



Accelerated Rhizome Forming & ABA conc. In Sacred Lotus (*Nelumbo nucifera*)

by Low Night Water Temperature

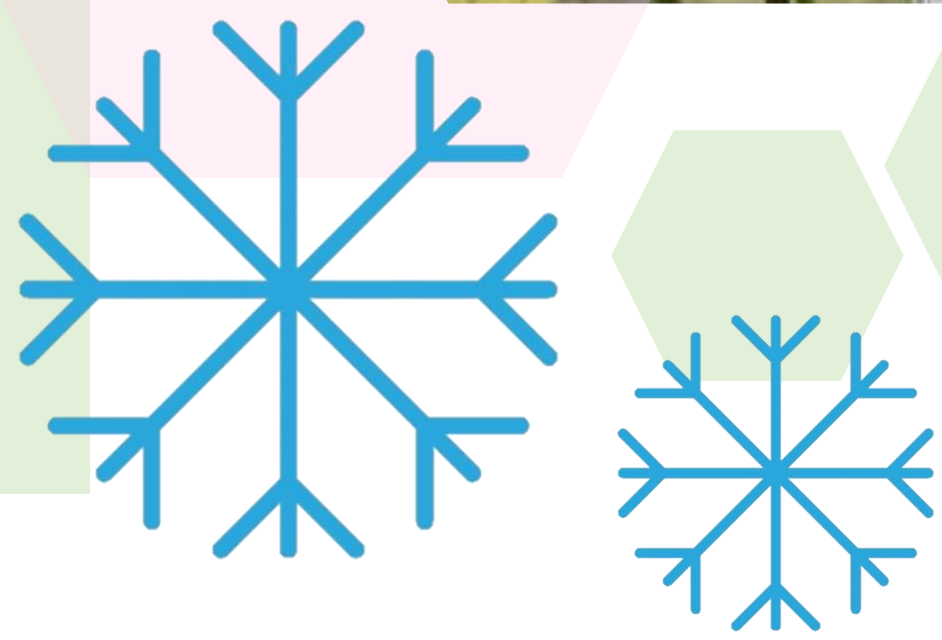
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Introduction

- Sacred lotus is one of the most important cut-flower crops in Thailand
- Temperature play an crucial role in the dormancy stage of the plant
- Deceasing of temperature induced the fluctuation of plant hormone which affect plant growth & development, resulted in poor growth and reduced flower yields in mild winter
- To confirm this hypothesis, the determine the effects of cooling water temperatures on growth, development, & ABA conc. were done in sacred lotus



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Methods



Fig. 1: Cooling unit for controlling the water temperature as a treatment

- The CRD experiment was conducted with 3 different Low Night Temperatures (LNT).
T1: Control (Ambient Temp.)
T2: LNT 20°C
T3: LNT 15°C
- Aboveground & underground growth parameters and abscisic acid concentration were collected in 2 stages: 45 & 90 days after treatments (45 DAT & 90 DAT)

Tab. 1: Aboveground growth of *Nelumbo nucifera* when grown under the different Low Night Temperature (LNT) treatment at 45 and 90 DAT.

Stage	Treatments	Aboveground Growth			
		Number of Leaves	Leaf Area (mm ²)	Leaf Dry Weight (g)	Flowering Percentage
Day 0		10.25	1320.71	10.76	93.33
45DAT	T1: Control	10.33 a	1621.70 a	13.66 a	41.67
	T2: LNT 20°C	6.67 b	726.50 b	10.96 a	8.33
	T3: LNT 15°C	ND	ND	2.37 b	0
90 DAT	T1: Control	12.33 a	1610.00 a	11.15 a	55.56
	T2: LNT 20°C	3.00 b	395.00 b	1.85 b	0
	T3: LNT 15°C	ND	ND	ND	0

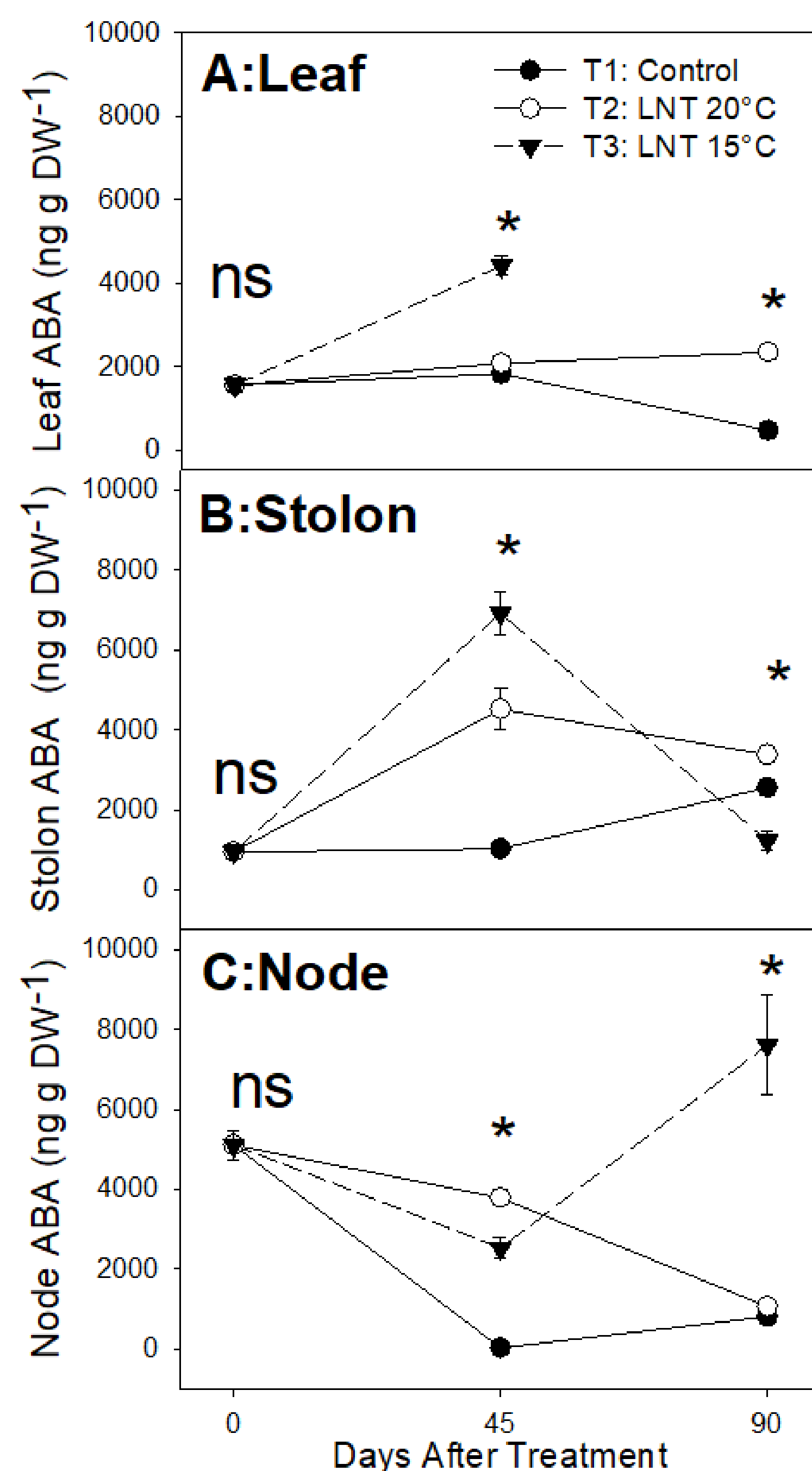


Fig. 2: Leaf, Stolon and Node ABA concentration of *Nelumbo nucifera* when grown under the different Low Night Temperature treatment at 45 and 90 DAT.

Tab. 2: Underground growth of *Nelumbo nucifera* when grown under the different Low Night Temperature (LNT) treatment at 45 and 90 DAT.

Stage	Treatments	Underground Growth		
		Total Stolon Length (cm)	Stolon Diameter (mm)	Rhizome Enlargement Index
Day 0		102.50	3.80	0.30
45DAT	T1: Control	154.50 c	4.47 c	0.29 b
	T2: LNT 20°C	223.00 b	6.82 a	0.52 a
	T3: LNT 15°C	261.00 a	5.95 b	0.58 a
90 DAT	T1: Control	203.00 c	7.65 b	0.37 c
	T2: LNT 20°C	235.00 b	11.00 a	0.54 b
	T3: LNT 15°C	267.33 a	11.51 a	0.65 a

Results

- The 20°C LNT suppressed the vegetative growth with less LF no., LF area, & LF DW, while there is no leaf to be found when plant receive 15°C LNT
- 20°C LNT gave the higher in stolon, stolon diameter & rhizome enlargement index while the 15°C LNT gave longer internode
- Low temp as 20°C LNT gave higher ABA in stolon part while 15°C gave higher ABA in LF and node part

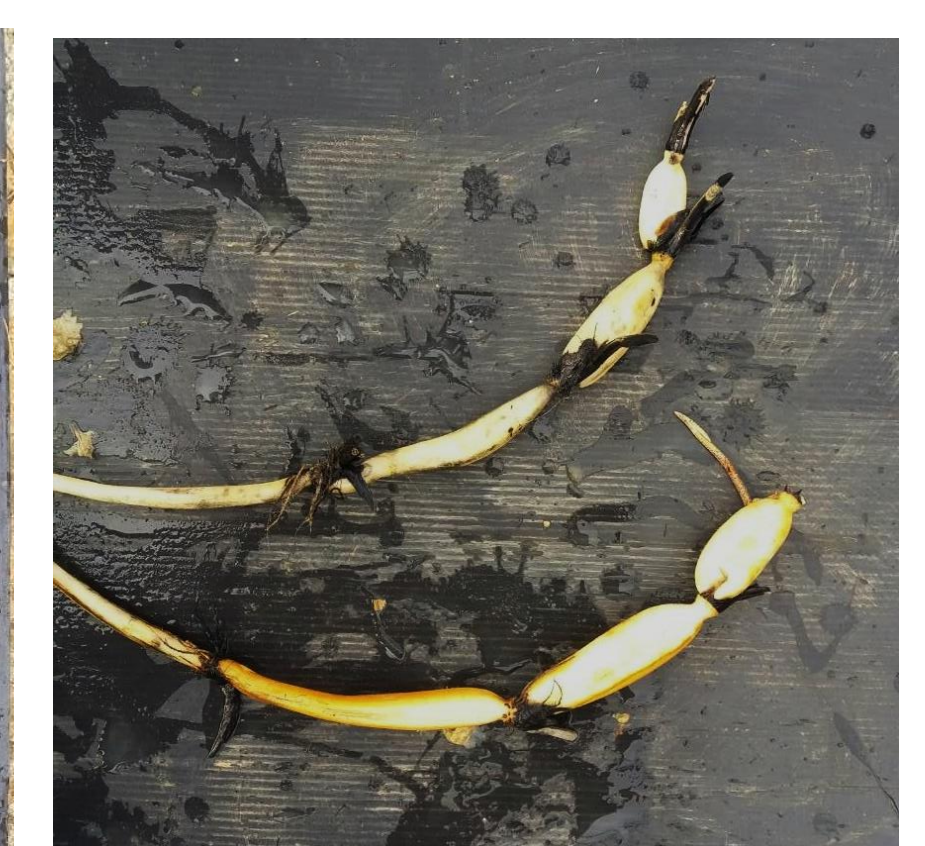
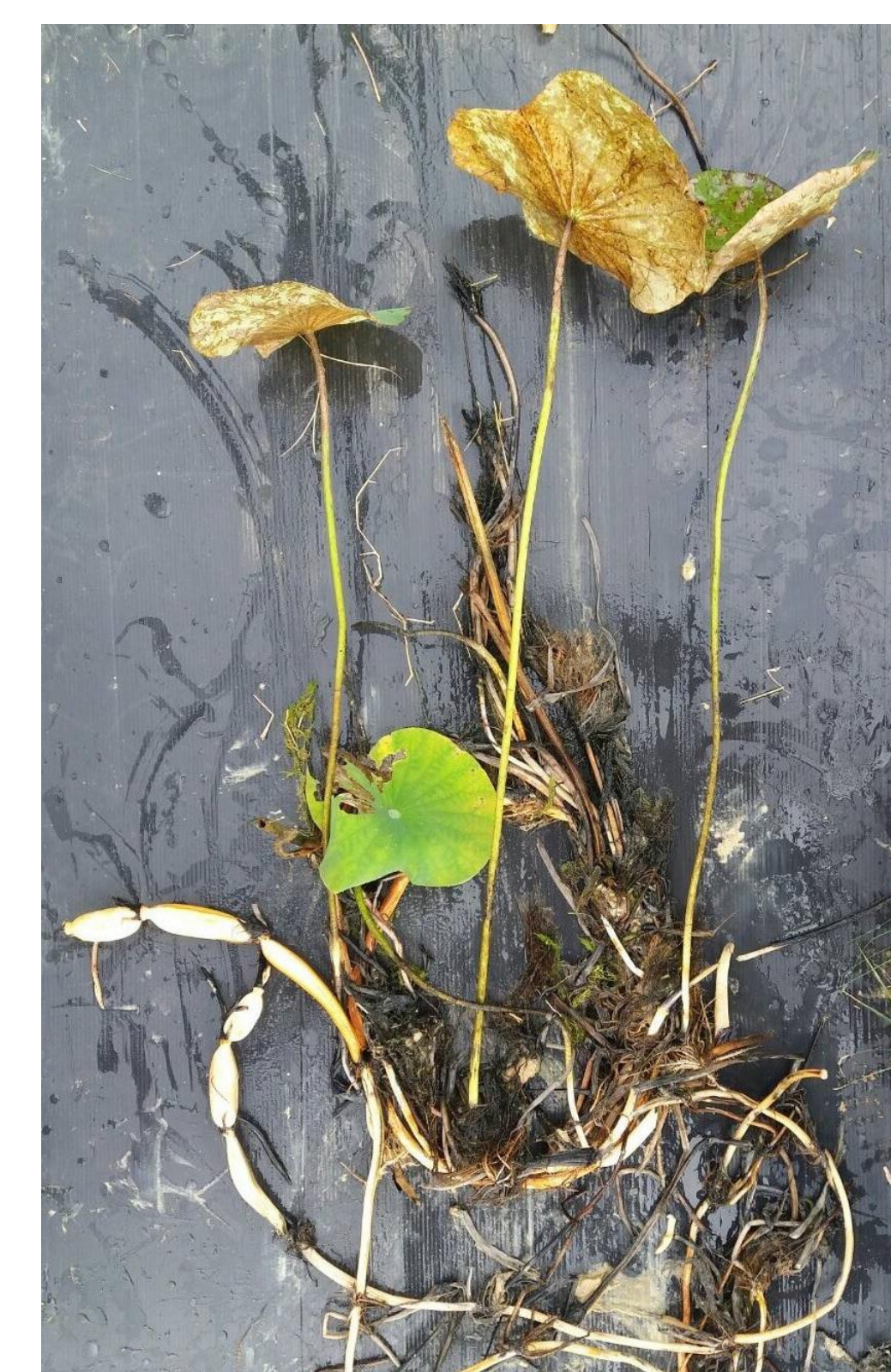


Fig. 3: Rhizome forming of *Nelumbo nucifera* when grown under LNT treatment at 90 DAT.

Conclusions

- Low Temperature suppressed vegetative growth and decrease the flowering percentage of the plant but accelerated rhizome growth
- Low Temperature gave higher ABA in all organs. The greatest accumulation of ABA was occurred in underground parts of the plant
- This finding might be beneficial information for developing sacred lotus as a cut flower for off-season (mild winter) production

Acknowledgement

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