EFFECT OF SPRAYING OF PROSOPIS FARCTA EXTRACT, FOLICIST AND ABO NAJEMH20 ON GROWTH OF POMEGRANATE TRANSPLANT VAR. WONDERFUL CALIFORNIA

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ABSTRACT

This investigation was carried out during growing season (2019-2020) in the lathhouse of College of Agricultural Engineering Sciences, University of Duhok, Kurdistan region, Iraq. To investigate the effect of spraying with Prosopis farcta (0, 100 and 200 ppm), Folicist (0, 50, and 100 ppm) and Abo-najemh20 (50, 75 and 150 ppm) on growth of Pomegranate transplant. The results show that the all studied parameters were increased by increasing the concentration of Prosopis farcta especially at (200 ppm) and Folicist at (100ppm) and Abo-najemh20 at (150ppm). The best interaction between Prosopis farcta and Folicist was (200ppm and 100 ppm) respectively. Also, the interaction of Prosopis farcta at 200ppm with Abo-najemh20 at 150ppm lead to enhancing most studied characteristics. And the interaction between Folicist at 100ppm + 150ppm had a significant difference in improving the studied parameters. However, in triple combinations it found that the Prosopis farcta at 200ppm + Folicist at 100ppm + Abo najemh20 at 150ppm was superior interaction compared with all other combination treatment including control treatment.

KEY WORDS: Pomegranate, Prosopis farcta, Folicist, Abo najemh20 and organic acid

1. INTRODUCTION

Pomegranate (Punica granatum L.), belonging to the family Punicaceae, is one of the favorite table fruits in the world, for its refreshing juice with nutritional value and medicinal purpose (Gosh et.al., 2009). Cultivation of Pomegranate now a day is considered a highly profitable and productive agriculture business in the world. It is widely cultivated throughout India, Iran, China, Turkey, USA, Spain, Azerbaijan, Armenia, Afghanistan, Uzbekistan, the Middle East, Pakistan, Tunisia and Israel, dry regions of Southeast Asia, Peninsular Malaysia, the East Indies and tropical Africa. The leading countries in the world for production of pomegranate were India (Sharma et.al., 2014). In Kurdistan region of Iraq, the pomegranate commercially had a significant value, even there were a wide range of preferred alternative fruits because of it uses in making shaperman (ketchup) and eating dried seeds of pomegranate fruits. Prosopis Lagonychium farcta genus is an underutilized legume plant that belongs to the Leguminosae family Its importance is a small fodder, but generally viewed as not more than an invasive herbs. (Pasiecznik et.al., 2004). Prosopis genus comprises 44 species, including P. juliflora, P. farcta, P. velutina, P. glandulosa, P. laevigata, P. pallida, P. cineraria, etc. The range of Prosopis farcta is similar to that of Prosopis cineraria from India to Iran, but then extends to the west and north. It is widespread in the Middle East, and is also found in Cyprus, Turkey, and Ukraine and along the North African coast as far as Algeria. No specific habitat preferences were observed, with a wide climatic range. (Pasiecznik et.al., 2004). Prosopis is mainly distributed in arid, semi-arid, tropical, and subtropical countries, such as America, India, Argentina, Chile, Kenya, and Pakistan (PASSIECZNIK, 2001). Prosopis faracta is a good source of phenolic compounds and flavonoids such as rutin, myricetin and caffeic acid derivatives (Harzallah-Skhiri & BenJannet, 2005) Folicist is used in many agricultural crops in order to improve seedling growth are required to achieve optimal growth and yield (Ziosi et.al., hasan.saleem@uod.ac
Folicist are reported to play a significant role in pomegranate (Chaudhari and Desai, 1993). Hence, an attempt has been made to find Folicist and their doses for improving fruit set and yield in pomegranate cv. Ruby, under West Bengal conditions (Chaudhari & Desai, 1993). The most important components of organic matter have been reported in Abo-Najemh20. Which was a strong role in increasing microbial activity, it is considered as a bio-stimulant for plant growth; Promotes absorption of nutrients as a chelating agent and improves vegetative properties, nutritional status and leaf pigments (Eissa Fawzia et.al., 2007).

The aim of this study was to improve the quality of pomegranate seedling to be ready for budding and grafting for next year this by using Prosopis farcta Extract, Folicist and Abo najemh20. Also, to determine the effect of Prosopis farcta Extract, Folicist and Abo najemh20 had a significant effect on increasing the height of pomegranate transplant as compared with control, the same effect was found with Folicist and abo-Najem h20. The height of pomegranate transplant in interactions between Prosopis farcta and Folicist got highest value with 200 ppm Prosopis farcta and 100 ppm Folicist which was (143.22 cm) as compared with other interactions, the superior interactions that affecting transplant height was between (200 ppm Prosopis farcta + 150 ppm Abo-Najemh20) (100 ppm Folicist + 150 ppm Abo-Najemh20) which were (137.78 cm) (137.89 cm) respectively. The triple interaction between Prosopis farcta, Folicist and Abo-Najemh20 had a significant effect in enhancing the height of pomegranate transplants especially at (200 ppm Prosopis farcta, 100 ppm Folicist and 150 ppm Abo-Najemh20) which record (150 cm) compared with all other combinations treatments and control treatment which record (94.67 cm).

### Table 1: Effect of Prosopis farcta, Folicist and Abo najemh20 and their interactions on Hight (cm) of Pomegranate transplant

| Prosopis farcta (ppm) | Folicist (ppm) | Abo-najemh20 0 ppm | Abo-najemh20 75 ppm | Abo-najemh20 150 ppm | Prosopis farcta * Folicist | Prosopis farcta |
|----------------------|--------------|-------------------|--------------------|---------------------|-------------------------|-----------------|
| 0                    | 0            | 94.67 m           | 99.00 lm           | 102.67 f            | 98.78 h                 | 112.93 c        |
| 50                   | 111.00 k     | 116.33 j          | 119.67 h-j         | 115.67 g            |                         |                 |
| 100                  | 122.33 f-l   | 123.00 f-i        | 127.67 d-f         | 124.33 a            |                         |                 |
| 100                  | 117.67 l-j   | 121.00 g-j        | 121.67 g-j         | 120.11 f            |                         | 126.93 b        |
| 50                   | 124.67 d-h   | 127.67 d-f        | 129.33 d-e         | 127.22 d            |                         |                 |
| 100                  | 129.67 d-c   | 134.67 c          | 136.00 c           | 133.44 c            |                         |                 |
| 200                  | 0            | 119.67 h-j        | 124.00 e-h         | 126.00 d-g          | 123.22 e                | 134.33 a        |
| 50                   | 135.67 c     | 136.67 b-c        | 137.33 b-c         | 136.56 b            |                         |                 |
| 100                  | 138.33 bc    | 141.33 b          | 150.00 a           | 143.22 a            |                         |                 |

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3.2. Stem diameter (mm)

It clearly shown in table 2 that the three studied factors play a significant role in improving the diameter of pomegranate transplant stems especially at high concentration as compared with untreated seedling. The stem diameter got highest value in dual interaction between (200 ppm Prosopis farcta + 100 ppm Folicist) which recorded (11.33 mm). the third concentration of both dual interactions (Prosopis farcta + Abo-najemh20) (Folicist + Abo-najemh20) as compared with control. The high value of stem diameter (12 mm) was acquired with 200 ppm Prosopis farcta, 100 ppm Folicist and 150 ppm Abo-Najemh20

| Prosopis farcta | Folicist | Abo-najemh20 | Abo-najemh20 | Abo-najemh20 | Prosopis farcta | Prosopis farcta |
|----------------|---------|--------------|--------------|--------------|----------------|----------------|
| 0 ppm | 0 | 6.17 j | 6.00 i | 6.83 k | 7.00 f | 8.00 c |
| 50 | 8.00 h | 8.17 gh | 8.50 gh | 8.22 e |
| 100 | 8.67 f-h | 8.67 f-h | 9.00 fg | 8.78 d |
| 100 | 0 | 8.17 gh | 9.00 fg | 9.50 ef | 8.89 d |
| 50 | 10.00 de | 10.00 de | 10.33 c-e | 10.11 c |
| 100 | 10.67 b-d | 11.00 bc | 10.67 b-d | 10.44 bc |
| 100 | 10.33 c-e | 11.00 bc | 10.33 c-e | 10.56 bc |
| 100 | 10.67 b-d | 11.33 ab | 12.00 a | 11.33 a |
| 100 | 10.67 b-d | 11.33 ab | 12.00 a | 11.33 a |

Means of each factor and their interactions followed with the same letters are not significantly different from each other’s according to Duncans multiple range test at 5% level.

3.3. Number of Branches per transplant

The obtained data indicated a significant variation of Prosopis farcta in term of number of branches of pomegranate transplant. On contrary, the effect of Folicist was significant on number of branches with the supreme value measured for transplant supplied with (100 ppm) of Folicist which was (10.11) when compared with control and (50 ppm) of Folicist, the same effect was found in interaction between Folicist and Abo-najemh20. Regarding the triple interaction between treatments, the supreme number of branches (12.33 cm) was measured for (200 ppm Prosopis farcta, 100 ppm Folicist and 150 ppm Abo-Najemh20). As shown in (Table 3).
3.4. Number of leaves per one branch

Results in table (4) revealed a significant difference of Prosopis farcta concentrations of (200 ppm) in term of number of leaves per transplant. The same thing was true for the Folicist spraying influence and the leaf number was significantly differed from leaf number of control treatment. The Abo-najemh20 impact on number of leaves per transplant obtained a maximum average of number of leaves per transplant (134.70) in comparison with other treatments. Binary interaction of 200 ppm Prosopis farcta + 100 ppm Folicist lead to produce a maximum number of leaves. The interaction between Prosopis farcta and Abo-najemh20 had a significant effect of increasing the number of leaves per transplant compared with control treatment. The same is true for the interaction between Folicist and Abo-najemh20. The interaction among (200 ppm Prosopis farcta + 100 ppm Folicist + 150 ppm Abo-Najemh20) creates a maximum average of number of leaves which counted (147.00) as compared with all other combination treatments.

Table (3): Effect of Prosopis farcta, Folicist and Abo najemh20 and their interactions on Number of Branches of Pomegranate transplant

| Prosopis farcta | Folicist | Abo-najemh20 | Abo-najemh20 | Abo-najemh20 | Prosopis farcta | Prosopis farcta |
|----------------|---------|-------------|-------------|-------------|----------------|---------------|
| 0              | 0       | 3.33 k      | 5.00 i-k    | 6.33 f-j    | 4.89 d         | 6.93 b        |
| 50             | 5.00 i-k| 6.00 f-k    | 7.33 e-i    | 6.11 cd     |                |               |
| 100            | 8.33 d-g| 9.67 b-e    | 11.33 a-c   | 9.78 b      |                |               |
| 100            | 0       | 3.67 j-k    | 5.33 h-k    | 5.33 h-k    | 4.78 d         | 7.04 b        |
| 50             | 7.33 e-i| 7.33 e-i    | 7.67 e-i    | 7.44 c      |                |               |
| 100            | 6.33 f-j| 9.00 c-e    | 11.33 a-c   | 8.89 b      |                |               |
| 200            | 0       | 5.67 f-j    | 7.67 e-i    | 8.00 e-h    | 7.11 c         | 9.22 a        |
| 50             | 7.67 e-i| 9.00 c-e    | 10.00 a-e   | 8.89 b      |                |               |
| 100            | 10.67 a-d| 12.00 ab   | 12.33 a     | 11.67 a     |                |               |
| Abo-najemh20   | 6.44 c  | 7.89 b      | 8.85 a      | Folicist    |                |               |
| Prosopis farcta | 0       | 5.56 d      | 6.89 cd     | 8.33 bc     |                |               |
| * Abo-najemh20 | 100     | 5.78 d      | 7.22 c      | 8.11 c      |                |               |
| 200            | 8.00 c  | 9.56 ab     | 10.11 a     |            |                |               |
| Folicist       | 0       | 4.22 e      | 6.00 d      | 6.56 d      | 0              | 5.59 c        |
| * Abo-najemh20 | 50      | 6.67 d      | 7.44 cd     | 8.33 c      | 50             | 7.48 b        |
| 100            | 8.44 c  | 10.22 b     | 11.67 a     | 100         | 10.11 a        |               |

Means of each factor and their interactions followed with the same letters are not significantly different from each other’s according to Duncan’s multiple range test at 5% level.

Table (4): Effect of Prosopis farcta, Folicist and Abo najemh20 and their interactions on Number of Leaves of Pomegranate transplant

| Prosopis farcta | Folicist | Abo-najemh20 | Abo-najemh20 | Abo-najemh20 | Prosopis farcta | Prosopis farcta |
|----------------|---------|-------------|-------------|-------------|----------------|---------------|
| 0              | 0       | 118.33 m    | 124.67 kl   | 125.33 i-l  | 122.78 h       | 125.48 c      |
| 50             | 125.00 j-l| 125.00 j-l  | 128.33 g-i  | 126.11 g    |                |               |
| 100            | 125.00 j-l| 127.67 g-k  | 130.00 f-h  | 127.56 fg   |                |               |
| 100            | 0       | 124.33 l    | 128.00 g-j  | 132.67 ef   | 128.33 ef      | 129.44 b      |
| 50             | 127.33 h-l| 128.00 g-j  | 133.67 e    | 129.67 de   |                |               |
| 100            | 127.33 h-l| 130.67 e-g  | 133.00 ef   | 130.33 d    |                |               |
| 200            | 0       | 130.00 f-h  | 133.00 ef   | 137.33 d    | 133.44 c       | 140.44 a      |
| 50             | 140.67 c | 143.33 bc   | 145.00 ab   | 143.00 b    |                |               |
| 100            | 142.00 c | 145.67 ab   | 147.00 a    | 144.89 a    |                |               |
| Abo-najemh20   | 128.89 c | 131.78 b    | 134.70 a    | Folicist    |                |               |
| Prosopis farcta | 0       | 122.78 h    | 125.78 g    | 127.89 ef   |                |               |

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Means of each factor and their interactions followed with the same letters are not significantly different from each other’s according to Duncans multiple range test at 5% level.

3.5. Total Chlorophyll (SPAD)

The chlorophyll content in pomegranate transplant leaves had a significant difference with three studied factors especially at third concentration (200 ppm, 100 ppm and 150 ppm) (Prosopis farcta, Folicist and Abo-Najemh20) respectively. The Chlorophyll content in leaves in interaction between Prosopis farcta and Folicist got highest value with 200 ppm Prosopis farcta and 100 ppm Folicist which was (57.86 SPAD) as compared with other interactions, the superior interaction that affecting Chlorophyll was between (200 ppm Prosopis farcta + 150 ppm Abo-Najemh20) (100 ppm Folicist + 150 ppm Abo-Najemh20) which were (56.96 SPAD) (50.61 SPAD) respectively. The combined influence of the three factors on total chlorophyll percentage was profound and the record of the highest chlorophyll percentage in leaves (58.97 SPAD) belonged to (200 ppm Prosopis farcta + 100 ppm Folicist + 150 ppm Abo-Najemh20) treatments as seen in table (5).

Table (5): Effect of Prosopis farcta, Folicist and Abo najemh20 and their interactions on Chlorophyll content in leaves of Pomegranate transplant

| Prosopis farcta | Folicist | Abo-najemh20 | Abo-najemh20 | Abo-najemh20 | Prosopis farcta | Prosopis farcta |
|-----------------|---------|--------------|--------------|--------------|----------------|----------------|
|                 | 0 ppm   | 75 ppm       | 150 ppm      | 0 ppm        | 75 ppm         | 150 ppm        |
| 0               | 34.73 r | 35.70 qr     | 39.37 op     | 36.60 h      | 39.17 c        |
| 50              | 39.83 op| 39.20 op     | 37.73 pq     | 38.92 g      |
| 100             | 41.10 m-o| 43.53 k-m   | 41.33 m-o    | 41.99 f      |
| 100             | 39.10 op| 42.53 l-i-n | 44.73 j-i    | 42.12 f      | 45.21 b        |
| 50              | 40.83 no| 45.57 i-k    | 46.40 h-j    | 44.27 e      |
| 100             | 47.47 hi| 48.73 gh     | 51.53 ef     | 49.24 d      |
| 200             | 53.53 c-e| 55.33 b-d    | 55.93 bc    | 54.93 b      | 55.36 a        |
| 50              | 50.57 fg| 53.30 de     | 55.97 bc    | 53.28 bc     |
| 100             | 57.03 ab| 57.57 ab     | 58.97 a     | 57.86 a      |

Means of each factor and their interactions followed with the same letters are not significantly different from each other’s according to Duncans multiple range test at 5% level.

3.6. Number of Roots per transplant

The data in below table (6) show that the Prosopis farcta, Folicist and Abo-najemh20 with their concentrations lead to increase the number of roots per transplant. Also, the high concentration had a significant difference in dual interactions between the studied factors. In case of triple combination, it clearly found that the 200 ppm Prosopis farcta + 100 ppm Folicist + 150 ppm Abo-najemh20 was superior combination treatment affecting the number of roots per pomegranate transplant which recorded (12%) compared with control that was (3.67%).
Table (6): Effect of Prosopis farcta, Folicist and Abo najemh20 and their interactions on Root Number of Pomegranate transplant

| Prosopis farcta | Folicist | Abo-najemh20 0 ppm | Abo-najemh20 75 ppm | Abo-najemh20 150 ppm | Prosopis farcta * Abo-najemh20 | Prosopis farcta * Folicist |
|-----------------|---------|--------------------|---------------------|----------------------|-------------------------------|-------------------------|
| 0               | 0       | 3.67 n             | 5.67 k              | 6.33 j              | 5.22 f                        | 5.85 c                 |
| 50              | 4.33 mn | 6.33 jk            | 7.33 g-j            | 6.00 e              |                               |                        |
| 100             | 4.33 mn | 6.33 jk            | 8.33 e-g            | 6.33 e              |                               |                        |
| 100             | 0       | 4.00 mm            | 5.00 lm             | 6.67 i-k            | 5.22 f                        | 6.63 b                 |
| 50              | 5.00 lm | 7.67 f-i           | 8.33 e-g            | 7.00 d              |                               |                        |
| 100             | 6.67 i-k| 7.67 f-i           | 8.67 d-f            | 7.67 c              |                               |                        |
| 200             | 0       | 7.00 h-j           | 7.67 f-i            | 8.67 d-f            | 7.67 c                        | 9.30 a                 |
| 50              | 8.00 e-h| 9.00 de            | 9.67 cd             | 8.89 b              |                               |                        |
| 100             | 10.33 bc| 11.33 ab           | 12.00 a             | 11.22 a             |                               |                        |

Means of each factor and their interactions followed with the same letters are not significantly different from each other’s according to Duncans multiple range test at 5% level.

3.7. Root length (mm)

Table (7): Effect of Prosopis farcta, Folicist and Abo najemh20 and their interactions on Root length of Pomegranate transplant

| Prosopis farcta | Folicist | Abo-najemh20 0 ppm | Abo-najemh20 75 ppm | Abo-najemh20 150 ppm | Prosopis farcta * Abo-najemh20 | Prosopis farcta * Folicist |
|-----------------|---------|--------------------|---------------------|----------------------|-------------------------------|-------------------------|
| 0               | 0       | 11.00 p            | 15.00 o             | 18.00 n              | 14.67 f                       | 20.48 c                 |
| 50              | 21.00 im| 23.33 i-l          | 24.67 h-j           | 23.00 d              |                               |                        |
| 100             | 22.33 j-m| 22.00 k-m        | 27.00 e-h           | 23.78 d              |                               |                        |
| 100             | 0       | 12.00 p            | 17.33 n             | 20.67 m              | 16.67 e                       | 22.85 b                 |
| 50              | 23.67 i-k| 25.33 g-i         | 27.33 e-g           | 25.44 c              |                               |                        |
| 100             | 24.67 h-j| 26.33 f-h         | 28.33 ef            | 26.44 c              |                               |                        |
| 200             | 0       | 12.00 p            | 26.67 f-h           | 28.67 ef             | 22.44 d                       | 30.04 a                 |
| 50              | 29.33 e | 31.67 d            | 33.33 cd            | 31.44 b              |                               |                        |
| 100             | 34.67 bc| 36.33 ab           | 37.67 a             | 36.22 a              |                               |                        |

Means of each factor and their interactions followed with the same letters are not significantly different from each other’s according to Duncans multiple range test at 5% level.

The length of pomegranate transplant roots was strongly affected by spraying of Prosopis farcta, Folicist and Abo-Najemh20. The dual and triple interactions also play a significant role in improving the length of roots especially at third levels (high concentrations of studied factors).

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4. DISCUSSION

It is clear from data that in above tables, the effect of Folicist on growth of pomegranate transplant characteristics was positive effect in all studied parameters, the results may be due to the role of essential elements in transplants such as photosynthesis reactions, DNA metabolism, and protein and carbohydrate biosynthesis due to increased mineral content in leaves (Hafez & El-Metwally, 2007). Furthermore, folicist Enhances N uptake as well as improving photosynthesis in fruit trees. Nitrogen is known to be an essential component of many compounds in plants such as chlorophyll, nucleotides, proteins, alkaloids, enzymes, hormones, and vitamins. (Marschner, 2011; Saeed & Mayi 2016)

5. CONCLUSIONS

Based on the results in this study it found that the Prosopis farcta at 200 ppm had a significant difference compared with control affecting on all studied parameters. The spraying of Folicist and Abo-Najemh20 with their concentration also make high enhancement in most of studied parameters. The best dual interaction affecting studied parameters founded when using high concentration of three factors. Then, the interaction among 200 ppm of Prosopis farcta, 100 ppm of Folicist and 150 ppm of Abo-najem h 20 had a significant effect of all studied parameters.

So according to the obtained results it highly recommended to use the Prosopis farcta with other fruit trees or plants due to its positive effect on growth and it don’t lead to contaminate the environment.

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تأثیر روش مستخلص نبات الکل و فولیزیت و آبنجمه ات 20 علی نمو شتلات الکل صنف وندرفول

الخلاصة

اُجریت این الدراسه در موسم النمو 2019 – 2020 فی ظل الخشیبیة تابعه ل قسم الپینکیه، كلیة علوم الهندسة الزراعیة، جامعة دیورک، أقليم کردستان، العراق. ل معرفة تأثیر الرش ب مستخلص نبات الکل بتراکیز (0 100 جزء من الکل) وفولیزیت وندرفول (0 50 جزء من الکل) وآبنجمه 20 بتراکیز (0 75 150 جزء من الکل) علی شتلات الکل صنف وندرفول. أُظهِرت النتایج الکه بانه جميع الصفات المدروسة تحسنت تحتاً معاونیة ب تراکیز العالیة علی العوامل المخزونة وفی التداخل الثلاثی واثلثی

آیضاً هنالک تحسین فی الصفات المدروسه ب استعمال التراکیز العالیة علی الکل وفولیزیت وآبنجمه

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