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Efficacy of BCA in managing rice pests and diseases: EPIC interim results

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EPIC Annual Meeting
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EPIC: Highlights (2016-2017)

- Data to validate IPM components:
  - Up to 90% reduction in damage (e.g. rodent management)
  - Yield increase (~0.5 tons/Ha)
- > 500 individuals went through short term capacity building
- >30 farmers involved in testing IPM components, > 100 farmers visited the adaptive research plots
- 6 graduate students (4 MSc, 2 PhD)

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Adaptive research platform

Province	Village	Experiment	Dry/Early wet season	Wet season
Battambang	GDA Station	Trichoderma x Fungicide	Completed	Ongoing
	Boeug Pring	Weed management	Completed	Ongoing
	Ota Gnea	Weed management	Completed	Completed
Kampong Thom	PDA Station	Trichoderma x Fungicide	Completed	Ongoing
	O Kunthor Tbong	Weed management	Completed	Ongoing
	Pannachi	EPF and botanical	Completed	Ongoing
Prey Veang	PDA Station	Trichoderma x Resistant Varieties	Completed	Completed
	Thom	Weed Management	Completed	Completed
	Sdao	EPF and botanical	Completed	Completed
Takeo/ CARDI	GDA Station	Trichoderma x Resistant varieties	Completed	Completed
	Kandaul	LTBS	Completed	Completed
	Rovieng	CTBS	Completed	Completed

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Trichoderma and Resistant Varieties to manage Rice Diseases

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Methodology

- Highlight WS data (when disease incidence is the highest) from Svay Rieng and Prey Veng
- Randomized complete block design, with 3 replications
- Treatments:
  - Resistant variety (CAR14), no *Trichoderma*
  - Resistant variety (CAR14), with *Trichoderma*
  - Susceptible variety (IR504), no *Trichoderma*
  - Susceptible variety (IR504), with *Trichoderma*

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Methodology: Treatments

- Certified seeds of CAR14 (resistant variety) and IR504 (susceptible)
- Application of *Trichoderma harzianum*
  - seed treatment: 250g of product per 20kg seed
  - foliar spray: 20g of product per 20 liter water at 20 DAS, 30 DAS, booting and milk stages

Methodology: Observations

- Disease (leaf blast, neck blast…) incidence data @ tillering, panicle initiation, booting and dough stage
- Yield data

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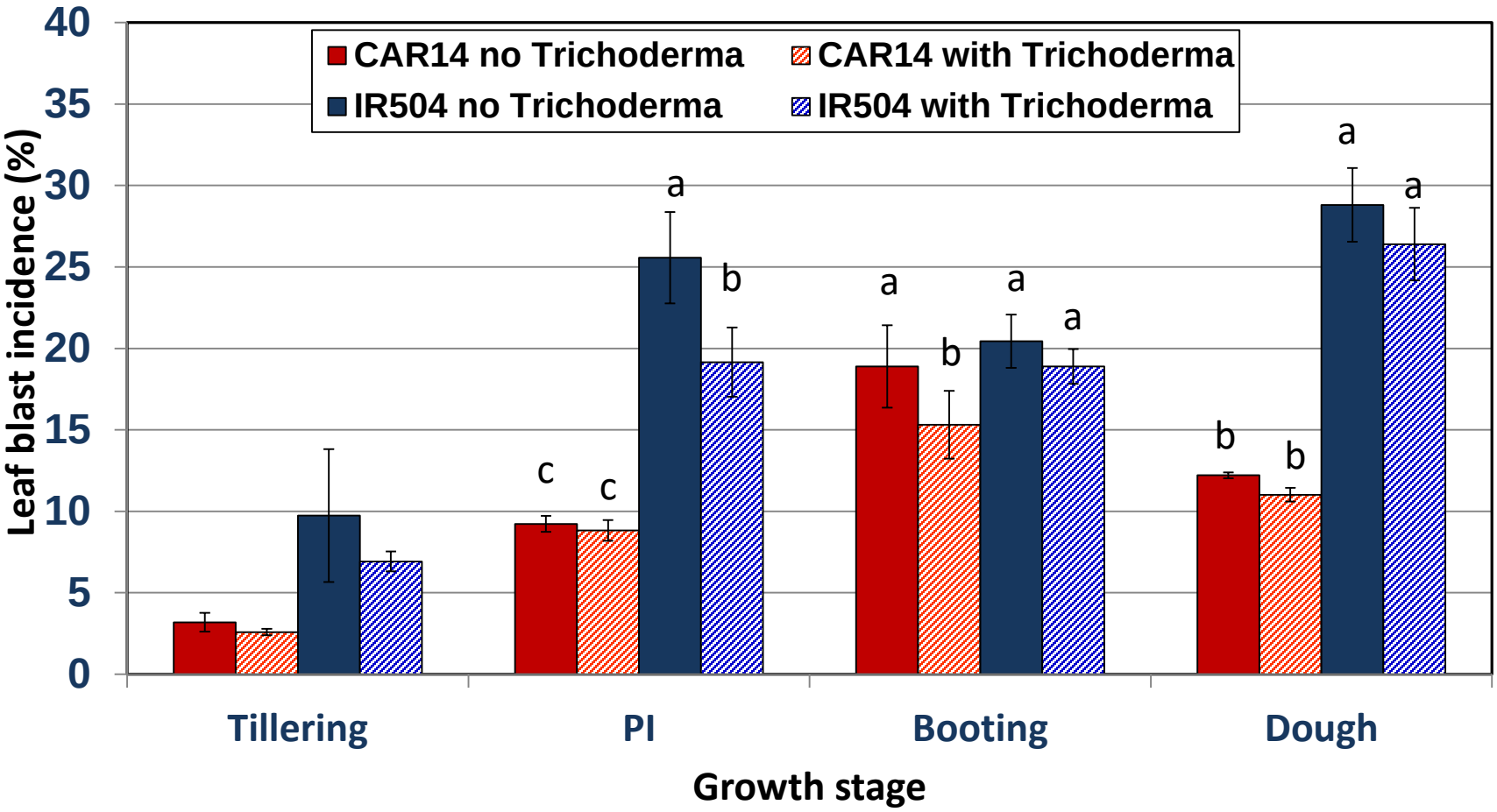
Effects on leaf blast Svay Rieng WS 2016



Effect of *Trichoderma* application and host plant resistance on leaf blast incidence, Kork Trop, Svey Rieng, Wet season 2016.

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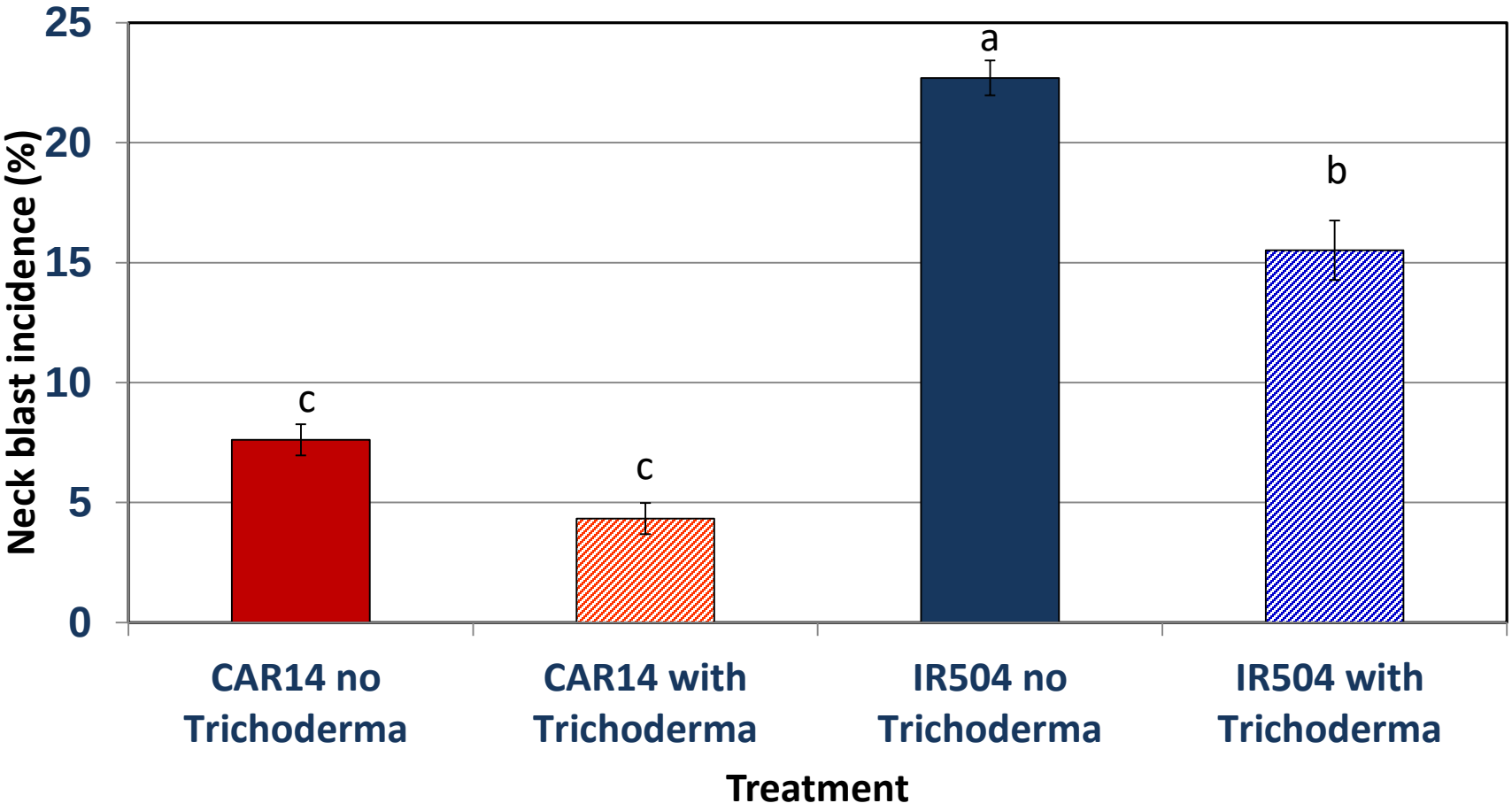
Effects on neck blast Svay Rieng WS 2016



Effect of *Trichoderma* application and host plant resistance on neck blast incidence, Kork Trop, Svey Rieng, Wet season 2016.

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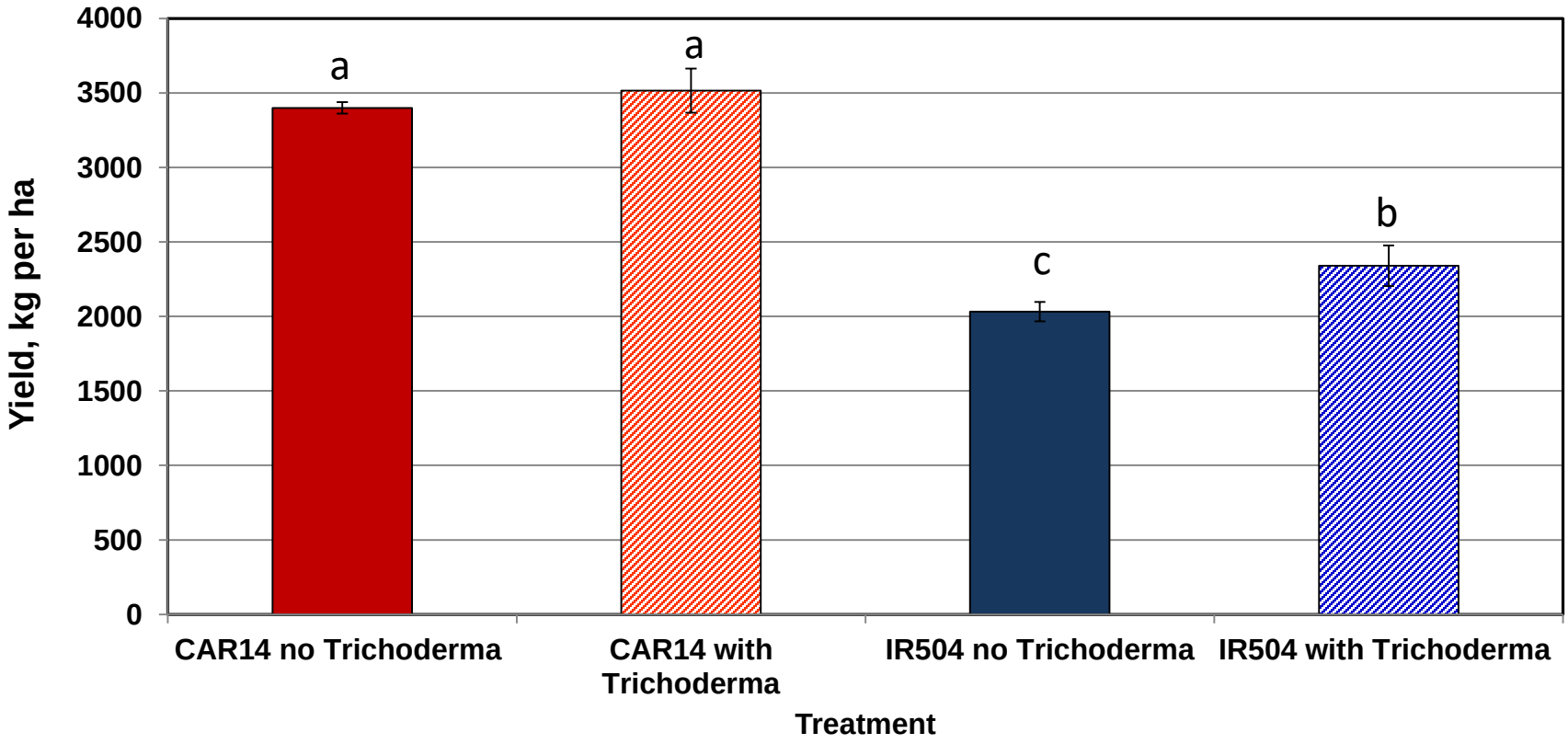
Effects on yield
Svay Rieng WS 2016



Effect of *Trichoderma* application and host plant resistance on yield, Kork Trop, Svey Rieng, Wet season 2016.

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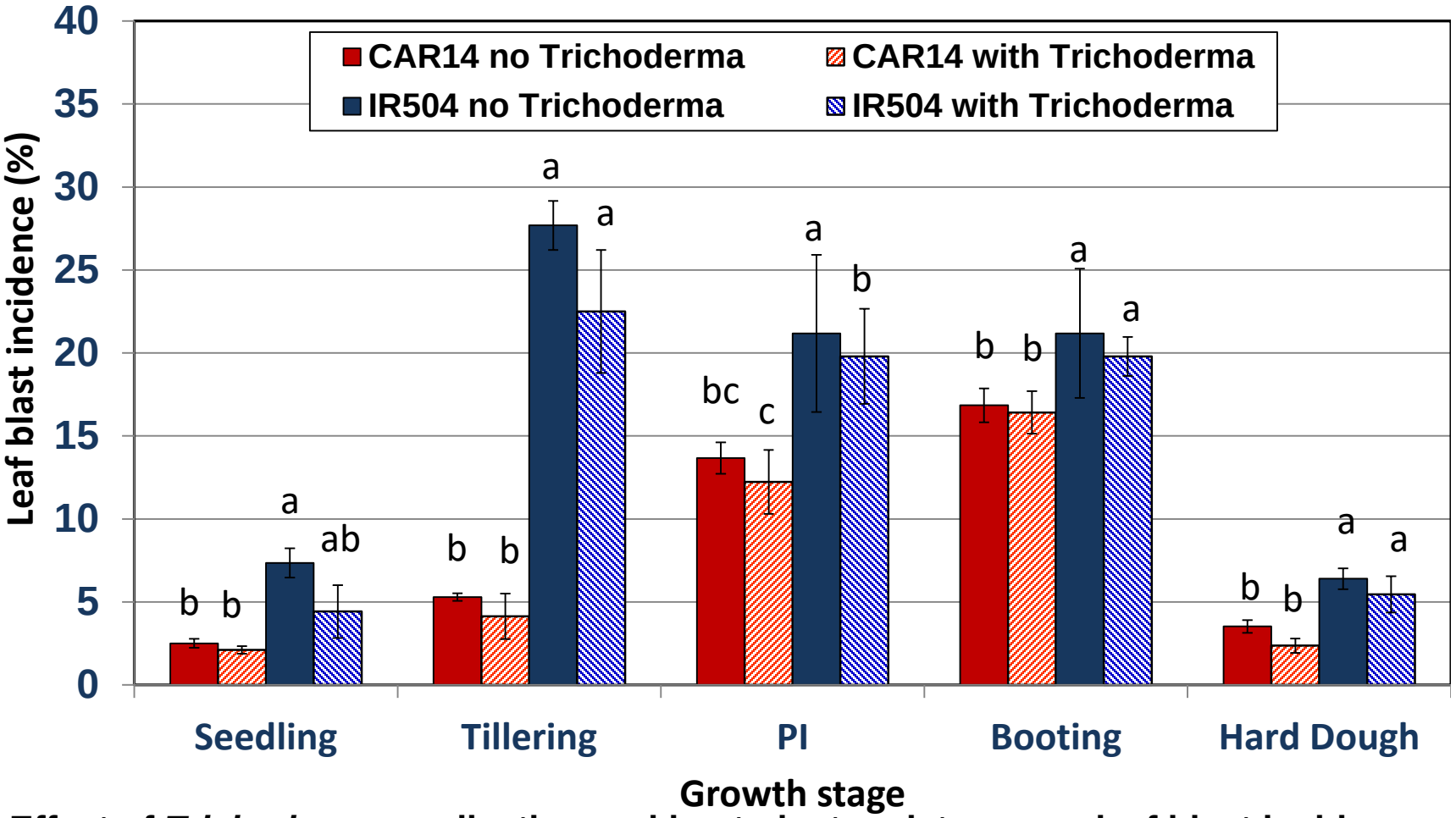
Effects on leaf blast Prey Veng WS 2016



Effect of *Trichoderma* application and host plant resistance on leaf blast incidence, Pour Las, Prey Veng, Wet season 2016.

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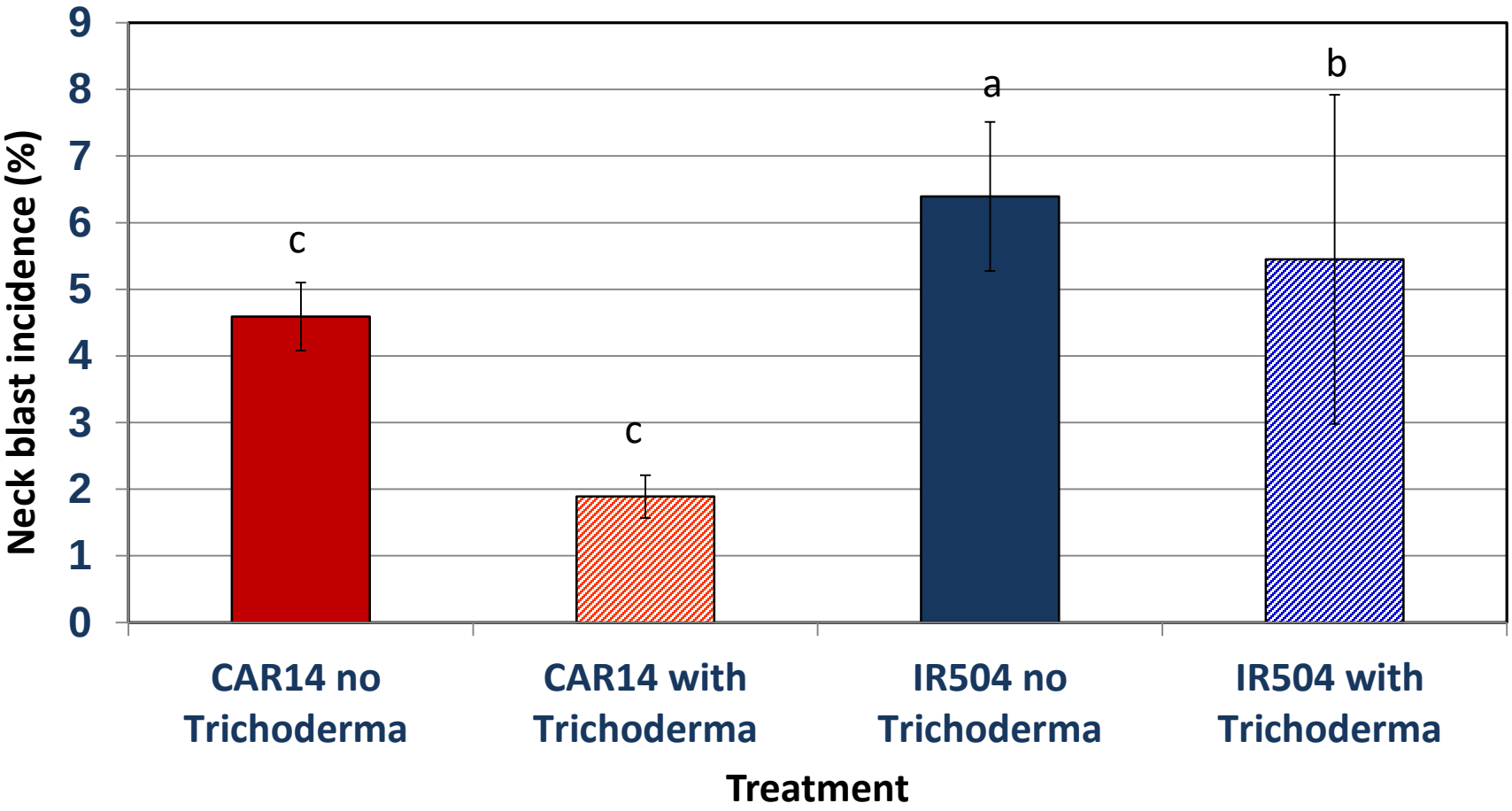
Effects on neck blast Prey Veng WS 2016



Effect of *Trichoderma* application and host plant resistance on neck blast incidence, Pour Las, Prey Veng, Wet season 2016.

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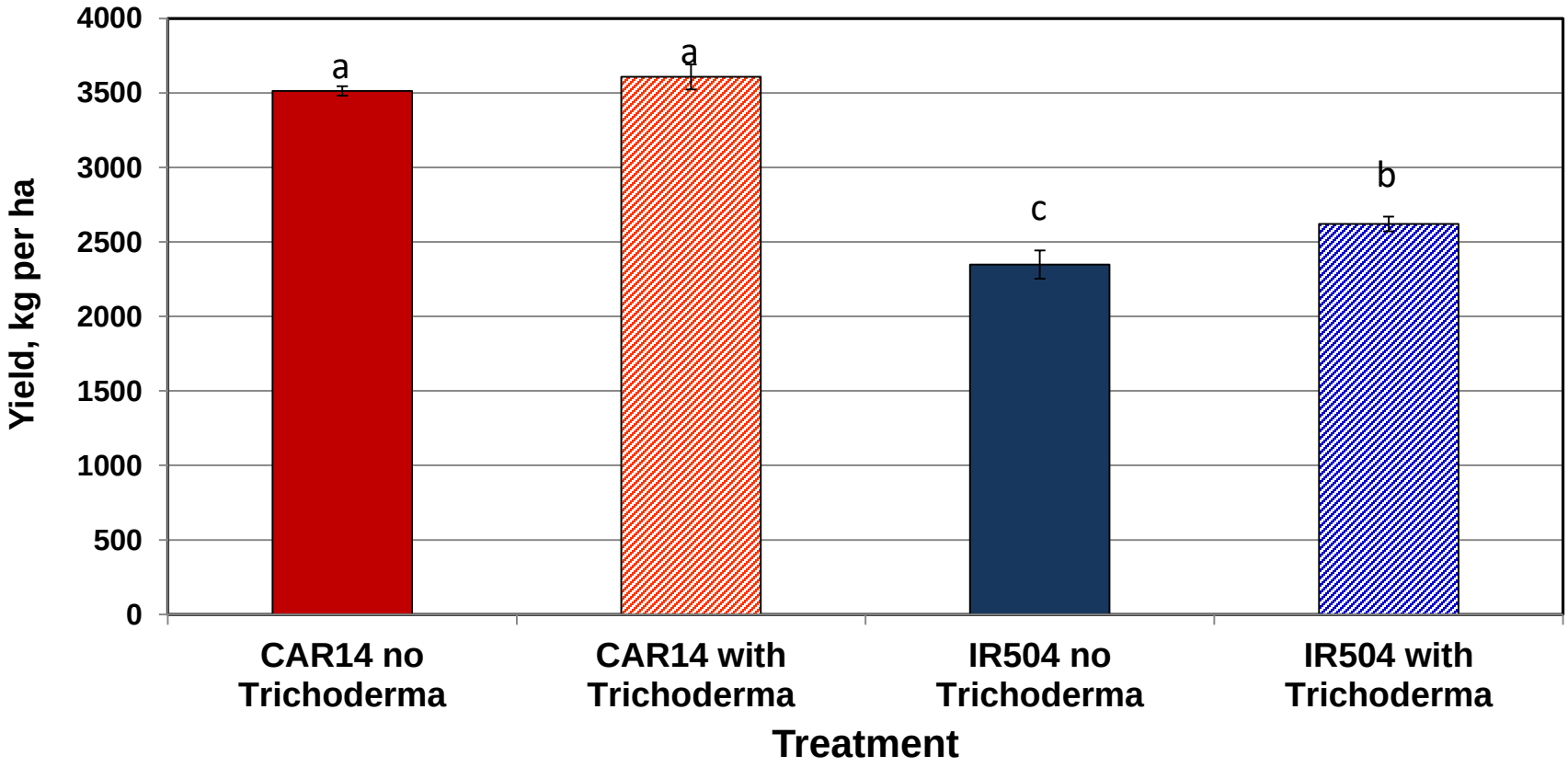
Effects on yield Prey Veng WS 2016



Effect of *Trichoderma* application and host plant resistance on yield, Pour Las, Prey Veng, Wet season 2017.

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SUMMARY & CONCLUSIONS

- Growing a resistant variety strongly reduced leaf blast and neck blast incidence.
- The application of *Trichoderma* reduced leaf blast and neck blast on the susceptible variety.
- Thus, if possible plant resistant variety. If susceptible variety is the only choice, Trichoderma application can be considered.
- Cost benefit analysis of the application of *Trichoderma* is ongoing

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Botanical and Microbial insecticides to manage rice insect pests

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Methodology

- Highlight DS data (when insect incidence is the highest) from Kampong Thom
- Randomized complete block design, with 4 replications
- Treatments: Botanical (Pre-Am, lemon oil), Microbial (Beauveria), BIPM, Conventional practice, Farmers' practice
- Observations: insect injury incidence at 4 stages, yield, economic costs/benefits.

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Treatments

	Pre-Am (Botanical)	Beauveria (Microbial)	BIPM	Conventional Practice	Farmers' practice
Establishment method	Drum seeder	Drum seeder	Drum seeder	Broadcast	Broadcast
Seed rate	100-120 kh/Ha	100-120 kh/Ha	100-120 kh/Ha	240 kg/Ha (K.Thom) 335 kg/Ha(P..Veng)	As per farmers' preference
Insect pest management	Pre-Am	Beauveria	None	-2 times a season (K. Thom) -5 times a season (P. Veng)	As per farmers' preference
Other	-2 Fungicide -2 Herbicide	- 2 Fungicide - 2 Herbicide	-2Fungicid -2 Herbicide	-2 Fungicide -2 Herbicide (7-30 DAS)	As per farmers' preference

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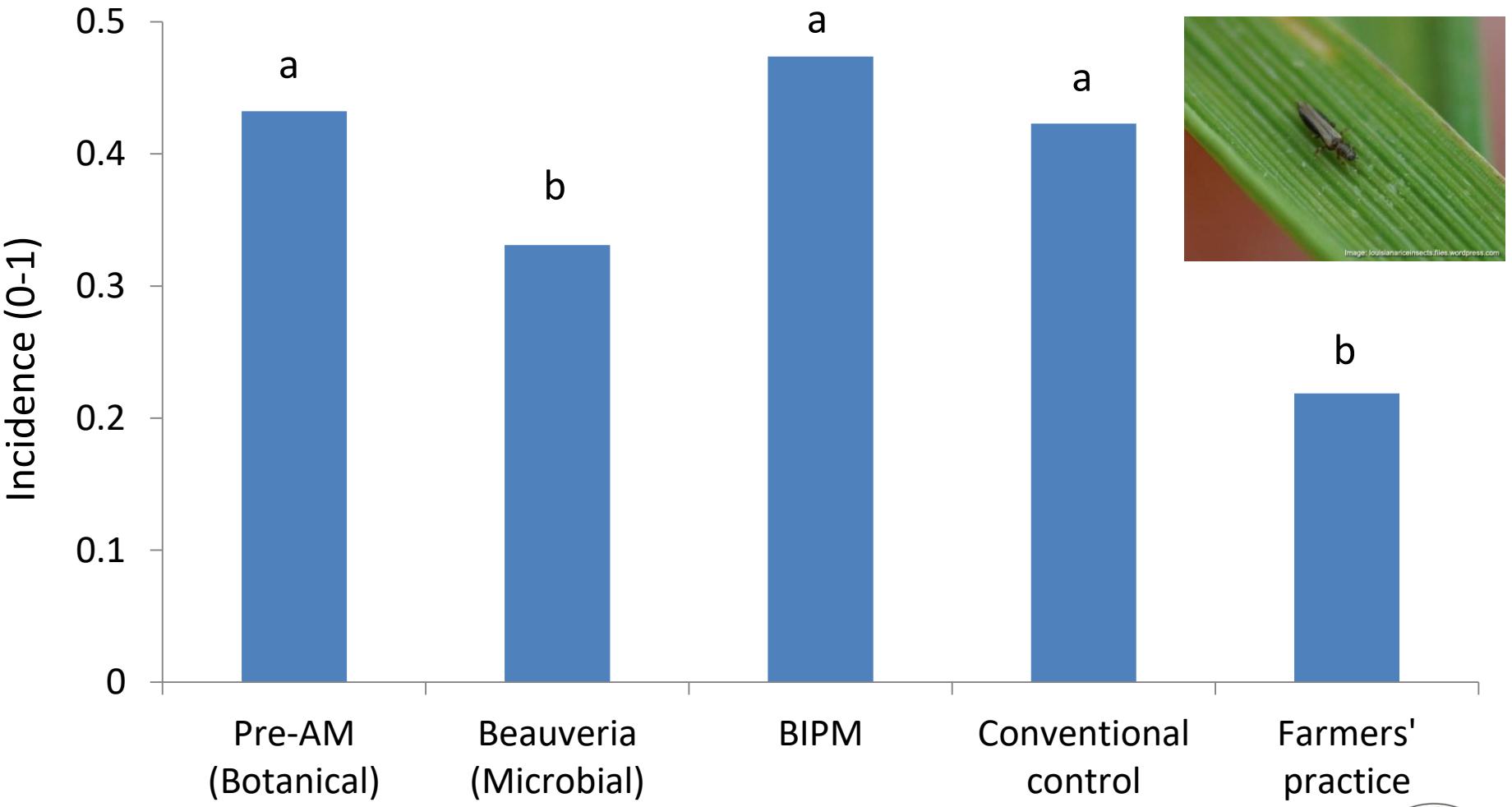
General findings

- Relatively low overall incidence of insect pests in DS 2017 (mostly defoliators, no or very low systemic injuries caused by hoppers or stem borers)
- Injury data showed different dominant types of injuries between plant stages
  - Thrips in the beginning of the season
  - Leaffolder, whorl maggot and other defoliators later in the season

Seedling stage injuries: Thrips – Kampong Thom DS 2017



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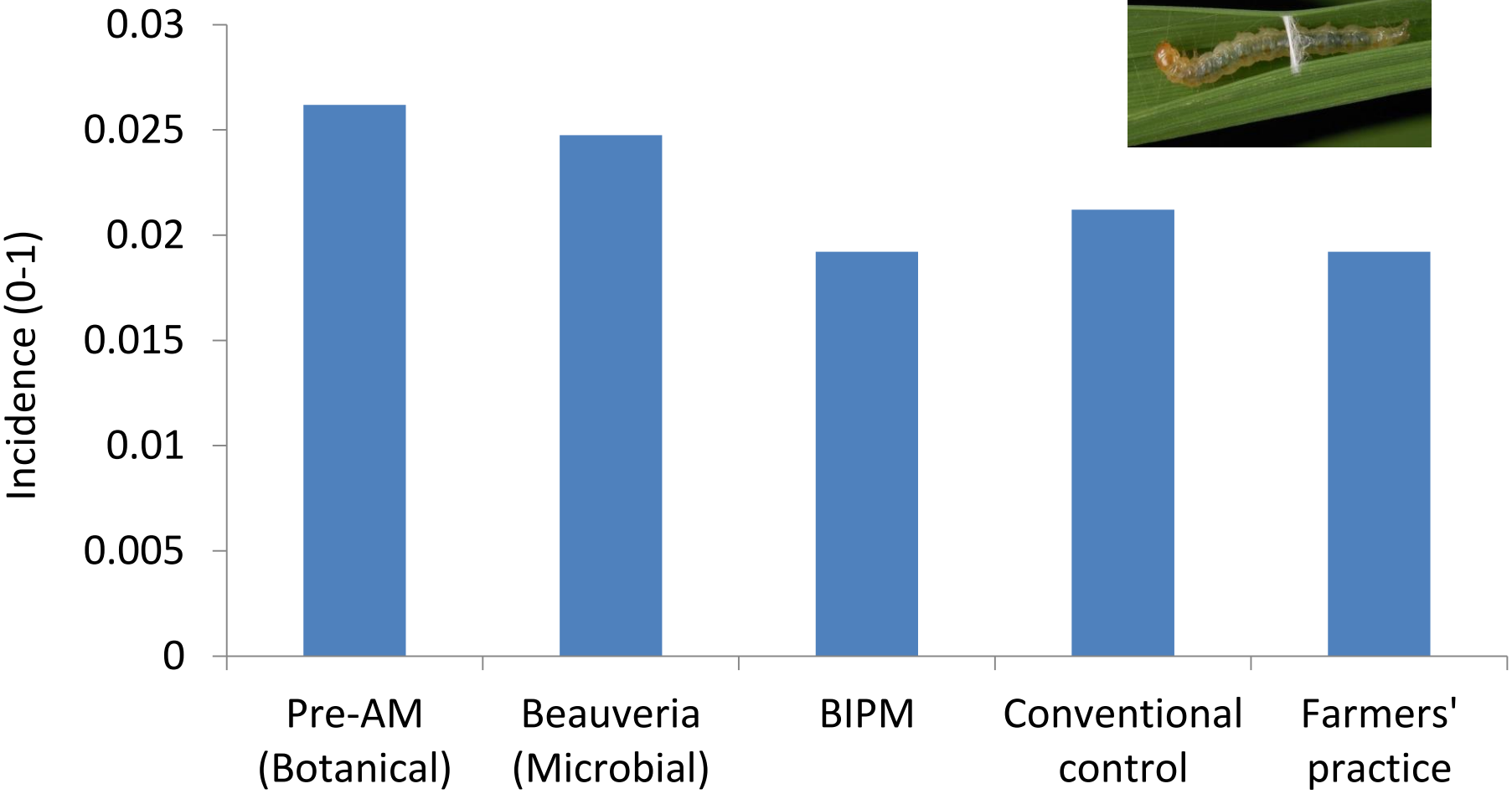
Booting stage injuries: Leaf folder, Kampong Thom DS 2017



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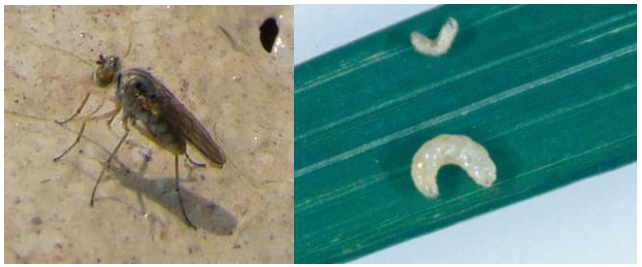
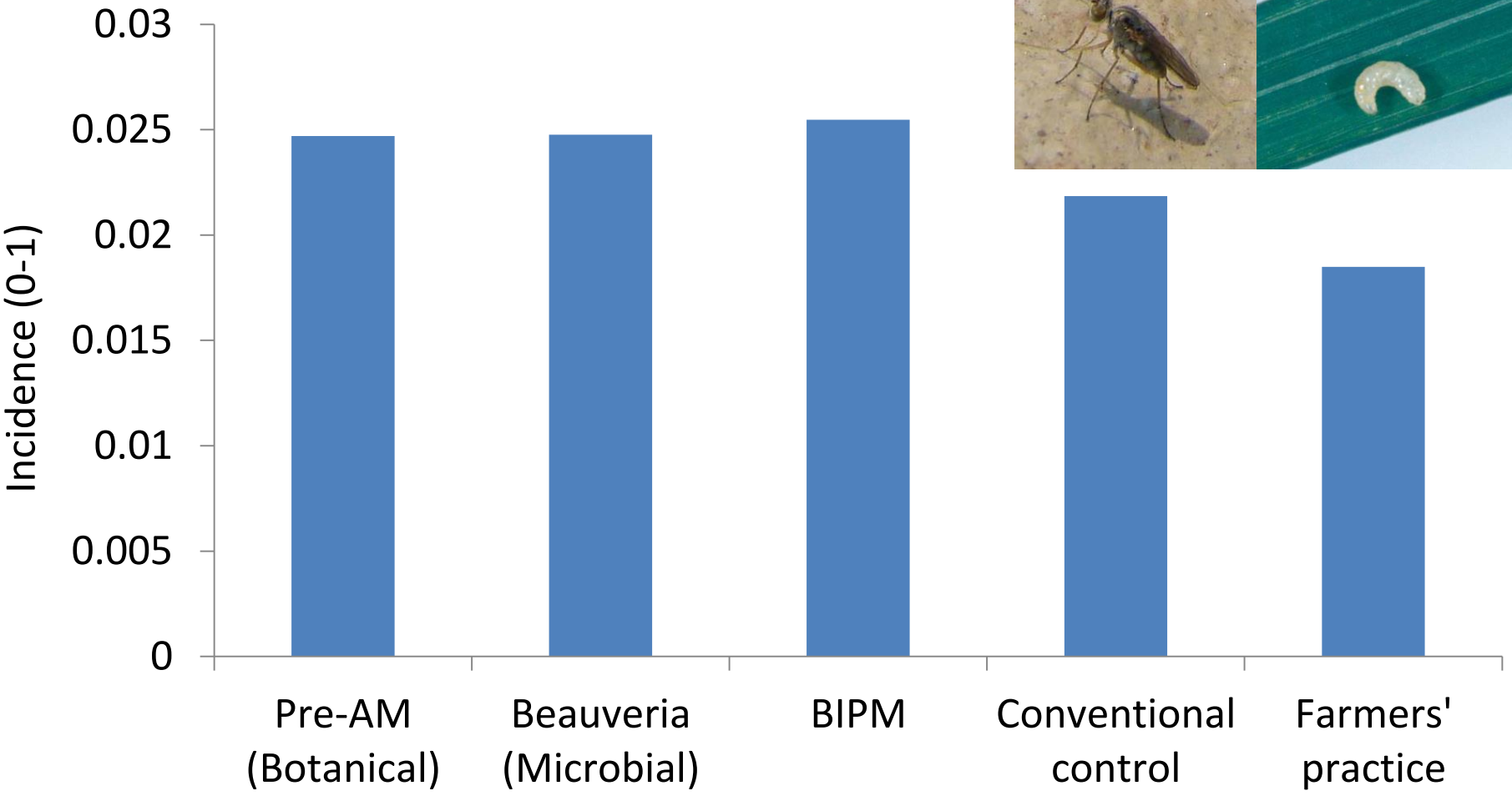
Booting stage injuries: Whorl maggot, Kampong Thom DS 2017





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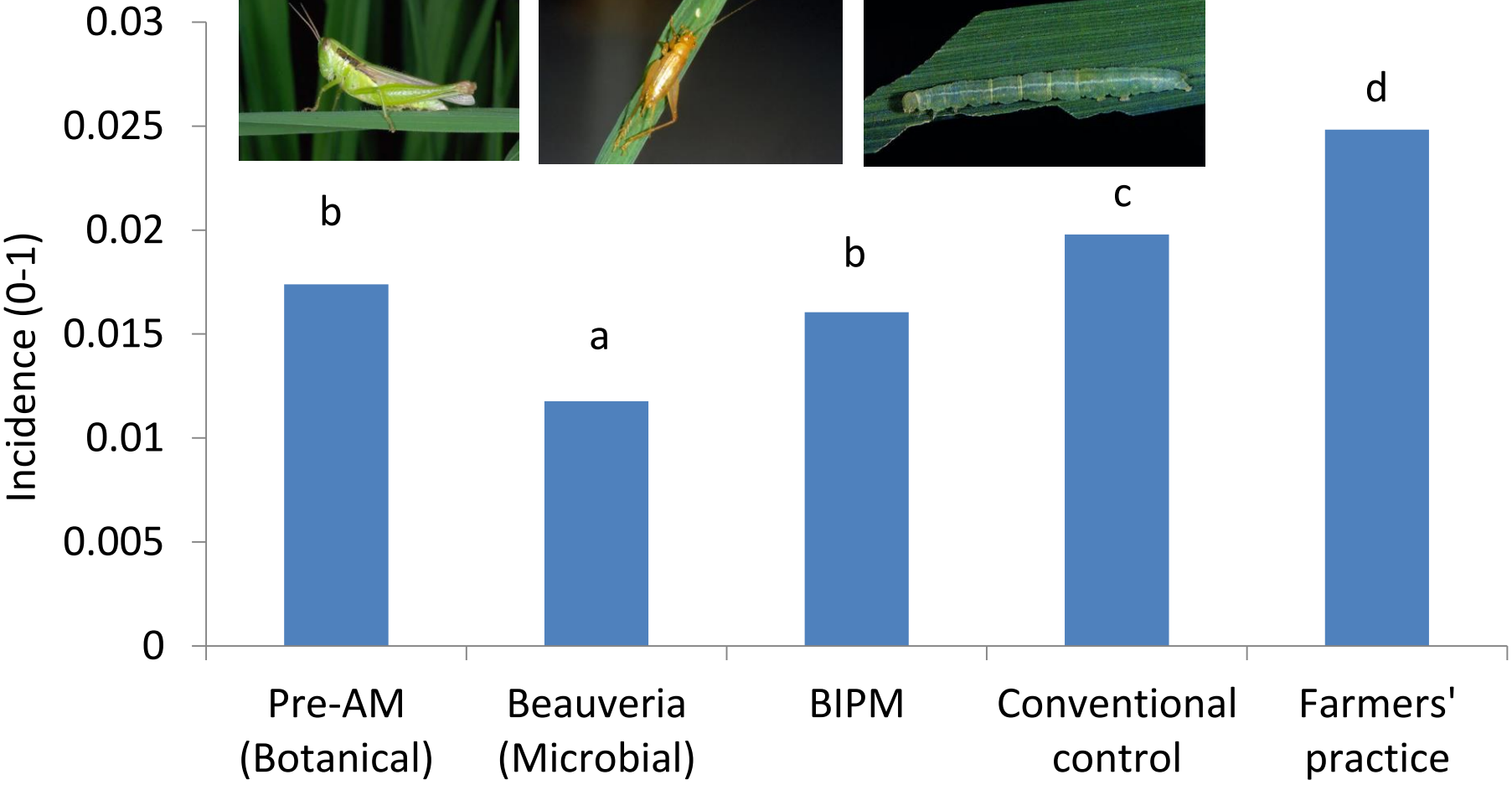
Booting stage injuries: Other defoliators, Kampong Thom DS 2017





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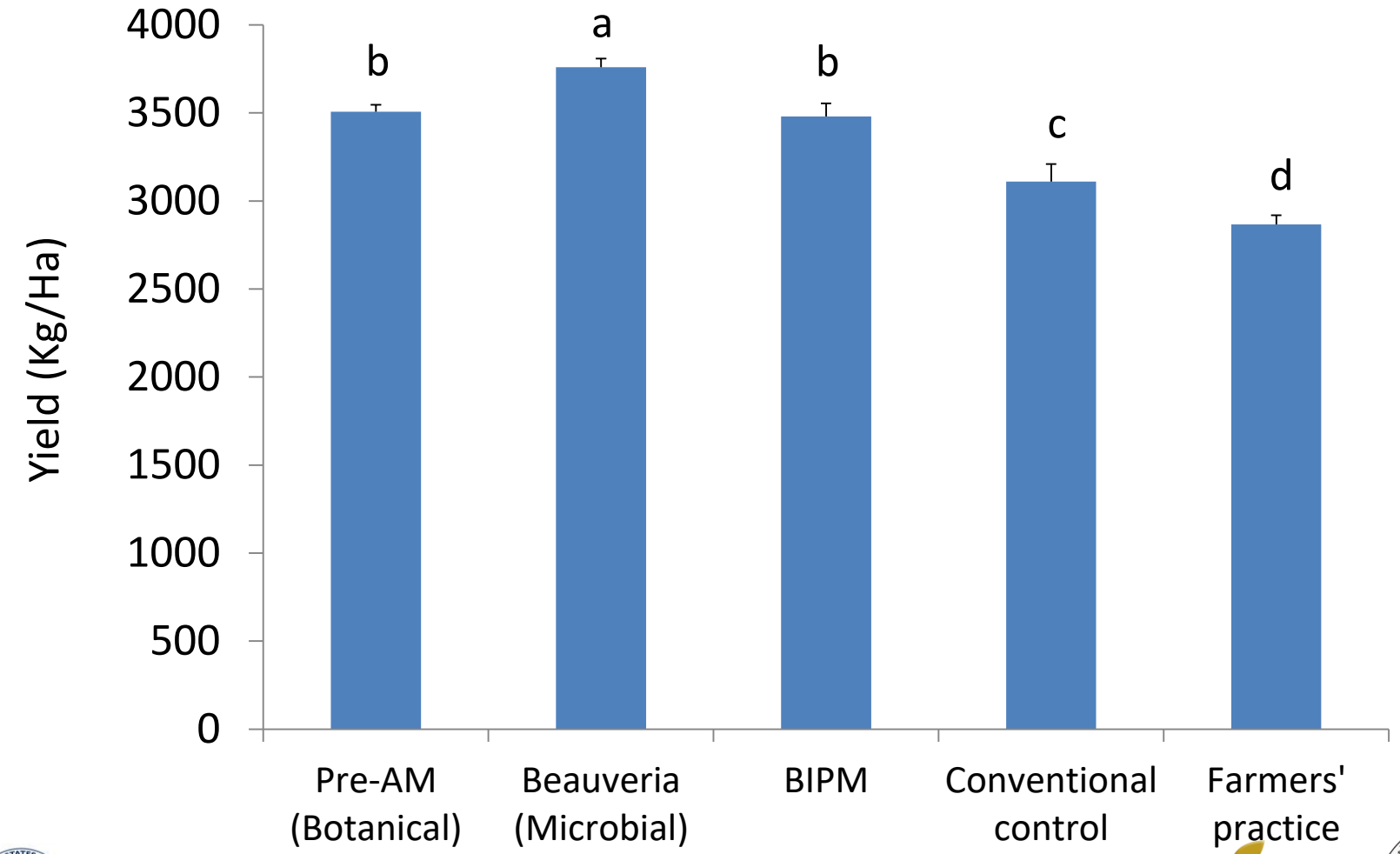
Yield (14% moisture) Kampong Thom DS 2017



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Estimation of profitability Kampong Thom DS 2017

		Pre-Am	Beauveria	BIPM	Conventional
Total expenses	Riel/ha	2,874,900	2,821,900	2,696,900	2,630,000
Total Income	Riel/ha	4,437,272	4,734,939	4,296,997	3,774,943
Net Profit	Riel/ha	1,562,372	1,913,039	1,600,097	1,144,943
Profit rate%		54	68	59	44

Running conclusion

- In a low pest pressure situations (e.g. DS 2017):
  - **Beauveria applications** lower incidences of thrips (start of the season) and other defoliators (later in the season) compared to most other treatments
  - **Yield is the highest in Beauveria-treated plots**
  - **BIPM** (no pest management action) and **BIPM+ yielded higher than conventional control and farmers' practice** (Drum seeder works!)