

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الملك سعود
برنامج ماجستير العلوم في التنوع الأحيائي

إمكانية تحسين التجديد في أشجار العرعر (*Juniperus procera* Hochst. ex Endl.)
في الغابات الطبيعية بالمملكة العربية السعودية
The Possibility of Ameliorating the Regeneration of Juniper Trees
(*Juniperus procera* Hochst. ex Endl.) in the Natural Forests of Saudi Arabia

إعداد

معاوية بن عبد الهادي قليل الغامدي

قدمت هذه الرسالة استكمالاً لمتطلبات الحصول على درجة ماجستير العلوم في التنوع الأحيائي

المشرف الأكاديمي الرئيسي
الأستاذ الدكتور /لطفى بن إبراهيم الجهني

المشرف الأكاديمي المساعد
الأستاذ الدكتور /إبراهيم بن محمد إبراهيم عارف

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English Summary

The Possibility of Ameliorating the Regeneration of Juniper Trees (*Juniperus procera* Hochst. ex Endl.) in the Natural Forests of Saudi Arabia

Juniper trees dominate the natural forests in the southwestern region of Saudi Arabia which is considered one of the rare ecological systems in the area and rich in biodiversity. However, various changes in the distribution, density and viability of juniper trees took place recently due to increase in human population, their activities and natural environmental pressures and their existence become threatened.

Juniper forests in southwestern region of Saudi Arabia also suffer from clear deterioration represented in low capacity of the natural regeneration and lack of plantation for ameliorating regeneration. This in addition to other factors including increasing the proportion of trees that misshaped, deteriorating and stricken by die-back.

Therefore, the present investigation was carried out to study the possibility of ameliorating the regeneration of juniper trees (*Juniperus procera*) in the natural forests of Saudi Arabia represented by Ridah Reserve through surveying trees and defining the proportion of the aforementioned sorts of trees. This study gives information about some qualitative characteristics for cones and seeds of juniper trees such as the degree of cone ripeness, colour of cones and seeds before and after ripeness. It also gives information about some quantitative characteristics such as the diameter of cone, the dimensions of seed, average number of seeds in the cone, percentage of extracting seeds, number of seeds in one kilogram, percentage of viable seeds and the percentage of moisture in cones and seeds. Proportion of cones and seeds of juniper and other plant species in soil seed bank were also counted.

Seedlings, cones and seeds of juniper were planted in forest ground and their growth was evaluated. A number of encouraging germination pretreatments were applied on juniper seeds. Thereafter germination percentages were calculated and the germinated seedlings were transferred to pots and placed in greenhouse for evaluating their growth for eight weeks.

The most important results of the present study was the lack in the number of naturally growing juniper seedlings in Ridah reserve despite the existence of their cones and seeds in a high percentage in soil samples. Slow relative growth rate of green shoots of juniper trees was noticed. The results showed

that relative height growth rate of the seedlings that were planted in the forest was significantly lower than that of those growing naturally under protection while they had almost similar diameter relative growth rates.

The seeds that were not treated, the scratched seeds and those cold-stratified had germination percentage greater than those in the other germination pretreatments. Regarding the production of juniper seedlings in the greenhouse, the average heights at the beginning of week eight of those produced from seeds treated with cold stratification, dipped in acid for five and ten minutes, scratched, dipped in acid for twenty minutes, untreated, soaked in water and cold stratified cones were 2.29, 2.18, 2.12, 2.02, 1.97, 1.94, 1.9 and 1.84 cm, respectively and the differences between them were significant.

Most juniper seedlings which produced from treated seeds and transferred to the greenhouse emerged their primary leaves from the first week after transferring to week five while, needles started to develop from week five. By the end of the experiment (week eight) the proportion of the needles ranged from 19.5% on the seedlings that were produced from seeds extracted from cones treated with cold stratification to 100% on those of dipping for five minutes in acid.

Survival percentage of the juniper seedlings that were planted in the forest was 82% while it was 37% for the germinated seedlings in Petri dishes and 83% for those growing for eight weeks after transferring to the greenhouse.