

**RESPON FISIOLOGIS DAN ANATOMIS PADI (*Oryza sativa* L.)
'CEMPO MERAH' TERHADAP PEMBERIAN KALSIUM SILIKAT
PADA KETERSEDIAAN AIR BERBEDA**

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ABSTRAK

Padi (*Oryza sativa* L.) 'Cempo Merah' memiliki beberapa keunggulan yaitu berasnya mengandung antioksidan, protein, asam lemak esensial, mineral dan serat, rasa nasinya pulen, aroma nasi disukai oleh masyarakat dan masa tanam relatif pendek yaitu 109 hari setelah tanam sehingga sangat potensial untuk dikembangkan. Silika merupakan unsur fungsional yang dapat memperbaiki fungsi fisiologis tanaman dengan mendukung tanaman mengatasi stress biotik maupun abiotik. Penelitian ini bertujuan untuk menganalisis respon fisiologis dan anatomis padi 'Cempo Merah' terhadap pemberian kalsium silikat pada ketersediaan air berbedadan menganalisis efektifitas serta hubungan densitas sel silika epidermis batang dengan pemberian kalsium silikat terhadap pertumbuhan, ketahanan dan produktifitas padi 'Cempo Merah' pada ketersediaan air berbeda. Penelitian ini menggunakan Rancangan Acak Lengkap dengan dua faktor. Faktor pertama yaitu kalsium silikat dengan konsentrasi 0, 100, 200 dan 300 kg/ha, sedangkan faktor kedua yaitu ketersediaan air pada kapasitas lapang 100 %, 75%, 50% dan 25%. Variabel yang diukur meliputi tinggi tanaman, jumlah daun, jumlah anakan produktif, biomassa tanaman, rasio tajuk akar, kadar klorofil, kadar prolin daun dan akar, densitas silika epidermis batang, kadar silika dan serapan silika batang, jumlah gabah bernas dan gabah hampa, persentase gabah bernas, jumlah gabah total, berat 100 bulir gabah bernas, dan berat gabah total. Hasil yang diperoleh akan dianalisis dengan ANOVA, dilanjutkan dengan uji DMRT pada tingkat kepercayaan 95%, kemudian dilakukan analisis regresi untuk melihat hubungan antar parameter perlakuan. Hasil penelitian menunjukkan bahwa kalsium silikat meningkatkan pertumbuhan vegetatif. Densitas sel silika epidermis batang meningkat sehingga meningkatkan ketahanan mekanik batang padi tetapi kadar silika dan serapan silika menurun sehingga pemberian kalsium silikat tidak berpengaruh terhadap peningkatan hasil padi 'Cempo Merah' pada ketersediaan air berbeda. Semakin menurun kapasitas lapangan, pertumbuhan dan hasil tanaman semakin menurun.

Kata kunci : Padi 'Cempo Merah', ketersediaan air, kalsium silikat

**PHYSIOLOGICAL AND ANATOMICAL RESPONSES OF RICE
(*Oryza sativa* L.) 'CEMPO MERAH' TO APPLICATION
OF CALCIUM SILICATE AT DIFFERENT WATER AVAILABILITY**

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ABSTRACT

Rice (*Oryza sativa* L.) 'Cempo Merah' has several advantages, such as antioxidants, protein, essential fatty acids, minerals and fiber content, fluffier rice flavor, aroma rice liked by the community, and short growing season (109 Days After Plant), so this rice is potential to be developed. Silica is a functional element that can improve the function of plant physiology with support to overcome both biotic and abiotic stresses. The objective of this study was to analyze the physiological and anatomical responses of rice 'Cempo Merah' to the application of calcium silicate at different water availability and to analyze the effectiveness and the relationships of silicon epidermis stem cell density on resistance of rice 'Cempo Merah' at different water availability. This study used complete randomized design with two factors. The first factor was calcium silicate with concentrations of 0, 100, 200 and 300 kg/ha, while the second factor was the availability of water at field capacity of 100%, 75%, 50% and 25%. The variables observed were plant height, number of leaves, number of productive tillers, plant biomass, shoot root ratio, chlorophyll content, proline content, the amount and uptake of stem silicon, silicon density in stem epidermis, number of filled and empty grain, the percentage of filled grain, the total number of grains, weight of 100 grains content, and total grain weight. The results obtained were analyzed by ANOVA, followed by DMRT at 95% confidence level, then were analyzed by regression analysis to determine the correlation between treatment parameters. The results showed that the calcium silicate increase vegetative growth. Silicon density of stem epidermis increased thereby increasing the mechanical resistance of rice stalks, but the amount of silicon and silicon uptake decreased so that application of calcium silicate do not affect increasing the yield of rice 'Cempo Merah' at different water availability. Declining soil moisture levels, decreased growth and yields of rice.

Keywords: rice 'Cempo Merah', water availability, calcium silicate