Industry Impact

Optimization of airblast sprayers for use in vineyards can improve spray deposition and reduce drift. Two techniques to optimize an airblast sprayer are using different nozzle types and controlling air assistance. Using TeeJet VisiFlo® hollow cone nozzles (TJTXV12, brown) and TeeJet Al type A nozzles (A1TX8002V, yellow), with and without air assistance (fan) (Fig. 1), we evaluated canopy deposition and drift in a WA winegrape vineyard in 2018. Spray deposition was collected as described in Fig. 2.

The ability to optimize the airblast sprayer for grapes can ultimately help improve disease control and save money.

Canopy Deposition

Results
- **AI - air off** vs. **AI - air on** – AI nozzles without air assistance had greater canopy deposition.
- **VisiFlo - air off** vs. **VisiFlo - air on** – Air assistance did not appear to greatly effect deposition patterns of the VisiFlo nozzle.
- **AI - air off** vs. **VisiFlo - air off** – Without air assistance, AI nozzles have greater canopy deposition than VisiFlo nozzles.
- **AI - air on** vs. **VisiFlo - air on** – With air assistance, VisiFlo nozzles had higher canopy deposition than AI nozzles.

Conclusions
Canopy deposition was higher and more evenly distributed using AI nozzles with no air assistance than other combinations. The larger droplets produced by AI nozzles, when combined with air, likely resulted in droplets bouncing off the leaf, decreasing deposition. Of the total (100%) deposition collected for each application canopy deposition was 99.9% for AI - air off, 91% for AI - air on, 99.51% for VisiFlo - air off and 99.51% for VisiFlo - air on.

VisiFlo nozzles had higher deposition in the upper canopy then the fruiting zone, likely due to less foliage below the cordon which could affect the eddy (wind) patterns of the small droplets.

Aerial Drift

Results
- **AI - air off** vs. **AI - air on** – AI nozzles had greater aerial drift with air assistance.
- **VisiFlo - air off** vs. **VisiFlo - air on** – VisiFlo nozzles with air assistance had more aerial drift.
- **AI - air off** vs. **VisiFlo - air off** – AI and VisiFlo nozzles without air assistance had low aerial drift.
- **AI - air on** vs. **VisiFlo - air on** – With air assistance, VisiFlo nozzles with air assistance had greater aerial drift than AI nozzles with air assistance.

Conclusions
Aerial drift was higher whenever air assistance was used, regardless of nozzle. The highest drift was produced by the VisiFlo nozzles with air assistance. This might be due to the smaller droplets produced by this nozzle type, which can drift further than the larger droplets produced by AI nozzles. Of the total (100%) deposition collected for each application aerial drift was 0.01% for AI - air off, 1% for AI - air on, 0.06% for VisiFlo - air off and 1.6% for VisiFlo - air on.

Al nozzles without air assistance produced the lowest aerial drift followed by VisiFlo nozzles without air assistance.

Floor Drift

Results
- **AI - air off** vs. **AI - air on** – AI nozzles had greater floor drift with air assistance.
- **VisiFlo - air off** vs. **VisiFlo - air on** – VisiFlo nozzles had greater floor drift with air assistance.
- **AI - air off** vs. **VisiFlo - air off** – Without air assistance, AI and VisiFlo nozzles had very low floor drift.
- **AI - air on** vs. **VisiFlo - air on** – With air assistance, AI nozzles had greater floor drift than VisiFlo nozzles.

Conclusions
Drift onto the vineyard floor was highest when air assistance was used; turning off the air assistance reduced drift, regardless of nozzle type. Of the total (100%) deposition collected for each application floor drift was 0.08% for AI - air off, 8% for AI - air on, 0.43% for VisiFlo - air off and 2.9% for VisiFlo - air on.

When comparing nozzles, floor drift was less with VisiFlo nozzles than AI nozzles. While small droplets increase aerial drift, they likely decrease drift onto the vineyard floor, explaining why VisiFlo nozzles had less floor drift than AI nozzles.

Take-Home Points

Turning off air assistance on a Rears Power Blast is one way to reduce drift.
Every drop to the crop!

- **AI nozzles** produce large droplets, which are less prone to aerial drift. When coupled with air assistance, however, they are more likely to bounce off of the canopy and onto the vineyard floor.
- **VisiFlo nozzles** produce smaller droplets which are more prone to aerial drift. This drift risk is increased when air assistance is used.

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