Improving management of white mold in dry beans:
Comparative fungicide efficacy

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Comparative efficacy of registered fungicides

Methods:

APPLICATION TIMING: Fungicides were applied at early bloom and 10 to 14 days later

FUNGICIDE SPRAY DROPLET SIZE: Nozzles and application pressures were generally not adjusted relative to canopy closure.

- Flat-fan nozzles emitting fine or medium droplets were utilized in most applications
- Initial findings from droplet size research conducted on dry beans (primarily pinto and kidney beans) suggest that calibrating fungicide droplet size relative to canopy closure will improve fungicide efficacy.

APPLICATION METHODS:

- Hand-held boom
- 15 gal/ac spray volume

Comparative efficacy of registered fungicides

Methods:

DATA WERE GENERATED FROM COMPARATIVE EFFICACY STUDIES funded by the Northarvest Bean Growers Association and by private companies.

- To assess comparative efficacy across multiple studies differing in overall treatment lists, data were analyzed for just the comparisons of interest (for instance, non-treated control vs. ProPulse @ 10.3 fl oz vs. Endura @ 8 oz) for all studies in which these treatments were evaluated.
- Combined analyses were conducted by treating the results from each study as an experimental replicate.
- Analyses were only conducted for fungicides that were evaluated a minimum of 3 times across different studies.

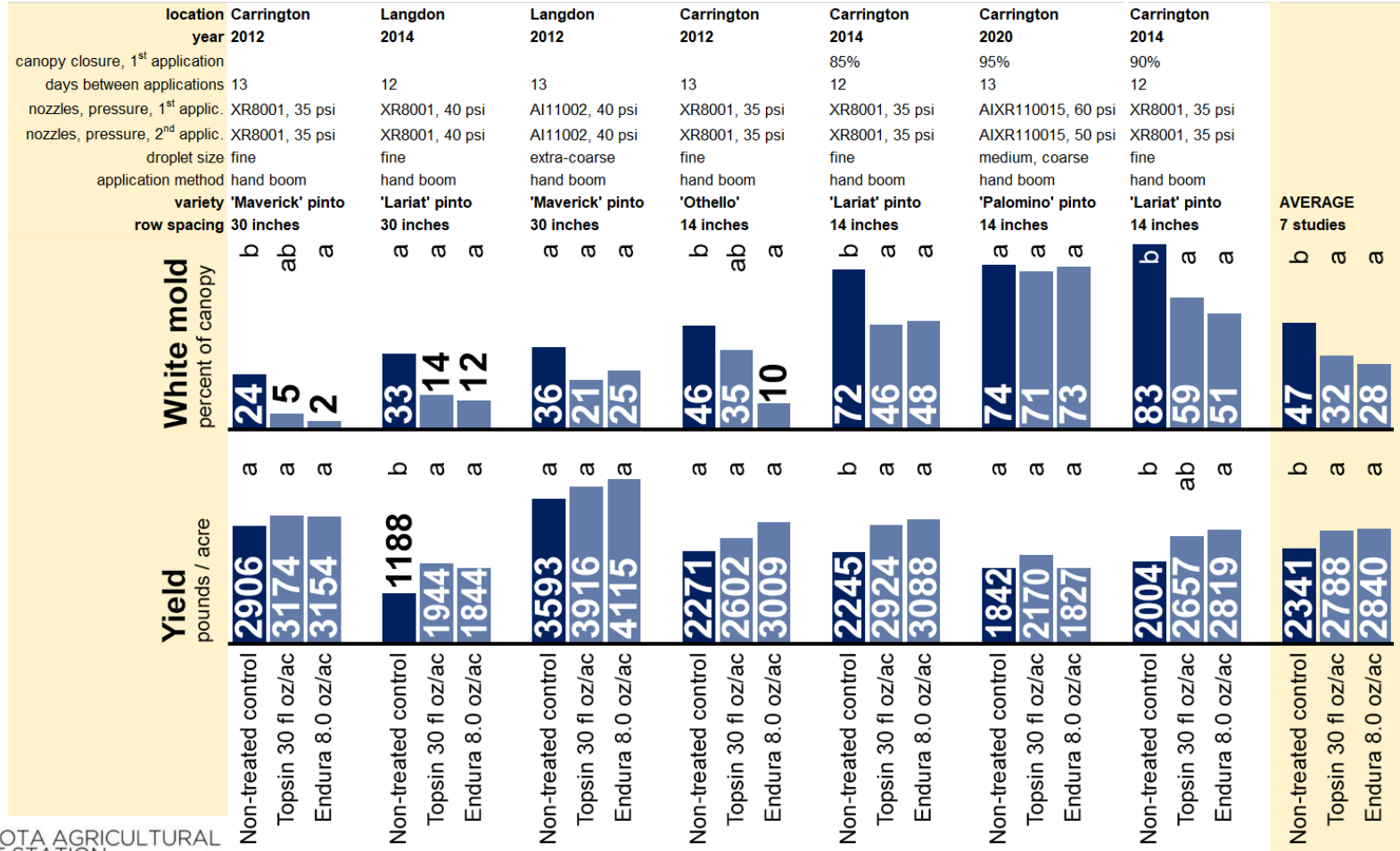
Comparative efficacy of registered fungicides

Topsin (30 fl oz) vs. **Endura** (8 fl oz/ac) applied twice

Endura (8 oz) **conferred a numerical increase in yield vs. Topsin** (30 fl oz) **in four of seven studies (just over half of the time).**

Statistical separation of these fungicides ($P < 0.05$) was not observed for disease or yield.

The combined analysis showed a trend towards slightly better disease control and yield with Endura, but statistical separation was not observed.



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Comparative efficacy of registered fungicides

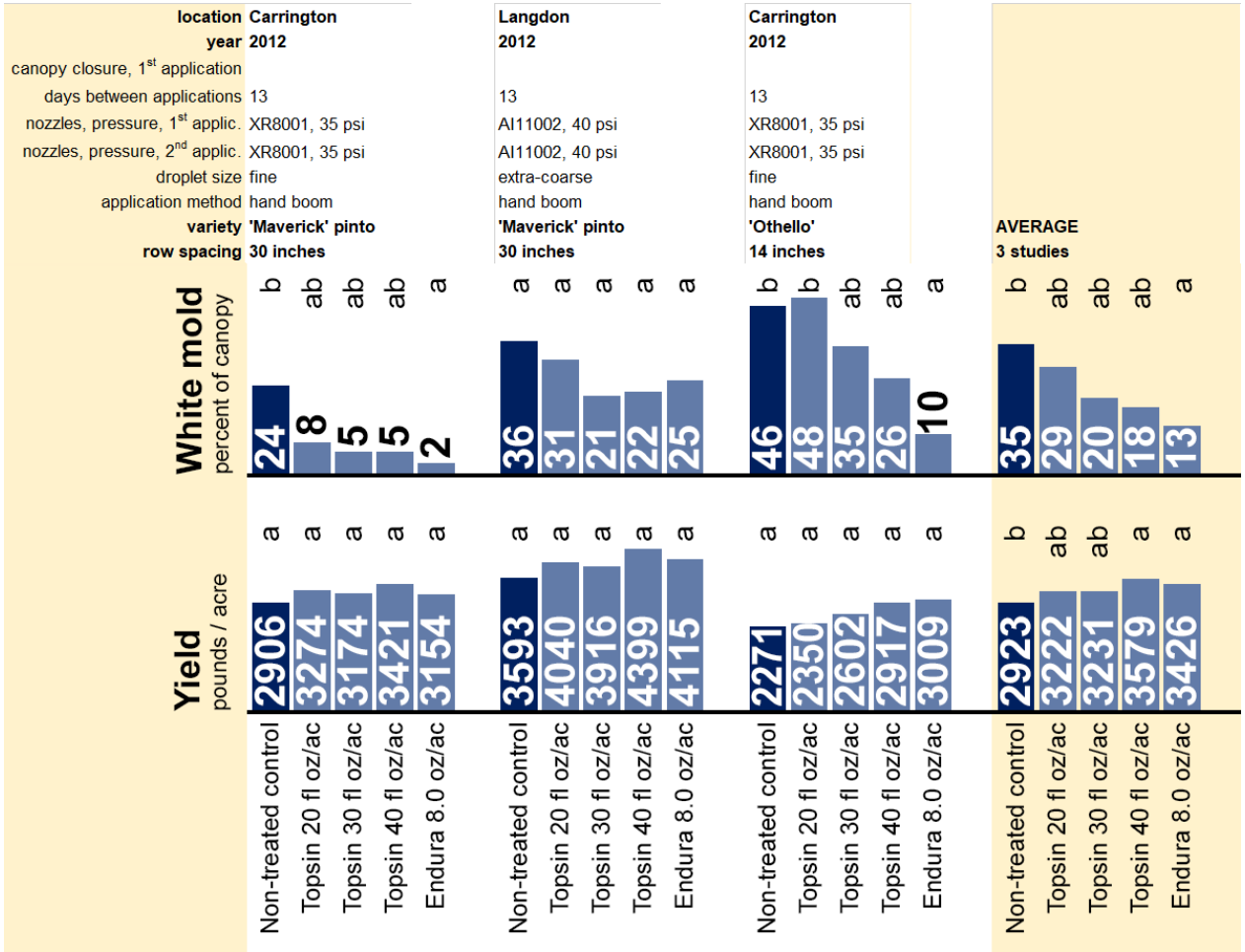
Topsin (20, 30 or 40 fl oz) vs. **Endura** (8 oz) applied twice

Topsin @ 40 vs. 20 fl oz: The higher application rate conferred a numerical increase in yield in 3 of 3 studies.
Topsin @ 40 vs. 30 fl oz: The higher application rate conferred a numerical increase in yield in 3 of 3 studies.
But statistical separation ($P < 0.05$) was not observed for application rates for Topsin in any individual study or in the combined analysis.

The results suggest that Topsin exhibits a rate response as the application rate increases from 20 to 40 fl oz/ac, but statistical separation was not observed.

Applied at 40 fl oz, Topsin performed very similarly to Endura at 8 oz/ac.

Note that the Topsin label permits only one application at 40 fl oz per season. If Topsin is applied at 40 fl oz, a different fungicide must be utilized if a second fungicide application is made that season.



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Comparative efficacy of registered fungicides

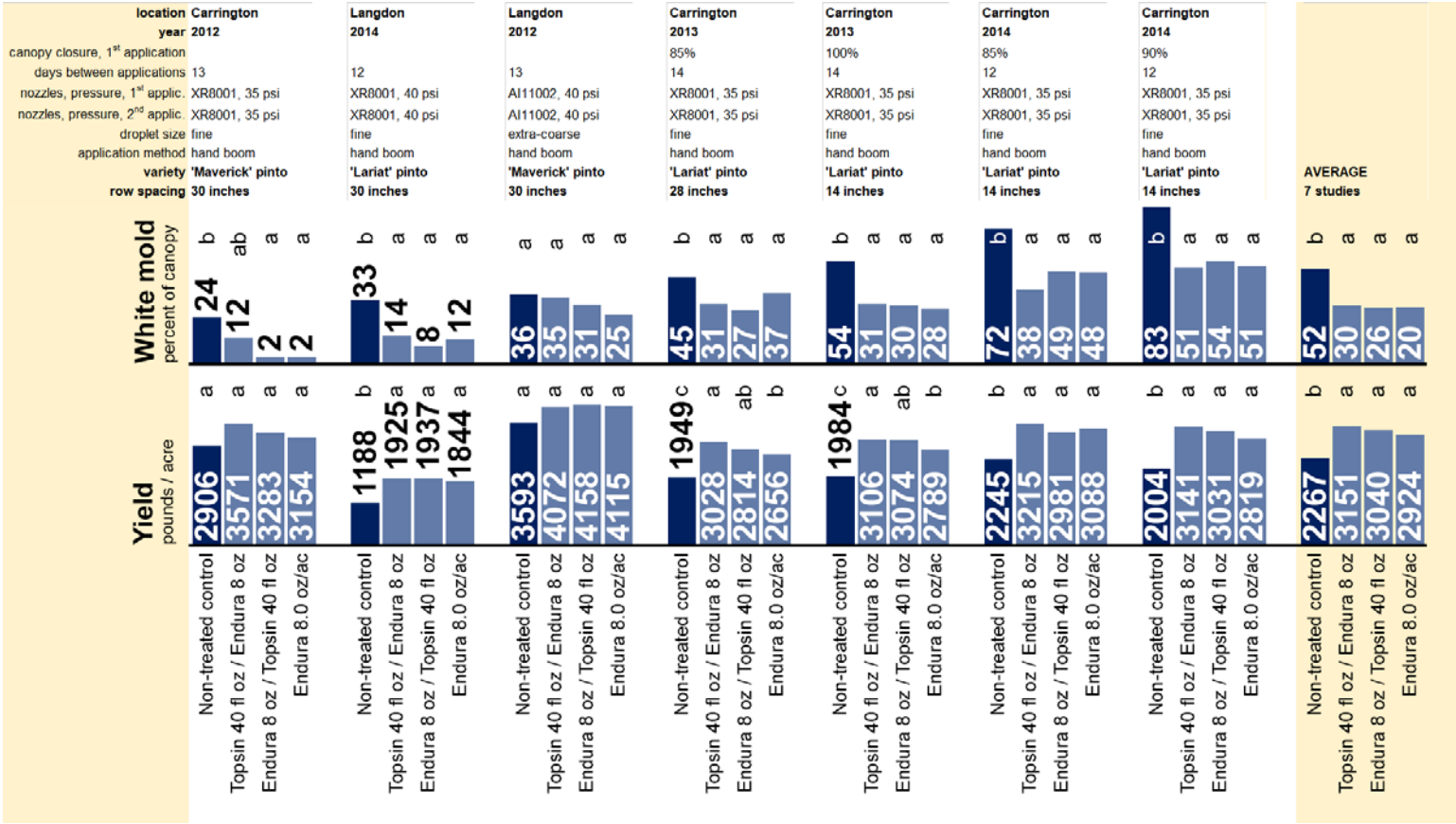
Topsin (40 fl oz) rotated with **Endura** (8 oz)

Applying Topsin 1st and Endura 2nd conferred a numerical increase in yield (vs. two applications of Endura) in 6 of 7 studies, with statistical separation ($P < 0.05$) observed in two studies.

Applying Endura 1st and Topsin 2nd conferred a numerical increase in yield (vs. two applications of Endura) in 6 of 7 studies, but statistical separation was not observed in any study.

The results suggest applying Topsin in rotation with Endura may be more effective than applying Endura twice.

Applying Topsin first and Endura second appeared to perform better than the reverse, but statistical separation was not achieved between these treatments.



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IMPROVING WHITE MOLD MANAGEMENT IN DRY EDIBLE BEANS

Comparative efficacy of registered fungicides

Omega (13.6 fl oz) vs. **Endura** (8 oz) applied twice

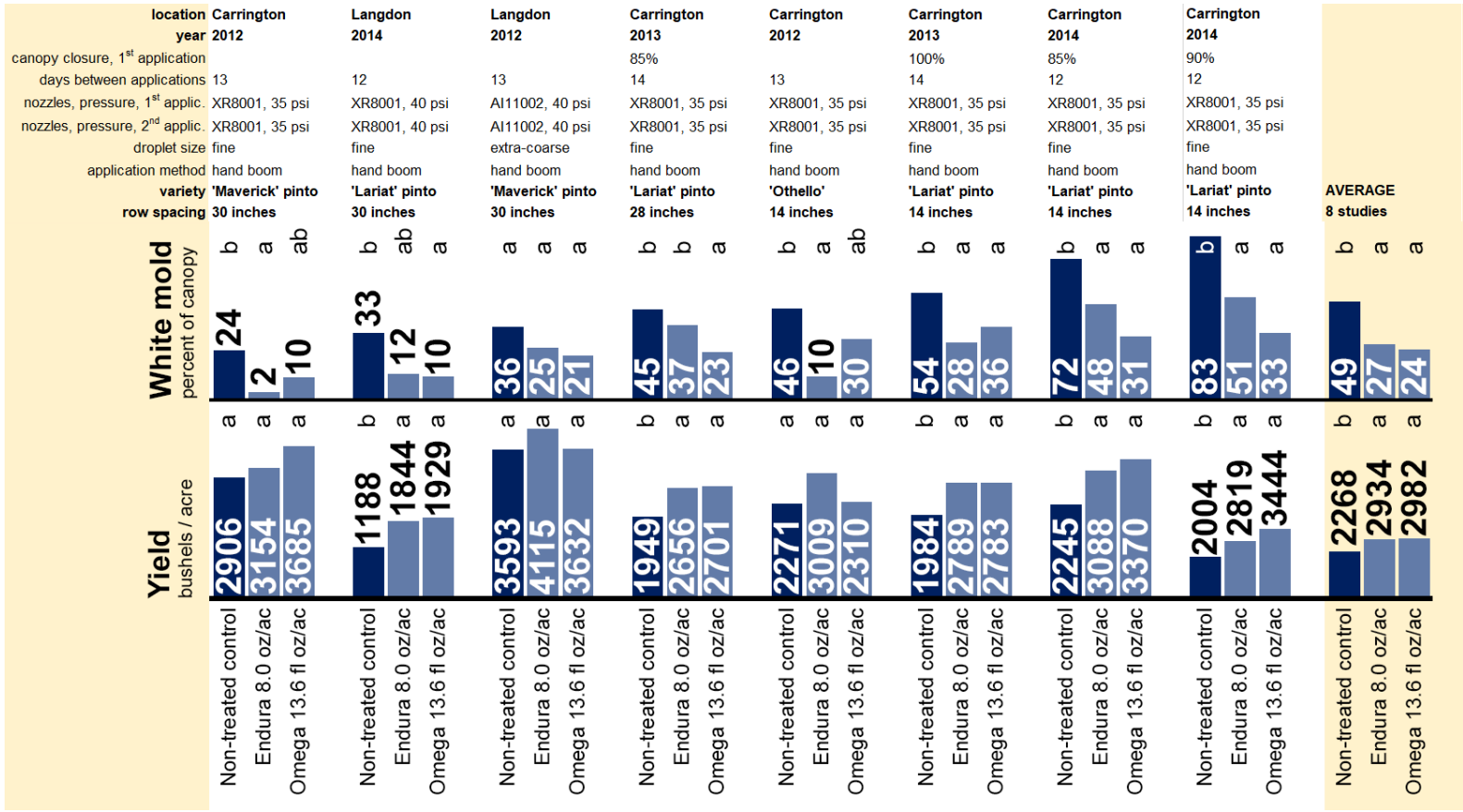
Omega (13.6 fl oz) **performed well when good fungicide coverage was achieved.**

- Omega was associated with a numerical increase in yield versus Endura (but not statistical separation) in five of eight studies.
  - Yields were equivalent in one study.
  - In both studies in which Omega was associated with associated with a numerical decrease in yield versus Endura, fungicide coverage in the interior of the canopy was poor.

Langdon (2012): fungicides were applied with extra-coarse droplets to pintos with an open canopy. This droplet size was much larger than needed for penetrating the canopy, resulting in poor coverage.

Carrington (2012): fungicides were applied with fine droplets to pintos with a very dense canopy. This droplet size was insufficient for achieving good deposition to the interior of a dense canopy, resulting in poor coverage to the interior of the canopy where white mold develops.

Omega is a contact fungicide with no systemic movement. Achieving good fungicide coverage to the target tissues is critical for achieving good white mold control with this fungicide.



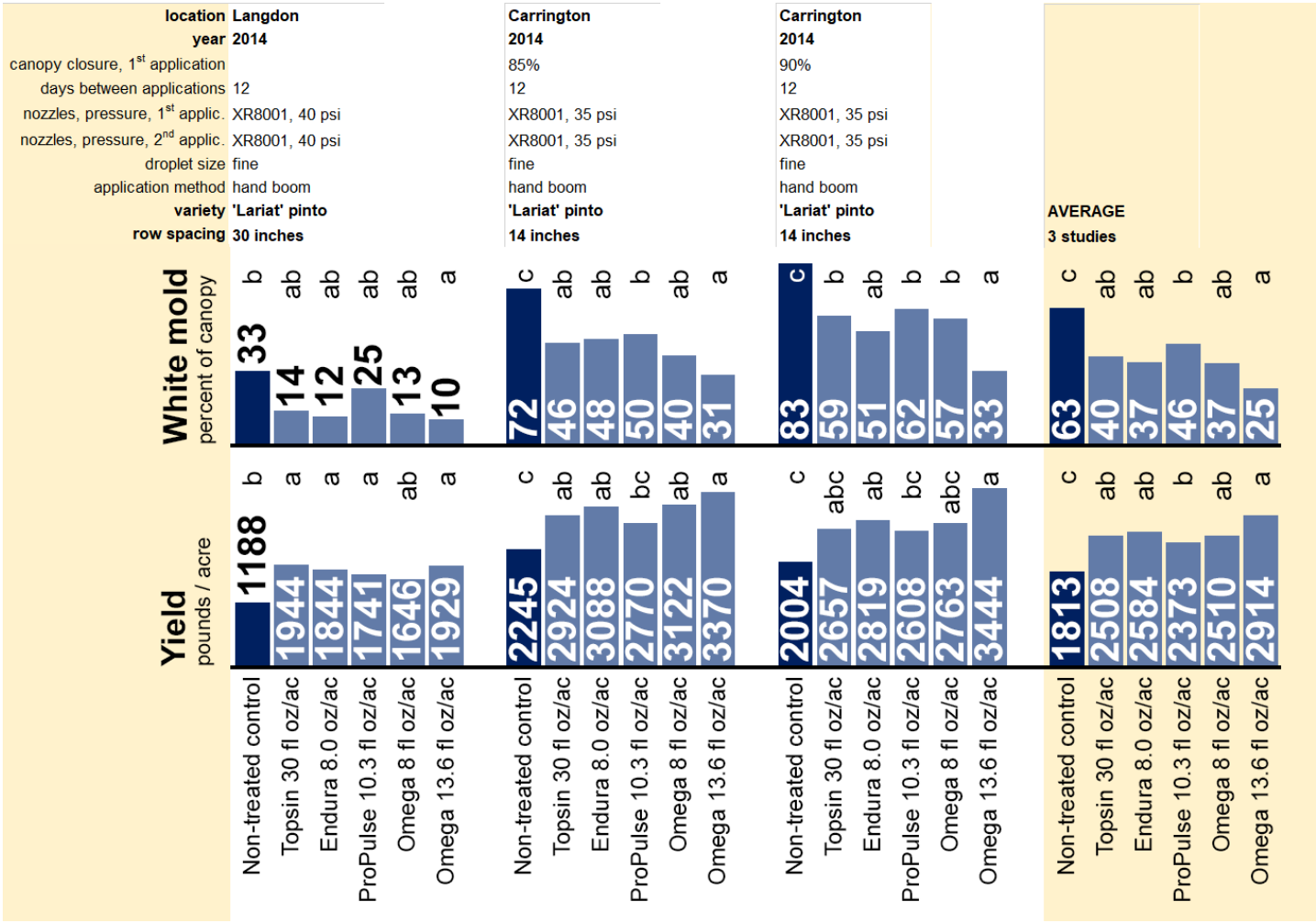
Comparative efficacy of registered fungicides

Omega (8 or 13.6 fl oz) vs. competitive standards applied twice

Increasing the application rate of Omega from 8 to 13.6 fl oz/ac resulted in a numerical increase in yield in three of three studies, but statistical separation was not observed.

The results suggest that Omega exhibits a rate response as the application rate increases from 8 to 13.6 fl oz, but statistical separation of these treatments ($P < 0.05$) was not observed.

Caution - Omega is a contact fungicide with no systemic movement. Achieving good fungicide coverage to the target tissues is critical for achieving good white mold control with this fungicide. See the previous slide for details.



IMPROVING WHITE MOLD MANAGEMENT IN DRY EDIBLE BEANS

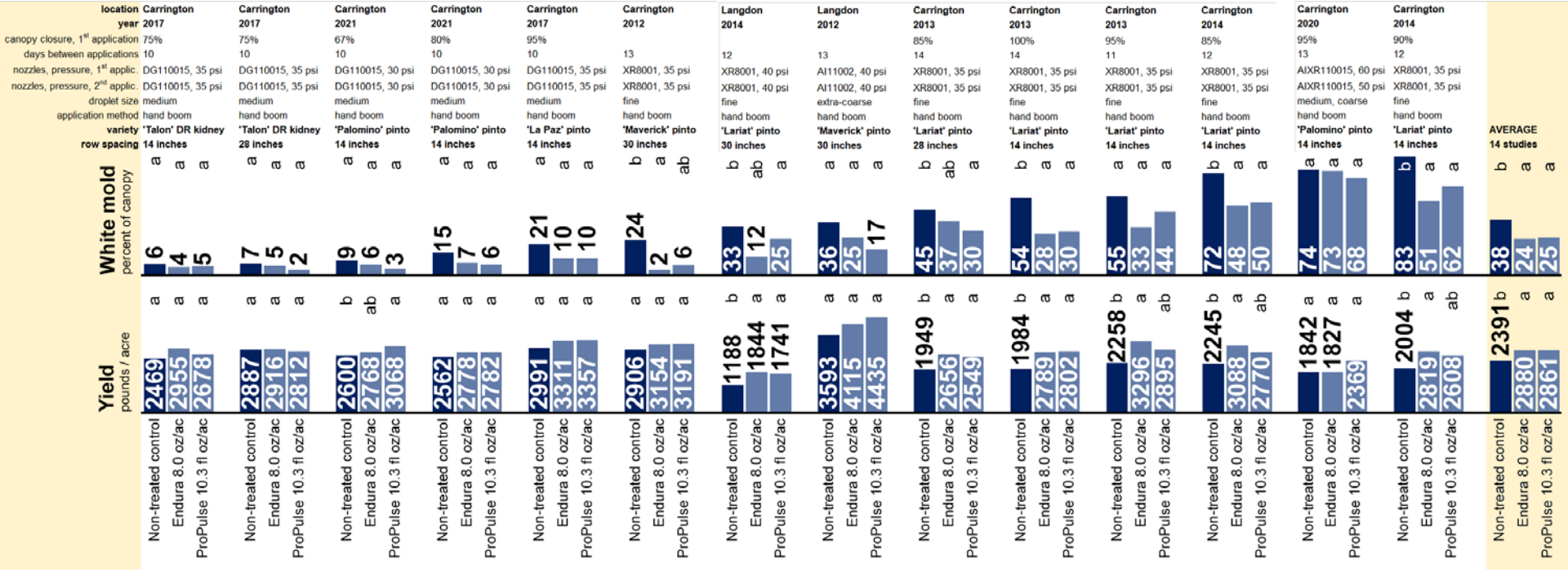
Comparative efficacy of registered fungicides

ProPulse (10.3 fl oz) vs. **Endura** (8 oz) applied twice

Applied twice 10 to 14 days apart to pinto and kidney beans under white mold pressure, **ProPulse** (10.3 fl oz) **and Endura** (8 oz) **performed equivalently.**

ProPulse (10.3 fl oz) conferred a numerical increase in yield vs. Endura (8 oz) in 6 of 14 studies;
Endura conferred a numerical increase in yield vs. ProPulse in 7 of 14 studies;
ProPulse and Endura conferred equivalent yields in 1 of 14 studies.

The average disease control and yield response conferred by ProPulse (10.3 fl oz) vs. Endura (8 oz) was virtually identical across 14 studies, and no statistical separation was observed between these fungicides in either the combined analysis or any individual study.



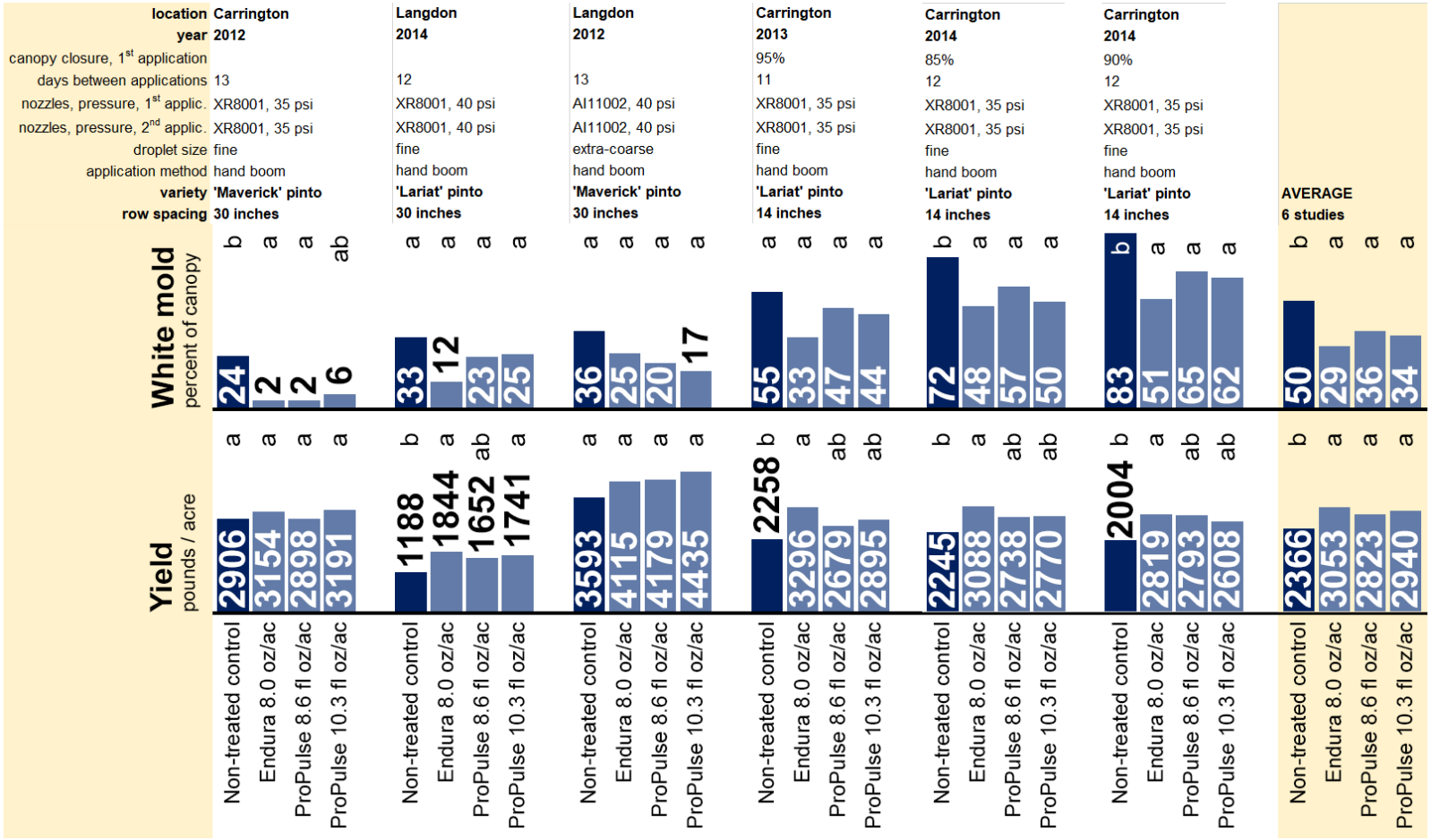
IMPROVING WHITE MOLD MANAGEMENT IN DRY EDIBLE BEANS

Comparative efficacy of registered fungicides

ProPulse (10.3 fl oz) vs. **Endura** (8 oz) applied twice

ProPulse @ 10.3 vs. 8.6 fl oz: The higher application rate of ProPulse was associated with a numerical increase in yield in 5 of 6 studies, but statistical separation was not observed.

The results suggest that ProPulse exhibits a rate response as the application rate increases from 8.6 to 10.3 fl oz, but statistical separation of these treatments ($P < 0.05$) was not observed.

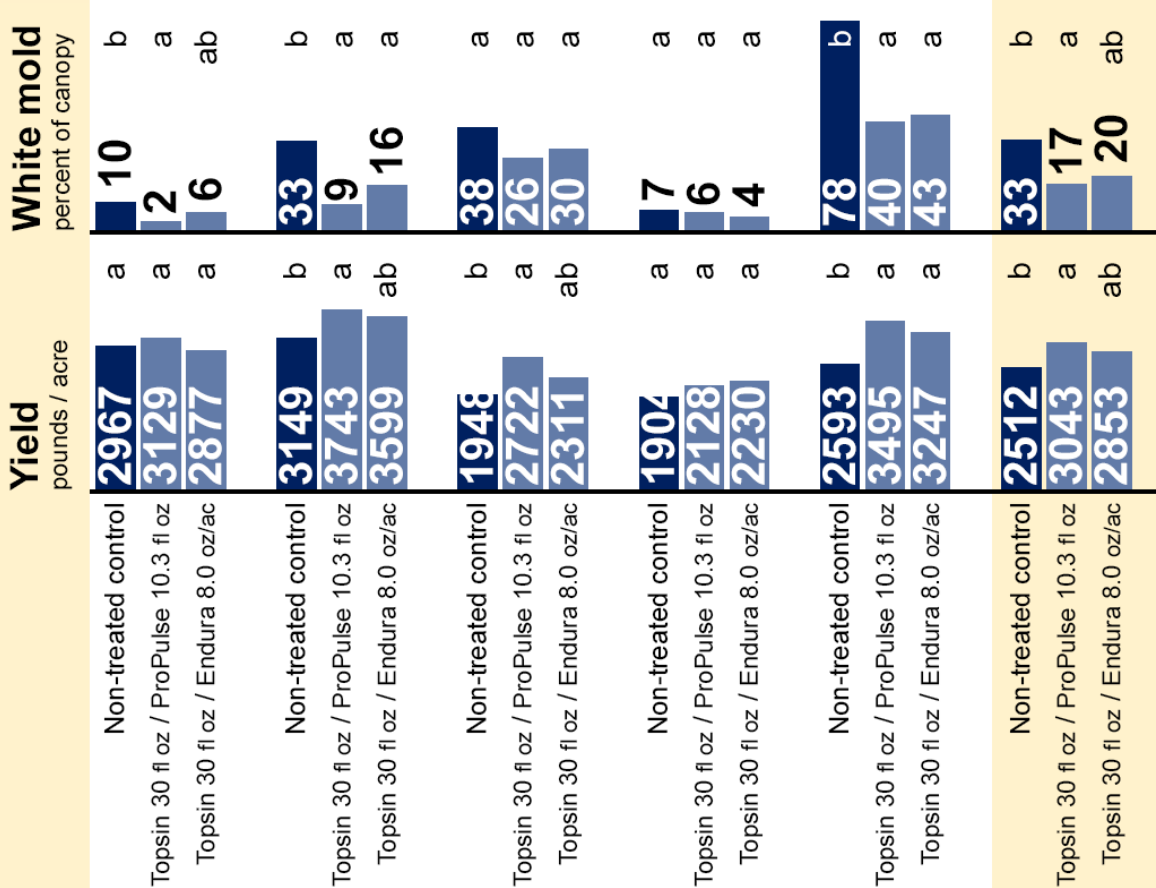


Comparative efficacy of registered fungicides

Topsin (30 fl oz) followed by **ProPulse** (10.3 fl oz) or **Endura** (8 oz)

Applying Topsin (30 fl oz) at early bloom followed by **ProPulse** (10.3 fl oz) 10-14 days later was associated with a numerical increase in yield (vs. Topsin / Endura) in 4 of 5 studies, but statistical separation was not observed.

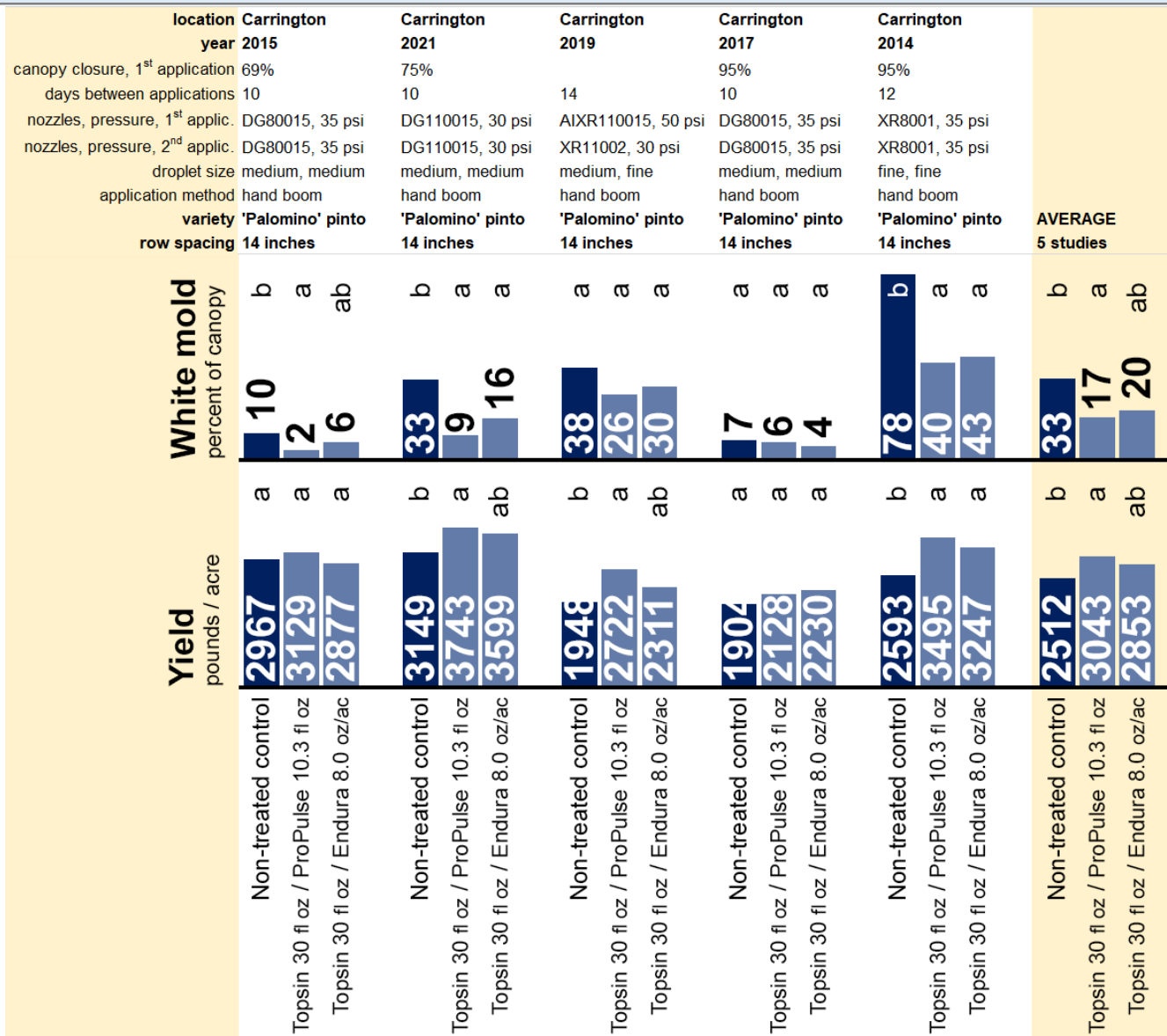
location	Carrington	Carrington	Carrington	Carrington	Carrington	
year	2015	2021	2019	2017	2014	
canopy closure, 1st application	69%	75%		95%	95%	
days between applications	10	10	14	10	12	
nozzles, pressure, 1st applic.	DG80015, 35 psi	DG110015, 30 psi	AIXR110015, 50 psi	DG80015, 35 psi	XR8001, 35 psi	
nozzles, pressure, 2nd applic.	DG80015, 35 psi	DG110015, 30 psi	XR11002, 30 psi	DG80015, 35 psi	XR8001, 35 psi	
droplet size	medium, medium	medium, medium	medium, fine	medium, medium	fine, fine	
application method	hand boom	hand boom	hand boom	hand boom	hand boom	
variety	'Palomino' pinto	'Palomino' pinto	'Palomino' pinto	'Palomino' pinto	'Palomino' pinto	AVERAGE
row spacing	14 inches	14 inches	14 inches	14 inches	14 inches	5 studies

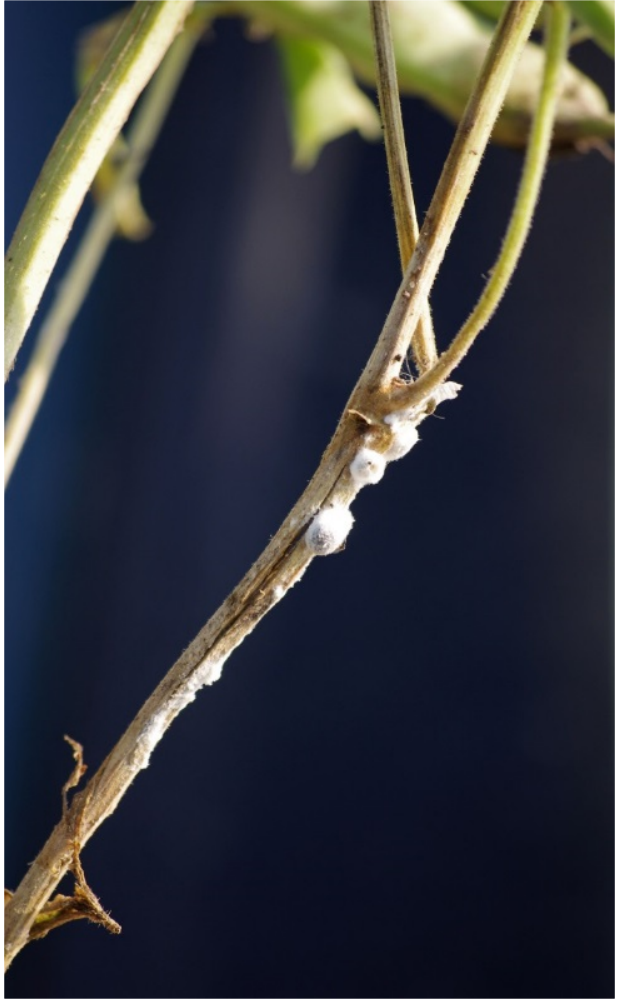


Comparative efficacy of registered fungicides

Topsin (30 fl oz) rotated with **ProPulse** (10.3 fl oz)

Applying Topsin (30 fl oz) at early bloom followed by **ProPulse** (10.3 fl oz) 10-14 days later was associated with a numerical increase in yield (vs. ProPulse f.b. Topsin) in 4 of 5 studies, but statistical separation was not observed.




Thank You!

Michael Wunsch, Jesse Hafner, Thomas Miorini, Suanne Kallis, Xavier Klocke, Billy Kraft, Michael Schaefer NDSU Carrington REC
Heidi Eslinger, Leonard Besemann, Kelly Cooper, Seth Nelson NDSU Robert Titus Research Farm, Oakes

RESEARCH FUNDED BY THE **NORTHARVEST BEAN GROWERS ASSOCIATION, BASF Corp., GOWAN Corp., and BAYER CropScience**

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