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Protect of Dormant Buds in Winter High Temperature from Frost Damage

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Description

The Daxing'an mountain is an important natural geographic barrier, in north east inner Mongolia and northwest Heilongjiang province, it is the middle part between semiarid inland area on northwest side and the Pacific Ocean. It is also known to be the transition zone semi-arid region to semi humid [1]. South east side of this area is blocked by mountains so; the summer monsoon cannot enter in this area. The eastern side of this region is humid and western side is more dried. Summer climate is explained by periodic invasions of warm and humid air from low elevation oceans, while winter season is invaded cold air masses on high latitudes. This study was done on high latitude in Daxing'an mountains. The annual mean vapor pressure (59.4, 59.8, 64.1) respectively at Mg, Kyh, and Nm sites and annual mean diurnal temperature (16,15.6, 12.7) respectively at 3-sites. Coldest month is January and maximum hotness in Month of July. Annual rain falls accounts for 68% in June to August. Relative humidity high in growing season. Spring and early summer face severe drought conditions frequently. This area also has an average high burning rate in china.

Drought Stress

Scots pine is an under the effects of drought stress and considered to be a drought tolerant, so it is thought to be a main climate limiting factors which reduce its growth in semi humid and semi-arid regions such as in Mongolian Plateau Daxing' an mountains. In previous studies, it also suggests that radial growth of scots pine is influenced by humidity, precipitation in these regions, and most of dendro climatic studies based on reconstruction of hydroclimatic history. On the other hand, a significant increase in radial growth of non-growing season due to temperature also observed. It is probable protect of dormant buds in winter high temperature from frost damage [2]. The positive growth response with spring temperature could be due to early snow melting process, which supplies the early spring water, and eventually tree growth rate stimulated. This infrequent drought response relatively due to humid climate and might be northern study site, where positive effect is strongly greater than negative effect [3]. Similar drought response also visible in most of reconstruction studies in Qilian mountains and also same case of drought stress in western Tian Shan mountain, China. Tree rings are widely used to evaluate the climate variation effects on forests [4]. In general, the environmental conditions in the soil and atmosphere are completely different under drought stress conditions. Plants recognize the change of water deficit conditions in the soil appropriately under drought stress and transmit the water deficit signal from the roots to the leaves to adapt to drought stress conditions through ABA accumulation. Drought stress responses are also regulated by both ABA-dependent and ABA-independent regulatory systems.

Growth Patterns

Most dendro chronological studies focus on radial growth patterns to infer the long-term variations in tree performance. There is a remarkable expansion in desertification across Mongolia due to climate warming at global scale, and it has potential influence on Mongolian environmental health and economy conditions in current years. So Mongolian government has applied reforestation plans. A variety of range of methodological approaches used to determine tree growth climate relations, but dendro climatological techniques are valuable in determining long term variations in forest productivity in perspective of climate relationship with variables like precipitations and warmer temperature. South east side of this area is blocked by mountains so; the summer monsoon cannot enter in this area. The eastern side of this region is humid and western side is more dried. Summer climate is explained by periodic invasions of warm and humid air from low elevation oceans, while winter season is invaded cold air masses on high latitudes. Total of 160 cores were selected from living old trees from breast height at 1.3 m. Each tree which selected for sample collection tried to avoid influence of visible stand disturbances (including windstorm, animal and human disturbances or fire damage). Large scale climate data were used from the national meteorological information center e.g. gridded diurnal temperature and vapor pressure, and soil moisture indices. The gridded climate data has much coherency and homogeneity than station data. Pearson correlation was conducted to climate growth relationship. And used growth trends of summer and winter diurnal temperature were made. We collected two cores per tree in May-2016. Total of 160 cores were selected from living old trees from breast height at 1.3 m. Each tree which selected for sample collection tried to avoid influence of visible stand disturbances (including windstorm, animal and human disturbances or fire damage). The average distance is more than 100 km between selected sample sites. All cores were air dried, mounted, surfaced and cross-dated following standard techniques of dendrochronology.

There is an obvious difference at Kyh-site between winter and summer season and growth trends in summer season there is growth trend first remain stable then start to decline but in winter season there is an obvious increase in growth.at Mg site also increase in trend in winter diurnal temperature [5].

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