## SUMMARY

Two Experiments in a randomized complete block system with four replicates, were carried out at the Experimental Farm of the Faculty of Agriculture at Moshtohor, Zagazig University, Egypt, during the seasons of 1981, 1982 and 1983 to study seed germination of different genera and species.

Local fresh seeds were subjected to one of the following treatment H.W.T's (40, 50, 60 and 95°C) by raising or lowering temperatures beside control (soaking in water at room temperature for 24 hours, also seeds were soaked in sulfuric acid 10 %, 20% or concentrated for 5, 10, 30, 45, 60 and 75 minutes, then thoroughly washed with water. While with olive seeds were soaked in sodium hydroxide (10 %) cold or warm solution at 55°C for 5 or 10 minutes, or sodium carbonate solution for 6 hours before direct planting. All previous treatments were compared to embeding seeds in wet peat moss, soaking in cold water or direct sowing.

Also combination of the previous treatments and $GA_3$ at 0.00, 50, 100, 150 p.p.m. for 24 hours before sowing were conducted.

Equal patches of treated seeds were sown in 15 cm pots during the first week of September of each year, while with olive this was in the last week of November. Soil medium consisted of 2 part sand : 1 part loam. All pots were watered up to the adequate soil moisture needed for best germination. The second experiment dealed with propagation by terminal, middle portion and leaf bud cuttings of Ficus elastica var. decora. Roxb. which were subjected to different treatments of growth regulators by dipping the basal parts as follows:

A. Control (distilled water).
B. IBA treatments dipping for 10 seconds at concentrations of 0.00, 2000, 3000 , 4000, 4500, 5000, and 5500 p.p.m.
C. Dipping in kinetin for 3 hours in concentrations at 1, 5, 10 and 15 p.p.m.
D. Dipping in kinetin for 1.5 hours in the previous concentration then followed by dipping in IBA (5000 p.p.m. for 5 seconds).

The treated cuttings were inserted into sand in 20 cm clay pots, each pot contained 4 cuttings in three replicates.

Data for seeds were recorded just after emerging, but for cuttings after 3 months from planting.

The most important results are:

Cassia didymobotrya, L.:

1. C. didymobotrya, seeds are sensitive to high H.W.T's since soaking in cold water resulted in the best number and percentage of germination. The cause may be attributed to injurious effects on embryo or due to heat influence on some biochemical pathways of metabolites needed by active embryo.

2. Incubating seeds in wet peat moss at room temperature for 8 days gave the highest number of germinated seeds due to the adequate supply of both moisture for imbibition and well gaseous exchange at early stages of germination.

3. $GA_3$ supressed seed germination of C. didymobotrya due to changing endogenous balance of hormones in seeds.

4. Chemical analysis of seeds and seedlings indicated that the highest percentages of indoles were coincided with seeds soaked for 24 hours. No particular relationship was found between IAA content and germination at early stages.

5. $GA_3$ at 150 p.p.m. changed the content of IAA in seedling of previous H.W.T, L (60°C), although germination percentages did not increase.

6. Cold water and $H_2SO_4$ 10 % treatments decreased phenols and those treatments were effective on increasing germination. High germination percentage was always related with lower content of phenols.

7. Chemical analysis gave some particular trend showing that exogenous treatments of seeds by H.W.T's, $H_2SO_4$ and $GA_3$ had influence on the content of seedlings from indoles and phenols.

Cassia goluca, L.:

1. H.W.T's had thermal stresses on germination; seed of C. goluca followed a similar trend as C. didymobotrya.

2. Peat moss application also was the best treatment for better germination.

3. It seemed that C. goluca, L. has non-deep dormancy which can be overcome by some physical treatments as soaking in cold water or inserting in wet peat moss, $H_2SO_4$ may cause injury to such seeds.

4. $GA_3$ decreased seed germination as compared to control except at the higher concentration as 150 p.p.m.

Cassia modesta, L:

1. H.W.T.R. to 60°C gave the highest number and percentages of germinating seeds by softening seed coats.

2. Peat moss treatment gave similar trend as C. didymobotrya or C. goluca this was coincided with the shortest period for germination.

3. $GA_3$ application at 150 p.p.m. following H.W.T's, L. or $H_2SO_4$ stimulated seed germination as compared to control.

Cassia fistula, L.:

1. For H.W.T's the shortest period to reach maximum highest number of germinated seeds resulted from soaking in H.W.T, at 95°C followed by cooling. All seeds were injured with H.W.T.R. to 95°C.

2. Treating seeds with $H_2SO_4$ for 30 minutes raised their percentage of germination to 97.2 % compared with 12 % (control) and this was the best experimental treatment including peat moss treatment. (The period needed for maximum germination was statistically shorter as compared with control).

3. $GA_3$ treatments after H.W.T's or $H_2SO_4$ had no great influence on raising germination as compared to the application of $H_2SO_4$ for 30 minutes.

4. Dry seeds contained the least content of indoles as

7.3 mg/100 gm (D.W.T.). Contents of indoles varied in seedlings between 7.3 to 20.8 mg/100 gm (D.W.T), and the higher contents indicated a relationship between facilitating seed germination and the increased auxin content.

5. After germination, seedlings content of phenols was 4 times as much as in dry seeds. Application of high concentration of $GA_3$ decreased the content of phenolic compounds in seedlings; such relationship proved that $GA_3$ promotion acts through inhibiting some phenolic compounds within seeds.

Acacia farnesiana, Willd:

1. H.W.T's gave similar trend to C. fistula although H.W.T.R. to 95°C did not completely injure seed viability.
2. The best germination percentage was attained by soaking seeds for 75 minutes in $H_2SO_4$.
3. The most promising effect of $GA_3$ promotion to seed germination was noticed after $H_2SO_4$ treatment for 30 minutes. The interaction of $H_2SO_4$ 30 minutes x $GA_3$ 150 p.p.m. was significant.

4. Chemical analysis proved that indoles had a minor role in seed germination of A. farnesiana; seedlings contained more indoles and phenols than in dry seeds. The contents flactuated in seedlings with no relationship to increased germination except when $GA_3$ was applied at high concentration as 150 p.p.m. indoles increased.

5. $H_2SO_4$ and $GA_3$ or their combinations had decreased phenols in seedlings especially with treatments which produced relatively higher percentages of germination. Hence, phenols showed a role in germination of A. farnesiana.

Acacia arabica, Willd:

1. H.W.T's L. at 95°C reflected on the rupture and soffening seed coat layers of A. arabica. resulting in 57.2 % compared to 8 % with control.

2. Dipping seeds of A. arabica in concentrated $H_2SO_4$ for 45 minutes resulted in the highest number of germinated seeds.

3. Incubating seeds of A. arabica in wet peat moss gave comparatively good results.

4. The best treatment of $GA_3$ which gave the highest

percentage of germination was $GA_3$ at 100 p.p.m. following $H_2SO_4$ (45 minutes) treatment.

5. A positive relationship showed that treatments which increased germination were the same which decreased phenols content in seedlings.

6. $H_2SO_4$ decreased contents of both indoles and phenols in seedlings compared to controls, $GA_3$ had a definite role on increasing seed germination of A. arabica when the application follow a previous treatment which facilitate water absorption.

Olea europaea, L.

1. H.W.T's and $H_2SO_4$ and peat moss treatments have not to be practised for the germination of Olive seeds.

2. Both treatments of sodium hydroxide (10 %) for 5 minutes and sodium carbonate (5 %) for 6 hours gave significantly the highest number of germinated seeds for both cvs.

3. Sodium carbonate gave the most rapid germination.

4. $GA_3$ at 150 p.p.m. following H.W.T's raised seed germination which was still lower than sodium hydroxide and carbonate treatments.

5. No relationship was found between indoles and phenols contents in olive seedlings and germination.

Ficus elastica var. decora, Roxb:

1. The best results for rooting terminal cuttings were application of IBA at 5500 p.p.m. for 10 seconds or kinetin at 5 p.p.m. for 3 hrs or kinetin 15 p.p.m. for 1.5 hrs x IBA 5000 p.p.m. for 5 seconds.
2. The middle portion cuttings need to be treated with IBA at 5500 p.p.m. for 10 seconds, kinetin at 5 p.p.m. for 3 hrs or kinetin 10 p.p.m. for 1.5 hrs x IBA 5000 p.p.m. for 5 seconds.
3. As for leaf bud cuttings, the successful rooting can be fulfilled by using IBA at 2000 p.p.m. for 10 seconds, kinetin 1 p.p.m. for 3 hrs. or kinetin 10 p.p.m. for 1.5 hrs x IBA 5000 p.p.m. for 5 second.

Chemical analysis:

In conclusion growth regulaters have great effects on changing biochemical substances since kinetin increased chlorophyll content and permitted more photosynthesis.