

EXOTIC INVASIVE *AGERATUM CONYZOIDES* L. IN INDIAN DRY TROPICS: A PRELIMINARY INVESTIGATION OF ITS BIOMASS ALLOCATION PATTERN AND PLANT TRAITS

Nidhi Chaudhary and Rup Narayan

Department of Botany, I. P. (PG) College, Bulandshahr- 203001, Uttar Pradesh
E-mail-nidhi.c06@gmail.com

Abstract: Billy goat weed *Ageratum conyzoides* was investigated for its biomass allocation pattern and plant traits across two contrasting soil resource regimes in a peri-urban region in Indian dry tropics. The plant populations at low resource (LR) site showed higher root length, biomass of root, leaf and reproductive parts and their mass fractions. High resource (HR) site showed higher shoot length and stem mass fraction. Plasticity indices of root mass fraction, root:shoot length and biomass ratios were higher at LR site. Phenotypic plasticity was also higher here. Biomass allocation to different components varied with ontogeny and soil resource states. Higher reproductive and root allocation by *Ageratum conyzoides* at LR site can be attributed to its successful invasive character in this region.

Keywords: Biomass allocation, Plant component biomass, Phenotypic plasticity, Bulandshahr

REFERENCES

- Allen, S. E.; Grismshaw, H. M. and Rowland, A.P. (1986). Chemical analysis. In: P.D. Moore PD, Chapman, S.B. (eds.) *Methods in Plant Ecology*. Blackwell Scientific, Oxford. pp. 285-344.
- Burke A. (2005). Biodiversity patterns in arid, variable environments. *Mt Res Dev.* **25**(3):228–234.
- Callaway, R. M. and Aschehoug, E. T. (2000). "Invasive Plants versus Their New and Old Neighbors: A Mechanism for Exotic Invasion." *Science.* **290**(5491): 521-523.
- Droste, T.; Flory, S. and Clay, K. (2010). Variation for phenotypic plasticity among populations of an invasive exotic grass. *Plant Ecol.* **207**(2):297–306.
- Gupta, S. and Narayan, R. (2006). Species diversity in four contrasting sites in a peri-urban area in Indian dry tropics. *Trop Ecol.* **47**(2):229–241.
- Gupta, S. and Narayan, R. (2010). Brick kiln industry in long-term impacts biomass and diversity structure of plant communities. *Curr Sci.* **99**(1):72–79.
- Gupta, S. and Narayan, R. (2012). Phenotypic plasticity of *Chenopodium murale* across contrasting habitat conditions in peri-urban areas in Indian dry tropics: Is it indicative of its invasiveness?" *Plant Ecol.* **213**(3): 493-503.
- Hernández, E.; Vilagrosa, A.; Pausas, J. and Bellot, J. (2010). Morphological traits and water use strategies in seedlings of Mediterranean coexisting species. *Plant Ecol.* **207**(2):233–244.
- Jiang, H.; Fan, Q.; Li, J.-T.; Shi, S.; Li, S.-P.; Liao, W.-B. and Shu, W.-S. (2011). Naturalization of alien plants in China. *Biodivers Conserv.* **20**(7):1545–1556.
- King, D. A. (2003). Allocation of above-ground growth is related to light in temperate deciduous saplings. *Funct Ecol* **17**(4):482–488.
- Mack, R. N.; Simberloff, D.; Lonsdale, W. M.; Evans, H.; Clout, M. and Bazzaz, F. A. (2000). Biotic invasions: causes, epidemiology, global consequences, and control. *Ecological Applications* **10**: 689-710.
- Mahoney, K. J. and Kegode, G.O. (2004). Biennial wormwood (*Artemisia biennis*) biomass allocation and seed production. *Weed Sci.* **52**(2):246–254.
- McKinney, M. L. (2002). Urbanization, biodiversity, and conservation. *Bioscience.* **52**: 883-890.
- Mead, R. and Curnow, R. N. (1983). Statistical methods in agriculture and experimental biology. Chapman and Hall, London.
- Müller, I.; Schmid, B. and Weiner, J. (2000). The effect of nutrient availability on biomass allocation patterns in 27 species of herbaceous plants. *Perspect Plant Ecol Evol Systematics* **3**(2):115–127.
- Okunade, A. L. (2002). "*Ageratum conyzoides* L. Asteraceae." *Fitoterapia* **73**: 1-16.
- Piper, C. S. (1944). *Soil and Plant Analysis*. Interscience Publications Inc., New York.
- Poorter, N. and Nagel, O. (2000). The role of biomass allocation in the growth response of plants to different levels of light, CO₂, nutrients and water: a quantitative review. *Australian Journal of Plant Physiology.* **27**: 595-607.
- Pyšek, P. and Richardson, D. M. (2007). Traits associated with invasiveness in alien plants: where do we stand? In: Nentwig W(ed) Biological invasions, vol 193. Ecological Studies. Springer Berlin Heidelberg, pp 97–125.
- Raghubanshi, A. S.; Rai, L. C.; Gaur, J. P. and Singh, J. S. (2005). *Current Science.* **88** (4): 539-540.
- Richardson, D. M.; Pysek, P.; Rejmanek, M.; Barbour, M. G.; Panetta, F. D. and West, C. J. (2000). Naturalization and invasion of alien plants: concepts and definitions. *Divers Distrib.* **6**(2): 93–107.
- Simberloff, D. (2003). How Much Information on Population Biology Is Needed to Manage Introduced Species? *Conservation Biology.* **17**(1): 83-92.
- Singh, K. P.; Shukla, A. N. and Singh, J. S. (2010). State-level inventory of invasive alien *Current Science.* **99**(1): 107-114.
- Singh, S.; Brojendro, W. R. D.; Marina, A.; Devi, W. I.; Swapana, N. and Singh, C. B. (2013). "Ethnobotany, phytochemistry and pharmacology of

Ageratum conyzoides Linn (Asteraceae)." *Journal of Medicinal Plants Research* **7**(8): 371-385.

Sui, Y.; Cui, Q.; Dong, M. and He, W. (2011). Contrasting responses of legume versus non-legume shrubs to soil water and nutrient shortages in the Mu Us Sandland. *J Plant Ecol*; doi: 10.1093/jpe/rtq040.

Turner, W. R.; Nakamura, T. and Dinetti, M. (2004). Global urbanization and the separation of humans from nature. *BioScience*. **54**: 585-590.

Valladares, F.; Sanchez-Gomez, D.; Zavala, M. A.

(2006). Quantitative estimation of phenotypic plasticity: bridging the gap between the evolutionary concept and its ecological applications. *J Ecol*. **94**(6):1103–1116.

Wu, F.; Bao, W.; Li, F. and Wu, N. (2008). Effects of drought stress and N supply on the growth, biomass partitioning and water-use efficiency of *Sophora davidii* seedlings. *Environ Exp Bot*. **63**(1–3):248–255.