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Warmest Regards,

Chairman

Gmail Rinaldi Sjahril <rinaldi.sjahril@gmail.com>

[ICBSB] Submission Acknowledgement

1 message

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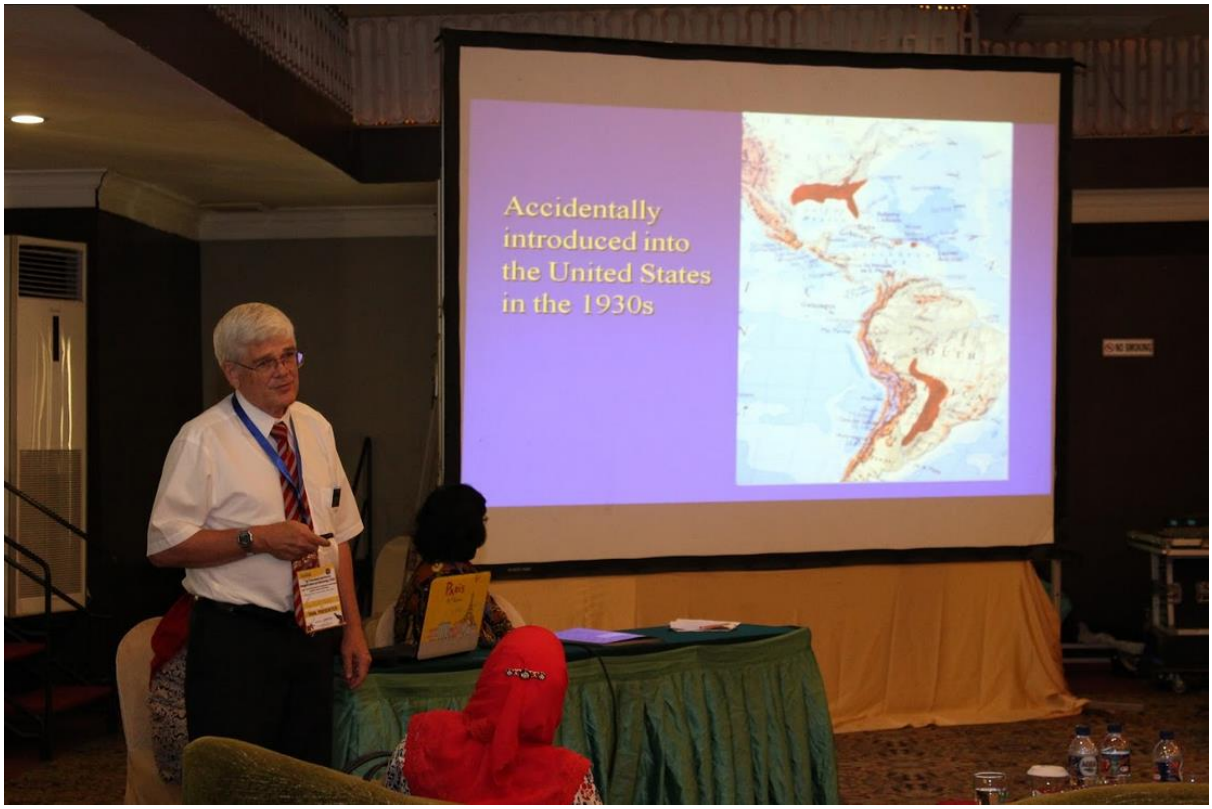
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PAPER • OPEN ACCESS

Selection of Character of Yield Component in M2 Aromatic Rice Mutant

A M Okasa[1], R Sjahril[2] and M Riadi[3]

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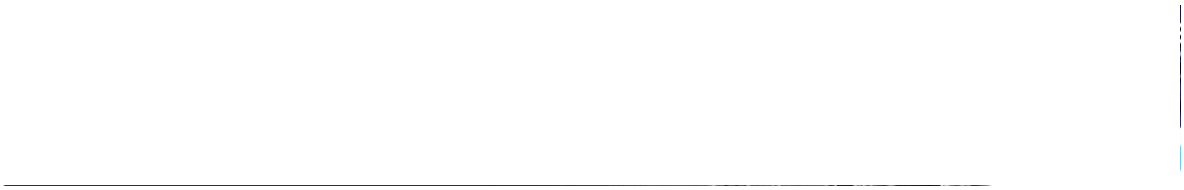
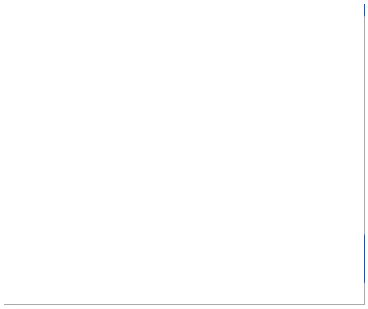
Abstract

Toraja has diversity of rice germplasm. Aromatic rice is very popular today because of its good quality and fragrant aroma. However its long harvesting period is not comparable to its low yield (2-3 ton ha-1) in 6 month planting season. Efforts to increase production through mutation breeding has been proposed here. The aim of this study is to evaluate the effect of 19 mutant (M2) lines on yield atributes.The study was conducted at Alla District, enrekang regency, South Sulawesi from May to October 2017 using mass selection method consisting of two irradiation treatments, namely: irradiation

with Carbon ion dose 150 Gy (PB-C), irradiation with 10 Gy Argon ions (PB-A), and control as a comparison. The result showed that lines that have the best production components is PB-A-14.2.14. Whereas, there are 14 lines that have better production components than controls. Cluster analysis showed that there were 3 main componenets of lines formed into further 5 sub-groups with similarity level 66.67%.





#7932 Summary

SUMMARY REVIEW

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Selection of Character of Yield Component in M2 Aromatic Rice Mutant

Selection of Character of Yield Component in M2 Aromatic Rice Mutant

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Abstract. Toraja has diversity of rice germplasm. Aromatic rice is very popular today because of its good quality and fragrant aroma. However its long harvesting period is not comparable to its low yield (2-3 ton ha-1) in 6 month planting season. Efforts to increase production through mutation breeding has been proposed here. The aim of this study is to evaluate the effect of 19 mutant (M2) lines on yield atributes.The study was conducted at Alla District, enrekang regency, South Sulawesi from May to October 2017 using mass selection method consisting of two irradiation treatments, namely: irradiation with Carbon ion dose 150 Gy (PB-C), irradiation with 10 Gy Argon ions (PB-A), and control as a comparison. The result showed that lines that have the best production components is PB-A-14.2.14. Whereas, there are 14 lines that have better production components than controls. Cluster analysis showed that there were 3 main componenets of lines formed into further 5 sub-groups with similarity level 66.67%.

Keyword: Aromatic Rice, Ion Beam, Irradiation, Mutant, Pare Bau

1. Introduction

Rice is one of the major cereal grain consumed more than half of the world's population. It is warm season crop grown extensively in the humid tropical and subtropical region of the world. China, India, Japan, Korea, South-East Asia and the adjacent islands of the pacific account for about 90 per cent of the world's rice production.

Toraja is an area in South Sulawesi that has germplasm diversity. The diversity of local rice in Toraja is a potential asset to be utilized and preserved [1]. One of the local rice found in Toraja specially North Toraja is Aromatic Rice (Pare Bau'). Pare Bau has been cultivated on a small scale for religious purposes, festivals, daily use for a thousand years. Aromatic rice is an important commodity worldwide and command premium prices in local and international market over non-aroamtic varieties because of their superior grain quality and pleasant aroma [2, 3].

Otherwise, aromatic rice is not as good as non-aromatic rice, so it is an obstacle for farmers to grow aromatic rice, especially in traditional communities. Aromatic rice generally has a high posture, less

number of panicles, lower yields and susceptibility to storage. On this, several methods have been tried by scientists to combat this perennial problem. Some researchers have tried nutritional method, physiological method, and breeding as well as control of pests and diseases. Among these methods, it is established that breeding for high yield traits is the most sustainable because the traits are heritable.

Yield and quality of rice depends on the genetic potential of cultivars, it surrounding environment and management practices. Selection of right type of variety is most important factors for maximizing rice production. Yield of rice changes due to growing environment, such as different locations, different dates of planting [4]. In developing varieties that adapt well to specific environments, it is necessary to identify strains that have high interactions with the environment [5]. One of the criteria that DSPAT is used as a selection variable is a component of production. The production component is the main criteria used by plant breeders in producing new varieties with high yield potential [6].

This research is expected to create new aromatic rice. Based on these matter, it is necessary to conduct research on "selection of 2nd generation mutant lines using the character of production component".

2. Method

The experiment was conducted at the Alla District, Enrekang Regency, south Sulawesi. The experimental site was a medium high land (650 above the sea level) at the coordinates of S: 3 ° 19'47,44 "; E: 119 ° 50'1,57 "and runs from May to October 2017.

2.1. Experimental apparatus

The materials used in this experiment were the local aromatic rice seeds of Toraja (Pare Bau) M1 generation previously irradiated by using 150 Gy carbon ions and 10 Gy of argon ions, manure, and soil for nursery media, rat poison, pesticides, irrigation water, and label. The tools used in this experiment are: Plastic pots for sowing, machetes, hoes, tractors, sprayers, nets, gauges, analytical scales, Contador seed counters, cameras, and stationery.

2.2. Problem formulation

The study was conducted by mass selection method consisting of two irradiation treatments, namely: 1) irradiation with Carbon ion dose 150 Gy (PB-C); 2) irradiation with 10 Gy Argon ions (PB-A), and control as a comparison. This research used M2 aromatic rice of local aromatic rice Toraja Pare Bau 'variety, the result of mutation technique of Ion Beam Carbon and Argon group to M0 seed which was conducted in RIKEN Nishina Center, Wako, Saitama Prevecture, Japan. For raising M2 generation, the seeds of the separate progeny lines of the selected M1 panicle for macromutational and the bulked seeds for macromutational studies of all the treatments varieties.

The final result of the scoring system is to classify the degree of linkage of the output parameters performed by the equation:

$$S_n = (X_n - X_1)/SD + 1 \quad \text{.....(1)}$$

Where :

S_n = data n^{th} score X_n = Value of the n^{th} data

SD = Standard Deviation X_1 = Lowest data value

3. Results and Discussions

Ion beam exhibited influence on the yield contributing generative characters and yield of aromatic rice (Table 1). Yield components of aromatic rice, such as maximum panicle length (38,78 cm) was recorded from PB-A-12.2.12. Results showed that the Panicle density ranged from 5.20 to 10.92 Maximum density. The maximum number of grain per panicle (386 g) was observed in PB-14.2.14 and the lowest was counted from PB-Cont+ (227 g). Maximum fertile grain weight (10.73 g) was

recorded from PB-A.6.1.9 and the lowest is PB-14.4.3 (4.77 g). Grain weight is one of yiled component that is closely related with production of plant per unit area. Maximum percentage of fertile grain was counted from PB-6.1.5 (94%) and the lowest 72% (PB-A.5.1.13 and PB-A.7.1.41). The fertility decreased linearly with increasing irradiation dose. Fertility was also different in every irradiation tratment even if the same radiation type was applied by the same dose. Maximum production per plant was recorded from 239.23 g and the lowest PB-14.4.3 (85.24 g).

Table 1. Yield contributing attributes of mutant aromatic rice of Local Toraja

No.	Treatment	Panicle length (cm)	Number of Grain per panicle	Panicle density (seed/cm)	Number of fertile grain (seed)	Fertile grain weight (g)	Production Per Plant (g/plant)
1	PB-Cont+	33,65	227	6,75	203	6,09	98,79
2	PB-Cont-	29,84	229	7,68	193	6,27	121,43
3	PB-A-5.1.13	35,08	280	7,97	201	6,03	105,59
4	PB-A-5.3.36	36,48	345	9,46	293	8,34	88,10
5	PB-A-5.3.45	32,23	352	10,92	279	8,07	99,28
6	PB-A-6.1.9	36,05	374	10,38	344	10,73	157,01
7	PB-A-6.1.12	35,68	313	8,78	286	8,32	141,59
8	PB-A-6.1.13	34,50	284	8,22	264	7,16	79,16
9	PB-A-6.1.15	36,90	323	8,76	303	9,54	124,07
10	PB-A-8.1.5	34,10	292	8,55	257	7,59	88,88
11	PB-A-7.1.9	36,48	346	9,49	308	9,58	137,19
12	PB-A-7.1.30	36,42	270	7,40	218	6,73	124,12
13	PB-A-7.1.41	34,34	248	7,23	180	5,26	117,25
14	PB-A-12.2.4	37,96	343	9,05	291	9,32	98,55
15	PB-A-12.2.11	35,64	255	7,16	198	6,03	175,40
16	PB-A-12.2.12	38,78	310	7,99	276	8,83	204,54
17	PB-A-12.2.34	37,41	327	8,73	275	8,77	239,23
18	PB-A-14.2.14	37,67	386	10,24	348	10,70	229,43
19	PB-A-14.3.1	36,80	360	9,78	311	9,72	118,09
20	PB-A-14.4.3	32,95	171	5,20	149	4,77	85,24
21	PB-C-20.1.49	34,55	314	9,07	263	8,08	120,26

Table 2. Scoring Data of Yield Components

No.	Treatment	Panicle length (cm)	Number of Grain per panicle	Panicle density (seed/cm)	Number of fertile grain (seed)	Fertile grain weight (g)	Production per Plant (%)	**TOTAL**
1	PB-Cont+	2,07	2,15	2,03	1,76	3,86	1,25	13,12
2	PB-Cont-	3,83	4,09	3,16	1,86	3,01	1,59	17,54
3	PB-A-5.1.13	3,07	3,05	1,98	1,72	1,00	1,63	12,46
4	PB-A-5.3.36	4,33	4,15	3,72	3,05	3,13	1,23	19,61
5	PB-A-5.3.45	4,46	5,24	3,45	2,90	2,19	1,44	19,67
6	PB-A-6.1.9	4,89	4,84	4,68	4,42	4,25	2,65	25,73
7	PB-A-6.1.12	3,72	3,65	3,58	3,04	4,15	2,41	20,55
8	PB-A-6.1.13	3,15	3,24	3,17	2,37	4,43	1,00	17,37
9	PB-A-6.1.15	3,91	3,64	3,92	3,74	4,57	1,98	21,77
10	PB-A-8.1.5	3,30	3,48	3,05	2,62	3,66	1,64	17,75
11	PB-A-7.1.9	4,35	4,18	4,00	3,77	3,78	2,17	22,24
12	PB-A-7.1.30	2,88	2,63	2,30	2,12	2,46	1,98	14,38
13	PB-A-7.1.41	2,47	2,50	1,58	1,28	1,00	1,81	10,65
14	PB-A-12.2.4	4,30	3,85	3,69	3,62	3,11	1,49	20,05
15	PB-A-12.2.11	2,61	2,45	1,93	1,73	1,96	2,95	13,63
16	PB-A-12.2.12	3,66	3,07	3,39	3,33	3,77	3,74	20,96
17	PB-A-12.2.34	3,97	3,61	3,38	3,30	3,00	4,50	21,76
18	PB-A-14.2.14	5,10	4,73	4,76	4,41	3,98	4,33	27,32
19	PB-A-14.3.1	4,61	4,39	4,06	3,85	3,37	1,85	22,12
20	PB-A-14.4.3	1,00	1,00	1,00	1,00	3,47	1,07	8,54
21	PB-C-20.1.49	3,72	3,87	3,15	2,90	2,95	1,96	18,55
Standard Deviation		52,23	1,35	52,91	1,74	0,06	47,24	

From the results above, it can be seen that the line with the highest score is PB-A-14.2.14. This can be used as a selection criteria based on phenotypic characters. This is supported by the scoring of yield components such as panicle length (5.10), panicle density (4.76), and Number of fertile grain (4.41). There are 14 lines that have better production components than controls, namely PB-A-5.3.36, PB-A-5.3.45, PB-A-6.1.9, PB-A-6.1.12, PB-A-6.1 .13, PB-A-6.1.15, PB-A-8.1.5, PB-A-7.1.9, PB-A-12.2.4, PB-A-12.2.12, PB-A-12.2.34, PB-A-14.2.14, PB-A-14.3.1, PB-C-20.1.49. The line can be used as planting material for further planting. According to Kasno (2013) [7], selection can be done to select a number of individuals, families, or lines in a diverse population to obtain the expected superior individuals.

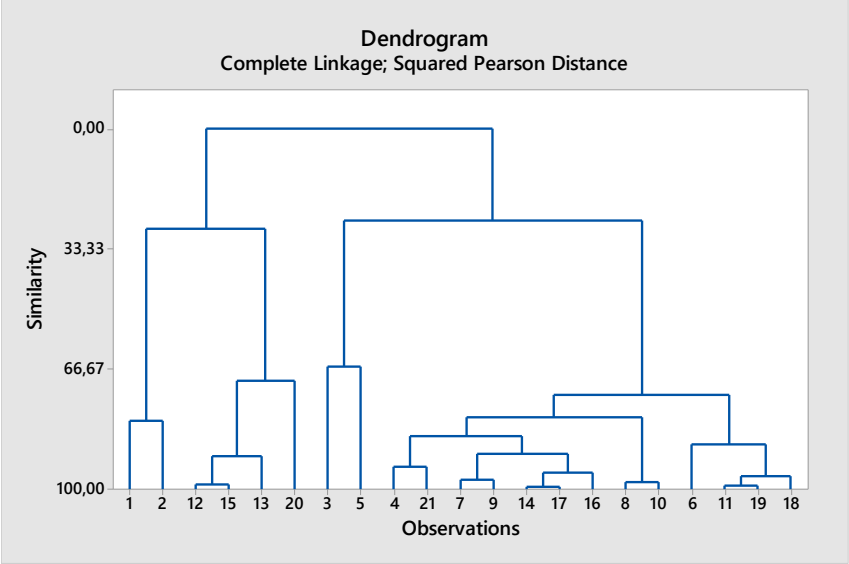

Figure 1. Clustering pattern of the morphological trait at dissimilarity coefficient of 66.67%

Based on the clusters in Figure 1, the presence of lines in one cluster indicates the closer the level of similarity. The most distant cluster differences are the first and fifth clusters. On the other hand, the lines in different clusters have increasingly similar levels of resemblance. The three main components formed into further 5 sub-groups with the similarity level of 66.67%. With a similarity rate of 66.67%, group 1 consisted of subgroups (1) PB-Cont + and PB-CONT-, sub-groups (2) PB-A-7.1.30, PB-A-12.2.11, PB-A -7.1.41, PB-A-14.4.3, sub-group (3) PB-A-5.1.13, sub-group (4) PB-A-5.3.45, sub-group (5) PB-A -5.3.36, PB-C-20.1.49, PB-A-6.1.12, PB-A-6.1.15, PB-A-12.2.4, PB-A-12.2.34, PB-A-12.2 .12, PB-A-6.1.13, PB-A-8.1.5, PB-A-6.1.9, PB-A-7.1.9, PB-A-14.3.1, and PB-A-14.2. 14.

4. Conclusions

Based on the results of the research can be summerized that that lines that have the best production components is PB-A-14.2.14. Whereas, there are 14 lines that have better production components than controls. Cluster analysis showed that there were 3 main componenets of lines formed into further 5 sub-groups with similarity level 66.67%.

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References

[1] Limbongan Y, dan F Djufry, 2015, Karakterisasi dan Observasi Lima Aksesi Padi Lokal Dataran Tinggi Toraja, Sulawesi Selatan. Bul. Plasma Nutfah 21(2):61-70.

[2] Nayak, A.R., Chaudhury, D. and Reddy, J.N. (2002). Genetic variability, heritability and genetic advance in scented rice. Indian Agric., 46 (12): 45-47

[3] Bradbury LM, Fitgerald TL, Henry RJ, Jin Q, Waters DLE, 2005, The Gene for Fragrance in Rice, Plant Biotech J 3:363-370.

[4] Sarker, U, 2002. Stability fro grain yield under difference planting times in rice. Bangladesh J. Agric. Res. 27:425-430.

[5] Abdullah B, dan H Safitri. 2014. Stabilitas Hasil Galur-Galur Harapan Padi Sawah. Penelitian Pertanian Tanaman Pangan 33(3) : 163-168.

[6] Riadi M, R Sjahril, N Kasim, R H Diardjo, 2018, *Herritability and Path Coeefficient Analysis for Important Characters of Yield Component Related to Grain Yield in M4 Red Rice Mutant*. IOP Conference Series: Earth and Envrionmental Science 157.

[7] Kasno, A., Trustinah, dan A.A . Rahmiana. 2013. Seleksi galur kacang tanah adaptif pada lahan kering masam. Penelitian Pertanian Tanaman Pangan 32(1):16-24.

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1. Bahwa dalam rangka Seminar 4th International Conference Biological Sciences and Biotechnologi (ICBSB) Universitas Sumatera Utara Medan yang dilaksanakan pada tanggal 7-9 Desember 2018 di Medan. Maka untuk kepentingan dinas perlu diterbitkan Surat Penugasan Dekan.
2. Maka dari itu, menugaskan yang disebut namanya di atas untuk menghadiri acara tersebut.
3. Surat penugasan ini berlaku mulai tanggal 7 Desember 2018, sampai selesainya kegiatan tersebut dengan ketentuan bahwa apabila di kemudian hari terdapat kekeliruan di dalamnya maka akan diadakan perbaikan sebagaimana mestinya.

Makassar, 3 Desember 2018
Dekan,

Prof. Dr.sc.Agr. Ir. Baharuddin
NIP. 19601224 198601 1 001

Tembusan:
1.Wakil Dekan
2. Kepala Bagian Tata Usaha
3. Kasubag Keuangan

The 4th International Conference on Biological Sciences and Biotechnology

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On behalf of the committee of The fourth International Conference on Biological Sciences and Biotechnology (ICBSB) 2018, conducted by Biology Department, Faculty of Mathematics and Natural Sciences, Sumatera Utara University. To each and everyone of you, we are pleased to extend a most cordial welcome in Medan. The fourth ICBSB 2018 is attended by 145 participants from 17 universities or Institutes, they are consisted of 140 participant from 13 universities in Indonesia, 4 universities from abroad, and 1 partipant from United State Department of Agriculture (USDA), Agricultural Research Service, USA. I would like to take this opportunity to express my sincere thanks to the our honorable keynote speakers from abroad who have come and share they knowledge to us today:

1. Dr. Abraham Kabutey, from Dept of Mechanical Engineering, Czech University
2. Prof. Dr. Hunsa Punnapayak, from Dept of Botany, Chulalongkorn University, Bangkok, Thailand
3. Dr. Intan Zarina Zainol Abidin, from School of Biosciences and Biotechnology, University Kebangsaan Malaysia
4. Prof. Toshiki Uchiumi, PhD, from Graduate School of Science and Engineering, Kagoshima University, Japan.

To all committee members, I would like to express my gratitude to all of you who so generously helped us makes this event come smoothly, we could not have done it without you. I sincere hope all of participants will enjoy today and networking in the next.

As The fourth ICBSB 2018 has agreement to IOP, the peer-review of manuscripts will still proceed after this conference. The reviewed and accepted paper will be published in IOP Conference Series: Earth and Environmental Sciences.

Through this conference, the committee facilitate, hoping each participant get exchange experiences.

Finally, I wish you have a pleasant stay in Medan.

Thanks for your very kind attention.

Warmest regards,

Dr. Kiki Nurtjahja, M.Sc.
Chairman of the ICBSB 2018