

Short course on how to reduce spray drift



Reduce PPP losses from diffuse sources

Spray drift

indirect
influence

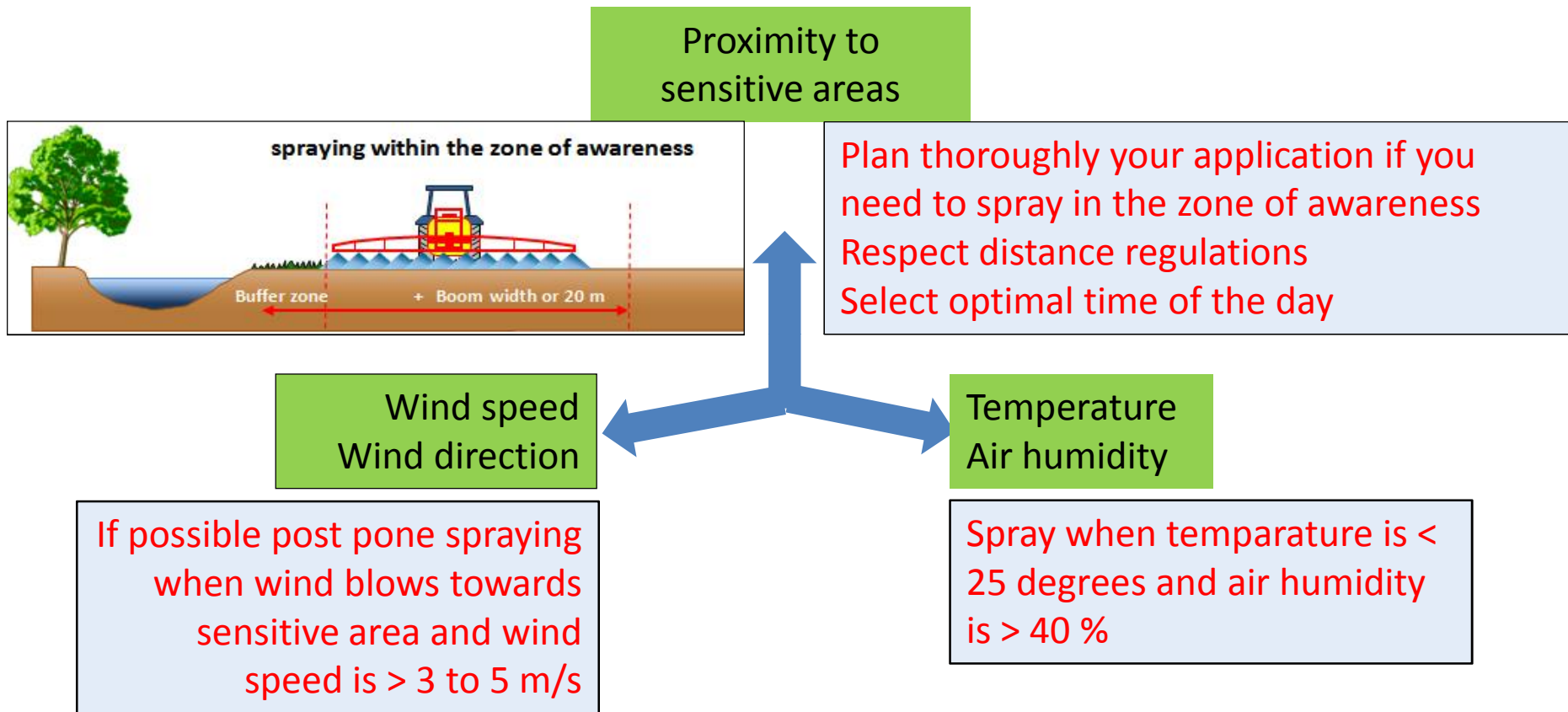
Key factors

- Wind speed
- Wind direction
- Temperature
- Air humidity
- Proximity to water
- Proximity sensitive area
- **Crop treated**
- **Adjacent vegetation**
- **Droplet size**
- **Application technique**
- **Adjustment of sprayers**

direct influence

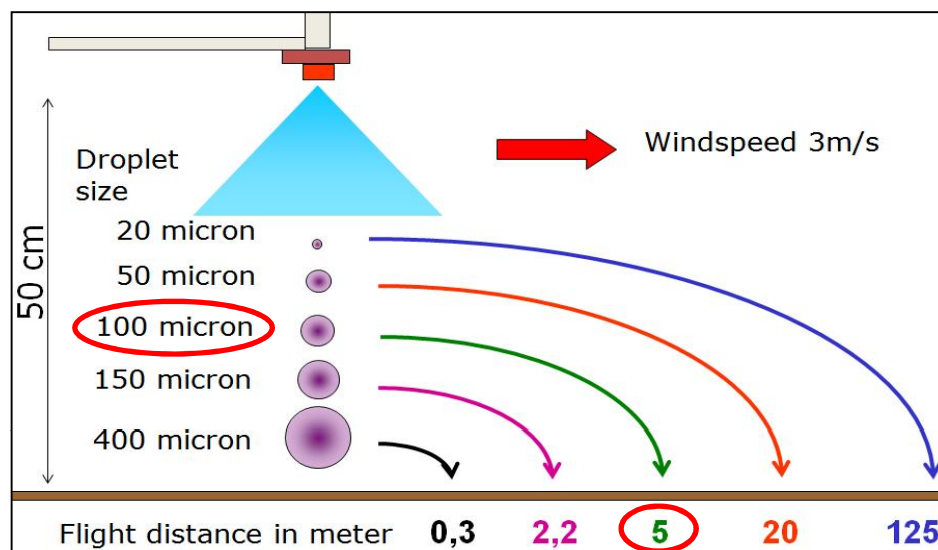


Be aware of the external conditions when spraying close to sensitive areas



Air induction nozzles allow to reduce the amount of fine droplets other dispersion techniques are less flexible

- Droplets below 100 micron cause the main drift risk
- Small droplets are lost by wind, thermic turbulence and may evaporate at low air humidity
- Coarse droplet spectra have shown comparable biological activity



Avoid droplets < 100 micron

Nozzles are classified in some countries (in % drift reduction, up to 99%)

Distance regulations are linked to the use of antidrift technologies according to local regulations

Key recommendations to manage spray drift in field applications

- Droplet size
reduce amount of fine droplets
- Boom height
the lower the better $\leq 50\text{cm}$
- Driving speed
keep speed along
sensitive areas $< 8\text{ km/h}$
- Sprayer with air support
(bare soil !)





Key parameters to manage spray drift in orchard / vine applications

Direct measures

- Reduce fine droplets
- Optimize sprayer adjustment
 - air support
 - liquid volume
- Select best spray scenario
- Select drift reducing sprayer

Indirect measures

- Hedgerows catch spray drift
- Hailnets reduce spray drift by about 50%
- Consider buffer strips / untreated zones



Key recommendation to manage drift in orchard / vine USE COARSE DROPLETS

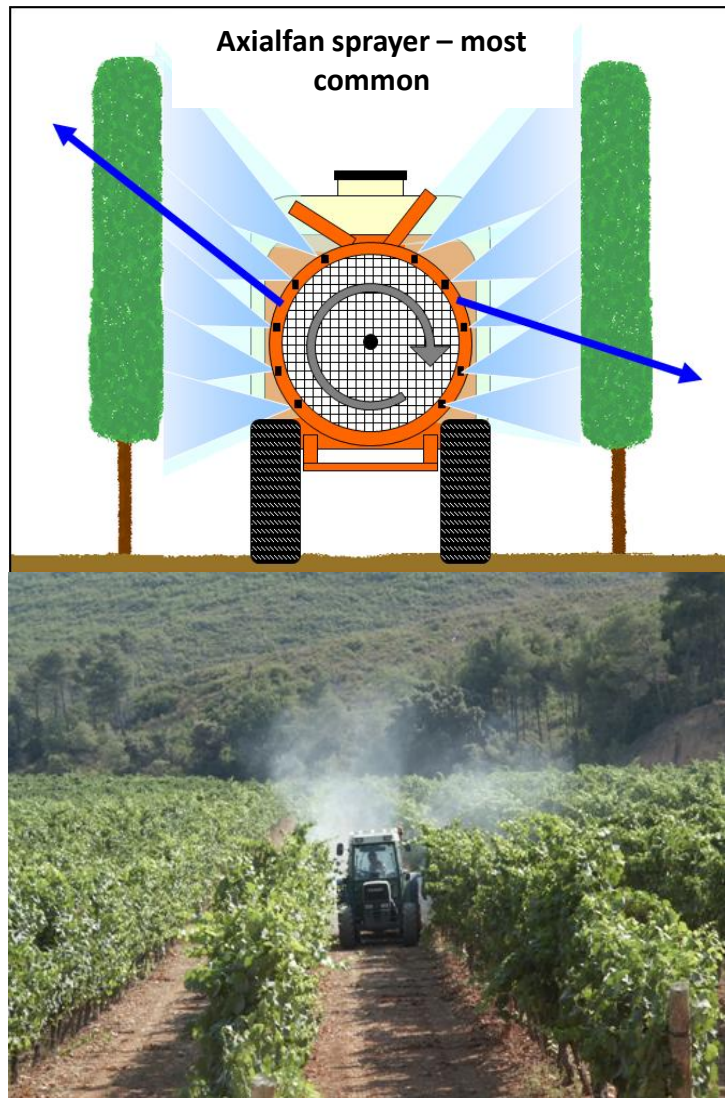
- Use nozzles with low amount of fine droplets
- Comparable efficacy for most PPP

Air injector nozzles



Key recommendations to manage drift in orchard / vine

ADJUST AIR DIRECTION, AIR VOLUME AND AIR SPEED



Orchard / vine sprayers transport the droplets into the canopy with the help of air.

- AIR direction / height need to be adjusted by windshields
- Windshields need to be adjusted according to unsymetric air volume and speed
- AIR volume can be adjusted by PTO speed at the tractor or gear box at the sprayer

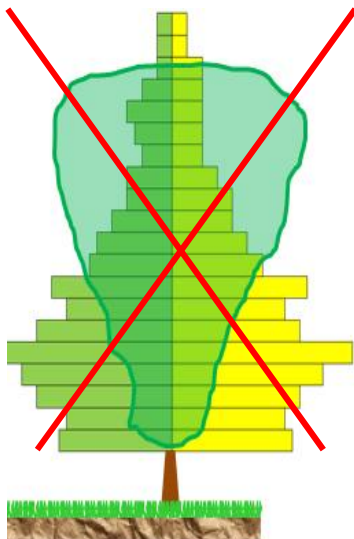
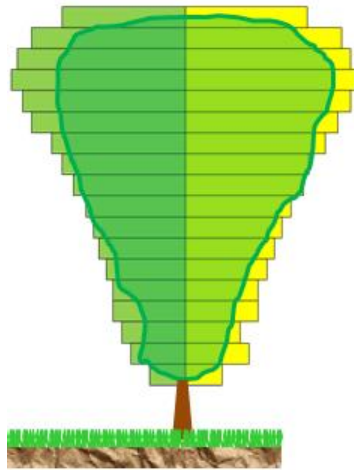
General observation:

Often applications are done with too much air volume.

More technical adjustment possibilities would be beneficial

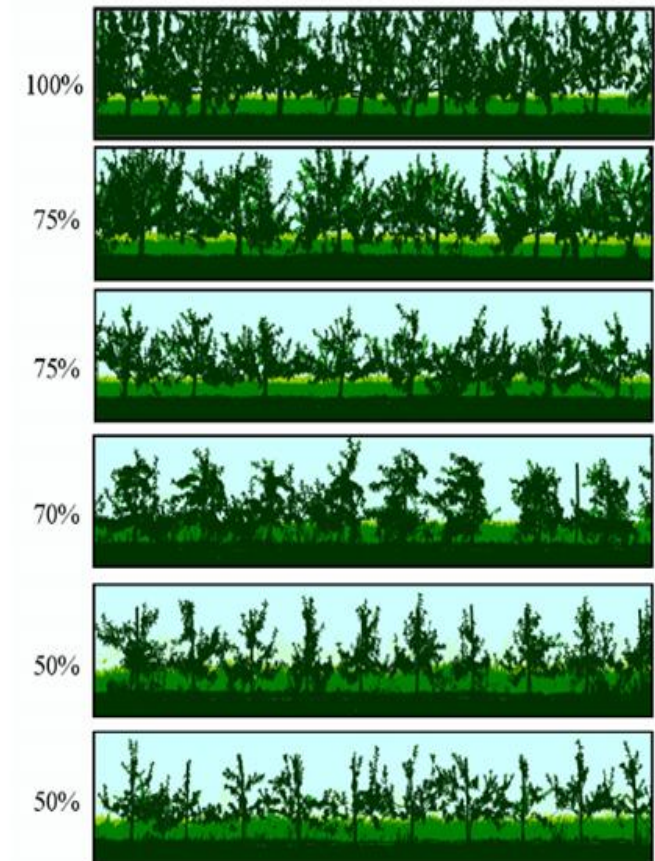
Key recommendations to manage drift in orchard / vine

ADJUST LIQUID OUTPUT TO CHANGING CANOPY



Big challenge is the correct adjustment of the spray output to the crop canopy

- spray volume need to cover and penetrate the shape and structure of the canopy
- nozzles with different spray output need to be arranged to fit the canopy
- Several adjustments needed during the season as canopy develops



The images shared by courtesy of Health and Safety Executive – UK. Walklate et al .2003.

Key recommendations to manage spray drift in orchard / vine

SPRAY SCENARIO: spray border rows from outside in



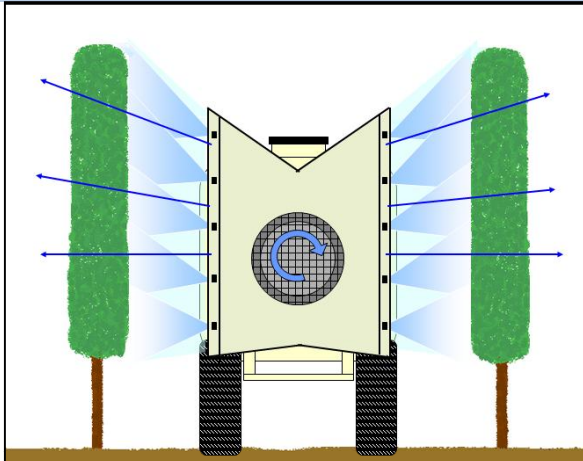
Border rows: 
one sided spray from outside in

- if wind blows towards a sensitive area, spray border rows from outside in
- modify airsupport to balance the drift risk

Spray scenarios can be used if later spraying cannot be postponed or sudden change of wind direction occurs

Key recommendations to manage drift in orchard / vine

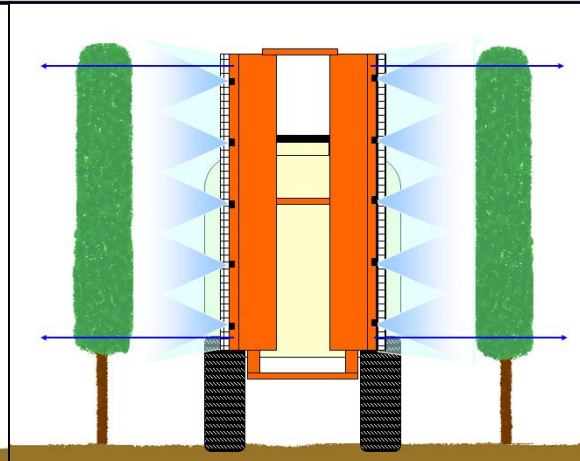
VARIOUS SPRAYERS ARE ABLE TO REDUCE DRIFT



Axialfan sprayer with installation

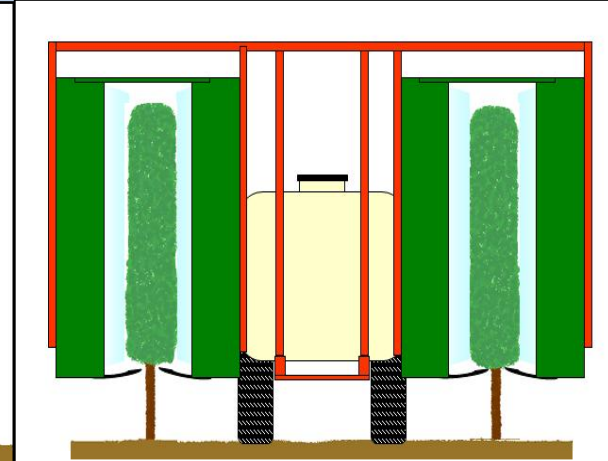
- distance to target more equal
- Air directed to canopy

Pictures: Ipach DLZ-Rheinpfalz



Tangential- fan sprayer

- distance to target more equal
- Air directed parallel to canopy



Tunnel sprayer

- drift is collected by shields
- Special training of crop is necessary / cannot operate everywhere

Measurement of drift reduction concentrates on complete sprayer and its configuration – a challenge



Understand more about drift risks and drift reduction

www.TOPPS-drift.org

The screenshot shows the homepage of the TOPPS-PROWADIS Drift Evaluation Tool. At the top left is the TOPPS PROWADIS logo. In the center, the title "TOPPS-PROWADIS Drift Evaluation Tool" is displayed. On the top right is the European Crop Protection logo and a language dropdown menu set to "english". Below the title is a descriptive sentence: "Understand the factors influencing spraydrift of Plant Protection Products and how mitigation measures can be used to reduce it". Three main content areas are presented as clickable cards: "FIELD" (yellow border), "ORCHARD" (red border), and "VINEYARD" (green border). Each card features a photograph of agricultural machinery in its respective setting and the text "click to open". Below these cards, a paragraph states: "These evaluation tools were developed in the European TOPPS-prowadis project in collaboration with partners and experts from 7 EU countries (BE, DE, DK, ES, FR, IT, PL)". Another paragraph mentions: "The project was supported by the European Crop Protection ASS. (ECPA)". At the bottom, a row of logos for partner organizations is shown, including VIDENCENTRET FOR LANDBRUG, DISAFA, IFV, inagro, JKI, InHort, and UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH.

Field crops / Orchards / Vine – 8 languages
Education and awareness



... We have means for the cloud to disappear



Acknowledgement

This presentation is based on results from the European wide TOPPS – prowadis project intended to reduce losses of Plant Protection Products to water from diffuse sources (spray drift and runoff).

The project developed Best Management Practices (BMPs) and disseminates these through information, trainings and demonstrations.

Univ. Cordoba, ES

Univ. Polytech Catalonia,
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Irstea , Lyon FR

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FR

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