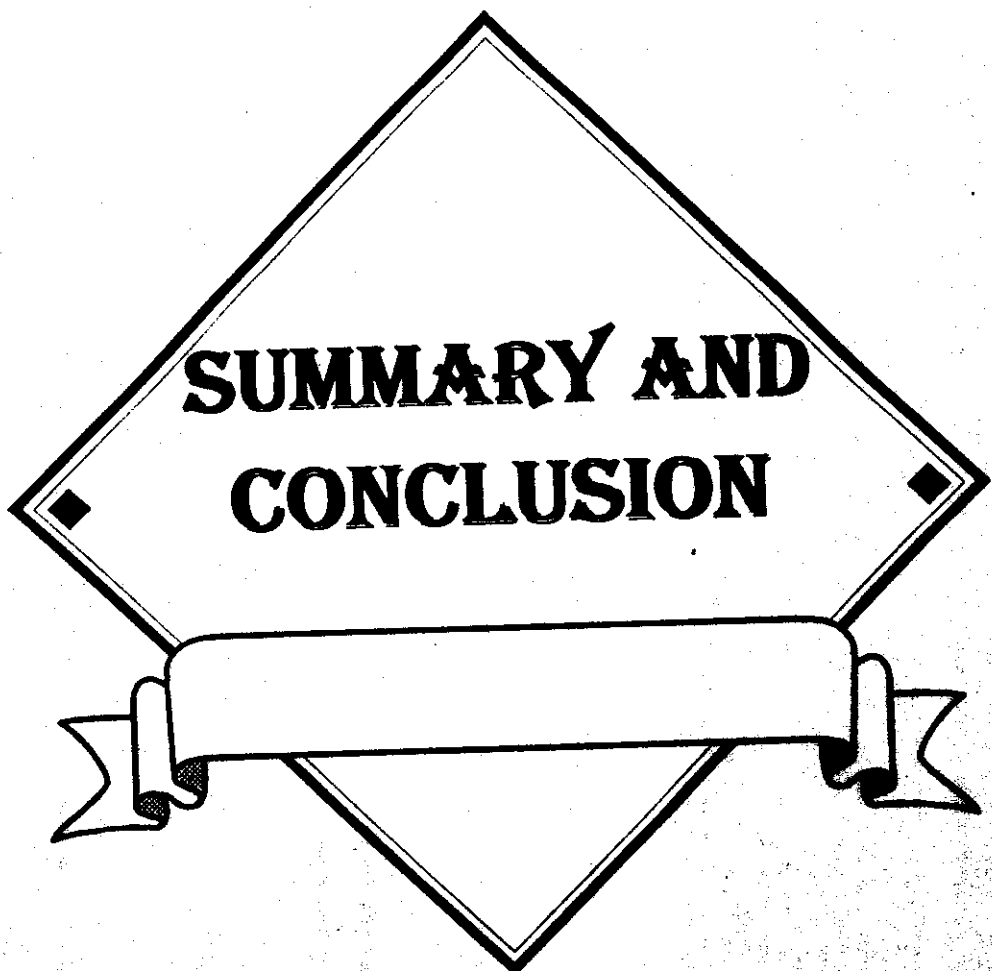
SUMMARY AND
CONCLUSION

V. SUMMARY AND CONCLUSION

This investigation was conducted during two successive experimental seasons of 1993 and 1994 years in the lath house of the Experimental Station belonging to Faculty of Agriculture, Ain Shams University at Shoubra El-Kheima region. Seeds of four deciduous fruit species namely : a- *Pyrus communis* "communis pear", b- *Diospyrus lotus* "persimon", c- *Prunus domestica* "Nemaguard peach" and d- *Prunus armeniaca* "Hamawy apricot" were the plant material used in this work. The main purpose of this study aimed to improve seed germination measurements and characteristics of developing seedlings of these rootstocks to attain an adequate vigour within a relative short period that enable nursery men from carrying out graftage at the end of the same growing season of seeds sowing. Therefore, for investigating possibility of accomplishing the abovementioned goal, three main means namely : 1- preplanting / prestratification soak in some growth regulators and other chemical solutions, 2- Presowing mechanical application of seed coat "removing of endocarp" and 3- Cold stratification for various periods were studied either solely (simple experiments) or each combined to another "factorial experiments" in this concern as follows :

V.1 Part,1 : Communis pear "*Pyrus communis*" and persimon "Diospyrus lotus"

V.1.1. Effect of cold stratification period combined with prestratification soak in GA solutions on pear and persimon seeds :

In this regard two factorial experiments were conducted each included 15 treatments being representative of the different combinations between five treatments of prestratification soak for 24h. in four GA

solutions [a - 0.0 (water), b - 1000, c- 2000 and d-3000 ppm], beside no soaking as control from one hand and three durations of cold stratification [4, 8 and 12 weeks] from the other. Taking into consideration that starting of cold stratification for the three various durations (4, 8 and 12 weeks) was adjusted to be terminated on the same date of sowing seeds i.e., February 15 th 1993 and March 1st 1994 during 1 st and 2nd seasons, respectively. Accordingly, an independent experiment was devoted for seeds of each fruit species for receiving the following treatments (combinations) :

1- No soak preceding cold stratification for 4 weeks.
2- No soak preceding cold stratification for 8 weeks.
3- No soak preceding cold stratification for 12 weeks.
4- Soak in GA, 0.0 (water) preceding cold stratific. for 4 weeks.
5- Soak in GA, 0.0 (water) preceding cold stratific. for 8 weeks.
6- Soak in GA, 0.0 (water) preceding cold stratific. for 12 weeks.
7- Soak in GA, 1000 ppm preceding cold stratific. for 4 weeks.
8- Soak in GA, 1000 ppm preceding cold stratific. for 8 weeks.
9- Soak in GA, 1000 ppm preceding cold stratific. for 12 weeks.
10- Soak in GA, 2000 ppm preceding cold stratific. for 4 weeks.
11- Soak in GA, 2000 ppm preceding cold stratific. for 8 weeks.
12- Soak in GA, 2000 ppm preceding cold stratific. for 12 weeks.
13- Soak in GA, 3000 ppm preceding cold stratific. for 4 weeks.
14- Soak in GA, 3000 ppm preceding cold stratific. for 8 weeks.
15- Soak in GA, 3000 ppm preceding cold stratific. for 12 weeks.

V.2. Part, II : Nemaguard peach "*Prunus domestica*" and Hamawy apricot "*Prunus armeniaca*" :

In this regard four experiments were conducted to study the following :

V.2.1. Effect of preplanting soak in some chemical solutions on nonstratified endocarp free seeds of Nemaguard and Hamawy apricot:

During both 1993 and 1994 seasons two simple experiments were conducted to investigate the response of the nonstratified endocarp - free seeds of both Nemaguard peach and Hamawy apricot to the preplanting soak for 24 h. in water, GA, thiourea, zinc sulphate potassium permanganate and citric acid solutions. In this connection, an independent experiment was dedicated for each of both included species (peach / apricot) to study their seeds response to the following 14 presowing soak treatments :

1- No soak (Control)
2- Water soak.
3- GA, 500 ppm soak.
4- GA, 1000 ppm soak.
5- GA, 2000 ppm soak.
6- GA, 3000 ppm soak.
7- Thiourea, 500 ppm.
8- Thiourea, 750 ppm.
9- Zinc sulphate, 2000 ppm.
10- Zinc sulphate, 4000 ppm.
11- Potass. permang., 5000 ppm.
12-Potass. permang., 10000 ppm.
13- Citric acid 2000 ppm.
14- Citric acid, 4000 ppm.

V.2.2. Effect of cold stratification duration in combination with removing endocarp of Nemaguard peach and Hamawy apricot seeds :

Two factorial experiments were independently carried out during both 1993 and 1994 seasons, 1 st was dedicated for peach while, 2 nd for apricot. Each experiment included the same eight treatments that representative of the differential combinations between both intact and endocarp-free seeds of each fruit species from one side and four periods of cold stratification (0, 3, 6 and 9 weeks) from the other side.

Thus the following combinations were the investigated 8 treatments in this concern :

1- Intact seeds with no stratification.

2- Endocarp - free seeds with no stratification.

3- Intact seeds + cold stratification for 3 weeks.

4- Endocarp - free seeds + cold stratification for 3 weeks.

5- Intact seeds + cold stratification for 6 weeks.

6- Endocarp - free seeds + cold stratification for 6 weeks.

7- Intact seeds + cold stratification for 9 weeks.

8- Endocarp - free seeds + cold stratification for 9 weeks.

Experimental layout :

The complete randomized design was used for arranging the treatments included in each of the abovementioned six experiments. Every treatment was replicated four times and each replicate was represented by 15 seeds. Sowing seeds were done on mid February 1993 and March 1 st 1994, as seeds of each replicate was planted together into an individual clay pot (25 cm. diameter) filled with sand + peatmoss (1 : 1 by volume) then placed in green house till late October of both seasons.

Data obtained during both seasons could be summarized as follows :

V.I. Part, I. Communis pear "pyrus communis" and persimon "Diospyrus lotus" :

V.1.1 Effect of cold stratification period combined with prestratification soak in GA solutions :

V.1.1.1. Germination parameters :

V.1.1.1.1. Number of days needed for 50% germination :

a- Communis pear :

Generally it could be noticed that all combinations of communis pear seeds stratified for less than 12 weeks failed to reach 50% germination within 9 weeks from planting "time allowed for test", regardless of the prestratification soak applied. Such trend was true during both 1993 and 1994 seasons, except those seeds received the combination of soaking in GA at 2000 ppm preceding cold stratification for 8 weeks which reached 50% germination after 8 and 10 days during 1 st and 2 nd seasons, respectively. Moreover, as the stratification period was extended to 12 weeks, all combinations reached 50% germination with variable speeds. The most effective combination/s for accelerating germination process to reach 50% faster was/were that of prestratification soak for 24h. in GA 2000 ppm preceding cold stratification for 8/12 weeks.

b- Persimon :

Data obtained during both 1993 and 1994 seasons, revealed obviously that soaking in water for 24 h. was the most effective prestratification treatment as being the only one that succeeded when combined with 4 weeks cold stratified persimon seeds to reach 50% germination. On the other hand, as the duration of cold stratification was extended shorter time was needed for 50% germination with both prestratification treatments of either no soaking or soaking in water for 24h. However, with all GA solutions the reverse was true especially 3000 ppm where stratified seeds for 12 weeks failed completely to reach 50% germination.

Conclusively, soaking seeds for 24 hours either in GA 2000 ppm (communis pear) or water (persimon) preceding cold stratification for eight

or four weeks were the most desirable treatments with seeds of communis pear and persimon, respectively for shorten time needed to reach 50% germination.

V. 1.1.1.2. Germination percentage :

a- Communis pear :

Specific effect :

Data obtained during both 1993 and 1994 seasons revealed clearly that seed germination % of communis pear was responded significantly to the duration of cold stratification, where the percentage was continuously increased with the elongation of cold stratification period. Since, 12 weeks resulted in germination % 3 times much more than 4 weeks period. As for the specific effect of prestratification soak treatments results obtained pointed out that all treatments of prestratification soak either in water or GA solutions increased germination % over control (no soak application). However, soaking seeds in GA at 2000 ppm for 24 h. was the superior.

Interaction effect :

Conclusively, it could be noticed the significant response of seed germination percentage of communis pear to the different combinations of stratification period and prestratification soak treatments. While the combinations between stratification for 12 weeks and prestratification soak in GA solutions 2000 / 1000 ppm were the superior as both exhibited the highest percentage, but the reverse was true with those between no soak or soaking in water from one hand and stratification for 4 and 8 weeks from the other.

b- Persimon :

Specific effect :

Data obtained declared obviously that germination percentage of persimon seeds was responded significantly to specific effect of duration of cold stratification where the intermediate period (8 weeks) was the superior while 4 weeks period was the inferior. On the other hand, however the response to specific effect of prestratification was significant but the trend took the opposite direction to that previously mentioned with communis pear. Hence, soaking in water for 24 hours was the most effective treatment while GA solution depressed significantly germination % of persimon seeds even though below unsoaked seeds (control)

Interaction effect :

As for the interaction effect of various combinations on germination % of persimon seeds data obtained showed that 12 weeks stratified seeds previously soaked in water for 24 hours was statistically the superior. However, soaking persimon seeds in GA 3000 ppm preceding cold stratification for either 4 or 12 weeks were the inferior combinations.

V.1.1.1.3. Germination rate :

a- Communis pear :

Specific effect :

Regarding the specific effect of both cold stratification period and prestratification soak in GA solution on seeds germination rate of communis pear, data obtained during two seasons displayed the same trend previously discussed with germination percentage. Since, germination rate was significantly increased as duration of stratification

was extended. Moreover, soaking seeds of communis pear in GA solution at 2000 ppm was the most effective prestratification treatment.

Interaction effect :

Data obtained during two seasons of study displayed generally that the different treatments of 12 weeks cold stratification especially those combined with soaking in GA solutions at 1000, 2000 or 3000 ppm resulted significantly in the highest value of germination rate. The opposite was true with those combinations of 4 weeks stratification, irrespective of prestratification treatments.

b- persimon :

Specific effect :

Data obtained during both seasons of study revealed obviously that seed germination rate of persimon was responded specifically to both duration of cold stratification and treatments of prestratification soak. Hence, intermediate period of cold stratification (8 weeks) was the superior. Beside, prestratification soak in water for 24 hours induced significantly the highest germination rate, but the reverse was true with GA solutions especially at highest concentration (3000 ppm).

Interactions effect :

Concerning the response to different combinations between both investigated factors, it is quite evident that combinations of cold stratification for 8 weeks regardless of prestratification soaking applied, besides those combinations between 8/12 weeks stratification and water soaked or unsoaked seeds all were statistically the superior from one hand

and equally effective from the other in increasing germination rate of persimon seeds.

V.1.1.1.4 Germination value :

a. Communis Pear :

Specific effect :

Data obtained during both seasons revealed that germination value of communis pear was specifically responded to both investigated factors. Since, the highest value was significantly related to 12 weeks stratified seeds and GA 2000 ppm soaked seeds as the specific effect of cold stratification period and prestratification soak was concerned respectively.

Interaction effect :

The greatest germination value of pear seeds was significantly induced by those combinations of the GA 2000 ppm soaked seeds stratified for 12 weeks followed by GA 1000 / 2000 ppm stratified for 12 and 8 weeks, respectively.

b. Persimon :

Specific effect :

Data obtained showed that the 8 weeks cold stratification was the superior as the specific effect of cold stratification was concerned. While the reverse was true with 4 weeks period whereas the lowest germination value of persimon seeds was detected. As for the specific effect of prestratification soak data declared that soaking in water was the superior followed by the nonsoak application.

Interaction effect :

Data obtained showed that stratifying the water soaked persimon seeds for 8 weeks was the superior. While the GA 3000 ppm soaked seeds when stratified for 4 or 12 weeks were the inferior combinations.

V.1.1.2. Growth measurements of seedlings :

V.1.1.2.1. Average shoot length "plant height" :

V.1.1.2.1.a. Communis pear :

Specific effect :

The plant height "shoot length" was positively influenced by the duration of cold stratification. Since the longest shoot was significantly induced by the 12 weeks cold stratified seeds. As for the specific effect of prestratification treatments, data obtained revealed that the longest shoot was statistically induced by soaking seeds in GA at 2000 ppm, while the reverse was true with that of unsoaked seeds.

Interaction effect :

The most effective combinations were those of 12 weeks cold stratified seeds of communis pear previously soaked in GA at 2000, 3000 ppm or in water beside soaking in GA 2000 ppm x 8 weeks cold stratification. However those of GA 2000 ppm x 8/12 weeks were the superior. The reverse was true with the combinations of the nonstratified seeds as they were the inferior.

V.1.1.2.1.b. Persimon :

Specific effect :

Shoot length of persimon seedlings exhibited the same trend previously mentioned with communis pear, regarding specific effect of

cold stratification period. However, the response to specific effect of prestratification soak treatments, the water soak for 24 hours was the superior in this concern.

Interaction effect :

Cold stratification for 12 weeks of water soaked persimon seeds was the superior combination, while those of soaking in GA especially 3000 ppm were the inferior as being the most depressive one on shoot length of persimon seedlings.

V.1.1.2.2. Average root length :

V.1.1.2.2.a. Communis pear :

Specific effect :

Root length of communis pear did not respond significantly to the stratification period, where differences were of minor importance. Meanwhile, root length was specifically affected by the differential solutions of prestratification soak, since all increased it significantly than control i.e., (nonsoaked seeds).

Interaction effect :

Data obtained revealed that combinations of stratifying the GA 1000 ppm soaked seeds for any of three investigated periods, as well as soaking communis seeds in GA 3000, GA 2000 or tap water preceding stratifying for 4,8 or 12 weeks respectively were the most effective for increasing root length.

V.1.1.2.2b. Persimon :

Specific effect :

Data obtained revealed that root length of persimon seeds was responded specifically to both investigated factors. The longest root was significantly related to the most prolonged stratification period (12 weeks) from one side and the water soaked persimon seeds from the other as the specific effect of both stratification periods and prestratification soak respectively were concerned.

Interaction effect :

The combination of soaking seeds in tap water before stratifying for 12 weeks induced persimon seedlings with the longest root system, while the reveres was true with the combinations of 4 weeks stratification (regardless of soaking application used).

V.1.1.2.3. Leaves dry weight :

V.1.1.2.3.a. Communis pear :

Specific effect :

Leaves dry weight was influenced by the specific effect of stratification period, since the 12 weeks was the superior. However, all prestratification soak treatments increased it specifically over no soak applied (control), but the GA 2000 ppm soak was statistically the most effective in this regard.

Interaction effect :

The more pronounced interaction effect was statistically exhibited by such combinations of GA solutions especially at 2000 ppm and

stratification for 12 weeks, besides 2000 ppm GA soaked seeds x 8 weeks cold stratification, whereas all showed the heaviest leaves dry weight.

V.1.1.2.3.b. Persimon :

Specific effect :

Data of two seasons disclosed that leaves dry weight of persimon seedlings followed the same trend of response that previously found for communis pear as the specific effect of duration of cold stratification was concerned. However, differences were more considerable in persimon seedlings. Meanwhile, the specific effect of prestratification soak was greatly differed as compared to that of pear, since soaking persimon seeds in water was the superior.

Interaction effect :

The heaviest leaves dry weight was always concomitant to persimon seedlings developed from stratifying the water soaked, nonsoaked and GA 1000 ppm soaked seeds for 12 weeks.

V.1.1.2.4. Shoot dry weight :

V.1.1.2.4.a. Communis pear :

Specific effect :

Regarding specific effect of cold stratification period, obtained results indicated that beneficial effect of prolonged period was of less importance. On the other hand GA 2000 ppm soaked seeds was the superior prestratification treatments as it induced the heaviest shoot dry weight per communis pear seedling.

Interaction effect :

Referring the interaction effect, it is clear that stratifying GA 2000 ppm soaked seeds for 12 weeks or 8 weeks resulted in the heaviest shoot dry weight per communis pear seedling. While the opposite was found with those combinations of nonsoaking or water soaking (regardless of stratification period) whereas the lightest shoot dry weight was induced.

V.1.1.2.4.b. Persimon :

Specific effect :

Specific effect of stratification period was considerably observed as the heaviest shoot was that of the prolonged period. As for the prestratification soak, soaking persimon seeds in water was the superior followed by the nonsoaked seeds.

Interaction effect :

Stratifying the water soaked seeds or nonsoaked seeds for 12 weeks gave persimon seedlings with the heaviest shoot dry weight. However combinations of 4 weeks stratification (regardless of soak application) were the inferior.

V.1.1.2.5. Root dry weight :

V.1.1.2.5.a. Communis pear :

Specific effect :

Root dry weight per communis pear seedling was responded clearly to specific effect of both investigated factors, since the heaviest weight was obtained by 8 and 12 weeks stratified seeds and GA 2000/3000 ppm soaked seeds as specific effect of both stratification period and prestratification soak treatments were concerned, respectively.

Interaction effect :

The combinations between prestratification soak in GA 2000/3000 ppm from one hand and cold stratification for 8/12 weeks from the other exhibited more beneficial effect, however the GA 2000 ppm x 12 weeks tended to be the most effective one.

V.1.1.2.5.b. Persimon :

Specific effect :

Root dry weight per persimon seedling followed the some trend of response previously detected with Nemaguard peach regarding the specific effect of stratification period, but differences were more pronounced with persimon. However , soaking in water even though nonsoaking were more effective than GA solution as the specific effect of prestratification soak was concerned.

Interaction effect :

The heaviest root system was obtained by stratifying the water soaked or nonsoaked persimon seeds for 12 weeks followed by GA 1000 ppm soaked seeds stratified for the same period (12 weeks).

V.I.I.2.6. Top/root ration :

Data obtained revealed that no firm trend/s could be detected regarding the specific effect of both duration of cold stratification and prestratification soak on top/root ratio of both communis pear and persimon. On the other hand interaction effect did not follow a determined pattern of response with seedlings of both fruit species.

V.1.1.2.7. Total plant dry weight :

The specific and interaction effects of stratification period and prestratification soak on the different plant organs (leaves, shoot and root dry weight) of each fruit species, i.e., communis pear and persimon were reflected on its total plant dry weight per the individual seedling to show the same pattern of response previously found with its own organs.

V.2. Part, II. Nemaguard peach "prunus domestica" and Hamawy apricot "Prunus armeniaca".

V.2.1. Effect of presowing soak of nonstratified, endocarp - free seeds in GA and other chemical solutions :

V.2.1.1. Effect on some germination parameters

V. 2.1.1.1. Number of days needed for 50% germination :

The nonstratified endocarp - free seeds of both Nemaguard peach and Hamawy apricot did not reach 50% germination within 8 weeks from sowing, regardless of soaking treatments.

V.2.1.1.2. Germination percentage :

V.2.1.1.2.a. Nemaguard peach :

Nevertheless, germination % of nonstratified, endocarp - free seeds of Nemaguard peach was increased by any of the investigated preplanting soak as compared with control except potassium permanganate 10000 ppm soaked seeds which failed completely to germinate. The most effective treatments were soaking in GA at 1000 or 2000 ppm, thiourea at 500 or 750 ppm and GA at 3000 ppm, however the first one tended to be more effective in this respect.

V.2.1.1.2.b. Hamawy apricot :

Data obtained during both 1993 and 1994 seasons revealed obviously that germination percentage of Hamawy apricot seeds (nonstratified endocarp - free) was influenced significantly by all investigated soak treatments. However, presowing soak in GA 2000/3000 ppm, thiourea 500 ppm and potassium permanganate at 5000 ppm were the superior treatments followed by those of soaking in both solutions of zinc sulphate and citric acid at 2000 and 4000 ppm respectively.

V.2.1.1.3. Germination rate :

V.2.1.1.3.a. Nemaguard peach :

All presowing soak treatments of the nonstratified, endocarp - free seeds of Nemaguard peach increased significantly the germination rate than unsoaked ones (control). Differences between various solutions were not significant in most cases.

V.2.1.1.3.b. Hamawy apricot :

Hamawy apricot seeds followed the same trend of germination rate previously mentioned with Nemaguard peach.

V.2.1.1.4. Germination value :

V.2.1.1.4.a. Nemaguard peach :

Nemaguard peach seeds followed nearly the same trend previously found with its germination % as the greatest value was closely related to the treatments of GA 1000 ppm and 2000 ppm, thiourea 500/750 ppm and zinc sulphate at 4000 ppm.

V.2.1.1.4.b. Hamawy apricot :

Data obtained showed that Hamawy apricot seeds followed nearly the same trends found with the previously discussed other germination parameters. However, soaking in GA, 2000/3000 ppm or thiourea at 500 ppm were the most effective treatments.

V.2.1.2. Growth measurements of developed seedlings :

V.2.1.2.1. Average stem length "plant height" :

V.2.1.2.1.a. Nemaguard peach :

Data obtained declared that the tallest Nemaguard peach seedlings were produced from seeds soaked in GA 1000/2000 ppm, thiourea 500/750 ppm, zinc sulphate 2000/400 ppm or citric acid at 2000/4000 ppm, however the shortest stem was that of either tap water soak or unsoaked seeds.

V.2.1.2.1.b. Hamawy apricot :

The obtained results disclosed that however all soaked seeds increased the plant height of Hamawy apricot seedling over control "unsoaked seeds", but soaking in GA 2000/3000 ppm, thiourea 500 ppm, zinc sulphate 2000 ppm, potassium permanganate 5000 ppm or citric acid at 4000 ppm induced seedlings having significantly the tallest stem.

V.2.1.2.2. Average root length :

V.2.1.2.2.a. Nemaguard peach :

Data obtained showed that the longest root system of Nemaguard seedlings was achieved by soaking the unstratified, endocarp - free seeds in GA 2000 ppm or zinc sulphate 2000/4000 ppm.

V.2.1.2.2.b. Hamawy apricot :

The response of root length to the different presowing soak. treatments was more pronounced with Hamawy apricot, hence the longest one was obtained by seedlings of GA 2000 ppm, thiourea 500 ppm, potassium permanganate 5000 ppm and citric acid at 4000 ppm soaked seeds. .

V.2.1.2.3. Leaves dry weight :

V. 2.1.2.3.a. Nemaguard peach :

Data obtained showed that soaking the unstratified, endocarp - free seeds of Nemaguard peach prior to sowing in GA 500/1000/2000 ppm, thiourea 500/750 ppm or citric acid at 2000 ppm induced seedlings having significantly the heaviest leaves dry weight.

V.2.1.2.3.b. Hamawy apricot :

Nevertheless, soaking in various solutions increased leaves dry weight per Hamawy apricot seedling over control. However, solutions of GA 2000/3000 ppm, zinc sulphate 2000 ppm, potassium permanganate 5000 ppm and citric acid 4000 ppm were significantly the most effective followed by thiourea at 500 ppm.

V.2.1.2.4. Stem dry weight :

V.2.1.2.4.a. Nemaguard peach :

Data obtained showed obviously that soaking Nemaguard peach seeds prior to sowing in GA 1000/2000 ppm or citric acid 2000 ppm were the superior followed by thiourea 500/750 ppm and zinc sulphate 2000 ppm as the increase in stem dry weight was concerned.

V.2.1.2.4.b. Hamawy apricot :

Stem dry weight of Hamawy apricot seedlings was responded to presowing treatments and followed the same trend previously detected with leaves dry weight as GA 2000/3000 ppm, thiourea 500 ppm, zinc sulphate 2000 ppm, potassium permanganate 5000 ppm and citric acid 4000 ppm were the superior in this regard.

V.2.1.2.5. Root dry weight :

V.2.1.2.5.a. Nemaguard peach :

From results obtained it could be concluded that both presowing treatments of soaking in GA 2000 ppm or citric acid 2000 ppm induced Nemaguard peach seedlings having significantly the heaviest dry root systems, followed by GA at 1000 ppm and thiourea at 500 / 750 ppm.

V.2.1.2.5.b. Hamawy apricot :

It could be safely concluded that soaking apricot seeds in GA 2000/3000 ppm, zinc sulphate 2000 ppm, potassium permanganate 5000 ppm followed by soaking either in citric acid 4000 ppm or thiourea 500 ppm were statistically the most effective treatments as root dry weight was concerned.

V.2.1.2.6. Top/root ratio :

V.2.1.2.6.a. Nemaguard peach :

However, no firm trend, but to some extent it could be noticed that unsoaked and GA, 500/1000 ppm soaked seeds increased top/root ratio.

V.2.1.2.6.b. Hamawy apricot :

The same trend of Nemaguard peach was nearly found with apricot whereas the unsoaked and soaked either in water or GA 500 ppm tended to increase the top / root ratio.

V.2.1.2.7 Total plant dry weight :

V.2.1.2.7.a. Nemaguard peach :

Soaking the nonstratified, endocarp - free seeds of Nemaguard peach prior to sowing in GA 2000 ppm induced seedlings with the heaviest dry weight followed by any of GA 1000, thiourea 750 and citric acid 2000/4000 ppm.

V.2.1.2.7.b. Hamawy apricot :

Presowing soak in GA 2000/3000 ppm and potassium permanganate at 5000 ppm were the superior followed by soaking in $ZnSO_4$ 2000 ppm, thiourea 500 ppm and citric acid at 4000 ppm.

V.2.2. Effect of cold stratification duration in combination with removing endocarp of Nemaguard peach and Hamawy apricot seeds :

Two factorial experiments were conducted each included the same eight treatments which being representative of combinations between 4 durations of cold stratification (0, 3, 6 and 9 weeks) and the intact or endocarp - free seeds. Meanwhile, an experiment was devoted for Nemaguard peach while second for Hamawy apricot to study the response of the following characteristics.

V.2.2.1. Effect on some germination parameters.

V.2.2.1.1. Number of days needed to 50% germination :

V.2.2.1.1.a. Nemaguard peach :

Data obtained during both seasons revealed that all combinations between intact seeds and various durations of cold stratification, besides those combinations of endocarp -free seeds and stratification for 0.0 or 3 weeks all failed to reach 50% germination. However, the 6 or 9 cold stratification of endocarp - free seeds of Nemaguard peach accomplished 50% germination rapidely after the shortest time from sowing.

V.2.2.1.1.b. Hamawy apricot :

The combination of the endocarp - free seeds and the longer duration of cold stratification reached 50% germination after the shortest time from sowing. However, the reverse was true with the nonstratified intact seeds.

V.2.2.1.2. Germination percentage :

V.2.2.1.2.a Nemaguard peach :

Specific effect :

Regarding the specific effect of both investigated factors (removing endocarp and period of stratification) data obtained declared that germination % of Nemaguard peach responded significantly to both factors. Since, positive relations was detected between stratification period and germination %, beside removing the endocarp increased also germination %.

Interaction effect :

The highest germination % was always concomitant to the combination between 9 weeks stratification and the endocarp - free seeds, followed statistically by both combinations of 6 weeks stratified endocarp - free seeds and 9 week stratified intact seeds.

V.2.2.1.2.b. Hamawy apricot :

Specific effect :

Regarding the specific effect of removing the endocarp, data obtained showed that the endocarp - free seeds of Hamawy apricot exceeded statistically the intact seeds in their germination %. Moreover the trend of response to the duration of cold stratification was similar to that previously found with Nemaguard peach, while with Hamawy apricot differences were more pronounced.

Interaction effect :

The superior combination was that of 9 weeks stratified endocarp - free seeds which resulted significantly in the highest germination % followed in a descending order by those of 9 weeks stratified intact seeds and 6 weeks stratified endocarp - free seeds.

V.2.2.1.3. Germination rate :

V.2.2.1.3.a. Nemaguard peach :

Specific effect :

Removing seed endocarp had no specific effect on germination rate of Nemaguard peach. However, stratification affected it significantly but three periods i.e. 3,6 and 9 weeks were equally the same as compared each to other.

the heaviest weight was gained by the endocarp - free seeds, as well as the prolonged stratification period as the specific effect of stratification period and mechanical removing of seed coat were concerned.

Interaction effect :

The heaviest leaves dry weight was induced by seedlings regenerated by 9 weeks stratified endocarp - free seeds of both Nemaguard and Hamawy apricot.

V.2.2.2.4. Shoot dry weight :

The same trends previously found with leaves dry weight/ seedling of both Nemaguard peach and Hamawy apricot were also detected with their shoot dry weight regarding the specific and interaction effects of both investigated factors (Stratification period and endocarp removing).

V.2.2.2.5. Root dry weight :

However, the response followed in general the abovementioned trends found with leaves and shoot dry weight regarding specific and interaction effects of stratification period and mechanical removing of endocarp, but the degrees of variance were slightly changed from one case to another with the two investigated fruit species.

V.2.2.2.6. Top/root ratio :

However, no firm trend could be observed for both Nemaguard peach and Hamawy apricot regarding their response to specific and interaction effects of stratification period and removing of seed endocarp, but cold stratifying resulted in a relative decrease for both species.

V.2.2.2.7. Total plant dry weight :

Data obtained revealed that the total plant dry weight per the individual seedling of Nemaguard peach and Hamawy apricot followed the same trend previously found with the dry weight of their plant organs in response to specific effect of mechanical removing of seed endocarp and stratification period. Hence, the heaviest seedling was obtained by sowing 9 weeks stratified endocarp - free seeds.