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August 22-24, 2017, MALAYSIA

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Weed Species Shifting and Dominance After Solarization with Color Plastic Mulches under Organic Farming Practice

SAT-12

Dielectric-Based versus Gravimetrically-Measured Water Content in Relations to Texture and Organic Carbon of Highland Soils

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Abstract— **This study aimed to determine relations between texture and organic carbon to the water content measured using the field and laboratory methods for highland soils in Sumatera, Indonesia. Five locations covered with different annual crops were selected for the measurements of actual soil water content and the sample collections for the laboratory analyses. Soil water content was first determined in situ by measuring the electrical impedance Z (in kΩ) using a portable impedance meter and converting the data into soil water content θ (g.g-1) according to the following equation: θ = a.Zb where a = 0.45 and b = -0.15. A soil sample was then taken from the same point and soil depth of the dielectric measurement, put tightly in the plastic bag and brought to the laboratory for the analyses of field soil water content, texture, and carbon organic. The measurement and sampling were repeated at ten points for each location; therefore there were 50 pairs of data collected in this study. Results showed that the actual soil water content in the field was related more closely to the clay fraction rather than to sand, silt and carbon organic contents. The dielectric-based predicted were consistently lower than the gravimetrically measured values of soil water content, therefore further studies were required to improve the accuracy of the proposed instrument. Keywords— electrical impedance; gravimetric water content; organic carbon; texture.**

SAT-13

SCREENING AND IDENTIFICATION OF UPLAND RICE LINES DERIVED RECURRENT SELECTION FOR DROUGHT TOLERANCE

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Abstract— **Variety assemblings for higher yield capacity of upland rice which tolerant to drought stress and highly adaptable to climate change have been needed to support the effort to increase both rice yield and the upland rice field extensification. This research aims to screen and identify an agronomic character of upland rice lines as the result of recurrent selection to a seedling stage on the drought stress. Materials were 180 rice lines as the result of recurrent selections from two local varieties Sriwijaya and Bugis with other two drought tolerant lines IR7858-1 and N148+. Twenty seeds each genotype were seeding in seed pods adjusted with stripe check such Salumpikit and Inpari 6 as tolerant and susceptible lines respectively. Drought stress treatment had conducted in a week, began at two weeks seedling age with a scoring value 0-9 (SES IRRI), at the same time were taken sample soil to measure the soil water content was done at a depth of 20 cm. Then, the crops were watered again to observe the recovery capacity of the crops, with the scoring 1-9 (SES IRRI). Anatomically stomatal proximation was observed for both susceptible and tolerant rice lines. The selected lines would transplant in the field to record the yield capacity and other agronomic characters. The SES screening resulted in 53 tolerant lines, 99 moderate tolerant, and 28 susceptible to the drought stress which had the soil water content ranged from 11.9 to 12.7 percent.. Anatomic stomatal observation showed that the stomatal structure and density of susceptible lines were closer and more than tolerant lines. The highest percentage of filled grains showed by the intercross line Sriwijaya/IR7858-1 about 77.4 to 85.1 percent with averagely 80.7 percent, which was a high category with the scale of 3 SES IRRI. The selected drought stress lines with better agronomic character would continuously test to know the yield capacity in the environmentally specific location.**

Keywords— **Screening, Drought tolerance, upland rice, recurrent selecti**

AGROECOTECHNOLOGY STUDY PROGRAM
UNIVERSITY OF BENGKULU

SCREENING AND IDENTIFICATION OF UPLAND RICE LINES DERIVED RECURRENT SELECTION FOR DROUGHT TOLERANCE

by
RENY HERAWATI AND MASDAR

BACKGROUND

This research aimed to screen and identify agronomic characters of 180 genotype rice lines resulting recurrent selection in drought stress tolerance at seedling stage.

METHOD

180 lines of recurrent cross selection result derived from local rice Bengkulu crosses

Drought tolerance assessed by Standard Evaluation System IRRI

Tabel 1. Plant drought respond classification based on SES IRRI (2002)

Score	criteria	Description
0	Highly Tolerant	No symptoms
1	Rather tolerant	Slight tip drying
3	Tolerant	Tip drying extended up to ¼
5	Moderate tolerant	One-fourth to 1/2 of all leaves dried
7	Moderate susceptible	More than 2/3 of all leaves fully dried
9	Susceptible	All plants apparently dead. Length in most leaves fully dried

Table 2. Plant recovery growth rate response classification after drought treatment based on SES IRRI, 2002

Score	criteria	Description
1	Tolerant	90-100% plants recovered
3	Rather tolerant	70-89% plants recovered
5	Moderate tolerant	40-69% plants recovered
7	Moderate susceptble	20-39% plants recovered
9	Susceptible	0-19% plants recovered

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RESULTS

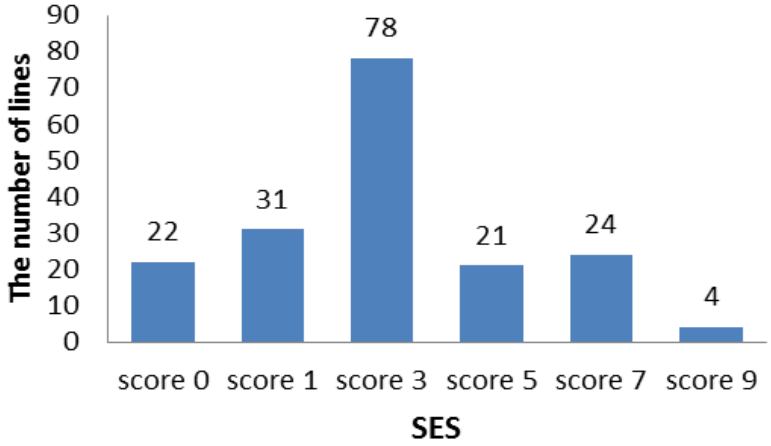

Figure 1. Distributions of rice lines with different drought tolerance scores (in SES scale 0-9)

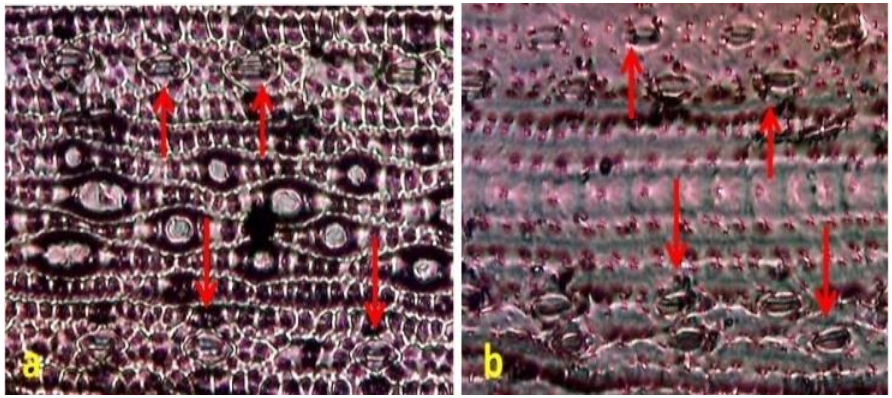

Figure 4. Stomatal observation on the tolerant line (a) and susceptible line (b)

Figure 2. The appearance of lines on the treatment of drought stress, and the ability of plants to recoverily grow back.

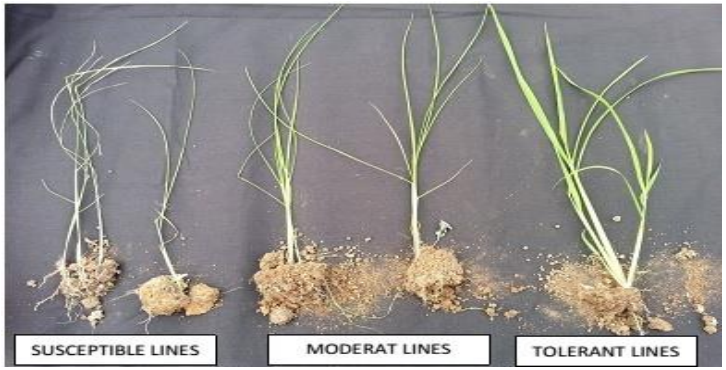

Figure 3. Comparison of tolerant seedlings (0-1 score), moderate tolerant (score 3-5) and susceptible (score 7-9) in treating drought stress

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RESULTS

Grouping and performance of 53 selected drought-tolerant lines

Crossbreeds	The number of lines	Plant height (cm)		The number of productive tillers	
		Range	Average	Range	Average
Bugis/IR7858-1	13	117-151	139,5	2-11	6,7
Bugis/N148+	5	125-143	136	2-22	5,6
Sriwijaya/N148+	12	112-128	118,5	6-12	8,9
Sriwijaya/IR7858-1	23	91-122	109,7	3-16	9,3
	The number of lines	Maturity		Panicle length (cm)	
		Range	Average	Range	Average
Bugis/IR7858-1	13	114-125	121,5	20,7-26,2	22,4
Bugis/N148+	5	110-116	113,6	20,5-22,1	21,3
Sriwijaya/N148+	12	114-120	118,5	20,4-22,5	21,7
Sriwijaya/IR7858-1	23	115-123	119,2	20,5-23	21,9
	The number of lines	Percentage fill grain/panicle		Grain weight/hill (g)	
		Range	Average	Range	Average
Bugis/IR7858-1	13	71,1-77,2	74,2	15,3-24,7	21,1
Bugis/N148+	5	72,7-81,3	77,1	15,1-23,1	18,8
Sriwijaya/N148+	12	72,6-84,6	81,6	15,5-22,2	19,7
Sriwijaya/IR7858-1	23	77,4-85,1	80,7	15,3-22,5	18,9

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CONCLUSION

- The screening based on SES results in 53 tolerant lines, 99 moderate tolerant lines, and 28 susceptible lines to drought.
- Anatomical observation to stomata shows that stomatal composition and density of susceptible genotype being more denser and number full compared to the tolerant genotype.
- The highest percentage of fill up grain at Sriwijaya/IR7858-1 crossbreed ranged from 77.4 to 85.1 percent, averagely 80.7 percent and being categorized as high based on the 3rd SES IRRI scale.
- Selected lines with good agronomic characteristics in drought being recommended for further testing to determine the potential yield rate in the specific environments.

THE END

THANK YOU