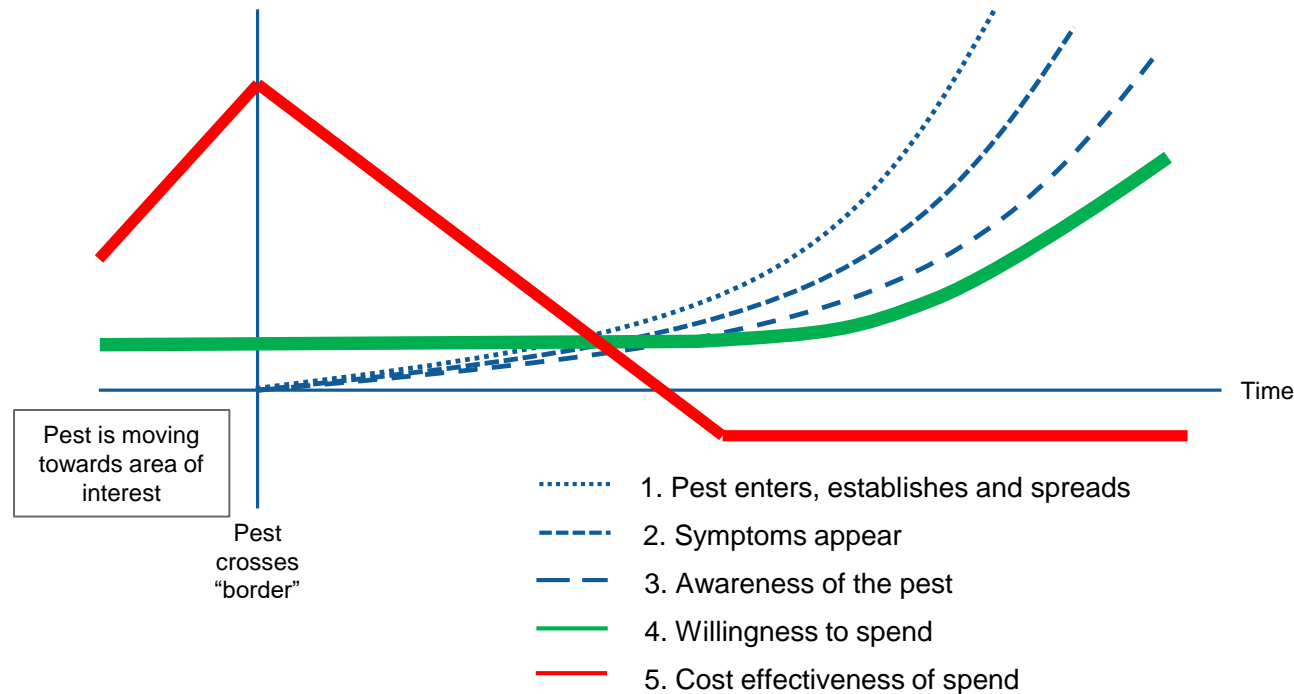


Citrus black spot disease (*Phyllosticta citricarpa*): monitoring in EU & epidemiology study in non-EU Mediterranean citrus production areas

Polona Kogovšek



Early detection is critical to enable eradication, containment and control



Typical progression of features in a standard outbreak of a plant pest, illustrating the time lags between pest population, symptoms, awareness and willingness to spend, alongside cost effectiveness of spend

Source: Ward, M (2016). Action against pest spread—the case for retrospective analysis with a focus on timing. Food Security 8, pp77–81

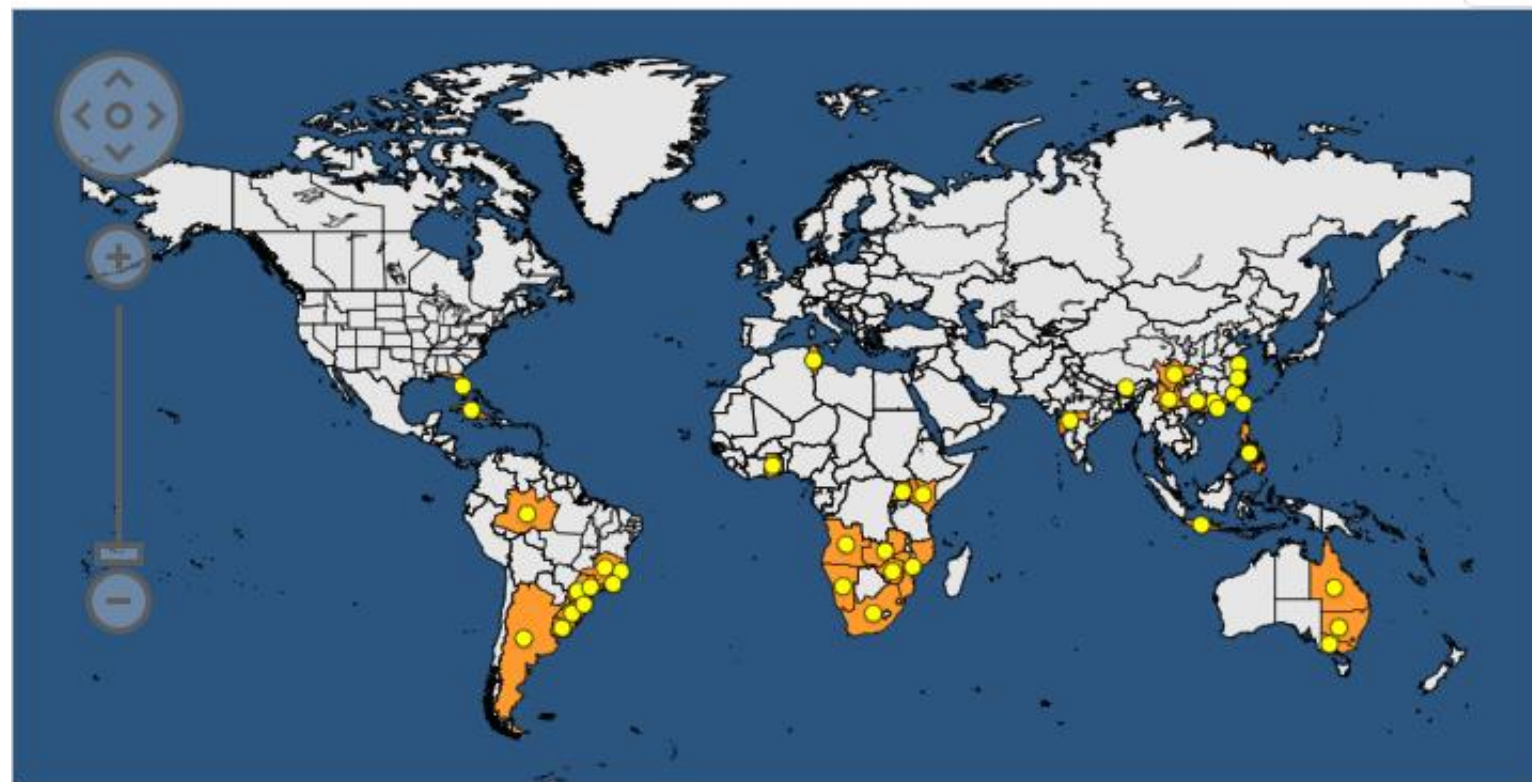
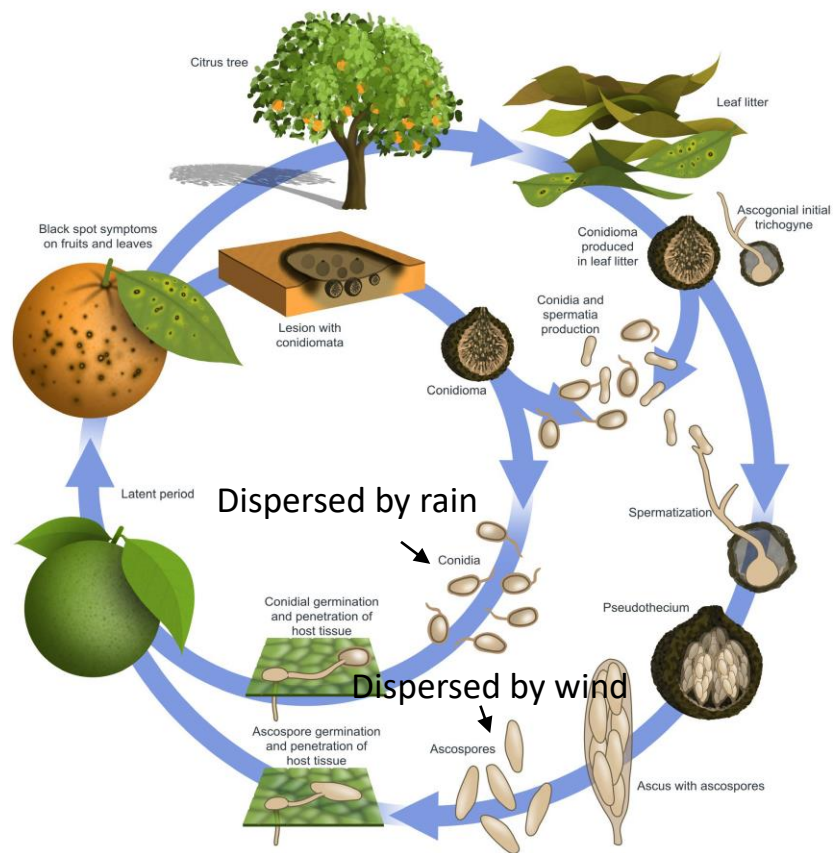
Citrus black spot (*Phyllosticta citricarpa*)

- Quarantine pathogen

In Mediterranean Basin reported in

- Portugal, Malta, Italy (2017) – but not officially confirmed !
 - SMART Surveillance (GP/EFSA/AFSCO/2017/04)
- Tunisia (in 2019)
 - Suitability of Mediterranean citrus production areas for *Phyllosticta citricarpa* (GP/EFSA/ALPHA/2019/04)





<https://gd.eppo.int/taxon/GUIGCI/distribution>

Smart Monitoring of Airborne pathogens – supporting Risk based plant health surveillance (SMART-Surveillance) 2017-2020



WP1: Running quarantine networks

- Establish model networks
- Use existing networks
- Data generation

(Partner: IVIA, FEM, MESDC-PPD)

WP2: Performance characteristics

- Sensitivity of methods: targeted qPCR, non-targeted HTS
- Evaluating optical system

(Partners: NIB, FEM)

WP3: Evaluating quarantine application - Support risk based surveillance

- Modelling scenarios
- Cost effectiveness

(Partners: Fera, input from all)

WP4: Transfer to other systems

- Evaluation of existing platforms
- Disease network characteristics

(Partners: FEM, Fera, input from all)

Smart Monitoring of Airborne pathogens – supporting Risk based plant health surveillance (SMART-Surveillance) 2017-2020

WP1: Sampling network

- Malta, Spain, Italy (Calabria), Greece
- Collecting air on 7-day tapes (Burkard sampler) – from May till October (December)
- Collecting rain (homemade system)
- Until now all received samples negative



Smart Monitoring of Airborne pathogens – supporting Risk based planT health surveillance (SMART-Surveillance) 2017-2020

WP2: Molecular detection & evaluation

- optimisation of the DNA extraction
- qPCR for fast and sensitive detection of *P. citricarpa*
 - Determination of limit of detection – artificially infected tapes
 - LOD 10E3 spores/ml sprayed on a tape representing a day
- Development of new specific qPCR assay for *P. citricarpa*
- HTS – Illumina sequencing of the fungal population (ITS)
 - Determination of limit of detection – artificially infected tapes
 - Preliminary LOD 10E3 - 10E4 spores/day

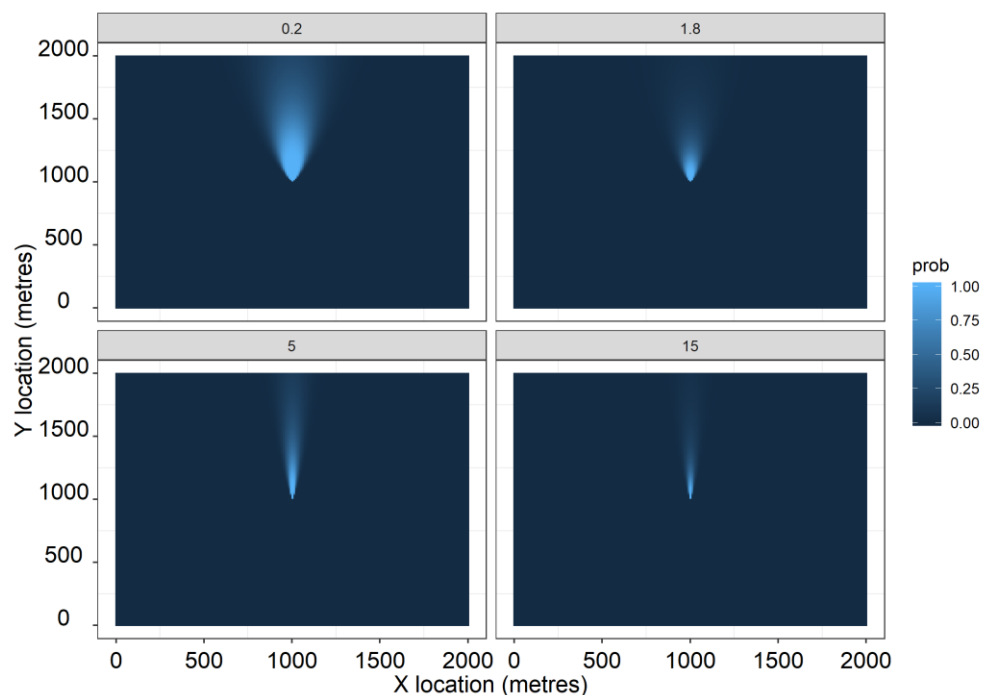


Figura 10. Fragmentos de cinta empleada en capturadores Burkard inoculada con dilución de conidias.

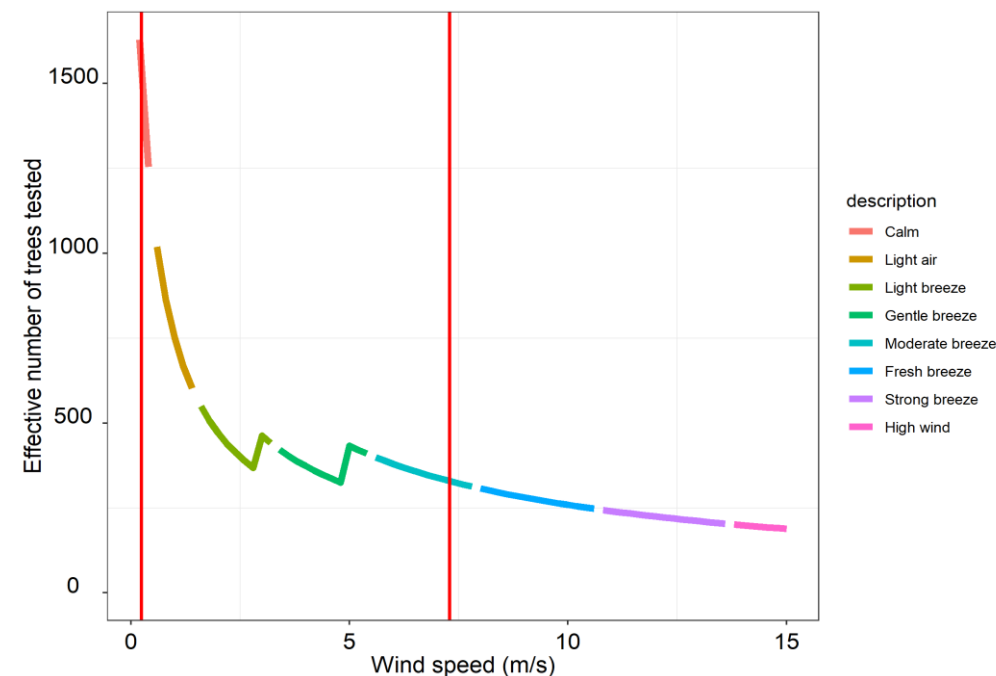
Smart Monitoring of Airborne pathogens – supporting Risk based planT health surveillance (SMART-Surveillance) 2017-2020

WP3: Modelling

- Collecting data from meteorological stations
- Data from molecular analysis
- ...

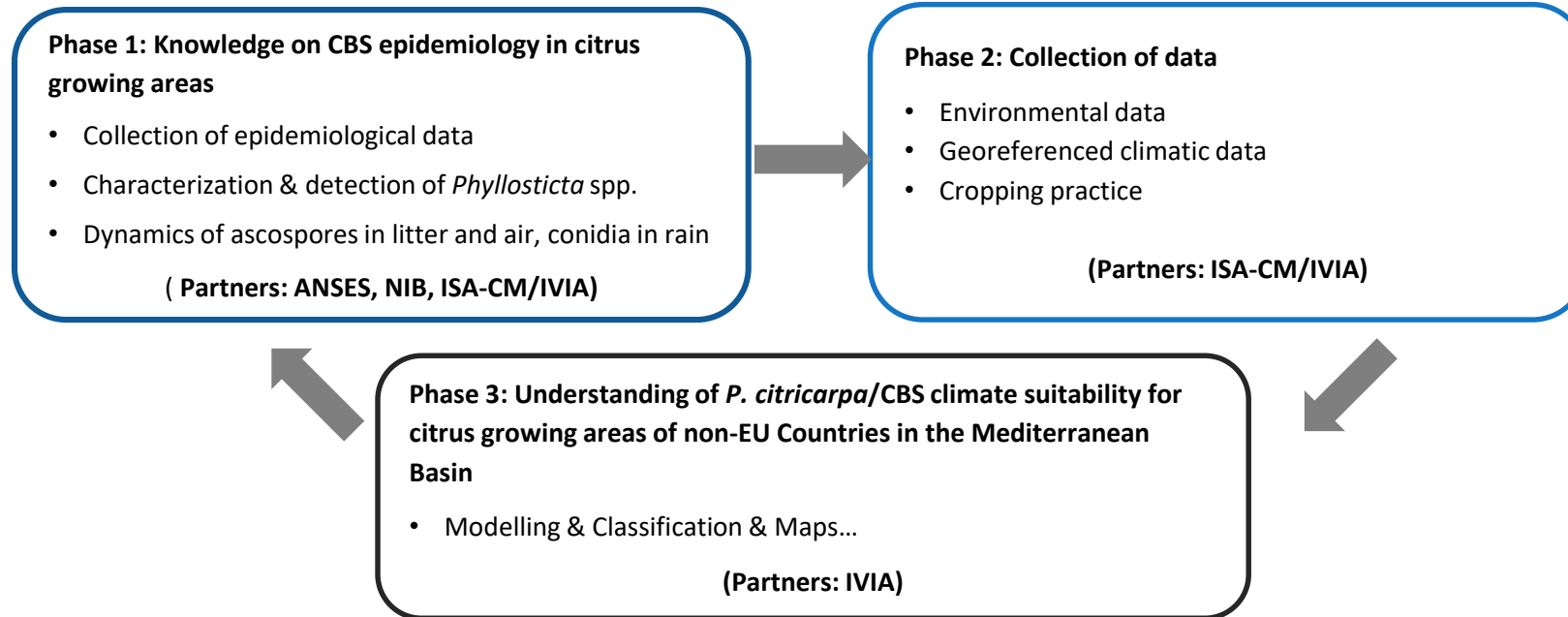


Areas within which a spore source may be detected where windspeeds lie between 0.2 and 15 ms⁻¹



Relation between windspeed and estimated effective number of trees tested per day (interval between vertical lines give average wind speed recorded in 95% of 3626 days near Valencia)

Reduce risk assessment uncertainty: suitability of Mediterranean citrus production areas for *Phyllosticta citricarpa* (2020-2023)



SMART Surveillance

Reduce risk assessment uncertainty: suitability of Mediterranean citrus production areas for *Phyllosticta citricarpa* (2020-2023)

Phase 1:

Knowledge on CBS epidemiology in citrus growing areas in non-EU Countries in the Mediterranean Basin by collection of epidemiological data

- Two experimental orchards
- 5*5 trees not treated and covered with mesh
- Collection of rain, air, litter for testing with qPCR
- Observing tree phenology
- Collecting/observing: each week, two years



Reduce risk assessment uncertainty: suitability of Mediterranean citrus production areas for *Phyllosticta citricarpa* (2020-2023)

Phase 2: Collection of data on weather, microclimate (within crop canopy) and cropping practices in citrus orchards

- Collect climatic data from The National Institute of Meteorology (NIM) in Tunisia, Joint Research Centre Agri4Cast database of the EC, WorldClim Version 2.0.

Phase 3: Understanding of *P. citricarpa*/CBS climate suitability for citrus growing areas of non-EU Countries in the Mediterranean Basin

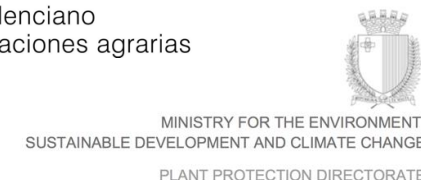
- Adopt and optimize available models for Mediterranean Basin
- Extrapolate the models for the EU citrus-growing areas and other regions of the Mediterranean Basin



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Thank you for your attention