

Ethrel Delays Blossoming, Reduces Fruit Set, and Increases Fruit Size of 'Baby Gold 5' Peaches

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Introduction:

There is a high risk of spring frost to the flowers of peach trees when grown in northern climates such as the Niagara Peninsula. Methods to delay flower development would reduce the inherent risk of crop lost associated with late spring frosts. Previous research has demonstrated that plant growth bio-regulators, particularly autumn applications of ethephon or gibberellic acid, have delayed flower development the following spring (Anderson and Seeley, 1993; Durner and Gianfagna, 1988, 1991; Crisosto et al, 1990). Some mortality of flower buds was also evident in these studies.

We hypothesize that autumn applications of ethephon can be used to delay flower opening the following spring as well as reduce fruit set, thereby reducing the need for hand thinning.

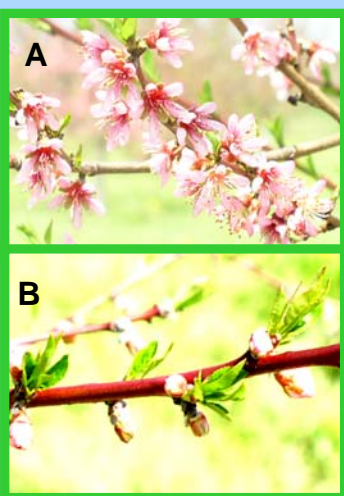


Fig. 1. Flower development of untreated control treatment (A) and trees treated with 400 mg/L Ethrel (B) on May 10, 2004

Research Objectives:

To determine:

- how effective autumn applications of ethephon are on delaying the flowering of peaches the following spring
- the effect of ethephon on fruit set, yield, fruit size and quality

Experimental Details:

- 'Baby Gold 5' peach trees on 'Bailey' rootstock, planted in 1999 at 5.0 x 2.0 m
- Randomized complete block experimental design with 6 replications
- Five treatments: 0, 50, 100, 200, and 400 ppm Ethrel, applied using handgun
- Trees sprayed on Oct. 20, 2003 (~25 % leaf drop) and Nov. 5, 2004 (50% leaf drop)
- Field and lab tests were used to monitor blossom development
- Fruit set, number of fruit per tree, total yield, fruit weight, vegetative growth, soluble solids concentration, and firmness measured

Results:

- Autumn applied ethephon delayed 'Baby Gold 5' peach bloom by 2 to 6 days in 2004 (Fig. 2)

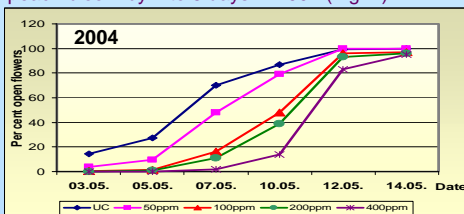


Fig. 2. Effect of ethephon on bloom delay of 'Baby Gold 5', 2004

- Ethephon treatments delayed flowering by as much as 8 days in 2005 (Fig. 3).

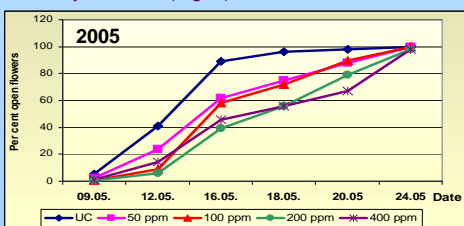


Fig. 3. Effect of ethephon on bloom delay of 'Baby Gold 5', 2005

- Ethephon treatments reduced 'Baby Gold 5' fruit set by 20 to 90% in 2004, and by 10 to 50% in 2005, respectively (Fig. 4 A, B)

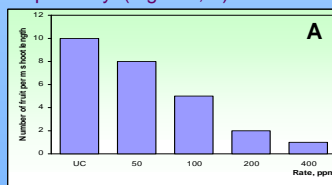
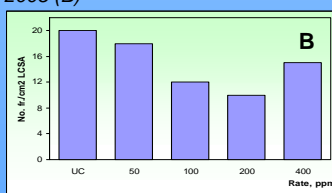


Fig. 4. Effect of ethephon on fruit set of 'Baby Gold 5' in 2004 (A), and 2005 (B)



- Yields were reduced in 2004 (Fig. 5 A), but unaffected by ethephon treatments in 2005 (Fig. 5 B). Fruit size, however was significantly increased in both years as a result of autumn ethephon applications (Figs. 5 A, B, and 6.)

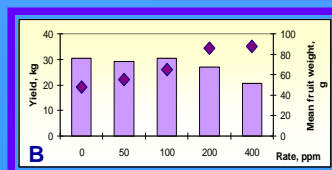
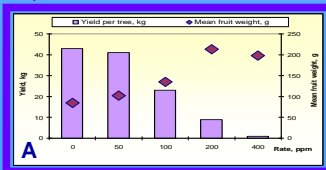


Fig. 5. Effect of ethephon on yield and fruit size of 'Baby Gold 5' in 2004 (A), and 2005 (B)

- Soluble solids concentration was increased and fruit firmness reduced by ethephon treatments in both experimental years (Table 1), indicating an advance in fruit maturity

Table 1. Effect of Ethrel on soluble solids concentration and fruit firmness of 'Baby Gold 5' peaches

Treatment	2004	
	Brix, %	Firmness, N
Rate, mg/L		
0	8	45
50	9	42
100	10	36
200	11	32
400	11	26
Significance ¹	**	***
LSD (P=0.05)	1	2
P value	0.0010	<.0001
	2005	
Rate, mg/L		
0	12	42
50	13	37
100	13	35
200	14	30
400	13	37
Significance ¹	-	***
LSD (P=0.05)	1	2
P value	0.0356	<.0001

¹ n.s., **, ***, indicates not significant, and significant differences at P=0.05, P=0.01, and P=0.001 respectively.



Fig. 6. Effect of Ethrel on fruit size of 'Baby Gold 5', 2004. Untreated control (A), and 400 mg/L Ethrel (E) treatment.

Conclusions:

- Autumn applied ethephon delayed bloom of 'Baby Gold 5' peach trees by as much as 6 days in 2004, and by 8 days in 2005, respectively.
- Significant reductions in fruit set were observed.
- An increase in fruit size of 150%, and 83% was recorded following ethephon application in 2004 and 2005, respectively, depending upon ethephon rate.
- Fruit quality was improved by the ethephon applications.
- Fruit maturity was not delayed by ethephon treatment, despite the delay in bloom.
- Ethephon treatments increased vegetative growth.
- Results of this study indicate autumn ethephon applications can be used successfully to delay blossom of the peaches, while reducing the need of hand thinning. In addition, increased fruit size and improved fruit quality of peaches was observed.

Literature cited:

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