

# Subject Matter Committee - ISPP Crop Loss

## Important points

- Over the past decade, the ISPP Crop Loss subject matter committee has been able to conduct two, global, networked activities on the impacts of diseases and on the losses caused by plant pathogens.
- However, major obstacles remain in making the theme of disease losses a central one in the global scientific community (Education, Research, and Extension). These obstacles stem from the cost and efforts crop loss research involve, the lack of scientific visibility of crop loss research, the specialisation of Science (and of Phytopathology), the evolution of the status of agriculture globally, and the general policy-economic context surrounding agriculture.
- Serge Savary will step down from his role of Chair of the SMC at ICPP2023. New leadership for the Crop Loss SMC of the ISPP will be sought.
- The merger of the ISPP Crop Loss SMC with the ISPP Postharvest Pathology is considered. The resulting new SMC could be called “*Pre- and Post-Harvest Pathology and Losses*”. This new entity would enable the theme of crop losses to be sustained.
- Irrespective of the choices made, a new action, pertaining to a web-based *global, open, collaborative repository of crop loss data* will be discussed at ICPP2023. This repository could (should) involve interested post-harvest pathologists.

**Established:** The ISPP Crop Loss Subject Matter Committee was created at the ICPP Congress of Beijing, 2013

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### Committee Meetings:

Members of the Crop Loss SMC have met at the Congresses of Beijing (2013) and Boston (2018). During these meetings, collective work on crop loss data, data analysis, and syntheses have been discussed.

### Committee Activities:

All activities of the Crop Loss SMC have been conducted online (email and visio-conferences). These led to two main activities in which some members of the SMC were directly involved along with Scientists who do not officially belong to the SMC.

- A global crop loss survey has been conducted. This activity took approximately 3 years to be conducted and led to an article published in *Nature Ecology and Evolution*: Savary, S., Willocquet, L., Pethybridge, S.J., Esker, P., McRoberts, N. and Nelson, A., 2019. The global burden of pathogens and pests on major food crops. *Nature Ecology & Evolution* 3(3):430-439.
- Another example is the work conducted by Clayton Hollier in the USA and worldwide on the losses caused by *Puccinia polysora* on maize.
- A number of members of the SMC has been involved in the Global Plant Health Assessment conducted under the aegis of the ISPP. This collective work involves approximately 100 scientists worldwide and address 33 Plant-Systems in several world Ecoregions: North, Central, and South America, Western Europe, the Mediterranean, sub-Saharan Africa, East, South, and South-East Asia, and Australasia. The Global Plant Health Assessment will be featured in three events during ICPP 2023: a Workshop to be held on the Sunday preceding the Congress, one Keynote Session (K4), and one evening Round Table.

- Simulation modelling of the effect of disease on crop physiology: generic models, models applied to Wheat diseases enabling multiple disease (pest) yield losses. This work complements earlier work on Rice.
- Analysis of the impact of interaction between disease and abiotic stresses on the physiology and yield of crop (link between plant diseases and climate change). Application to wheat leaf rust and drought stress. Work underway.

#### **Subject Matter Committee focus issues:**

- A key focus and global issue that the SMC addresses is the *absence of a global, open, collaborative repository of crop loss data*. This is a major obstacle for fact-based Science and research prioritization in plant pathology (and in the plant sciences in general).
- The above activities are meant to mobilize the scientific community on this challenge.
- Several members of the SMC have published work, articles and communications, on the topic during the past 5 years.

#### **Additional work identified:**

- Developing a global, open database on crop losses caused by plant diseases remains a central piece of the agenda of the SMC. How to achieve this will be discussed in the upcoming meeting in Lyon at ICPP2023.
- Producing a book which would refresh and provide guidelines for crop loss assessment (mainly refreshing and synthesizing available literature); this book could be published online on the ISPP website, and available for free. (Suggestion from Laetitia Willocquet)
- Provide information to scientists working partly or importantly on crop loss concepts and methods, through several mechanisms: posting on the ISPP website materials; through workshops; maybe mentoring of PhDs and MSc in cooperation with their supervisors.

#### **Thoughts on the future of this Subject Matter Committee (from S Savary, Chair)**

- Despite progress, challenges in the development of the SMC remain. Crop loss assessment and modelling has become an overlooked component of plant pathology over the past decades. This, among other reasons, is due to (1) the small size of the community addressing crop loss, (2) persistent challenges in making “crop loss” (assessment and modelling) a buoyant, active, relevant, practical, highly visible and attractive field of investigation, and (3) the difficulty met to fund meetings and workshops. The very existence of crop losses, as a subject for the global plant pathology community, is to be questioned. Ways to ensure that the theme does not disappear must be pondered. How to ensure that the topic remains on the agenda of ISPP, and of the global plant pathology community at large, will be discussed in Lyon.
- Two ways of ensuring that crop losses caused by plant pathogens remains a topic on the agenda of the ISPP are proposed:
  1. Maintain the Crop Loss SMC as it currently is. This will require discussing future plans. This could include the construction of a global open database on crop losses.
  2. Merge the Crop Loss SMC with the Post-Harvest Pathology SMC. This latter SMC is very active, with entire teams and labs dedicated to post harvest problems, and regular externally funded international Workshops. The new SMC resulting from the

merger could be, for instance, called: “Pre- and Post-Harvest Losses” SMC. A strong and active entity would thus be created, where crop loss, as a field of investigation, would be durably and safely maintained.

3. Other options will be discussed in Lyon-ICPP2023.

- Irrespective of the course of action chosen by the Crop Loss SMC, Serge Savary will step down from his role of Chair. A new Chair will have to be nominated if the decision is made that the Crop Loss SMC is to be maintained in its current form.

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