

Thematic 1. Spray quality and precise application



DiiMOTION
DIRECT INJECTION IN MOTION



What means Spray quality and precise application?



- Improvement and securing of plant protection efficacy
- Reduction of the use of PPP
- Fostering and securing the use of biocontrol products by farmers (defined by that limited efficacy by growers)
- Indirect effects : reduction of Impacts on health and Environment

- The right dose at the right place at the right moment.
- Huge differences between the efficiency of applications techniques used by farmers
- Control of spraying parameters
- (with traceability)



FIELD CROPS WORKSHOP





FIELD CROPS: Priorities issues and challenges

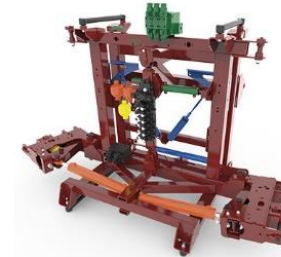
- The need to **provide more training to farmers** on how to adjust and use their spraying equipment:
 - Training courses should be coupled with demonstrations of SETAs
 - SETAs that allow further increase in the precision, efficacy and environmental risk control
- The **cost of innovations** : depending on the type of farm, some innovations are economically not feasible, which considerably hinders their adoption
- Insufficient communication to the global society about farmers' work. Their **work relative to the use of PPP is often miscommunicated to the general public** and the communication is quite often negative.



FIELD CROPS: Highest ranked innovations



Auto boom height control systems



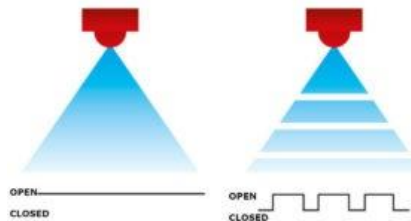
Hardi AutoSlant, AutoHeight and AutoTerrain



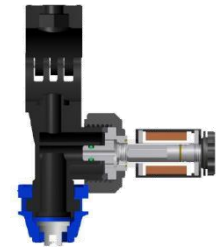
Variable dose rate sprayer (inc. PWM)



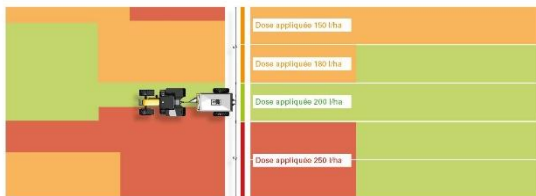
Teejet DynaJet Flex 7120



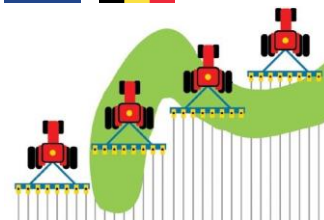
Dammann proSpray PWM



GPS and individual nozzle control



Müller MULTI-Rate





FIELD CROPS: Promotion and policies for EU

- **Overcome the economic barrier for the purchase of new/innovative spraying technologies:** It is important to **provide financial support** to small farms and this could be based on the “potential risk”.
 - The risk of direct PPP contamination is higher if a farm is located close to vulnerable areas like watercourses, residential areas, high biodiversity area
- **Provide more trainings to the agricultural community** (farmers, agricultural technicians, sprayer controllers, sprayer manufacturers) on the technical aspects of spraying: proper sprayer calibration, ways to reduce drift, precision spraying, etc.
- Ensure that when a farmer buys a sprayer, he receives training on the correct use and adjustment of his machine. One possible solution would be to **combine mandatory technical inspection of the sprayer with the setting of the sprayer**. In this way, the sprayer controller could talk directly with the farmer



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ORCHARD WORKSHOP





ORCHARD: Priorities issues and challenges

- The **lack of information and practical training about how to adjust the sprayer** (e.g. working modes regarding water rates, droplet sizes, etc.)
- **Lack of dissemination of information** about new existing technologies and the way they can be properly used
- In terms of R&D: **necessity to have devices that can be easily adjusted**, either automatically or manually, to target the spraying on the plant as effectively as possible.
- The **need to reconnect society with the agricultural community** and to explain the important notion of agricultural service.

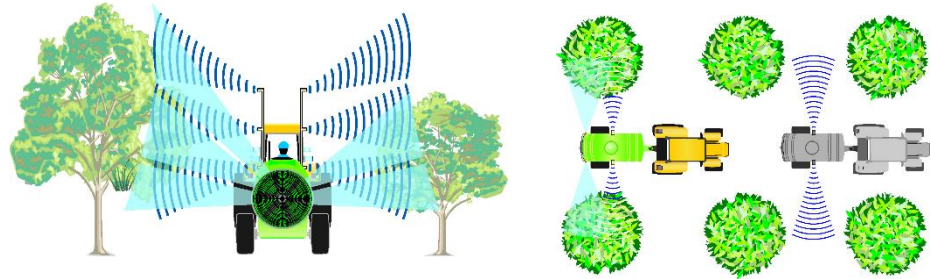




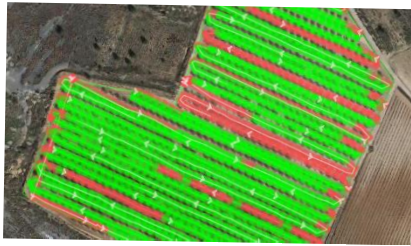
ORCHARD WORKSHOP



Canopy sensors (characterize the vegetation)



Spraying control units (real-time application parameters control system)



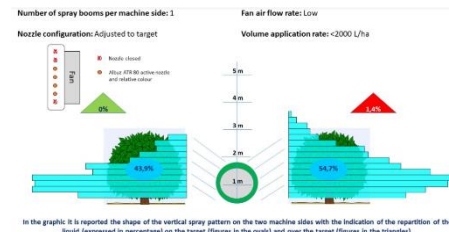
Tools/apps for sprayer adjustment (patternator)



Dosaviña
<https://dosavina.upc.edu/>



Lechler Nozzle Calculator



<https://www.laboratorio-cpt.to.it/citrus-vertical-spray-pattern/?lang=en>



ORCHARD: Promotion and policies for EU

- To ensure the development of **canopy sensors**, it is necessary to translate the information collected into relevant dose modulation maps. Thus, even though there was a consensus among the participants on the interest of having such tools in the long term, they also remark that the agronomic advantage is complex to evaluate, since the link with "agronomy" is missing. Consequently, R&D need to work on the development of these tools, which will become the basis for precision spraying in the future
- To **reconnect society with the agricultural community** and to explain the important notion of agricultural service, Organize events at school level: a day of discovery of agricultural world, internships in agricultural environments, etc.
- In terms of public policy priorities, the **importance of promoting training courses for farmers and advisers** was raised: BMPs for spraying, drift reduction , ... should be included in the mandatory training courses.



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ORCHARD: Promotion and policies for EU

- Establish a common charter at European or zonal level that would deal with guidelines for spraying practices, such as sprayer's calibration according to the type of crop, in order to have a common technical reference base, as it was done in the European TOPPS & PROWADIS projects.
- Extend mandatory periodic inspection of sprayers to the calibration of the machine and propose settings adapted to the conditions encountered by farmers. A technical reference framework on the correct calibration of sprayers agreed between the different stakeholders is needed at national and EU level.



VITICULTURE WORKSHOP





VITICULTURE: Priorities issues and challenges

- The **cost of new technologies** limits the dissemination and the use of spraying innovation, especially for the **smallest farms**.
- **Difficulty for operators to verify the quality of spraying**. It is crucial to raise awareness among farmers about the fact that a great distribution profile optimizes the PPP application in vineyards.
- **Raise awareness of the importance of a proper sprayer adjustment and train operators** (advisors, farmers, sprayer distributors, etc.) **on sprayer calibration**.
- Development of **SETAs that increase the precision of PPP application so that it can be used by farmers with limited skill and training** :
 - disease and canopy automatic detection;
 - prescription maps generation;
 - “smart” spraying systems that automatically adjust PPP dose and sprayer settings according to canopy without the operator's involvement



VITICULTURE WORKSHOP



Spray quality assessment tools, apps or help from advisors for sprayer calibration



Dosaviña
<https://dosavina.upc.edu/>



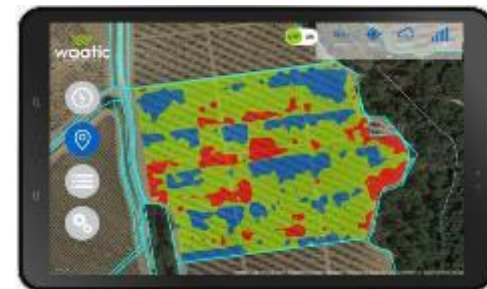
Lechler Nozzle Calculator



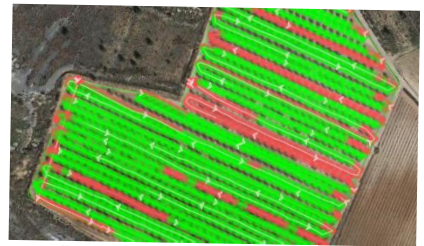
SnapCard WSP coverage measurement



VRA (Variable Rate Application) technologies ← mapping of vegetation



Spraying control units for real-time monitoring of spray parameters





VITICULTURE: Promotion and policies for EU

- Training courses covering **very practical** aspects under real field conditions to provide **better information of the importance of sprayer settings** and their the effectiveness of protection and the risks of contamination
- Encourage winegrowers to **acquire easy-to-use on-farm tools** that would allow them **to understand and visualize** the spray distribution in the field.
- **Field demonstrations** organized by manufacturers are needed to make end-users aware of the SETAs sold on the market



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VITICULTURE: Promotion and policies for EU

- **Subsidies for the purchase** of efficient sprayers based on their precision and their environmental performance should be offered to farmers
- It is also necessary to **give producers the possibility to control spraying quality in real time during treatment** by the monitoring of spraying application parameters.
- **Indeed**, most sprayers used in viticulture are still fitted with only one sensor, which is a simple manometer located on the sprayer, far from the cab. **These monitoring systems should become mandatory on each sprayer in Europe to facilitate spraying operations.**



GREENHOUSE WORKSHOP





GREENHOUSE: Priorities issues and challenges

- **Lack of information and training about the correct use of spraying equipment** and innovative technologies emerging on the market. Fill the knowledge gap by training about how to correctly set a sprayer because **most of the operators do not calibrate their sprayer appropriately.**
- Problem **of the high cost of innovative technologies for farmers**
- **Raise awareness of operators (farmers and advisers, ...) about BMPs**
- Develop **support tools for the calibration of sprayers**
- Develop **robots performing automated operations.** In an “ideal future greenhouse”, **the entire process of scouting and pest control should be automatic.**



GREENHOUSE WORKSHOP



Greenhouse sprayers with vertical booms specifically designed for vertical crops



carretillasamate



idm



Innovative Robots for spraying



Bogaerts greenhouse logistics
Qii-Jet TAH-342



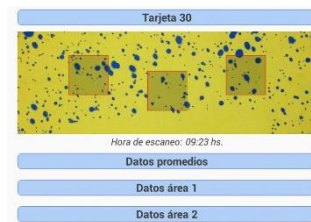
Holland Green Machine
S55 AIRMIXer



Tools for the correct calibration of the sprayers



Lechler Nozzle
Calculator



SprayGuru



Training material



GREENHOUSE: Promotion and policies for EU

- Importance of having **tools to assess spraying quality and distribution** before spraying – to be coupled with farmers training for a correct use
- Offer more **training courses to show operators how to correctly use SETAs**, because the Innovative products or technologies are not always easy to understand, in particular for farmers.
- **Research institutes, sprayer manufacturers and farmers should collaborate** for carrying tests and experimentation of SETAs in commercial greenhouses under real conditions , which would help to convince users with objective data.
- Provide **subsidies/funding /economic incentives to cover the acquisition cost of a SETAs** would be an efficient way to promote innovation dissemination

PROMOTION

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GREENHOUSE: Promotion and policies for EU

- **Subsidies of the purchase** of new spraying technologies
- **Provide more trainings to the agricultural community.** All stakeholders need to be included: farmers, advisors, students, sprayer manufacturers, PPP distributors as well as policy makers and local authority.
- Agricultural advisors and universities should **collaborate to develop training programs and seminars about sprayer calibration** and pest and disease control at regional level.
- Sprayer manufacturers, research institutes/universities and national and regional authorities could also **collaborate to develop the best calibration methodologies and technologies.**

