Scientific Collections International: Food Security Research Initiative

Prospectus & Workshop Agenda

Stressors and Drivers of Food Security: Evidence from Scientific Collections

19-21 September 2016 at the USDA National Agriculture Library, Beltsville, MD

Like war and disease, food security has been a dominant factor in human history. Food security has fueled rapid growth in population size and its insecurity has led to the collapse of societies and mass migrations. Fluctuations in food security have been felt on many different timescales from short-lived famine to prolonged declines in staple crops, livestock and wild prey. As our population has grown, we have consumed wild species, selected and cultivated them as dietary staples, altered them through selective breeding, and mitigated against fluctuations in their supply with agricultural advances.

Scientific collections in a variety of disciplines may contain overlooked evidence that could prove valuable to researchers involved in food security. As we learn more about the origins and characteristics of the species we select as food sources, the ways we have and can modify them to meet our needs, and the histories and causes of their changing abundance, we become better able to predict and protect our future food supply.

Symposium Goals: Building on discussions begun during SciColl's e-Consultations, the symposium will illustrate how:

- Scientific collections in different disciplines provide information and data for the most significant research and mitigation questions;
- New tools and resources are needed to expand the network of collections used to address these questions; and
- New funding opportunities and organizational behavior is needed to support the collections and researchers.

Discussion Framework: In convening this research symposium, SciColl is bringing together communities of practice along two axes:

- Organizations working on food security issues but using different strategies. The symposium will promote interchange, discussion and collaboration among:
  - Academic researchers in agriculture, ethnobiology, anthropology and other fields;
  - Applied researchers from private industry and government agencies;
  - Scientific collections that provide diverse samples for basic and applied research;
  - International initiatives that involve governments and NGOs; and
  - Funding agencies and private foundations that support research and mitigation activities.
- Scientific collections in different disciplines that are isolated from each other despite the potential for synergy. The symposium will be an unprecedented gathering of collections professionals across disciplines such as botany, zoology, geology, hydrology, anthropology and agriculture.

Day 1: Monday, 19 September 2016

12:00 Registration

13:00 **Welcome and Introductions.**

Welcome

SciColl Introduction

The USDA Perspective

13:45 **Session 1: Keynotes.**

Keynote Speaker, History and Drivers of Food Security, TBD (45 min)

Keynote Speaker, Stressors of Food Security, TBD (45 min)

15:30 Coffee Break

16:00 **Session 2: Collections Lightning Talks.** Representatives from different types of scientific collections will give short presentations to introduce the range of potential resources, such as

- Biodiversity
- Soils
- Anthropology
- Archaeology
- Seed banks
- Germplasm banks
- Botanical gardens
- Zoos
- Culture collections
- Cores/Paleoclimate
- Ecotoxicology
- Pests
- Pathogens
- Nutrients/Chemistry
- Zoonotic diseases

17:30 Adjourn

Day 2: Tuesday, 20 September 2016

Sessions 3-6 will be devoted to presentations about different research challenges, followed by commentaries and discussion by panelists representing different collection domains. The focus will be on how different collection types could contribute to research.

8:30 Registration and Pastries

9:00 **Session 3: Varieties of Food.**

- Invited Speaker: Research challenges on the selection and/or development of new/historical crop species/cultivars (15 minutes)
- Invited Speaker: Research challenges on the selection and/or development of new/historical animal food sources (15 minutes)
- Panelist from the following collections communities will be invited to comment on collections-based research on selection/development of new food sources (30 minutes)
    - Types of collections: seed and germplasm banks, botanic gardens, midden remains, cooking artefacts
    - Potential research questions: What were the ancestral species that gave rise to domesticated species? How are new food species selected? How can genetic diversity of wild relatives be conserved and utilized?

10:00 Q&A, group discussion: What are the most promising areas in which collections can have an impact?

10:30 Coffee Break

11:00 **Session 4: Biological Stressors and Aides.**

- Invited Speaker: Research challenges on protecting current crop species and cultivars from biological stressors, and/or protecting and developing new aides (15 minutes)
- Invited Speaker: Research challenges on protecting current domesticated and wild animal food sources from biological stressors, and/or protecting and developing new aides (15 minutes)
- Panelist from the following collections communities will be invited to comment on collections-based research on biological stressors and aides (30 minutes)
    - Types of collections: pests, parasites, invasive species, viruses, fungi, bacteria, microbiome, pollinators
    - Potential research questions: How are known pests/parasites/invasive species kept out of pristine areas? How are pests/parasites/invasive species and pathogens combatted after an infestation/infection? What agents caused historical famines and what evidence is there?

12:00 Q&A, group discussion: What are the most promising areas in which collections can have an impact?

12:30 Lunch

13:30 **Session 5: Environmental Stressors and Benefits.**

- Invited Speaker: Research challenges on the abiotic environmental factors that threaten and promote the success of crop species/cultivars (15 minutes)
- Invited Speaker: Research challenges on the abiotic environmental factors that threaten and promote the success of animal food sources (15 minutes)
- Panelist from the following collections communities will be invited to comment on collections-based research on environmental stressors and benefits (30 minutes)
    - Types of collections: soils, sediment cores (water proxy?), air, chemicals/nutrients, biodiversity distribution/phenology
    - Potential research questions: How does the environment impact the success or failure of food species? Which environmental variables are the most important? What specimen-based proxies are available for different environmental variables?

14:30 Q&A, group discussion: What are the most promising areas in which collections can have an impact?

15:00 Coffee Break

15:30 **Session 6: Feeding the 10 Billion.**

- Invited speakers: The future of agriculture: genetics, biosecurity, bioeconomy, climate change, nutritional deficits, caloric requirements, distribution of people vs agriculture
    - 3 X 20 minutes or 4 X 15 minutes

16:30 Q&A, group discussion: What are the most promising areas in which collections can have an impact?

17:00 Adjourn

Day 3: Wednesday, 21 September 2016

8:30 Registration and Pastries

9:00 Day 2 Recap and Preparation for Session 7.

- 4 Rapporteur reports, 10 minutes each?
- Instructions to breakout groups

10:00 **Session 7:** Break-out discussions with facilitators and rapporteurs

Participants will separate into break-out groups to discuss new strategies for increasing the use and impact that their collections and associated databases can have for food security research. For example, new strategies could involve new approaches to:

- Sampling and sample preservation;
- Information capture and databasing;
- Data dissemination and connectivity with other data resources; and
- Involvement in interdisciplinary research initiatives.

11:00 **Discussion & Next Steps:** This final moderated discussion will summarize:

A. **Findings**: What have we learned about collections and their potential use and impact on food security research?
B. **Recommendations:** What new capabilities, best practices and collaborations should be set as new goals for collections and researchers?
C. **Action Items:** What should we do in the near-term, mid-term, and long-term to pursue these goals?

12:30 Adjourn

14:00 (Optional) Collections Tours

- US National Aphid Collection & US National Mites Collection
- NAL Library and Special Collections