

REGEV HBX - A New Hybrid Fungicide for Soybean Disease Control





Group 3

Group BM01

REGEV HBX is a hybrid fungicide, uniting the disease fighting power of botanical and conventional chemistries. Specially tailored to the needs of soybean, rice and pecan producers, REGEV HBX combines **tea tree oil** and **difenoconazole** for remarkable fungal and bacterial disease control with reduced chemical load. REGEV HBX does this by delivering broad-spectrum **preventive, anti-sporulant and double kick-back curative control** through its eight powerful mechanisms of activity, all while enhancing plant growth, yield and resistance management.

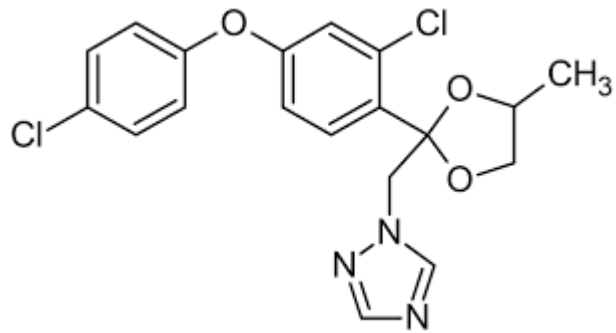


REGEV HBX

Hybrid Fungicide

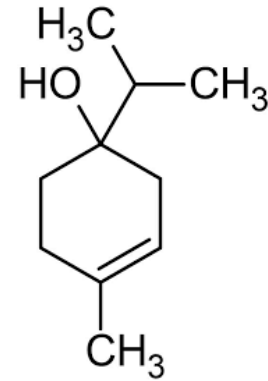


Difenoconazole

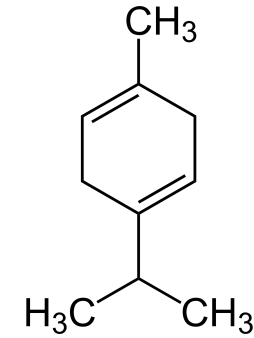


**Tea Tree Oil
Terpenes**

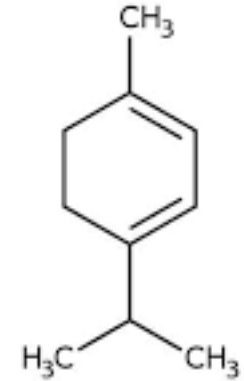
Terpinen-4-ol



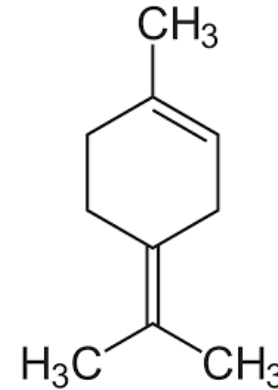
γ-Terpinene



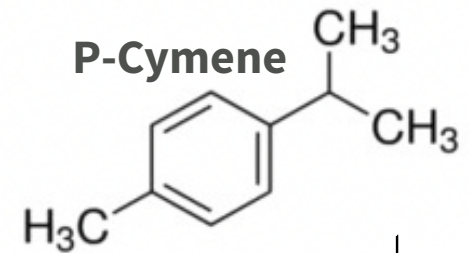
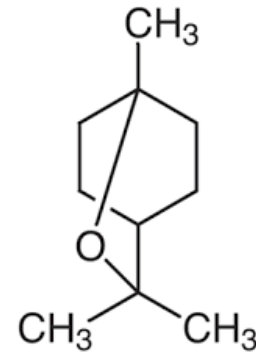
α - Terpinene



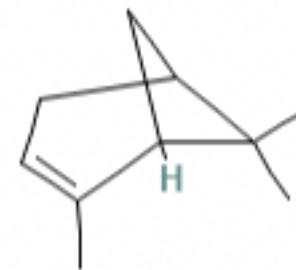
Terpinolene



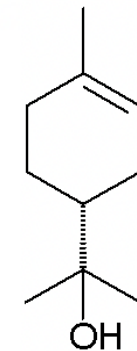
1,8 - Cineole



α - Pinene



α - Terpineol



What is Tea Tree Oil ?

- Derived from the leaves of the tea tree, *Melaleuca alternifolia*
- **Tea tree oil** is an essential **oil** originally used in alternative medicine
- Not an oil in the classic sense — not phytotoxic, can be used with adjuvants



Extract Composition of Tea Tree Oil

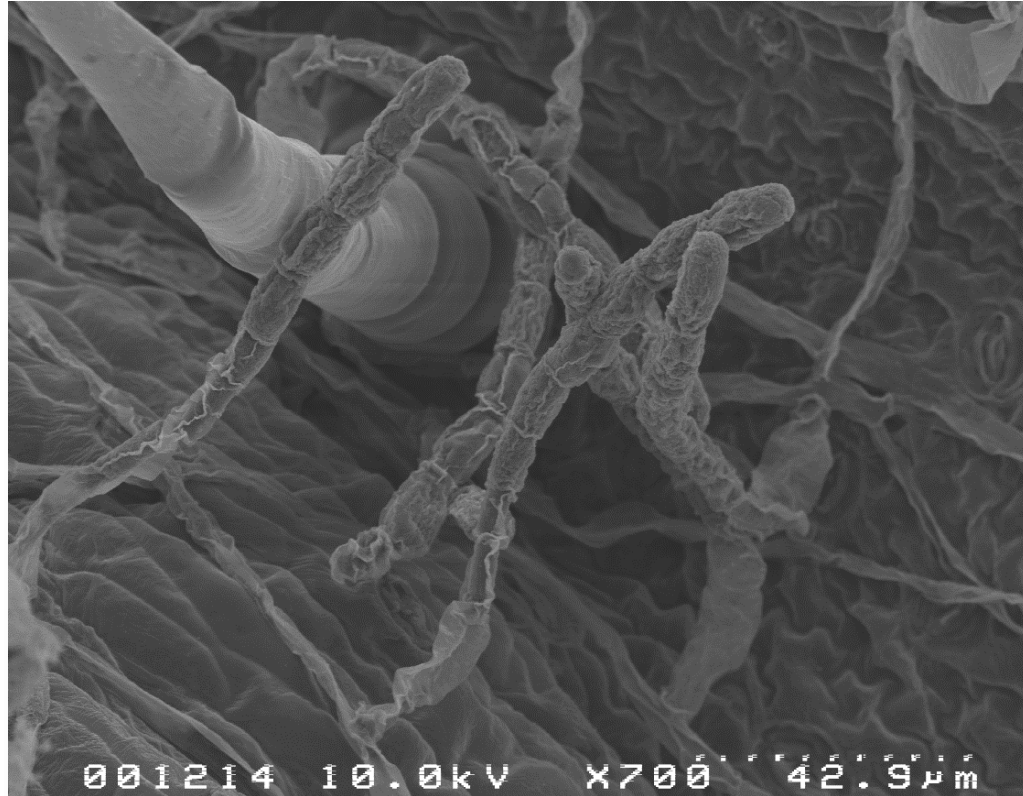
Component	%
Terpinen-4-ol	40.1
γ-Terpinene	23.0
α-Terpinene	10.4
1,8-Cineole	5.1
Terpinolene	3.1
p-cimene	2.9
α-pinene	2.6
α-Terpineol	2.4

Effects of TTO on hyphae & conidia of the cucurbit powdery mildew

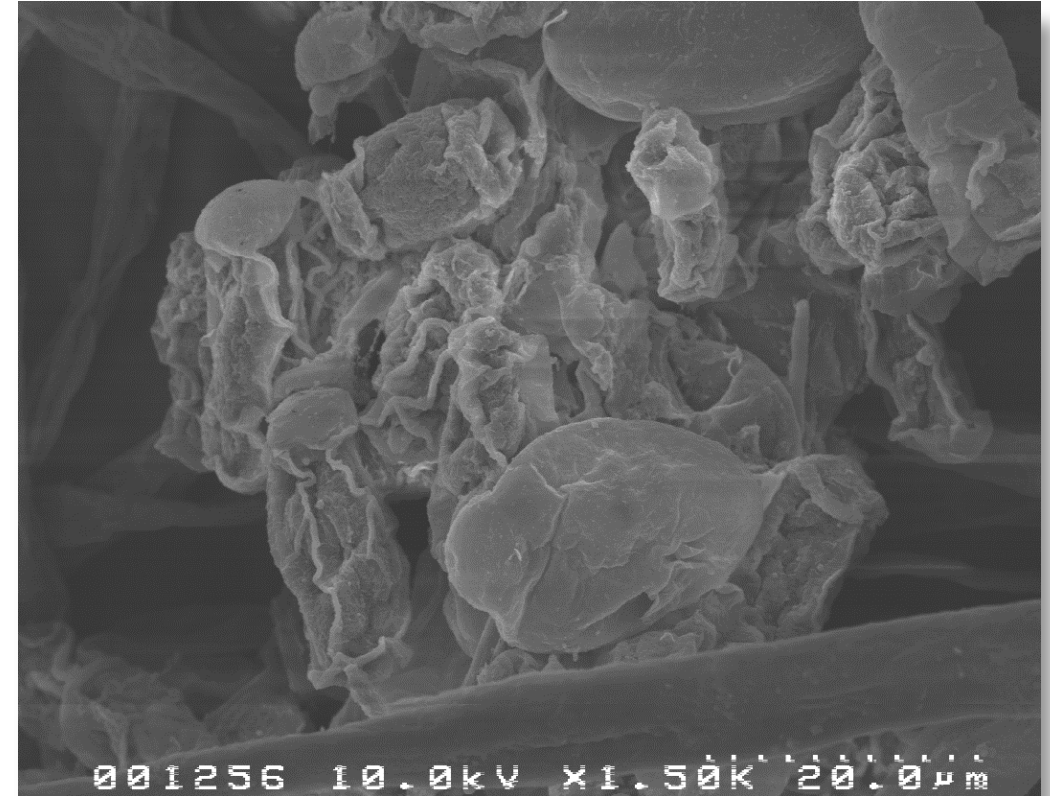
REGEV^{HEX}

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Untreated



TTO Treated

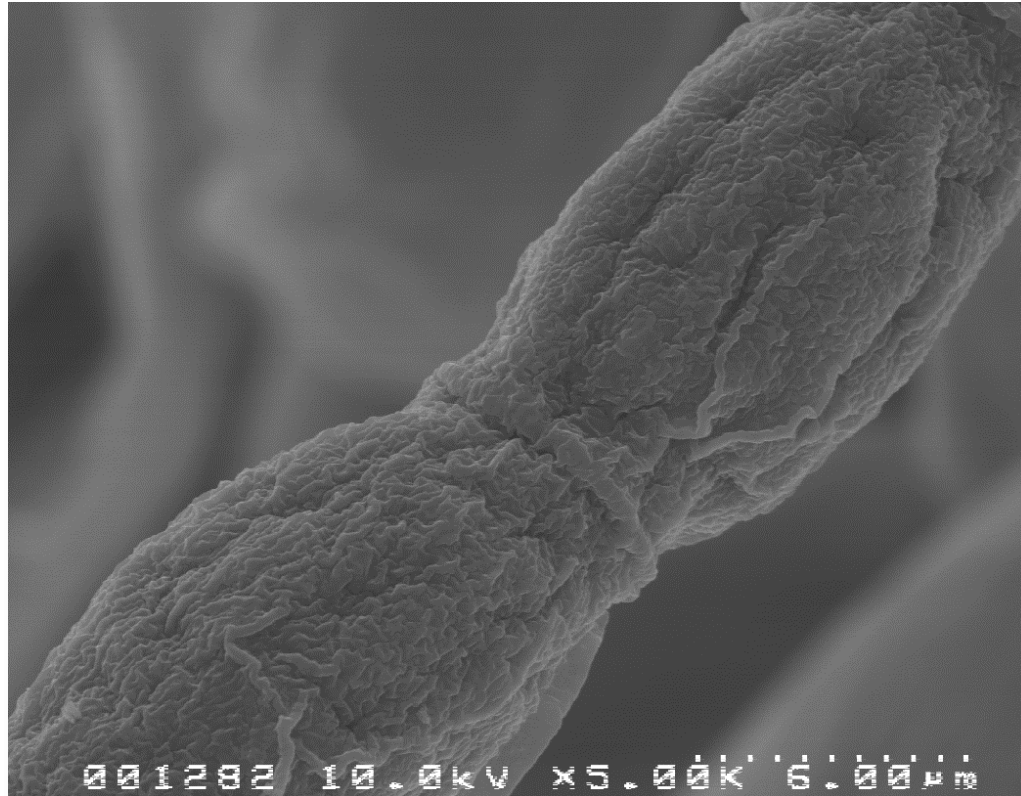
Moshe Reuveni, et. al. Agronomy. 2020.
10, 609; doi:10.3390/agronomy10040609
www.mdpi.com/journal/agronomy

TTO disrupts conidia (spore) development

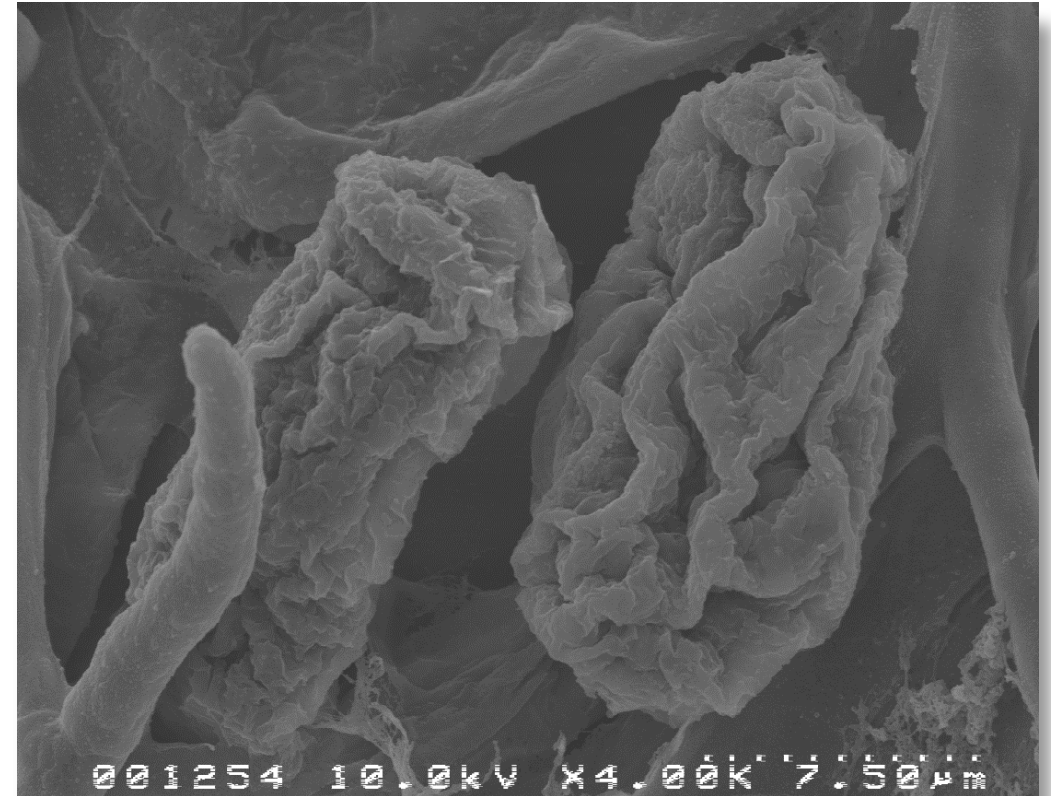


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Untreated



TTO Treated

Moshe Reuveni and Yigal Cohen.
Agronomy 2020, 10, 838; doi:10.3390/agronomy
10060836 www.mdpi.com/journal/agronomy

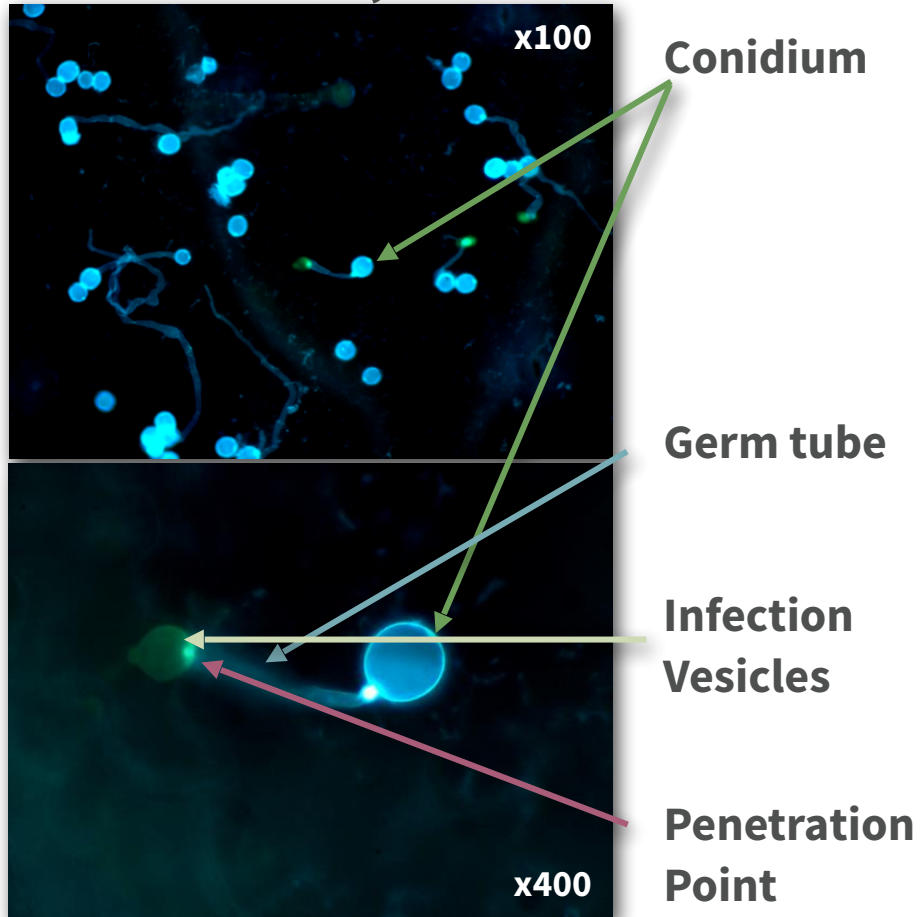
TTO disrupts spore germination & infection vesicle formation



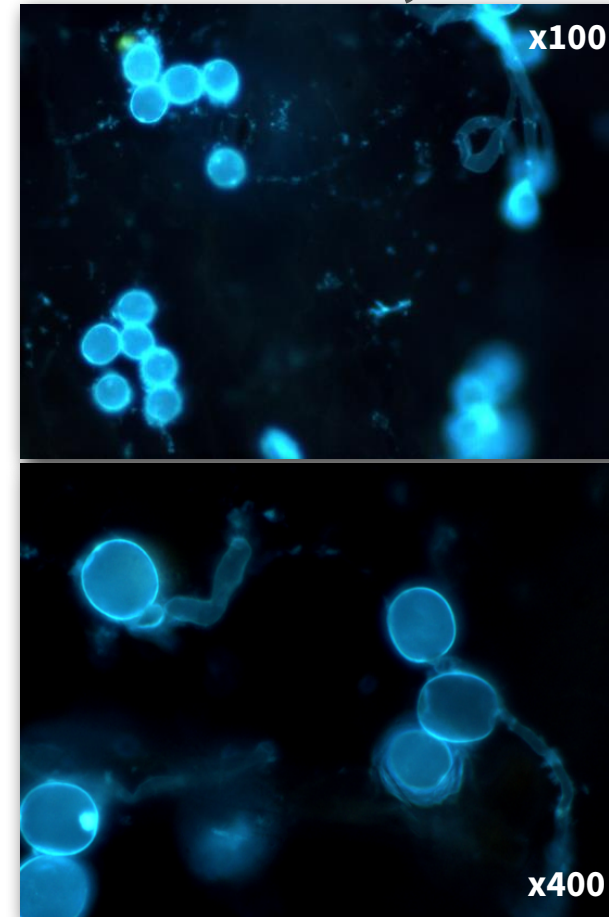
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Untreated, 2 DAI



TTO treated, 2 DAI



Conidia with low germination and no infection vesicle formation

Moshe Reuveni and Yigal Cohen.
Agronomy 2020, 10, 838; doi:10.3390/agronomy
10060836 www.mdpi.com/journal/agronomy

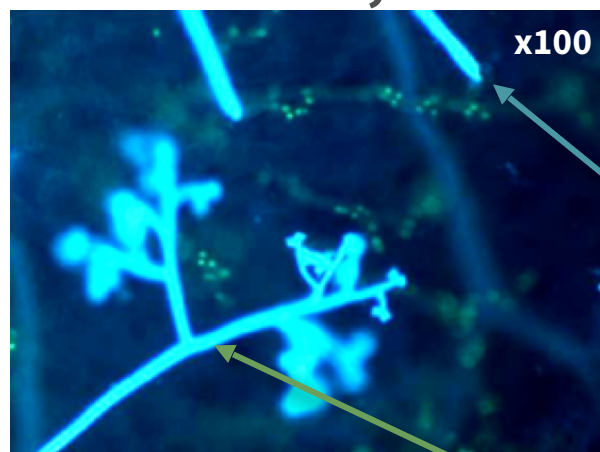
TTO disrupts infection, colonization and sporulation



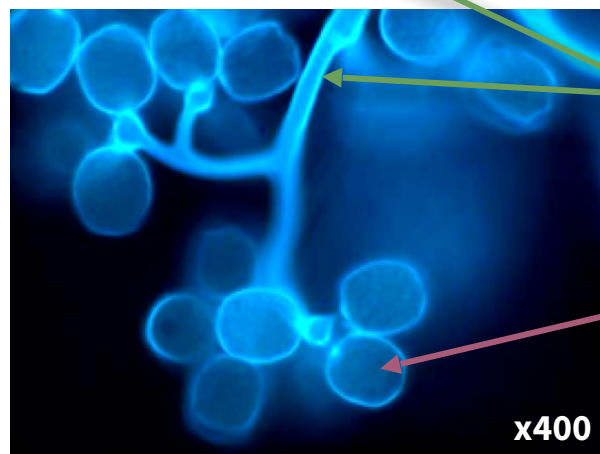
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Untreated, 6 DAI



Hyphae and AS

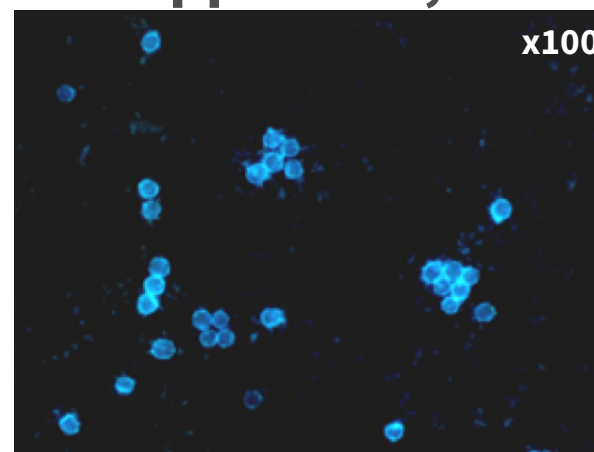


Conidiophore

Conidia

x400

2500 ppm TTO, 6 DAI

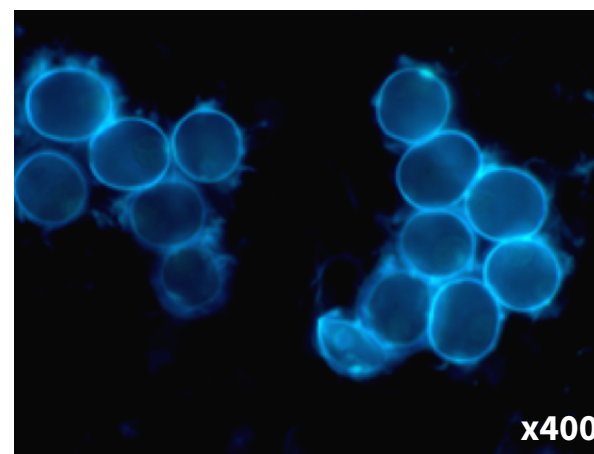


x100

No conidia (spore) germination

No Infection structure development

No colonization nor sporulation

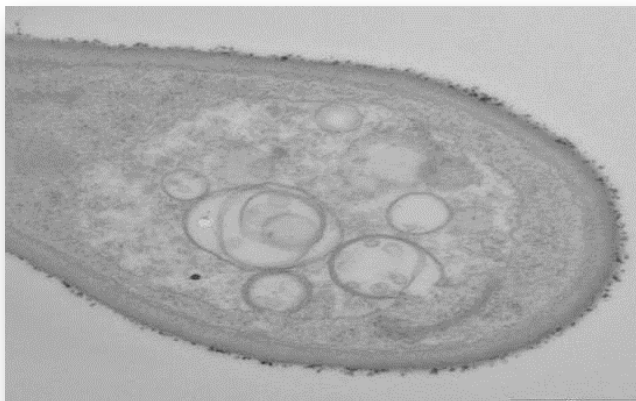


x400

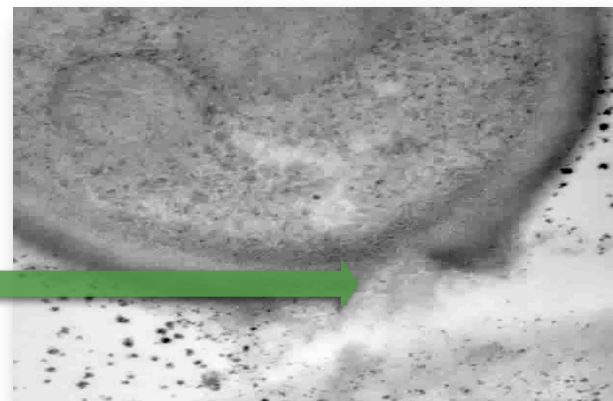
Moshe Reuveni and Yigal Cohen.
Agronomy 2020, 10, 838; doi:10.3390/agronomy
10060836 www.mdpi.com/journal/agronomy

TTO Disrupts Cell Membranes

Untreated



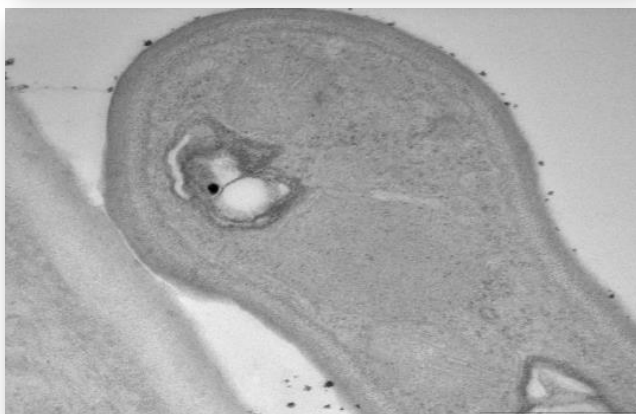
Tea Tree Oil



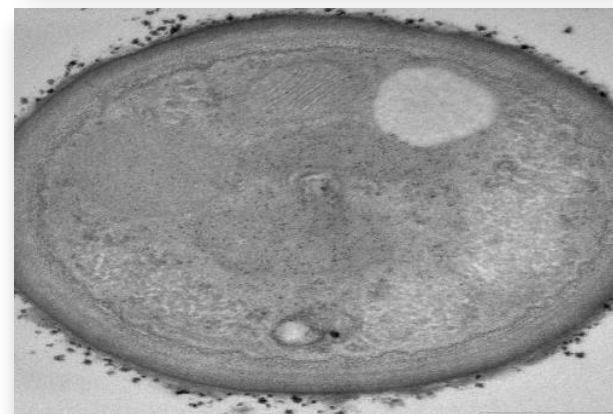
TTO breaks the
cell wall and
cell membrane
of the pathogen



Magnification
x50,000



Mineral Oil



Triazole

Hyphae of *Mycosphaerella fijiensis*.
M. Reuveni, E. Sanches, and M. Barbier.
Curative and Suppressive Activities of Essential
Tea Tree Oil against Fungal Plant Pathogens.
Agronomy 2020, 10, 609;
doi:10.3390/agronomy10040609

TTO Multiple Mechanisms of Activity

These allow plants to resist infections and disease development

Induction of Systemic Resistance (ISR)

Induction of Systemic Acquired Resistance (SAR)

Inhibition of Sporulation

Inhibition of Spore Germ

These prevent infections and disease epidemics from starting

This leads to death of both fungal & bacterial plant pathogens

Disruption of Cell Membranes

These prevent sporulation, disease development & spread

Inhibition of Respiration & Ion Transport

Inhibition of Mycelial Growth

Inhibition of Quorum Sensing on Bacteria

This prevents bacterial infections

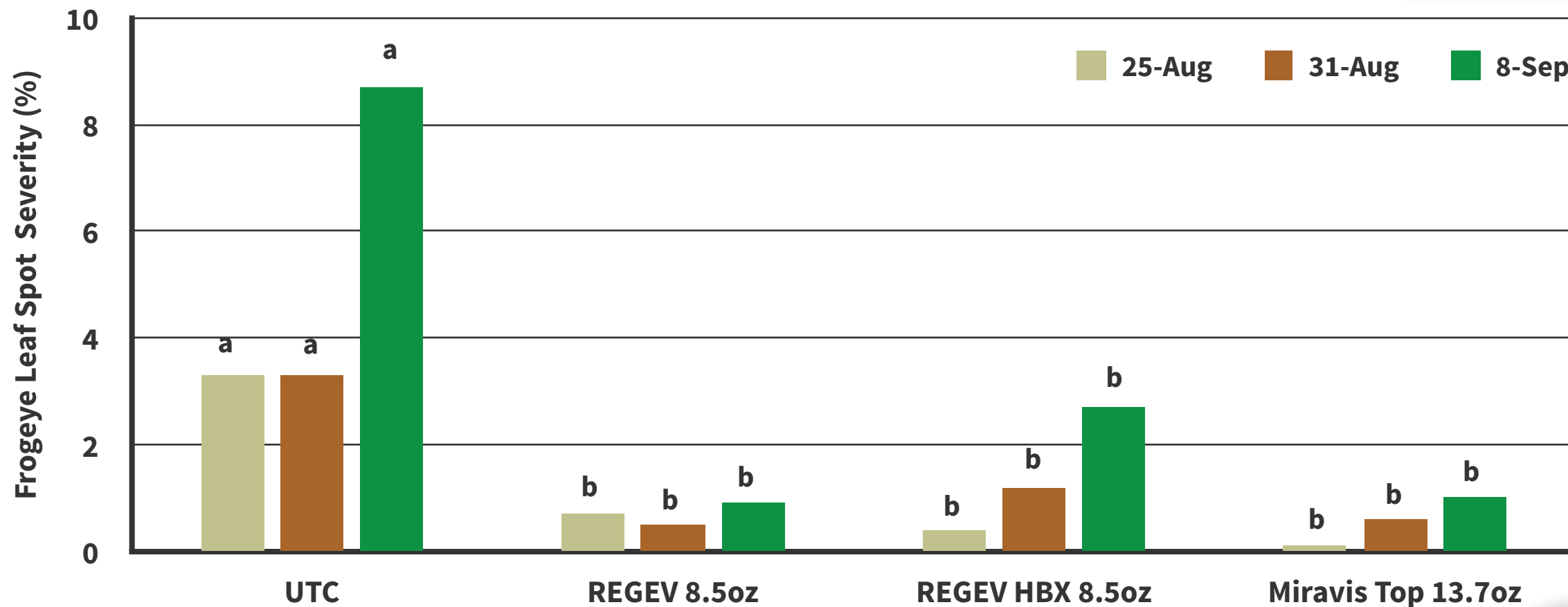
Tea Tree oil

Efficacy Against Frogeye Leaf Spot on Soybean



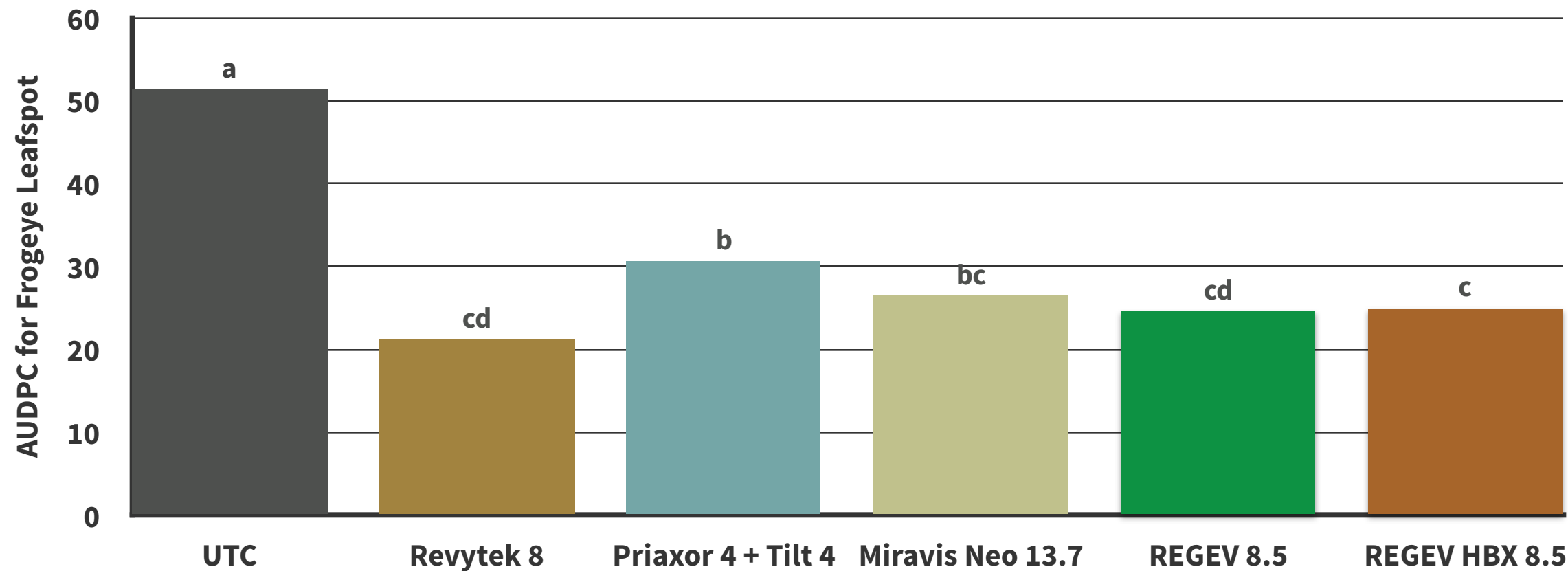
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Source: 531 Bradley Soybean FELS Princeton, KY. 2021

Area Under the Disease Progress Curve - FELS



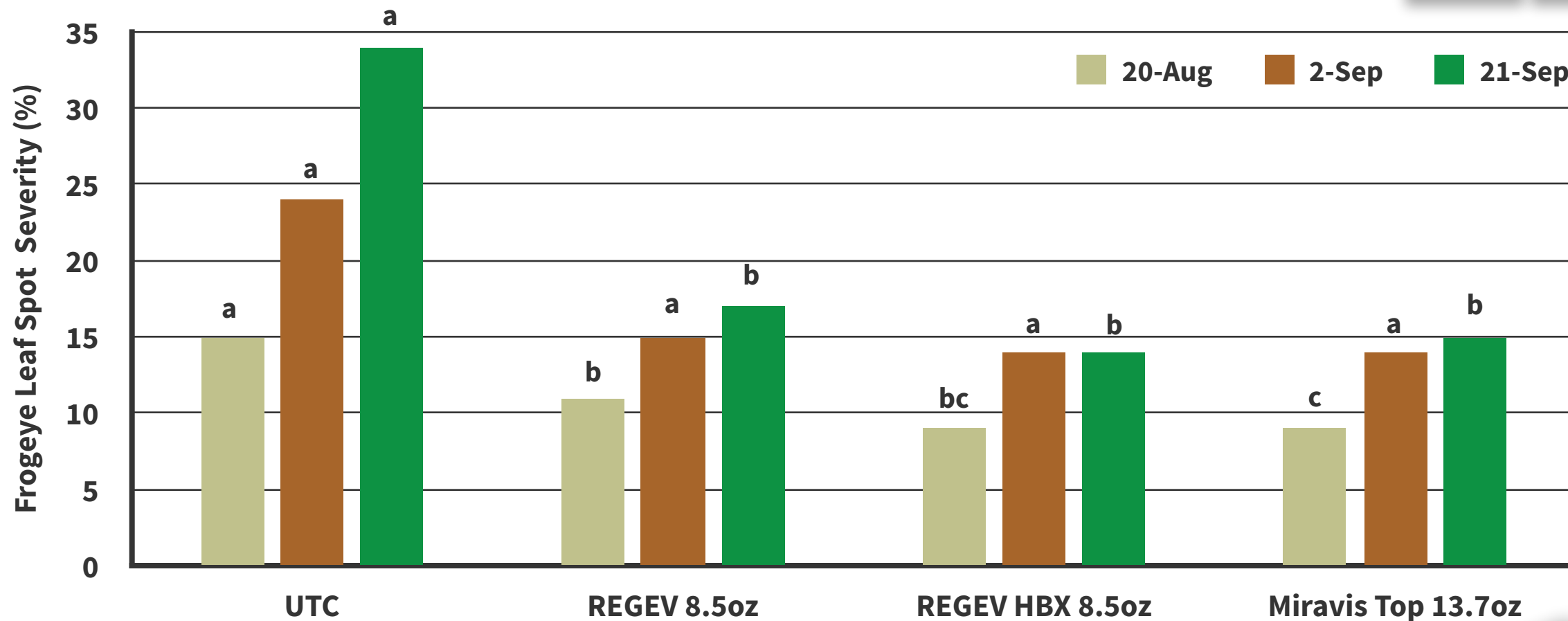
Source: 532 Bond Soybean Shawneetown, Illinois 2021

Efficacy Against Frogeye Leaf Spot on Soybean



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Source: 544 Winslow Soybean Belvidere, NC. 2021

TTO & Resistance Management: FRAC BM01



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BM: Biologicals with Multiple Modes of Action: Plant Extracts

TARGET SITE & CODE	GROUP NAME	CHEMICAL GROUP	COMMON NAME	COMMENTS	FRAC CODE
cell membrane disruption, cell wall, induced plant defense mechanisms	plant extract	terpene hydrocarbons, terpene alcohols and terpene phenols	extract from <i>Melaleuca alternifolia</i> (tea tree)	Resistance not known	BM01
			plant oils (mixtures): eugenol, geraniol, thymol		



Change mode of attack on soybean diseases

Resistance calls for a different approach in controlling common and emerging soybean diseases.

Kevin Schulz | Feb 09, 2022

Frogeye leaf spot is not uncommon on soybean plants, but Tamra Jackson-Ziems says one of her graduate students made a discovery that may be of concern.

"We're seeing resistance to one of the fungicide groups, Group 11 QoI [quinone outside inhibitor, formerly Strobilurin], in many other states," says Jackson-Ziems, a professor of plant pathology at the University of Nebraska-Lincoln.

Sampling was conducted in 48 counties in eastern Nebraska, and resistance was found in all of the 375 samples pulled from 128 different fields in that geographic area, representing the majority of the soybean-growing acres of Nebraska. "So, I think you can safely say that if you're looking at frogeye leaf spot out in the field, it is likely resistant to the Group 11 fungicides," Jackson-Ziems says.

Jackson-Ziems says updated recommendations reflect the inefficacy of the Group 11 products, and now call for mixed products with two or three different classes or modes of action.

REGEV HBX Competitive Summary

REGEV[™] HBX

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REGEV HBX Hybrid Fungicide

vs.

Other Triazole Fungicides

Multiple Mechanisms of Activity — 8

Inhibits Sporulation

Inhibits Spore Germination

Disrupts Cell Membranes

Inhibits Respiration & Ion Transport

Inhibits Mycelial Growth

Inhibits Quorum Sensing

Induces Defense Mechanism

Fungal Disease Activity

Bacterial Disease Activity

Viral Disease Activity

SAR / ISR Activity

Strong Resistance Management Product

Cost Competitive

Including Trifecta Protection:
Preventive, Anti-Sporulant, and
Double Kick-Back Curative Activity

BM01: New FRAC
Group for Tea Tree Oil

Multiple Mechanisms of Activity — 4 or Fewer

Inhibits Sporulation

Inhibits Spore Germination

Inhibits Respiration

Inhibits Mycelial Growth

Fungal Disease Activity

Assists Resistance Management

REGEV HBX fungicide is sold exclusively through Helena Agri-Enterprises & Tenkoz Member Companies

To learn more, visit us at **SUMMITAGRO-USA.COM**

Always read and follow label directions

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