RESEARCH REGARDING EFFECT OF SOME TREATMENTS APPLIED TO *PHOENIX DACTYLIFERA* SEEDS BEFORE SOWING

CERCETĂRI PRIVIND EFECTUL UNOR TRATATEMNTE APLICATE SEMINȚELOR DE *PHOENIX DACTYLIFERA* ÎNAINTE DE SEMĂNAT

CHELARIU Elena Liliana[1]*, DRAGHIA Lucia, BRÎNZĂ Maria*, AMIŞCULESEI Petronica, AELENEI S.I.

*Corresponding author e-mail: julia@uaiasi.ro; mariabrinza2007@yahoo.com

Abstract. *Date palm is a plant utilised both for its ornamental features as well as for its edible fruits. At this species seed's germination is realised with difficulty, germination duration, without interventions on seeds, could be between 8 and 12 months. The current paper present some aspects regarding the effect of some treatments applied to Phoenix dactylifera seed before sowing, on their germination and on plant's growing. So, were organised seven experimental variants: one control variant at which wasn't applied any treatment, a variant at which seeds were subjected to a mechanical treatment (filing), two hydrothermal variants and three variants with peroxide (3%) with different exposure period. Treatment of seeds before sowing caused the shortage of germination period up to 90 days. The best results were obtained at variant at which was applied the treatment with peroxide for 3 minutes, which caused a germination rate of 80%. At all variants at which were applied treatments, were obtained very significant results in comparison with control variant.*

Key words: *Phoenix dactylifera*, multiplication through seeds, treated seeds

Rezumat. *Curmalul este o plantă utilizată atât pentru însuşirile ornamentale, cât şi pentru fructele comestibile. La această specie germinația semințelor se realizează cu dificultate, durata germinației, fără intervenții asupra semințelor, poate fi între 8 şi 12 luni. Lucrarea de față prezintă câteva aspecte referitoare la efectul unor tratamente aplicate semințelor de Phoenix dactylifera înainte de semănat, asupra germinării acestora şi creşterii plantelor. S-au organizat şapte variante experimentale: o variantă martor la care nu s-a aplicat nici un tratament, o variantă la care semințele au fost supuse unui tratament mecanic (pilire), două variante hidrotermice şi trei variante cu apă oxigenată (3%) cu perioadă de expunere diferită. Tratarea semințelor înainte de semănat, a determinat scurtarea perioadei de germinație cu până la 90 de zile. Cele mai bune rezultate au fost obținute la varianta la care s-a aplicat tratamentul cu apă oxigenată timp de 3 minute, care a determinat o rată a germinației de 80%. La toate variantele la care s-au aplicat tratamente, s-au obținut rezultate foarte semnificative în comparație cu varianta martor.*

Cuvinte cheie: *Phoenix dactylifera*, înmulțirea prin semințe, semințe tratate

[1]University of Agricultural Sciences and Veterinary Medicine from Iaşi, Romania

INTRODUCTION

Date palm (*Phoenix dactylifera*) is a palm tree, known and appreciated since Antiquity, being considered by Egyptians as a symbol of fertility. Due to the long history of the nowadays culture, the exact origin of palm is unknown, but most probably comes from old Mesopotamia (Southern of Iraq) or from West of India (Wrigley, 1995). Cropping of palms is one of the oldest known fruits cropping and were cultivated in Northern Africa and in Middle East for at least 5000 years (Zohary and Hopf, 2000). Date palm was for a long period of time the source of the most important cultivated fruits from arid regions of Arabian Peninsula, Northern Africa and Middle East (Broschat and Black, 1988; Wagner, 1982). In continental temperate climate, date palms are cultivated in pots as ornamental plants through leave (Draghia and Chelariu, 2011; Chelariu, 2015).

Even if it is used with the torrid weather from origin country, date palm is very well suitable to be cultivated in pots for décor of apartments. Because prefer light, is recommended to be placed near a window. During summer, could be placed also on a balcony, with the condition to be daily wetted. But in winter, for date palm will be applied a decreasing of luminosity and water, and the temperature must be kept at a value of over 20ºC (Draghia and Chelariu, 2011; Chelariu, 2015). Date palms blossom when the temperature at shadow increase over 18ºC and the fruits are formed when the temperature is above 25ºC (Zaid *et al*, 2002).

Germination of date palm seeds could be influenced by more factors (technological, ecological, biological, etc.). Sowing deep is a factor which is often ignored but which could cause a reduced germination. Germination of palm seeds is, generally, very reduced if are sowed too deep, probably that seeds, by their nature, germinate at soil surface, and if sowing deep is too big, soil moisture will be also too high than at soil surface and could cause the decreasing of germination. Generally, palms dramatically respond to temperature at which seeds were placed for germination. Seeds germination temperature must be constant, 28ºC-32ºC. At temperatures below 26ºC germination of palm seeds could be delayed (Carpenter, 1988; Donselman, 1981).

For stimulating germination of date palm seeds could be applied special treatments for seeds, aiming to decrease the hardness of their tegument (Draghia and Chelariu, 2011; Chelariu, 2015)

In the current paper are presented the results regarding the influence of some treatments applied to date palm seeds for stimulating their germination.

MATERIAL AND METHOD

At studied species were organised experiments to highlight the influence of applied treatments at date palm seeds on germination process and plants growing. Research was carried out in didactical glasshouse of Faculty of Horticulture, University of Agricultural Sciences and Veterinary Medicine from Iaşi, during January – September 2018.

Were organised 7 experimental variants (tab. 1) as follows: V1 – control variant without any treatment, V2 – was realised a mechanical treatment namely seeds' filing, V3 – was realised a hydrothermal treatment for 2 minutes, this operation being repeated by 5 times, with 2 minutes breaks, V4 – a 4 minutes hydrothermal treatment, with 5 repetitions and 2 minutes breaks, V5 – treatment with peroxide for 2 minutes, V6 – treatment with peroxide for 3 minutes, V7 – treatment with peroxide for 4 minutes, for each variant being utilised a number of 10 seeds. Sowing was realised on 16.01.2018.

Table 1

Experimental design

Variant	Treatment
V1	Control – untreated seeds
V2	Filing of seeds
V3	Hydrothermal treatment, 2 minutes (x5)
V4	Hydrothermal treatment, 4 minutes (x5)
V5	Treatment with peroxide, 2 minutes
V6	Treatment with peroxide, 3 minutes
V7	Treatment with peroxide, 4 minutes

During research period, March – September 2018, was observed the dynamics of seeds germination, germination rate, characterization of seedlings. Statistical interpretation of date was done using limit differences.

RESULTS AND DISCUSSIONS

In according with the experimental design, for each variant was utilised a different treatment type which was applied to seeds, in this way being observed the influence of treatment on germination and rate of plants' emergence (tab. 2, fig. 1, fig. 2).

Table 2

Dynamics of plants' emergence (%)

Variant	Date (2018)								
	12.III	16.III	19.III	23.III	27.III	30.III	10.IV	20.IV	16 IX
V1	0	0	0	0	0	0	0	3	20
V2	50	60	60	60	60	60	70	70	70
V3	20	20	30	30	30	40	40	40	50
V4	20	20	40	50	50	50	60	60	70
V5	0	30	40	40	40	40	40	50	60
V6	40	60	80	80	80	80	80	80	80
V7	0	20	30	30	40	40	60	60	70

After three month from the moment of sowing, germination rate was between 40% and 80 % at variants at which were applied treatments for seeds, face to 3% at untreated control (tab. 2, fig. 1). After 8 months from sowing, germination rate was between 50% and 80% at treated variants, face to 20% at control variant (tab. 2, fig. 2).

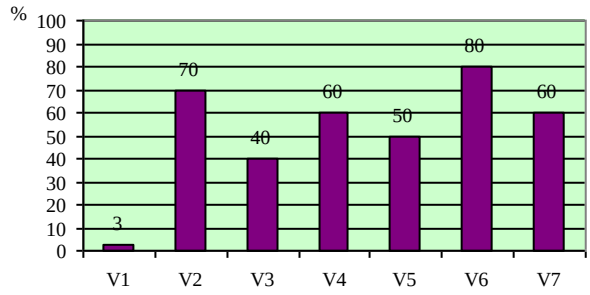

Fig. 1 Germination rate after 3 months from sowing

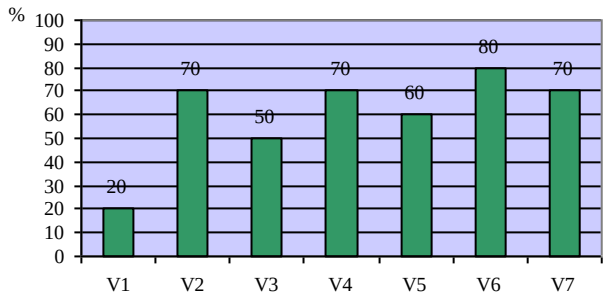

Fig. 2 Germination rate after 8 months from sowing

It could be observed that variant V6 had the greatest number of emergence plants, fact which show the efficiency of the treatment applied at this variant, namely treatment with peroxide for 3 minutes.

Analyzing the obtained results it was noticed the influence of treatments on seeds' germination in comparison with control variant, confirming the results from literature which affirm that date palm seeds germinate into an interval of 8-12 months if there is no interventions on them (Andrade, 1994; Carpenter, 1988; Zohary and Hopf, 2000; Draghia and Chelariu, 2011; Chelariu, 2015).

After statistical interpretation of results was observed that differences face to control were very positive significant at all variants with treated seeds, also after three months, as well as after 8 months from sowing (tab. 3).

In table 4, could be observed the general characteristic of seedlings after three months from sowing date. The best results were recorded at variant V2, followed by variants V6 and V3. It was tracked aspects like length, width as well as number of leave.

Table 3

Influence of treatments applied to seeds on germination rate

Variant	Germinated seeds (%)	
	after 3 months	after 8 months
V1	3	20
V2	70***	70***
V3	40***	50***
V4	60***	70***
V5	50***	60***
V6	80***	80***
V7	60***	70***
	$LD_{5\%}$ = 2.0; $LD_{1\%}$ = 2.8; $LD_{0.1\%}$ = 4.0	$LD_{5\%}$ = 2.7; $LD_{1\%}$ = 3.8; $LD_{0.1\%}$ = 5.3

Analyzing from statistically point of view was observed that differences face to control, regarding length, as well as width of leave were very positive significant at all variants with treated seeds (tab. 4).

Table 4

Characterization of plants after 3 months from sowing

Variant	Number of leave (pcs)	Length (cm)	Width (cm)
V1 control	1	0.20	0.10
V2	1	23.25***	0.52***
V3	1	18.75***	0.47***
V4	1	19.80***	0.42***
V5	1	16.92***	0.48***
V6	1	19.93***	0.54***
V7	1	14.71***	0.47***
		$LD_{5\%}$ = 2.6 cm $LD_{1\%}$ =3.7 cm $LD_{0.1\%}$ = 5.2 cm	$LD_{5\%}$ = 0.1cm $LD_{1\%}$ = 0.2 cm $LD_{0.1\%}$ = 0.3cm

In table 5 are presented the results regarding characterization of date palm plants at 8 months from sowing. It was observed that mean height of plants was between 29.10 cm and 34.79 cm at plants obtained from treated seeds face to 6.10 cm at control. Mean number of formed leave varied between 2.0-2.5 leave/plant face to 1 leaf/plant at control variant. Mean length of leave was situated in interval 23.85-26.85 cm at variants with treated seeds face to 5.90 cm at control, and mean width was 0.90-0.97 cm face to 0.42 cm.

Statistically speaking was observed that at all those four analysed characters limit differences face to control were very positive significant (tab. 5).

Table 5

Characterization of plants after 8 months from sowing

Variant	Height of plant (cm)	Number of leave (pcs)	Length of leave (cm)	Width of leave (cm)
V1 control	6.10	1.0	5.90	0.42
V2	34.52***	2.3***	26.30***	0.96***
V3	30.26***	2.0***	24.55***	0.93***
V4	29.83***	2.2***	24.62***	0.90***
V5	29.10***	2.0***	23.85***	0.91***
V6	34.79***	2.5***	26.85***	0.97***
V7	30.05***	2.0***	23.98***	0.92***
	$LD_{5\%}$ = 2.0 cm $LD_{1\%}$ = 2.8 cm $LD_{0.1\%}$ = 4.0 cm	$LD_{5\%}$ = 0.1 cm $LD_{1\%}$ = 0.2 cm $LD_{0.1\%}$ = 0.3 cm	$LD_{5\%}$ = 0.3 cm $LD_{1\%}$ = 0.4 cm $LD_{0.1\%}$ = 0.5 cm	$LD_{5\%}$ = 0.0 cm $LD_{1\%}$ = 0.0 cm $LD_{0.1\%}$ = 0.1 cm

CONCLUSIONS

The applied treatments to date palm seeds before sowing caused a shortage of duration till beginning of germination.

From those six applied treatments to seeds, the highest germination rate (80%) was caused by treatment with peroxide for 3 minutes (V6). Close results were caused by mechanical treatment (V2), treatment with peroxide for 4 minutes (V7) and hydrothermal treatment for 4 minutes (V4).

Morphological characters of plants at variants with treated seeds recorded close values, but with significant differences face to control variant.

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