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Executive Summary

CID a Useful Technique to Select Drought Tolerant Wheat Genotypes

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Wheat (*Triticum aestivum*) is a staple food in many countries of the world. In Algeria, wheat is cultivated chiefly in semi-arid areas. Therefore, output of this crop is low with annual production of bread wheat 9.52 million quintals and average yield 16.3 q ha^{-1}[1]. Cereal crops in this country have to suffer abiotic stresses including winter-spring cold and terminal drought. Less rainfall and high temperatures affect the quality and quantity of this valuable staple food commodity in arid and semi-arid areas. Moreover, according to previous investigation conducted in 2006, productivity of wheat genotypes under terminal drought is associated with their capacity to maintain their photosynthetic activity[2]. Therefore, it's the need of our, to hunt for appropriate genotypes which can resist drought conditions.

In this regard a new research was conducted by a team led by Bachiri[3] to compare the response of some wheat genotypes under different water regimes using carbon isotope discrimination technique (CID or Δ) and to assess the link between Δ, dry matter (DM) as well as relative water content (RWC). Carbon isotopes discrimination is a significant nuclear method to screen suitable genotypes for drought prone areas. Moreover, this technique takes less time as well.

CID of C_3 plant leaves is linked with photosynthetic gas exchange, because Δ is in part determined by C_i/C_a. The C_i is the ratio of CO_2 concentration present in the leaf intercellular spaces and C_a indicates the atmosphere[4].

Bachiri[3] and colleagues performed this experiment on 10 bread wheat genotypes. These varieties were grown in pots in the absence of stress until 3 weeks of germination and 3 treatments of water regimes were imposed progressively. After germination, water stress was imposed and then scientists measured the dry matter (DM), relative water content (RWC) as well as carbon isotope ratio (δ) analyzed from shoot dry matter.

This research showed a positive association between dry matter and CID. High dry matter was found to be linked with elevated CID under water stress, pointing that CID technique provides an integrated and effective selection criteria for drought tolerant wheat genotypes. Conclusively, techniques like CID have the potential to be used efficiently in wheat breeding programs.

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