

# Greenhouse Production of Basil (*Ocimum spp.*) during the Winter for Essential Oils

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## Introduction

While commonly used as a culinary herb, basil is also used in aromatherapy and some cultivars are considered to have medicinal properties. It is one of the few herbs that is an annual. Eight cultivars of basil were tested to study their growth during the winter months under greenhouse conditions in Nebraska. These conditions included a structure with a double polyethylene cover with no supplemental lighting, basic fertigation through a capillary mat and under-bench heating. Three different fertilizer treatments were applied to promote basil growth and flowering.



## Materials and Methods

Eight cultivars of basil were grown in a double-layer polyethylene greenhouse. Seeds were sown in October and germinated within 3-5 days. The seedlings were transplanted once true leaves emerged and after four weeks of growth. Multiple seedlings were potted up into 6-inch standard pots filled with a 1:1:1 peat perlite vermiculite soilless mix. Four weeks later each pot was pricked out to 3 plants. On each bench was a sandwich of black plastic, capillary mat and white/black plastic into which holes were cut so the pots sat directly on the mat. Drip hoses ran the length of the bench between the capillary mat and white/black plastic which allowed for fertigation through capillary action.

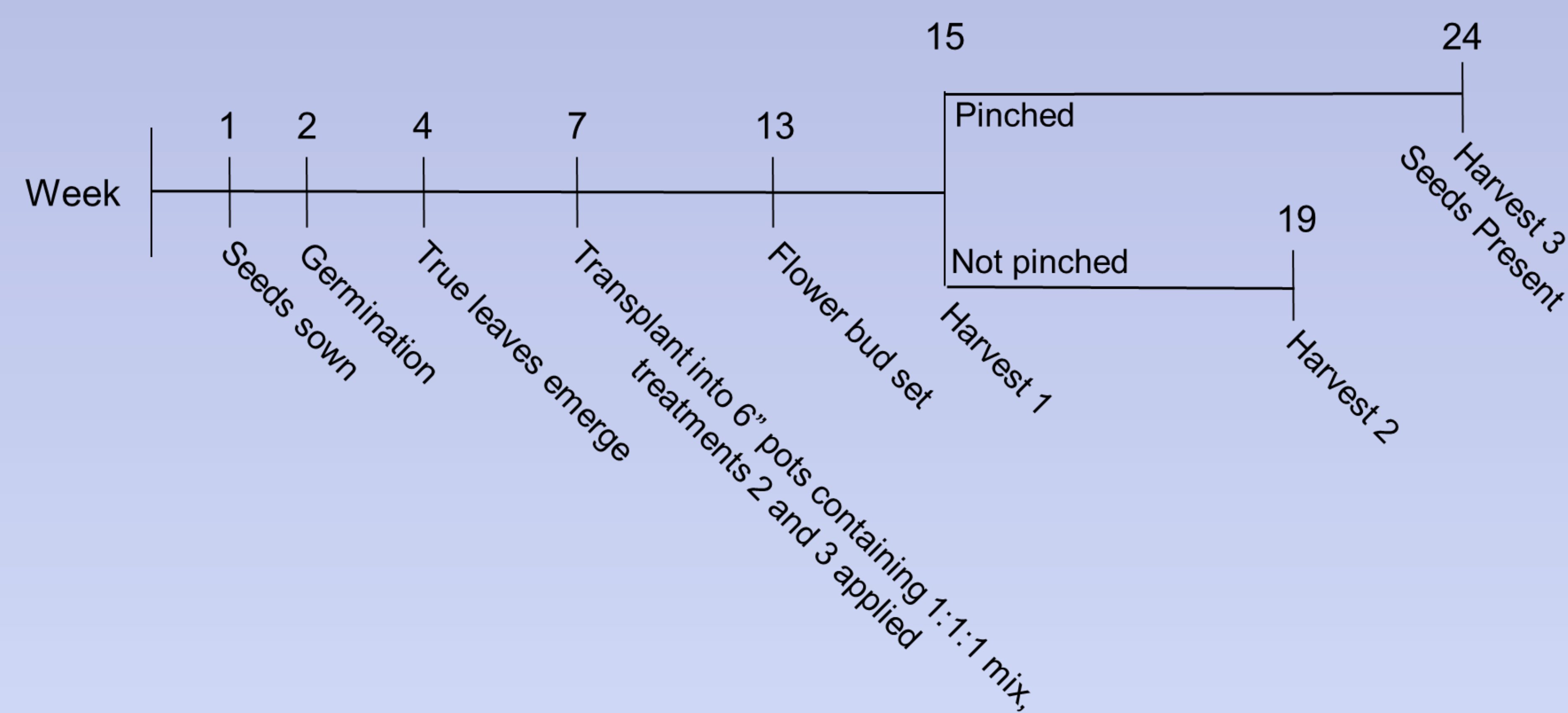
The experiment design was a randomized complete block design with 6 replications running east to west over two benches. The three different nutrient treatments used were: 100 ppm N from 20N-4.4P-16.6K water soluble fertilizer; 100 ppm N from 20N-4.4P-16.6K plus 6 g of 12N-3.1P-14.9K slow release fertilizer or 100 ppm N from 20N-4.4P-16.6K plus 9 g of 12N-3.1P-14.9K slow release fertilizer.

For the first harvest, plants were cut at the soil line and dried in a 60 °C oven to determine dry weight. Half of the remaining plants were then pinched to determine the effects of pinching on growth habit. For the second and final harvests plants were separated into leaves, stems and flowers and dried in a 40 °C oven for oil determination. Production time lines charting growth and flowering were recorded for all eight cultivars.

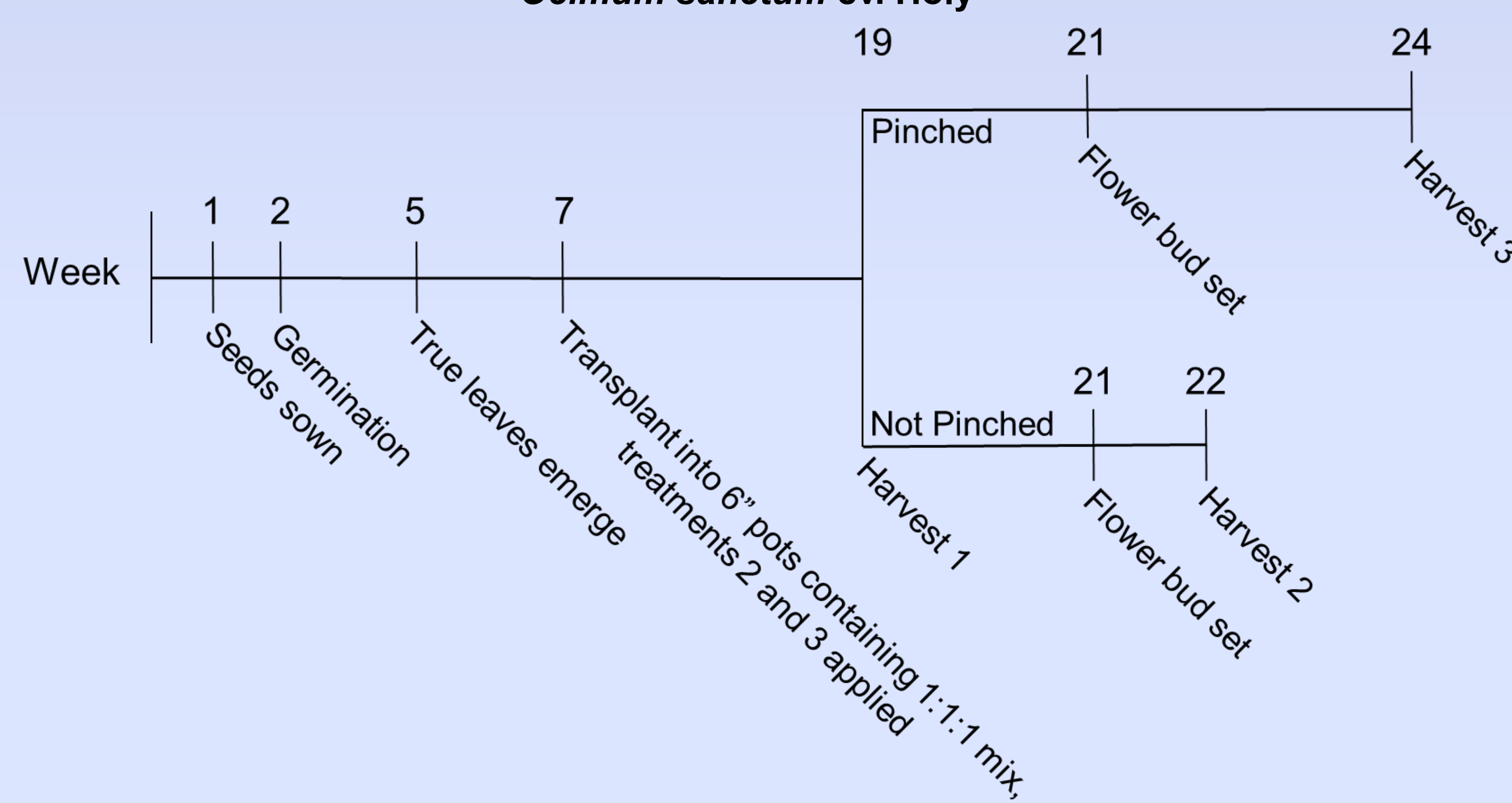


'Mrs. Burns' Lemon'  
Harvest 2, Treatment 2

*Ocimum basilicum* cv. Italian Large Leaf  
Nufar  
Mrs. Burns' Lemon  
Dolly  
Aroma 2  
Spicy Globe  
Genovese



*Ocimum sanctum* cv. Holy



'Dolly'  
Harvest 2, Treatment 2



'Spicy Globe'  
Harvest 2, Treatment 2



'Holy'  
Harvest 2, Treatment 2

## Results

Cultivar	Germ. (days)	True Leaves (days)	Flower Bud Set (weeks)	Habit	Leaves	Observations
Italian Large Leaf	3	12	13	Tall and straight	Medium to large	Smells of anise/licorice
Nufar	3	10	12	Tall and straight	Large, round and cupped	Smells of anise/licorice Heavy thrips and aphid damage
Mrs. Burns' Lemon	4	13	12	Multiple leader, Pinching had no effect	Small, serrated and flat	Produces abundant flowers Strong lemon smell Heavy aphid damage
Aroma 2	4	13	12	Tall and straight when not pinched	Medium	Pinching made it twist and curve Strong typical basil smell
Dolly	4	12	13	Tall and straight when not pinched	Medium to large, cupped	Pinching made it twist and curve Mild typical basil smell
Holy ( <i>O. sanctum</i> )	5	15	21	Multiple leader	Small, serrated and pubescent	Purple stems and flowers Thrips damaged young plants Aphids did not damage it Smells of cloves
Spicy Globe	4	12	13	Compact and globular habit, pinching had no effect	Small, obovate	Multiple plants will form a globe Flowers took longer to reach anthesis Smells spicy Minimal pest damage
Genovese	4	---	13	Tall and straight	Medium to large, cupped	Strong, sweet basil smell Uniform leaf size and shape