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Effect of CPPU on Fruit Set, Drop, Yield and Fruit Quality of Hollywood and Santarosa Plum Cultivars

Samia A. Assad
Horticulture Research Institute, Agriculture Research Centre, Cairo, Egypt.

THE present investigation was conducted during two successive seasons of 2012 and 2013 on Hollywood and Santarosa plum Cvs. (Prunus salicina). Trees were 10 years old and grown in a private farm at desert road in Menofia Governorate. CPPU at 5 or 10 ppm were sprayed three times (after one week, two weeks and three weeks of full bloom) on both plum cultivars.

Results showed that spraying with 5 or 10 ppm CPPU after one week of full bloom recorded the highest values of fruit set, yield, fruit weight, size, length, diameter, firmness and acidity and the lowest values of fruit drop and TSS. Control recorded the lowest values of fruit set, yield, fruit weight, size, length, diameter, firmness and acidity and the highest values of fruit drop and TSS in both seasons for the two cultivars under study. So, the study recommend to spray 5 or 10 ppm of CPPU after one week of full bloom to increase fruit set, yield and to improve fruit characteristics.

Plums (*prunus salicina*) are occupying an importance share in the total fruit production of Egypt. The total area of plum in Egypt reached about 2645 Feddans, according to the census of Ministry of Agriculture. Egypt (2010) - which produced 7376 tons with average yield of 2.99 tons / Fed.

Fruit size depends on different factors (a): The number of cells present at fruit set, (b): number of cells division that occur subsequently and (c): the extent which theses cells expand. Cell division during the early stage of fruit development has a major influence on final fruit size (Westwood, 1993). Early fruit cells division is normally influenced by the natural growth hormones especially cytokinin (Looney, 1993). Studies on the synthetic cytokinin CPPU {(N-(2-chloro-1-pyridinyl)-N-phenylurea)} has indicated that, in many fruit crops, it is one of the main factor affecting fruit growth and fruit size. CPPU gave promising results in controlling fruit growth and cropping of grapes (Nickell, 1986), apple (Greene, 1989), kiwi fruit (Biasl *et al.*, 1991) and persimmon (Ital *et al.*, 1995).

Several investigations mentioned that, spraying deciduous fruit trees with CPPU with different concentrations enhanced cell division, increased cell size, increased fruit weight, size and fruit yield. Furthermore, application of the abovementioned growth regulators improved the most fruit properties as being cleared by (Jindal and Sharma, 1986) on plum, (Nickell, 1986), (El-Barkooky, 1985), (Greene, 1989)

on apple, (Biasl *et al.,* 1991) and (Lowes & Woolley, 1992) on Kiwi, (Rizk 1998), (Feng *et al.,* 1999), (Al-Ashkar, 2000), (Ranpise *et al.,* 2000) and (Marwad 2001) on grapes, (Kabeel, 1999) on persimmon, (Fatma *et al.,* 2009) on apple, (Guirguis *et al.,* 2003) and (Kabeel & Fawaaz, 2005) on pear trees.

Due to the little information currently available about the effect of CPPU on plum fruit, this study was carried out to explore the effect of concentration and application time of CPPU on fruit set, yield and fruit quality of Hollywood and Santarosa plum trees (Prunus salicina).

Materials and Methods

The present investigation was conducted during the two successive seasons of 2012 and 2013 on Hollywood and Santarosa plum (*Prunus salicina*) cultivars, trees grown at Eva grow in a private orchard from Tanboal road at El-Monofia governorate. Selected trees were 10-years old, almost uniform in vigor, grafted on Mariana rootstock and planted at 4 x 5 m apart. Twenty one trees were chosen for each cultivar for carrying out 7 treatments in this study. Each treatment was replicated three times (one tree for each replicate). CPPU (Sitofex) at 5 or 10 ppm were sprayed three times (after one week, two weeks or three weeks of full bloom) on both plum cultivars and arranged as follows:

- Spraying CPPU at 5 ppm after one week
- Spraying CPPU at 5 ppm after two weeks
- Spraying CPPU at 5 ppm after three weeks
- Spraying CPPU at 10 ppm after one week
- Spraying CPPU at 10 ppm after two weeks
- Spraying CPPU at 10 ppm after three weeks
- Spraying tap water (Control)

Four main branches representing all tree sides were chosen at random and labeled before spraying. After spraying the following data were measured as follows:

Percentage of fruit set

The total number of flowers on each tagged limb was counted at full bloom. The number of set fruit was counted on the same limbs after one month from full bloom. Fruit set percentage was calculated according to (Westwood, 1993) as follows:

$$\text{Fruit set \%} = \frac{\text{Number of developing fruitlets}}{\text{Total number of flowers}} \times 100$$

Percentage of fruit drop

Number of dropped fruits were recorded till harvest time, then determined as percentage on the basis of initial number of fruitlets according to this equation according to (Westwood, 1993):

$$\text{Fruit drop \%} = \frac{\text{Number of dropped fruits}}{\text{Number of set fruitlets}} \times 100$$

Yield / tree

The average of tree yield in kgs for each treatment was determined at harvest time (at maturity stage).

At picking date, samples of five fruits from each replicate were taken to determine the following characteristics:

- Average fruit weight (gm).
- Average fruit size (cm^3).
- Average fruit dimensions (length and diameter cm).
- Average fruit firmness ($Ib/inch^2$) was estimated by Pentrameter.
- Total soluble solids (%) of fruit juice percentages were estimated by using hand Refractometer.
- Total acidity (%) was calculated as mg malic acid/100g. fresh weight (A.O.C.A., 1990).

Statistical analysis

All obtained data were statistically analyzed according to complete design plots (Steel and Torrie, 1980). L.S.D. at 5% test was used for comparison between means of the studied treatments.

Results and Discussion

Fruit set

As shown in Table 1 and Fig. 1, it is appeared that spraying with 5 or 10 ppm CPPU after one week, two weeks or three weeks of full bloom had significantly effect on fruit set in the both seasons for Hollywood and Santarosa plum cultivars. It was found that spraying with 5 or 10 ppm CPPU after one week of full bloom recorded the highest significant values of fruit set followed in a descending order by spraying with 5 or 10 ppm CPPU after two weeks of full bloom, whereas, the lowest significant values were obtained from control in both seasons for the two cultivars under study.

TABLE 1. Effect of different CPPU treatments on fruit set (%) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons .

Treatments	2012 season		2013 season	
	Hollywood	Santarosa	Hollywood	Santarosa
CPPU (5 ppm) after one week	19.71	25.76	21.83	33.34
CPPU (5 ppm) after two week	19.44	24.77	21.54	32.06
CPPU (5 ppm) after three week	18.91	23.31	20.95	30.18
CPPU (10 ppm) after one week	20.06	25.93	22.23	33.57
CPPU (10 ppm) after two week	19.87	25.50	22.02	33.01
CPPU (10 ppm) after three week	18.98	24.52	21.03	31.74
Control	16.92	19.92	18.88	26.08
LSD at (0.05) =	1.47	2.78	1.49	3.29

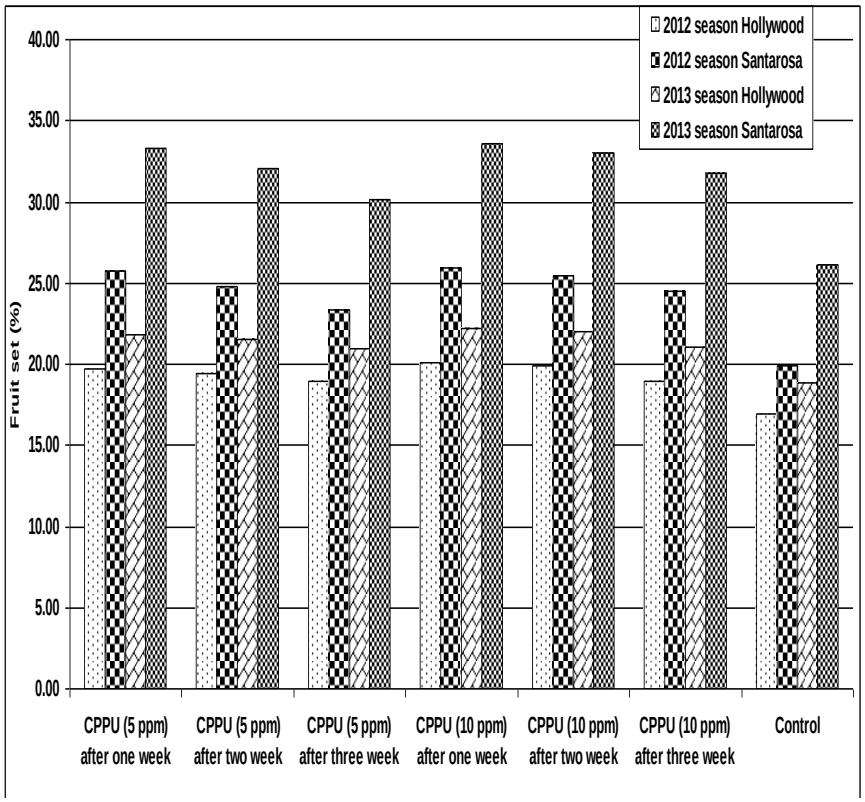

Fig. 1. Effect of different CPPU treatments on fruit set (%) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons

These results were in line with those obtained by Greene (1989) on apple, Jindal and Sharma (1986) on plum, Biasl *et al.* (1991) and Lowes and Woolley (1992) on Kiwi, Kabeel (1999) on persimmon and Guirguis *et al.* (2003) on pear trees.

Fruit drop (%)

Data in Table 2 and Fig. 2 revealed that all spraying with 5 or 10 ppm CPPU after one week, two weeks or three weeks of full bloom had significantly affected fruit drop in the two seasons for Hollywood and Santarosa plum cultivars. The minimum values were recorded on trees sprayed with 5 or 10 ppm CPPU after one week of full bloom. The highest significant values of fruit drop followed in an ascending order were obtained by spraying with 5 or 10 ppm CPPU after two weeks of full bloom. Whatever, the maximum values were significantly obtained from control in both seasons for the two cultivars. These results are agreed with Jindal and Sharma (1986) on plum, Biasl *et al.* (1991) and Lowes and Woolley (1992) on Kiwi, Kabeel (1999) on persimmon and Guirguis *et al.* (2003) on pear trees.

Tree yield

Data in Table 3 and Fig. 3 revealed that spraying with 5 or 10 ppm CPPU after one week, two weeks or three weeks of full bloom had significantly effect on tree yield in the both seasons for Hollywood and Santarosa plum cultivars. The maximum values were recorded of trees sprayed with 5 or 10 ppm CPPU after one week of full bloom followed in a descending order by spraying with 5 or 10 ppm CPPU after two weeks of full bloom. Whatever, the minimum significant values were obtained from control in both seasons for the two cultivars under study.

Results of this study are in harmony with those reported by El-Barkooky (1985) and Greene (1989) on apple; Jindal and Sharma (1986) on plum, Biasl *et al.* (1991) and Lowes and Woolley (1992) on Kiwi, Kabeel (1999) on persimmon and Guirguis *et al.* (2003) on pear trees.

Fruit weight

As shown in Table 4 and Fig. 4 it is appeared that spraying with 5 or 10 ppm CPPU after one week, two weeks or three weeks of full bloom had significantly affected fruit weight in the both seasons for Hollywood and Santarosa plum cultivars. It was found that spraying with 5 or 10 ppm CPPU after one week of full bloom revealed the highest values of fruit weight followed by spraying with 5 or 10 ppm CPPU after two weeks of full bloom, whereas, the lowest values were obtained from control in both seasons for the two cultivars.

TABLE 2. Effect of different CPPU treatments on fruit drop (%) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons .

Treatments	2012 season		2013 season	
	Hollywood	Santarosa	Hollywood	Santarosa
CPPU (5 ppm) after one week	60.38	47.17	65.34	48.19
CPPU (5 ppm) after two week	61.93	47.35	67.00	48.37
CPPU (5 ppm) after three week	64.93	47.92	70.25	48.96
CPPU (10 ppm) after one week	57.38	46.52	62.08	47.52
CPPU (10 ppm) after two week	60.40	47.09	65.35	48.11
CPPU (10 ppm) after three week	63.42	47.42	68.62	48.44
Control	66.46	49.07	71.73	50.02
LSD at (0.05) =	0.43	0.28	0.61	0.40

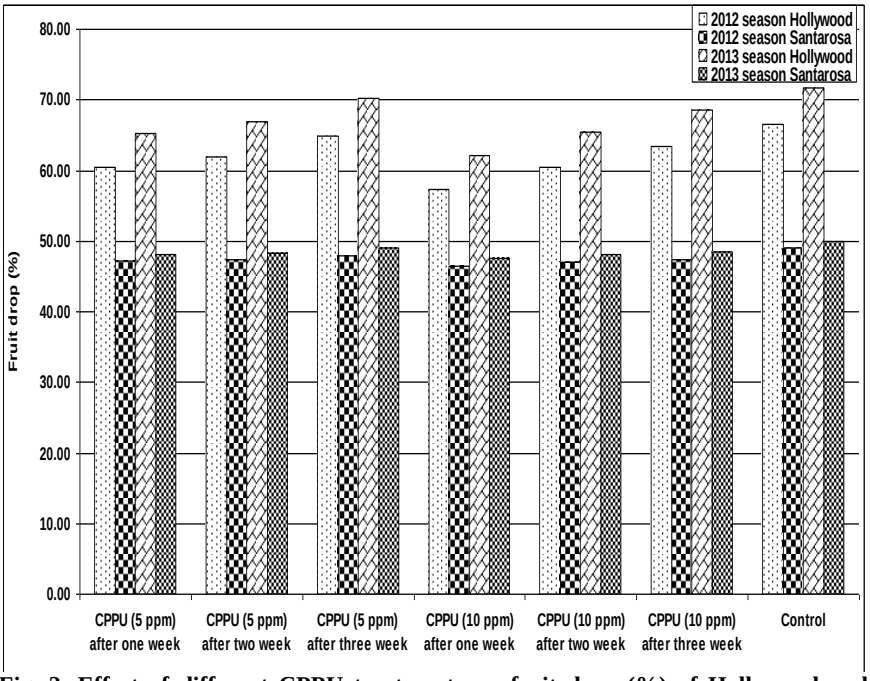

Fig. 2. Effect of different CPPU treatments on fruit drop (%) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons.

TABLE 3. Effect of different CPPU treatments on yield/tree (kgs) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons .

Treatments	2012 season		2013 season	
	Hollywood	Santarosa	Hollywood	Santarosa
CPPU (5 ppm) after one week	17.02	20.12	19.06	25.47
CPPU (5 ppm) after two week	16.79	19.34	18.80	24.49
CPPU (5 ppm) after three week	16.33	18.21	18.29	23.05
CPPU (10 ppm) after one week	17.33	20.25	19.40	25.64
CPPU (10 ppm) after two week	17.16	19.91	19.22	25.21
CPPU (10 ppm) after three week	16.39	19.15	18.36	24.24
Control	14.61	15.56	16.48	19.92
LSD at (0.05) =	1.27	2.17	1.30	2.51

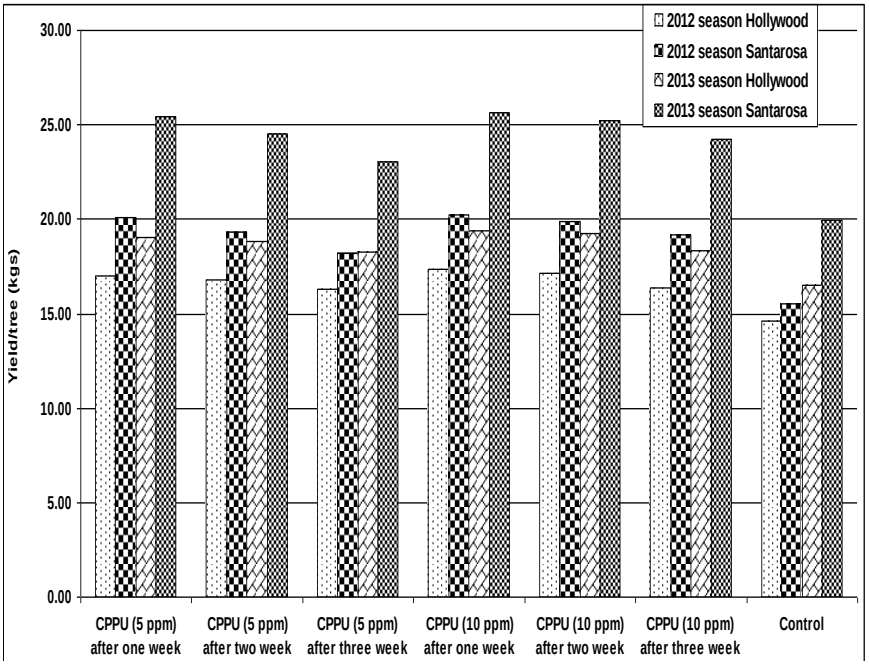

Fig. 3. Effect of different CPPU treatments on yield/tree (kgs) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons .

TABLE 4. Effect of different CPPU treatments on fruit weight (gm) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons .

Treatments	2012 season		2013 season	
	Hollywood	Santarosa	Hollywood	Santarosa
CPPU (5 ppm) after one week	49.86	27.56	58.51	32.34
CPPU (5 ppm) after two week	49.18	26.50	57.72	31.10
CPPU (5 ppm) after three week	47.85	24.94	56.15	29.27
CPPU (10 ppm) after one week	50.76	27.75	59.57	32.56
CPPU (10 ppm) after two week	50.28	27.28	59.01	32.02
CPPU (10 ppm) after three week	48.03	26.23	56.36	30.79
Control	42.81	21.31	50.60	25.30
LSD at (0.05) =	3.71	2.97	3.98	3.19

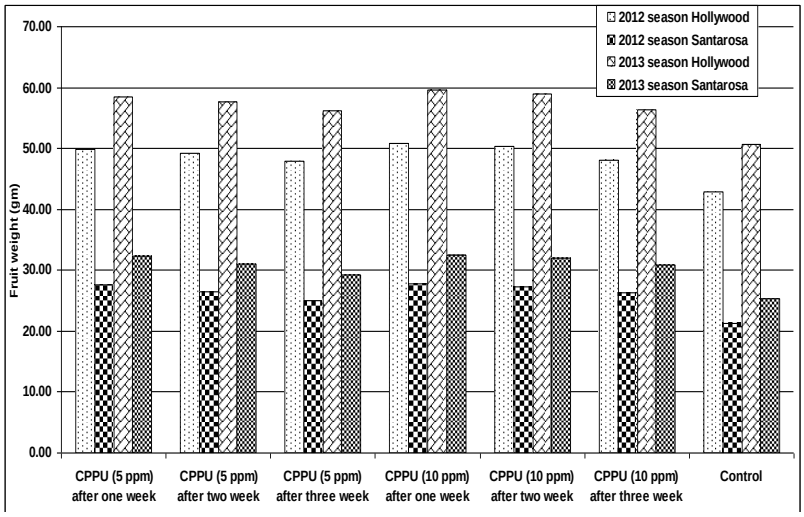

Fig. 4. Effect of different CPPU treatments on fruit weight (gm) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons

These results were in line with those obtained by El-Barkooky (1985) and Greene (1989) on apple, Jindal and Sharma (1986) on plum, Biasl *et al.* (1991) and Lowes and Woolley (1992) on Kiwi, Kabeel (1999) on persimmon and Guirguis *et al.* (2003) on pear trees.

Fruit size

Data in Table 5 and Fig.5 revealed that spraying CPPU at 5 or 10 ppm CPPU after one week, two weeks or three weeks of full bloom had obviously effect on fruit size in the both seasons for Hollywood and Santarosa plum cultivars. The maximum values were obtained from trees sprayed with 5 or 10 ppm CPPU after one week of full bloom followed in a descending order by spraying with 5 or 10 ppm CPPU after two weeks of full bloom. The minimum values were obtained from control in both seasons for the two cultivars under study.

Results of this study are in harmony with those reported by El-Barkooky (1985) and Greene (1989) on apple, Jindal and Sharma (1986) on plum, Biasl *et al.* (1991) and Lowes and Woolley (1992) on Kiwi, Kabeel (1999) on persimmon and Guirguis *et al.* (2003) on pear trees.

Fruit length

As shown in Table 6 and Fig. 6 it is apparent that spraying with 5 or 10 ppm of CPPU after one week, two weeks or three weeks of full bloom significantly affected fruit length in the both seasons for Hollywood and Santarosa plum cultivars. It was found that spraying with 5 or 10 ppm CPPU after one week of full bloom recorded the highest values of fruit length followed by spraying with 5 or 10 ppm CPPU after two weeks of full bloom. Whereas, the lowest values were obtained from control in both seasons for the two cultivars under study.

TABLE 5. Effect of different CPPU treatments on fruit size (cm3) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons .

Treatments	2012 season		2013 season	
	Hollywood	Santarosa	Hollywood	Santarosa
CPPU (5 ppm) after one week	48.00	25.60	56.33	30.04
CPPU (5 ppm) after two week	47.00	25.13	55.15	29.49
CPPU (5 ppm) after three week	46.67	24.33	54.76	28.56
CPPU (10 ppm) after one week	49.67	26.00	58.28	30.51
CPPU (10 ppm) after two week	48.33	25.53	56.72	29.96
CPPU (10 ppm) after three week	46.93	24.60	55.08	28.87
Control	43.10	22.16	50.80	26.15
LSD at (0.05) =	2.23	1.49	2.39	1.60

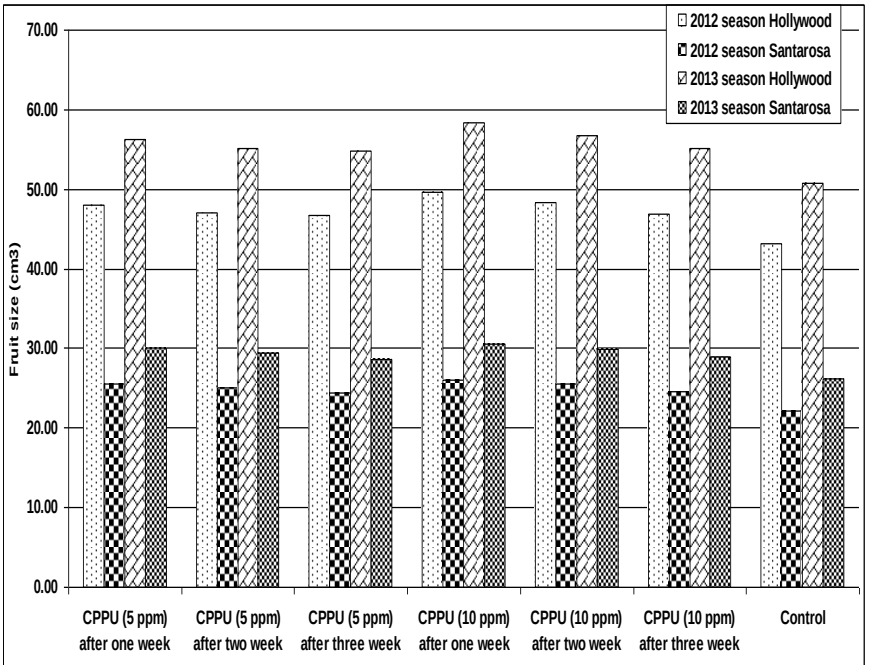

Fig. 5. Effect of different CPPU treatments on fruit size (cm3) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons.

TABLE 6. Effect of different CPPU treatments on fruit length (cm) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons.

Treatments	2012 season		2013 season	
	Hollywood	Santarosa	Hollywood	Santarosa
CPPU (5 ppm) after one week	4.35	3.32	4.89	3.73
CPPU (5 ppm) after two week	4.28	3.25	4.81	3.65
CPPU (5 ppm) after three week	4.25	3.23	4.77	3.63
CPPU (10 ppm) after one week	4.42	3.33	4.96	3.75
CPPU (10 ppm) after two week	4.30	3.28	4.83	3.69
CPPU (10 ppm) after three week	4.27	3.27	4.80	3.67
Control	4.09	3.12	4.58	3.49
LSD at (0.05) =	0.03	0.02	0.05	0.03

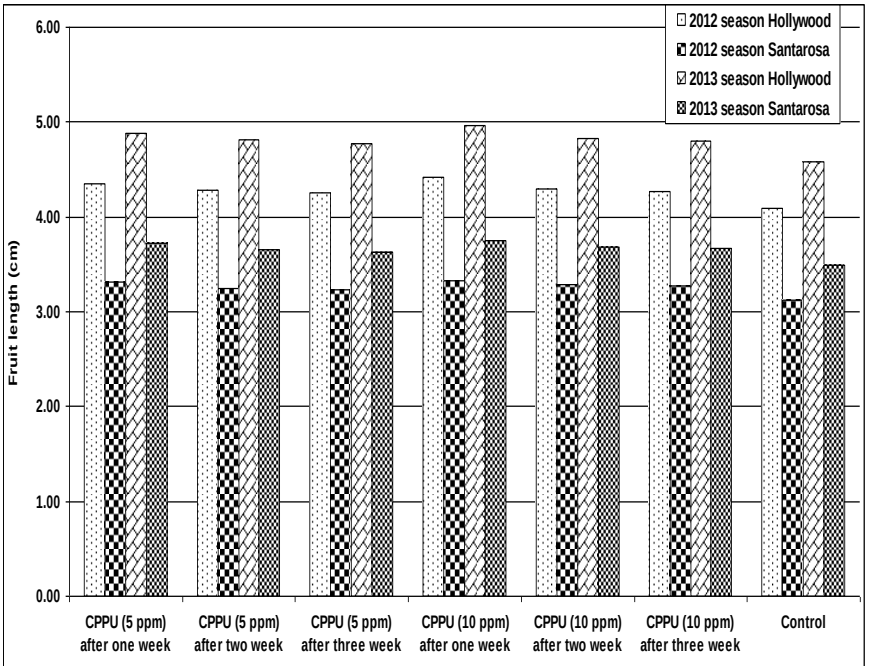

Fig. 6. Effect of different CPPU treatments on fruit length (cm) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons.

These results are agreed with Jindal and Sharma (1986) on plum, Biasl *et al.* (1991) and Lowes and Woolley (1992) on Kiwi, Kabeel (1999) on persimmon and Guirguis *et al.* (2003) on pear trees.

Fruit diameter

Data in Table 7 and Fig. 7 revealed that all spraying with 5 or 10 ppm CPPU after one week, two weeks or three weeks of full bloom had significantly effect on fruit diameter in both seasons for Hollywood and Santarosa plum cultivars. The maximum values were significantly noticed on trees sprayed with 5 or 10 ppm CPPU after one week of full bloom followed in a descending order by spraying with 5 or 10 ppm CPPU after two weeks of full bloom. The minimum significant values were obtained from control in both seasons for the two cultivars under study.

These results were in line with those obtained by Jindal and Sharma (1986) on plum, Biasl *et al.* (1991) and Lowes and Woolley (1992) on Kiwi, Kabeel (1999) on persimmon and Guirguis *et al.* (2003) on pear trees.

Fruit firmness

As shown in Table 8 and Fig. 8 it is apparent that spraying with 5 or 10 ppm CPPU after one week, two weeks or three weeks of full bloom had significantly affect on fruit firmness in the both seasons for Hollywood and Santarosa plum cultivars. It was found that spraying with 5 or 10 ppm CPPU after one week of full bloom recorded the highest values of fruit firmness followed by spraying with 5 or 10 ppm CPPU after two weeks of full bloom. Whereas, the lowest significant values were obtained from control in both seasons for the two cultivars.

Results of this study are in harmony with those reported by Jindal and Sharma (1986) on plum, Biasl *et al.* (1991) and Lowes and Woolley (1992) on Kiwi, Kabeel (1999) on persimmon and Guirguis *et al.* (2003) on pear trees.

Fruit TSS

Data in Table 9 and Fig. 9 revealed that all spraying with 5 or 10 ppm CPPU after one week and two weeks of full bloom significantly affected fruit TSS in the two seasons for Hollywood and Santarosa plum cultivars. The minimum significant values were recorded on trees sprayed with 5 or 10 ppm CPPU after one week and two weeks of full bloom followed in an ascending order by spraying with 5 or 10 ppm CPPU after three weeks of full bloom. While, the maximum values were obtained from control in both seasons for the two cultivars. These results are agreed with Lowes and Woolley (1992) on Kiwi, Kabeel (1999) on persimmon and Guirguis *et al.*, (2003) on pear trees.

TABLE 7. Effect of different CPPU treatments on fruit diameter (cm) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons .

Treatments	2012 season		2013 season	
	Hollywood	Santarosa	Hollywood	Santarosa
CPPU (5 ppm) after one week	4.27	3.82	4.80	4.29
CPPU (5 ppm) after two week	4.21	3.77	4.73	4.23
CPPU (5 ppm) after three week	4.18	2.92	4.70	3.28
CPPU (10 ppm) after one week	4.33	3.91	4.87	4.39
CPPU (10 ppm) after two week	4.29	3.85	4.82	4.33
CPPU (10 ppm) after three week	4.24	3.03	4.76	3.41
Control	4.04	2.80	4.51	3.14
LSD at (0.05) =	0.02	0.03	0.05	0.04

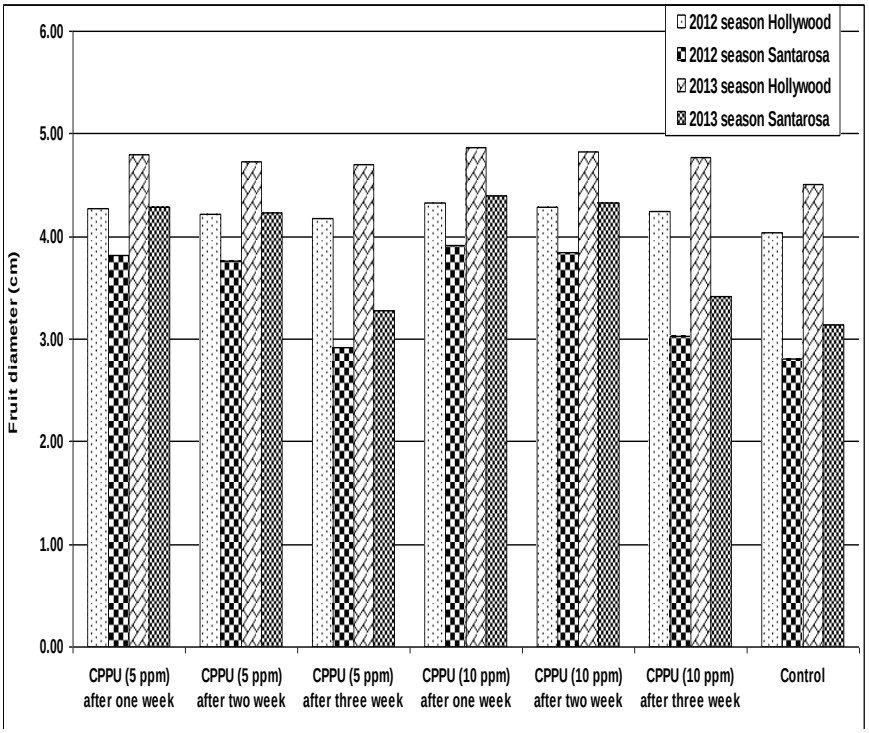

Fig. 7. Effect of different CPPU treatments on fruit diameter (cm) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons .

TABLE 8. Effect of different CPPU treatments on fruit firmness (Ib/inch2) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons .

Treatments	2012 season		2013 season	
	Hollywood	Santarosa	Hollywood	Santarosa
CPPU (5 ppm) after one week	2.74	1.44	2.85	1.50
CPPU (5 ppm) after two week	2.19	1.37	2.28	1.42
CPPU (5 ppm) after three week	1.32	1.32	1.37	1.38
CPPU (10 ppm) after one week	2.97	2.28	3.09	2.37
CPPU (10 ppm) after two week	2.53	2.13	2.63	2.21
CPPU (10 ppm) after three week	1.64	1.95	1.71	2.03
Control	1.13	1.16	1.15	1.18
LSD at (0.05) =	0.15	0.13	0.19	0.16

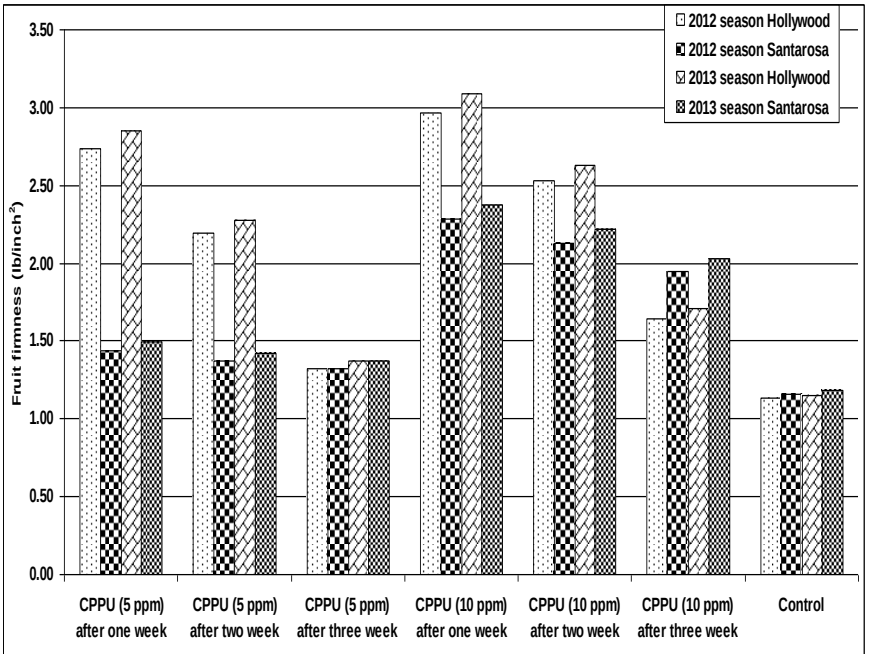

Fig. 8. Effect of different CPPU treatments on fruit firmness (Ib/inch2) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons.

TABLE 9. Effect of different CPPU treatments on fruit TSS (%) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons .

Treatments	2012 season		2013 season	
	Hollywood	Santarosa	Hollywood	Santarosa
CPPU (5 ppm) after one week	13.33	11.59	13.96	12.14
CPPU (5 ppm) after two week	13.67	11.63	14.32	12.18
CPPU (5 ppm) after three week	14.33	11.78	15.01	12.33
CPPU (10 ppm) after one week	12.67	11.43	13.27	11.97
CPPU (10 ppm) after two week	13.33	11.57	13.96	12.12
CPPU (10 ppm) after three week	14.00	11.65	14.66	12.20
Control	14.67	12.06	15.33	12.60
LSD at (0.05) =	0.09	0.07	0.13	0.10

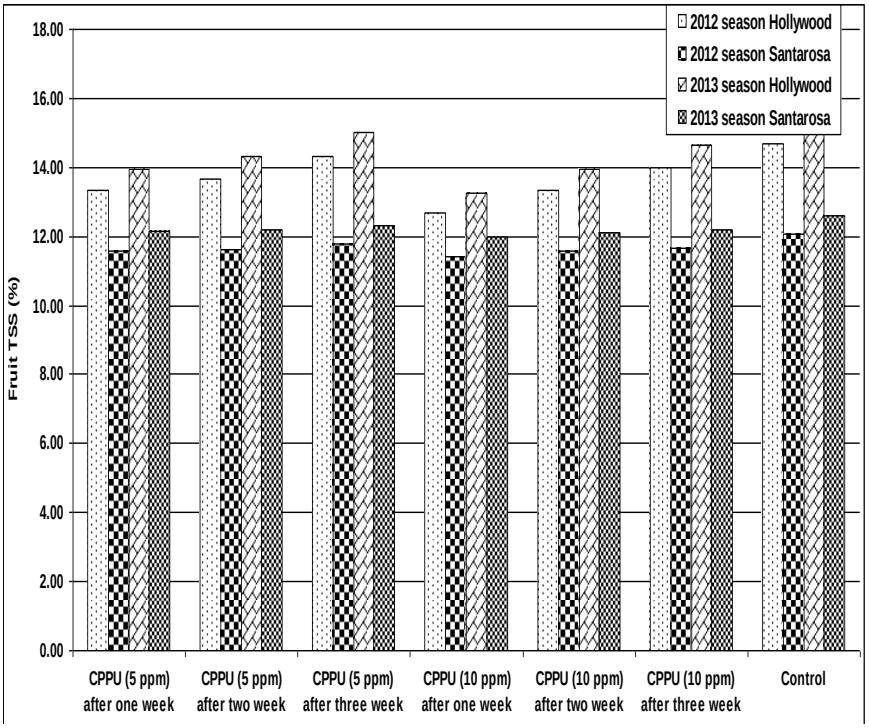

Fig. 9. Effect of different CPPU treatments on fruit TSS (%) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons.

Fruit acidity

As shown in Table 10 and Fig. 10 it is apparent that spraying 5 or 10 ppm of CPPU after one week, two weeks or three weeks of full bloom had significantly affect on fruit acidity in the two seasons for Hollywood and Santarosa plum cultivars. It was found that spraying 5 or 10 ppm CPPU after one week of full bloom recorded the highest values of fruit acidity followed by spraying with 5 or 10 ppm CPPU after two and three weeks of full bloom, whereas, the lowest values were obtained from control in the both seasons for the two cultivars.

These results were in line with those obtained by Jindal and Sharma (1986) on plum, Biasl *et al.* (1991) and Lowes and Woolley (1992) on Kiwi, Kabeel (1999) on persimmon and Guirguis *et al.* (2003) on pear trees.

TABLE 10. Effect of different CPPU treatments on fruit acidity (%) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons .

Treatments	2012 season		2013 season	
	Hollywood	Santarosa	Hollywood	Santarosa
CPPU (5 ppm) after one week	1.67	2.43	1.72	2.51
CPPU (5 ppm) after two week	1.33	2.36	1.37	2.43
CPPU (5 ppm) after three week	1.08	2.21	1.11	2.28
CPPU (10 ppm) after one week	1.74	2.87	1.79	2.96
CPPU (10 ppm) after two week	1.49	2.74	1.54	2.82
CPPU (10 ppm) after three week	1.17	2.65	1.21	2.73
Control	0.97	2.10	1.00	2.14
LSD at (0.05) =	0.08	0.05	0.09	0.07

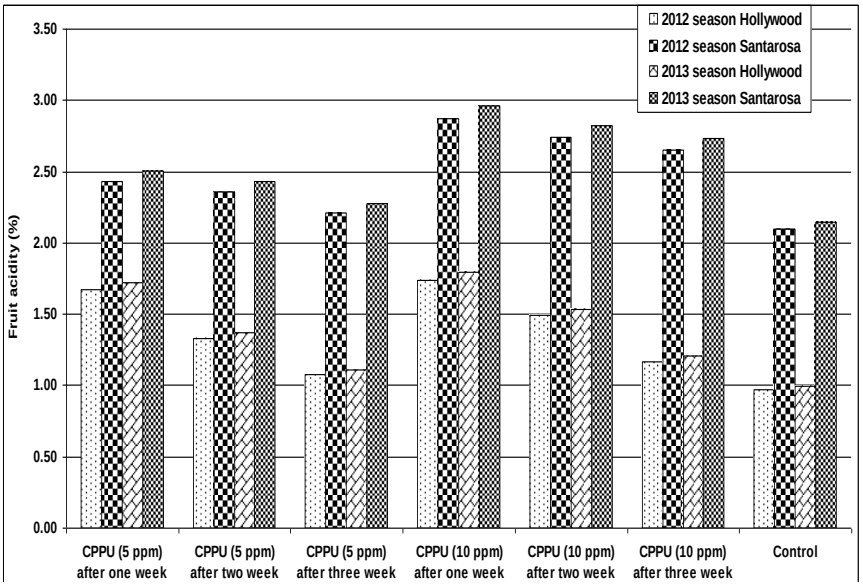

Fig. 10. Effect of different CPPU treatments on fruit acidity (%) of Hollywood and Santarosa plum cultivars at 2012 and 2013 seasons .

Conclusion

From the previous results, it seemed that spraying 5 or 10 ppm of CPPU after one week of full bloom recorded the highest significant values of fruit set, tree yield, fruit weight, size, length, diameter, firmness and acidity and the lowest significant values of fruit drop and TSS%, whereas, control recorded the lowest significant values of fruit set, tree yield, fruit weight, size, length, diameter, firmness and acidity and the highest values of fruit drop and TSS% in the both seasons for the two cultivars. So, we recommend to spray 5 or 10 ppm of CPPU one week after full bloom to increase fruit set and yield, decrease fruit drop and to improve fruit characteristics.

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تأثير السيتوفكس على عقد وتساقط الثمار والمحصول وجودة الثمار لصنفى البرقوق الهوليود والسانتا روزا

سامية أيوب أسعد
معهد بحوث البســاتين – مركز البحوث الزراعية – القاهرة – مصر.

تم اجراء البحث خلال موسمى ٢٠١٢ و٢٠١٣ على أشجار برقوق عمر ١٠ سنوات صنفي (هوليود و سانتا روزا) فى مزرعة برقوق خاصة فى محافظة المنوفية. حيث تم رش CPPU بتركيز ٥ و ١٠ جزء/مليون فى ثلاثة مواعيد (بعد قمة التزهير بأسبوع، وأسبوعين، وثلاثة أسابيع).

وقد أشارت النتائج إلى أن رش CPPU بتركيز ٥ و ١٠ جزء/مليون بعد قمة التزهير بأسبوع سجلت أعلى القيم لنسبة العقد والمحصول ووزن وحجم وأبعاد وصلابة وحموضة الثمار وأقل القيم بالنسبة إلى نسبة تساقط الثمار ونسبة المواد الصلبة الذائبة الكلية، بينما أشجار الكنترول سجلت أقل القيم بالنسبة للمحصول ونسبة العقد ووزن وحجم وأبعاد وصلابة وحموضة الثمار وأعلى القيم فيما يخص نسبة تساقط الثمار ونسبة المواد الصلبة الذائبة الكلية.

وعليه فإن الدراسة توصى برش CPPU بتركيز ٥ و ١٠ جزء/مليون بعد قمة التزهير بأسبوع لزيادة العقد وتقليل التساقط وزيادة المحصول وتحسين المواصفات الثمرية.