



## Saffron Production: Life Cycle of Saffron (*Crocus sativus*)

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<http://www.uvm.edu/~entlab/Saffron/Saffron.html>



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Saffron is the dried stigma of a flowering plant *Crocus sativus* and is considered the most expensive spice in the world. It is a highly prized spice used for both sweet and savory dishes, most notably Italian risotto, Spanish paella, and many Iranian and Asian recipes. In addition, saffron contains several chemical components, such as safranal, crocin and picrocrocin, which are reported to have beneficial medicinal properties. The low yield per acre compared to other crops and the labor to harvest the flowers and separate the stigma from the petals elevates the price. Commonly saffron is sold for around \$19/gram or \$540/oz.

Growers intending to cultivate saffron should become familiar with its life cycle to maximize on yield and productivity. The saffron crocus is a fall blooming corm that is grown extensively in southeastern Asia and parts of the Mediterranean region. Most crocuses that we know bloom in the spring. Saffron is not harvested from these species. If you want to produce saffron, make sure you purchase *Crocus sativus* corms.

The annual cycle of saffron involves five major stages: sprouting, flowering, leaf development, development of daughter corms and dormancy (Fig. 1). The timing and duration of each stage depends on the climatic conditions. For our research trials in Vermont, we planted saffron corms in mid-late August or early September and watered the soil. Flowering began after 30-40 days, and continued for 5-6 weeks (Fig. 2). In some regions, the flowers appear first, but we found the flowers and spikey leaves appeared at approximately the same time. After flowering is finished, the leaves remain green for 6-8 months. During this time the daughter or secondary corms develop and grow on top of the mother corm. The color of the leaves start to change from green to yellow when development of the secondary corms is complete, and finally they turn brown and dry out.

### What's the difference between a corm and a bulb?

Both corms and bulbs are parts of the plant that store food to help it grow and bloom. A bulb is a plant stem and leaf that grows underground in layers. A tiny version of the flower is at the center of the bulb. Tulips, lilies, iris, daffodils and onions are examples of bulbs. A corm is an underground stem that serves as the base for the flower stem and is solid, not layered. It has internodes with at least one growing point or bud.

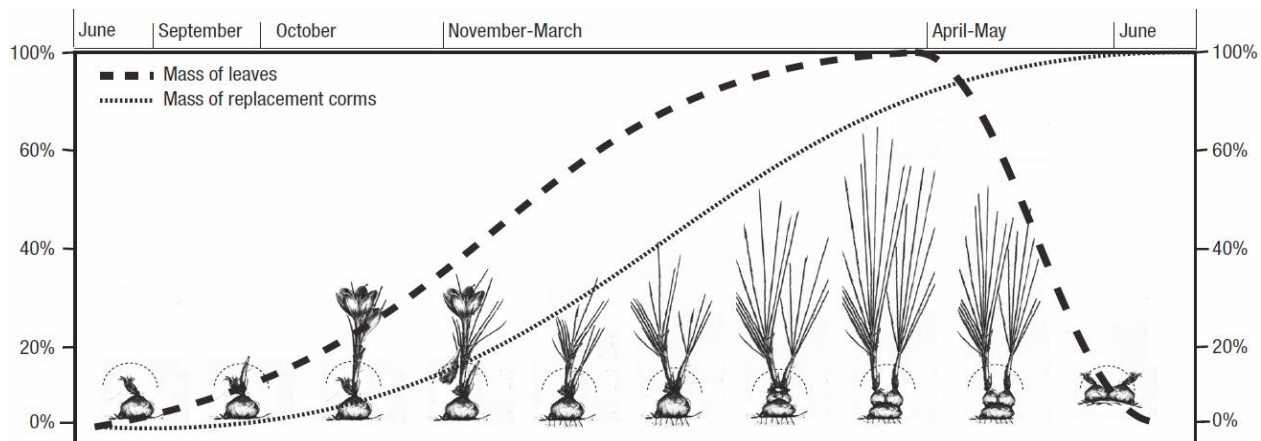
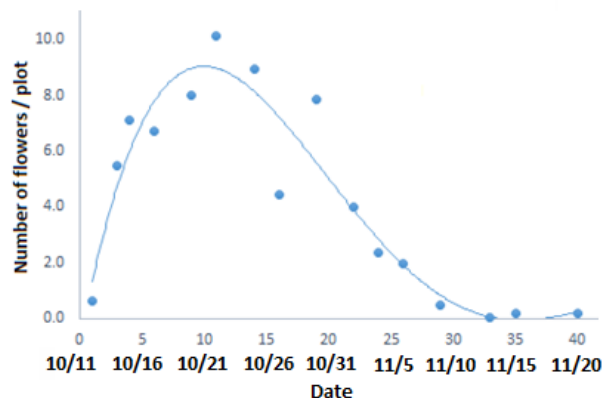


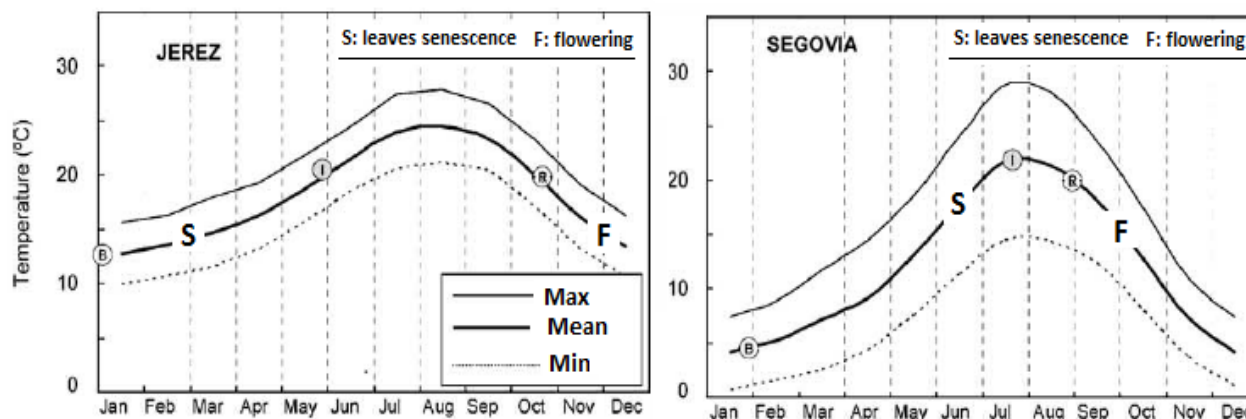
Fig. 1. The annual cycle and major growth stages of saffron (Corcoles et al. 2015).

Once the daughter corms reach dormancy, growers can dig up the corms to sell or store. It is reported that the optimum temperature for storing dormant saffron corm is 25°C (77°F). The corms that remain in the soil do not need to be watered during the summer because they are dormant. If grown in a high tunnel or greenhouse, watering of the corms should begin again in August.

We monitored the flowering pattern of saffron in our VT trial to better understand the labor demands of the crop. The corms were planted in early September and flowering began in early October. Though a few flowers were observed in early November, most of the flowering occurred over a 2-week period from October 16 – 31 (Fig. 2). Based on the ambient temperature in the high tunnels or around the fields, saffron reaches dormancy anytime between March and June. Molina et al. (2005) reported that, in Spain, saffron went into dormancy at different times depending on the mean air temperature (Fig. 3). The leaves dried out earlier in places where the average temperature was higher than in sites with cooler temperatures.



**Fig. 2.** Pattern of saffron flowering in our Vermont high tunnel research in 2015.



**Fig. 3.** Min, max and mean temperature in two different saffron producing regions. S: startind point of leaves senescence; F: starting point of flowering season (Molina et al. 2005).

It is impossible to predict the life cycle of saffron because of natural variation in temperature and other factors that may influence how this plant grows. As more growers around North America begin to cultivate saffron, we will gain a better appreciation for regional differences in its life cycle.

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