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The 8th International Conference on Integration of Science and Technology for Sustainable Development (8th ICIST)

Huiyuan International Hotel, Jingde, Anhui Province, P.R. China

November 19-22, 2019

this

CERTIFICATE OF MERIT

is hereby awarded to

Reny Herawati

as

Oral Presentation

at the 8th International Conference on Integration of Science and Technology for Sustainable Development at Huiyuan International Hotel, Jingde, Anhui Province, P.R. China November 19-22, 2019

KASEM SOYTONG, Ph.D.
Founder and President
AATSEA

TIMO KORPERA, Ph.D.
Chairman of International
Organizing Committee

The 8th International Conference on Integration of Science and Technology for Sustainable Development (8th ICIST)

Water Conservation, Biological Diversity, Food Safety and Agriculture"

Huiyuan International Hotel, Jingde, Anhui Province, PR China

November 19-22, 2019

Ref. No. 07/044
Date: 16/7/2019
Email: reny.herawati@unib.ac.id

Dear Dr. Reny Herawati,

This is to inform you that your research entitled "**Analysis of Polyethyleneglycol (PEG) and Proline to Evaluate Drought Stress of Double Haploid New Type Upland Rice Lines**" has been accepted for **ORAL PRESENTATION** in the 8th International Conference on Integration of Science and Technology for Sustainable Development 2019 (8th ICIST 2019) to be held in Huiyuan International Hotel, Jingde, Anhui province, PR China during November 19-22, 2019. The scientific program which including date and time of presentation will be send to you soon. Please submit full manuscript before 30 August 2019. Full manuscript will be proceeded to peer review for evaluation process to be accepted to publish in special issue of scopus indexed journal (IJAT). You can also be introduced 3 reviewers for your full manuscript to evaluate by given names and email address to us. If manuscripts do not qualify for IJAT or late submission, it will be online published in conference proceedings at website www.aatsea.org. Thereafter, the abstracts are accepted, the author must make payment for registration fee, otherwise your abstract will not be published in the book of abstracts. Please kindly make payment of registration fee directly to Bank Name: Bangkok Bank Co.Ltd., Thailand, Address: 999 Tambol Bangpree Yai, Amphur Bangpree, Samutprakarn province 10540, Thailand, Swift Code: BKKBTHBK, Account Name: AATSEA, Savings Account No: 862-013355-6, or transfer through Western Union to Miss Rungrat Vareeket, Bangkok, Thailand, Citizen ID Card No: 3220200206373 and send transfer copy to ICIST registration website.
Room booking, field trip and transport will be directly reserved at website http://icist2019.aatsea.org/registration.html. Room reservation and booking must be confirmed not later than 30 August 2019. If you have any information, please directly contact to Ms. Yi Zhao, email: zhaoyijoy@163.com.

Thank you very much and hope to see you in the conference.

Very truly yours,

Kasem Soytong
President, AATSEA

Session 4	**CROP PROTECTION AND RELATED TECHNOLOGIES**
Room 4	**Chairs: Prof. Dr. Raphael Okigbo (Nigeria), Prof. Dr. T. S. S. K. Patro (India), Dr. Hoang Pham (Vietnam)**
11:00-11:20	**Invited Speaker: Prof. Dr. Raphael Okigbo (Nigeria):** The impact of biopesticides on agricultural yields and food security in Africa
11:20-11:40	**Chaisit Preecha (Thailand):** Study on fruit spot caused by *Fusarium* sp. of pummelo (*Citrus maxima* (Burm.) cultivar Tabtimsiam and screening fungicides and antagonist for alternate control *in vitro*
11:40-12:00	**Reny Herawat (Indonesia):** Analysis of polyethylene glycol (PEG) and proline to evaluate drought stress of double haploid new type upland rice lines
12:00-13:00	LUNCH BREAK
13:00-13:20	**Invited Speaker: Prof. Dr. T. S. S. K. Patro (India):** Importance of bioagents in mitigating the major diseases of nutri cereals
13:20-13:40	**Charida Pakasap (Thailand):** Effect of larval-stage mealworm (*Tenebrio molitor*) powder on qualities of bread
13:40-14:00	**Thawatchai Masiriyanan (Thailand):** Evaluation and selection of chili germplasms resistant to pepper yellow leaf curl Thailand virus (PepYLCVTH)
14:00-14:20	**Waree Laophemsuk (Thailand):** Identification of morphology and pathogenicity of *Pyricularia* sp. causing blast disease in grass
14:20-14:40	**Rosemarie Del Rosario Josue (Philippines):** Biological control using parasitoids *Comperiella calauanica* hastens the recovery of the coconut trees from coconut scale insect (CSI) infestation in Basilan, Philippines
14:40-15:00	**Nattawut Suanphrom (Thailand):** Comparison of growth and yield of maize (*Zea mays* L.) grown after using intercropping and monocropping systems
15:00-15:20	**Hathairat Kingkampang (Thailand):** Phenols and peroxidase activity in pepper yellow leaf curl virus resistant and susceptible chili (*Capsicum annuum* L.) genotype
15:20-15:40	COFFEE BREAK
15:40-16:00	**Invited speaker: Dr. Hoang Pham (Vietnam):** The Rotting fungi of street plant in Ho Chi Minh City
16:00-16:20	**Watchareeporn Suksiri (Thailand):** Resistance genes investigation in a broad-spectrum resistance indigenous rice Yang Mawng variety
16:00 -16:40	**Rungrat Vareeket (Thailand):** Natural products of fine particles derived from *Neosartorya hiratsukae* against brown spot of rice cause by *Drechslera oryzae*
16:40 -17:00	**Jeremias Lacsamana Ordonio (Philippines):** Identification of quantitative trait loci for seedling stage salinity tolerance using NSIC Rc222 X Jumbo Jet BC1F2 population
17:00-17:20	**Suphattra Janthasri (Thailand):** Genetic inheritance of gene controlling leaf blast disease resistance in Dawk Pa-yawm Rai variety (GS23774)
17:20-17:40	**Laxmi Rawat (India):** Enhancement of growth, yield & yield contributing traits and alleviation of sheath blight disease caused by *Rhizoctonia solani* in barnyard millet (*Echinocloa frumentacea* L.) with a particular reference by using *Trichoderma* isolates through seed bio-priming and pre colonized FYM
17:40-18:00	**Danilo Sarcon Josue (Philippines):** Promotion of improved rice farming technology for resilient and profitable enterprise
18:00 -18:20	**Teerawat Sarutayophat (Thailand):** Drought-tolerant characters, yield and its component of an elite landrace upland rice cultivars in Thailand
18:30	CLOSING CEREMONY

Analysis of polyethyleneglycol (PEG) and proline to evaluate drought stress of double haploid new type upland rice lines

Herawati, R.[1*], Purwoko, B. S. [2], and Dewi, I. S. [3], Romeida, A.[1]

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Evaluation and characterization, as well as a selection of rice that are tolerant to drought stress, is an essential stage in plant breeding. To make the process of selection of double haploid lines, especially those related to drought tolerance can be done by looking at the morphological features on the root system of each genotype. The treatment of PEG solution into the planting medium is expected to create conditions of stress because of the availability of water for plants is reduced. Molecular size and the concentration of PEG in the solution determining the osmotic potential that occurs. The mechanisms used by plants to defend on drought stress is through the accumulation of proline for adjustment osmotic, production and accumulation of free amino acids like proline in plant tissues during drought stress, an adaptation response in these conditions. In this research, PEG 6000 inhibited germination (33.9 percent), root length (60.8 percent), and shoot length (80 percent) of upland rice lines. Drought stress treatment (60 percent of field capacity) at the flowering period showed no significant reduction in the growth of doubled haploid upland rice but reduced the weight of grains per hill (52.11 percent). Drought stress decreased total chlorophyll (20.7 µmol/cm) and increased proline content in leaves (30.3 µmol/g). The content of proline in the leaves varies in inbreds due to drought stress. The tolerant genotype had high proline content based on PEG 6000 are P3-31, followed by P6-95 respectively 30.33, 20.82 µmol/g, and genotype moderate line P6-291 at 20:42 µmol/g. Drought stress led to a decrease in total chlorophyll, and increase the proline content in the leaves.

Keywords: drought stress, doubled haploid, upland rice, polyethyleneglycol, proline

Importance of bioagents in mitigating the major diseases of nutri cereals

Patro, T. S. S. K.

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Millets are group of small grained cereal food crops which are highly tolerant to drought and other extreme weather conditions and are grown with low chemical inputs such as fertilizers and pesticides. Most of millet crops are native of South East Asia and are popularly known as Nutri-cereals as they provide most of the nutrients required for normal functioning of human body. Millets are gluten free and non- allergenic. Millet consumption decreases triglycerides and C- reactive protein, thereby preventing cardiovascular disease. Millets are nutri cereals comprising of sorghum, pearl millet, finger millet (Major millets) foxtail, little, kodo, proso and barnyard millet (minor millets). Millets are prone to various diseases across the India. The major diseases occuring in millets are Blast, Banded sheath blight etc. Diseases are major cause for reducing the economic yield and losses upto 75%. Control of these pathogens is difficult because of its ecological behavior, Its extremely broad host range and the high survival rate of sclerotia under various environmental conditions. For management of these pathogens, various methods, that is, chemical control, biological control, resistant varieties, cultural control and physical control, are applied. Resistant varieties are the best and cheapest method for managing the diseases. However, resistant break down occur over the years. Resistance against some pathogen resistant are not available. Chemical management is the second-best option for managing the diseases, due to continuous and irrational use of the chemicals; pathogens have developed resistance against certain class of fungicides/bactericides. Moreover, these chemicals also assist in environmental pollution and toxicity in the produce. Bio-agents are naturally occurring living organisms, which are found in rhizosphere, phylloplane, etc. These bio-agents help in not only managing the diseases but also increasing the crop yield. Therefore, the use of bio-agents for biological management of millet crops is the focused research area worldwide. Also, biological control assumes special significance as it is ecologically conscious and cost-effective alternative strategy and presently has vital role in the present farming system. Bioagents, such as *Trichoderma* spp., *Bacillus subtilis* and *Pseudomonas flouroscens* are effective in controlling of the major diseases in millets. Seed treatment and foliar sprays with bioagents reduces the incidence of the diseases in millets. If we promote the use of Bioagents for control of various diseases of millets in South East Asia we could be a global leader in Agri business and farmers could sustain their livelihood.

Keywords: millets, nutri cereals, blast, banded blight, bioagents, *Trichoderma* spp., *Bacillus subtilis*, *Pseudomonas flouroscens*

Analysis of Polyethyleneglycol (PEG) and Proline to Evaluate Drought Stress of Double Haploid New Type Upland Rice Lines

R.HERAWATI[1]*, B.S. PURWOKO[2], and I.S. DEWI[3], A. Romeida[1], and Marlin[1]

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BACKGROUND

Anther Culture Process

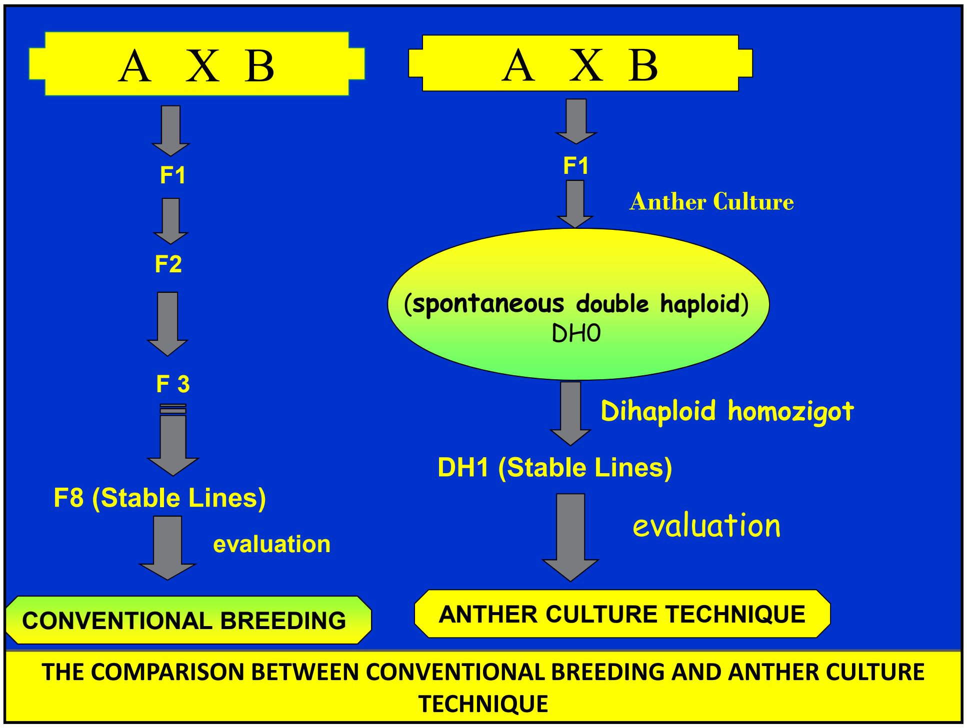
anther culture

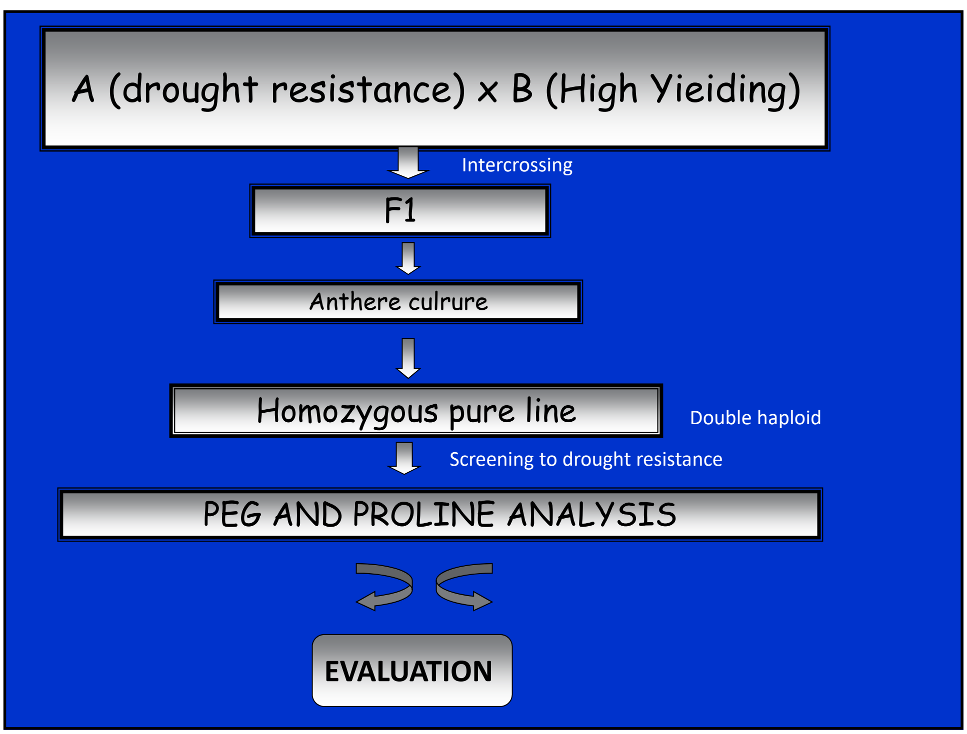
↓

produce inbreds in one generation

↓

Double haploid (100% homozygous)


A X B
F1
F2
F 3
F8 (Stable Lines)
evaluation
CONVENTIONAL BREEDING
A X B
F1
Anther Culture
(spontaneous double haploid)
DH0
Dihaploid homozigot
DH1 (Stable Lines)
evaluation
ANTHER CULTURE TECHNIQUE
THE COMPARISON BETWEEN CONVENTIONAL BREEDING AND ANTHER CULTURE TECHNIQUE


A (drought resistance) x B (High Yieiding)
Intercrossing
F1
Anthere culrure
Homozygous pure line
Double haploid
Screening to drought resistance
PEG AND PROLINE ANALYSIS
EVALUATION

THE AIM OF THE RESEARCH

to determine the double haploid lines tolerant to drought:

↪ PEG

drought stress test at the 60% field capacity:

↪ Proline analysis

THE PURPOSE OF THE RESEARCH

- Screening the double haploid lines tolerant to drought

METHOD

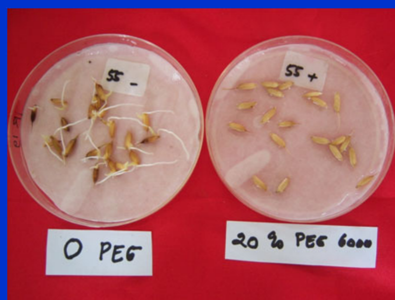
SCREENING FOR DROUGHT RESISTANCE

- PEG (POLIETHIYLENEGLYCOLE)
- Drought stress treatment (60 percent of field capacity)

Polyethylene glycol (PEG) → Effect of PEG-Induced Osmotic Stress on Germination and Seedling

- ✓ PEG 6000 with 20% has an osmotic potential of -0.71 MPa (7.06 bar).
- ✓ Soil in conditions of field capacity has an osmotic potential of -0.03 MPa (0.33 bar) and
- ✓ under permanent wilting conditions has an osmotic potential of -1.5 MPa (15 bar) (Taiz and Zeiger 2002).

METHOD



20 % PEG 6000
The observation after 24 hours for one week:
- % germination
- Root length
- Plumule length

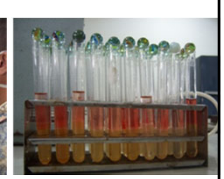
- 100 % field capacity and 60 % field capacity at the flowering stage (one week before and after anthesis)

Drought stress treatment (60 percent of field capacity)

100 % Field Capacity and 60 % Field Capacity at flowering stages

Tolerant Genotipe

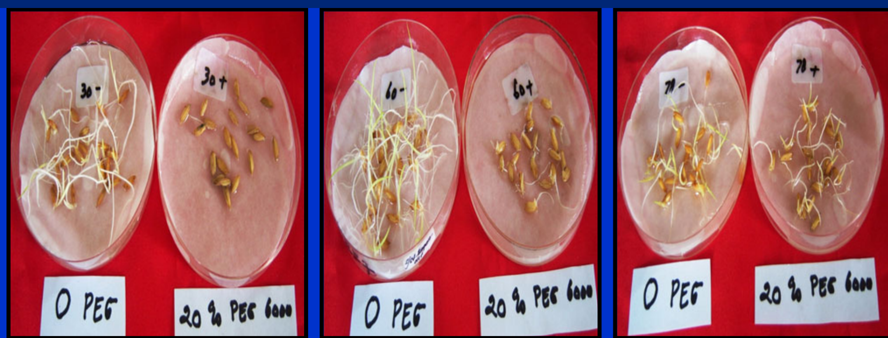
Susceptible Genotipe



Proline content analysis (Bates *et al.*, 1973)

RESULTS

INDUCED PEG 6000 20% ON GERMINATION STAGE

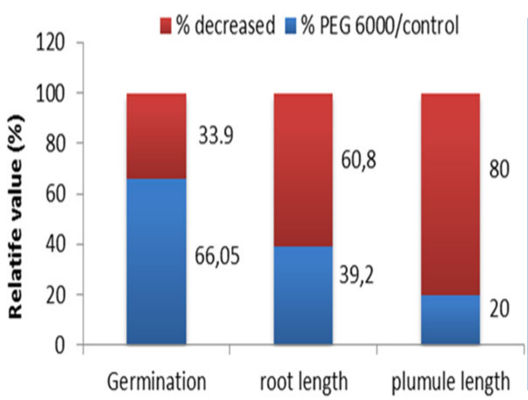


Susceptible Genotipe

Moderate Genotipe

Resistance Genotipe

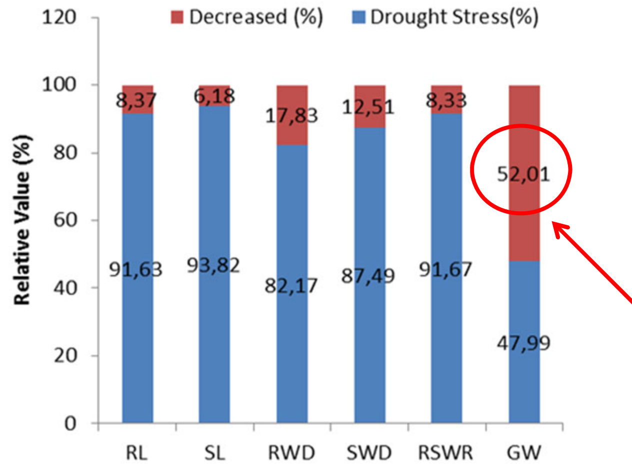
Effect of PEG 6000 on germination, roots length and plumule length



PEG) decreased :

- ✓ germination (33.9%),
- ✓ root length (60.8%) and
- ✓ plumule length (80%)

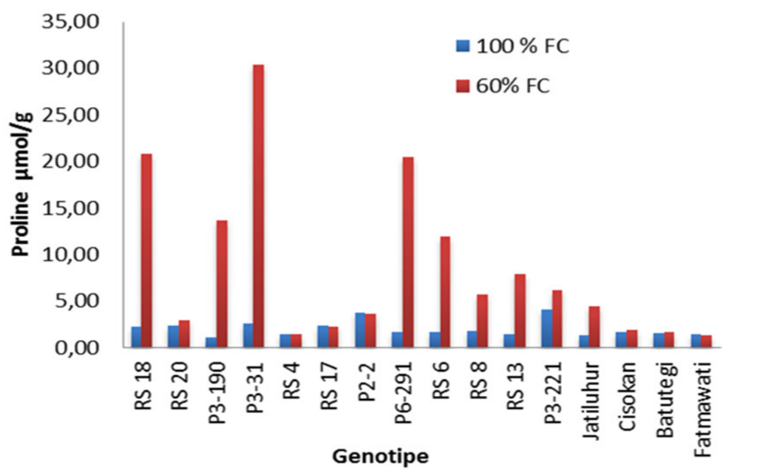
Effect of drought stress on growth and yield



Treatment drought 60 percent of field capacity at the flowering stage decrease grain weight/hill of 52 percent.

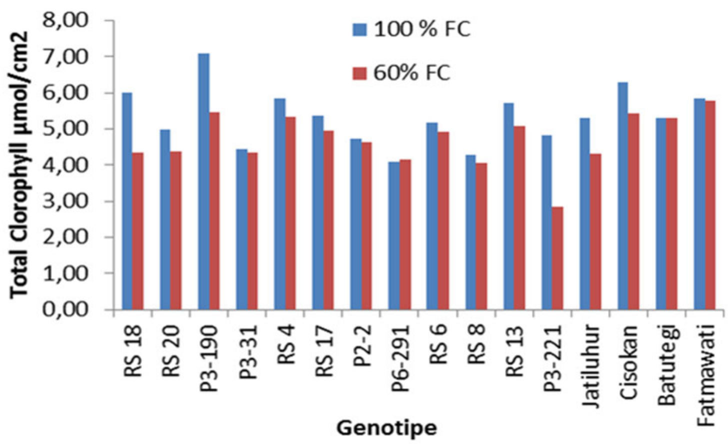
RL: root length; SL: shoot lenth; RWD: root dry weight; SWD: shoot dry weight; RSWR: Root shoot weight ratio; GW: grain weight/hill

The content of proline of double haploid lines on drought stress



Drought stress led to increase proline content of the leaves

The total chlorophyll content of double haploid lines on drought stress



Drought stress led to a decrease in total chlorophyll

The selection of line based on RLR, WGR and proline content

LINES	Criteria*	Grain weight/hill (g)		WGR[2]	Proline content (µmol/g)		Criteria**
		100 % FC[1]	60 % FC[1]		100 % FC[1]	60 % FC	
RS 18	Tolerant	4.31	0.28	6.49	2,2	20,8	Tolerant
RS 20	Tolerant	14.87	3.31	22.26	2,4	3,0	Susceptble
P3-190	Tolerant	28.44	19.94	70.11	1,1	13,7	Tolerant
P3-31	Tolerant	17.74	3.88	21.87	2,6	30,3	Tolerant
RS 4	Moderat	19.16	18.22	95.09	1,5	1,4	Tolerant
RS 17	Moderat	10.40	8.18	78.65	2,4	2,2	Tolerant
P2-2	Moderat	17.00	3.09	18.17	3,8	3,6	Susceptble
P6-291	Moderat	8.07	2.20	27.26	1,6	20,4	Tolerant
RS 6	Susceptble	16.98	12.20	71.85	1,7	11,9	Tolerant
RS 8	Susceptble	3.32	0.83	25.00	1,8	5,7	Susceptble
RS 13	Susceptble	24.61	2.62l	10.65	1,5	7,9	Susceptble
P3-221	Susceptble	8.66	1.32	15.24	4,1	6,1	Susceptble
Jatiluhur	Tolerant	52.34	33.01	63.07**)	1,3	4,5	Toleran
Cisokan	Susceptble	38.03	11.75	30.89	1,7	1,9	Susceptble
Batutegi	Tolerant	46.77	31.37	67.07	1,6	1,6	Toleran
Fatmawati	Susceptble	38.89	15.55	39.98	1,5	1,3	Susceptble

**Based on Root Length Ratio (RLR) at PEG test; [1]FC=Field Capacity; [2]WGR = Weight Grain Ratio; **Based on tolerance of parental (Jatiluhur) tolerant if WGR>60%, Moderate if 30<WGR<60, and susceptible if WGR<30%*

The lines tested with polyethyleneglycol (PEG) 6000 is not all consistent with drought stress testing 60 percent of field capacity in the greenhouses.

CONCLUSION

1. Polyethyleneglycol (PEG) 6000 inhibits germination, root length and plumule length of double haploid lines.

2. Treatment 60 percent of field capacity at the flowering stage decreased 52.11 percent grain weight/hill

3. Drought stress led to a decrease in total chlorophyll, and increase proline content of the leaves.

4. The line RS 18, P3-180, P3-31, P6-291, and RS-6 potential as drought-resistant and should be test further at the field experiment.

THANK YOU