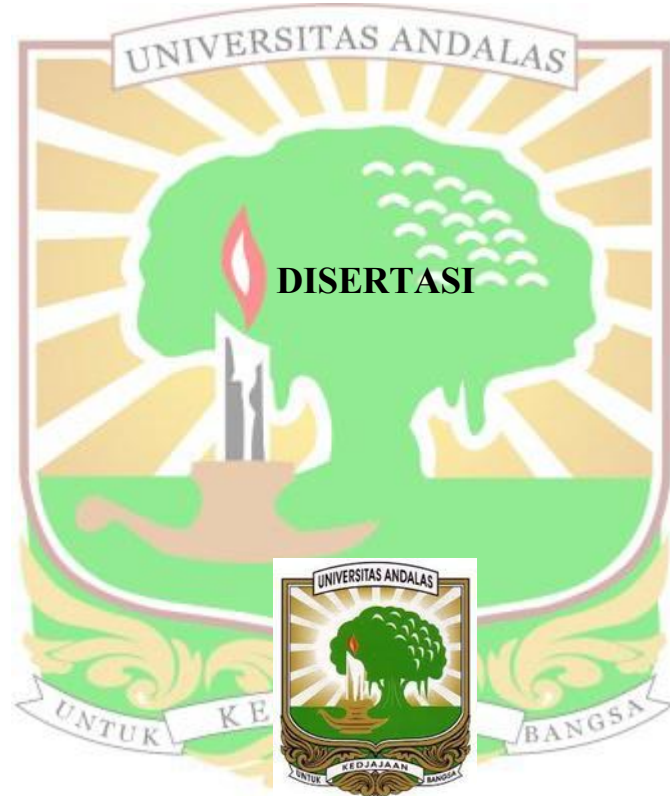


**PERBAIKAN KARAKTER TINGGI TANAMAN DAN UMUR
PANEN PADI LOKAL ASAL KABUPATEN KUANTAN
SINGINGI, RIAU MELALUI INDUKSI MUTASI**

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RINGKASAN

Gusti Marlina. Perbaikan karakter tinggi tanaman dan umur panen padi lokal asal Kabupaten Kuantan Singingi, Riau melalui induksi mutasi. Dibimbing oleh Auzar Syarif, Gustian, dan Yusniwati.

Padi lokal genotipe Singgam Putih memiliki cita rasa nasi yang pera, warna nasi putih bersih (sesuai namanya), aroma yang khas, dan adaptasi tinggi terhadap agroekosistem lokal. Namun, genotipe ini berumur panjang (>125 hari) dan memiliki tinggi tanaman >150 cm sehingga rentan rebah. Oleh karena itu, diperlukan perbaikan genetika melalui induksi mutasi untuk memperoleh galur berumur genjah dan berpostur batang *semi-dwarf*.

Penelitian ini bertujuan untuk mendapatkan: 1) Menentukan dosis iradiasi gamma yang efektif untuk menghasilkan keragaman genetik yang luas pada padi lokal genotipe Singgam Putih. 2) mendapatkan kandidat mutan umur genjah dan mutan berpostur batang *semi-dwarf* pada generasi M2. Hal ini dapat mendukung program seleksi dalam menghasilkan galur mutan harapan yang berumur genjah dan berpostur batang *semi-dwarf* yang memiliki produktivitas yang lebih baik dari tanaman aslinya. Penelitian dilakukan dalam 3 tahap dengan metode setiap tahap seperti uraian berikut: Metode penelitian tahap 1: penentuan LD50. LD50 digunakan untuk menentukan dosis iradiasi yang menyebabkan penurunan viabilitas atau pertumbuhan sebesar 50% dibandingkan dengan kontrol. Dosis sinar gamma ^{60}Co dosis 0, 150, 200, 250, 300, 350 Gy. Iradiasi dilakukan di Pusat Aplikasi Isotop dan Radiasi Badan Tenaga Nuklir Nasional (PAIR-BATAN), Jakarta. Pengujian berikutnya merupakan pengujian mutan 1 di persemaian dan penanaman di lapangan dilaksanakan di Kabupaten Kuantan Singingi, Riau. Penelitian tahap 2: seleksi generasi M2 untuk mendapatkan kandidat mutan padi lokal umur genjah dan berpostur batang *semi-dwarf*. Penelitian dilaksanakan di lahan sawah tadah hujan Desa Pebaun Hulu, Kecamatan Kuantan Mudik, Kabupaten Kuantan Singingi, Riau. Penelitian tahap 3: pemurnian galur M3 padi lokal umur genjah dan berpostur batang *semi-dwarf*. Penelitian dilaksanakan di lahan sawah tadah hujan Desa Pebaun Hulu, Kecamatan Kuantan Mudik, Kabupaten Kuantan Singingi, Riau.

Hasil penelitian tahap 1: Didapatkan bahwa dosis iradiasi yang efektif dalam menghasilkan keragaman genetik yang luas pada padi lokal genotipe singgam putih asal Kabupaten Kuantan Singingi, Riau adalah 300 Gy. Hasil penelitian tahap 2: didapatkan bahwa kandidat mutan berumur genjah (85-95 hari) dan berpostur batang *semi-dwarf* (90-125 cm) dibandingkan dengan tanaman kontrol. 9 rumpun kandidat mutan umur genjah dengan frekuensi mutasi sebesar 0,06 % dan kandidat mutan berpostur batang *semi-dwarf* dari tanaman kontrol diperoleh dengan frekuensi 1,30 %. Jumlah rumpun yang diamati pada generasi M2 sebanyak 500 rumpun, dengan menggunakan metode perhitungan deskriptif pada dasar penentuan kandidat mutan. Umur panen mutan mencapai 85-95 hari dengan tinggi tanaman 90-125 cm. Sedangkan, jumlah anakan pada mutan 9,98 anakan. Hasil penelitian tahap 3: didapatkan bahwa melalui seleksi dan pemurnian mutan ke-9 galur terhadap postur batang *semi-dwarf* dan umur genjah diperoleh secara keseluruhan

dari 9 galur mutan harapan yang sudah homogen dengan koefisien keragaman rendah. Keseragaman fenotip antar mutan serta stabilitas karakter antar individu.



SUMMARY

Gusti Marlina. Improving plant height and harvest duration of local rice from Kuantan Singingi Regency, Riau, through mutation induction. Supervised by Auzar Syarif, Gustian, and Yusniwati.

The local rice genotype Singgam Putih is characterized by a firm, non-sticky cooked rice texture, a pure white color (true to its name), a distinctive aroma, and high adaptability to the local agroecosystem. However, this genotype has a long growth duration (>125 days) and a plant height exceeding 150 cm, making it prone to lodging. Therefore, genetic improvement via mutation induction is required to obtain lines with early maturity and a *semi-dwarf* plant stature. This research aims to: 1) determine the effective gamma irradiation dose for generating broad genetic diversity in the Singgam Putih genotype; and 2) identify candidate mutants exhibiting early maturity and *semi-dwarf* stature in the M2 generation. These efforts support selection programs to develop promising mutant lines characterized by early maturity and *semi-dwarf* stature that offer superior productivity compared to the original variety. The research was conducted in three stages, with methodologies outlined as follows: Stage 1 involved determining the LD50 the irradiation dose causing a 50% reduction in viability or growth relative to the control. Gamma-ray (^{60}Co) doses of 0, 150, 200, 250, 300, and 350 Gy were applied. Irradiation was performed at the Center for Isotope and Radiation Application of the National Nuclear Energy Agency (PAIR-BATAN) in Jakarta. Subsequent steps included initial mutant testing in the seedbed and field planting in Kuantan Singingi Regency, Riau. Stage 2 involved M2 generation selection to identify candidate mutants with early maturity and *semi-dwarf* stature; this was conducted in rain-fed paddy fields in Pebaun Hulu Village, Kuantan Mudik District, Kuantan Singingi Regency, Riau. Stage 3 focused on the purification of M3 lines exhibiting early maturity and semi-dwarf stature. The research was conducted on rain-fed rice fields in Pebaun Hulu Village, Kuantan Mudik District, Kuantan Singingi Regency, Riau. Results from Phase 1 indicated that an irradiation dose of 300 Gy was effective in generating broad genetic diversity in the local Singgam Putih rice genotype from Kuantan Singingi Regency, Riau. Results from Phase 2 identified mutant candidates characterized by early maturity (85–95 days) and a semi-dwarf stem stature (90–125 cm) relative to the control plants; nine early-maturing mutant candidate clumps were obtained (mutation frequency of 0.06%), and semi-dwarf mutant candidates were obtained at a frequency of 1.30%. A total of 500 clumps were observed in the M2 generation, with mutant candidates identified using descriptive analysis. The mutants exhibited a harvest age of 85–95 days and a plant height of 90–125 cm, with an average of 9.98 tillers per plant. Results from Phase 3 involving the selection and purification of nine mutant lines based on semi-dwarf stature and early maturity yielded nine promising mutant lines that were uniform and exhibited low coefficients of variation, demonstrating phenotypic uniformity among mutants and trait stability across individuals.