



Spinach - *Spinacia oleracea*
Chenopodiaceae Family

Spinach is a cool season crop that is easily grown here through winter and in early spring with few pest or disease problems. The spring growing season is short here, since optimum temperatures for growing spinach are 60-65°F daytime and 40-45°F nighttime. However, because spinach seeds will germinate in soil temperatures ranging from 35-75°F you can plant them direct anytime during early spring and expect a reasonable germination rate – more about that later. With modest row covering, spinach can be overwintered to provide fresh greens through winter.

Timing

Recommended planting time for spring Spinach is Jan 15 – Feb 15. For fall and winter growing, the month of September is recommended for planting. Timing in spring is critical because Spinach is day-length sensitive and will bolt quickly once day-length exceed 14 hours. May 26, 2011 is the first 14-hour day, with each following day becoming 1 minuet longer. So, you plant late, expect your spring spinach to put up bloom stalks and blossom even if the plants are small.



Planting and Growing

If planting in rows, sow seed on 1” spacing – after germination that will yield seedlings at about the optimum spacing of 6-8 per row foot. If planting on a grid in wide beds use a 6-8 inch grid spacing. For “cut and come” growing, broadcast seed in wide beds and cover with ½ inch of compost. Harvest the plants often when small to avoid crowding.

Sow seeds ½ inch deep in loose soil that has been amended with compost, manure and some kind of high nitrogen fertilizer, like cottonseed meal or feather or blood meal. Spinach requires nitrogen to grow rapidly even in cold temperatures. Adding calcium to our soils is also advisable to insure an adequate available supply. Gypsum is the most cost effective option. Spinach also requires abundant levels of potassium – but most local soils have adequate amounts. You should side dress spinach with an additional high nitrogen fertilizers about half way through the growing season to ensure continued rapid growth. Spinach requires even watering with adequate soil water always available. Avoid drought stress and soggy soils.

To extend the growing season and hold back bolting, always remove the older and larger leaves – whether or not they are edible. Large leaves produce the hormone that stimulates bolting later in the season by sending the hormone to the apical growing area of the plant. When hormone levels reach a critical point, the plant produces a bloom stalk instead of additional leaves. You can extend the growing season by 7-10 days this way.

Improving Germination

Germination rates in Spinach can be quite variable depending on several factors – the following are easy methods of improving germination:

- Seed storage charts say that Spinach seed remains viable for three years, but the germination rate declines (sometimes significantly). So buying new seed every year or at least every other year will reduce the snaggle-toothed look of your Spinach bed.
- You can also germinate Spinach seed indoors under lights and transplant out when the starts have two true leaves. Holding the seedlings until they have multiple true leaves will stress the transplants, reducing growth and leaf production.
- Using a soil thermometer and managing soil temperatures can greatly improve the germination rate. As stated above, Spinach will germinate at temperatures between 35°F and 75°F, but you get optimum germination between 60°F and 68°F. Soil temperatures above 75°F will actually reduce the germination percentage. Knowing and managing soil temperatures is important to optimum germination.
- Seed Priming is the easiest and most efficient way of improving seed germination and early seedling development in Spinach.

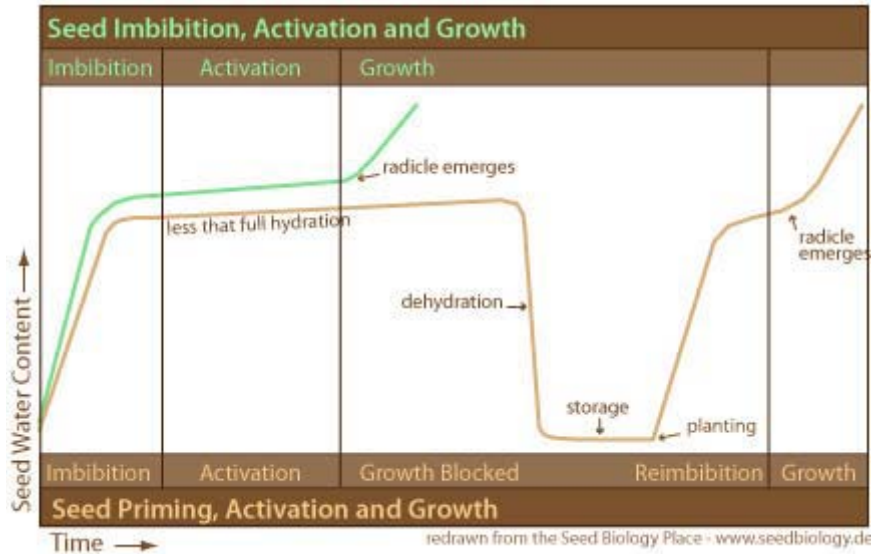
Seed Priming

In Spinach seeds, as in all seeds, germination takes place in three stages. The first is soaking up moisture (Imbibition). The second is growing new cells inside the seed (Activation) and the final (Growth) stage begins with the emergence of the radicle or shoot. It is well known that prolonging the Activation stage in an oxygen rich atmosphere enhances germination and seedling strength. The process of prolonging the activation stage is called Seed Priming and is practiced both in the laboratory and on the farm.

Priming Spinach seed is easily done in three steps:

1. Soak the seed in water at room temperature for 24 hours (Imbibition)
2. Remove and dry the seeds at room temperature for a day or two (Dehydration)
3. Store the seeds sealed in a container in a cool place (not refrigerated) – for up to five days (Activation)

Following priming, plant the seed (Reimbibition and Growth) following the above recommendation in the culturing section of this article. Seed priming can greatly increase your germination percentage in Spinach, as well in other seeds.



In the graph above you can see that when seeds are less than fully hydrated the activation stage can be prolonged allowing additional time to grow new cells within the seed prior to emergence. You can also see that when planted after partial dehydration and storage the re-hydration time is shorter, so seeds spend less time in the soil prior to emergence of the radicle and growth of leaf tissue. The result is increased germination, reduced risk of damage from dry soil or soil diseases and stronger seedlings.

Spinach is an excellent crop to grow here through fall, winter and early spring. Using the information here and following up with watchful gardening should provide you with a dependable supply of nutritious Spinach.

Good Gardening and Good Eating

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