The effects of seed soaking, temperature, and other environmental factors on the germination of jojoba *(simmondsia ciiinensis)*

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At present, Jojoba (Simmondsia chinensis) is under investigation as a possible source of oil to replace products from the now-endangered species, the Sperm Whale. The oil is used in the cosmetic, lubricant, and pharmaceutical industries. Jojoba plantations are being developed to supply the oil-bearing jojoba seed, as the only current source of seed is harvested from wild populations in the Sonoran Desert of south-western U.S.A. and northern Mexico. In order to establish these plantations, efficient propagation techniques need to be determined. This paper defines some of the conditions necessary for successful germination of Jojoba seed.

Methods

The influence of four separate factors on the germination of Jojoba seed were investigated; namely, different seed soaking times and water temperatures used for the soaking, different soil temperature variations, and lastly, the effect of seed size. All the seed used was harvested from bushes at an elevation of 900m a.s.l. in the Superstition Mountains of Arizona, U.S.A. and was screened to 1600 seeds per kilogram. Ambient temperature and humidity during the experiment were controlled at 27 degrees C and 87% respectively, with seeds kept moist between two layers of gauze-covered cotton wool by means of intermittent misting, in a thermostatically-controlled propagation box.

Results and Discussion

Maximum germination of jojoba seed (91%) occurred when the seed had been soaked for 4 hours at 30 degrees C before planting and the day/night soil temperature was held constant at 27 degrees/20 degrees C on a 12-hour cycle. As long as individual seed size was above 4g/seed there was no variation in the germinability of the seed.

The germination of jojoba seed was marginally reduced by 5% when subject to the following conditions: (a) when the seed was unsoaked, or soaked for more than 24 hours; (b) when the water temperature used for soaking was held constant at 40 degrees C; or(c) when nocturnal soil temperatures fell below 15 degrees C.

The inherent germinability of jojoba seed was severely reduced by over 25% under the following conditions: (a) seed was soaked for more than 36 hours; (b) the water temperature used for soaking the seed was below 10 degrees C or above 40 degrees C; or (d) if the individual seeds used were smaller than 4g each.

The results indicate that there *is* an advantage in soaking seed before planting, although long-term soaking is not recommended. There is no need to control the temperature of the water used for soaking as long as it is kept within the range of 10 degrees C to 40 degrees C. Furthermore, the soil temperature during germination has a significant bearing on the germinability of jojoba seed, with optimum germinability attained within the range of 25 degrees C to 31 degrees C. Large diurnal temperature variation substantially reduces Jojoba seed germination. Finally, as jojoba seeds are generally heavier than 4 g, seed size plays only a marginal role in germinability.