Study the effect of climate change on plants seed compromises

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Abstract: Climate changes in all spatial and temporal scales, with the interpretation that the soil and air temperature is raising and their moisture is falling. Climate changes can affect all organisms of ecosystem particularly plants in the ecosystem are more vulnerable to these changes that due to their vitality in human life, the need to study, identify and resolve their sensitivities to the process of climate changes is essential. In previous studies, it was found that the seed of plants has a mode that temporarily biological activity stops in it to have germination in favorable conditions and the harvest be able to have sufficient time for growth and biological cycle that it is called seed dormancy. Seed dormancy that is found in most wild plants and even in native species, by environmental parameters such as light, temperature, humidity is adjusted and specifies the time of germination. This useful and consistent feature of plants is shaped during evolution and retains plant survival in their habitat. By changing the climate of a region, regulating sleep parameters are changing that disorders occur in the time and manner of germination that may threat risk of extinction of rare and useful species.

Keywords: Climate Change, germination, seed dormancy, the plant compatibility

Introduction

Climate changes have been long occurred in time and space dimensions (9), an increase in greenhouse gas concentrations due to the high consumption of fossil fuels, land use change and improper exploitation of forests is gradually caused changes in the Earth climate (9). Given that an important source of medicinal plants in human access grows wildly and often have seed dormancy (14) whereas seed dormancy is in the interaction with the environment (12) In this study, the relationship between seed dormancy and climate change is investigated. Seed is generally composed of three parts: External part or layer that forms an external dead layer, endosperm that is one or several cell layers beneath the crust that contains grain reserves and helps to grow seedling until autotrophic and self-sufficiency (7) and finally embryo that as a new miniature plant is for staring the next generation (26). In the late seed development of native plant, drying seed turned it into a unique structure that finds high tolerance to dehydration (dry) and other adverse environmental factors. In fact, most of the seeds in the phase entered stagnation or sleep that causes stopping common life activities without the loss (26,11). Seed dormancy resolved through compromise with environment. So there is a variety of mechanisms of sleep due to weather conditions and habitats that have evolved in it (12). Many studies have been conducted on seed dormancy of different plants from various aspects (29, 15, 27, 17, 10, 19, 13, 24, 28, 1) But the studies that is conducted for strategy of aim coping with effects of climate change on seed dormancy has been very little or surface, as it was said seed in connection with its climatic conditions and highly is vulnerable to climate changes. The necessity of study shows the effects of climate on seed compromise. This study is conducted aimed to seed pathology resulting in climate changes and the dangers that threaten the useful herbs in this direction.

Anatomy of seed dormancy

Seed dormancy is an obstacle to complete germination of a proper healthy sees under the optimal growth conditions. This obstacle for germination, among species in different ways and through compromise with the environment can be resolved, as germination occurs when conditions for the establishment of generation of a new plant to be appropriate. Sleep is a seed characteristics, its degree determine what conditions must exist for seed germination. This definition states clearly, germination takes place when the internal and external factors necessarily are overlap (6). Seed germination after sleeping conducted when the specific environmental circumstances prevail (25). Sleep enables seed to germinate during adverse times and with varying degrees of plants can make possible their seeds distribution in unpredictable environments (22). Sleep may be a major determinant of distribution of the species because seed should be able to deploy and germination in a habitat (5). In addition to the plants during evolution of several years have crossed natural disasters such as glacial and wildfires that seed dormancy caused their success in response to such natural disasters. After each fire may break seed existed dormancy and new plants arise then (21).

Association of seed dormancy with climate

Conditions are including moisture, temperature, light as components of the climatic conditions, thus when it is spoken about seed-specific adaptation to one area means that plant seed according to the above conditions in the best time
in their environment is germinated to have enough time to grow and biological cycle and thus is able to maintain its survival in the mentioned environment. Items listed show the relationship of formed sleep in the seed during the evolution with the climate of environment. For example, seeds usually by chilling release from sleep. Because this temperature occurs only during the winter, seeds that require this practice of dormancy should pass the cold season before be able to germinate. The advantage of this strategy is that the young seedling emerges in spring and successfully establishes in the optimal months. The advent before winter follows the risk of destruction in difficult conditions (3). So climate change may lead to late or no buds sprout which in turn leads to the loss of plant and may even lead to the extinction of endangered species. Phillips (2010) reported that various mechanisms to break dormancy of seed and onion among Allium species exist that depend on the difference in climate between collection points (24). Specht and Keller (1997) emphasized there is a close relationship between geographical origin and temperature needs for species of the Allium. Their results showed that Allium seeds belonging to the sub-genus Melanocrommyum before germination requires a long period of cold temperatures [28], Ghaemizadeh and colleagues (2011) in a study titled "Evaluation of seed germination recession in different populations of shallots” in order to examine the difference in germination in different populations of Shallot of 6 provinces (Hamedan, Kermanshah, Kordestan, Lorestan, Qazvin, Chaharmahal Bakhtiari) in an experiment conducted in the form of 3 reps.

They concluded that some masses have a physiological deep sleep and some other masses in addition to it have dormancy of hard shell of seed (13).

Fetal growth potential (mainly related to the root) should be increased to make possible the growth of radicle and output it through the layers covering. Resistance of coating layers (pericarp, shell or endosperm) must be weakened. Especially weakening Micro pillar endosperm covering has the most important. In fact, strengthening radicle and weakening of the tissues surrounding are the key processes to remove sleep and induce seed germination in most species. These processes contain known molecular mechanisms that some of which are evolutionarily conserved between species and fixed. In both types of sleep caused by fetal or shell, finally the fetus is not able to overcome the resistances imposed that on the first is related to the factors contained fetus and in the latter is caused by tissues contained. So in total sleep of seed is the result of one or several dam of germination (or in the fetus or in the shell or both). Removal of the dams is always by environmental cues such as chilling, the clay, light, nitrate and temperatures facilitating management (3).

Some environmental factors such as light intensity, low temperature (18), food (20) and water (22) day (10) have been identified as regulators of seed dormancy. It is reported that various triggers of germination (light, temperature, nitrates) alters the Trans Cryptome. The signals cause hormone metabolism in seed and hormonal regulation of seed and finally seed is also responsive to hormonal regulation (30). Soil temperature is the main cause of environmental in the dormancy cycle in temperate regions (16)). So with changes in the factors mentioned quickly as the plant not have the opportunity to adapt and evolve (climate changes in the short term) obviously germination is impaired and may be occurred at the wrong time or harvest not has enough time to complete the life cycle that causes the loss of seed of wild rare species that some medicinal plants are useful (14) This could lead to disassemble ecosystem. This issue needed further study on rare plant species, identify their sleep and tried to destroy their sleep to find a way to endow them with the new requirements or, if necessary, transformed them from wild to native plants.

Conclusion

The seeds are important structures to keep the crowd of germination and in natural environments germinate that often limit to places with environmental conditions. Although it may happen that the seeds not germinate, because many species have already sleeping mechanisms that prevent germination in bad conditions. It is possible that breaking sleep occurs as a result of placing seed exposed to one factor with necessary intensity in a reasonable period. Sleep is an obstacle of using resources in rehabilitation programs and native plants (4), so the study of seed germination of endangered species for protection strategy, especially in conditions that climate changes are emerging is the essential.

Typically, seed dormancy in any species is dependent on the habitat climate. The difference in climate of habitat makes difficult accurate detection of conditions required for the germination of a species (23) In other words, the seed of a species in different habitats can have several different sleep that each has evolved according to conditions of that habitat, this suggests that seed is a plant species that evolved to a specific habitat with climate change of habitat may not have the germinate or sprout out condition or sprout out in improper season that it is doomed to extinction or new evolution that there are ample opportunity for new development and in the case of climate change in a short time, evolution seems almost inconceivable. However, given that we are currently facing with climate change crisis and these changes can occur in the temperature, humidity and other environmental parameters in other areas (9) and whereas these parameters in each area is in related with seed dormancy of the plants in the same area (12) as a result, the identification more than seed dormancy helps us to help the plants to get rid of the negative effects of the crisis.

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