



Determination of suitable conditions for Shirazi thyme (*Zataria multiflora* Boiss. Shiraz ecotype) seed germination

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Introduction

Shirazi thyme is native to the south and southwest of Iran, and its natural habitats in Iran are in rocky slopes in the Sahara-Sandy and Irano-Turani regions in the provinces of Isfahan, Yazd, Kohgiluyeh and Boyer Ahmad, Fars and Hormozgan. Seeds are tiny so that determination of optimal condition for germination and seedling establishment is totally important. To plant seeds in nursery, seeds place under a thin layer of soil (maximum 0.5 centimetre depth) and cultivate along with splash irrigation. Actually, direct cultivation of Shirazi thyme in the field cause a lot of problems. Although seeds are necessary for reproduction and development, suitable condition for seed germination in laboratories are not considered. Therefore, thyme seeds were investigated in different temperatures and substrates in the laboratory in order to achieve a citable procedure for evaluation of these seeds.

Materials and methods

Shirazi thyme seeds (Fars province ecotype) were prepared in 2023. It was figure out that there was no dormancy after seeds being placed in germination condition under temperature rooms. Shirazi thyme seeds were put in three substrate germination of top paper, between paper, and sand in 20, 25, 20-30°C temperatures. Twenty-five seeds were placed in top and between paper substrate in four replications in 9cm petri-dishes on one layer of whatman no.2 filter paper for 28 days. Constant temperature treatments and alternative temperature treatments (20-30°C) during 16/8 hour of light/darkness were transferred to incubator and germinator, respectively. Germination tests were implemented by factorial analysis based on complete randomized design (Anonymous, 2021). Germinated seeds were counted daily. Different seed germination indices were calculated. Statistical analyses were carried out using the SAS V.9 program, and the Office Excel 2013 program drew graphs. Mean comparisons of different indices were done according Duncan test at 5% probability.

References

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Results and Discussion (Time New Romans 10-12)

Analysis variance of different germination indices in different temperatures and substrate treatments illustrated that temperature and substrate interaction on rate index, mean germination time, R50, and time to reach 50% germination had significant difference at 1% and on indices of germination uniformity, time to reach 90% germination was significantly different at 5%. Main effects of temperature and substrate on both mentioned indices was significantly different at 1%. Results suggested that more than 90% of normal seedlings were observed at 20 and 25°C and at 20-30°C this amount was 84%. Mean daily germination was 7.6 days at 20 and 25°C while it was 7.1 days at 20-30°C. A decrease in germination percent at higher and lower temperatures than optimal one was due to metabolic efficiency was declined in seeds (Adam et al., 2007). That was consistent with this study. It was revealed that thyme seeds had lower germination at temperatures above 20°C (Thanos et al., 1995). The amount of both indices in both substrates TP and BP was recorded higher than S substrate. Germination rate evaluation of Shirazi thyme seeds was carried out by six indices of RI, mean germination time, R50, time to reach 50% germination, germination uniformity, and time to reach 90% germination which suggested that the highest germination rate was at 20 and 25°C and in two substrates of TP and BP. Nevertheless, the lowest germination rate was reported at 20-30°C and in the sand. It was pointed out that S substrate compared with two others (TP and BP) showed lower germination rate among all substrates at three temperatures.

Conclusion

It was concluded that Shirazi thyme seeds had higher germination at 20 and 25°C than alternative temperature 20-30°C. Also, it was suggested that TP and BP substrates were chosen so as to increase germination rate in laboratory condition.

Keywords

Seedling establishment, Shirazi thyme, Standard germination, Substrate.

