

## Evaluation of N-Phenyl-Phthalamic Acid influence on Fruit Setting and Quality of Sweet Cherry Cultivars

<sup>1</sup>Zia Nosrati, <sup>2</sup>Abdollah Khadivi Khoob and <sup>3</sup>Naser Bouzari

<sup>1</sup>Department of Biotechnology and Physiology, Iranian Academic Center for Education Culture and Research (ACECR) of Horticultural Plant, Karaj, Iran

<sup>2</sup>Department of Horticultural Sciences, Faculty of Agriculture, Arak University, Arak, Iran

<sup>3</sup>Seed and Plant Improvement Institute, Horticulture Section, Karaj, Iran

**Abstract:** Sweet cherry is economically important fruit of the temperate zone. In this study, influence of N-phenyl-phthalamic acid (Nevirol 60 WP) on fruit setting and fruit quality of three sweet cherry cultivars was evaluated. The research results show that by using Nevirol 60 WP we can improve the fruit setting. As a result of this process, the yield amount will increase, but fruit quality parameters (weight, length, width and diameter) were decreased. There is a significant difference between the reactions of different cultivars. It can be concluded that Nevirol 60 WP has a great effect on the improvement of yield amount, especially with a good nutrient supply. Also before using Nevirol 60 WP, we have to take into consideration that increasing yield needs a higher nutrient supply.

**Key words:** N-phenyl-phthalamic acid • Sweet cherry • Fruit setting • Fruit quality

### INTRODUCTION

*Prunus* was divided into five subgenera (*Prunophora*, *Amygdalus*, *Cerasus*, *Padus* and *Laurocerasus*). There are several kinds of taxonomic systems in *Prunus* subg. *Cerasus* [1]. Species of subg. *Cerasus* grow wild throughout the temperate climate zone on the Northern Hemisphere. *P. avium* includes sweet cherries, cultivated for human consumption and wild cherry trees grown for their wood [2]. This species is diploid (AA, 2n=2x=16) and its natural range covers the temperate regions [3].

Ensuring yield-balance although the applied technologies give a good possibility for this in large-scale farming is a difficult and complicated task. Pollination of certain horticultural species, because of climatic and genetic influences is not possible in many cases [4]. For sufficient yield amount and required yield quality we have to interfere in pollination. With the help of N-phenyl-phthalamic acid, which is an agent of Nevirol 60 WP, we can achieve this goal [5].

The N-phenyl-phthalamic acid is a regulator that increases the working life of stigma and supports the better pollination, which results in a higher yield [6]. The acid is not auxin, but it has a synergistic effect with auxin

in biological tests. This has not caused any phytotoxicity or parthenocarpia [7]. Applying Nevirol 60 WP, the possible unfavourable effects of the objective (agronomics, agrotechnics, species and weather) and subjective conditions of production can be reduced and yield fluctuation can be leveled, thus, crop safety can be considerably increased. The product, like other regulators and all synthetic pesticides, is not approved in the organic production system [4].

Its application is recommended for the flowering period in greenhouses and foilhouses, as well as in field (orchard) cultivation for some crops such as apple [7, 8], sour cherry [5], sweet cherry [9] and eggplant [10].

The product may be mixed with insecticides, fungicides and foliar fertilizers, excepting alkaline products. Attention has to be paid to the phytotoxic effect of some scab fungicides in the full bloom period, which should be avoided [6]. The preparation of the spray liquid does not need any special measures, as the preparation contains the necessary constituents to ensure quick and thorough wetting. For applications with ground machine use 400-1000 l/ha, at aerial applications 60-80 l/ha. It is important to note that while a higher yield is aimed at through better fruit setting, a higher level of basic nutrition should be provided.

Table 1: Characteristics of the experimental sweet cherry plantations and the chosen cultivars

Number	Cultivar	Region	Fruit skin color	Fruit size	Fruit shape
1	Sweet cherry 1	Iran	Blackish Red	Large	Heart
2	Sweet cherry 2	Iran	Blackish Red	Large	Heart
3	Sweet cherry 3	Iran	Blackish Red	Large	Heart

## MATERIALS AND METHODS

This research was conducted in the periods from 2009 and 2010, in collection experiments of seed and plant institute (SPI) Karaj, Iran. We have chosen three sweet cherry cultivars for this study. Some characteristics of cultivars are presented in Table 1. Trees were planted in north-south row direction. In our research, the usual cultivation and integrated plant protection was applied. For better fruit setting, we applied N-phenyl-phthalamic acid, which is an agent of Nevirol 60 WP in 0.4 kg/ha doses. It was sprayed at full bloom.

The observation and measurement were carried out on three trees per treatment. The total number of trees was 18. Tables contain the average of these data. Fifty sweet cherry fruits were randomly sampled from each tree for this evaluation, so that the total number was 150 per cultivar.

In our investigations, we determined the following properties of sweet cherry:

- Fruit setting: This means the number of harvested fruits from 100 flowers per tree.
- Fruit weight: The weight of fruit was estimated in 0.1 grams with the help of digital analytic scales.
- Fruit diameter: This was measured in 0.1 millimeters with slide-gauge.

- Fruit length: This was measured similar to fruit diameter in 0.1 millimeters with slide-gauge.
- Fruit width: This was measured similar to fruit diameter in 0.1 millimeters with slide-gauge.

Analysis of variance was performed for all traits by SAS and MSTATC softwares.

## RESULTS AND DISCUSSION

Results showed that fruit setting of sweet cherry cultivars was increased in many cases, when N-phenyl-phthalamic acid (Nevirol 60 WP) was applied. This increase of fruit setting was detected for sweet cherries (Figure 1 and Table 2). However, it is need to mention that the increase of fruit setting was not significant in several cases. These results were agreed with finding in apple (Racsko et al. 2004, 2006), sour cherry (Racsko *et al.*, 2006), sweet cherry (Thurzo *et al.*, 2008) and eggplant (Kowalska, 2008).

The positive effect of Nevirol 60 WP on fruit setting was considerable for high setting cultivars. The fruit setting was the highest on cultivar 1 of sweet cherry (49%). The increase of fruit setting increased the number of fruits per tree too. These results were agreed with finding in apple [7, 8], sour cherry [5] and sweet cherry [9] and eggplant [10].

Table 2: Effect of Nevirol 60 WP on quality parameters of fruits

	Control	Treatment	Control	Treatment	
	Fruit Set (%)		Fruit Length (mm)		
Sweet cherry 1	43	49	Sweet cherry 1	19.35	18.68
Sweet cherry 2	44	47	Sweet cherry 2	19.78	18.85
Sweet cherry 3	40	45	Sweet cherry 3	19.1	18.4
	Fruit weight (gr)		Fruit Width (mm)		
Sweet cherry 1	4.32	3.56	Sweet cherry 1	19.44	18.62
Sweet cherry 2	4.37	3.69	Sweet cherry 2	18.9	18.3
Sweet cherry 3	4.23	3.57	Sweet cherry 3	18.8	18.2
			Fruit Diameter (mm)		
Sweet cherry 1	16.9	16.2			
Sweet cherry 2	16.33	15.82			
Sweet cherry 3	16.1	15.6			

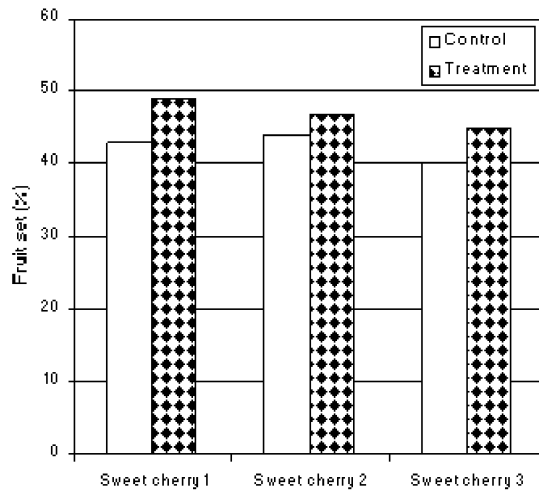


Fig. 1: Effect of Nevriol 60 WP on fruit setting of sweet cherries

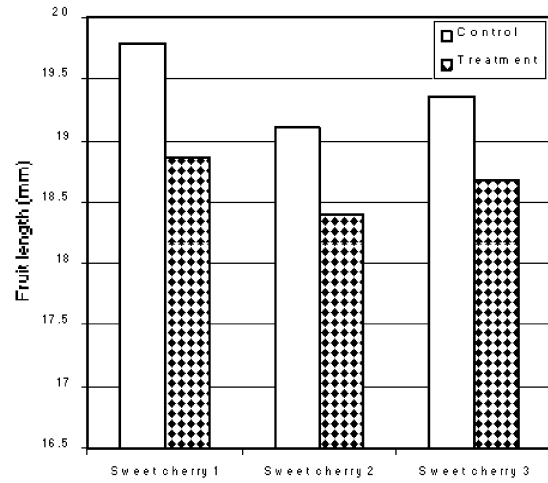


Fig. 4: Effect of Nevriol 60 WP on fruit length of sweet cherries

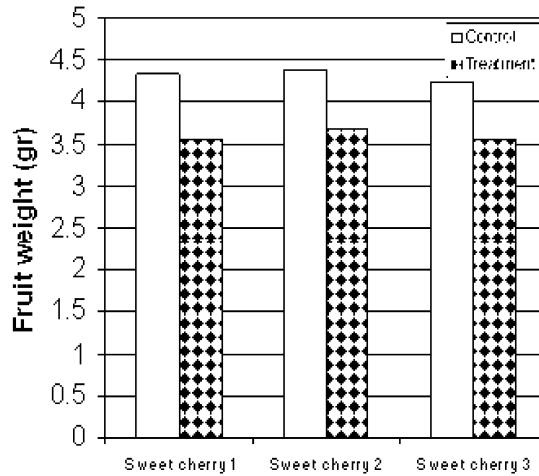


Fig. 2: Effect of Nevriol 60 WP on fruit weight of sweet cherries

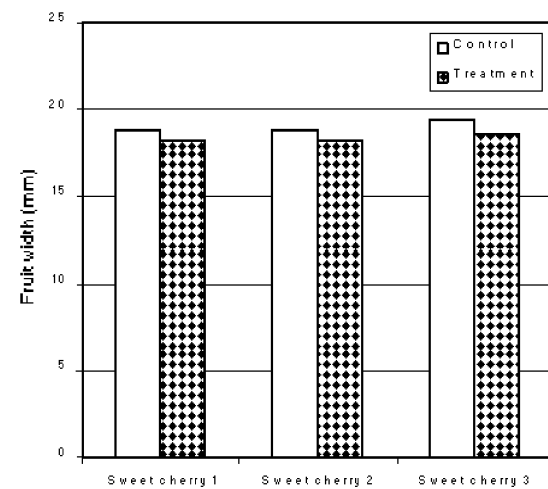


Fig. 5: Effect of Nevriol 60 WP on fruit width of sweet cherries

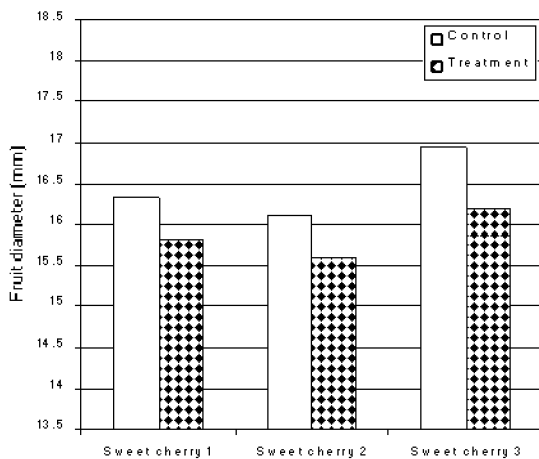


Fig. 3: Effect of Nevriol 60 WP on fruit diameter of sweet cherries

Table 3: Variance analysis of effect of Nevriol 60 WP on quality parameters of fruit

SOV	Trait			
	Fruit weight	Fruit diameter	Fruit length	Fruit width
Sweet cherry 1	2.86**	1.33 <sup>ns</sup>	4.33*	1.80 <sup>ns</sup>
Sweet cherry 2	2.32**	1.25 <sup>ns</sup>	2.55 <sup>ns</sup>	1.77 <sup>ns</sup>
Sweet cherry 3	2.21*	2.80*	2.22 <sup>ns</sup>	3.37*
df	18	18	18	18

Decrease of fruit weight was considerable on all cultivars when Nevriol was applied (Table 2). The reason for this is that fruit set was high and fruit received not enough nutrition for growing up. Similar tendency was

found for the diameter, length and width of fruit, however, the differences among cultivars were presented. These results were agreed with finding in apple [7, 8], sour cherry [5] and sweet cherry [9]. Variance analysis of the effect of Nevirol 60 WP on quality parameters of fruit is shown in Table 3.

### CONCLUSION

Result showed that Nevirol 60 WP could increase fruit setting, which resulted in a yield increase too. Nevirol 60 WP treatment showed significant differences among cultivars. Nevirol 60 WP has a great effect on crop yield, especially when Nevirol 60 WP is applied with a good fertilizer supply. Before using Nevirol 60 WP we have to take into consideration that increasing yield needs nutrient supply, otherwise fruit mass, diameter, length and width will decrease and the yield frittered away.

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