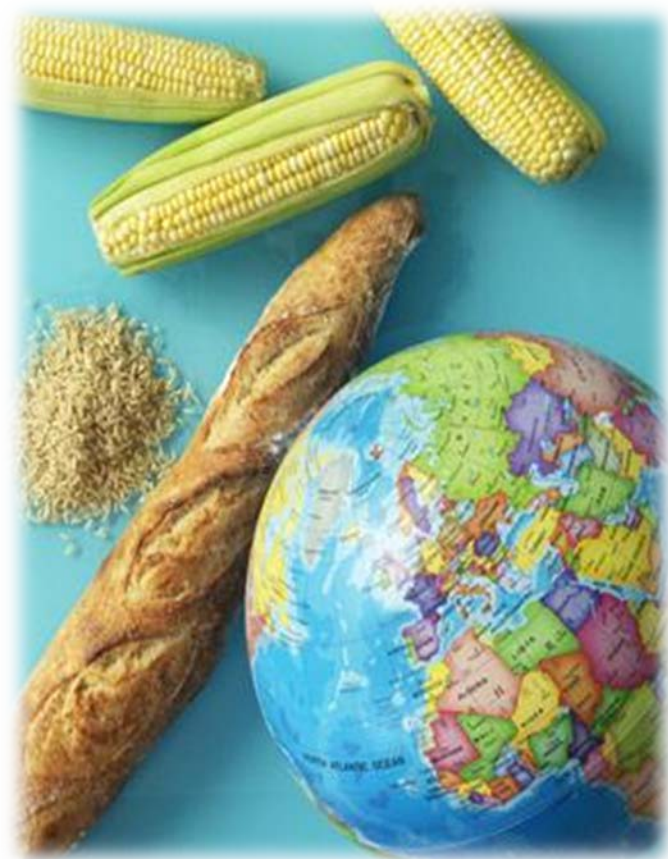


Next Generation Sequencing in the context of the International Plant Protection Convention (IPPC)

Adriana Gonçalves Moreira & Jane Chard

Workshop on the use of NGS technologies for plant pest diagnostics
22-23 November 2017
Bari, Italy

How to secure cooperation among nations



protect global plant resources

prevent spread
introduction
of pests

preserve food security
biodiversity

facilitate international trade ?



IPPC

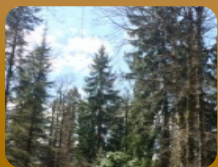
- **International treaty for international cooperation in plant protection**
- **The global instrument for the harmonization of phytosanitary measures for trade and environment**
- **The standard setting organization for plant health recognized by WTO-SPS**



IPPC Strategic Objectives (2012-2019)



Protect sustainable agriculture and enhance global food security



Protect the environment, forests and biodiversity from plant pests



Facilitate economic and trade development



Develop phytosanitary capacity for members

The IPPC in summary

183 contracting parties

Multilateral treaty for international cooperation in plant protection

National Reporting Obligations

Capacity development

Standard setting (identified in the WTO-SPS Agreement for plant health standards)

Adopted standards: ISPMs (1993-2017)



Food and Agriculture
Organization of the
United Nations



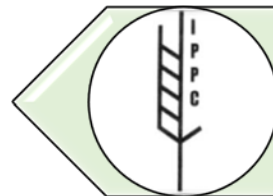
International Plant Protection Convention
Protecting the world's plant resources from pests

ISPM 2

ENG

Framework for
pest risk analysis

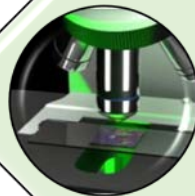
Produced by the Secretariat of the
International Plant Protection Convention (IPPC)



41 standards



31 phytosanitary
treatments



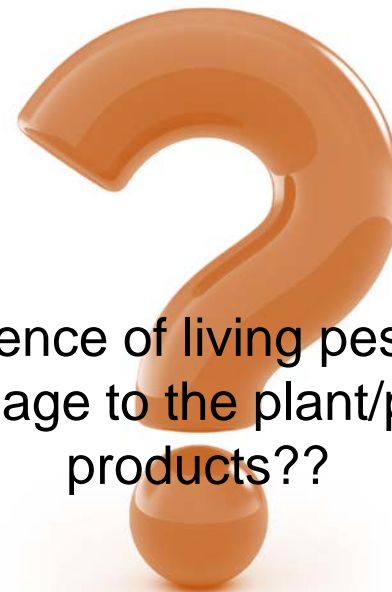
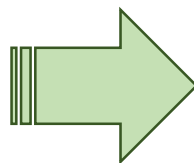
24 diagnostic
protocols



Next generation sequencing (NGS) and the IPPC



Detection and identification of pests



Evidence of living pests or damage to the plant/plant products??

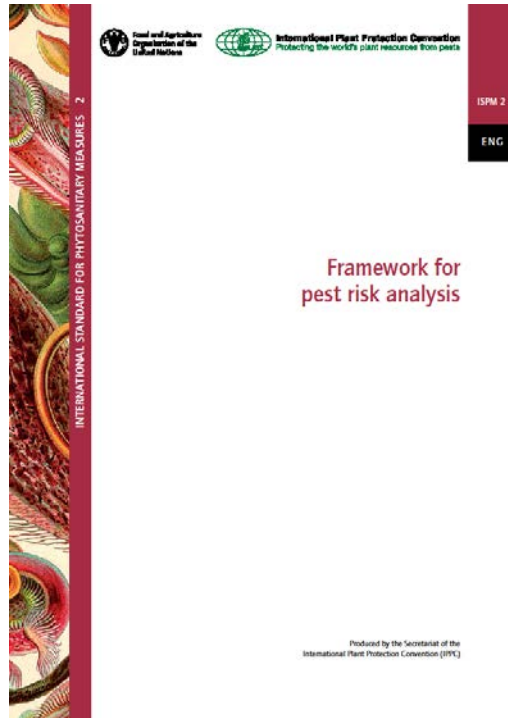
Interpretation of results: Beyond detection and identification...

Next generation sequencing (NGS) and the IPPC



How NGS can be used to help taking appropriate regulatory decisions for phytosanitary purposes?

NGS and the IPPC



- ISPM 2 (*Framework for pest risk analysis*)
- ISPM 6 (*Guidelines for surveillance*)
- ISPM 8 (*Determination of pest status in an area*)
- ISPM 11 (*Pest risk analysis for quarantine pests*)
- ISPM 17 (*Pest reporting*)
- ISPM 27 (*Diagnostic protocols for regulated pests*)

NGS and the IPPC

- Technical Panel on Diagnostic Protocols (TPDP) -

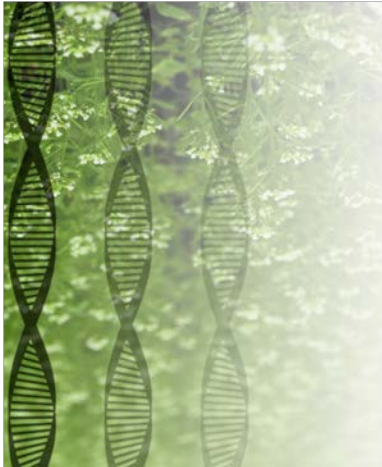


NGS and the IPPC



- ✓ Interpretation of results is the biggest challenge in the phytosanitary context;
- ✓ Guidance on the interpretation of the NGS results has not been developed yet: these technologies may currently be used for screening consignments, but not to form the basis for final decisions (e.g. destruction or rejection of consignments);
- ✓ Not all organisms associated with plants are pests: some may be mutualists or commensal agents.

NGS and the IPPC



- ✓ Detection of non-viable organisms;
- ✓ NGS for phytosanitary purposes: significant **validation data** would have to be available and **criteria** for its use and policies for the **interpretation of the results** would need to be developed to enable appropriate regulatory decisions.

NGS and the IPPC

- Do the newly detected organisms present an economic or trade risk?
- What is the biological significance (e.g. host range) of the newly detected organism?
- How to determine the geographic distribution of this organism if the organism is recently discovered and is cryptic or latent in nature?
- What type of actions would be appropriate following findings based on NGS technologies (e.g. destruction of an imported consignment, further testing using other methodologies)?

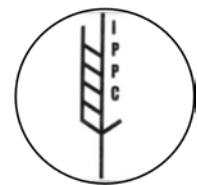
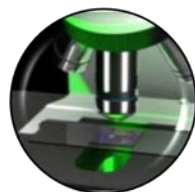
NGS and the IPPC

Standards Committee (2017)

- ✓ NGS: broader than pest diagnosis – PRA and surveillance
- ✓ Further work is needed on NGS technologies before they can be considered as the sole method for pest detection

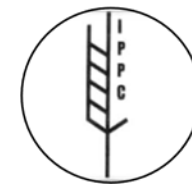
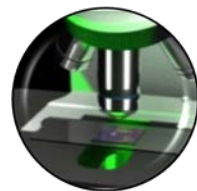
CPM-13 (2018)

- Side session: “Gene sequencing and molecular technologies”



NGS and the IPPC

Thank you.



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