

Yield Attributes Responses of Winter Wheat (*Triticumaestivum*. L) and Triticale (x *Triticosecale* sp.) to Short Term Elevated CO₂ Exposure Combined with Two Nitrogen Levels

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Abstract—Increasing atmospheric CO₂ concentrations are generally expected to enhance photosynthesis and growth of agricultural C3 cereal crops and as a result substantially increase yields. However, little is known about the combined effect of elevated CO₂ and nitrogen (N) supply on growth and yield attributes. This study aims to assess the interactive effects of short term exposure of elevated atmospheric CO₂ and nitrogen addition on growth and yield attributes of winter wheat and Triticale. An experimental set up was established, winter wheat (cv.PBW-555) and Triticale were grown to maturity for one season, under elevated (EC, 580 ± 20 μmol mol⁻¹) and ambient (AC, 384 ± 13 μmol mol⁻¹) CO₂ in OTC's, at two levels of nitrogen supply high (N₂, 0.107 g of N/kg of soil), and 50% of high (N₀, 0.053 g N/kg of soil). Results showed significantly higher yield at elevated than ambient CO₂. Plant height and number of tillers increased in response to elevated CO₂ with HN in both the varieties. Biological yield, grain yield and 1000 seed weight was high in Triticale as compared to PBW-555. Triticale was more responsive towards the treatment than PBW-555. Addition of nitrogen was found to enhance the effects of elevated CO₂ on yield attributes, however, long-term studies are necessary to get more realistic findings on responses of agro ecosystem to elevated CO₂ and nitrogen addition.

Keywords: Elevated CO₂, Wheat, Oat, nitrogen, climate change.