On-Farm Trials Evaluating Fungicide Strategies for Peanut Disease Management in North Florida

Keith Wynn[1] (kwynn@ufl.edu) and Dr. Nicholas S. Dufault[2] (nsdufault@ufl.edu)
[1] Hamilton County Extension, University of Florida, Jasper, FL, [2] Dept. of Plant Pathology, University of Florida, Gainesville, FL.

Concluding Thoughts and Perspectives:

The study underscores the complexity of peanut disease management with fungicides and highlights the importance of fungicide selection, rotation, variety selection and resistance management strategies.

- Programs with four consecutive SDHI sprays had significantly lower yields (~2.8%) and net returns (~4.5%) compared to programs that incorporated a DMI spray.
- The study highlights that relying on consecutive applications of SDHI fungicides may not be beneficial, even in mixed-mode-of-action products.

Hypothesis:

DMI-based early and late leaf spot fungicide programs provide greater yield savings and net returns than SDHI-based programs in peanut production systems of North Florida.

Objectives:

- Compare fungicide program efficacy for leaf spot management (2021–2024).
- Assess yield and economic impacts of different fungicide programs.
- Provide recommendations for optimizing fungicide applications.

Methods:

- Analysis of variance (ANOVA) showed an effect of year in the full linear mixed effect model for all response variables.
- Fungicides applied at 60 and 90 days after planting were used to create the meta-analysis groupings of SDHI (Priaxor and Lucento) and DMI (ProvostSilver and Provysol plus tebuconazole).
- A multivariate random effects model meta-analysis was performed to evaluate the fungicide groupings relative to a standardized mean difference (SMD).
- SMD was calculated by this formula: ln(fungicide grouping) – ln(overall trial mean)

Timeline of fungicide applications in Hamilton County trials from 2021 to 2024. Days after planting (DAP) is indicated in the middle and product rates are shown in () as fl oz or oz per acre.

Abound (6)	Proline (5.7)	Elatus (9.5) + Miravis (3.4)	Priaxor or Lucento	Elatus (9.5) + Miravis (3.4)	Priaxor or Lucento	Bravo WS (16) + Topsin (10)	Bravo WS (24)
DAP: 0	30	45*	60	75*	90	105	120
Abound (6)	Proline (5.7)	Elatus (9.5) + Miravis (3.4)	Provost Silver or Provysol Tebuconazole	Elatus (9.5) + Miravis (3.4)	Provost Silver or Provysol Tebuconazole	Bravo WS (16) + Topsin (10)	Bravo WS (24)

* In the 2024 trial, Convoy (26) and Bravo WS (16) was used instead of Elatus/Miravis sprays.

Results:

TABLE 1
Log response ratio (effect size) relative to mean trial response (standardize mean difference), fold yield savings, and correspondinng statistics for the influence of fungicide sprays on plot yields (lb/a) and net return ($/acre).

Response	Mode of action[w]	K[x]	Effect Size[y] L	Effect Size[y] P	Percent[z] Ī
Yield (lb/a)	DMI	8	0.012	0.140	1.25
	SDHI	6	-0.029	**0.027**	**-2.84**
Net($/a)	DMI	8	0.020	0.098	2.00
	SDHI	6	-0.047	**0.013**	**-4.55**

[w] Mode of action categories set by sprays applied at 60 and 90 days after planting in timeline
[x] Total number of study treatments used in each analysis.
[y] L = mean log-transformed treatment mean response ratio relative to the standardized mean difference (average trial mean) & *P* = probability value (significance level) different from zero.
[z] Mean percent yield or dollar savings based on the response variable inidcated (Ī).

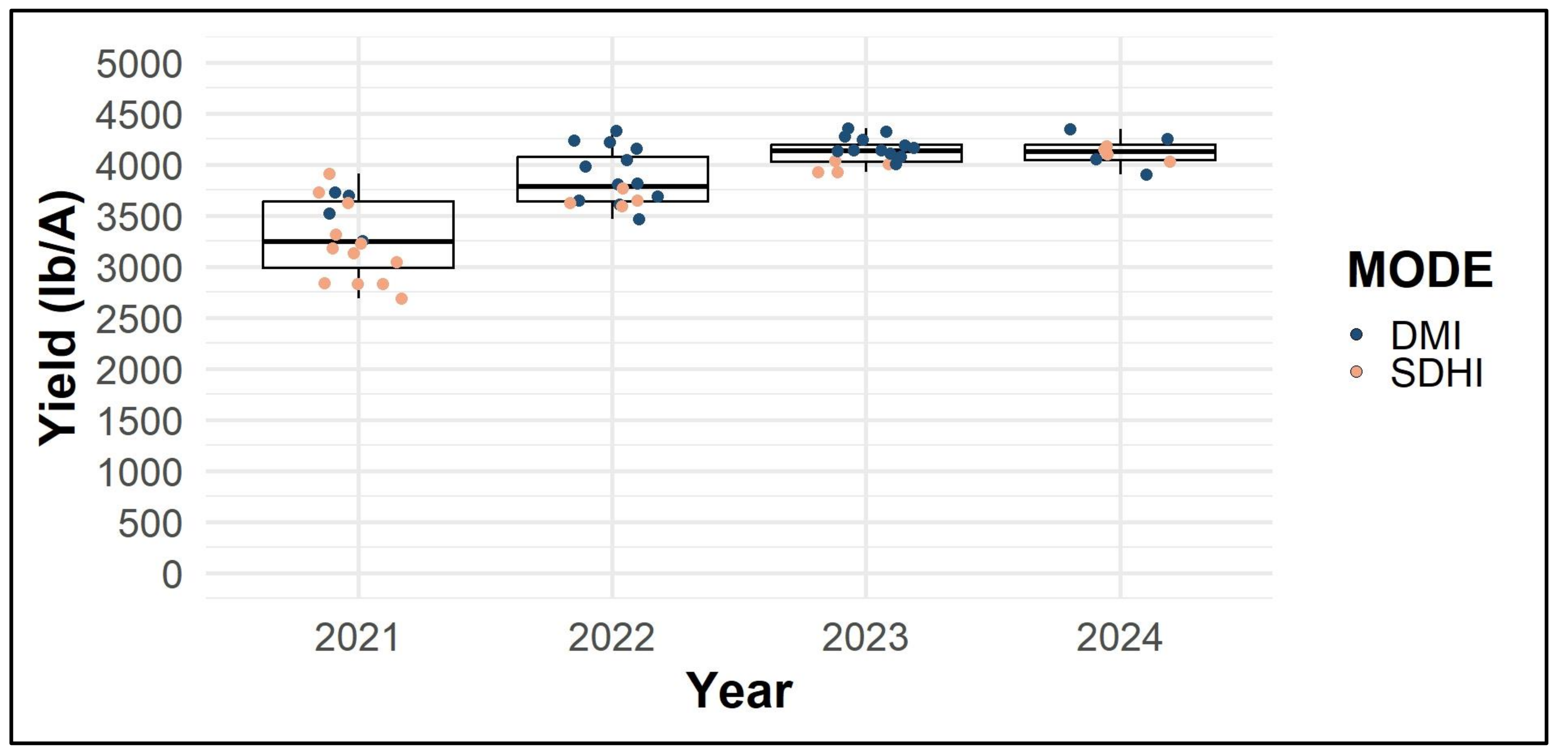

Figure 1. Yield (lb/A) across different years for peanut fungicide trials, comparing DMI (dark blue) and SDHI (light peach) modes of action. Boxplots represent yield distributions, with individual replication data points overlaid.

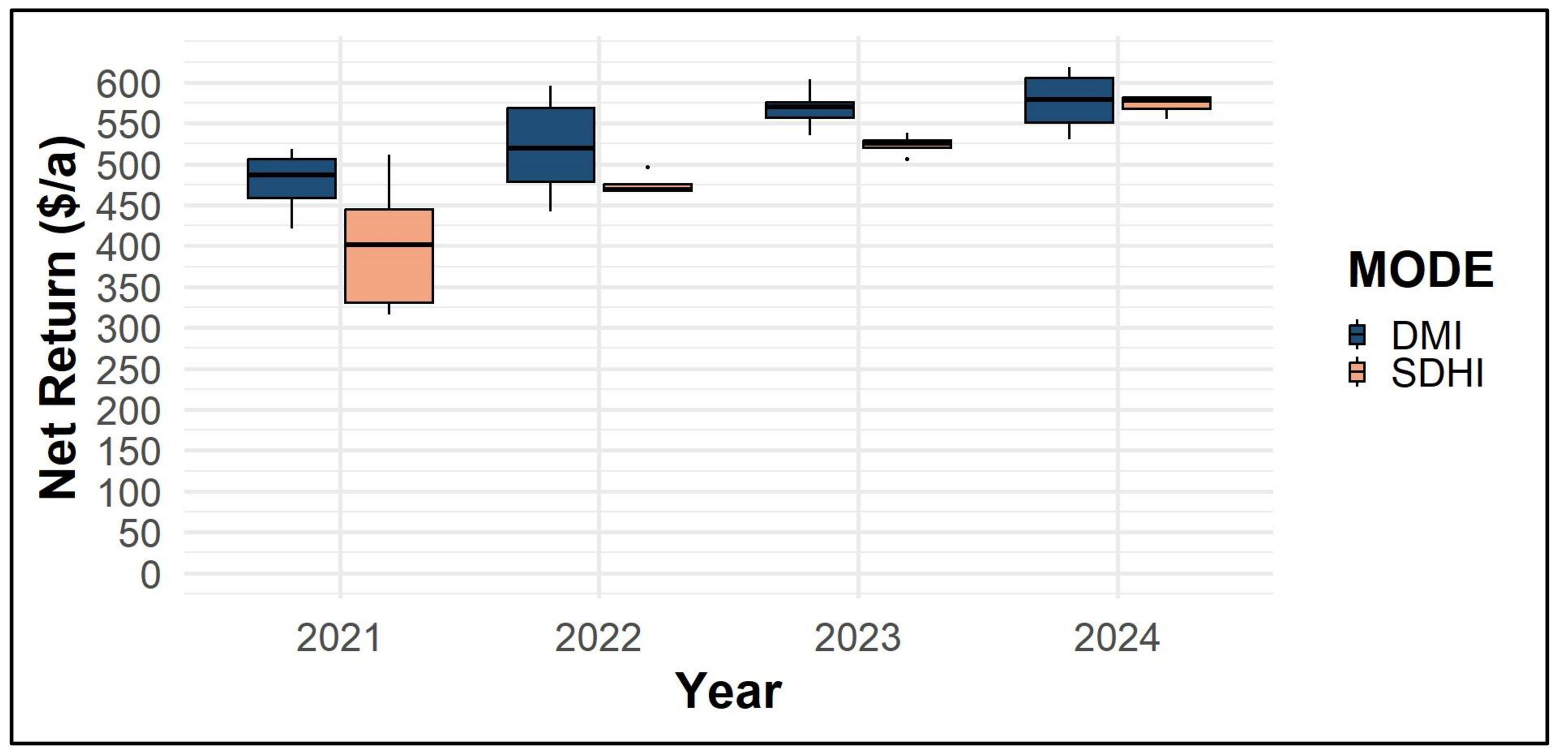

Figure 2. Net return ($/a) across different years for peanut fungicide trials, comparing DMI (dark blue) and SDHI (light peach) modes of action. Boxplots represent the distribution of net returns, which were calculated by subtracting the fungicide program cost ($/a) from the estimate crop value ($/a) provided by the Suwannee River Peanut buying point.

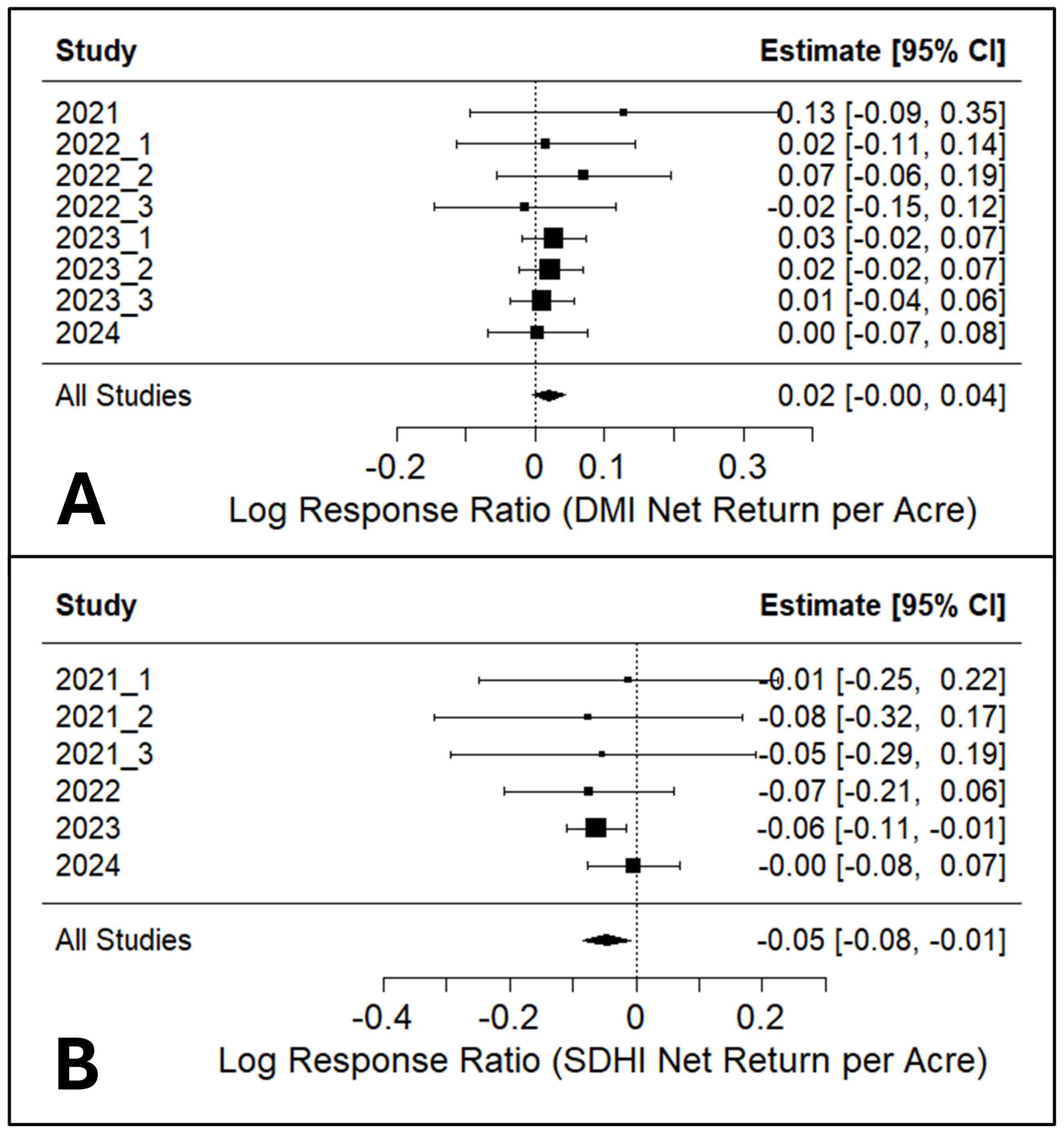

Figure 3. Forest plots comparing the log response ratio of net return per acre for DMI (A) and SDHI (B) across multiple studies and years. In both plots, squares represent study estimates, with larger squares indicating higher weight. Horizontal lines show 95% confidence intervals, while the diamond at the bottom represents the overall effect size for all studies. (A) Displays results for DMI, while (B) illustrates findings for SDHI.

Yield (lb./A) and Florida 1 to 10 Scale
Pearson's Correlation (r) = -0.381; p-value 0.004

Conclusions:

- The negative correlation (r = -0.381, p = 0.004) between disease severity and peanut yield highlights the impact of effective disease management.
- Four consecutive SDHI sprays resulted in significantly lower yields (~2.8%) and net returns (~4.5%) compared to programs incorporating a DMI fungicide rotation.
- Lucento performed better in 2024 than in 2023 after replacing the 45 and 75 DAP sprays with Convoy (an SDHI not associated with leaf spot control), emphasizing the role of fungicide timing and selection.
- Programs that integrate DMI fungicides at key points (e.g., 60 and 90 DAP) appear to be more effective in protecting yield & economic returns than programs that rely on SDHIs.

Funding: FLORIDA PEANUT PRODUCERS ASSOCIATION; FLORIDA PEANUT FEDERATION

References:
1. Anco, D. J. et al. 2020. Peanut yield loss in the presence of defoliation caused by late or early leaf spot. Plant Disease, 104:1390-1399.
2. Dufault, N. S. et al. 2023. Field trial failures: How loss of fungicide efficacy led to genomic sequencing of peanut leaf spot pathogens. Plant Health 2023. Denver, CO.
3. Mehl, H. L. et al. 2020. Multiyear regional evaluation of foliar fungicide applications for cotton target spot management in the southeastern United States. Plant Disease, 104:438-447.
4. van den Bosch, F. et al. 2014. Mixtures as a fungicide resistance management tactic. Phytopathology, 104:1264-1273.

UF IFAS UNIVERSITY of FLORIDA | PLANT PATHOLOGY

UF IFAS Extension UNIVERSITY of FLORIDA