

Effect of Decapitation and Suckers Removal on Growth and Yield Traits of Pomegranate *Punica granatum* L. Cv. Salimi Sekhi, Y. S.

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ABSTRACT

An experiment was conducted out at a private orchard from Baharke town of Erbil province during 2016 season on pomegranate cv. Salimi. The age of trees was 13 years. Branches of one year old branches decapitated in February with three levels of 25, 50 and 75%. Suckers also were removed once in Feb, April and June. Results showed that 50% decapitation of branches + removal for twice of suckers gave the highest average for all vegetative and fruit traits as branches length and diameter, leaf area, leaf dry material and fruit size of 25.21cm, 25.13mm, 8.001cm², 84.86%, 107.0 fruit tree⁻¹ and 33.23mm respectively. Furthermore this treatment reduced fruit drop percentage up to 4.33 %. It could be extracted that deputation and sucker removal were efficient to improve growth and yield components. Thus, accordingly, it is necessary to apply decapitation and removal of suckers to increase fruit yield of pomegranates.

Keywords: decapitation, pomegranate, suckers, removal, growth traits.

INTRODUCTION

Pomegranate *Punica granatum* L., is member of puniceae family under Genus of *Punica*, which involved two species grew in tropical and subtropical regions and represented the common and ornamental pomegranate. Whereas, the second species is *Punica protopunica* grown on Sumatra Iceland. This species is non palatable, but it is eaten by Sumatran population (Alfred, 1981 and Bose, 1986). Cultivation of pomegranate is distributed in world wide as IRAQ, Iran (original), Arab peninsula, Palestine, North Africa, South Europe and Asia (Al-jumaily and Abou-Saad, 1990). Economic value of pomegranate represented by longevity over-counter in markets, translocation for remote distances and potentiality of storage for long time with conservation of nutritional value (Al-dulaimy, 1999 and Martin 1995). Furthermore, Fruits contain various nutritional components as water, carbohydrate, Vit.C, proteins, and minerals (Kumar, 1990). Moreover, pomegranate possesses medicinal properties, which used for caring some diseases as spasmodic and stomach pains (Al-dulaimy, 1999). Decapitation is considered as important process that cause increase of production and improving the quality (Al-jumaily and Abou-alsaad, 1990, Alshemary, 2013). This study was laid out to investigate the effect of deputation and suckers removal on some vegetative and fruit grant of pomegranate cv. Salimi.

MATERIALS AND METHODS

The experiment was laid out on a private orchard in Baharka town Erbil province (North Iraq) during 2016 season to investigate the effect of decapitation intensity, sucker removal and their combinations on vegetative and fruit growth properties of pomegranate cv. Salimi. Thirty trees at 13 years old were chosen and uniform as possible. The trees were cultivated at 4x4 m. All process were applied as irrigation, fertilization and pest control as it was necessary. Site soil was analyzed for chemical and physical properties (Table 1). Ten treatments were randomly distributed under RCB design. Each treatment included three trees and each tree was considered as replicate.

Decapitation treatments were applied at the rate of 25, 50 and 75 % in the beginning of Feb. (Al-mensoury and Alhadeethy, 2014), whereas sucker, were removal for once in Feb., for twice in April and for thrice in June as below:

T0: branches without decapitation and non-suckers' removal

T1 & T2 and T3: deputation of 25.50 and 75% respectively for branches with 1y old.

T4: T5 and T6: removal of suckers for once, twice and thrice, respectively.

T7: 25% deputation + once suckers removal.

T8: 50% deputation + once suckers removal.

T9: 75% deputation + once suckers removal.

Table 1. Some chemical and physical properties for field soil of experiment

Property	Value	Unite
Sand	9.5	%
Clay	42.3	%
Silt	48.2	%
Soil texture	Salty clayey	Sc
pH	7.7	-
EC	0.3	Ds. ⁻¹
OM	1.0	%
Total N.	0.17	mg.kg ⁻¹
Avail. P	7.2	mg.kg ⁻¹
Avail. K	180	mg.kg ⁻¹

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EC = Electrical conductivity.

OM = Organic matter.

Measured Traits;

Leaf area (cm²): Fully expanded 20 leaves were collected, which represented all aspects of tree (Alsahaf, 1989) with a various heights on August. Leaf area was measured by leaf area meter.

Branches length (cm): was measure at ending of growth season.

Branches diameter (mm): was calculated using vernier caliper at ending of growth season.

Dry material % in leaf: 10 leaves were taken from each treatment from middle of branches then desiccated using electrical oven 70°C up to stabilize the weight. The percentage of dry material was calculated using equation below:

$$\text{Biomass \%} = (\text{dry weight} / \text{fresh weight}) \times 100$$

(Alsahaf, 1989)

Ripening fruit number per tree (Fruit tree⁻¹).

Fruit size average: was calculated using graded cylinder (Al-dulaimy and Kfeish, 2015).

Drop fruity %: was measured using the equation below:

$$\text{Drop fruit \%} = (\text{Drop Fruit No.} / \text{Total Fruit No.}) \times 100$$

Statistical analysis

Means were worked out then compared using LSD test under probability of 0.05 (Almohammed and Almohammed, 2012).

RESULTS AND DISCUSSION

Results pointed that 50% of decapitation X twice suckers removal significantly increased the average of branches length, branch diameter, leaf area and OM %of 25.21 cm, 25.13 mm, 8.00 cm² and 84.86%, respectively. In contrast, once suckers removal gave the lowest averages of 17.56 cm, 18.75 cm, 18.75, 4.04 cm² and 66.08 % for each trait, respectively (Table 2).

Table 2. Effect of decapitation and suckers removal on some vegetative traits of pomegranate c.v. salami

Treatment (Ti)	Branch length (cm)	Branch diameter (mm)	Leaf area (cm ²)	O.A.A (%)
T0	17.56	18.75	4.29	66.08
T1	20.47	18.35	4.26	69.69
T2	19.49	15.77	5.74	68.45
T3	17.22	17.56	5.00	68.56
T4	18.30	18.28	4.04	68.92
T5	19.86	20.97	4.11	70.85
T6	20.81	21.06	4.98	71.17
T7	20.81	21.39	5.78	69.83
T8	25.21	25.13	8.01	84.86
T9	20.53	20.45	5.78	73.13
LSD _{0.05}	2.84	3.26	1.97	6.79

These results could be interpreted there by that decapitation led to accumulate assimilates from source leaves in limited parts by removal others (Salvatava, 2006) and resulted in reduction of consumption of nutritional materials. So, leaf area was increased by decapitation. Thus, synthesized carbohydrates that produced in leaves via low energy due to surplus parts removal were maximized them positively effect on vegetative growth improvement as seen from (table 2). Furthermore, table revealed that branch length, branch diameter, leaf are and organic matter were positively improved where they could be associated with each other reflected in general improvement. Moreover, synthesized materials were translocated into roots resulted in improvement growth and root activity for absorbing nutrients as growth regulator form ones (Alsheikh, 2003). In turns, so sucker removal for once in February that it is previous tree growth and simplest flux in April, which represented the peak of vegetative activity positively reflected in translocation of synthesized materials from leaves into activity zone in branches and new leaves instead of its consumption by suckers those considered as strong compete or with branches on produced food materials (Al-mansoury and Alhadeethy, 2014).

Table 3 showed that 50% decapitation x twice sucker removal achieved significant increase on fruit No. and size 107.0 fruit.tree⁻¹ and 23.33mm, respectively. It also reduced fruit drop up to 4.33%. Whereas control

recorded low average of fruit No. and size of 47.0 fruit tree¹ and 13mm, respectively. While fruit drop was increased with control by 20.33%.

Thus these results could be explained by effectiveness of 50% decapitation x twice sucker removal led to improve the vegetative growth of pomegranate (Table2) positively resulted in improvement of yield components (Khalil and Raheed, 2005).

Therefore, it could be desired that sucker removal of pomegranate cv. Salimi with decapitation of outliers of 8.01, from total branches contributed on serving adequate synthases for trees growth led to improve the yield and its components by minimizing the fruit dropping.

Table 3 . Effect of decapitation and suckers removal on fruit No., fruit size and fruit drop % of pomegranate c.v. salami.

Treatment (Ti)	Fruit No. (Fruit.Tree ⁻¹)	Fruit size (mm)	Fruit drop (%)
T ₀	47.0	13.00	20.33
T ₁	52.3	14.67	19.00
T ₂	53.7	15.00	17.33
T ₃	56.0	17.67	16.67
T ₄	50.0	16.67	14.33
T ₅	63.3	15.33	14.00
T ₆	65.7	15.67	14.33
T ₇	69.3	17.33	9.67
T ₈	107.0	23.33	4.33
T ₉	81.0	19.00	6.33
LSD _{0.05}	15.20	3.666	1.989

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تأثير تقليم التقصير وإزالة السرطانات في بعض صفات النمو و الحاصل للرمان صنف سليمي (punica granatum)
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أجريت هذه التجربة في أحد البساتين الخاصة في ناحية بحركة محافظة أربيل للموسم 2016 على أشجار الرمان صنف سليمي بعمر 13 سنة حيث قصرت الأفرع التي بعمر سنة بشهر شباط 2016 بثلاث مستويات (75,50,25%) وكذلك أزيلت السرطانات على الخشب ثلاث مرات في شهر شباط وشهر أبريل وشهر يونيو. أظهرت النتائج تفوق معاملة (تقليم الأفرع بعمر سنة 50% + إزالة السرطانات مرتين) في الصفات الخضريّة والثمريّة, والتي أعطت أعلى معدل لطول وقطر الأفرع والمساحة الورقية ونسبة المادة الجافة وعدد وحجم الثمار وبلغت على التتابع (25,21 سم, 25.13 ملم, 8.001 سم³, 84,86%, 107.0 ثمرة/شجرة¹ و 33.23 ملم), كما وقللت بالمقابل من نسبة التساقط للثمار وبلغت 4,33%. يمكن أن نستنتج بان تقليم التقصير وإزالة السرطانات كانت فعالة في تحسين نمو ومكونات الحاصل للرمان, لذلك يمكن الاعتماد على هذه العوامل حيث من الضروري تطبيق تقليم التقصير وإزالة السرطانات لتحسين نمو وزيادة الحاصل لثمار الرمان.

الكلمات المفتاحية: تقليم, الرمان, السرطانات, إزالة السرطانات, صفات النمو.