



COMMISSION ON PHYTOSANITARY MEASURES

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Standards Committee recommendations to the Commission on Phytosanitary Measures
Agenda item 10.5
Prepared by the IPPC Secretariat

I. Challenges associated with the use of NGS in phytosanitary context

1. The ability to detect a plant pest varies with the quality and specificity of the detection tools. Next generation sequence (NGS) technologies, also known as high-throughput sequencing, have provided a very powerful alternative for detection and identification of organisms without a *priori* knowledge. However, these detections and identifications may not be associated with evidence of living pests or damage to the plant/plant products by these organisms, i.e. these technologies bring the risk of false positives that may lead to assumptions on the pathogenicity (ability to infect). Therefore, the use of highly sensitive technologies, such as NGS, for the detection and identification of plant pests and its implications is becoming a point of concern for the IPPC community.

2. The IPPC Technical Panel on Diagnostic Protocols (TPDP)¹, which manages the development of the IPPC DPs annexes to ISPM 27 (*Diagnostic protocols for regulated pests*), has discussed the use of NGS technologies as a diagnostic tools for phytosanitary purposes. In its February 2017 meeting², the panel made some recommendations to the Standards Committee (SC), subsidiary body of the CPM that oversees the work of the technical panel.

¹ Technical Panel on Diagnostic Protocols: <https://www.ippc.int/core-activities/standards-setting/expert-drafting-groups/technical-panels/technical-panel-diagnostic-protocols>

² 2017-02 TPDP Meeting Report (Rome, Italy) – see Appendix 6: <https://www.ippc.int/en/publications/84892/>

3. The TPDP acknowledged that the proper interpretation of results is the biggest challenge in the phytosanitary context, as it requires very large databases of known pests as the reference for comparisons. Additionally, the databases generated using earlier methods may not be appropriate for NGS. Guidance on the interpretation of the NGS results has not been developed yet. For such reasons, 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). The TPDP also noted that not all organisms associated with plants are pests; some may be mutualists providing benefit to the host plant or commensal agents. There is also the issue, as with other indirect methods, that NGS technologies will detect non-viable organisms. Therefore, if NGS was to be used 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.

4. The IPPC Standards Committee (SC) in May 2017 noted³ the TPDP recommendations and stressed that the issue is broader than diagnosis – it is also relevant for pest risk analysis and surveillance. The SC also invited the Commission on Phytosanitary Measures (CPM) to note the challenges associated with the use of the NGS technologies, and that further work is needed on NGS technologies before they can be considered as the sole method for pest detection.

5. The CPM is invited to:

- 1) *note* the challenges associated with the use of the Next generation sequence (NGS) technologies and that further work is needed on NGS technologies before they can be considered as the sole method for pest detection.

³ 2017-05 Report of the Standards Committee – see section 6.3.1: <https://www.ippc.int/en/publications/84388/>