


# Capability Analysis of Suitable Natural Habitat for Wild American Ginseng: A Sensitivity Analysis of Main Growing Factors

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## ABSTRACT

This article presents a sensitivity analysis of the main growing factors for wild American ginseng in North Carolina, USA. This study examines the influence and importance of ginseng's natural growing factors in the predictive models generated through the method of weighted linear combination by conducting a sensitivity analysis over the relative importance of growing factors. By identifying these factors, government agencies can more effectively plan law enforcement activities and streamline their preservation efforts to protect this valuable species. The results of our sensitivity analysis indicate that the shade-related factors and spatial factors play very important roles in predicting suitable areas for wild American ginseng to grow in nature in the context of North Carolina. This finding implies that the proper consideration of these factors substantially enhances model predictability and consistency of predictions with real-world observations.

## KEYWORDS:

Ginseng, GIS, Natural Habitat, Wild American Ginseng, Suitability Analysis, Main Growing Factors, and Sensitivity Analysis, Weighted Linear Combination

## INTRODUCTION

Ginseng is a root part of the *Panax* plant family, which stands out for its notable presence of ginsenosides and gintonin. With a rich history as a traditional medicine in China, this popular herb is found exclusively in North America, Korea, Manchuria, and Siberia, all situated in the Northern Hemisphere. In the annals of American history, ginseng has long held a prominent role, and nestled within this botanical saga unfolds, for example, the riveting chronicle of Daniel Boone—a frontiersman whose exploits stretched beyond the untamed frontiers. Boone, renowned as a scout, hunter, and patriarch, navigated a diverse array of pursuits, from legislative roles to managing a tavern, store, and warehouse, according to Morgan (2008). Amidst this dynamic life, Boone's connection to the forest's treasures led him to become a ginseng digger, supplementing his earnings. Known informally

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as “sang” in the southern Appalachians, ginseng was not merely a medicinal herb, but it also held commercial allure, especially in the expanding China market.

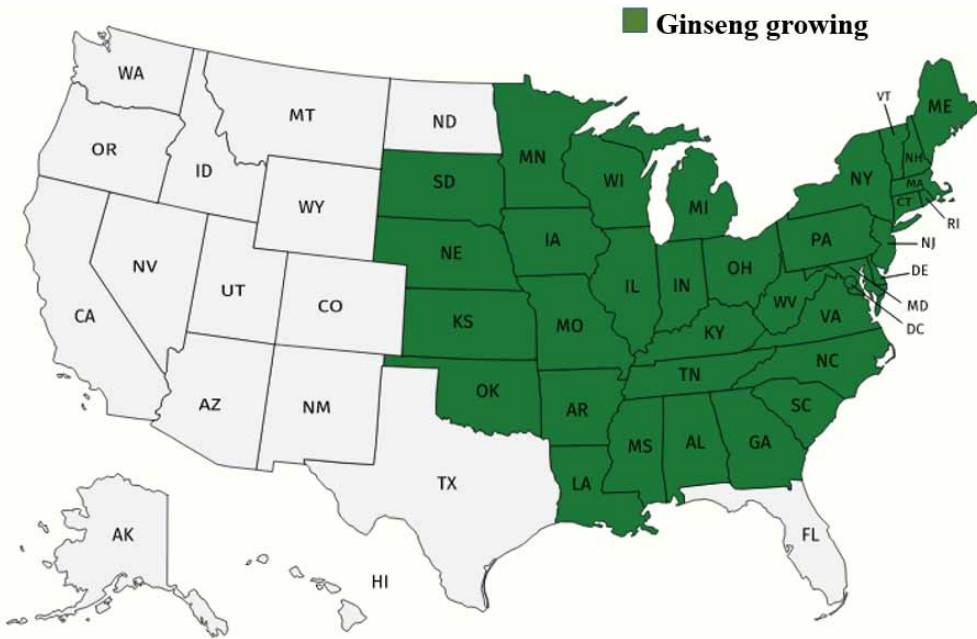
Flourishing predominantly in the understory of eastern deciduous forests, wild American ginseng is a resilient perennial herb. It shares remarkable similarities with Chinese ginseng, particularly in its elevated ginsenoside content, setting it apart from Siberian ginseng, which lacks this valuable component. The coveted high level of ginsenoside in wild American ginseng renders it exceptionally sought after in the Chinese market. Ginseng has been exported from the United States since the 18th century. For instance, in 1860, Wisconsin exported 120 tons of wild American ginseng root to China. It is still in high demand, to the extent that wild American ginseng is nowadays priced around \$400–800 per pound.

Ginseng is sold in more than 35 countries. Only four countries, China, South Korea, Canada, and the United States, produced 99% of the world’s ginseng in the early 21st century (Baeg & So, 2013). Almost 95% of the wild American ginseng harvested in the United States is shipped for the Asian market. China is the largest consumer of this plant in the world. Several states export their harvested wild American ginseng to the Chinese market. North Carolina is one of the major exporters of wild American ginseng to China. Annually, over three million dollars in revenue is brought to North Carolina by trading this plant. Due to such high prices, excessive harvests of American ginseng from the wild for export to Asian medicinal herb markets have raised concerns over the survival of American ginseng in the wild. This is primarily because harvesting the root of the plant is deadly to the individual plant, and it subsequently impacts this species’ population size, structure, as well as its genetic diversity (Van der Voort et al., 2003; Cruse-Sanders et al., 2005).

Wild American ginseng grows mostly in the deciduous forests of the eastern United States, such as the Appalachian and Ozark regions, mainly because of suitable shade and soil moisture (Compton, 2006). Figure 1 shows ginseng-growing areas in the United States.

**Figure 1. Areas in the United States where ginseng root grows**

*Note: From “How to Find and Sell American Wild Ginseng,” by M. Watson, 2022, Owlcation (<https://owlcation.com/stem/How-to-Find-and-Sell-American-Wild-Ginseng>). Copyright 2022 by The Arena Media Brands, LLC.*



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