

# The Performance of Congress Grass (*Partheniumhysterophorus*) in Response to Air Pollution Tolerance Index (APTI)

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**Abstract:** *With the tremendous scientific and technological advancement, man has to a large extent succeeded in controlling and dominating nature. Plant species contain a tremendous amount of genetic variation, both within and between populations. This genetic variation shows up in the morphological and physiological traits of plants adapted to survive in different climates. Turreson (1922) defined an ecotype as a population of plants that is genetically differentiated in response to the conditions of a particular habitat. An ecotype reflects the elevation, precipitation, temperature, growing season, soil and site characteristics where the population is found. Sessile modular organisms, such as plants, which cannot migrate when environmental conditions change and whose modules may experience different environments, benefit from mechanisms to cope with environmental heterogeneity. Because most organisms, and certainly plants, change their phenotype in response to environmental change, it is often assumed that phenotypic plasticity has frequently evolved as an adaptation to environmental heterogeneity. Many phenotypic responses to environmental stress, however, may be the consequence of passive reductions in growth due to resource limitation (Dorn et al., 2000; van Kleunen et al., 2000a). Moreover, phenotypic plasticity does not necessarily evolve as an adaptation but alternatively can evolve due to genetic correlations with other traits that are under selection or due to genetic drift. Therefore, plasticity of a trait does not necessarily imply that it is adaptive (Sultan, 1987; Schmid, 1992). We found strong phenotypic plasticity in *Partheniumhysterophorus* regarding life span, height of plant, flowering time, under pollutant stress, particularly air pollution tolerance. Environment might be more important in determining genetic and phenotypic changes. The very existence of phenotypic plasticity means that the same genotype can express different phenotypes in diverse environments. There is also increasing evidence that the amount and pattern of expressing genetic variation itself is environment dependence. *Partheniumhysterophorus* shows adaptive phenotypic evolution within range of environments.*

**Keywords:** Phenotypic plasticity, *Parthenium*, Ecotype, Environmental variation, APTI