



DEEPEN KNOWLEDGE IN PLANT PATHOLOGY FOR INNOVATIVE AGRO-ECOLOGY



Concluding remarks

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May 29 – June 2 2017
Dunkerque – Malo-les-Bains – France



**12th European Foundation for Plant Pathology (EFPP)
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What have we learned?



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THREATS



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Global change (climate, agricultural practices, trade of plant material) has a strong impact on plant health

- emerging and re-emerging pathogens (introductions, host jumps, hybridization,..)
- Attacks of the clones
- Clones can become populations
- changes in population structure

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OPPORTUNITIES



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Great **new tools** available

- Next generation sequencing
- Genotyping by sequencing
- pathogenomics
- Spectral imaging (Phytobike)
- artificial leaf surfaces
- bioinformatics
- all kinds of models
- CRISPR/Cas and RNA interference



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- Increase our knowledge about plant pathogens and the phytobiome/holobiont (“knowledge is power”)
 - plants select function, not taxa
 - root exudates select microbial communities
 - Coevolutionary model to explain how soils become suppressive;
 - how do pathogens move
 - systemic versus local colonization
 - what makes fungi pathogenic
 - Host susceptibility genes



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- Knowledge goes beyond plant pathology
 - Plant pathogens are great plant physiologists
 - Strong links with ecology



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- Revisiting of dogmas in plant pathology
 - Powdery mildew host specificity is overestimated
 - life cycle of eyespot disease on wheat
 - alternative hosts of rust on oat
 - formae specialis – *F. oxysporum* f. sp. sapiens
 - Viruses are not always pathogens



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- Revisiting recommendations
 - Eradication can be disastrous (Xanthomonas wilt)
 - Eradication can be non-effective (pine nematodes)
 - Mowing can contaminate plants (Xanthomonas/strawberry)
 - Pyramiding of R genes is not always the best solution (Leptosphaeria on oilseed rape)



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- New ways to control diseases
 - CRISPR/cas
 - RNA interference (HIGS and SIGS)
 - Clever selection and use of biocontrol agents
 - Lipopeptides/ulvans/volatiles



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- But do not forget about the power of traditional control methods
 - cropping systems
 - Cultivar mixtures
 - Sowing density
 - Clean planting materials



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- Massive data generation



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CHALLENGES



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- How to apply knowledge about biodiversity and biotic interactions in practice?
- How to define a healthy plant? (risk assessment)
- How to deal with large datasets?
- How to communicate about plant pathology with the public
- How to teach and train plant pathologists



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RECOMMENDATIONS



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- Ask the right questions
- Work together (large European projects)
- Share knowledge (databases)
- Work interdisciplinary
- Rethink the traditional ways we do science (peer review/project funded research)
- Train students in a holistic way
- Make the public aware of plant pathology
- Do not forget the tropical countries



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