Report from the thematic session on integrated plant protection

(plant session II)

1) Overview of relevant running Horizon 2020 projects and/or topics

Running projects:

- EUCLID: EU-CHINA Lever for IPM Demonstration

2) Overview of challenges from the EU and China

Main challenges in China

- Abuse of chemical pesticides; residues cause safety issues, environmental pollution, human health damage and pesticide resistance
- Results of a vicious cycle of increasing pesticide use, an increase of agricultural production inputs, damage to the environment; in particular strong reduction in biological diversity of natural enemies or other beneficial insects
- How to ensure food production and security, while safeguarding environmental and food safety?
- Risk assessment of pesticide application and to limit the pesticide residue contamination
- Improve the efficient usage of chemical pesticides through improved plant protection machinery and establish an effective monitoring system for pesticide residues
- Research and development of green microbial metabolite pesticide
    - Identification of new metabolites by synthesis of ribosomal and non-ribosomal pathways with biocontrol activity from the PGPR *Bacillus* and so on, study the regulation and synthesis mechanism of the bioactive metabolites, development of metabolite biopesticide and its effect and stability evaluation.

Main EU challenges

- Unpredictable effects of climate change and trade on pest and disease outbreak -> new (invasive) pests/diseases/weeds
- Negative spiral resulting from the use of chemical pesticides (kills pests but beneficials as well – resulting in more pests – leading to a higher use of chemical pesticides – and finally exacerbating development of pest resistance)
- Currently crop protection is focused very much on reactive measures, change needed towards more resilient systems
- Looking at systems including crop traits, choice of fertilizers, irrigation, landscape management, beneficial arthropods and beneficial microorganisms
- Biological control as tool to unlock positive spiral (more beneficials – fewer pests – less pollution and reduced run-off of chemical pesticides
- Resilience towards biotic stresses through systems approach incorporating breeding, microbiome, biocontrol, precision farming, biodiverse soils
- Challenge to integrate various integrated pest management strategies, need for improved knowledge transfer to increase uptake

3) Common challenges and role of the R&I

Common challenges

- Impact of chemical pesticides on the human health, environment, non-target organisms
- Resulting in increasing pesticide resistance
- Climate change, in addition to the above issues, calls for more diverse crop protection than the mere use of chemical pesticides

Research and innovation could potentially contribute to tackle these challenges

- Using and integrating available alternative pest and disease management solutions
- Focus on biological control such as
    - Natural enemies, biostimulants, natural compounds and bioactive substances derived from e.g. microorganisms
- Including technologies to be integrated in IPM approach (precision farming, monitoring, early warning, prevention practices)
- E.g. focus on fresh fruit and vegetables due to the economic (trade) importance of the sector for both sides and the fact that fresh products generate the most pronounced residue concerns from the side of consumers

Comments:

Common challenges were identified; different perspectives on how to tackle these challenges have been raised. It should be noted that Societal Challenge 2 of Horizon 2020 follows a challenge-based approach where methods/technologies are seen as means to reach objectives.