Fungicide Options for QoI-resistant Aerial Blight in Soybean

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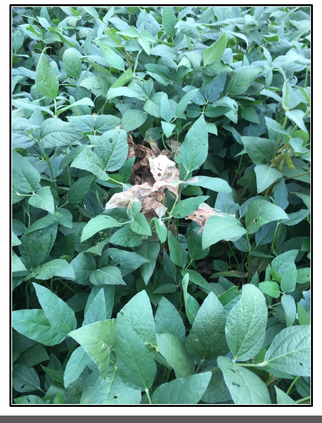
Problem/Hypothesis

Strobilurin (QoI) fungicides are no longer effective in managing soybean aerial blight in many areas of Louisiana. Fungicides containing SDHI materials may be effective alternatives.

Project Background

In areas of Louisiana where rice and soybean rotations are common, aerial blight of soybean (photos below) is a major problem. Since the late 1990s, strobilurin (QoI, Group 11) fungicides have been used extensively in rice and soybean production to combat many foliar diseases. During the 2010s, field failures using these materials to manage aerial blight and sheath blight began to occur, particularly in the southwest portion of the state where 70-75% of Louisiana rice is produced. With limited crop rotation options, limited cultivar resistance information, and the long-term soil survival potential of the pathogen, the only current management option for aerial blight is application of effective fungicides. Research to fight this problem has been conducted on farms in areas where resistance has been documented or suspected and on LSU AgCenter research stations.



Procedures

- On-farm fungicide and research station efficacy trials for 7 seasons
- Multiple farms, farmers, and research stations involved
- Parishes (Acadia, Calcasieu, Franklin, Rapides)
- Small-plot, replicated research trials, statistically analyzed with ANOVA and Tukey post hoc (P=0.10)
- Many experimental and commercial fungicide options tested
- Treatments applied with a CO_2-powered handheld boom or compressed air-powered self-propelled applicator from R2-R5
- Plots rated for disease 2 to 3 times over the season
- Yields determined by hand harvest or small plot combine
- At least two location-years with significant differences compared to the non-treated control were considered to confirm efficacy

Results

- QoI (strobilurin) fungicides were virtually ineffective on aerial blight.
- Several commercially-available fungicides containing SDHI (succinate dehydrogenase inhibitor) materials were effective on aerial blight.
- Effective fungicides resulted in less aerial blight and preserved yields.

Trial Location Example – Morse, LA - 2019

Non-treated

SDHI-treated

Location Summary

Year	Quadris Effective?	SDHIs Effective?	Yield Preservation?	Overall Disease Pressure
2016	No	Yes	Yes	Heavy
2017	No	No	N/A	Very light
2018	No	No	N/A	Very light
2019	No	Yes	Yes	Heavy
2020	N/A	Yes	Yes	Moderate
2021	N/A	Yes	Yes	Moderate
2022	N/A	Yes	Yes	Moderate

Effective Fungicides with SDHI Actives

Active Ingredients (%)	Brand Name	Use Rate (fl oz/acre)
inpyrfluxam (31.25%)	Excalia 2.84 SC	2.0
flutriafol (26.47%) bixafen (15.5%)	Lucento 4.17 SC	3 - 5.5
pydiflumetofen (6.9%) difenoconazole (11.5%)	Miravis Top 1.67 SC	13.7
pyraclostrobin (28.58%) fluxapyroxad (14.33%)	Priaxor 4.17 SC	4.0 - 8.0
mefentrifluconazole (11.61%) pyraclostrobin (15.49%) fluxapyroxad (7.74%)	Revytek 3.33 SC	8.0 - 15.0
benzovindiflupyr (2.9%) azoxystrobin (10.5%) propiconazole (11.9%)	Trivapro 2.21 SC	13.7 - 20.7

Conclusions

Although helpful, identification of alternative fungicides for aerial blight management is a relatively short-term solution. Fungicides with very specific mode-of-actions historically have been short-lived in their usefulness, and it is only a matter of time before fungal pathogens develop resistance. Future research should continue to focus on experimental fungicides, resistance delineation and mitigation, fungicide use patterns, as well as identification and development of soybean varieties resistant to aerial blight.

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