
The Good, the Bad, and the Ugly
Spray Application with Drones
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Ground vs Aerial

Ground	Aerial
• Decent productivity	• High productivity (not drones)
• Limited on wet ground	• Not limited on wet ground
• Less drift potential	• More drift potential
• More uniform swaths	• Less uniform swaths
• More water is a reasonable option	• More water usually not an option
• All products have registration	• Few products have registration

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Current Landscape for Drones

- Provide logistical niche;
- Legitimate regulatory & technical hurdles;
- Require solid registrant support (portfolio, technical).

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Technical Hurdles

- Water Volume
- Spray Quality
- Canopy Penetration
- Deposit Uniformity

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CORTEVA™ agriscience

Garlon™ XRT
Herbicide

GROUP	4	HERBICIDE

For the control of undesirable woody plants and annual and perennial broadleaved weeds on pastures and rangelands, in non-crop areas such as rights-of-way, military bases and industrial sites, and in forest and woodland management areas. Garlon XRT Herbicide may be applied by remotely piloted aircraft systems (RPAS) for control of willow, poplar and aspen tree species growing on non-crop areas such as rights of ways, and industrial sites.

COMMERCIAL + RESTRICTED

READ THE LABEL AND BOOKLET BEFORE USING
KEEP OUT OF REACH OF CHILDREN

ACTIVE INGREDIENT: triclopyr, present as butoxyethyl ester ..... 755 g/L
Emulsifiable Concentrate

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Remotely Piloted Aircraft Systems (RPAS)
Garlon XRT Herbicide may be applied by remotely piloted aircraft systems (RPAS) for control of willow, poplar and aspen tree species growing on non-crop areas such as rights of ways, and industrial sites. Use 2.5 to 5 L of Garlon XRT Herbicide in a minimum spray volume of 30 L per hectare. Ensure uniform and adequate coverage is achieved and that equipment has been accurately calibrated. Use higher application rates and volumes when the tree species are dense or under drought conditions.

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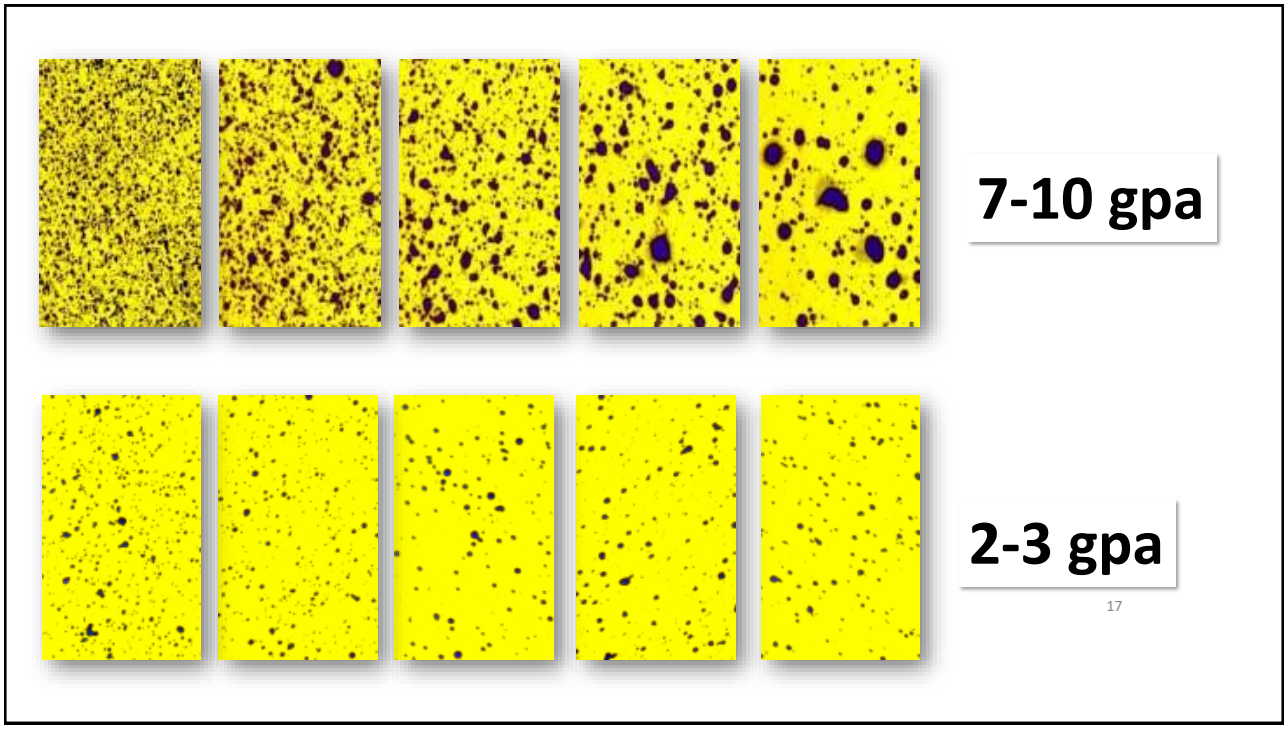

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Apply only by RPAS which has been functionally and operationally calibrated for the atmospheric conditions of the area and the application rates and conditions of this label. Use uniform application. To avoid streaked, uneven or overlapped application, use appropriate marking devices or a GPS system.

Apply only when meteorological conditions at the treatment site allow for complete and even crop coverage. Apply only under conditions of good practice specific to remotely piloted aircraft systems (RPAS) application as outlined in the *Canadian Remotely Piloted Aircraft Systems Manual*, developed by the Federal/Provincial/Territorial Committee on Pesticide Management and Pesticides.

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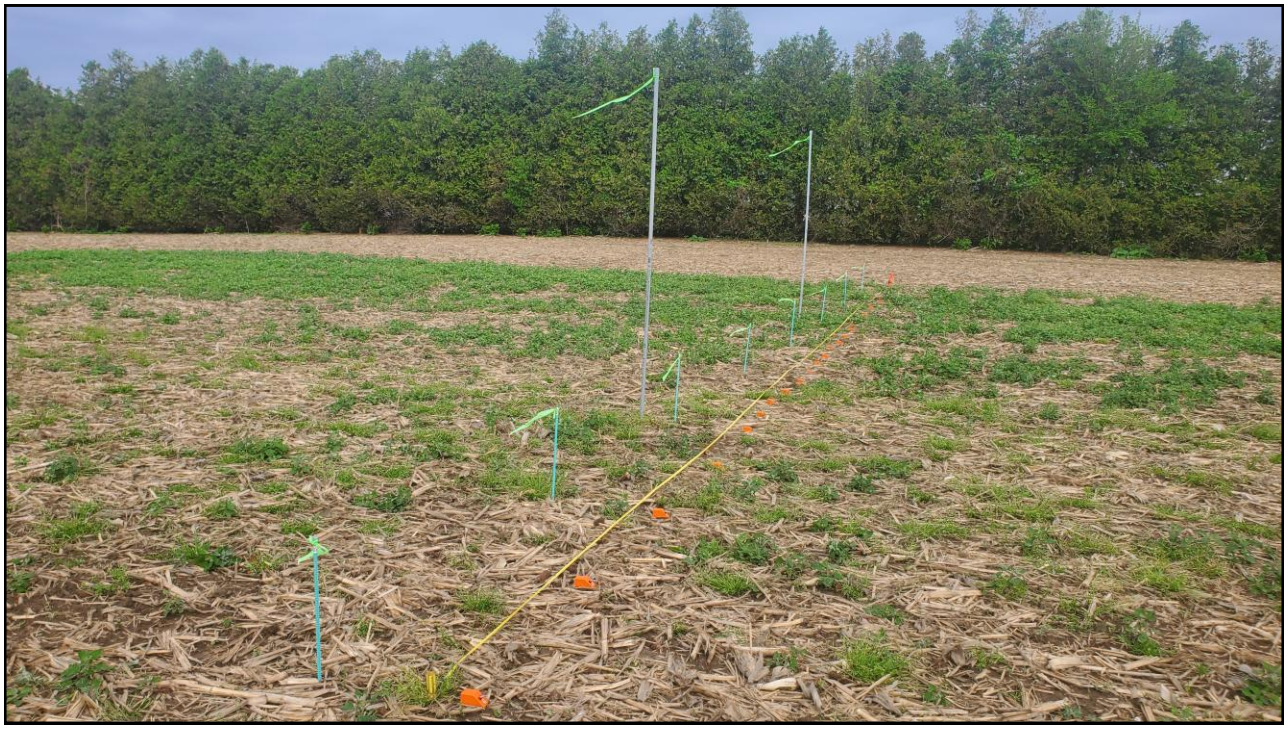

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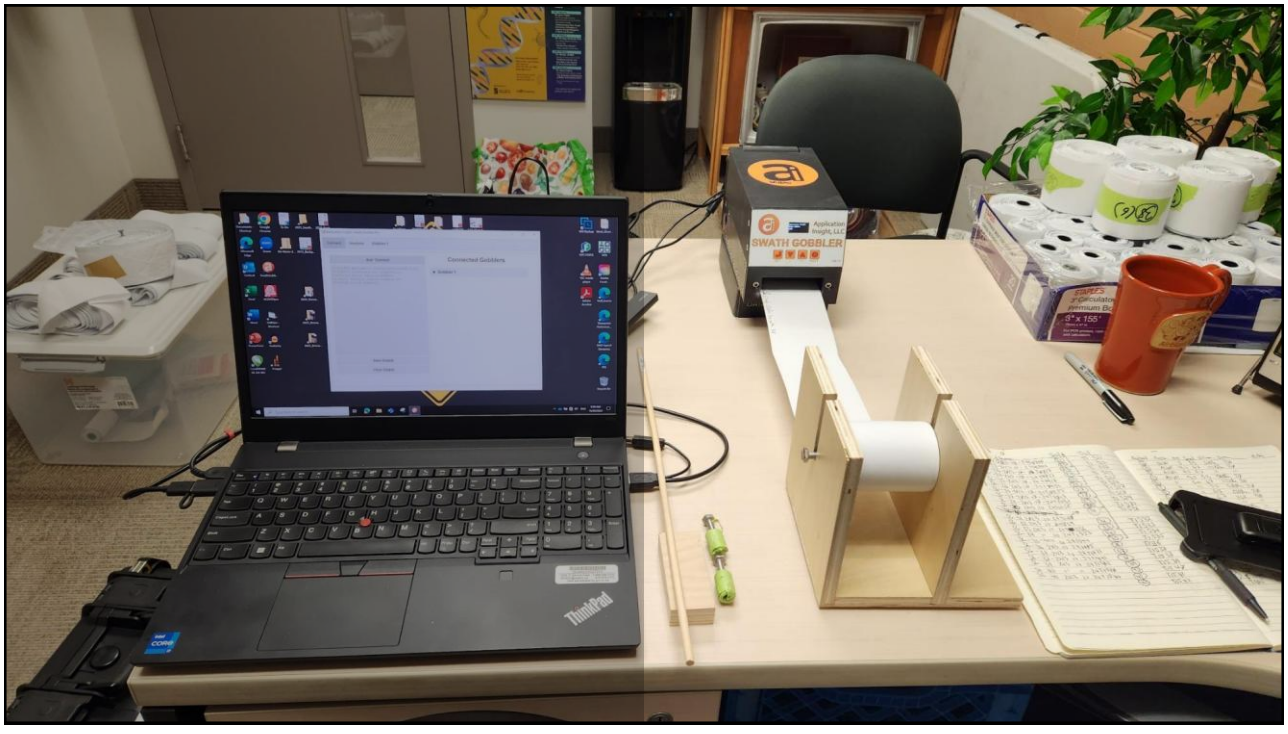

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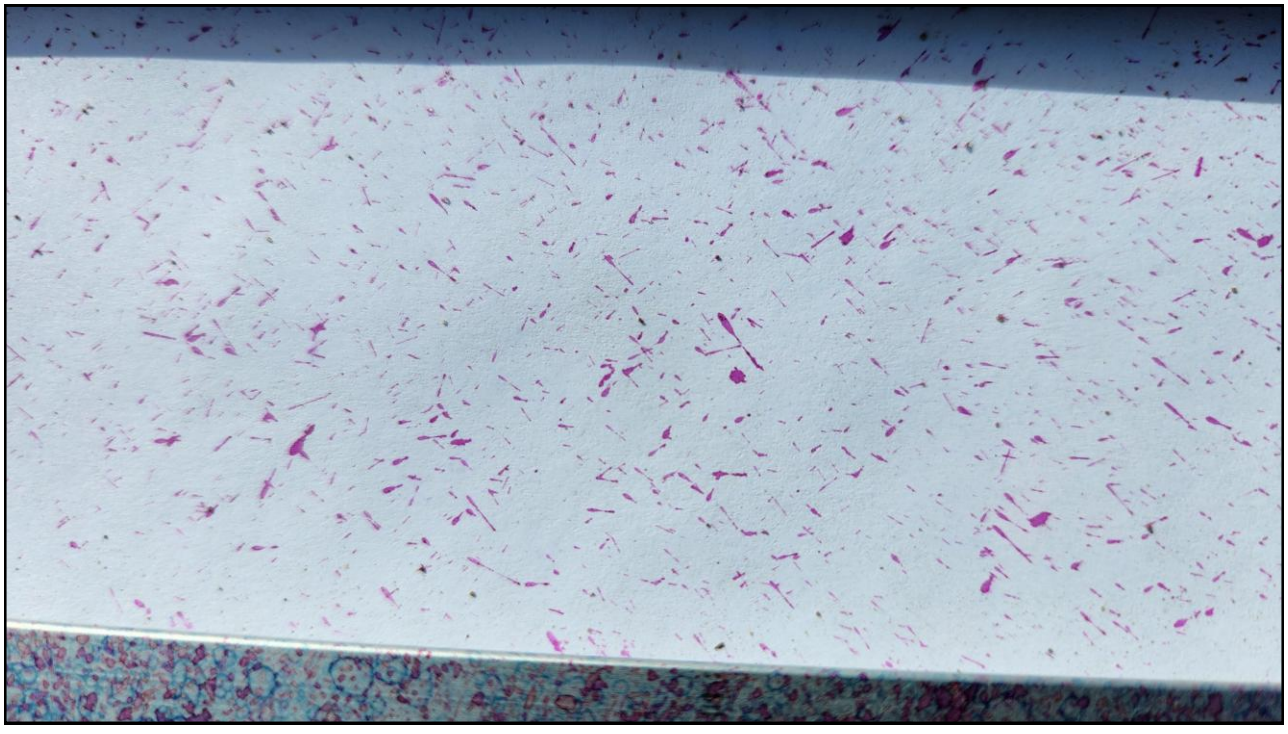

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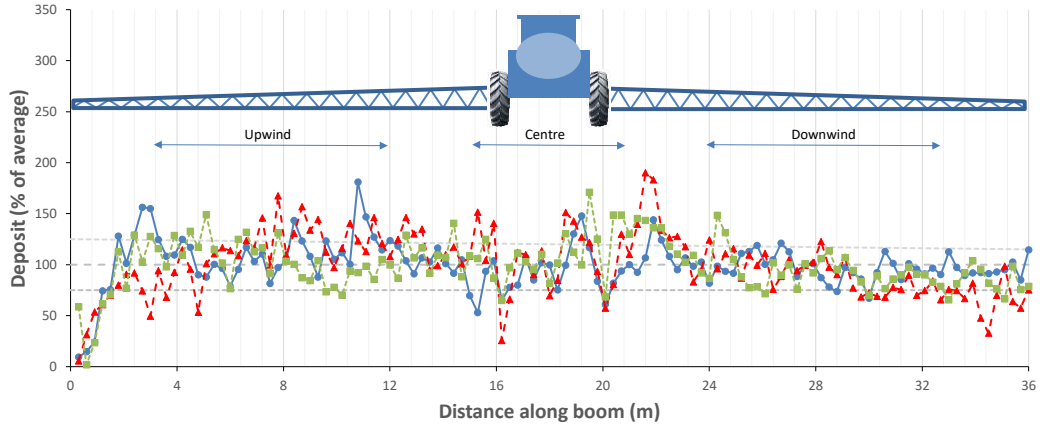
Extremely Coarse Spray (ULD11004), 24 km/h, 90 cm



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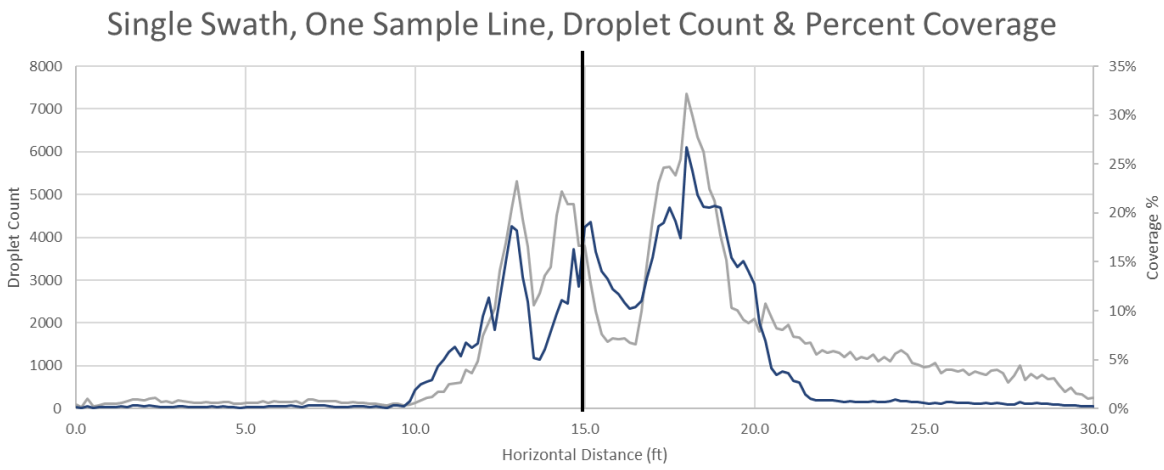
Single Swath, One Sample Line, Droplet Count & Percent Coverage
Droplet Count
Coverage %
Horizontal Distance (ft)
Mid Count
Mid Coverage
Sprayers101

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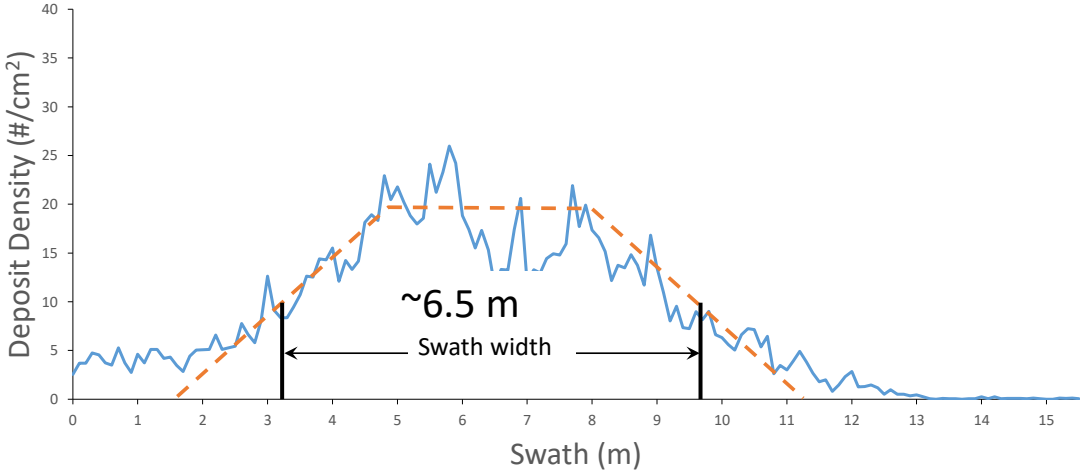
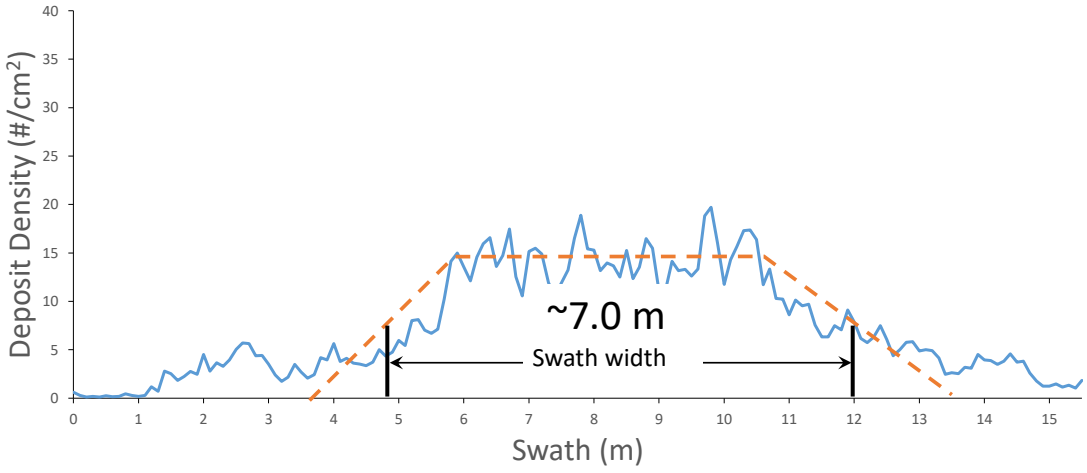

T50, 250 µm, 3 m, 29 km/h, 30 L/ha, Rep 1
Deposit Density (#/cm²)
~6.5 m
Swath width
Swath (m)

36

T50, 250 µm, 3 m, 29 km/h, 30 L/ha, Rep 2



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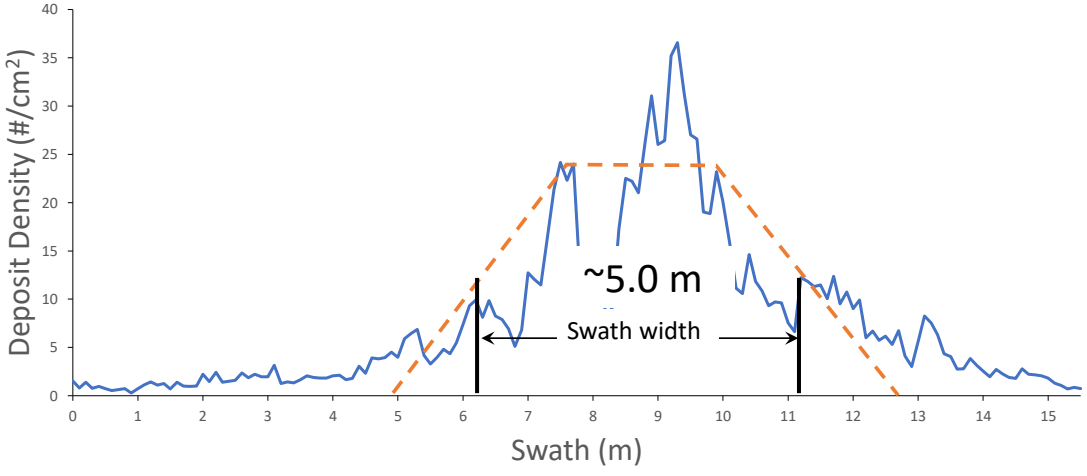
T50, 250 µm, 3 m, 29 km/h, 30 L/ha, Rep 3



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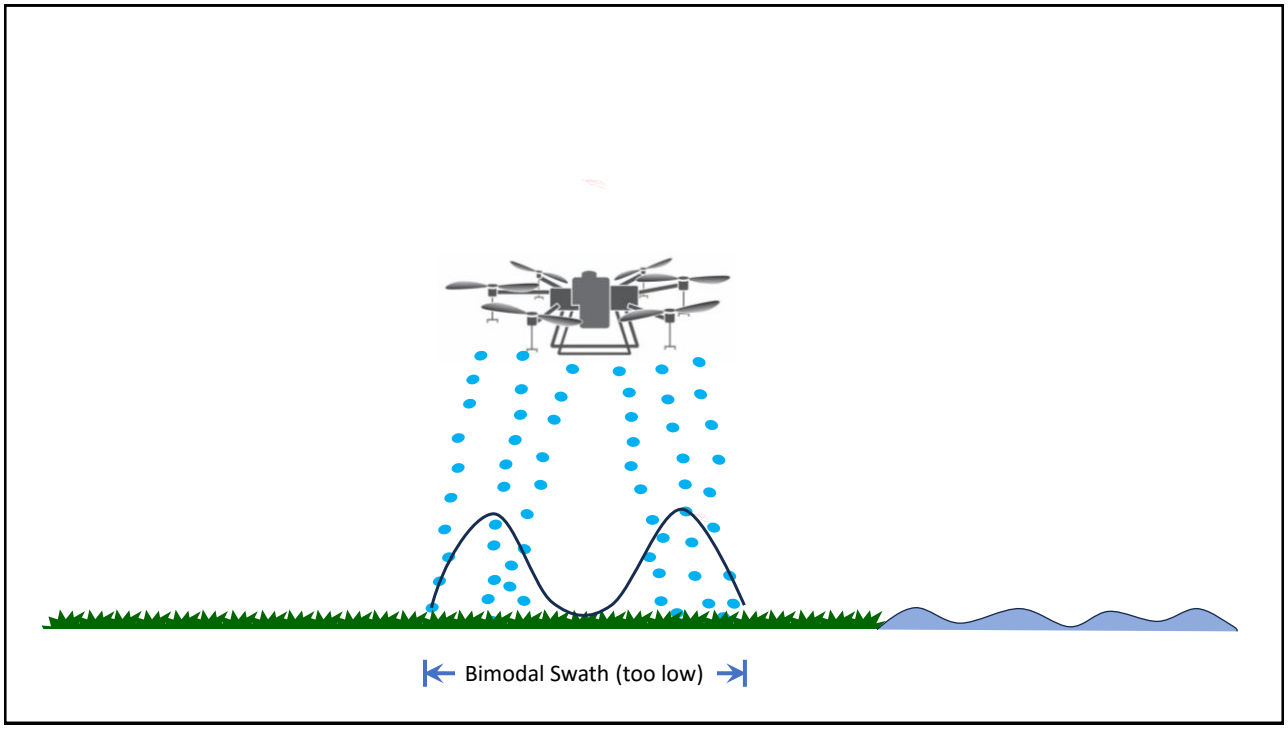

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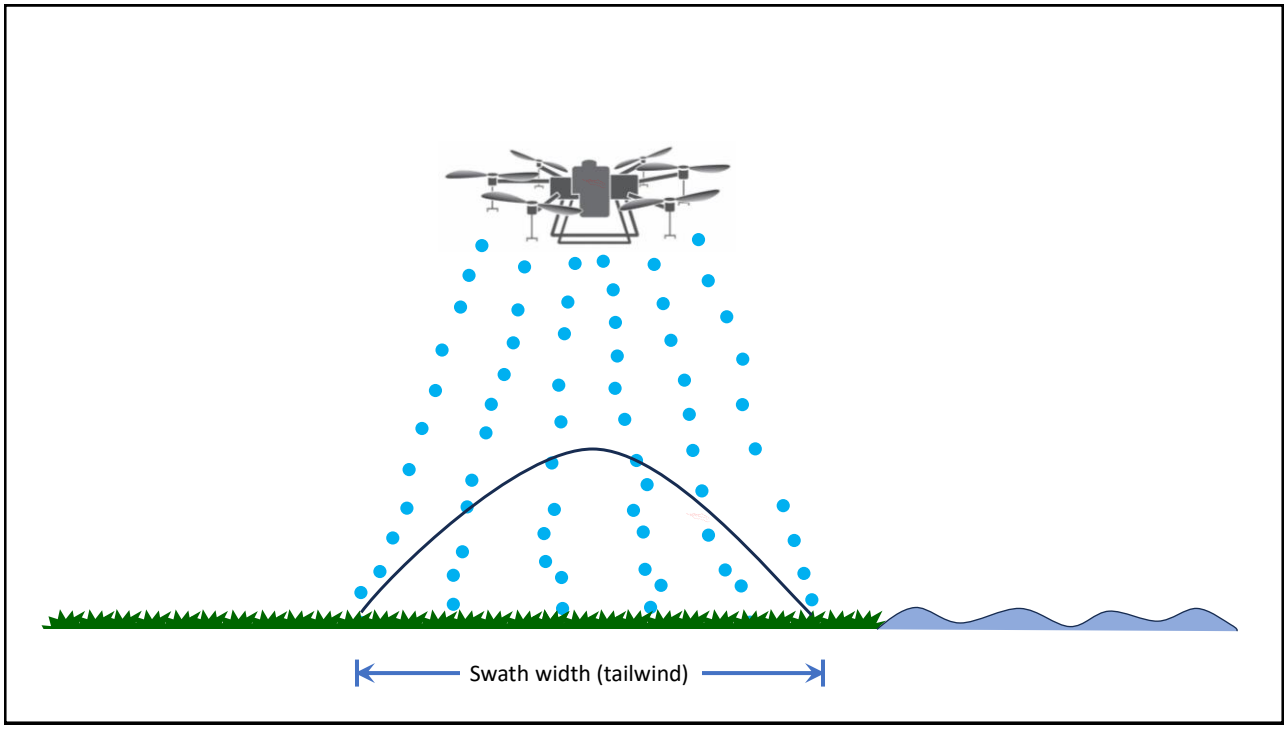

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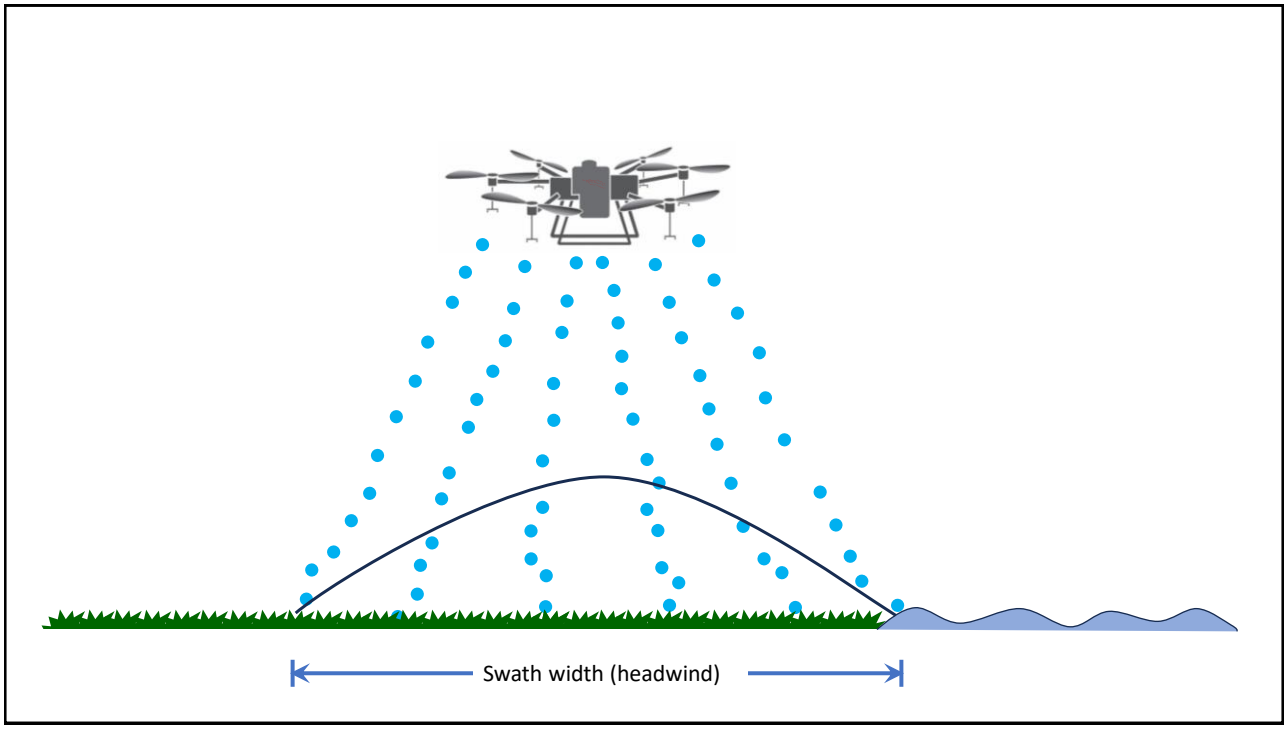

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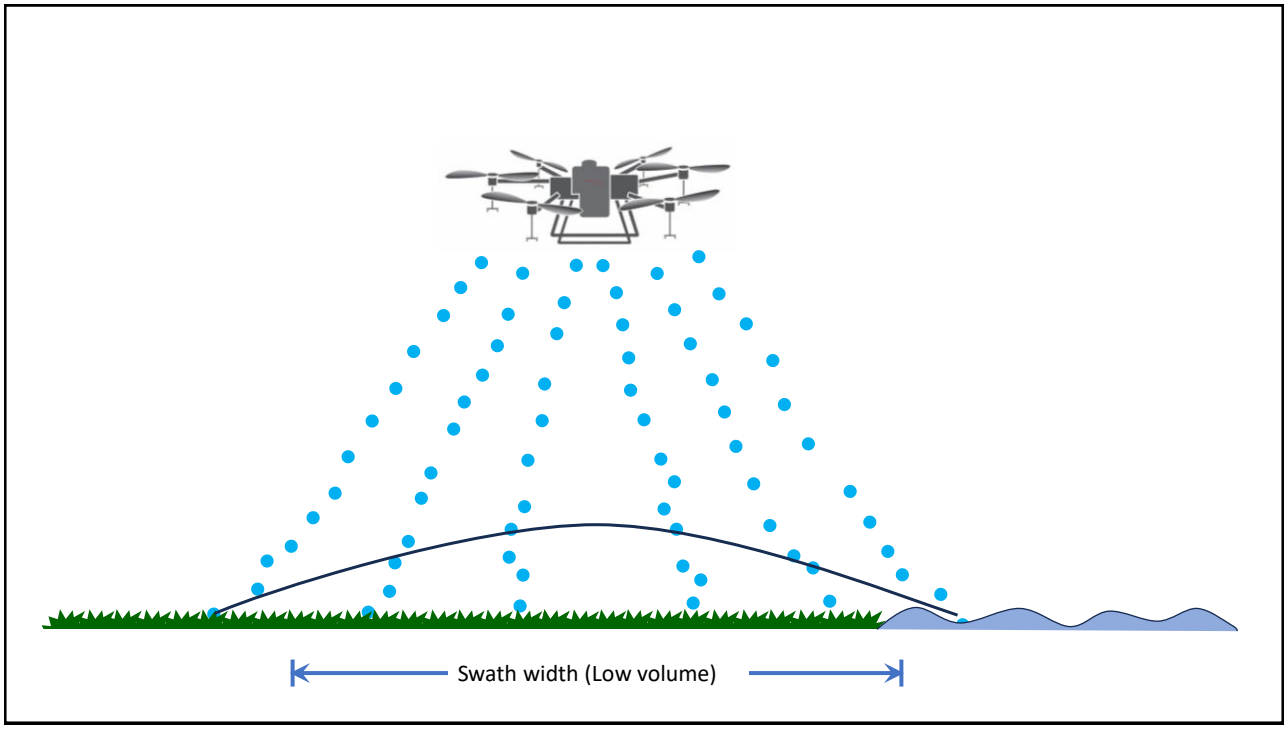

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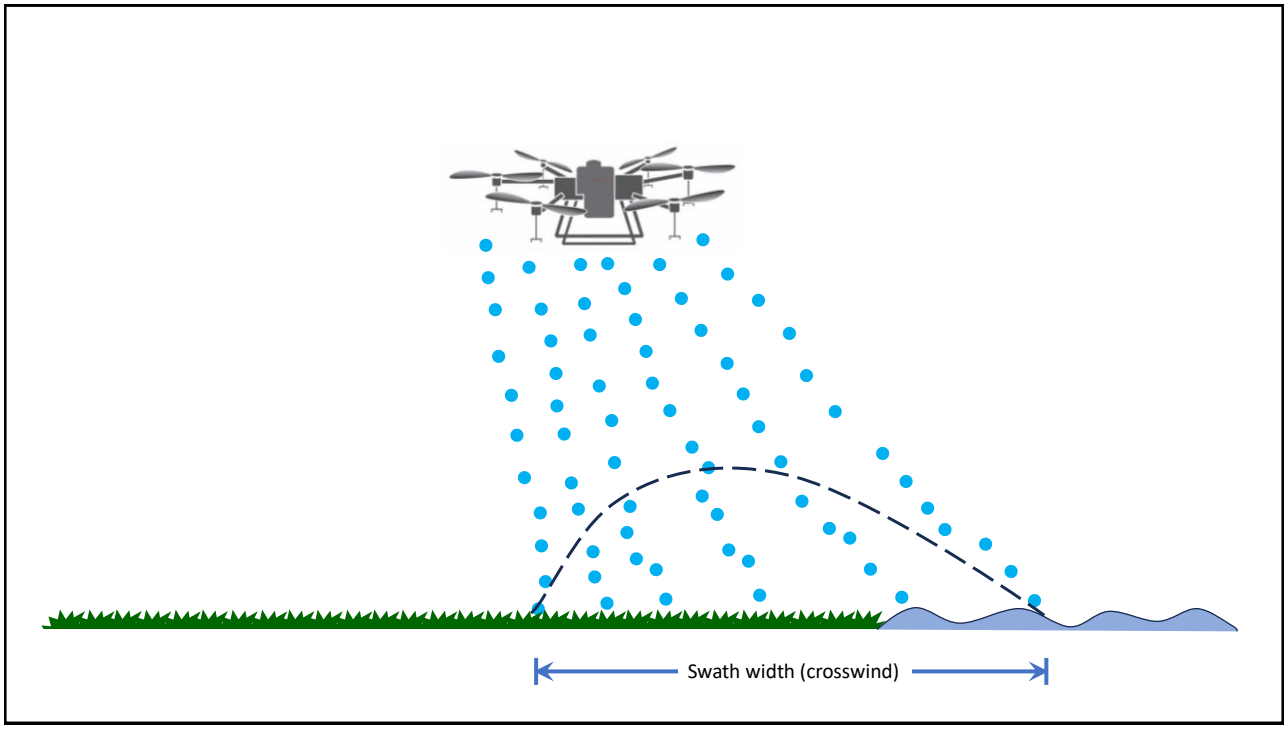

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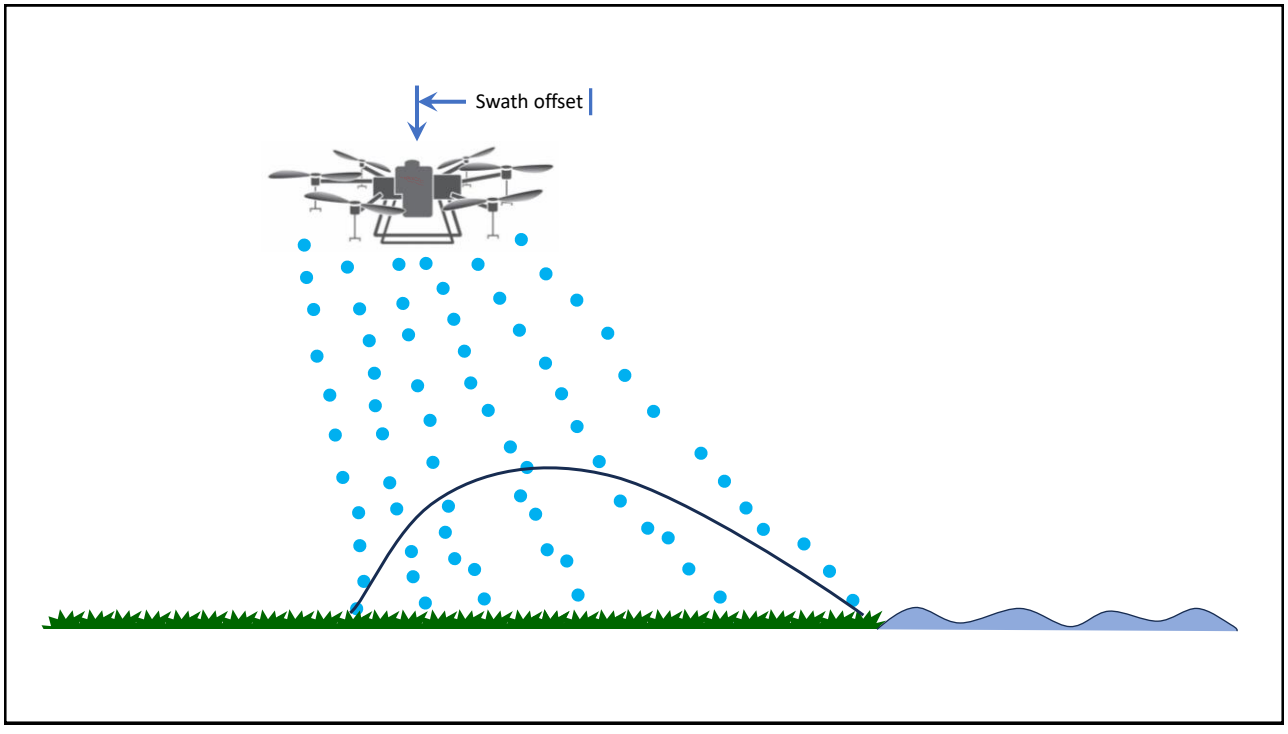

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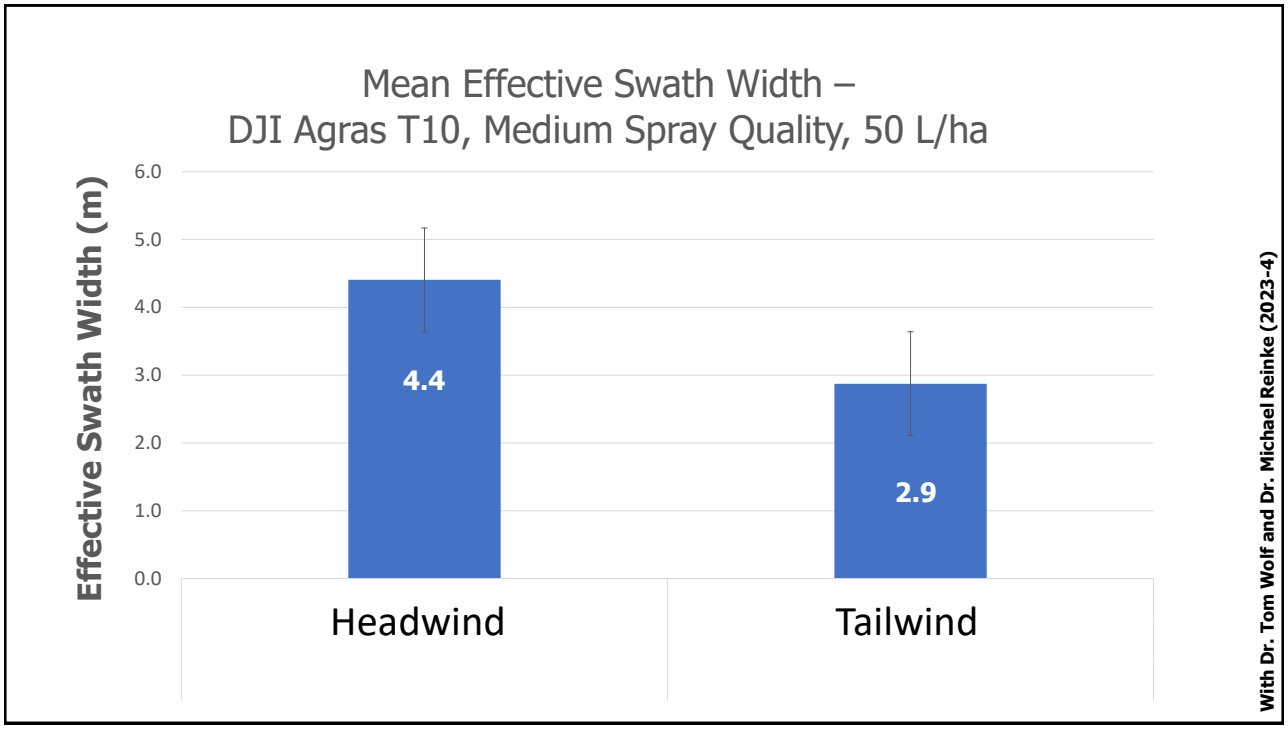
Mean Effective Swath Width –
DJI Agras T10, Medium Spray Quality, 50 L/ha
Effective Swath Width (m)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
4.4
2.9
Headwind
Tailwind
With Dr. Tom Wolf and Dr. Michael Reinke (2023-4)

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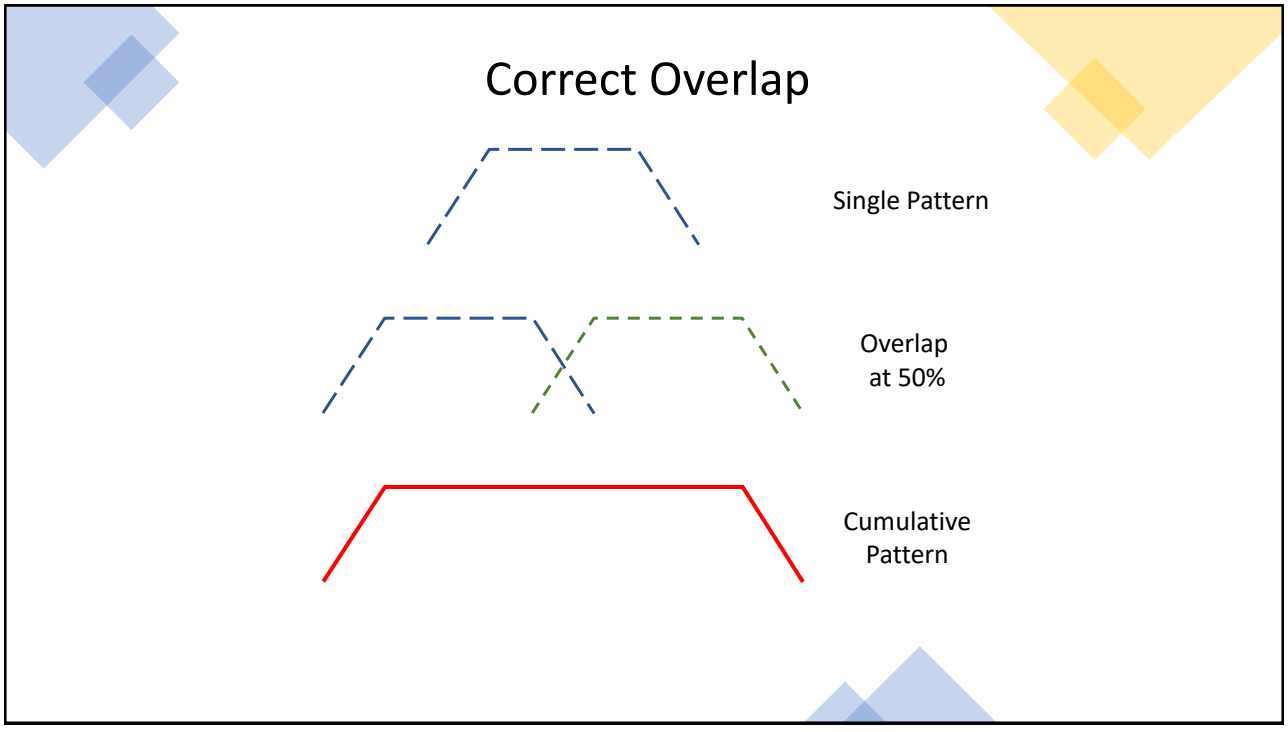
Correct Overlap
Single Pattern
Overlap
at 50%
Cumulative
Pattern

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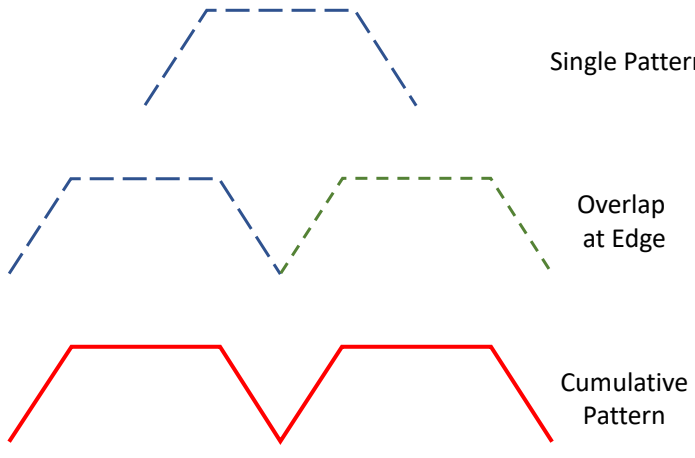
Insufficient Overlap



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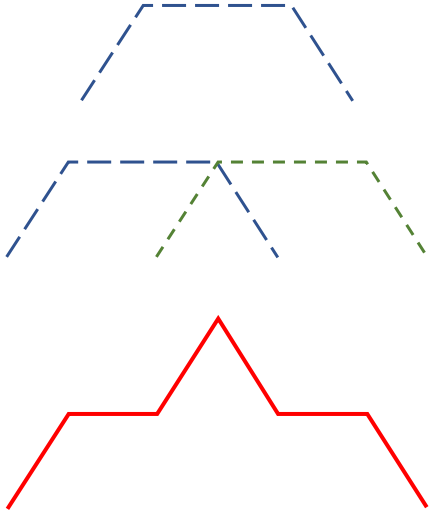
Excessive Overlap



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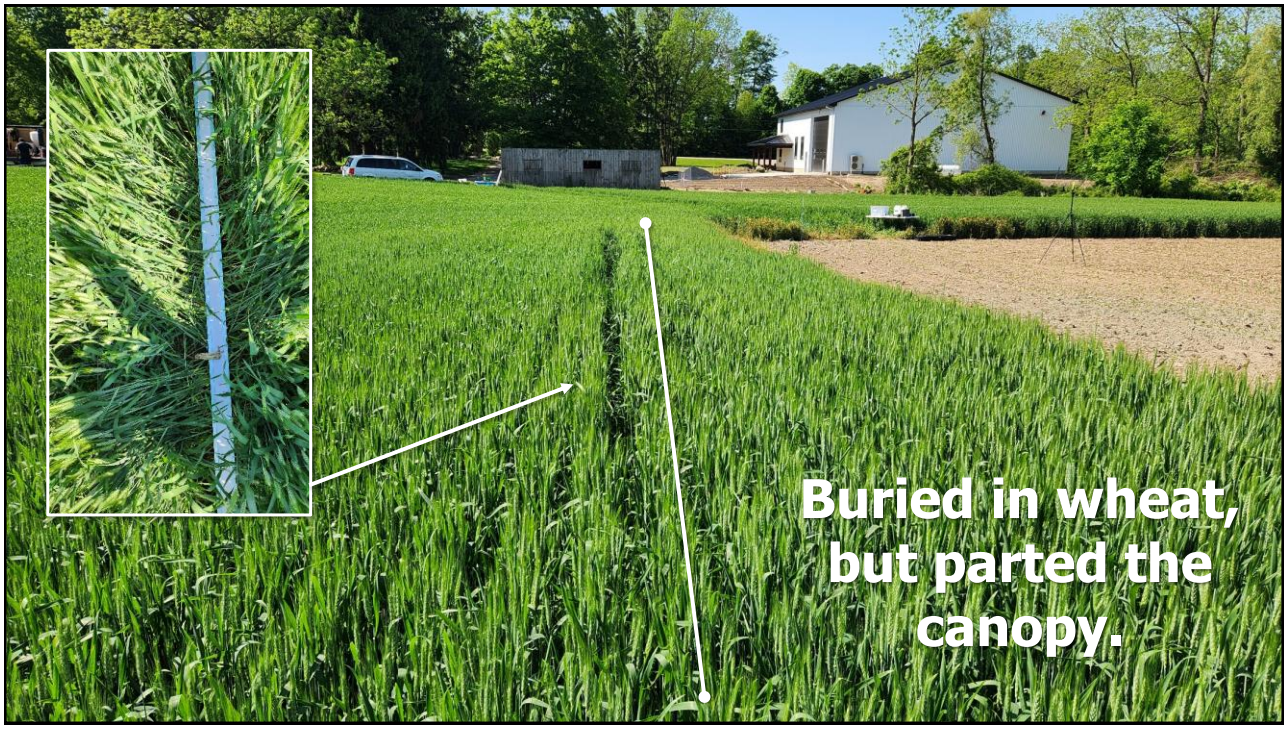
Buried in wheat, but parted the canopy.

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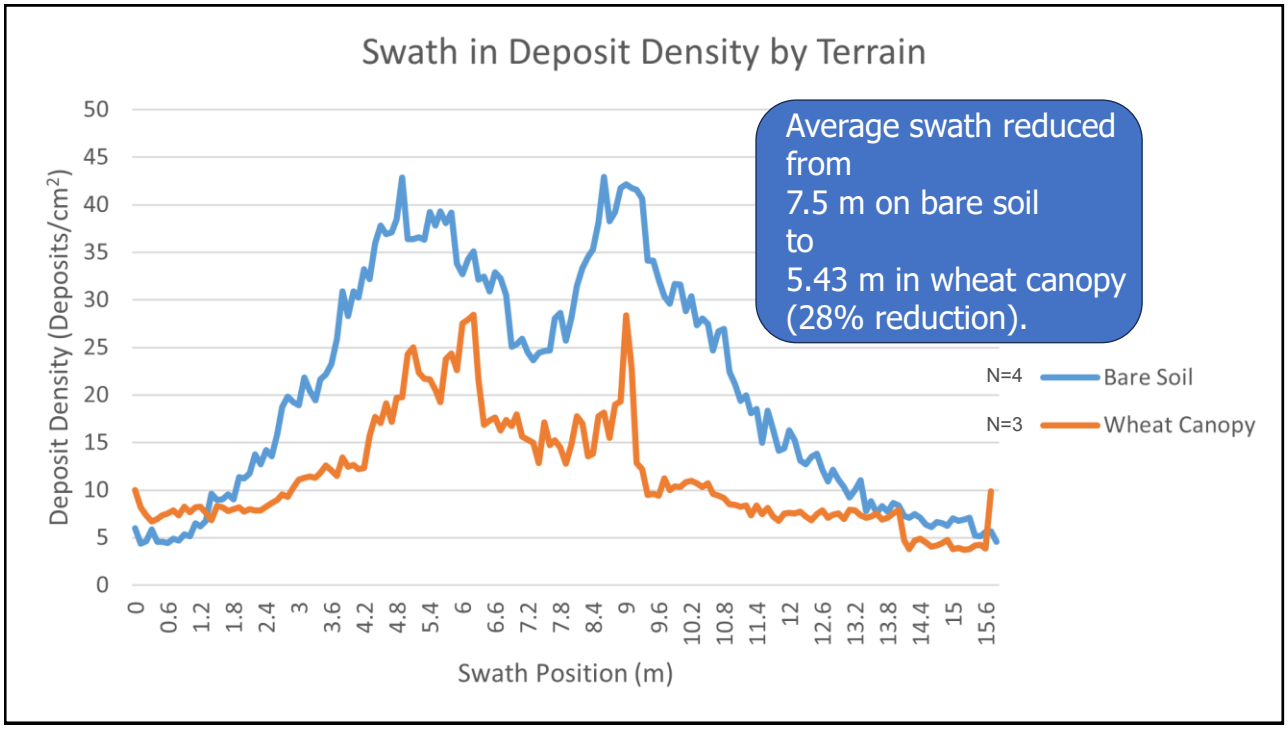
Swath in Deposit Density by Terrain
Deposit Density (Deposits/cm²)
Swath Position (m)
Average swath reduced from 7.5 m on bare soil to 5.43 m in wheat canopy (28% reduction).
N=4 Bare Soil
N=3 Wheat Canopy

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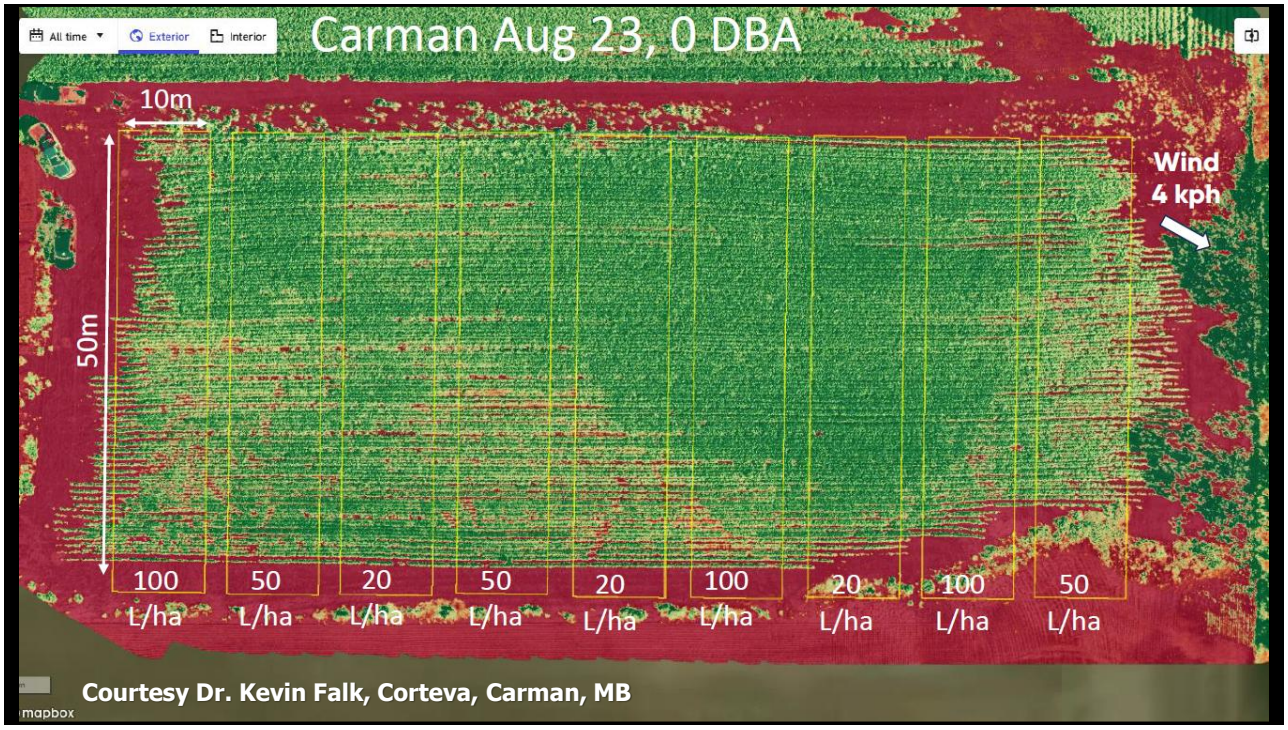
All time
Exterior
Interior
Carman Aug 23, 0 DBA
10m
50m
Wind
4 kph
100 L/ha
50 L/ha
20 L/ha
50 L/ha
20 L/ha
100 L/ha
20 L/ha
100 L/ha
50 L/ha
Courtesy Dr. Kevin Falk, Corteva, Carman, MB
mapbox

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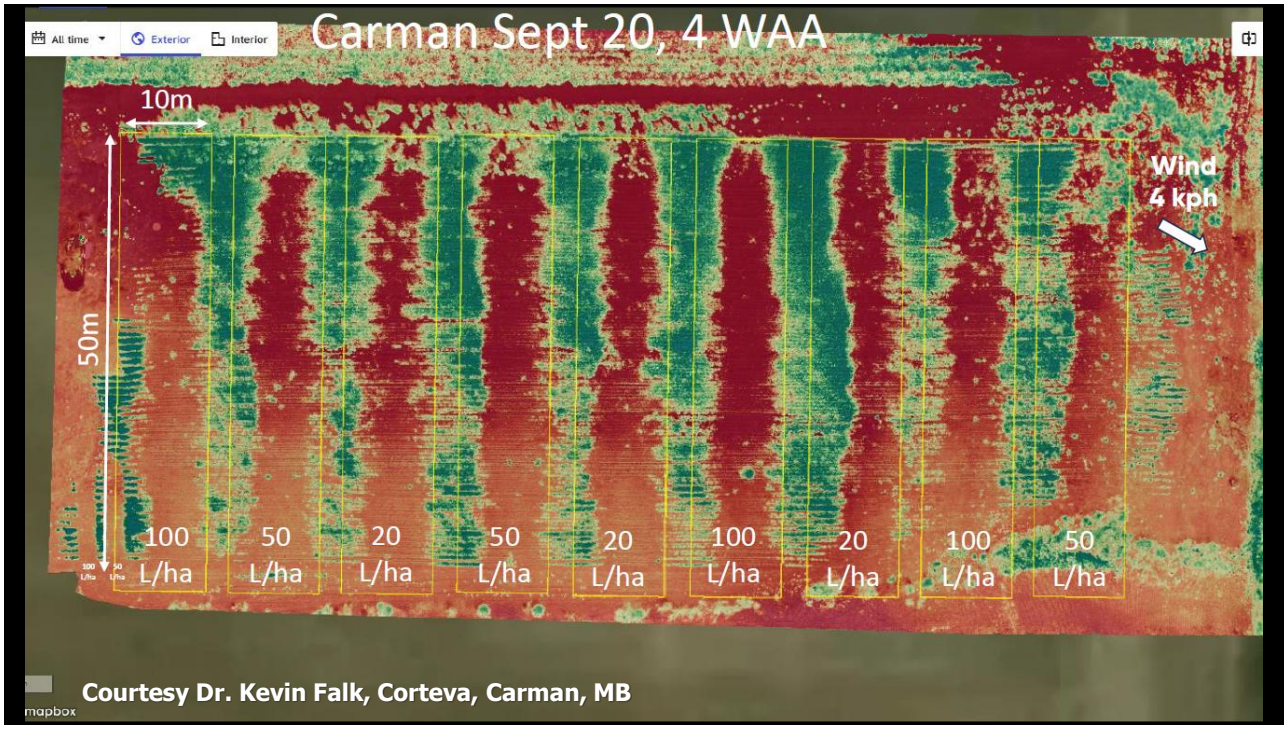
All time
Exterior
Interior
Carman Sept 20, 4 WAA
10m
50m
Wind
4 kph
100 L/ha
50 L/ha
20 L/ha
50 L/ha
20 L/ha
100 L/ha
20 L/ha
100 L/ha
50 L/ha
Courtesy Dr. Kevin Falk, Corteva, Carman, MB
mapbox

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Incident Response

- Drift
- Unregistered application
- Uncertified operators
- Airspace violations
- etc.

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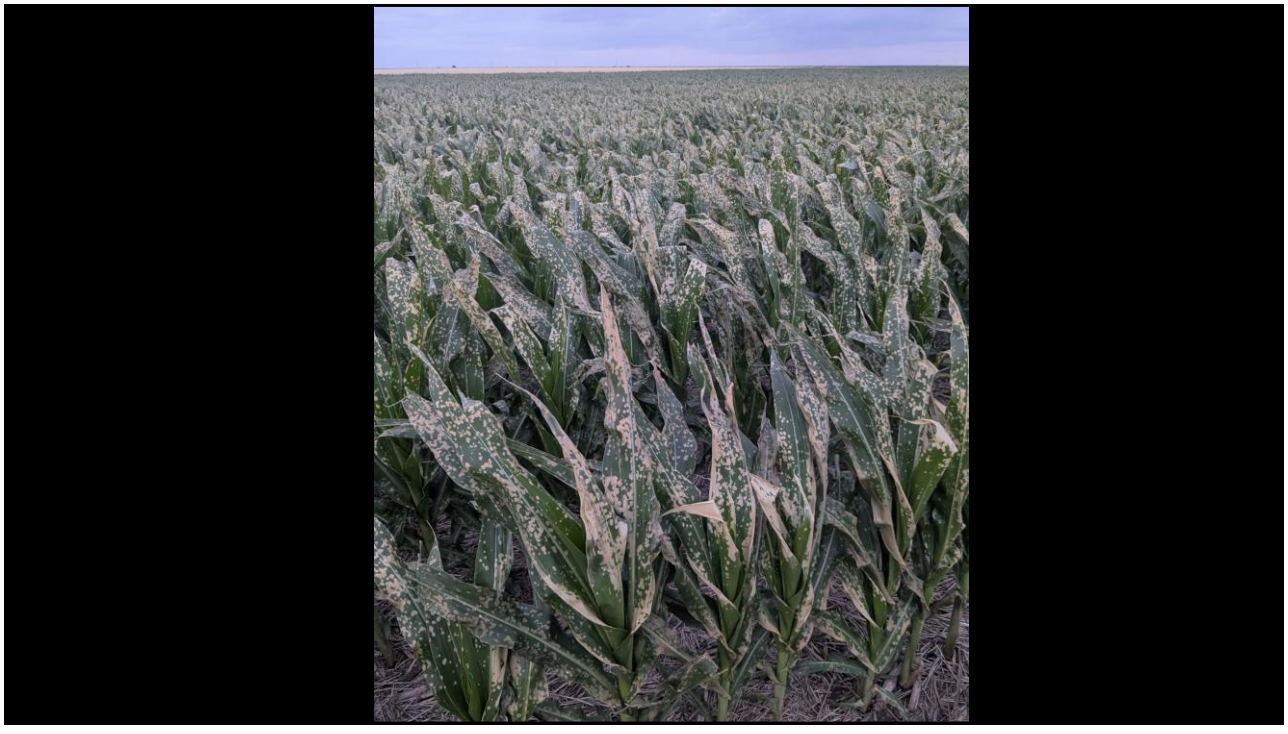

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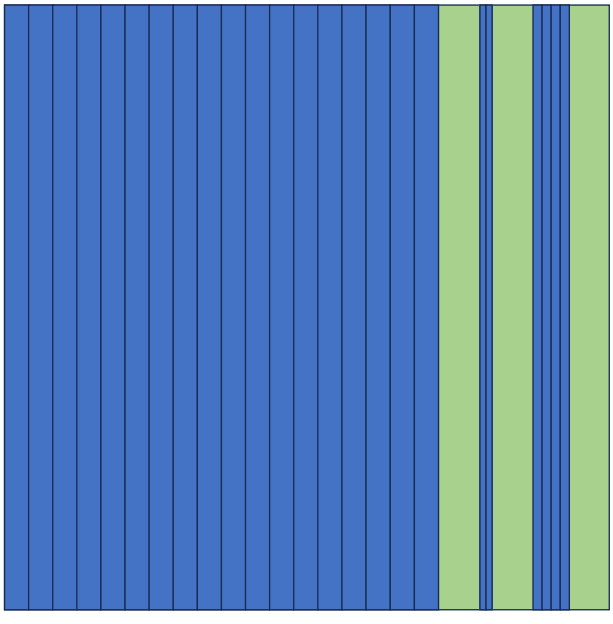
Productivity (160 acres)

- ***Ground** (120' boom, 1200 gal tank, 10 gpa)*
  - 22 passes, 2 fills, each 20 min
  - 110 acres/h
  - 48 min to empty
  - 90 minutes for field
- ***T50** (26' swath, 40 L tank, 3.2 gpa)*
  - 102 passes, 51 fills, each 3 min
  - 30 acres/h
  - 4 min to empty
  - 5.5 h for field
- ***T100** (36' swath, 100 L tank, 3.0 gpa)*
  - 74 passes, 19 fills, each 4 min
  - 60 acres/h
  - 4 min to empty
  - 2.3 h for field



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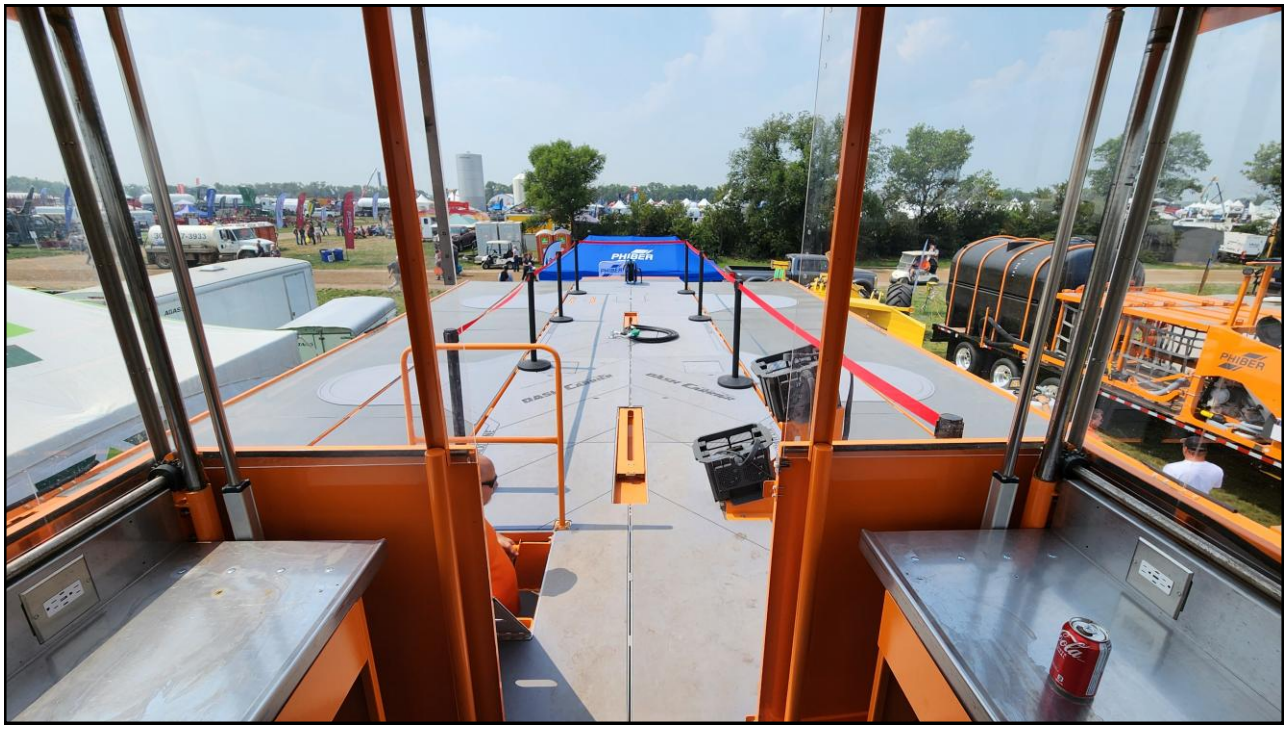
PHIBER
PHIBER

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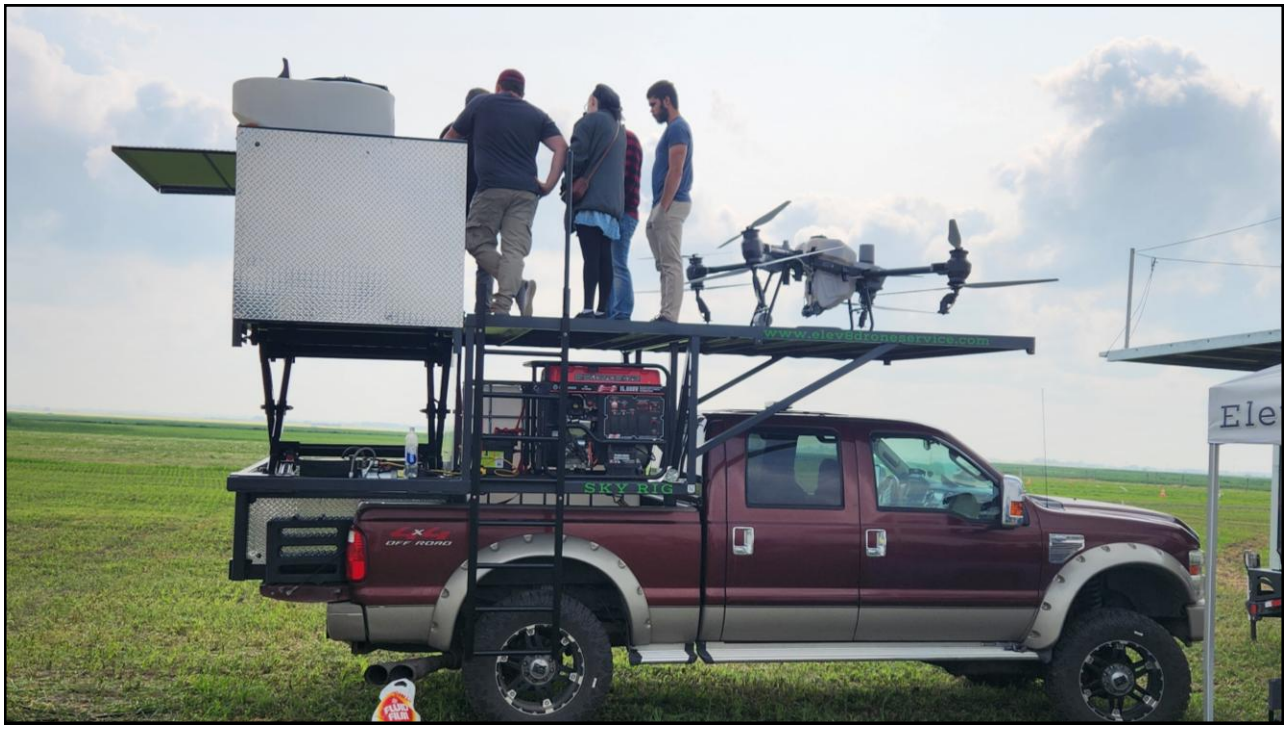
www.elevedroneservice.com
SKY RIG
4x4
OFF ROAD
Ele

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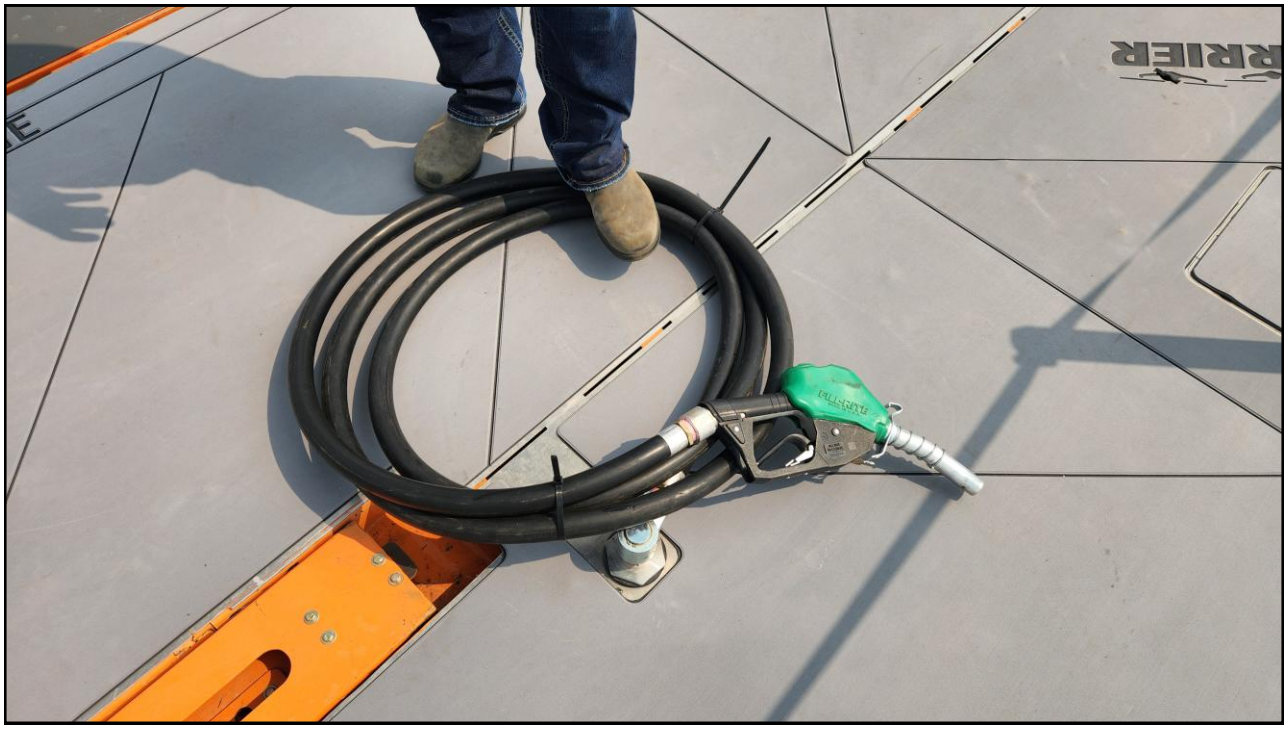

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Guardian SC1

- **80” rotors, 200 lb payload, 18’ boom, 30 gpm pump**
- **2-20 gpa is 40-15 acres/hour**
- **Avg. flight time is 3 min. to dispense 20 gal.**
- **1 min. to refill and plug-in recharge (>10,000 cycles - no removable battery)**
- **Aircraft alone is 119,000 USD**

-as of March, 2024

Company folded September, 2025

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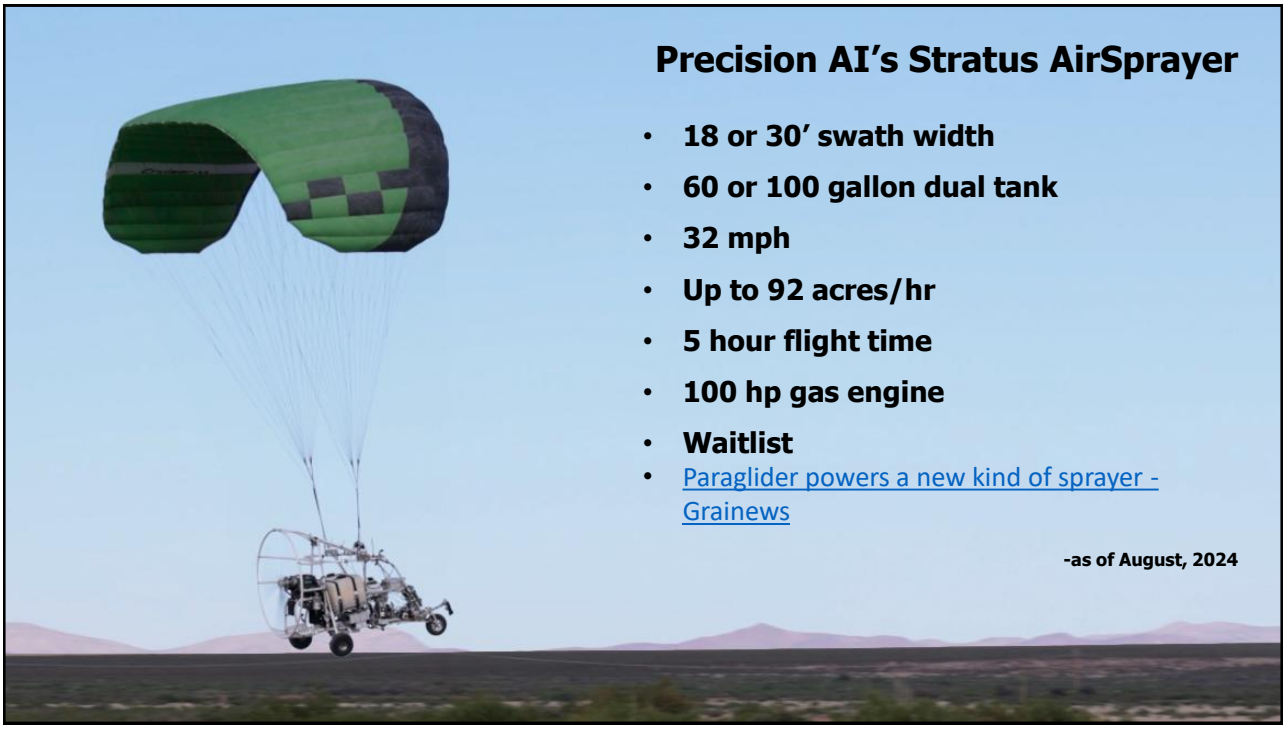
Precision AI's Stratus AirSprayer
• 18 or 30' swath width
• 60 or 100 gallon dual tank
• 32 mph
• Up to 92 acres/hr
• 5 hour flight time
• 100 hp gas engine
• Waitlist
• Paraglider powers a new kind of sprayer - Grainews
-as of August, 2024

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Drones

- Are cheap to buy;
- Use low volumes;
- Generate fine droplets;
- Create a narrow swath with variable deposition;
- Do not have a pressure gauge;
- Have a small tank without agitation;
- Do not have an air-conditioned cab.

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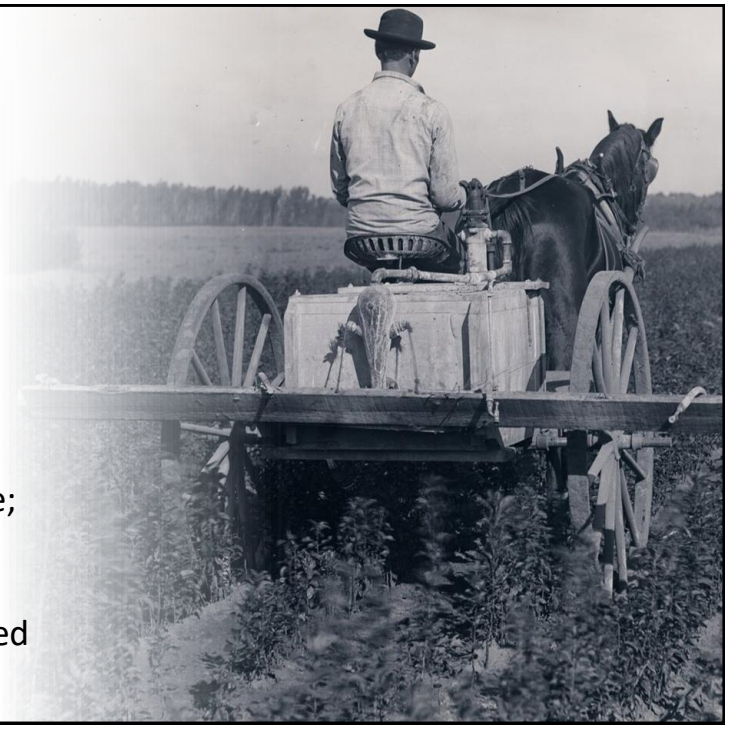
Same

- Are cheap to buy;
- Use low volumes;
- Generate fine droplets;
- Create a narrow swath with variable deposition;
- Do not have a pressure gauge;
- Have a small tank without agitation;
- Do not have an air-conditioned cab.



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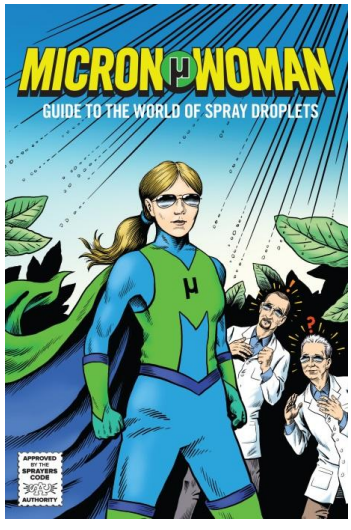

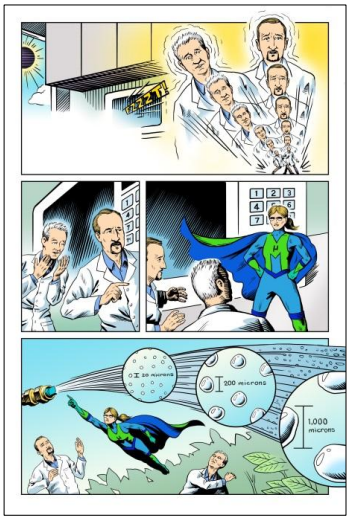

Sprayers 101

Dr. Tom Wolf
@nozzle_guy

Dr. Jason Deveau
@spray_guy

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