INTERNATIONAL CONFERENCE ON BIODIVERSITY

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Mulawarman University & Sebelas maret University

Berau, Indonesia, July 5-8, 2017

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International Conference on Biodiversity

Berau, Indonesia, 8th July 2017

SOCIETY FOR INDONESIAN BIODIVERSITY MASYARAKAT BIODIVERSITAS INDONESIA

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Pest diversity identification in East and North Kalimantan local upland rice population

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Background

- Pest is a serious problem in plant production and it is also a primary constraints in rice (Oryza sativa) production systems.

- It reduces the economic yield significantly.

- More than 100 species of insects are considered pests in rice production systems globally, but only about 20 species cause significant economic damage.

http://www.knowledgebank.irri.org/

Background

- Developing and using pest-resistant varieties is one of the most practical and economical approach to overcome this problem.

- Therefore, genetic improvement of pest resistance is one of important assignments in plant breeding program.

Background

East Kalimantan local rice varieties:

- Good taste (WWF, 2013), adaptive to local environmental condition.

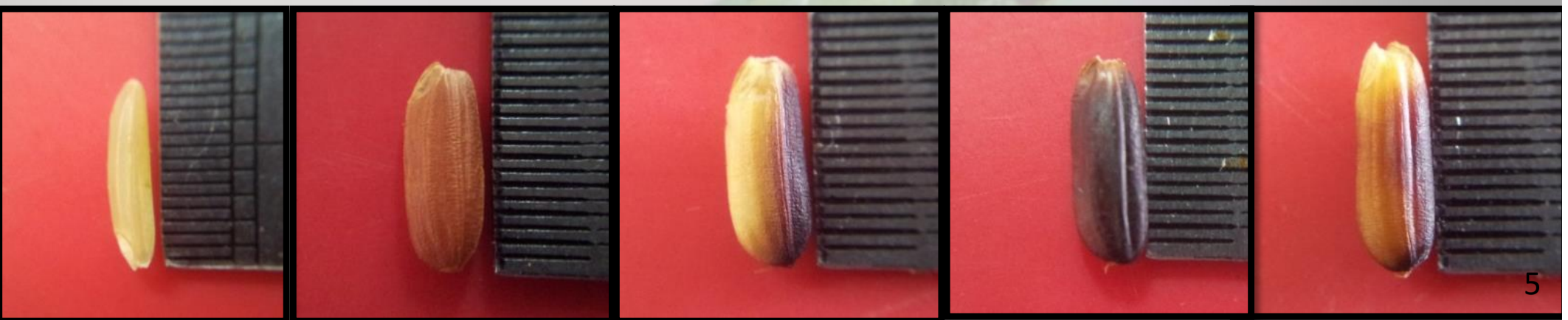
- Tolerance to particular rice diseases (Nurhasanah et al. 2016).

- Carrying alleles encoding for other superior traits which have not been characterized.

- Unfortunately, their response against pest diseases has not been well characterized.

Objective

- ✓ To characterize the diversity and intensity of pest in the local upland rice population
- ✓ To evaluate the response of East and North Kalimantan local upland rice cultivars against pest.
- ✓ To select local cultivars having tolerance against pest for rice breeding programs.



Methods

- 70 local upland rice cultivars from East and North Kalimantan were used as plant material in this study.

  - Penajam Paser Utara (7)
  - Paser (14)
  - Kutai Barat (36)
  - Kutai Kartanegara (7)
  - Nunukan (6)

Methods

- Field trial was conducted in Kutai Kartenegara Districts, East Kalimantan, in 2016.
- Three seeds were sown in every planting holes of 25 cm x 25 cm distances (distance in and between rows) in a small plots of 3m x 3m.
- Thinning and replanting were carried out when the seedlings were two weeks old, to maintain only one seedling grown well in each hill.
- The plants then were grown according to general upland rice cultivation procedure.

Methods

- ✓ Pest diversity were characterized in East and North Kalimantan local upland rice population

- ✓ Pest frequency and damage intensity were observed to evaluate the East and North Kalimantan local upland rice cultivars response against pest.

Results

There were several types of herbivore and detritivorous insects found in the rice cultivation

- ✓ Rice bug (*Leptocorisa sp*)
- ✓ Brown planthopper (*Nilaparvata lugens* Stal)
- ✓ Grasshoppers (*Locusta* spp.)
- ✓ Green stink bug (*Nezara viridula*)
- ✓ Coreid bug (*Anoplocnemis* spp.)
- ✓ Black and red ant (ordo Hymenoptera)

Results

The pests distribution in the local upland rice population

Pest Diversity	Number of cultivar infected
Grasshoppers	50
Rice Bug	39
Coreid Bug	14
Red Ants	13
Black Ants	10
Green Stink Bug	7
Brown Planthopper	1

Results

The pests distribution in the local upland rice population

Pest Diversity	Maximal damage intensity (%)
Grasshoppers	50
Rice Bug	5
Coreid Bug	20
Red Ants	30
Black Ants	30
Green Stink Bug	10
Brown Planthopper	10

Results

Pest frequency in the local upland rice cultivars

Number of Pest	Number of cultivar
5	2
4	7
3	15
2	29
1	14
0	3

Results

The most susceptible cultivar

Identity	Cultivar	Pest*
KBR_73	Baqu’	GH, CB, BA, RA, BP
KBR_110	Lani	GH, CB, BA, GSB, BP
PPU_7	Ketan Hitam	GH, RB, GSB, BP
PSR_38	Ketan Serang	GH, CB, RA, BP
PSR_71	Padi Dusun	GH, CB, RA, BP
KBR_74	Ketan mayang	GH, CB, RA, BP
KBR_91	Basong	GH, CB, BA, BP
KBR_119	Kojeng	PH, GH, CB, RA
KBR_141	Mayas Pancing	CB, BA, RA, BP

*Grasshoppers (GH), Rice Bug (RB), Coreid Bug (CB), Red Ants (RA), Black Ants (BA), Green Stink Bug (GSB), Brown Planthopper (BP)

Results

The putative resistant cultivar

Identity	Cultivar
KBR_124	Bogor
KKR_129	Bi’
KKR_134	Serai Gunung

Conclusion

- ✓ The response of East and North Kalimantan local upland rice cultivars against pest were varied
- ✓ There are several cultivars susceptible against particular pest but resistance to other
- ✓ Among 70 local upland rice cultivars, there were 3 cultivars resistance against pest.

Acknowledgements

The authors thank to:

- **The Ministry of Research, Technology through the INSINAS Research Grants 2014-2015 for the funding of East and North Kalimantan local rice exploration study.**
- **The Ministry of Research Technology and High Education through the PUPT Research Grants 2016-2017 for the funding of this current study.**

Thank you