Third Jack R. Harlan International Symposium Dedicated to the Origins of Agriculture and the Domestication, Evolution, and Utilization of Genetic Resources. New actors, new insights, challenges and opportunities
3-7 June 2019, Montpellier, France

The scientific committee will review abstracts before acceptance and reserves the right to redirect an application to a session other than the one initially chosen by the author. In order to allow a maximum number of participants to present their work, participants should submit only one abstract as a presenting author, although they may appear as co-authors on other abstract submissions. As each session will have a limited number of slots, the committee might offer to authors whose abstracts are not accepted as oral presentations the possibility to present their work as a poster instead. Only proposals of insufficient scientific quality or clearly not within the subject of the symposium will be rejected.

Please follow the instructions bellow :

- The abstract should be written in English.
- Maximum 300 words (200 words if you include a figure)
- Oral presentations will last 15 minutes, followed by 5 minutes of discussion.
- Posters will be installed the first day of the conference.
  Two Poster sessions, one hour each, will allow participants to come and discuss with posters authors, who will be asked to stand next to their poster during these sessions.
- The available surface for your poster is adapted to A0 format: 118 cm (height) x 96 cm (width) // 46.5 in (height) x 37.8 in (width)

DETAILS OF THE CALL FOR ABSTRACTS (COMMUNICATIONS AND POSTERS)

Introduction

While industrial and technological revolutions have changed the way humans live, move and communicate, our survival still depends on the way we care for and manage a living world arising from millions of years of evolution. In many respects, the history of agriculture and genetic resources could be a preview of the future facing the (still) wild world in the Anthropocene era: the evolution of populations, species and communities under human-imposed selection pressures and in artificialized environments, marked by dramatic changes in landscapes and by tensions in governance systems.

Agriculture is a strong driver of anthropogenic global change. It must also be an important part of solutions to minimize human impact on the biosphere. With increasing recognition of the necessity for ways of farming that preserve biodiversity and ecosystem functioning (nature-based solutions, agroecology, biodiversity-friendly agriculture), genetic resources—collectively, agrobiodiversity—have taken on new functions. They are called upon to enhance not only the provisioning of food—ample food of high quality—but also other ecosystem services, such as the conservation of biodiversity in mosaic landscapes and mitigation of the impact of climate change by the storage of soil carbon.

Since the 2nd JR Harlan symposium in 2008, due to dramatic progress in biological sciences, we know more about agricultural trajectories of past and contemporaneous societies, the diversity and adaptive potential of genetic resources and their management in its technical, social and political dimensions. Owing both to this progress and to the changing expectations of farmers and consumers, our research questions on these themes have evolved.

The third Harlan symposium will highlight the major advances in knowledge on these themes and draw attention to emerging issues in the history of agriculture and the evolution, conservation and use of genetic resources.

SESSION 1

History of agriculture

Presentations in this session will draw on numerous disciplines to understand the domestication of plants, animals and microorganisms and the history of landscapes. Where appropriate, they will use these historical perspectives to reflect on the future of agriculture and agrobiodiversity.

Where, when, how and why the first agricultural societies emerged are key questions in the history of agriculture. Did agriculture emerge as a result of climate change, demographic expansion, sedentarisation or other causes? Was domestication rapid or slow? Did agriculture expand rapidly following the first domestications? How did agriculture replace foraging as the predominant mode of subsistence? These and many other questions are still debated, and a synthesis of different hypotheses has not been attempted.

This session will address the origin(s) of agriculture and the trajectories of agricultural systems and their biodiversity over time, as revealed by studies in biological (botany, genetics, ecology, paleogenomics, paleoecology, etc.) and social sciences (anthropology, history, archeology).

The main topics to be covered include:

- The origin and expansion of agriculture and the impact of agriculture on ecosystems and societies ;
- The domestication process and the long-term evolution of agricultural genetic resources ;
- Lessons of history for the future.

SESSION 2

Diversity and adaptation

During and after domestication, in large part through selective pressures exerted directly and indirectly by humans, plants and animals evolved numerous adaptations to new environmental conditions. During the last ten years, thanks to the emergence of whole-genome sequencing for a vast majority of crop plants and domesticated animals, our understanding of the genetic basis of these adaptations has grown by leaps and bounds. The wealth of data also allows us to better understand the impact of the domestication process on non-adaptive genetic diversity across the genome. We have also begun increasingly to recognize how the diversity of domesticated organisms was shaped not only by the domestication process per se ("per se" in italics) but also sometimes by secondary contact with wild populations. Today, domesticated plants and animals face new and rapidly changing conditions associated with human-driven global change. What new adaptations could emerge in response to these changes?

Presentations in this session will illustrate how genetic diversity—neutral, beneficial and deleterious—was reshaped during the history of domesticated species and how this diversity can contribute to adapting agriculture to future conditions.

SESSION 3

The multiple dimensions of the mobilization of genetic resources: scientific and social innovations

Domesticated plants and animals play central roles in economies and as sources of food. They are also endowed with diverse and often specific social roles. They may be markers of identity, be imbued with symbolic significance and social value, or circulate in social networks. Micro-organisms also are not solely biological objects when they contribute to the characteristics of entities with high cultural value (e.g. bread, wine, soils).

The management of genetic resources both shapes and reflects pathways of innovation. The constitution of large germplasm collections provides a concentration of diversity inherited from the past that can be drawn upon in a centralized and coordinated manner. Standing agrobiodiversity is a visible and dynamic genetic resource that evolves as it is used. Resources managed on farm or in situ

are continually subject to evolutionary forces (including selection, resulting in adaptation) driven by various actors.

Scientific and technical advances provide tools and methods to mobilize genetic diversity to cope with the diversification of breeding targets and of ecological, social and economic environments, and to monitor crop diversity in agro-ecosystems. Technology has also created new opportunities to fine-tune analyses of diversity, taking into account co-evolutionary processes of plants, animals and microorganisms.

How individual and collective management of genetic resources, as biological, social and even immaterial (information) objects, may enhance their mobilization, evolution and adaptation is a subject that requires more documentation and more research.

Conservation, evaluation and use of genetic resources require documenting and proposing roles, rules and regulation. These must take into account different actors to participate in the monitoring of science and policy decisions, to improve practices, and to address issues of ethics and intellectual property. All these actions pose technical and scientific challenges, but they also bring novel opportunities.

The presentations in this session will illustrate the various dimensions of the conservation, evaluation and use of genetic resources, in particular:

- the different management levels (in situ, on farm, ex situ) of the different objects (biological entities, digital sequence information, ...) and the reciprocal interactions of these levels.
- capitalizing information and mining diversity
- roles, rules and regulation (monitoring of science and policy decisions, improving practices, issues of ethics and intellectual property, etc.)

SESSION 4

Emerging questions about agroecosystem services and functioning

The following themes will be treated in this session:

***Agrobiodiversity and food security*:** Relationships between biodiversity and ecosystem functioning extend to agroecosystems and the ecosystem services they provide, including food security. Agrobiodiversity contributes to dietary diversity and food quality. Diversity in agroecosystems can also enhance the stability of crop yields at different scales of space and time.

Presentations in this session will explore how agrobiodiversity at different levels (interspecific, intraspecific; functional diversity of genetic resources; mixtures of varieties and crops) contributes by different mechanisms to the most crucial service provided by agroecosystems, the provisioning of ample and high-quality food. Agrobiodiversity is taken to include associated “wild” biodiversity, including the microbiomes of crop plants and domesticated animals, organisms that are viewed increasingly as holobionts.

***New crops (neodomestication) and the revitalization of old and orphan crops*:** Planetary environmental change will require developing new varieties adapted to new climates and environments. Adaptation to environmental change can also be enhanced by the development of entirely new crops (neodomestication) and the revitalization of research on old and orphan crops. Agriculture in new environments will require not only changes in crop plants, but also in their associated microbiomes, as plant/microbe mutualisms regain their importance in mediating interactions of crop plants and the abiotic and biotic components of soil ecosystems. Like food security, issues around the development of new crops include social and economic aspects and require a systemic approach, not a purely technical one.

***Paths to biodiversity-friendly agriculture*:** In a context of climate change and mounting economic and environmental costs of external inputs such as herbicides, pesticides and fertilizers, studying the local ecological knowledge of small-scale “traditional” farmers, and investigating innovations that reduce dependence on inputs, can help us find paths toward the ecological intensification of

agriculture. We invite presentations that explore the functioning of low-external-input agroecosystems—including the interactions of crop plants with above- and below-ground associated biodiversity—and the insights they may provide for agroecology.

Soil carbon storage in agroecosystems, and other soil-provided services**:** Presentations will address the role that can be played by agrobiodiversity (including crops, domesticated animals and crop-associated biodiversity, particularly soil animals and microbes) for mitigating the impact of anthropogenic emissions of greenhouse gases (soil carbon storage) and decreasing emissions of greenhouse gases.