

## [P3] Abiotic Stress for Crop Production

Thu. Sep 9, 2021 12:15 PM - 2:00 PM Room 3 (Poster) (Abiotic Stress for Crop Production)

1:15 PM - 2:00 PM

### [P3-46] Roles of Root Plasticity to Growth and Yield of Quinoa under Different Soil Water Regimes

\*Nominated for Presentation Awards

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Recent studies indicated new perspectives on the morphology and architecture of the quinoa root system, its intraspecific diversity and plasticity in response to drought. This study therefore aimed to evaluate whether promoted development of root system due to the plasticity triggered by drought stress would contribute to increased growth, and yield of quinoa. The experiment was designed with Split-plot method with 3 replications. The main plots were Green (G1) and Red (G2) genotypes and sub-plots were three soil moisture treatments: 30% soil moisture content (SMC (w/w)) (Well-watered, W1) as control, 20% SMC (mild drought, W2), and 15% SMC (severe drought, W3). The results showed that the growth of genotypes was significantly affected by the different soil water regimes. The root traits such as total root length, total nodal root length, total lateral root length, and nodal root numbers under drought treatments (W2 and W3) were significantly higher as compared with those under control. Furthermore, the root plasticity was expressed in both G1, G2 genotypes, which resulted in significantly increased water use, shoot dry matter, and consequently increased yield and yield components. In addition, the positive and significant relationships were observed among measured traits (total root length and water uptake, water uptake and shoot dry weight, and shoot dry weight and yield) of two genotypes under different water regimes. These results prove that in both genotypes, root plasticity was triggered by drought, which enhanced root systems development contributing to increased water uptake, shoot dry weight and yield.