Assessment of drift potential of sprays produced from tilted shielded rotary atomizers compared to hydraulic nozzles

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Controlled Droplet Application (CDA)...

Rotary atomiser
(GrASP)
Compromise in terms of droplet sizes ...

Rotary atomiser (Micromax 120)
- VMD=270
- Span=0.6

Anti-drift nozzle (Hardi Injet 015)
- VMD=325
- Span=1.1
Objective

To investigate whether a tilted shielded rotary atomizer can reduce drift potential to acceptable levels.

Method

Simulating the behaviour of droplets in the atmosphere

Combined ballistic and random-walk models + Evaporation
Wind profile

Initial conditions:
- Nozzle height = 0.5 m
- Static nozzle
- Crop height = 0.1 m
- Wind velocity = 2 m/s
Assessment of the travelled distance by drifttable droplets

Wind speed: 2 m/s

Static nozzle

(Y)

(Z)

(X)
**Rotary atomiser:** VMD = 270 µm; Span = 0.6; Emitted droplet velocity = 25 m/s

**Hydraulic nozzle:** VMD = 270 µm; Span = 1.1; Emitted droplet velocity = 10 m/s
Droplet behaviour at 2.0 m from nozzle axis
Rotary atomiser: VMD=270 µm; Span=0.69; Emitted droplet velocity= 25 m/s

Hydraulic nozzle: VMD=270 µm; Span=1.1; Emitted droplet velocity= 10 m/s
**Rotary atomiser:** VMD=270; Span=0.69; Emitted droplet velocity= 25 m/s

**Hydraulic nozzle:** VMD=270; Span=1.1; Emitted droplet velocity= 10 m/s
- Forward tilted rotary atomisers increased drift relative to vertical orientations.

- Vertical rotary atomisers with a narrow droplet size distribution centred around a VMD of 300µm reduce drift comparatively to hydraulic nozzles.

- A monodisperse droplet size distribution may avoid spray drift.
THANK YOU FOR YOUR ATTENTION
\[\Delta \text{adhesion}, \bullet \text{rebond} , \times \text{fragmentation}\]