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# Investigation of Carbon Sequestration Model according to Independent Variables of DBH and Height in *Populus deltoides* Plantation, Case Study: West, Center and East of Gilan Province, Iran

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**Abstract:** *Populus deltuides* W. Bartram ex Marshall is one of the most important economically (wood production), environmentally (biomass production and carbon sequestration), and fast growing species in plantations. Therefore, the purpose of this study was to investigate DBH, height and carbon sequestration models according to the age using Stem Analysis Method in poplar plantations of Guilan province, Iran. Thirty trees were randomly selected in different diameter classes, fell down and the discs were obtained in order to stem analysis. The annual rings of discs counted, age at different tree heights obtained, and the annual rings diameter were measured to determine annual diameter and volume growth. Biomass was measured and finally, regression analysis performed by the relationship between DBH and height by carbon in age based on the highest coefficient of determination and minimum standard error. The results showed that the model of carbon sequestration was $C = 3.3d^{0.29} + 0.002H^{2.42}$ ($R^2$=99, SE=0.31) in the west, $C = 1.51(d^{0.8} + H^{0.97})$ ($R^2$=0.98, SE=2.16) in the center and $C = 1.29(d^{0.07} + H^{0.89})$ ($R^2$=0.82, SE=3.80) in the east poplar plantation of Guilan Province.

**Keywords:** Carbon model, Plantation, *Populus deltoides*, Stem analysis.