



Introduction:

This study is taking place in Changling(長嶺) where to collect the data from the grasslands of the Completely non-degraded steppe, Moderate degradation steppe and Completely degraded steppe respectively.

Introduction of Plant types of Jinlin:

1. *Setaria viridis*

Setaria viridis is a species of grass known by many common names, including *green foxtail*, *green bristlegrass*, and *wild foxtail millet*. It is sometimes considered a subspecies of *Setaria italica*. It is native to *Eurasia*, but it is known on most continents as an introduced species and is closely related to *Setaria faberi*, a noxious weed (Agricultural Research Service (ARS), 2015).

2. *Megathyrsus maximus*

Megathyrsus maximus, known as *Guinea grassland green panic grass* in English, is a large perennial bunch grass that is native to *Africa*, *Palestine*, and *Yemen*. It has been introduced in the tropics around the world. it was named *Urochloa maxima* before. It was moved to *genus Megathyrsus*, which it shares with one other species, *M. infestus* (Dhanesh Wisumperuma, 2007).

3. *Chloris virgata*

Chloris virgata is a species of grass known by the common names *feather finger grass* feathery *Rhodes-grass* and *feather windmill grass*. It is native to many of the warmer temperate, subtropical, and tropical regions of the world, including *Jilin* (Georgia, Ada E., 1914).

4. *Digitaria sanguinalis*

Digitaria sanguinalis is a species of grass known by several common names, including *hairy crabgrass*, *hairy finger-grass*, *large crabgrass*, *crab finger grass*, *purple crabgrass*. It is one of the better-known species of the *genus Digitaria*, and one that is known nearly worldwide as a common weed (Brutnell, T; et al, 2010).

Objectives:

1. Compare the biodiversity of different steppes.
2. Find out the relationship between the species and different steppes.
3. Analyze how different steppes affect the species richness.

Definition:

Steppe also means grassland which is defined by *Latin (Spita)*. Steppe is "the natural community type with the predominance of dry perennial herbs" (Hou, 1960.).

Grassland is an important green ecological barrier and plays an important role in maintaining ecological security. Grassland is a huge carbon pool, maintaining eco- logical balance, and grassland vegetation enrich the pattern of soil formation on the earth's surface (Chen, 2008.).



Tools:

Quadrat (1 m x 1 m), Circle, Insect Trap Net, Measuring Tape, Scissors, Marker, Plastic Bags, Sealed Bag, Reaping Hook.

The methodology of research:

Data collection of Grass:

1. Measure the grass in 1 m x 1 m quadrat for 3 times.
 - a. Identify the grass in different types.
 - b. Measure the natural height of 10 samples for each type of grass.
 - c. Estimate the grass coverage (the total coverage can over 100%).
 - d. Mow the grass.
 - e. Classify and count the total numbers of each grass
 - f. Measure the net weight of each grass.
2. Measure the grass in a circle for 3 times.
 - a. Observe the distribution of plants
 - b. Measure the number of each grass.
3. After the data collection from 3 places, sort out the data of the grasses, find out the relationship between different steppes from the distribution, richness, frequency and coverage of grass. Analysis of the importance of biodiversity in different steppes.

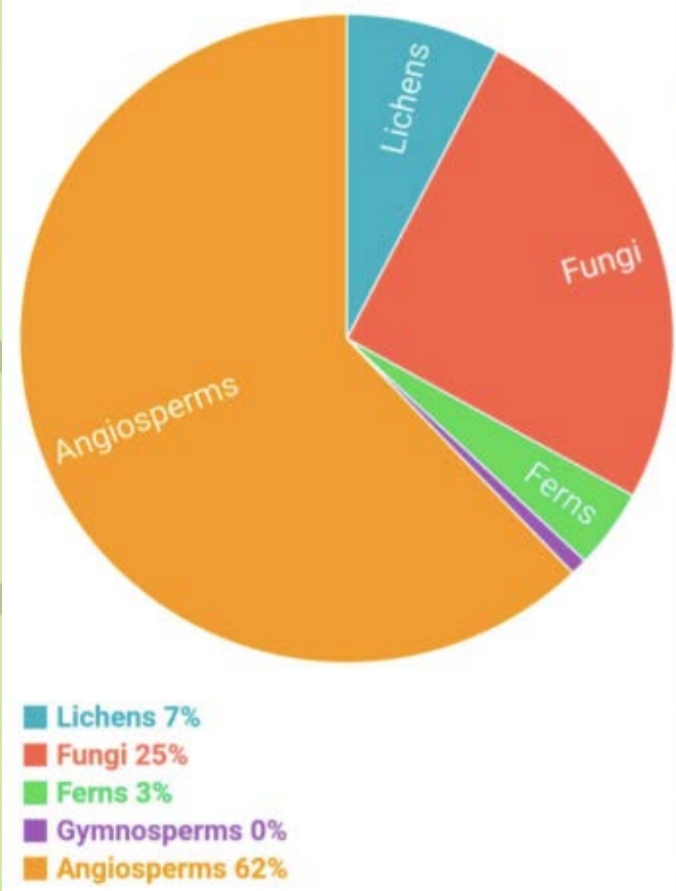
Data collection of Insect:

1. Select the area for 10 meters.
2. Wave around with the insect net, about 5cm from the grass surface.
3. Put the insects into the sealed bag.
4. Classify and count the total numbers of each insect.
5. After the data collection from 3 places, sort out the data of the insects, find out the relationship between different steppes from the distribution, richness, frequency and coverage of insects. Analysis of the importance of biodiversity in different steppes.

Compare different levels of grassland degradation in Changling(長嶺)

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Data of plant resources in Jilin



Results and Discussions:

The plant in Jilin is rich in resources. There are 3,890 species of wild plants in Jilin Province, including more than 270 species of lichens, more than 900 species of fungi, more than 140 species of ferns, 30 species of gymnosperms, and more than 2,200 species of angiosperms. There are 16 kinds listed in the "National List of Key Protected Wild Plants (First Batch)", including 3 national level I protected wild plants and 13 national key protected wild plants. Wild edible plants include fern, weed, bud, pine mushroom, black fungus, monkey head, mountain grape, pecan and so on. The East Minister Baishan District is rich in wild medicinal plants and is regarded as one of the three treasures of natural medicine in China (吉林省^①星及航天信息^②展^③划 (2015—2025年, 2016).

The relationship between plants and grassland is regarded as "symbiosis". Symbiosis is literally meaning "common" and "life". It is the interaction between the living organisms of the two organisms, and even the phagocytic behavior between dissimilar organisms. The term "host" is often used to refer to a larger member of a symbiotic relationship, the smaller is being referred to as a "symbiotic." Symbiosis can be divided into external symbiosis and internal symbiosis according to location.

For Jilin, both of them exist. In terms of external symbiosis, the symbiotic living on the surface of the host, including the inner surface of the digestive tract or the duct of the exocrine gland. For the internal symbiosis, the symbiotic living in the host Intracellular or internal to the body but outside the cell.

It is clear that there are plenty of plant resources for investigation in Jilin. The plant types, height, amount and coverage are totally different from that of Hong Kong. So, it is very worth to carry out several investigation on the symbiosis in grassland of Jilin.

Types of insects in different levels of grassland degradation in Changling

1. Light degraded	About 8 types of insects (Mainly Acrididae)
2. Moderate degraded	About 6 types of insects (Mainly Acrididae)
3. Severe degraded	About 2 types of insects (Mainly Acrididae)

How do the different levels of degraded grassland affect the richness of species?

The wide range of plant types act as a food source and living shelters for the insects, which different levels of grassland degradation will affect the richness of biodiversity. From the collected data, the light degraded grassland has higher biodiversity of species, the average height and coverage of the plants are relatively higher. The moderate degraded grassland still has higher biodiversity of species, but the number of species, types and coverage of plants are relatively less than the light degraded grassland.

For the severe degraded grassland, the types and numbers of plants and species are greatly decrease. As a results, plant diversity enhances the types and numbers of species.

The reason for grassland degradation is mainly due to the human activities, like removing a large amount of resource and energy from the grassland continuously, which grassland can not recover within a period of time. Overgrazing in Changling grassland is the main reason to the result of severe degradation. Livestock grazing on grassland with frequent foraging and trampling, that brought the photosynthesis of pasture can not carry out normally, seed reproduction and nutrient renewal are blocked (Wang et al., 2017).

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How do the level of degradation affects the plants growth?

Under unreasonable utilization, the process of retrograde succession and productivity decline of grassland is called grassland degradation. The main performance is the decline of grassland vegetation height, coverage, yield and quality, soil habitat deterioration, bad production capacity and ecological function. The long-term, wide-scale degradation of grassland not only causes the decline of the productivity of the grassland itself, but also causes the deterioration of the ecological environment and the threat to human survival and development.

There are three levels of degradation, which are severe degradation, moderate degradation and light degradation. If the degradation gets higher, there are 6 disadvantages for the grassland. First, the height of plants grows shorter. Second, the coverage of grass decreases. Third, the yield and quality of plants becomes lower. Forth, the soil habitat deterioration gets serious. Fifth, the production capacity of the soil decreases Sixth, the ecological function will be badly influenced.

Conclusion:

Overgrazing will cause about the degradation of grassland. Therefore, different levels of grassland degradation will affect the growth, richness of types and numbers in both plants and species.

