



LINKING ROOTS MOISTURE TO MEDICAL PLANT SPECIES (SENECIO L.) AND ELEVATION IN SHAN COUNTY

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ABSTRACT

A key plant species (Senecio L.) not only is a vital multilevel functional medicinal material of indications of respiratory tract infections, tonsillitis, pharyngitis, pneumonia, conjunctivitis, enteritis, dysentery, but also it is a widely distributed wide plant species. This plant species is widely distributed elevation from 500m to 1500m in six landscapes in Shan County of China. However, understanding dynamics of roots moisture of this species is difficult along elevation. This research explained that linking roots moisture of the species and elevation is a significant positive connection from 500m to 1000m ($P < 0.01$) as well as the linking roots moisture of this species to elevation is a significant negative connection from 1000m to 1500m ($P < 0.01$). This study provides six types and eco-adaptation for finding new species. Therefore, this study has theoretical and practical significance for medicinal plant protection along elevation and environmental gradient over the spatial-temporal-environmental-disturbance scales (STEDS) in the multilevel green space diversity.

KEYWORDS: Roots moisture; Elevation; Connection; Adaptation; Eco-functional value; Medicinal plant.

1. INTRODUCTION

Roots moisture influences medical plants growth and sustainable evolution along elevation scale. Natural environmental and plantation factors often integrated effects of the human activities and acid rain on medicinal plant species by the research of process for deposition of thin films.^[1-3] But medicinal plant functional more traits may be finding through key physiological characters of antireflection coatings and ecological functional traits along elevation gradient.^[4-7] Using plant leaf oxide films technological tools,^[8-10] scientists explain that multilevel functional traits of medical species^[11,12] and medical plant communities^[13,14] by dynamic framework model^[15] for food chains.^[16]

For instance, dynamics of community's height,^[17] tree community's total trunk volume,^[18] plant community's tree individual number,^[19] plant individual specie's and plant communities' crown volume^[20,21] of medicinal plant (*Sophora japonica*) along elevation. Although limits to local agricultural landscape area for protecting more natural landscapes^[22] (e.g., grasslands, wetlands, water and forests) or some half natural landscapes (e.g., green ecological urban and beautiful green countryside) areas for sustainable medical plant species, but dynamics of total dry biomass,^[23] total fresh biomass,^[24] vegetation

coverage,^[25] plant average height,^[26] roots cuticle biomass,^[27] leaf -stalk biomass,^[28] stems cuticle biomass,^[29] species pair's co-dominance abundance dominancy,^[30] Important Value,^[31] and moisture content^[32] of (*Cremastra Appendiculata*) also deeply research.

Therefore, it is a vital topic issues that the relationship between gene level and medical plant roots cuticle functional traits,^[33,34] as well as the dynamics of roots cuticle biomass,^[35] fresh roots biomass,^[36] stems cuticle biomass³⁷ associations with daily solar radiation for human cognitive^[38] medical plant,^[39] especially, risk assessment and early warning mechanism (e.g., watersheds areas).^[40,41] In short, herein explains linking roots moisture of this plant to elevation at STEDS.

2. Typical environmental condition, situation of typical vegetation and methods of research

Study area is local in three typical zones: firstly, evergreen vegetation of north subtropical zone; secondly, evergreen and deciduous coniferous and broad-leaved mixed forest of north subtropical and warm temperate transition; thirdly, deciduous vegetation of warm temperate zone in Earth. Thus, this area is local in evergreen and deciduous coniferous and broad-leaved

mixed forest in north subtropical and warm temperate transition in *Shan County* of China at STEDS (Figure 1).

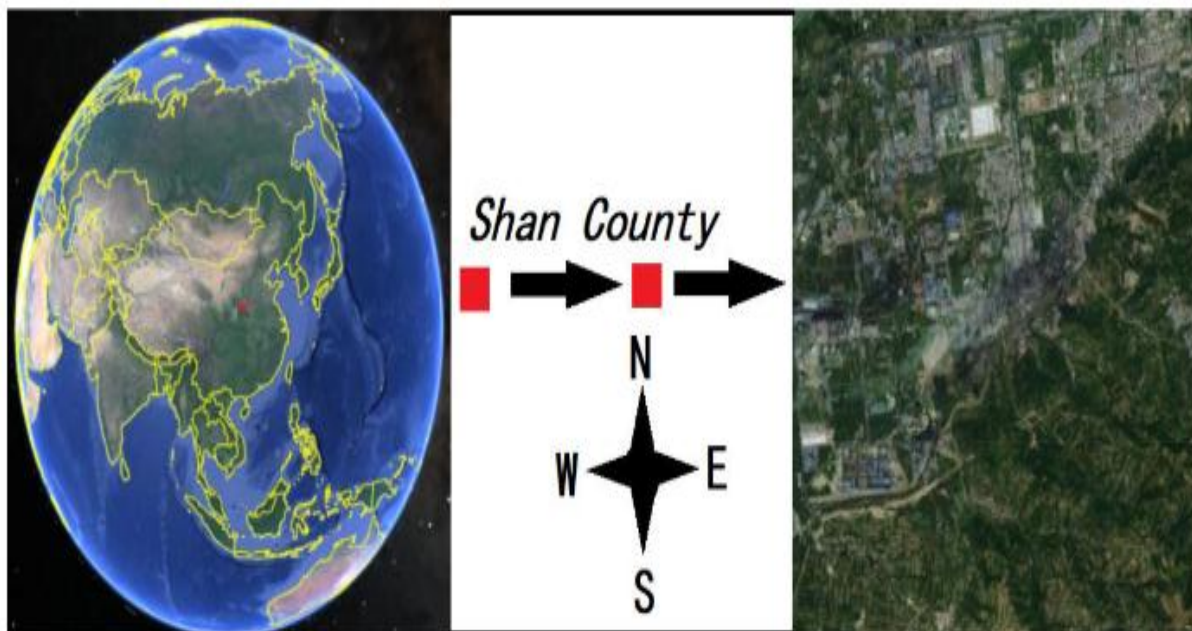


Figure 1: A Digital cadaster map of typical location in *shan county* of china on earth.

There is a long-time investigation linking roots moisture of medicinal plant species to elevation from 2005 to 2019. Investigation of “big data” included that roots moisture of medicinal plant species or other eco-index of medicinal plant species along elevation gradient over STEDS.^[42,43]

Thus, there is a linking roots moisture of (*Senecio L.*) to elevation, as well as there is a series of best six landscapes areas ecological adaptation of roots moisture of this plant species by the “big data” of ecological investigation, qualitative analysis, and quantitative statistics, human cognitive ecological linguistic rules, scientific theories and ecological planning methods.

3. RESULTS AND ANALYSIS

Based on “big data” of plant investigation, this species is a widely distributed wide species along elevation from

500m to 1500m. A key species (*Senecio L.*) is a widely distributed along the different elevation from 500m to 1500m in *Shan County* of China. However, understanding the elevation effect on the relation between roots moisture of this plant species and elevation is very difficult, because elevation effect on plant root biomass,^[43] bryophyte and lichen biomass,^[44] wood biomass,^[45] mushroom biomass and diversity biomass,^[46] production of medicinal plant species.^[47]

Applying the dynamics of “big data” investigation, this work suggested there are five rules:

Firstly, herein showed that it is not only the increasing of (*Senecio L.*) roots moisture with the increasing of elevation from 500m to 1000m, as well as there are but also decreasing of (*Senecio L.*) roots moisture with increasing of elevation gradient from 1000m to 1500m (Figure 3).

Table 1: Roots moisture of this medical plant species association with elevation gradient.

Roots moisture along elevation	Roots moisture of this medical plant species
Elevation From 500 to 1000	0.994**
Elevation From 1000 to 1500	-0.995**

Note: **, $P < 0.01$.

Secondly, this study explained that there is a significant positive connection between (*Senecio L.*) roots moisture and elevation from 500m to 1000m ($P < 0.01$), as well as there is a significant negative connection between (*Senecio L.*) roots moisture and elevation from 1000m to 1500m in *Shan County* of Henan Province of China over STEDS ($P < 0.01$) (Table 1).

Thirdly, this research shows a good areas ecological adaptation of (*Senecio L.*) from 500m to 1500 in *Shan County* of China. Because there are results that there are not only different natural environmental factors, there are but also dynamics of different elevation environmental factors from 500m to 1500m by the dynamics of roots moisture of this medical species (Figure 1, 2).

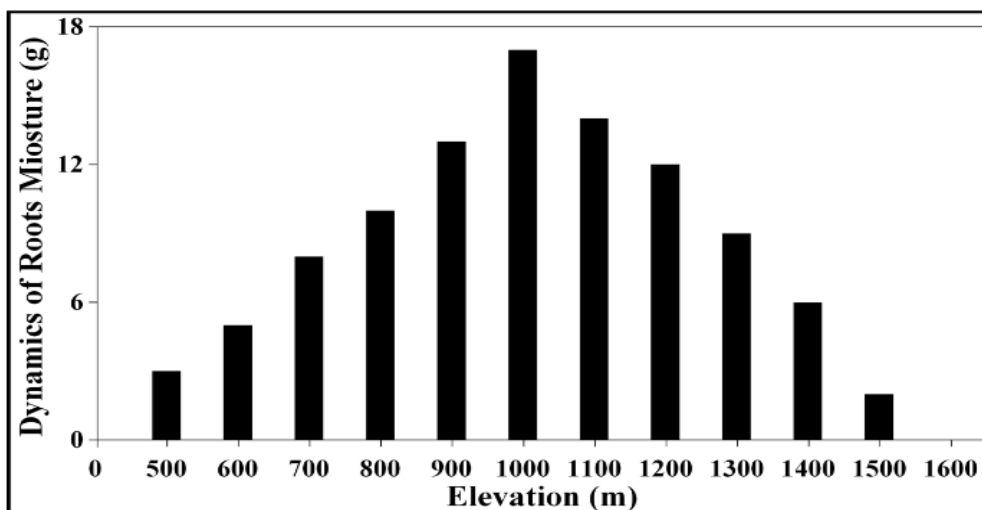


Figure 2: Dynamics of (*Senecio L.*) roots moisture along elevation gradient.

Fourthly, this research proposed that the medicinal plant species (*Senecio L.*) is local in the six typical landscape types (forests, mixed between forests and grassland, mixed between forests and wetland, mixed between forests and river, mixed between forests and eco-urban, mixed between forests and countryside) by the “big data” of this plant roots moisture investing along elevation, because there may be results that there are not only dynamics of natural environments, there are but also dynamics of climate environmental factors from 500m to 1500m along elevation gradient.



Figure 3: Total structures of medical plant species (*Senecio L.*) by Long-time investigation.

Fifthly, the typical medical plant species (*Senecio L.*) not only is a vital functional medicinal material of indications of treating to respiratory tract infections, tonsillitis, pharyngitis, pneumonia, conjunctivitis, dysentery and enteritis, but also it is belonging to *Compositae* families of *Senecio* races of *Discotyledoneae* in *Angiospermae*, especially, total structures of (*Senecio L.*) (Figure 3).

Thus, this research found a series of typical areas ecological adaptation of plant (*Senecio L.*) of indication of treating respiratory tract infections, tonsillitis, pharyngitis, pneumonia, conjunctivitis, enteritis, dysentery along elevation gradient, as well as there is linking of the medical plant species (*Senecio L.*) roots moisture and elevation gradient in *Shan County* of *Henan Province* of China.

4. DISCUSSION

The respiratory tract infections, tonsillitis, pharyngitis, pneumonia, conjunctivitis, dysentery and enteritis always influence public health, which often led human died. But understanding dynamics of medicinal plant species is very difficult issues, for instance, molecular dynamics,^[48] evolutionary dynamics^[49] and indigenous medical plant.^[50] So, finding a vital multilevel functional medicinal plant (*Senecio L.*) of indications of respiratory tract infections, tonsillitis, pharyngitis, pneumonia, conjunctivitis, enteritis and dysentery not only is a key value plant species, but also treating many people's diseases or saving some individual human-lived. As such, it is a research that (*Senecio L.*) were found from 500m to 1500m in *Shan County* of *Henan Province* of China. And this research suggested three rules between (*Senecio L.*) roots moisture and elevation gradient at STEDS:

1. This work showed that there is an increasing of (*Senecio L.*) roots moisture with enhancing of elevation from 500m to 1000m; there be decreasing of (*Senecio L.*) roots moisture with increasing of elevation from 1000m to 1500m (Figure 2). There is a significant positive connection between (*Senecio L.*) roots moisture and elevation from 500m to 1000m ($P < 0.01$) as well as there is a significant negative connection between (*Senecio L.*) roots moisture and elevation from 1000m to 1500m along elevation gradient over STEDS in *Shan County* ($P < 0.01$) (Table 1).
2. This research provides six landscape types (forests, mixed landscape between forests and grassland,

mixed landscape between forests and wetland, mixed landscape between forests and river, mixed landscape between forest and eco-urban, mixed landscape between forests and green beatified countryside), as well as there is a series of ecological adaptation of landscape areas (for instance, the best areas ecological adaptation of (*Senecio L.*) from 500m to 1500m) for finding this plant (*Senecio L.*) by the dynamics of (*Senecio L.*) roots moisture along elevation gradient.

3. (*Senecio L.*) not only is a vital multilevel functional medicinal material of indications of treating to respiratory tract infections, tonsillitis, pharyngitis, pneumonia, conjunctivitis, dysentery and enteritis, but also it is belonging to *Compositae* families of *Senecio* races of *Discotyledoneae* in *Angiospermae*, as well as it is widely distributed wide specie by the “big data” investigation of (*Smilax scobinicaulis*) roots moisture in *Shan County of Henan Province of China* (Figure 1, 2, 3).

Indeed, better regional regulators and local government need better planning and regulation many medicinal plant species sustainability^[51] of ecosystems by researches on the vital biomass of medicinal plants^[52] along elevation and environments with dynamics of plant diversity in the global, regional and landscapes natural ecosystem types with the ways “big data” investigation, scientific quantitative statistics^[53] by landscape stability and sustainable medical plant diversity production.^[54] Therefore, government planner will protect habitats of this medical plant species (*Senecio L.*) by the lands eco-restoration^[55,56] and integrated strategy technology^[57] for avoiding plant species loss.^[58]

5. CONCLUSION

This research has a vital theoretical and practical significance for the reasonable protection of (*Senecio L.*) along elevation gradient, because this plant species not only is an important widely distributed wide medicinal material part by treating infections, tonsillitis, pharyngitis, pneumonia, conjunctivitis, enteritis and dysentery, but also there are five rules by linking (*Senecio L.*) roots moisture and elevation. Therefore, this study has vital theoretical and practical significance for multi-functional values and relation between the medicinal plant (*Senecio L.*) roots moisture and elevation along different environs, then, the planner needs integrated conservation priority areas.

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