Evaluasi Padi Berpotensi Alelopati dalam Pengendalian Gulma untuk Pengembangan Teknologi Budidaya Asupan Rendah Ramah Lingkungan

Penelitian Unggulan IPB: Penelitian Strategis Internasional

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INTRODUCTION

★ Allelopathy ⇒ the inhibitory/stimulatory effect(s) of one plant

(Rice, 1984) (weeds, crops, plants' residues, m.o.)

(Molisch, 1937) on another plant(s)

through production of chemical compound(s)

that escape into the environment

- Could be released as: root and pollen exudates;
- litter decomposition;
- volatile compounds of leaves, stem, roots;
- leachates from aerial parts

★ Allelopathic rice against weeds for sustainable agriculture

☞ Rice plants with allelopathic traits

⇒ could be used as eco-friendly cultivation against weeds in terms of LEISA scheme.

⇒ Rice plants with an allelopathic effect on weeds could mean lower production cost because the need for herbicide application and/or hand weeding can be reduced.

☞ Exploring rice allelopathy

⇒ optimization of rice's potential resources to give beneficial contribution for cultivation purposes.

☞ During rice cultivation, beside achieving for high productivity, quality and profitability ⇒ we should also concern to keep sustainability of the resources.

Research Status

★ Institut Pertanian Bogor (IPB) - Konkuk University (KU) Korea Selatan

⇒ *Letter of Agreement for Academic Cooperation Program* (April 2005)

★ Rice Allelopathic Res. at KU:

⇒ started since 2000

⇒ Junaedi's dissertation:

¤ Evaluation of bioassay

⇒ Double Pots Allelopathy Bioassay (DPAB) in Lab.

⇒ Rice-mixture exudates bioassay in Lab.

⇒ Rice Ratoon Interplanting Barnyardgrass Seedling (RRIBS) bioassay in Field.

☞ Evaluation in F9 (and F10) of Nongan/Sathi cross

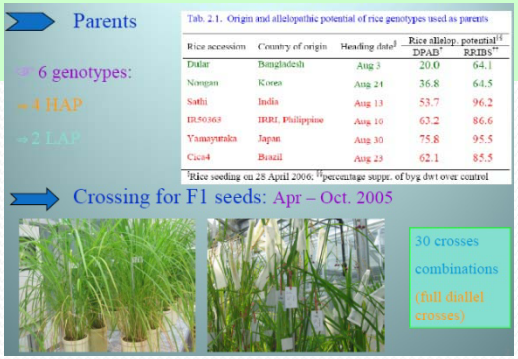
Research Status

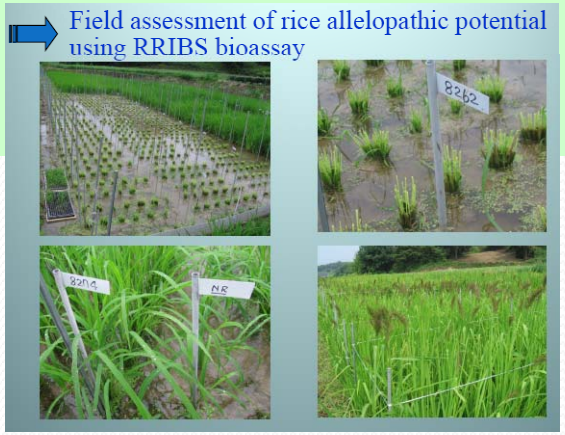
⇒ Junaedi's dissertation:

¤ Diallel analysis on rice allelopathic potential

⇒ 4 HAP, 2 LAP accessions

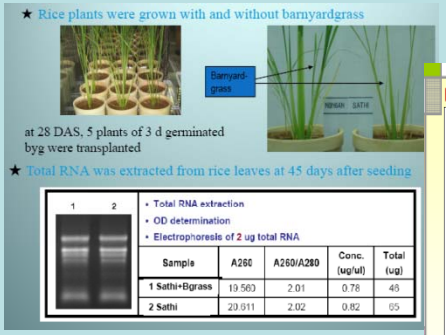
☞ Pengembangan populasi F2, F3, dst

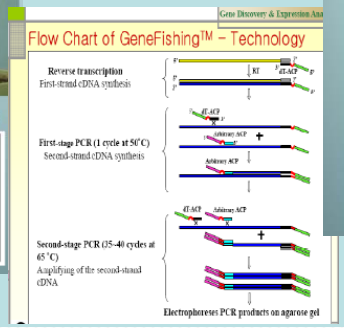


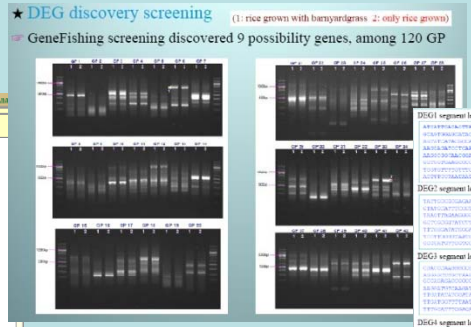


⇒ Junaedi's dissertation:

¤ **Differentially Expressed Genes**







Lingkup Penelitian

Percobaan 1: Evaluasi potensi alelopati RILs F_9 Nongan/Sathi.
⇒ dilanjutkan pada F10

Percobaan 2: Evaluasi periode kritis terhadap gulma pada galur harapan HAP RILs F_{10} Nongan/Sathi

Percobaan 3: Evaluasi agronomis produktivitas galur harapan HAP RILs F_{10}

4. Pengembangan pertanaman populasi F_2

5. Pengembangan pertanaman populasi F3 -- dst

Evaluasi potensi alelopati RILs Nongan/Sathi.

F_9 $\Rightarrow$ dilanjutkan pada F_{10}

Rice Ratoon Interplanting Barnyardgrass Seddling Bioassay

rice transplanting → byg seeding → rice ratooning + byg transplanting

30 (15) days, in tray

at 3 (2) WAT, Byg seedling

at 5/4 WAT, one byg seedling/ rice hill

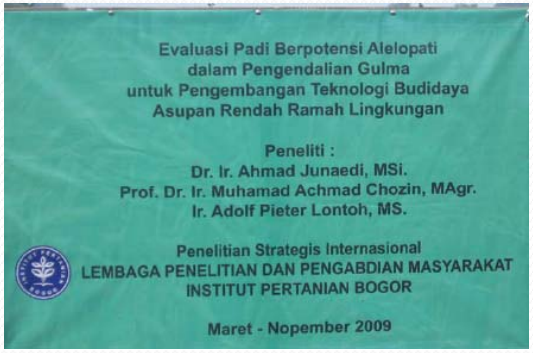
co-growing

observations

Byg height and

Byg dwt at 6 WABT

Pelaksanaan Penelitian



- Nongan and Sathi varieties,
  Suppressed 6.9 and 28.7 % in Byg height,
  Suppressed 27.3 dan 77.1 % in Byg dry-weight

In RILs

- suppression of barnyardgrass height as much as 7.4 – 41.3%

- suppression of barnyardgrass dry-weight as much as 39.2 – 85.9 %

- Rice showed variation among selected lines in date to heading, plant height, panicle length and number of panicle per hill.

- Generally, heading time in tropical (Bogor) condition is 20 – 30 days earlier than that in sub-tropical (Seoul, Korea) condition. Rice plant height in Bogor is also shorter 20 – 40 cm than that in Seoul condition.

- The promising lines presumably have less than 100 days of planting period and may have better grain quality, in particularly for the taste.

CONCLUSION

- Some promising high and low allelopathic rice lines have been obtained from the Nongan/Sathi cross (a cross between Japonica and Indica in which having high and low allelopathic potential)

  ➡ useful as internal mechanism for weed control, in terim of LEISA

- These promising lines have advantage on several important characters such as earlier heading and better grain quality.

- Further serial works are under progress to evaluate agronomical performance of these promising lines to promote them could be applied in the farmer's field.

Thank You