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Influence of scabbing and hot water treatment on germination of Sage plant (*Salvia verticillata*) seeds

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ABSTRACT

Seed dormancy is a kind of property of many range land and medicinal plant seeds, and experimentation over the past century has identified numerous chemical treatments that will break seed dormancy. Scabbing and hot water treatment break seed dormancy in a range of species. In this research, effects of scabbing and hot water treatment have been studied on Sage plant (*salvia verticillata*) seeds. Result shoed that Scabbing treatment have effect to improve germination about 20 percent of seed and hot water treatment reduce 14 percent germination of Sage plant (*salvia verticillata*).

INTRODUCTION

Salvia verticillata is a herbaceous perennial native from Labiatae (mint family) to a wide area ranging from central Europe to western Asia, and naturalized in northern Europe and North America. It was first described by Carolus Linnaeus in 1753 [2, 5]. This plant widely grow in some parts of Iran such as Tehran, Karaj, Mazandran [5], Ghazvin [17], Gilan and Tabriz. *Salvia verticillata* has a leafy base of mid-green leaves covered with hairs, putting up leaf-covered stems that carry 0.91 m inflorescences. The tiny lavender flowers grow tightly packed in whorls, with tiny lime-green and purple calyces. The specific epithet *verticillata* refers to the whorls that grow in verticils. A cultivar introduced in the 1990s, 'Purple Rain', is much more showy and long-blooming, growing about 0.61 m tall [2, 5]. This plant has been used as medicinal plant for reducing blood sugar, antiseptic and anti-seizure. Extract of this plant has antioxidant effect [17]. Due to importance of medicinal plants in treating diseases, limited natural habitat, natural regeneration and Indiscriminate cutting, cultivation and domestication for this plant is essential.

Table 1: Scientific name for *Salvia verticillata* Classification Report [16].

Kingdom	<i>Plantae</i> – Plants
Subkingdom	<i>Tracheobionta</i> – Vascular plants
Superdivision	<i>Spermatophyta</i> – Seed plants
Division	<i>Magnoliophyta</i> – Flowering plants
Class	<i>Magnoliopsida</i> – Dicotyledons
Subclass	<i>Asteridae</i>
Order	<i>Lamiales</i>
Family	<i>Lamiaceae</i> – Mint family
Genus	<i>Salvia</i> L. – sage
Species	<i>Salvia verticillata</i> L. – lilac sage

Seed Dormancy has been defined by Lang et al. [12] as a temporary suspension of visible growth of any plant structure containing an embryo meristem. Dormancy may be associated with diverse plant structures that appeared at different times during evolution and may have evolved in adaptation to a variety of habitats and climates [6]. One of the major obstacles to the use of medicinal plants from natural habitat is limitation amount of seed germination and their Dormancy [7]. In fact, seed Dormancy is a state that the seeds of a species, if they have been grown in the suitable environmental conditions (such as humidity, temperature, etc.) are not capable of germination before braking seed Dormancy [14].

Harper [9] recognized three types of seed dormancy – innate, induced and enforced-which play slightly different roles in the regulation of germination. Innate dormancy is normally due to endogenous factors such as immaturity of embryo or the presence of inhibitors, it can be overcome with a period of after ripening or often by some seasonal stimulus, for example, photoperiod, thermoperiod. Induced dormancy develops in seeds when an adverse factor acts upon the seed and produces a suspended animation that continues after the causal factor has ceased to act. Enforced dormancy is imposed by an exogenous factor (e.g. carbon dioxide narcosis) and lasts only as long as the factor acts upon the seed [13].

Obviously, seeds Dormancy is beneficial to plants. In this case, because the seeds will not germinate on the mother plant and has opportunities for distribution. The seed has been disabled in this term and can tolerate the many environmental stresses and poor climatic that ensures the continuity of generations and the survival of plant species [11]. However, sometimes Dormancy in the seeds seems to be a negative characteristic. The study of how the process of germination and simply farming of plant seeds are very difficult by effect of seed Dormancy. Therefore, the plant physiologists interested in the causes of Dormancy and have been seeking ways to break it [3].

Erhoudi et al. [4] studied effect of gibberlin 250 and 500 ppm, scabbing and coolin on germination of *Myrtus communis* and Found that this treatment has significant effect on seed germination of this plant.

Tavili et al found that scabbing, warm water treatment, sulfuric acid and potassium nitrate have been effected on *Ammodendron* seed germination [4]. Hajebi et al. [8] found that warm water treatment, sulfuric acid 98% and scabbing have been effect on seed germination of *salvia mirzayanii*.

Najaf et al. was shown gibberellin has effect on seed germination of gummosa alureF and muircueT [14].

Although reports on the effectiveness of different treatments to improve germination of plants, there are not any report for seed germination of Sage plant (*salvia verticillata*).

MATERIALS AND METHODS

This experiment was conducted in completely randomized design with four replications. Mature Seeds of plant have been collected from Arasbaran reign from East Azarbayjan Province with elevation 1383 m in summer 2010. Teeny five seeds have been put in a petri-dish for study seed germination and it has been repeated for 4 petri-dishes. Each petri-dish was placed on a bench near a window and watered regularly. Germination was recorded when the radical emerged [13]. In all cases seeds were examined every day for 30 days and all germinated seeds were counted and removed from the dishes. Germination was expressed as percentage [13]. Treatments for study are Control (4 Petri-dishes with 25 seeds in each), scabbing treatment (4 Petri-dishes with 25 seeds in each) and hot water treatment (4 Petri-dishes with 25 seeds in each).

Seeds have been watering in control Petri-dishes when they need water, seeds input in 70°C water and remind in 28°C for 24 h for hot water treatment and seeds have been scabbed with a scabbier for scabbing treatment.

RESULTS

The seeds of Sage plant (*salvia verticillata*) are small in size. Mature *salvia verticillata* seeds collected in summer 2010 and subjected to germination test in distilled water as control treatment that germinated (33% germination). When treated with scabbing the seeds germination improve to 53% and germination of seeds decries to 19% with hot water treatment (fig.1).

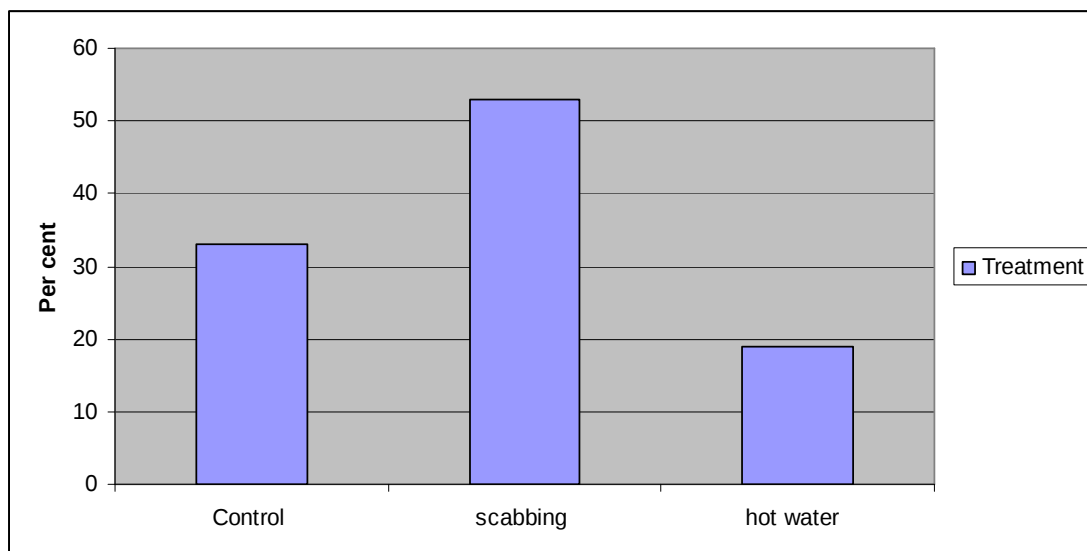


Figure 1: percent of germination of Sage plant (*salvia verticillata*) in control, scabbing and hot water treatments.

The results show that the seed of Sage plant experience a kind of seed dormancy for germination that can be improved with scabbing and decries with hot water treatments.

DISCUSSION

The data presented here strongly indicate that scabbing treatments is been role in the dormancy breaking in Sage plant (*salvia verticillata*) and hot water treatments reduce germination because damage embryo of seed. These data suggest to us that scabbing is required for the dormancy breaking in seeds of this plant.

Heat treatment has been reported to be effective for removing dormancy of some seeds [1, 10, 15], but in this research it reduce seed germination.

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REFERENCES

- [1] Agrawal, P.K., Nanda, J.S., *Riso* **1969** 18: 325-326.
- [2] Betsy, C., Barner, C.D., *The New Book of Salvias*, Timber Press, **2003** Vol. pp.298
- [3] Brayant, J., *Seed physiology*, Translated by Rahimian, R and Khosravi, M Jihad Daneshgahi Press, Mashhad, **1996** Vol. pp
- [4] Farhoudi, R., Makizadeh-Tafti, M., Sharifzadeh, F., Naghdi-badi, H., *Research on methods of braking seed sleeps germination on myrtus communis*, Shahed University, Mashhad, **2006** Vol. pp
- [5] Gharaman, A., *Folor Colored Iran*, Froest and rangland research Organization, Tehran, **2003** Vol. 1-24 pp
- [6] Graeber, K., Linkies, A., Muller, K., Wunchova, A., Rott , A., Leubner-Metzger, G., *Plant Mol Biol* **2010** 73 (67): 78.
- [7] Gupta, V., *Journal of medicinal and aromatic plants science* **2003** 25: 402-407.
- [8] Hajebi, A.H., Soltanpour, M.A., *Journal of medicinal plant Research* **2006** 22 (3): 231-241.
- [9] Harper, J.L., *The ecological significance of dormancy and its importance in weed control*, Proceedings of the 4th International Congress on Crop Protection **1957**: 415-420.
- [10] Hayashi, M., Morifuji, N., *japoniese journal of tropical agriculture* **1972** 16: 115-120.
- [11] Lampter, V., *Seed Technology*, Translated by Hejazi, A., Tehran University Press, Tehran, **1994** Vol. pp
- [12] Lang, G.A., Early, J.D., Martin, G.C., Darnell, R.L., *Hort Science* **1987** 22: 371-377.
- [13] Muoghalu, J.I., Chuba, D.K., *Applied Ecology And Environmental Research* **2005** 3 (1): 39-46.
- [14] Nadjaf, M., Bannayan, L., M., R., *Journal Arid Environments* **2006**: Article in press.
- [15] Naredo, M.E.B., Juliano, A.B., Lu, B.R., Guzman, F., Jackson, M.T., *responses to seed dormancy- breaking treatments in rice species (oryza L.)*, seed sci. & Technol. **1998** 26: 675-689.
- [16] USDA, *Salvia verticillata L.*, <http://plants.usda.gov/java/nameSearch>, Retrieved 26, July, 2011 **2011**.
- [17] Zolfeghari-far, M., Ardastani, S., Farsam, H., Sori, E., *Medicinal plant*, **2004** 21: 21.