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LINKS BETWEEN DRY WEIGHT BIOMASS OF (CREMASTRA APPENDICULATA) OF BIOMEDICAL AND PHARMACEUTICAL PLANT AND ELEVATIONS BY LONG-TIME INVESTIGATION OF "BIG DATA"

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ABSTRACT

(*Cremastra appendiculata*) of treating lumbago and arthritis not only is a vital medicinal material plant, but also it is a widely distributed wide biomedical and pharmaceutical plant species. This plant species is widely distributed elevation from 500m to 3100m in the different forestation vegetation ecosystems in *Mei County* of China. However, understanding dynamics of biomass of dry weight of this species is difficult along elevation. This research explained that links between biomass of dry weight of this species and elevation is the significant positive correlation from 500m to 1500m ($P<0.01$), as well as the links between biomass of dry weight of this species and elevation are the significant negative correlation from 1500m to 3100m. This study provides six community's types and a series of areas ecological adaptation for finding new medicinal plant species. Thus, this research has vital theoretical and practical significance for medicinal plant protection.

KEYWORDS: Dry biomass weight; elevation; correlation; areas ecological adaptation; medicinal species.

INTRODUCTION

More and more research has assessed the correlation between biomass (average height, numbers, biodiversity, et al.) of plant species and elevation from biomass (average height, numbers. biodiversity, et al.) of medicinal plant perspective (Table 1)[1-11] for better future of human health (ecosystems).[6-11] However, medicinal species with typical history spanning over 1500 years, and areas ecological adaptation of a lot of dry biomass weight of species are unknown, and cognitive ecological theory of the links between dry biomass weight of medicinal species and elevation can be unknown at the spatial-temporal-environmental-disturbance scales (STEDS).[12-17]

Thus, understanding these medical values of medicinal spices, as well as the links between dry biomass weight of medical species of different areas ecological adaptation and elevation is a vital ecological rule along elevation and environmental gradient in typical communities in *Mei County*.

(*Cremastra appendiculata*) not only is vital medicinal material of treating lumbago and arthritis, but also is widely distributed wide specie in *Mei County* of China. This specie is belonging to *Cremastra* genus of Orchidaceae families of Monocotyledoneae in Angiospermae. Understanding dynamics of biomass of dry weight of this species is unknown, however. Indeed, our research not only explained that there are links between biomass of dry weight of this species and elevation, but also explained that this species is a key plant of treating lumbago and arthritis by better health.

Therefore, there are some vital rules that the correlations between biomass of dry weight of (*Cremastra appendiculata*) and elevation in vegetation landscapes of *Mei County* of China.

Abbreviation: STEDS, the spatial-temporal-environmental-disturbance scales.

Table 1: Links between medicinal plant structure number (biomass, height) and elevation.

Links between medicinal plant structure number (biomass, height) and elevation	Authors
Links between elevation environments and numbers of plant species at STEDS.	Liao, et al., 2010.[1]
Links between biomass of medicinal herb and elevation in wetland landscape.	Liao, et al., 2011a[2]
Links between plant functional number and elevation in forest landscape.	Liao, et al., 2011b[3]
Links between plant functional number and elevation in near-natural forests.	Liao, et al., 2014a[4]
Links between herbs number and disturbance of different elevation in wetland.	Chen, et al., 2019[5]
Links between number of medicinal tree species and elevation in forestation.	Liao, et al., 2019a[6]
Links between number of medicinal tree trunk volume and elevation at STEDS.	Liao, et al., 2019b[7]
Links between height of medicinal tree and elevation in the natural landscape.	Liao, et al., 2019c[8]
Links between number of tree community crown volume and elevation in forest.	Liao, et al., 2019d[9]
Links between number of tree individual specie's crown volume and elevation.	Liao, et al., 2019e[10]
Links between herbs number and different disturbance of different elevation.	Liao, 2014 b[11]

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

Typical area is local in three 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, our research area is local in evergreen and deciduous coniferous and broad-leaved mixed forest in north subtropical and warm temperate transition in *Mei County* of China (Figure 1).

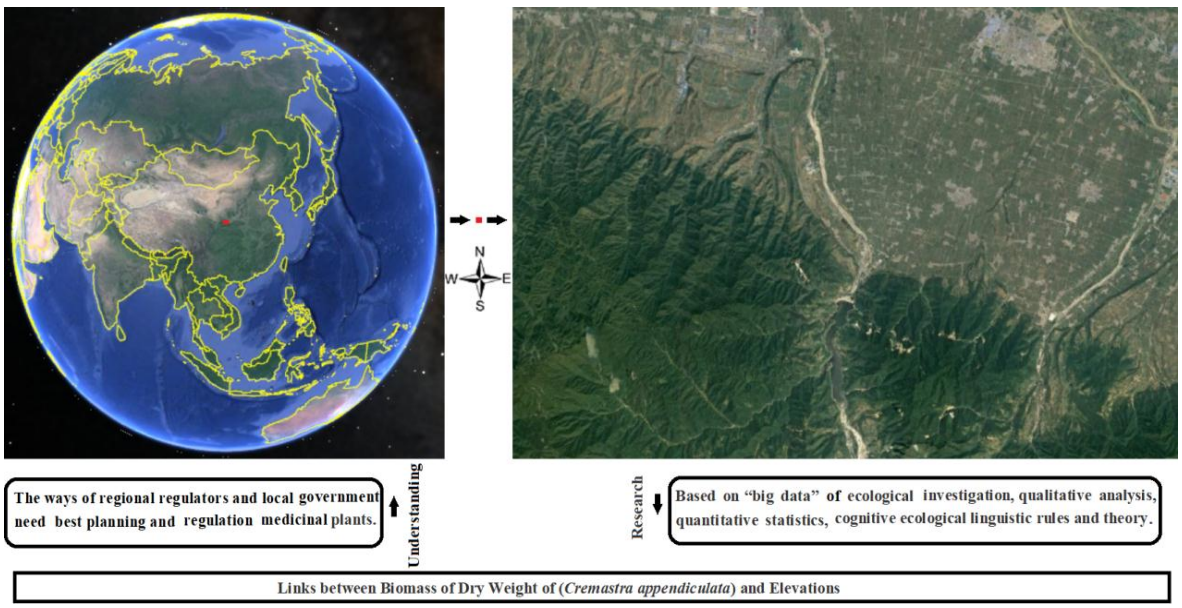

Figure 1. A digital cadaster Map and Research methods of typical location in *mei county* of china of earth.

There are long-time investigation of the links between biomass of (*Cremastra appendiculata*) dry weight and elevation from 2005 to 2019. Investigation of "big data" included that dry biomass weight or other index of medicinal species along environments by our previous researches.[2-15]

Therefore, there is the links between biomass of (*Cremastra appendiculata*) dry weight and elevation, as well as there is a series of (good, better, best) natural landscapes areas ecological adaptation of elevation of this medical plant species by the "big data" of ecological investigation, qualitative analysis, quantitative statistics, human cognitive ecological linguistic rules, theories, methods and ways along different elevation and environmental gradient by the "big data" of ecological investigation, qualitative analysis, quantitative statistics, cognitive ecological linguistic rules and theory and methods[6-24] at STEDS in *Mei County* of China.

Results and Analysis

Based on "big data" of plant investigation, this species is a widely distributed wide species along elevation from 500m to 3100m. (*Cremastra appendiculata*) is a widely distributed along the different elevation from 500m to 3100m in *Mei County* of China. However, understanding the elevation effect on the links between biomass of dry weight of this plant species and elevation is very difficult, because elevation effect on dry biomass weight of medicinal species.[2-14, 18-23]

Using the dynamics of "big data" investigation, this research suggested there are four rules:

Firstly, this research suggested that there is not only increasing of biomass of (*Cremastra appendiculata*) dry weight with increasing of elevation from 500m to 1500m, as well as there are but also decreasing of biomass of (*Cremastra appendiculata*) dry weight with increasing of elevation from 1500m to 3100m along elevation gradient in *Mei County* of China (Figure 2).

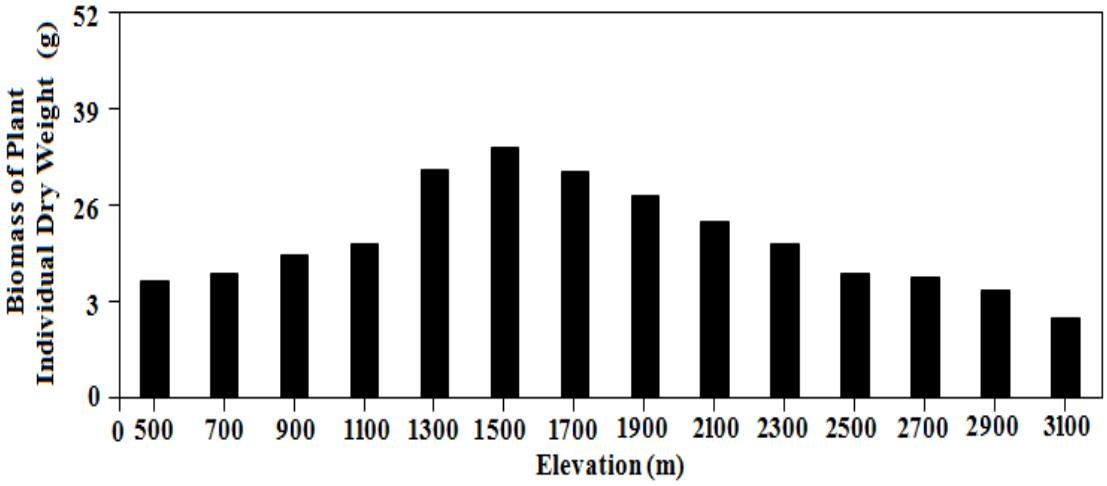

Figure 2: Dynamics of Biomass of (*Cremastra appendiculata*) Dry Weight along Elevation.

Secondly, this study explained that there is the significant positive correlations between biomass of (*Cremastra appendiculata*) dry weight and elevation from 500m to 1500m (P<0.01), as well as there is the significant negative correlations between biomass of (*Cremastra appendiculata*) dry weight and elevation from 1500m to 3100m along elevation at STEDS (P<0.01) (Table 2).

Table 2: Correlation between biomass of plant dry Weight and Elevation along Elevation.

Elevation (m)	Elevation From 500m to 1500m	Elevation From 150m to 3100m
Biomass of Dry Weight	0.944**	-0.991**

Note: **, P<0.01.

Thirdly, this research provides a good areas ecological adaptation of (*Cremastra appendiculata*) from 500m to 3100 in *Mei County* in China. Meanwhile, this research proposed that there is not only the better area ecological adaptation of (*Cremastra appendiculata*) from 1000m to 2000m, there is but also the best areas ecological adaptation of (*Cremastra appendiculata*) from 1300m to 1700m; because there are results that there are not only dynamics of different air environmental factors, there are but also dynamics of different soil environmental factors from 500m to 3100m along elevation and environmental gradient by biomass of dry weight of this species (Figure 2).

Fourthly, this research proposed that medicinal plant species (*Cremastra appendiculata*) is local in the six typical communities (forestation community, mixed community between

forestation and grassland, mixed community between forestation and wetland, mixed community between river and forestation, mixed community between forestation and urban, mixed community between forestation and rural settlement) by the "big data" of biomass of dry weight of medicinal plant species investing along elevation, because there may be results that there are not only dynamics of air environments, there are but also dynamics of soil environmental factors from 500m to 3100m along elevation gradient by dynamics of dry biomass weight of this species in *Mei County*.

Thus, this research found a series of typical (good, better, best) areas ecological adaptation of (*Cremastra appendiculata*) of treating lumbago and arthritis along elevation gradient, as well as there is the links between dry biomass weight of this medical plant species and elevation gradient.

CONCLUSION AND DISCUSSION

Understanding dynamics of medicinal plant species is very difficult.[1-16, 24- 28] This research suggested three rules between dry weight biomass of (*Cremastra appendiculata*) and elevation:

1. This research suggested that there is the increasing of dry biomass weight of (*Cremastra appendiculata*) with increasing of elevation from 500m to 1500m, as well as there is decreasing of biomass of dry weight of (*Cremastra appendiculata*) with increasing of elevation from 1500m to 3100m (Figure 2). There is the significant positive correlation between biomass of dry weight of (*Cremastra appendiculata*) and elevation from 500m to 1500m (P<0.01), as well as there is the significant negative correlation between biomass of dry weight of (*Cremastra appendiculata*) and elevation from 1500m to 3100m along elevation in *Mei County* at STEDS (P<0.01) (Table 2).

2. This research provides six community's types (forest, mixed between forest and grassland, mixed between forest and wetland, mixed between forest and river, mixed between forest and urban, mixed between forest and rural settlement), and there is a series of areas ecological adaptation (a good areas ecological adaptation from 500m to 3100, the better area ecological adaptation from 1000m to 2000m, the best areas ecological adaptation from 1300m to 1700m) for finding (*Cremastra appendiculata*) by dry weight biomass of (*Cremastra appendiculata*).

3. (*Cremastra appendiculata*) not only is a vital medicinal material of treating lumbago and arthritis,but also it is belonging to *Cremastra* genus of Orchidaceae families of Monocotyledoneae in Angiospermae, as well as it is widely distributed wide biomedical and pharmaceutical plant species by "big data" investigation of dry weight biomass of of (*Cremastra appendiculata*).

Therefore, this research has a vital theoretical and practical significance for the reasonable protection of (*Cremastra appendiculata*) along elevation gradient in different plant communities, because this medical plant species not only is an important widely distributed wide medicinal material plant by treating lumbago and arthritis, but also there are three rules by the links between biomass of dry weight of (*Cremastra appendiculata*) and elevation in *Mei County* of China. Indeed, better regional regulators and local government need better planning and regulation a lot of management sustainability of medicinal plant communities by researches on biomass of dry weight (biodiversity, height, et al.) based on dynamics of links among biodiversity, elevation, environments by the new ecological ideas in local, regional, global near-natural ecosystems for better future of ecosystem services (functions, procession) and human health at STEDS.[1-19, 29-41]

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