Evolution of Fungicide Application Technologies for reducing FHB and DON

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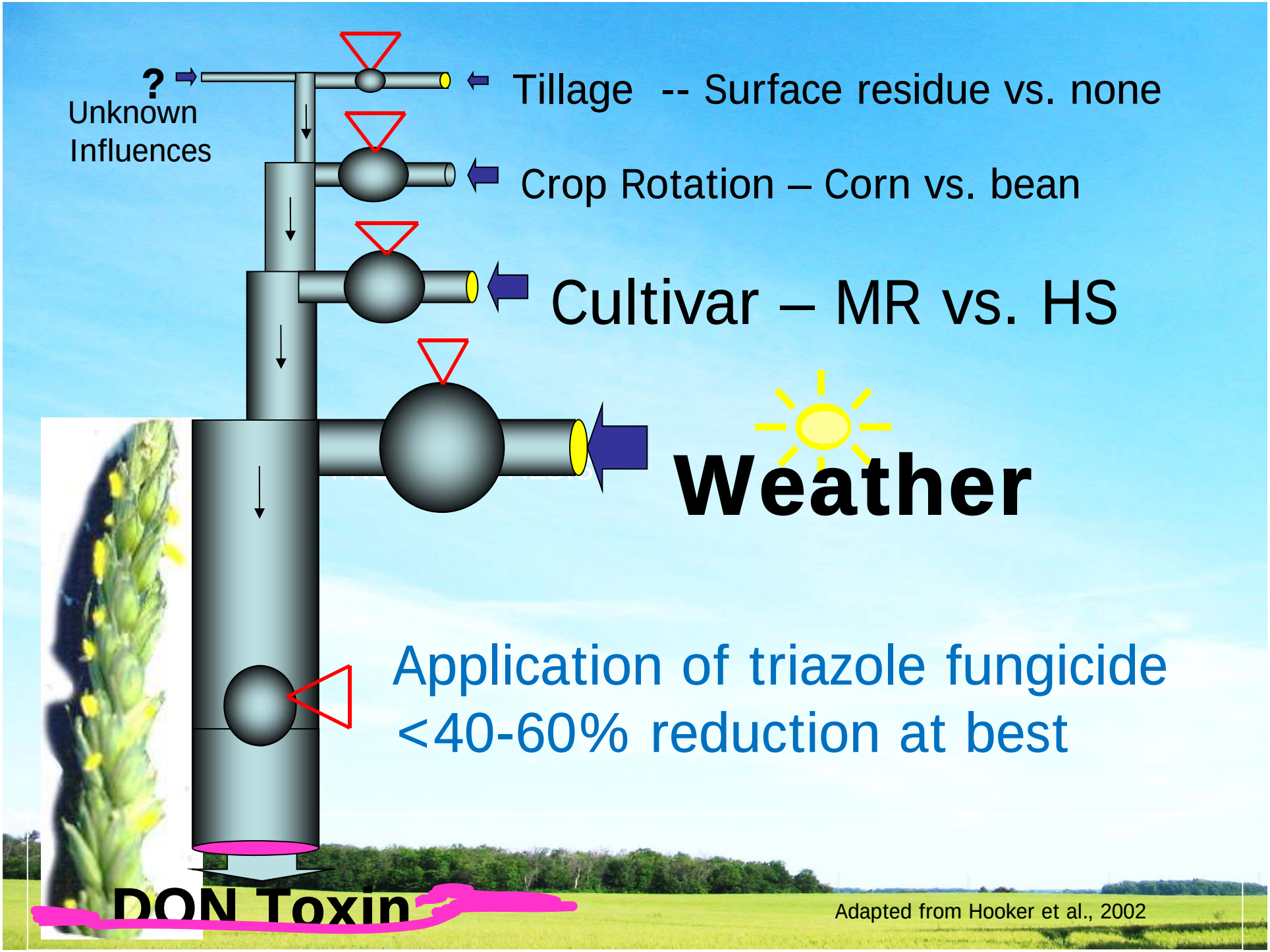
? Unknown Influences
Tillage -- Surface residue vs. none
Crop Rotation – Corn vs. bean
Cultivar – MR vs. HS
Weather
Application of triazole fungicide
<40-60% reduction at best
DON Toxin
Adapted from Hooker et al., 2002

UTC

Best fungicide @ best timing using best application technology

First generation testing

- UV dye sprayed
- different nozzles
- image analysis

- uneven head coverage
- good leaf coverage
- good soil coverage
- Head coverage = fungicide efficacy??

Hooker (Univ Guelph)

Second generation testing

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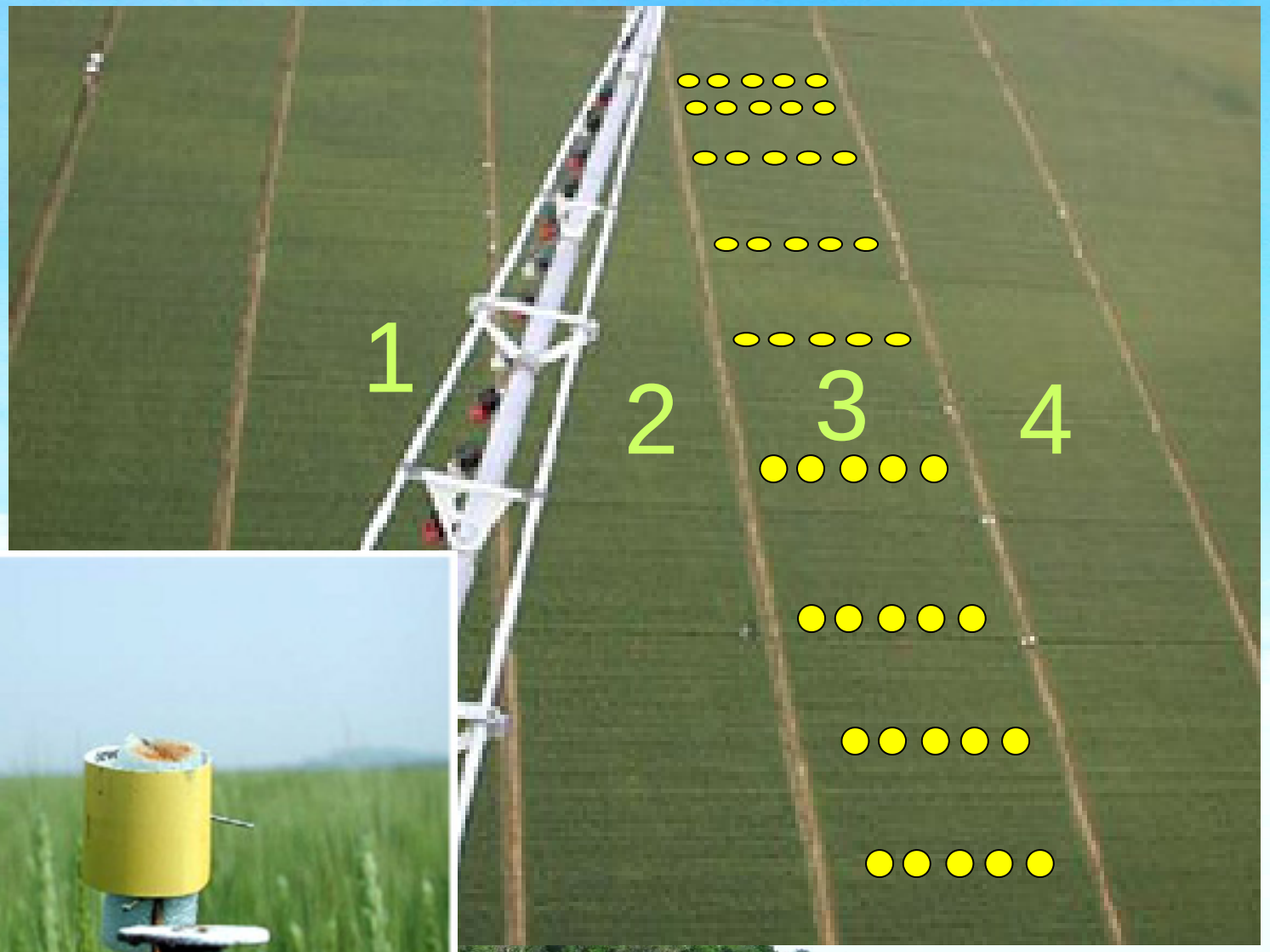
5 Swath Positions x 9



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Sprayer Rodeo

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Back-Fwd
Turbo FF TeeJet


TwinJet


Conventional
Turbo FF TeeJet


Conventional
Turbo FF TeeJet
Sprayed 2x – Opposite Directions
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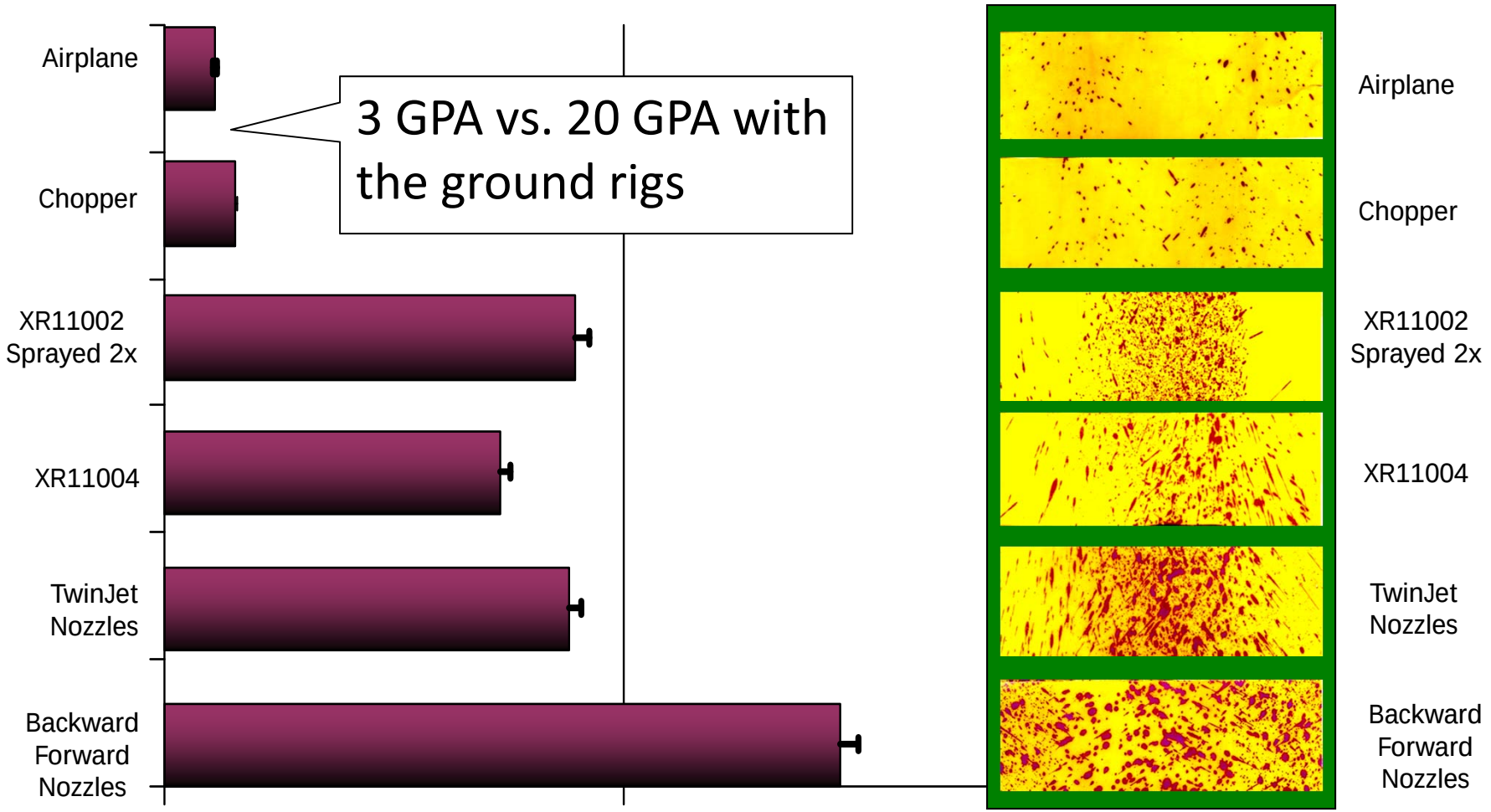
Spray Coverage vs Application Method



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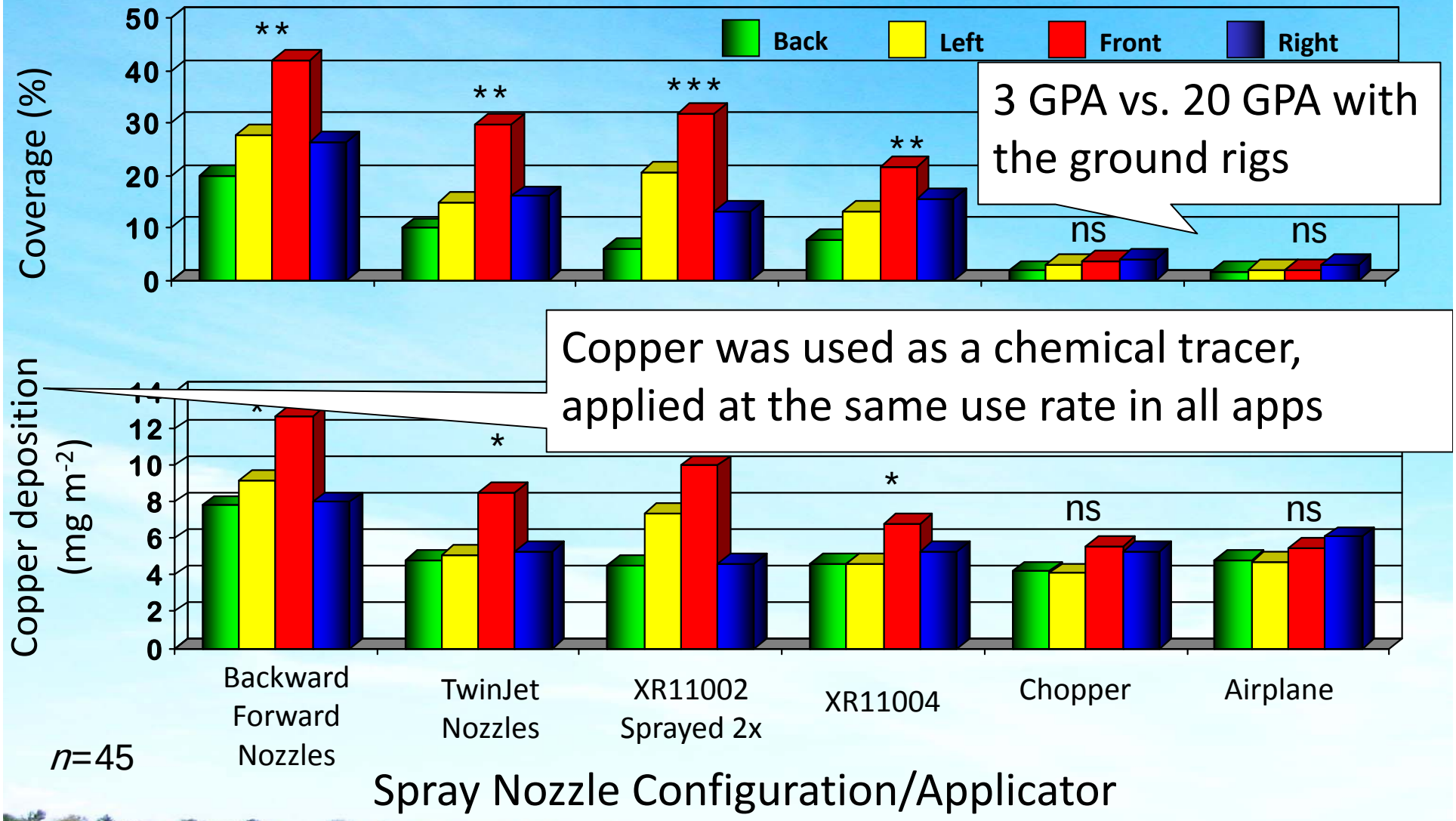
Spray Distribution on Heads vs Applicator



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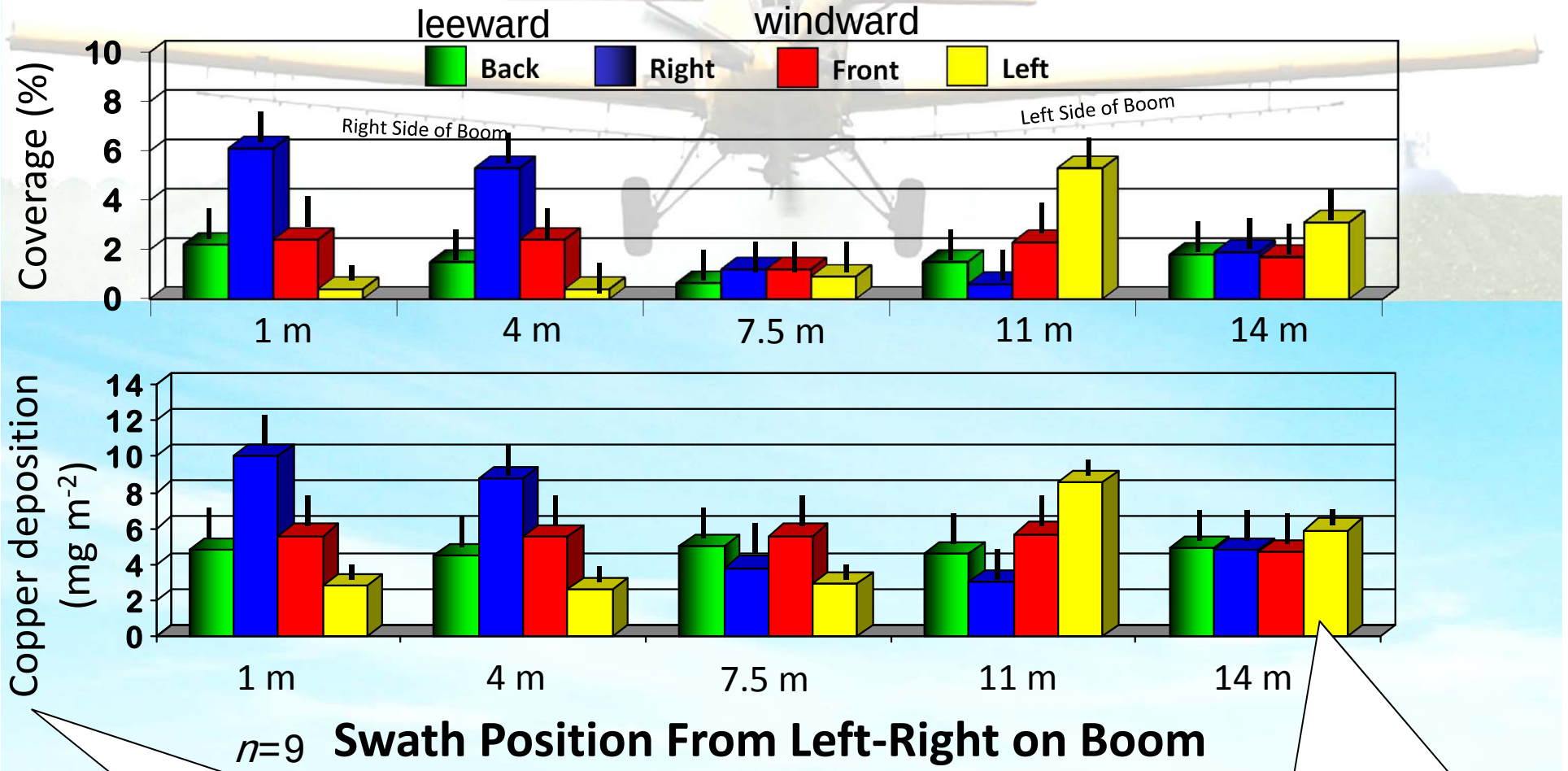
*,**, *** differences in coverage among sides (P=0.05, 0.01, <0.01 respectively)


Source: http://bhoulgrave.files.wordpress.com


Source: http://addins.whig.com


http://corbisimages.com

Spray Distribution on Heads Across Swath Width
-- Airplane --



Copper was used as a chemical tracer

Note differences in coverage from side-to-side on boom, and on "head" coverage

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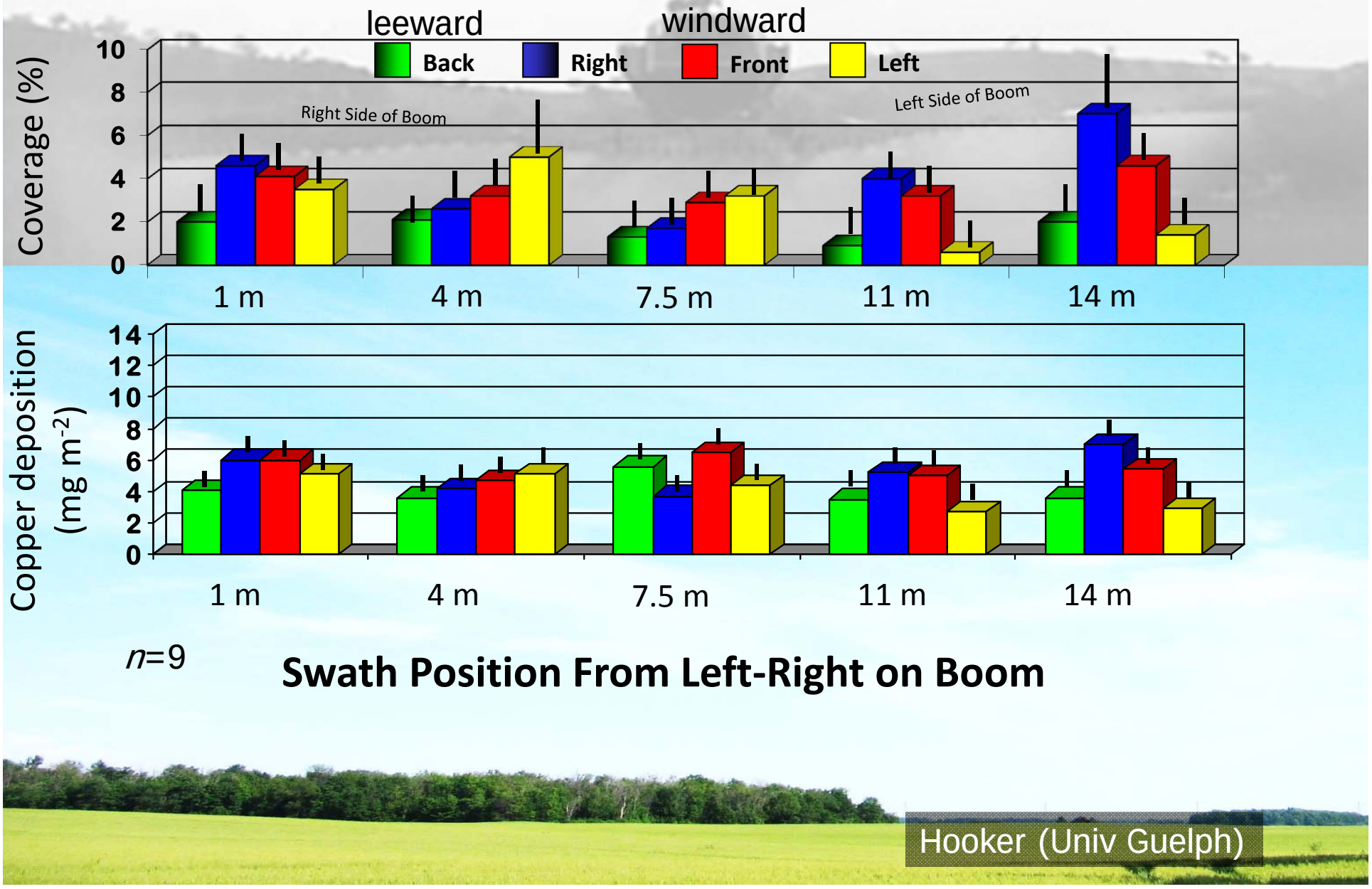
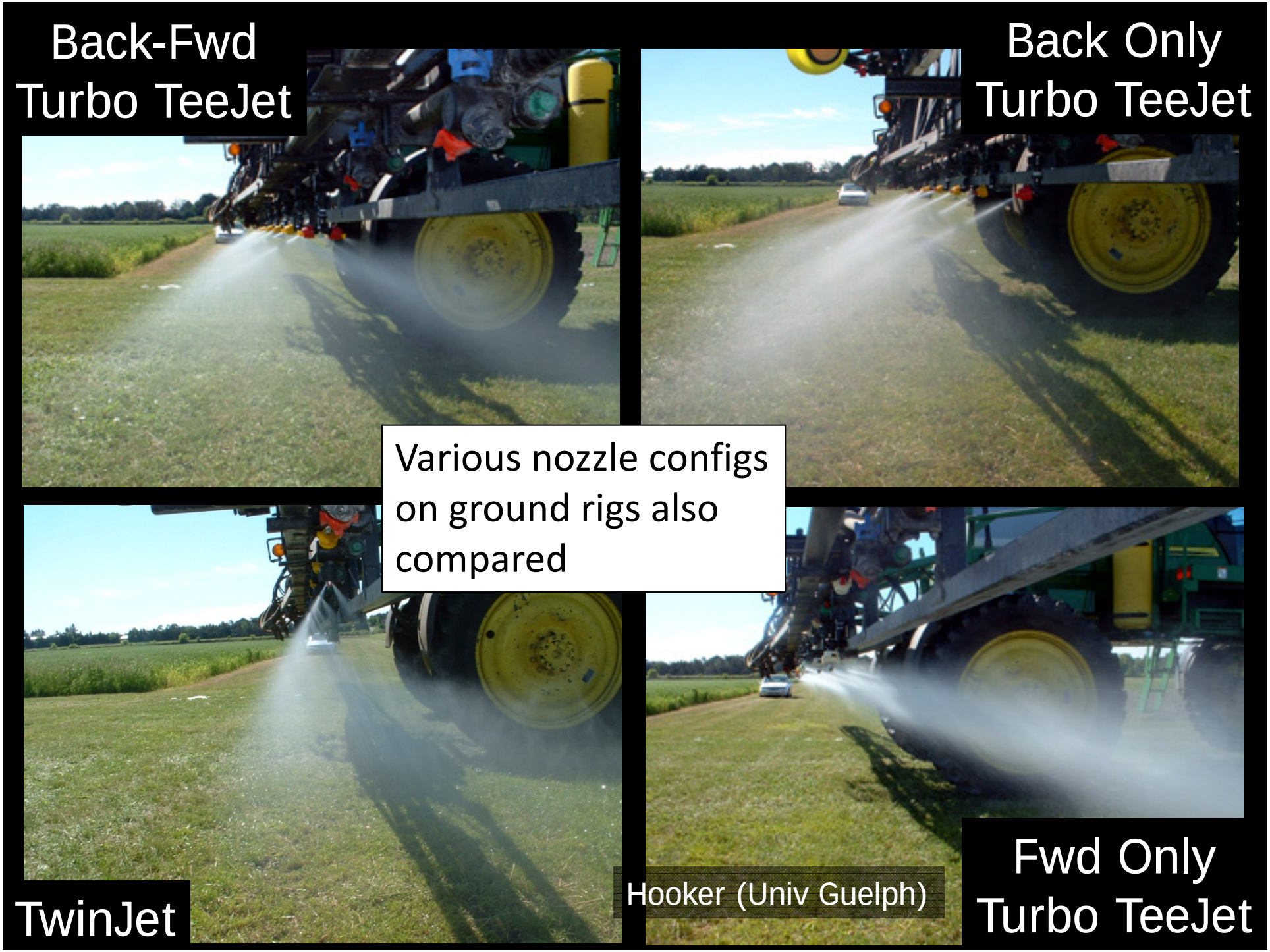
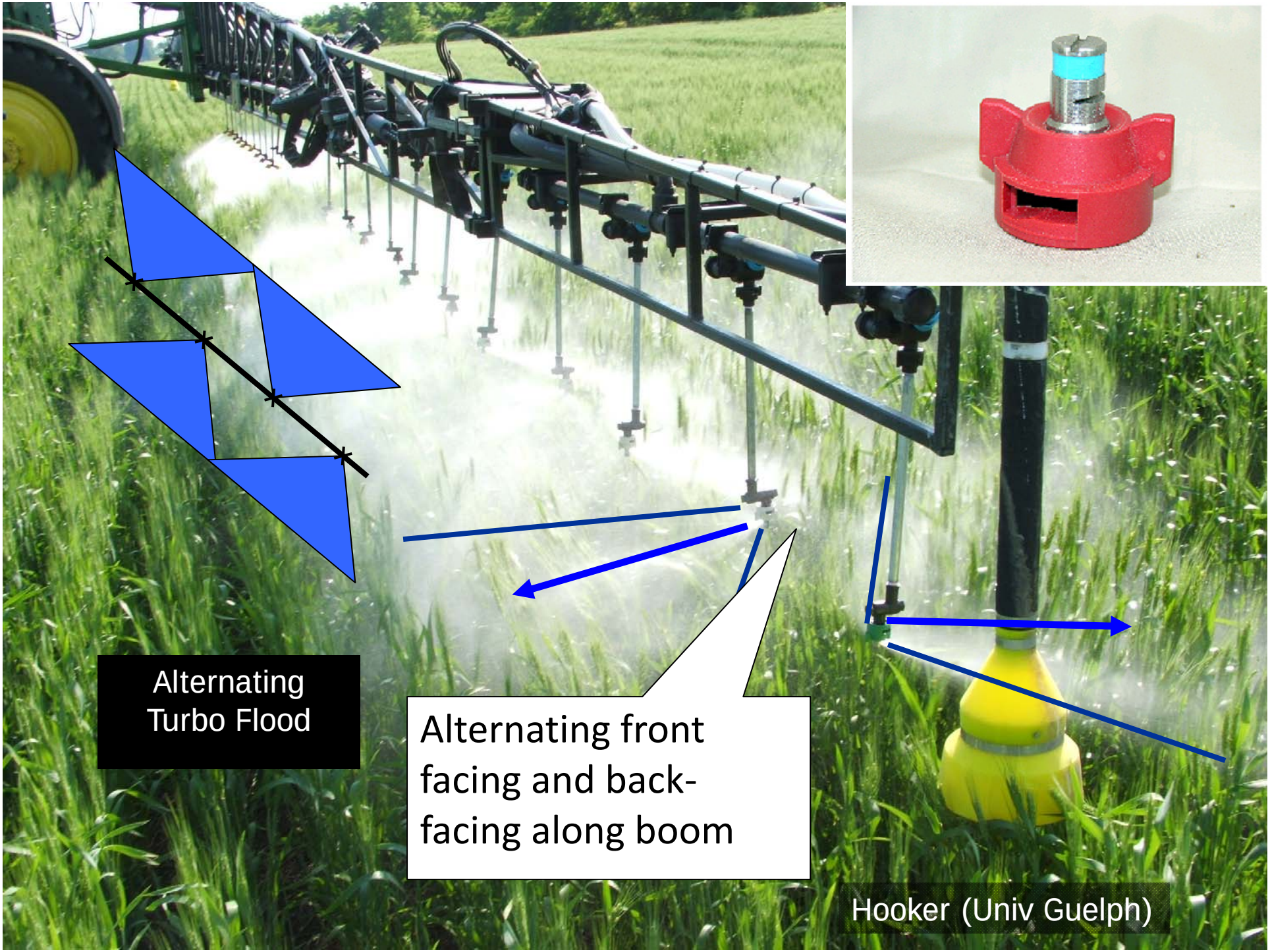
Spray Distribution on Heads Across Swath Width
-- Helicopter --



Hooker (Univ Guelph)


Back-Fwd
Turbo TeeJet
Back Only
Turbo TeeJet
Various nozzle configs on ground rigs also compared
TwinJet
Hooker (Univ Guelph)
Fwd Only
Turbo TeeJet


Cone
TeeJet Duo
TwinCap
Hooker (Univ Guelph)
Alternating Turbo FloodJet


Alternating
Turbo Flood
Alternating front facing and back-facing along boom
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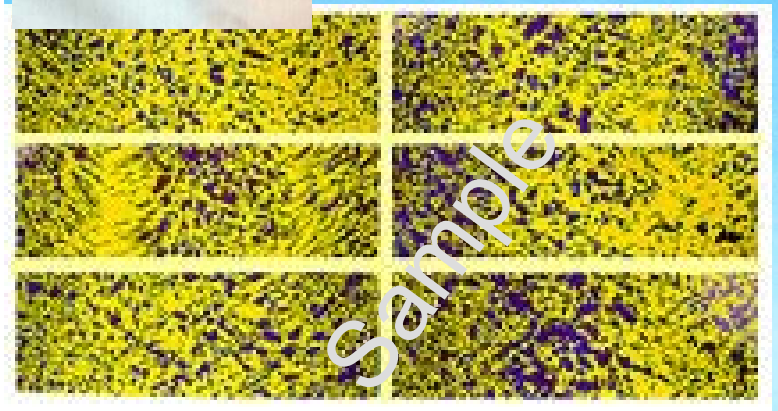
Fwd-Back @ 6 mph

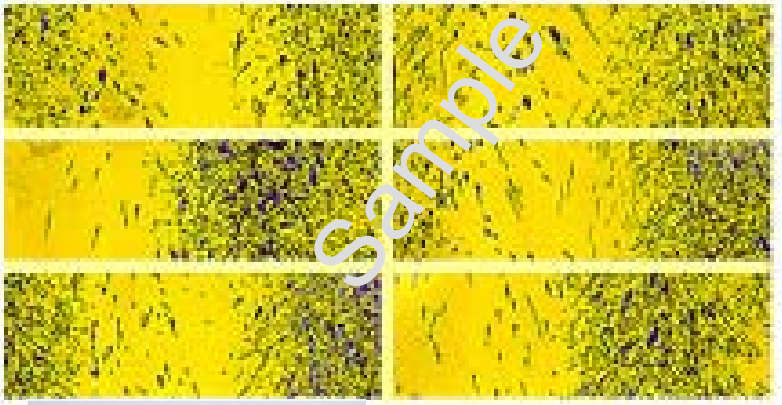


6 cards shown of 24

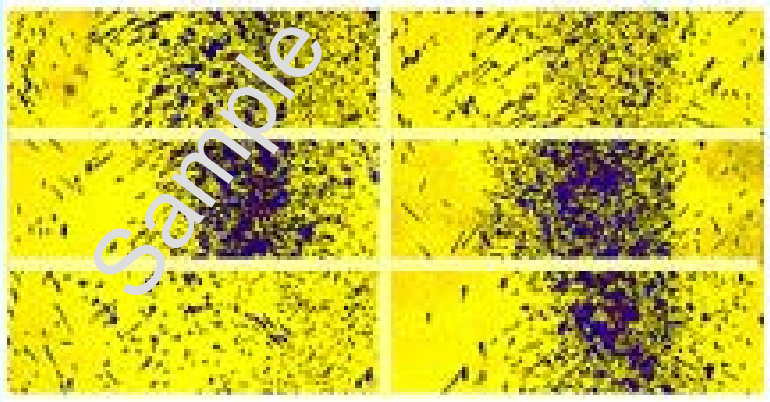
TwinJet @ 6 mph

6 cards shown of 24

XR11002 Sprayed 2x @ 6 mph



Twin Cap @ 6 mph



6 cards shown of 24

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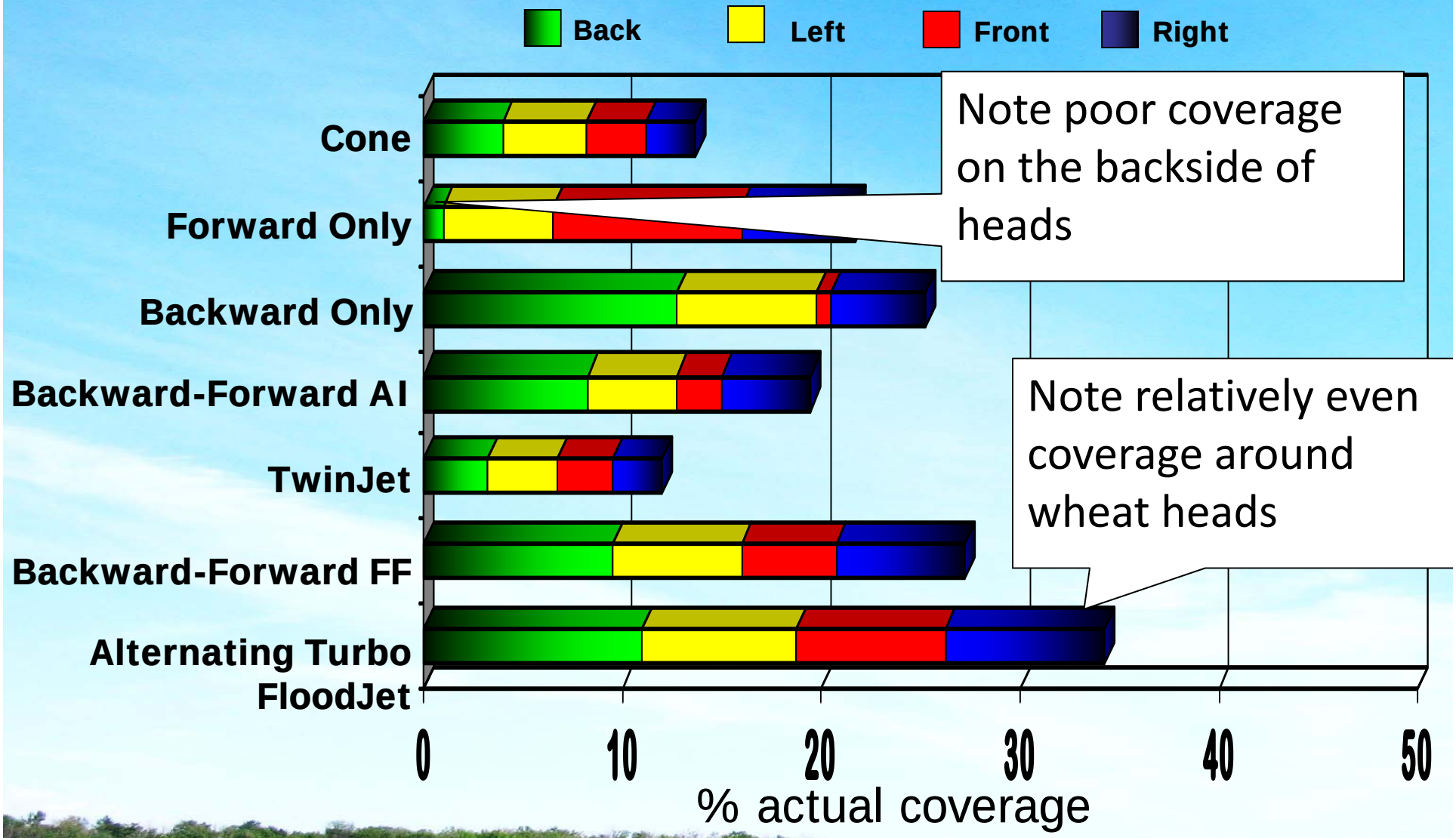
Spray Distribution on “Heads” vs Nozzle



All tmts applied 12 mph @ 20 GPA

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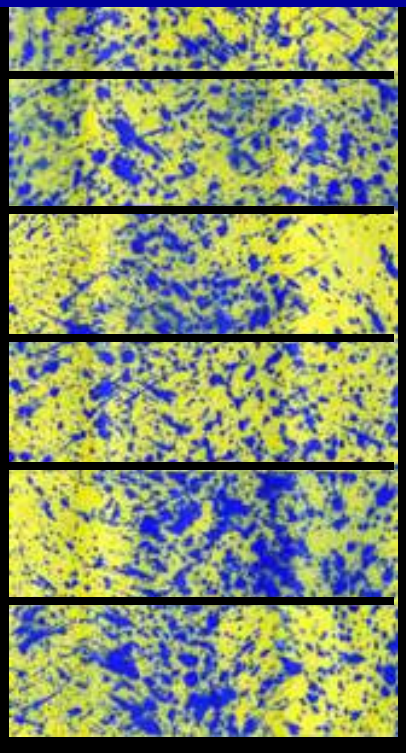
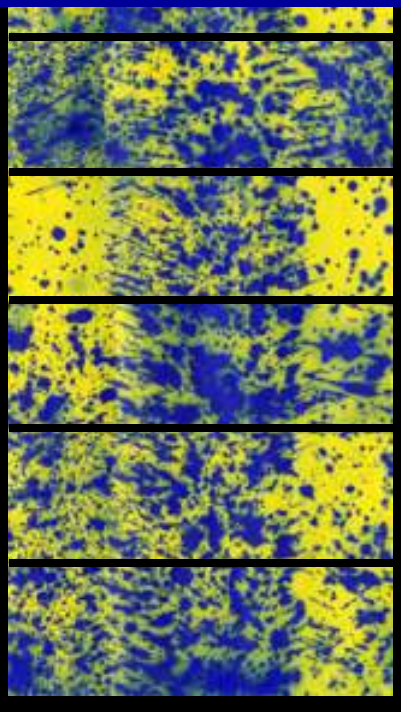
Nozzle Configurations Compared

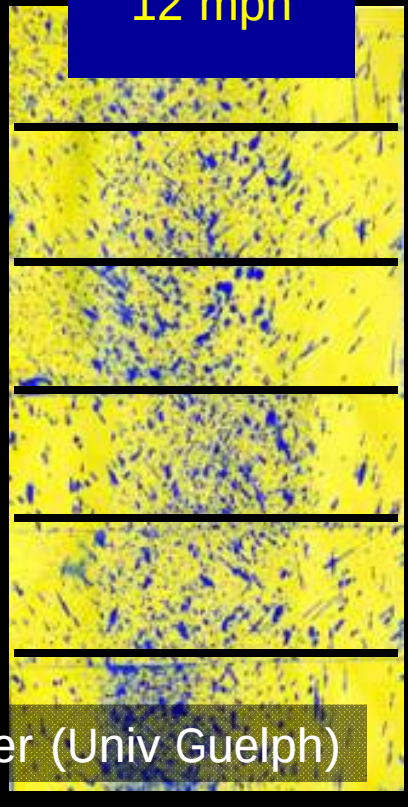
FWD-BACK TT11004
12 mph

TurboFlood Alternate on Boom
12 mph

TwinJet
12 mph







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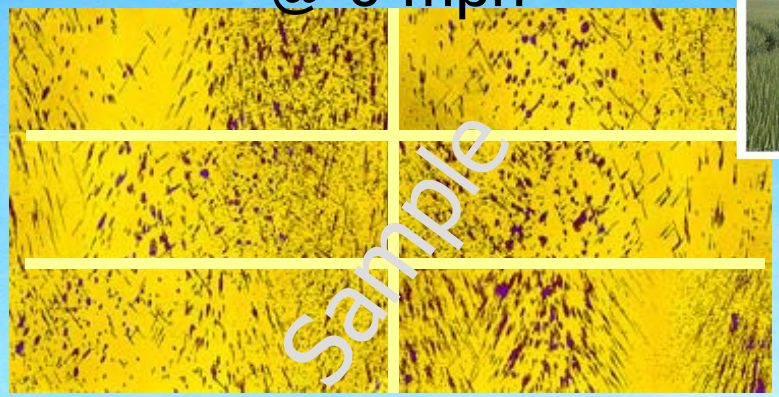
TwinJet @ 6 mph



6 cards shown of 24

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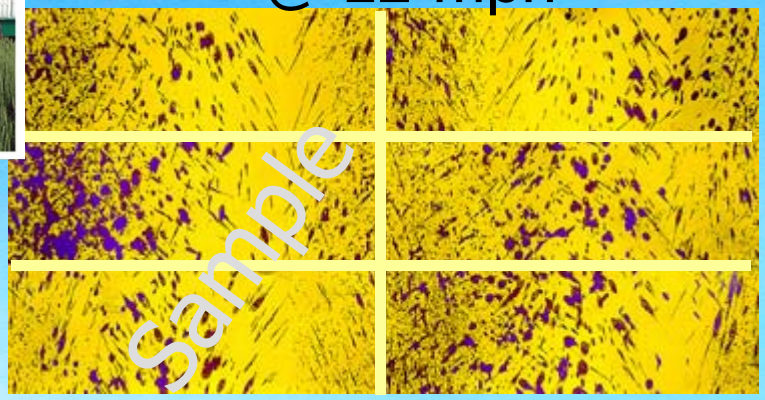
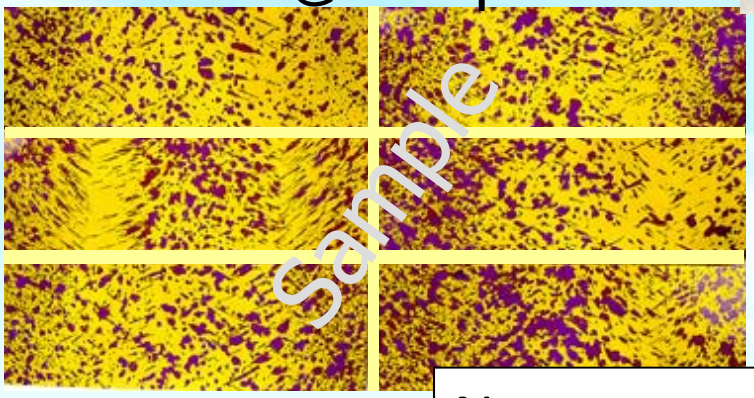
TwinJet @ 12 mph



6 cards shown of 24

Forward-Backward @ 6 mph



6 cards shown of 24

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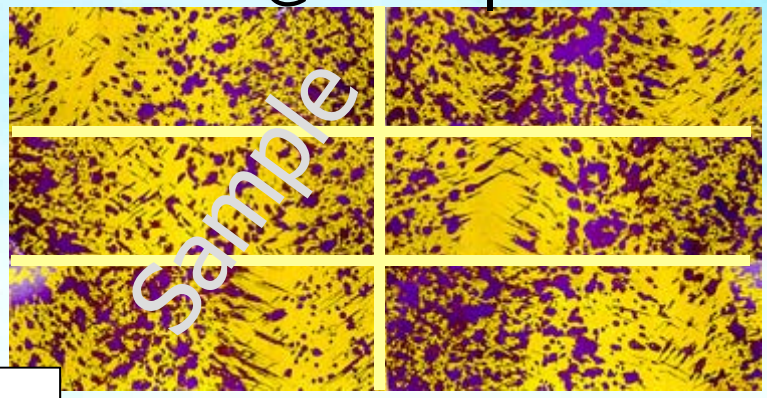
Forward-Backward @ 12 mph



ards shown of 24

Note coverage v similar at 6 or 12 mph; 20 GPA

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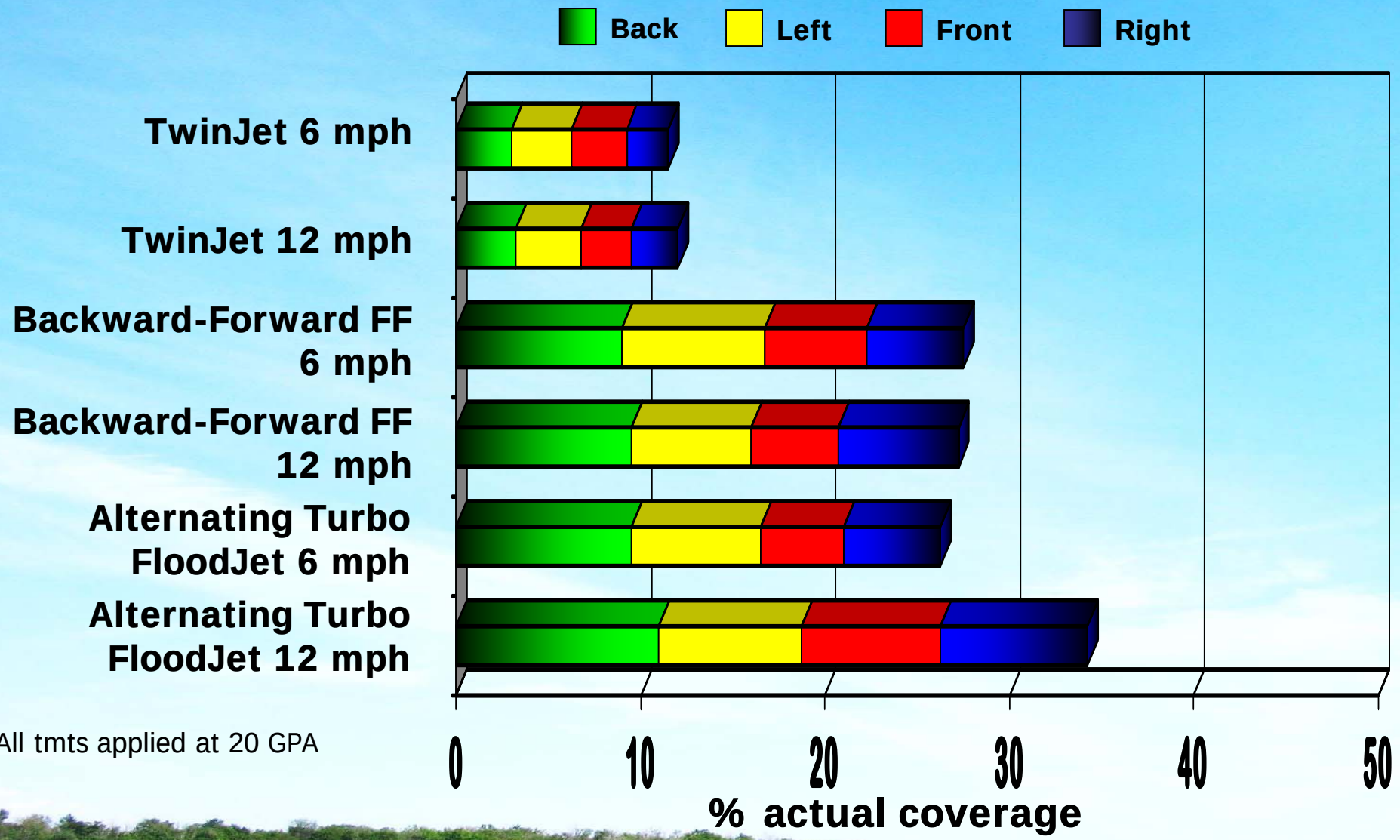
Coverage: Travel Speed vs Nozzle



All tmts applied at 20 GPA

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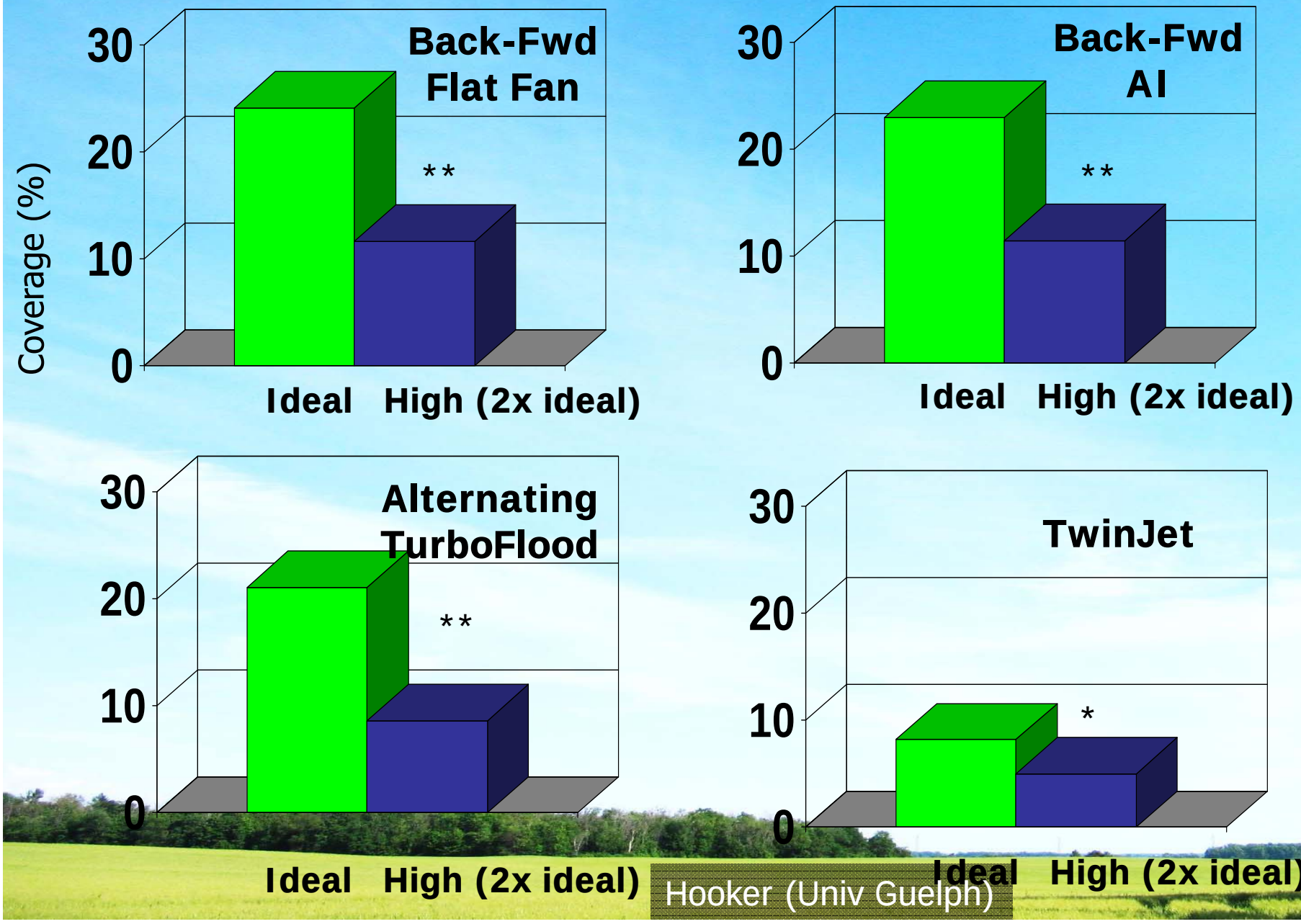
Boom Height Affects Coverage!!



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Boom Height and Spray Drift

Boom Height 0.8m

Boom Height 0.5m

Source: Tom Robinson, Syngenta. UK

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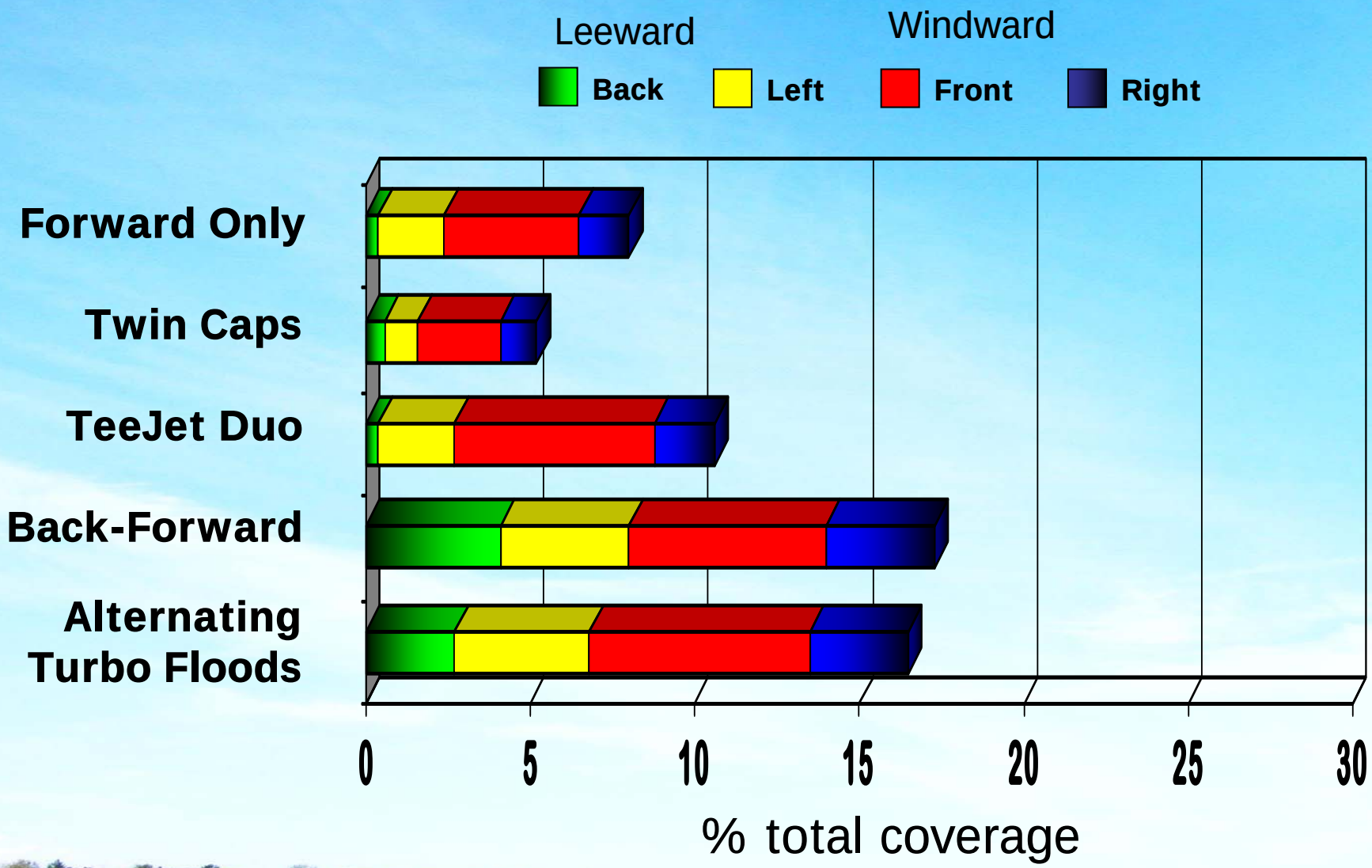
Spray Coverage – Wind Effects



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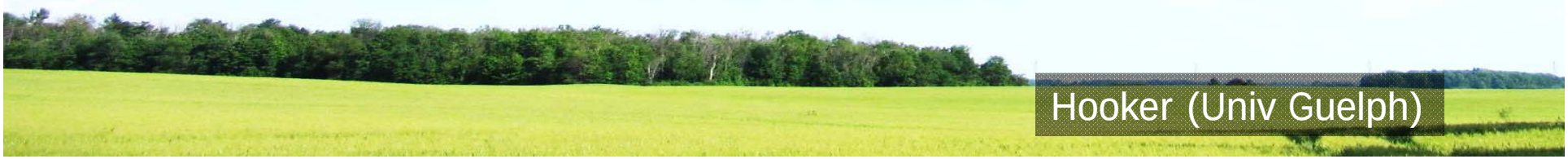
Conclusions

- Coverage with aerial app = TwinJet™ ground app
- Most uniform highest coverage using alternating TurboFlood™ or Back-Fwd nozzles
  - Spray pattern 15 degrees from horizontal
- Poor coverage other nozzles including “Forward Only”
- 12 MPH = 6 MPH forward speed
- Slight wind = low coverage on leeward side of spike
  - Boom height important for reducing wind effects
  - 20 GPA >> 10 GPA for coverage and uniformity



Thanks!!

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