RINGKASAN

Penggunaan pupuk NPK secara terus menerus akan berdampak pada efek gas rumah kaca dan mencemari air tanah. Pupuk NPK juga dapat berdampak pada penurunan kualitas pada sifat fisika dan kimia tanah sehingga kesuburan tanah akan menjadi rendah. Dampak tersebut dapat diperbaiki dengan perakitan pupuk NPK-*SR* (*Slow Release*) yang melepaskan unsur hara secara perlahan-lahan. Pupuk NPK-*SR* mempunyai efisiensi N sangat tinggi dan tidak mencemari lingkungan. Penelitian ini bertujuan untuk mengetahui pengaruh pemberian pupuk NPK-*SR*, asam humat dan pemberian residu jerami terhadap sifat kimia air, serapan N dan pertumbuhan varietas padi IR-64.

Penelitian ini menggunakan Rancangan Acak Lengkap (RAL) yang terdiri dari 3 faktor, yaitu pupuk NPK-*SR* pada perbedaan *grade* N (5 aras) yaitu N_0 (Tanpa pemberian pupuk NPK-*SR*), N_1 (*Grade* 1,65-10-8), N_2 (*Grade* 7,61-10-8), N_3 (*Grade* 12,13-10-8), dan N_4 (*Grade* 18,17-10-8). Asam humat (2 aras) yaitu A_0 (Tanpa pemberian asam humat) dan A_1 (Pemberian asam humat setara 100 L/ha atau 100 $kgha^{-1}$). Residu pemberian jerami (2 aras) yaitu J_1 (Residu pemberian jerami setara 40 ton ha^{-1}) dan J_2 (Tanpa pemberian jerami). Jumlah perlakuan adalah 5 x 2 x 2 atau 20 kombinasi perlakuan, diulang 3 kali sehingga diperoleh 60 unit percobaan. Data hasil pengamatan dianalisis menggunakan ragam sidik ragam (ANOVA) pada taraf 5% untuk mengetahui pengaruh perlakuan. Apabila hasil sidik ragam berpengaruh nyata dilakukan uji lanjutan menggunakan DMRT (*Duncan's Multiple Range Test*) pada taraf 5%.

Hasil penelitian menunjukan bahwa kombinasi perlakuan pemberian pupuk NPK-*SR*, residu pemberian jerami, dan asam humat berpengaruh nyata terhadap nilai pH H_2O. Faktor tunggal pupuk NPK-*SR* berpengaruh nyata terhadap pH H_2O pada 5 MST (8,91) dan 6 MST (7,97). Faktor tunggal residu jerami berpengaruh nyata terhadap pH H_2O pada 6 MST (7,83). Faktor tunggal pupuk NPK-*SR* berpengaruh nyata terhadap DHL berturut-turut pada 2 – 7 MST (1.792,8 μscm^{-1}; 787 μscm^{-1}; 785,5 μscm^{-1}; 635,4 μscm^{-1}; 1.676 μscm^{-1}; 928,2 μscm^{-1}). Faktor tunggal asam humat berpengaruh nyata terhadap DHL pada 2 MST (1.444,7 μscm^{-1}) dan 7 MST (561,4 μscm^{-1}). Interaksi antara pupuk NPK-*SR* dan asam humat dan residu jerami berpengaruh nyata terhadap DHL 2 MST (2.264 μscm^{-1}). Faktor tunggal pupuk NPK-*SR* berpengaruh nyata terhadap TDS berturut-turut pada 2 – 7 MST yaitu (832,5 ppm; 418,7 ppm; 404,2 ppm; 356,6 ppm; 836,9 ppm; 464,7 ppm). Faktor tunggal asam humat berpengaruh nyata terhadap TDS pada 2 MST (721,3 ppm), 4 MST (313,3 ppm), 5 MST (287.5 ppm), 7 MST (280,3 ppm). Faktor tunggal residu jerami berpengaruh nyata terhadap TDS pada 4 MST (317,7 ppm). Interaksi asam humat dan residu jerami berpengaruh nyata terhadap TDS pada 4 MST (318,1 ppm). Interaksi antara pupuk NPK-*SR* dan asam humat dan residu jerami berpengaruh nyata terhadap TDS pada 2 MST (1.184 ppm). Faktor tunggal pupuk NPK-*SR* berpengaruh nyata terhadap potensial redoks tanah pada akhir vegetatif (105,41 mV). Faktor tunggal asam humat berpengaruh nyata terhadap potensial redoks tanah pada akhir vegetatif (94,8 mV). Interaksi antara pupuk NPK-

SR dan asam humat dan residu jerami berpengaruh nyata terhadap potensial redoks tanah pada akhir vegetatif (111,3 mV). Faktor tunggal pupuk NPK-*SR* berpengaruh nyata terhadap serapan N pada daun (0,53 %). Faktor tunggal residu jerami berpengaruh nyata terhadap serapan N pada daun (2,54 mg N/daun). Faktor tunggal asam humat berpengaruh nyata terhadap tinggi tanaman 7 MST (93,2 cm). Faktor tunggal pupuk NPK-*SR* berpengaruh nyata terhadap jumlah daun/ rumpun 7 MST (56,3 helai/rumpun). Faktor tunggal asam humat berpengaruh nyata terhadap jumlah anakan/ rumpun (10,47 anakan/rumpun). Pupuk NPK-*SR* dianggap dapat dijadikan sebagai pupuk alternatif pengganti pupuk NPK. Pupuk NPK-*SR* mempunyai kandungan hara yang dapat dilepaskan secara perlahan-lahan sehingga pupuk mempunyai efisiensi N, P dan K yang cukup tinggi.

SUMMARY

The use of NPK fertilizers continuously will have an impact on the greenhouse effect and pollute groundwater. NPK fertilizers can also have an impact on the decline in the quality of soil physical and chemical properties so that soil fertility will be low. This impact can be improved by the assembly of NPK-SR (Slow Release) fertilizers that release nutrients slowly. NPK-SR fertilizer has very high N efficiency and does not pollute the environment. This study aims to determine the effect of NPK-SR fertilizer, humic acid and straw residue on water chemistry, N uptake and growth of IR-64 rice varieties.

This study used a completely randomized design (CRD) consisting of 3 factors, namely NPK-SR fertilizer at different N grades (5 levels), namely N0 (No NPK-SR fertilizer), N1 (Grade 1,65-10-8), N2 (Grade 7,61-10-8), N3 (Grade 12,13-10-8), and N4 (Grade 18,17-10-8). Humic acid (2 levels), namely A0 (No humic acid application) and A1 (Humic acid application equivalent to 100 L/ha or 100 kg/ha*). Straw residue (2 levels): J1 (Straw residue equivalent to 40 tons/ha) and J2 (No straw residue). The number of treatments was 5 x 2 x 2 or 20 treatment combinations, repeated 3 times to obtain 60 experimental units. Observation data were analyzed using variance analysis (ANOVA) at the 5% level to determine the effect of treatment. If the results of variance analysis significantly influenced, further tests were carried out using DMRT (Duncan's Multiple Range Test) at the 5% level.*

The results showed that the combination of NPK-SR fertilizer, straw residue, and humic acid treatment significantly affected the pH value of H2O. The single factor of NPK-SR fertilizer significantly influenced the pH of H2O at 5 weeks after planting (8.91) and 6 weeks after planting (7.97). The single factor of straw residue significantly affects the pH H2O at 6 weeks after planting (7.83). The single factor of NPK-SR fertilizer significantly affected the DHL at 2 - 7 weeks after planting (1,792.8 μscm^{-1}*; 787* μscm^{-1}*; 785.5* μscm^{-1}*; 635.4* μscm^{-1}*; 1,676* μscm^{-1}*; 928.2* μscm^{-1}*). The single factor of humic acid significantly affected DHL at 2 weeks after planting (1,444.7* μscm^{-1}*) and 7 weeks after planting (561.4* μscm^{-1}*). The interaction between NPK-SR fertilizer and humic acid and straw residue significantly affected the DHL at 2 weeks after planting (2,264* μscm^{-1}*). The single factor of NPK-SR fertilizer had a significant effect on TDS successively at 2 - 7 weeks of planting, namely (832.5 ppm; 418.7 ppm; 404.2 ppm; 356.6 ppm; 836.9 ppm; 464.7 ppm). The single factor of humic acid had a significant effect on TDS at 2 weeks (721.3 ppm), 4 weeks (313.3 ppm), 5 weeks (287.5 ppm), 7 weeks (280.3 ppm). The single factor of straw residue had a significant effect on TDS at 4 weeks after planting (317.7 ppm). The interaction of humic acid and straw residue significantly affected TDS at 4 weeks after planting (318.1 ppm). The interaction between NPK-SR fertilizer and humic acid and straw residue had a significant effect on TDS at 2 weeks after planting (1,184 ppm). The single factor of NPK-SR fertilizer had a significant effect on soil redox potential at the end of vegetative stage (105.41 mV). The single factor of humic acid had a significant effect on soil redox potential at the end of vegetative stage (94.8 mV). The interaction between NPK-SR fertilizer*

and humic acid and straw residue had a significant effect on soil redox potential at the end of vegetative stage (111.3 mV). The single factor of NPK-SR fertilizer had a significant effect on N uptake in leaves (0.53%). The single factor of straw residue had a significant effect on N uptake in leaves (2.54 mg N/leaf). The single factor of humic acid had a significant effect on plant height 7 weeks after planting (93.2 cm). The single factor of NPK-SR fertilizer had a significant effect on the number of leaves/clump 7 weeks after planting (56.3 leaves/clump). The single factor of humic acid had a significant effect on the number of tillers/plant (10.47 tillers/plant). NPK-SR fertilizer is considered to be an alternative fertilizer to replace conventional NPK fertilizer. NPK-SR fertilizer contains nutrients that can be released slowly so that the fertilizer has a fairly high efficiency of N, P and K.