genebank Training Workshop

April 24-26, 2018, Fort Collins, Colorado

33 attendees represented USDA-ARS, USDA-NIFA, land-grant universities, seed industry, Mexico's and Canada's genebanks, a botanic garden, and The Crop Trust

Report published in Volk et al., 2019, Crop Science 59:853-857

# Plant Genetic Resources Training Program

## RESOURCE LIBRARIES

Publicly available  
Hosted by GRIN-Global and/or others

### Learning objects

Video segments  
Animations  
Lessons with 5-15 min of content

### Downloadable information

Best practices  
SOPs  
Regulations  
Handbooks  
Images  
Popular press articles

### Online links

Workshops and courses  
Other available resources

## DISTANCE LEARNING

University hosted courses  
Short modules or full-length  
Continuing education or academic credit

## WORKSHOPS

Provided periodically  
Online course/webinars or in-person  
Possible topics

- Genebank operations
- Phenotyping
- Genotyping
- Envirotyping
- Regulations
- Others

**PEER REVIEW:** For content and instructional quality and accuracy

**FEEDBACK:** Through surveys and online opportunities

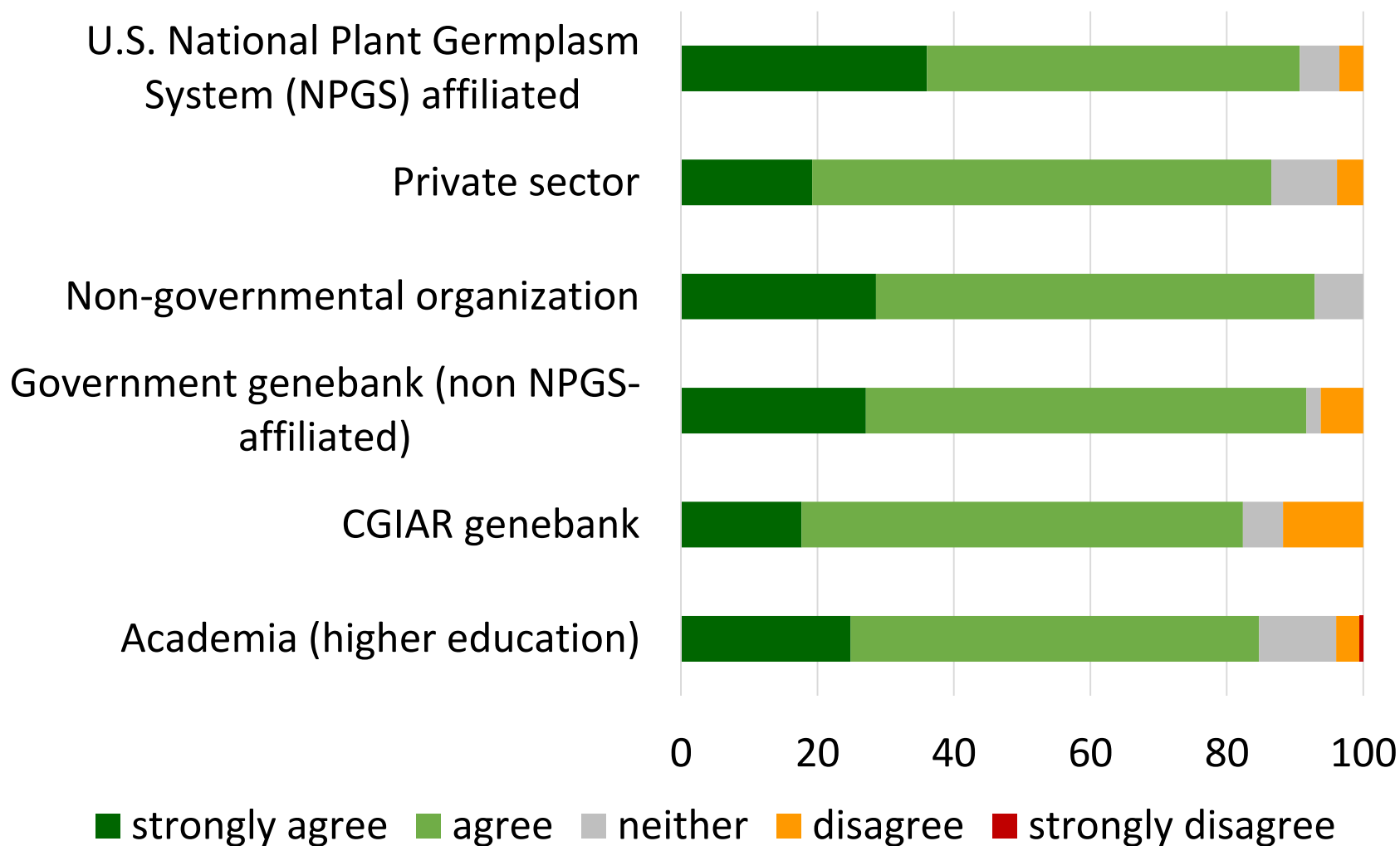
**TRAINING OVERSIGHT COMMITTEE:** Guide and direct training activity efforts



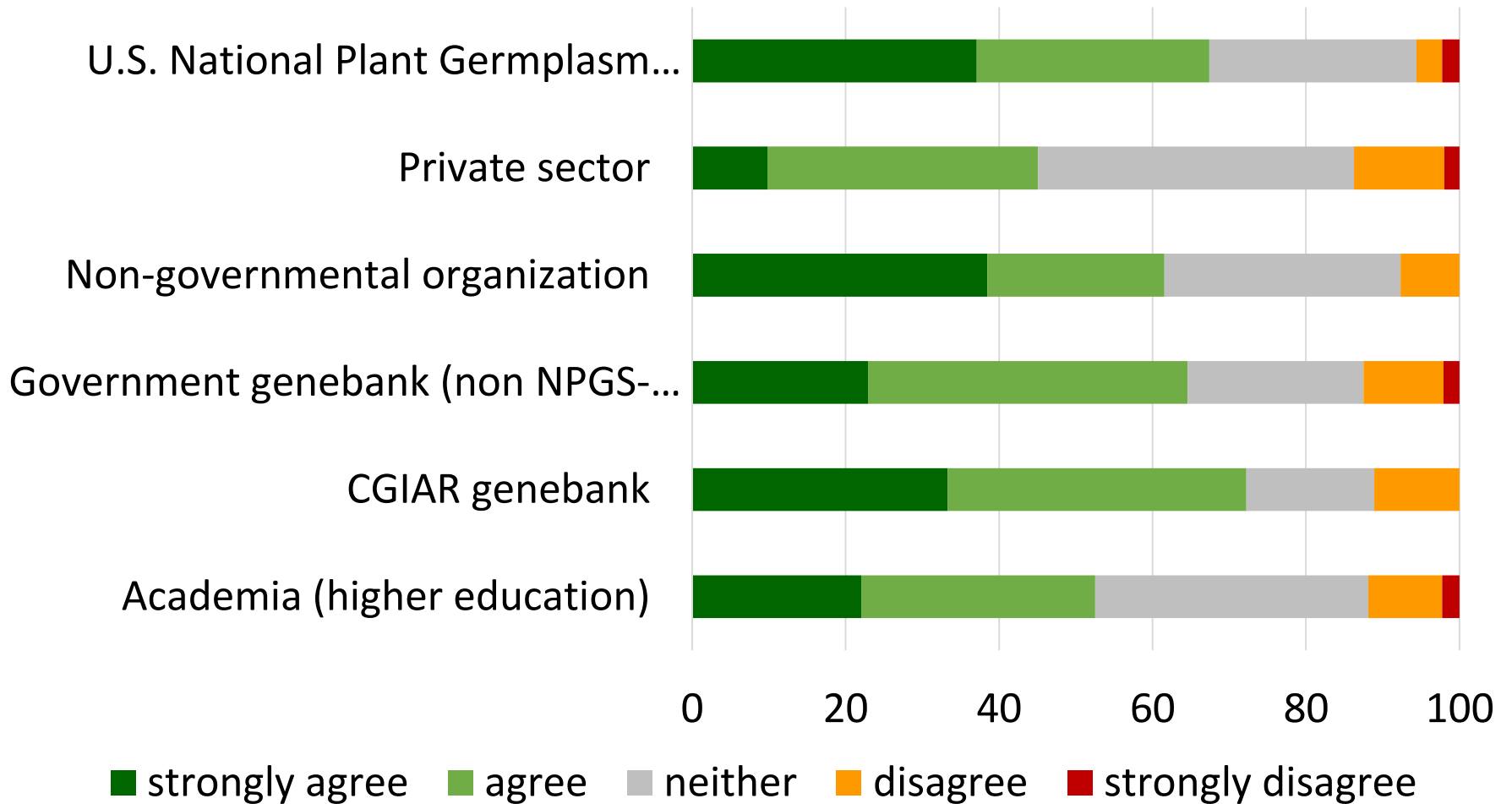
## Survey on Plant Genetic Resources Learning Materials

- 10 questions, 5-10 minutes, anonymous
- Conducted online for two weeks in March, 2019
- Advertised broadly to crop science, horticultural, seed trade, and plant genetic resources communities
- Responses received from 622 unique devices, of which 425 were useable

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

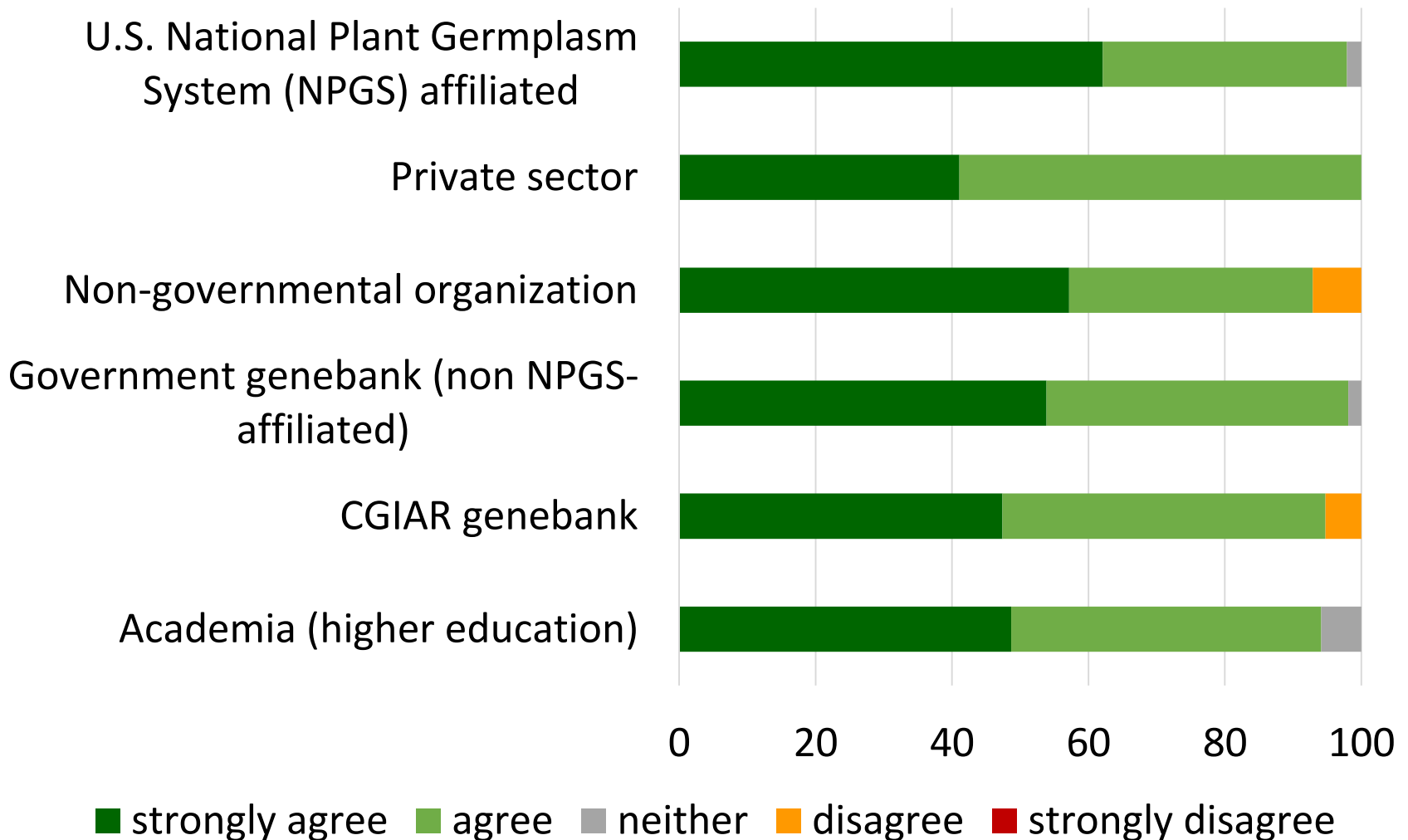


## Availability of high-quality learning materials on plant genetic resources would help advance my career

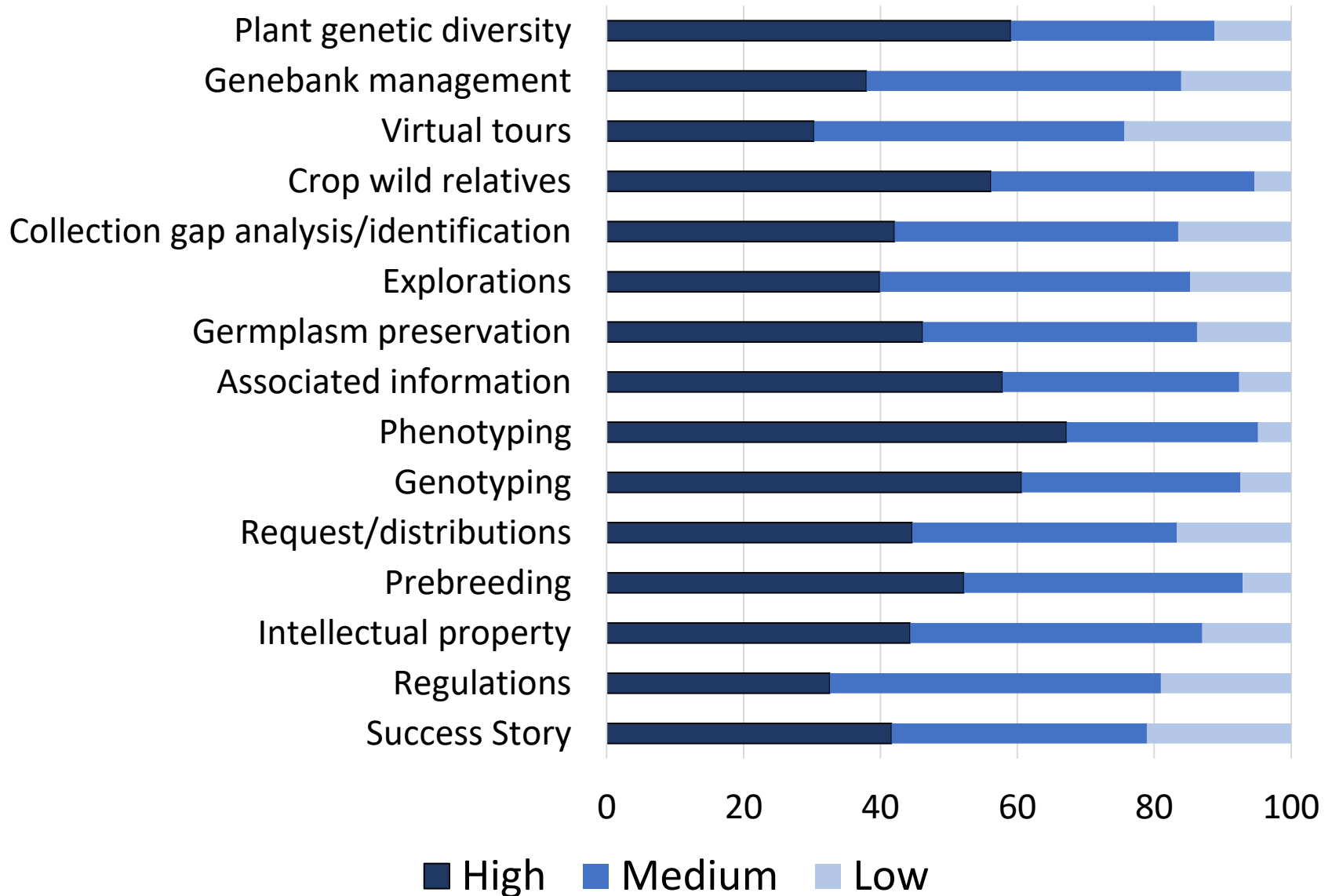




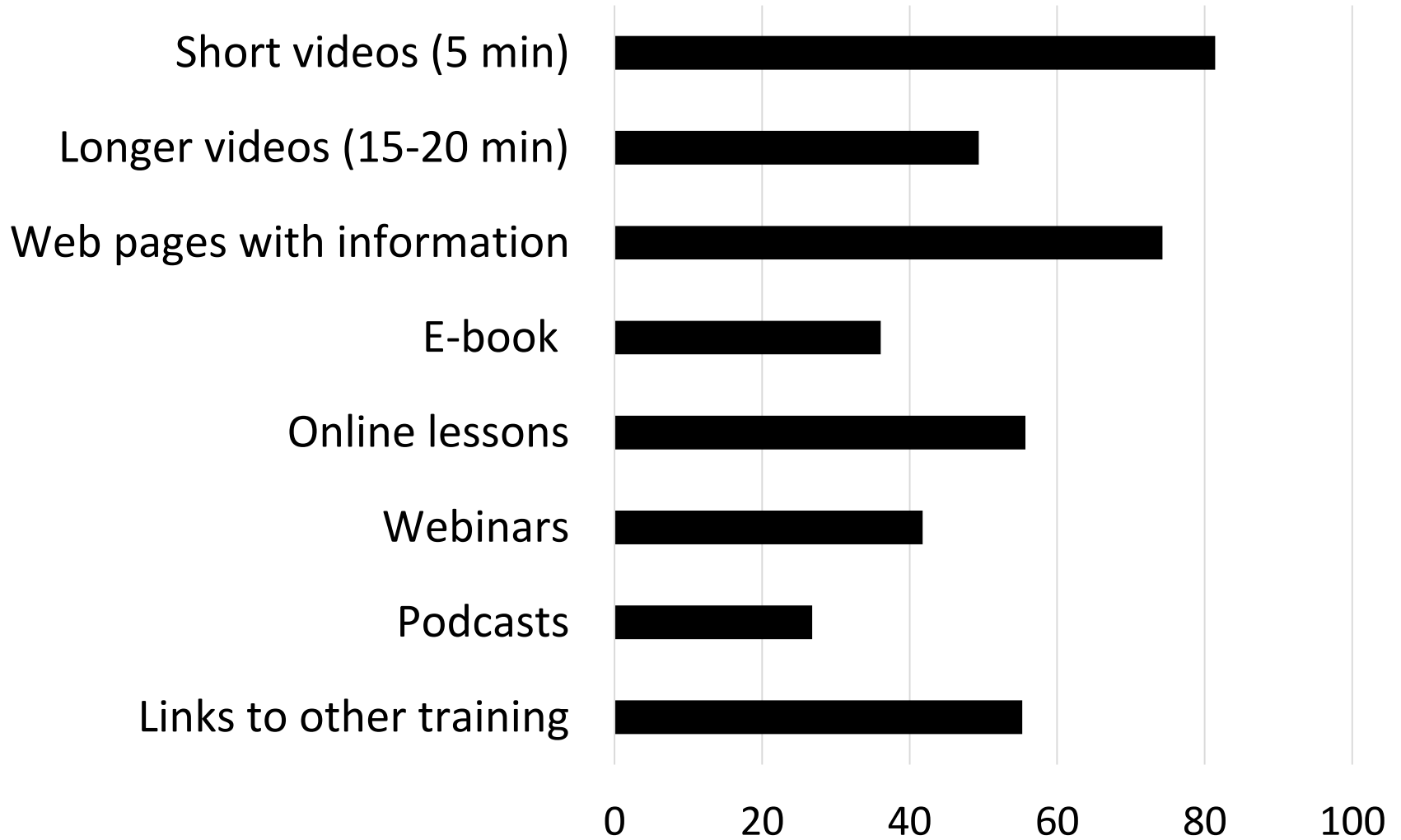
## Availability of high-quality learning materials on plant genetic resources would be useful in teaching or providing information to others



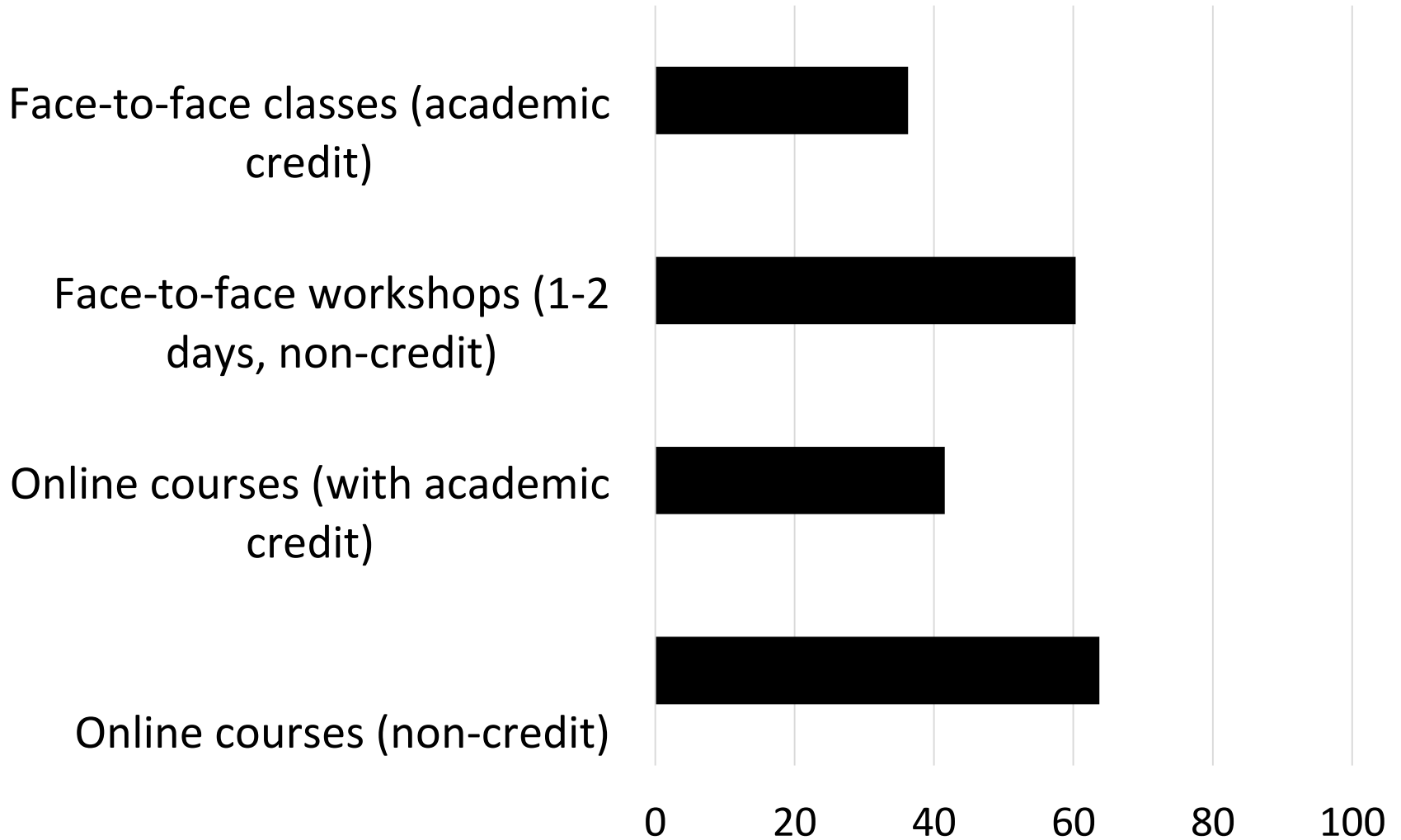
## Priorities ranked by respondents from academia



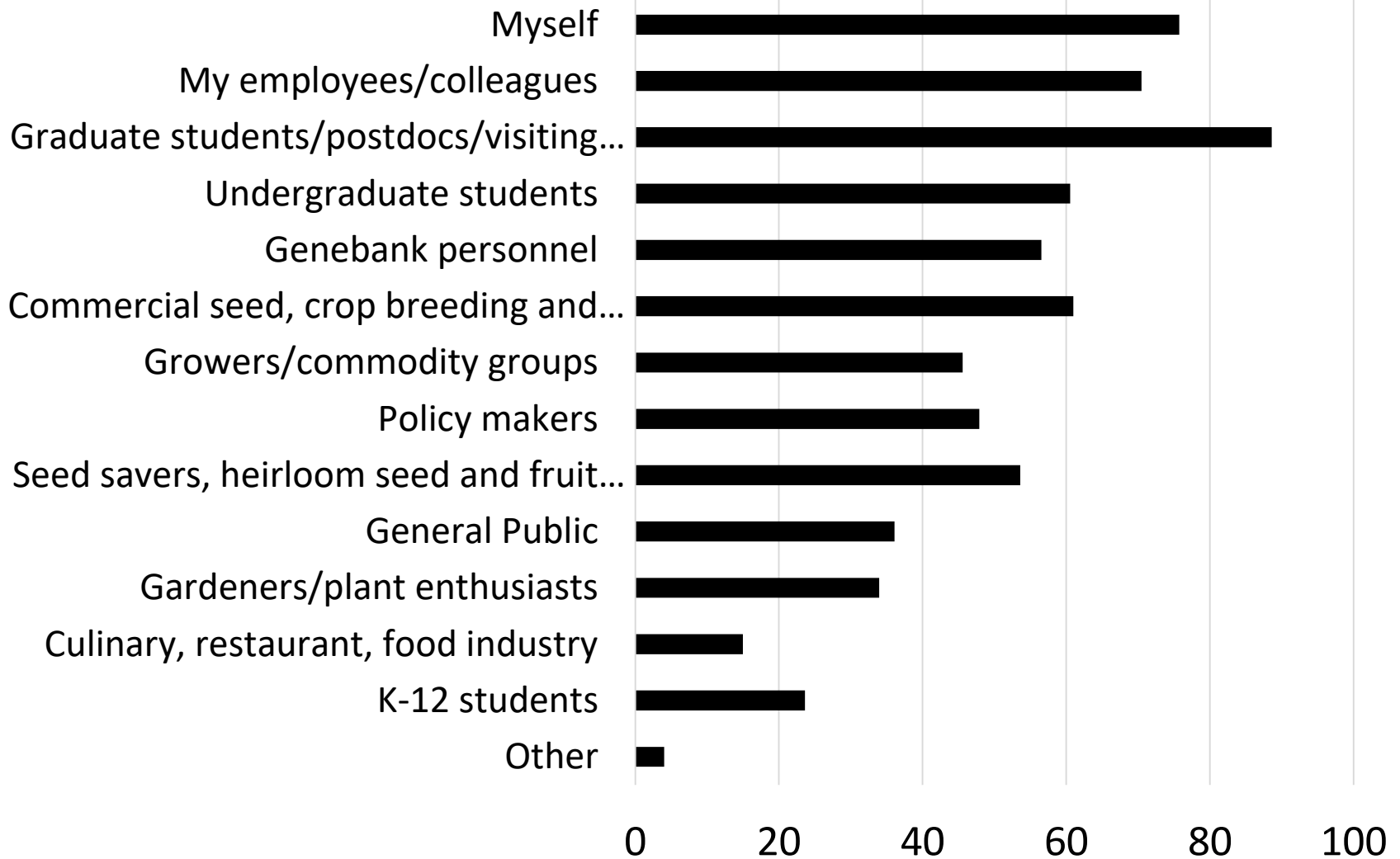
## Useful formats for free training materials



## Useful formats for fee-based training materials



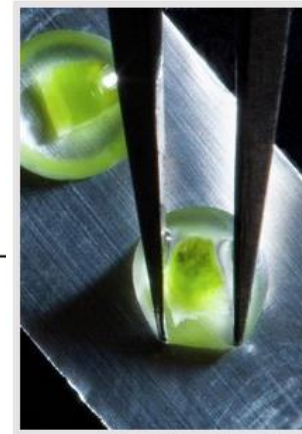
## Primary audiences that would benefit from learning materials



# TRAINING IN PLANT GENETIC RESOURCES: CRYOPRESERVATION OF CLONAL PROPAGULES

## CITRUS SHOOT TIP CRYOPRESERVATION

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[Chapter in Pressbooks e-Book platform]

### 3. HARVESTING AND PREPARING BUDWOOD

Budwood is collected from the pathogen-tested screenhouse collection at the NCGRCD in Riverside, California for long-term preservation at NLGRP. The citrus trees in pots at the NCGRCD are pruned in March each year. The new flushes of growth that will be cryopreserved are harvested between the following September and January. In February, the floral buds emerge and the harvest season for cryopreservation is over. The vegetative budwood is about 3-5 mm in diameter. Leaves and petioles are removed from the budwood.





Citrus budwood at correct stage for harvest



Video of shoot tip excision process

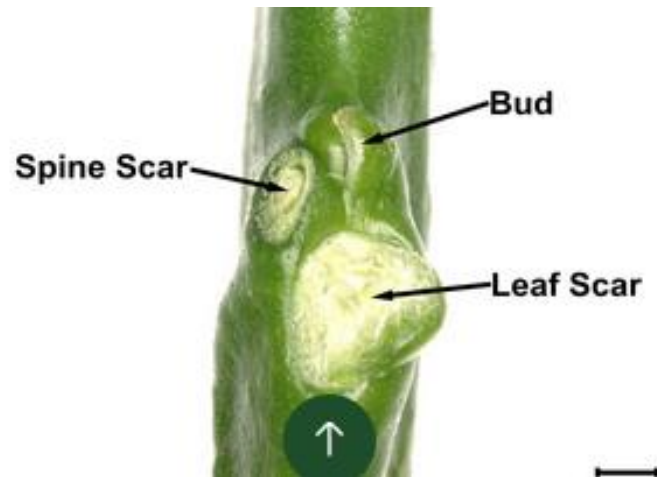


Diagram of a citrus budwood node



# Evolutionary History of Wheat



# What's next?

- Manuscript on survey results submitted to Crop Science
- USDA-NIFA Higher Education Challenge Grant Proposal submitted last month
  - Collaboration among Colorado State, Iowa State, and USDA NPGS (Fort Collins, Ames, Beltsville)
  - Resource libraries housed at GRIN, online graduate-level course modules, linkage with Plant Breeding e-Learning in Africa
- Continue capturing videos and documenting methods as time and resources permit