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The effect of climate changes on the growth of Pinus radiata

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Pinus radiata, Monterey Pine, is one of the most common pine species in the southern hemisphere. It is native to Central Coast of California. In wild, P. radiata grows to between 15–30 m in height and 30-90 cm in diameter but in optimum condition it could grow up to 60 m. In Australia, New Zealand, and Spain it is the leading introduced tree and the most widely planted pine in the world valued for rapid growth and desirable lumber and pulp qualities. However this tree faces serious threats in its natural range suffering from pitch canker or a fungal disease and its damage could be serious due to climate change. According to United Nations Framework Convention on Climate Change (UNFCCC), average temperature has increased by approximately 0.6 [U+2103] from the end of the nineteenth century. And most of this increments occurred in the high and middle latitudes of the northern hemisphere. In this region changes in precipitation regimes and air humidity were also observed. The combination of mean rainfall and temperature values partially determines the type of ecosystem that can develop in an area. A change in these variables implies that the ecosystem will change its composition to adapt to the new conditions. At least 40 years ago, there was no possibility to grow or even be survived for P. radiata in Korea. However, during the last 100 years, temperature has increased by approximately 3.0 [U+2103] in the Korean Peninsula. For this reason, some new plants have been introduced and some tree species were in line to be tested for their adaptability. In 2009, seeds of 3 growth forms of P. radiata were introduced into Korea. To test the adaptability of P. radiata, total of 2,700 seedlings were planted into 3 different places, e.g. Jeju, Naju and Anmyun which were in different northern lands. After 6 months of planting, characteristics of growth such as height, diameter of root collar and survival rates were examined with climate factors. The range of height was from 17.4 cm to 31.6cm. The diameter of root collar was from 3.4mm to 5.3mm. Water logging might be one of serious problems for not only growth but also survival rates of the species. Depending on the test sites, especially the survival rates of seedlings varied. Despite of global warming, this species may not grow well in Korea yet. However the response of the species on the climate change and the possibility of adaptation should be examined closely.