

Control of Helminthosporiosis in *Oryza sativa* Varieties Treated with 24-Epibrassinolide

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Abstract : The objectives of this study were to evaluate the effects of foliar application of 24-epibrassinolide (EBR) on the development of rice helminthosporiosis caused by *Bipolaris oryzae* and its influence on the improvement of growth parameters and induction of the synthesis of defense substances in the rice plants. The experimental asset up involved a multifactorial split-plot with two varieties (NERICA 3 and local variety KAMKOU) and five treatments (T0: control, T1: EBR, T2: BANKO PLUS (fungicide), T3: NPK (chemical fertilizer), T4: mixture: NPK + BANKO PLUS + EBR) with three repetitions. Agromorphological and epidemiological parameters, as well as substances for plant resistance, were evaluated over two growing seasons. The application of the EBR induced significant growth of the rice plants for the 2015 and 2016 growing seasons on the two varieties tested compared to the T0 treatment. At 74 days after sowing (DAS), NERICA 3 showed plant heights of 58.9 ± 5.4 ; 83.1 ± 10.4 ; 86.01 ± 9.4 ; 69.4 ± 11.1 and 87.12 ± 7.4 cm at T0; T1; T2; T3, and T4, respectively. Plant height for the variety KAMKOU varied from 87.12 ± 8.1 ; 88.1 ± 8.1 and 92.02 ± 6.3 cm in T1, T2, and T3 to 74.1 ± 8.6 and 74.21 ± 11.4 cm in T0 and T3. In accordance with the low rate of expansion of helminthosporiosis in experimental plots, EBR (T1) significantly reduced the development of the disease with severities of 0.0; 1.29, and 2.04%, respectively at 78; 92, and 111 DAS on the variety NERICA 3 compared with 1; 3.15 and 3.79% in the control T0. The reduction of disease development/severity as a result of the application of EBR is due to the induction of acquired resistance of rice varieties through increased phenol (13.73 eqAG/mg/PMF) and total protein (117.89 eqBSA/mg/PMF) in the T1 treatment against 5.37 eqAG/mg/PMF and 104.97 eqBSA/mg/PMF in T0 for the NERICA 3 variety. Similarly, on the KAMKOU variety, 148.53 eqBSA/mg/PMF were protein and 6.10 eqAG/mg/PMF of phenol in T1. In summary, the results show the significant effect of EBR on plant growth, yield, synthesis of secondary metabolites and defense proteins, and disease resistance. The EBR significantly reduced losses of rice grains by causing an average gain of about 1.55 t/ha compared to the control and 1.00 t/ha compared to the NPK-based treatment for the two varieties studied. Further, the enzymatic activities of PPOs, POXs, and PR2s were higher in leaves from treated EBR-based plants. These results show that 24-epibrassinolide can be used in the control of helminthosporiosis of rice to reduce disease and increase yields.

Keywords : *Oryza sativa*, 24-epibrassinolide, helminthosporiosis, secondary metabolites, PR proteins, acquired resistance

Conference Title : ICPPD 2020 : International Conference on Phytopathology and Plant Diseases

Conference Location : Rome, Italy

Conference Dates : October 15-16, 2020