



Performance Selection of Mentik Wangi M5 Generation Rice Resulting from 100 Gray Gamma-ray Irradiation

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INTRODUCTION

The local aromatic rice Mentik Wangi varieties are originated from the Special Region of Yogyakarta that has a fluffier rice texture, which makes this rice very popular with consumers. However, it has several disadvantages that are a longer harvest age, and relatively high plant height so that it can easily collapse.

One way to overcome weaknesses is through plant breeding using gamma-ray radiation mutations. Gamma-ray radiation of rice seeds has an effective dosage range in the range of 100-500 grays, which can produce mutants that have agronomic characteristics such as low height, early maturity and have high production (Yunus et. al 2017).

AIM

To select Mentik Wangi M5 irradiated by 100 Gy gamma-ray, which has a short stem and has high productivity.

METHODS

The research was conducted by planting 35 M5 strain codes of 100 gray Mentik Wangi rice and control plants parallel without doing randomization. The observation data has been selected from 35 strains to 10 best strains. The observational data were analyzed descriptively and compared between control plants and Mentik Wangi 100 gray plants using a T-test analysis.

RESULT

1. Plant Height



Table 1. The plant height of Mentik Wangi M5 rice from 100 gray gamma irradiation.

M5 Line	Range (cm)	Average (cm)
M-MW1-G35-02-06-19	103-126	114,40 ± 11,81
M-MW1-G35-02-06-20	105-124	114,50 ± 9,95
M-MW1-G35-02-06-13	105-125	115,10 ± 10,09
M-MW1-G35-02-06-01	109-122	115,50 ± 6,77
M-MW1-G12-01-18-01	102-126	114,10 ± 11,66
M-MW1-G12-01-18-19	99-118	108,50 ± 9,41
M-MW1-G12-01-18-05	96-110	103,20 ± 7,07
M-MW1-G80-11-08-15	97-106	101,30 ± 4,52
M-MW1-G89-20-03-01	97-108	102,30 ± 5,44
M-MW1-G89-20-12-17	103-121	112,30 ± 8,86
CONTROL	136-146	141,00 ± 4,69

The shortest plant height was found in the M-MW1-G12-01-18-05 strain of 96 cm with a plant height range of 96-110 cm (Table 1). Rice plants that have short stems will reduce the level of agitation due to environmental factors such as rain and wind (Haris 2013).

2. Seed yield per clump



Table 2. Seed yield per clump of Mentik Wangi M5 rice from 100 gray gamma irradiation.

M5 Line	Seed Yield per Plant (gram)	Average (Ton/ha)
M-MW1-G35-02-06-19	34,59	5,53
M-MW1-G35-02-06-20	32,15	5,14
M-MW1-G35-02-06-13	30,89	4,94
M-MW1-G35-02-06-01	31,08	4,97
M-MW1-G12-01-18-01	37,16	5,95
M-MW1-G12-01-18-19	29,83	4,77
M-MW1-G12-01-18-05	32,55	5,21
M-MW1-G80-11-08-15	34,82	5,57
M-MW1-G89-20-03-01	30,41	4,87
M-MW1-G89-20-12-17	32,55	5,21
CONTROL	23,63	3,78

Irradiation causes mutations in plants resulting in increased plant diversity of rice grain weight per clump (Hairmainis 2010). The highest level of plant productivity was found in the M-MW1-G12-01-18-01 strain, which was 5.95 tons/ha, the lowest productivity level was in the M-M-MW1-G12-01-18-19 strain of 4.77 ton/ha (Table 2).

3. M5 Mutant Selection

Table 3. M5 Mentik Wangi from 100 gray gamma-ray irradiation Mutant Selection.

M5 Line	Selected plant number	Plant height (cm)	Harvest age (DAP)	Grain yield per clump (gram)	Productivity (ton/ha)
M-MW1-G35-02-06-19	70	98	108	33,53	5,06
	81	108	108	33,16	8,83
M-MW1-G35-02-06-20	82	105	108	39,92	6,39
	76	109	108	37,50	6,00
M-MW1-G35-02-06-13	90	107	108	30,56	4,89
M-MW1-G35-02-06-01	105	116	108	43,41	6,95
M-MW1-G12-01-18-01	88	104	111	40,00	6,40
	86	101	111	33,47	5,08
	109	102	111	36,73	5,88
M-MW1-G12-01-18-19	70	98	111	36,85	5,90
M-MW1-G12-01-18-05	8	115	111	48,40	7,74
	69	97	111	38,73	5,88
	41	100	111	47,66	7,63
M-MW1-G80-11-08-15	20	101	112	40,12	6,42
	29	101	112	40,51	6,48
	50	100	112	42,19	6,75
	15	100	112	40,59	6,49
M-MW1-G89-20-03-01	11	98	113	38,63	6,18
	21	104	113	40,30	6,45
M-MW1-G89-20-12-17	33	102	114	32,57	5,18
	76	118	114	43,15	6,90
CONTROL		141	123	23,63	3,78

The results of the selection there are 21 individual M5 plants of Mentik Wangi from 100 gray gamma irradiation. The results of plant selection (Table 3) of the M5 generation had a plant height range of 97-118 cm. The mutant plants with the lowest plant height were in the M-MW1-G12-01-18-05 strain, with plant number 69 having a plant height of 97 cm. The mutant plants that had the highest productivity were found in the M-MW1-G35-02-06-19 strain plant number 81, which had the highest productivity level is 8.83 tons/ha.

Conclusion

1. The Mentik Wangi M5 rice plants resulting from 100 gray gamma-ray irradiation had better performance than control.
2. There are 21 selected M5 generations of Mentik Wangi rice mutant plants that have short stems, have short lives, and have high productivity.

The strains that have the potential as superior mutants from the 10 selected strains are M-MW1-G35-02-06-19, M-MW1-G35-02-06-20, M-MW1-G12-01-18-05, M-MW1-G80-11-08-15, and the M-MW1-G89-20-03-01 strains which can be used as planting material for further research.

References

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