V- SUMMARY AND CONCLUSION

V. SUMMARY AND CONCLUSIONS

The present study was carried out during two consecutive seasons of (1993 / 1994) and 1994 / 1995) on 12 years old Thompson Seedless grapevines, growing in a clay loamy soil in a private vineyard at Samannud region Gharbia Governorat, Egypt to study the effect of some growth regulators i.e. Dormex (H_2CN_2), GA_3 and NAA and nutrient elements i.e Zn SO_4, KNO_3 and urea,on growth and fruiting of Seedless grapevines.

The study was dealing with spraying the dormant one year old wood only canes after pruning with the following growth regulators and nutrient solutions.

1- Control (vines were sprayed with water).

2- Dormex (H_2CN_2) at 1.25%.

3- Dormex (H_2CN_2) at 2.5% .

4- Dormex (H_2CN_2) at 5% .

5- GA_3 at 50 ppm.

6- GA_3 at 1000 ppm.

7- NAA at 25 ppm.

8- NAA at 250 ppm.

9- KNO_3 at 5% .

10- Zn SO_4 at 25% .

11- Urea at 10 %.

The above treatments were sprayed once at the following dates.

On 15th Dec., Jan., 1^{ct} at 15th. and Feb. 1st.

The experiment was designed according to the randomized completely block design to study the following

1-The effect of these treatments on the phonological phases of the grapevines i.e. Time of the begining of budburst, begining of blooming end of blooming, begining of ripening stage (Veraison) and date of harvesting date.

2-The buds free amino acids, total soluble and non-soluble sugars. contents.

3-Bud behaviour (budburst percentage, fruitful shoots % and number of clusters per vine).

4- Yield per vine.

5- Physical properties of clusters and berries.

6- Fruit quality (T.S.S. sugar and total acidity).

The obtained results could be summarized as follows :-

1- The effect of spraying some growth regulators and nutrient elements on the phynological phases.

1- Budburst

a- Spraying grapevines at dormant season with Dormex (H_2CN_2) caused an earling of budburst from 66 to 7 days depending upon the oncentration and date of spraying, the early application and high concentration(2.5 and 5%) were more effective in this respect.

b- Spraying KNO_3 at 5% and urea at 10 % enhanced budburst with a few days.

c- Spraying GA_3, NAA and Zn SO_4 delayed budburst than the control.

d- GA_3 application at 50 and 1000 ppm and NAA at 250 ppm gave the latest budburst, since these treatments delayed the budburst by about 10 to 14 days than the control.

e- The more effective treatments on delaying budburst were GA_3 on January 1st and NAA on February 1st at high concentration.

2- Time of Blooming :

a- Dormex (H_2CN_2) at15 th Dec. caused an earliness in time of begining of blooming by 40 to 50 and 32 to 39 days, in the first and second season respectively. While in the later application Feb 1st was from 10 to 21 and from 16-21 days in the first and second seasons respectively.

b- Application of urea at 10 % advanced blooming date from 5 to 13 and 10 to 18 days than the control in the first and second seasons respectively.

c- Conversely GA_3 application and Zn SO_4 at two early dates and NAA at the two later dates delayed time of blooming in comparison with the control.

3- Time of Harvesting :

a- Dormex (H_2CN_2) was more effective agents in earliness in harvesting date of Thompson Seedless grape the number of earlines in days ranged from 20 to 30 days in two seasons of study in comparison with the control.

b-Urea application at 10 % at 15 Jan. and Feb. 1st advanced harvesting date by about 10 to 15 days than the control in the two seasons of study.

c- Also spraying grapevines with KNO_3 at 5% on Jan 1st,15 Jan and Feb. 1st advanced harvesting date by about 10-20 days.

d- On the other hand GA_3 application at 50 and 1000 ppm and NAA at 25 and 250 ppm delayed harvesting time by about 5 to 10 days.

II- Chemical Composition of Buds at Dormancy.

I- Total free amino acids.

Total free amino acids buds content were significantly affected with utrient elements and the date of spraying.

The highest values in this respect resulated from spraying Dormex (H_2CN_2) at 5,2.5 and 1.25 %. Also applying KNO_3 at 5%, Zn SO_4 at 25 % and urea at 10 % significantly increased total free amino acids buds content than the control but less than Dormex (H_2CN_2).

The lowest values resulted from spraying GA_3 at 50, 1000 ppm and NAA at 25, 250 ppm in both seasons of study. Also applying these agents on 15 Jan. and Feb. 1st were more effective in this respect.

2- Total soluble sugars,

Applying Dormex (H_2CN_2) at 1.25, 2.5 and 5% KNO_3 at 5 % ,and urea at 10 % in the first season significantly increased total soluble buds content at dormancy in comparison with the control. Also using above agents except urea at 10 % significantly increased total soluble sugrs of buds content than the control. On the other hand applying GA_3 at 50, 1000

ppm and NAA at 25, 250 ppm and Zn SO_4 at 25% and urea at 10 % gave the lowest values in this respect.

Using Dormex (H_2CN_2) at 5% on February 1st gave the highest values in this respect, while using GA_3 at 1000 ppm on 15 Dec. gave the lowest values in the two seasons of study.

3- Total non-soluble sugers .

Spraying Thompson seedless grapevines at dormant season with GA_3 at 50, 100 ppm and NAA at 250 ppm and Zn SO_4 at 25% significantly increased total non-soluble sugars content of buds in comparison with the control and other agents used in this respect during the two seasons of study, NAA at 25 and 250 ppm gave the highest values in this respect. On the other hand using Dormex (H_2CN_2) at 5% gave the lowest values in two seasons of study. Also applying NAA at 25,520 ppm on 15 Dec gave the highest values in this respect in both seasons of study, while spraying urea at 10% on Feb. 1st in the first season and H_2CN_2 at 5% on Feb. 1st gave the lowest values in this respect.

Spraying above agents at 15 December gave the highest values from total non-soluble buds contents then declined to the lowest values at February 1st during the two seasons of study.

III : Bud Behaviour

1- Budburst percentage :

Generally the obtained results revealed that early Dormex (hydrogen cyanamide) application i.e. at 15 Dec. and Jan. 1st increased budburst percentage, over the control in the two seasons of study. Also spraying with GA_3 at 1000 ppm on 15 Dec., Zn SO_4 at 15 Dec. and Jan. 1st and urea at Feb. 1st increased budburst over the control, in the two seasons of study.

2- Fruitful shoots Percentage per Vine :

Application of Dormex (hydrogen cyanamide) at 2.5 and 5 % had significantly the greatest percentage of fruit full shoots in both seasons of study.

While spraying with GA_3 at 50 and 1000 ppm took the other way around. The highest values was obtained, when Dormex (hydrogen cyanamide) at 2.5 and 5%, NAA at 25 ppm and Zn SO_4 at 25% were sprayed on Feb. 1st . Moreover spraying NAA at 250 ppm on 15 Dec., KNO_3 at 5% on 15 Dec. and 15 Jan. and urea on 15 Jan. also significantly increased percentage of fruitfull shoots over the control in the first season.

In the second season spraying hydrogen cyanamide at all used concentrations on early date 15 Dec. increased fruitfull shoots precent than the control.

While the best treatments in this respect were spraying Dormex (H_2CN_2) at 2.5 and 5;% on Feb. 1st and KNO_3 on 15 JAN. On the other hand all other treatments decreased the percent of fruitfull shoots in the second season.

3- Number of Clusters per Vine.

Spraying dormex (hydrogen cyanamide) at 2.5 and 5 % and Zn SO_4 at 25 % significantly increased number of flower clusters per vine in the first and second seasons srespectively. Conversly all other agents used take the other way around.

In additioon the later spraying dates i-e. 15 Jan. and Feb. 1st induced the highest number of flower clusters per vine regardles of agents used in the two seasons of study.

IV. Yield per Vine :

a- Spraying Zn SO_4 at 25 % on all dates of spraying gave the highest yield

b- Spraying with Dormex (H_2CN_2) at 2.5 and 5 % concentrations on two later dates i-e 15 January and February 1st, also produced significantly higher yield, on the other hand lower concentration 1.25 % of Dormex (hydrogen cyanamide,) on early spraying dates 15 Dec. and Jan. 1st significantly decreased the yield than the control especially in the second season.

c- Application of GA_3 at 50 and 1000 ppm on the two later dates 15 Jan. and Feb 1st significantly increased the yield.

d- Application of urea at 10 % ppm on 15 Jan. and Feb. 1st significantly increased the yield over the control, but some what less than the above treatments.

e- Application of NAA and KNO_3 in the second season decreased the yield than the control.

V. Physical Properties of Clusters and Berries :

1- Gluster Weight :

In general all used treatments except application of Dormex (hydrogen cyanamide) at 1.25 % significantly increased cluster weight than the control, in the two seasons of study. Moreover the heaviest clusters were obtained by spraying GA_3 at 1000 and 50 ppm and Zn SO_4 at 25 % conversely spraying H_2CN_2 at 1.25 % on Dec. and Jan 1st significantly decreased cluster weight.

2- Berry Weight :

Application of Dormex (H_2CN_2), GA_3 and Zn SO_4 at dormant season significantly increased berry weight than the control during the two seasons of study. Moreover application of Dormex (H_2CN_2) at 1.25,2.5 and 5% concentrations gave the highest berry weight. On the other hand NAA spraying significantly reduced weight of berries than the control.

3- Cluster Stem Percentage :

All treatments used significantly increased cluster stem percentage in comparison with the control during the two seasons of study. Moreover GA_3 at 50 and 1000 ppm, urea at 10 % and Zn SO_4 at 2.5 % were the most effective in this respect.

4- Cluster Length :

All used treatments except Dormex (H_2CN_2) significantly increased cluster length than the control during the two seasons of study. Furthermore GA_3 at 50 and 1000 ppm and Zn SO_4 at 25 % gave the highest significant effect in this respect. On the other hand Dormex (hydrogen cyanamide) application decreased cluster length than the control.

5- Cluster Width :

All used agens except Dormex (hydrogen cyanamide)significantly decreased cluster width than the control during the two seasons of study.

Moreover spraying Thompson Seedless grapevines with NAA at 25 and 250 ppm at all spraying dates gave the lowest values in this respect, during the two seasons of study.

6- Berry Length :

Spraying Thompson Seedless grapevines at dormant season with Dormex (H_2CN_2) at 2.5 and 5 %, GA_3 at 50 and 1000 ppm and Zn SO_4 at 25%, significantly increased berry length than the control and other treatments in the two seasons of study.

7- Berry Width :

All used treatments excep Dormex (hydrogen cyanamide) at 2.5 and 5% concentrations, significantly decreased berry with than the control. On the other hand application of Dormex (hydrogen cyanamide), at 2.5 and 5 % significantly increased berry width than the control during the two seasons of study.

8- Berry Length / Width (Shape index) :

All used treatments significantly increased berry length / width (Shape index) than the control during the two seasons of study.

Furthermore GA_3 application at 50 and 1000 ppm, Zn SO_4 at 25 % and KNO_3 at 5 % had the highest values in this respect

9- Juice Percentage :

The application of GA_3 at 1000 ppm was the only treatment that significantly decreased the juice percentage in comparison with the control and other treatments, during the two seasons of study while application of KNO_3 at 5 % gave the highest values in this respect, in the two seasons of study.

10- Peel Percentage :

The application of GA_3 at low and hight (50 and 1000 ppm) concentrations gave the highest peel percentage during the two seasons of study. On the other hand application of KNO_3 at 5 % significantly decreased peel percentage than the control, during the two seasons of study.

Berry Camical Characteristics :

1.T.S.S. Percentage at harvesting date :-

Spraying Thompson Seedless grapevines with Dormex (H_2CN_2) at 1.25, 2.5 and 5 %, KNO_3 at 5% and urea at 10% at all spraying dates gave the highest T.S.S. percentage in comparison with the control and other used agents during the two seasons of study. On the other hand application of GA_3 at 50 and 1000 ppm, NAA at 25 and 250 ppm and Zn SO_4 at 25% at all spraying dates gave the lowest values in this respect.

2- Total Acidity% :

Spraying grapevines at dormant season with Dormex (H_2CN_2) at 1.25, 2.5 and 5 % and KNO_3 at 5% decreased significantly acidity percentage of berries juice than the control during the two seasons of

study. On the contrary the application of GA_3 at 50 and 1000 ppm and NAA at 25 and 250 ppm at dormant season significantly increased the total acidity in berry juice than the control, during the two seasons of study.

3- T.S.S / Acid Ratio :

The application of Dormex (H_2CN_2), KNO_3 and urea induced the highest values of T.S.S. / acid ratio. While application of GA_3, NAA and $Zn\ SO_4$ had the lowest values in this respect, the differences between each of these treatments and the control were statistically significant.

CONCLUSION

Form the results obtained in our investigation it can be concluded spraying Thompson Seedless grapevines with Dormex (H_2CN_2) at 1.25,2.5 and 5.0%, KNO_3 at 5.0% and Urea at 10 % induced earlier budburst, blooming and ripening. On the other hand, applying GA_3 at 50, 1000 ppm, NAA at 25, 250 ppm and Zn SO_4 at 25 % delayed budburst, blooming and ripening. Dormex (H_2CN_2) was more effective in inducing earlier harvesting date. Also applying KNO_3 at 5 % and Urea at 10.0% advanced harvesting date but less than Dormex (H_2CN_2) alone. The study showed that applying Dormex (H_2CN_2), KNO_3 , Zn SO_4, Urea and GA_3 improved berry quality and yield. Under similar conditions of this research application of Dormex (H_2CN_2) at 2.5 % it can be recommended at mid of Jan. and Feb 1st , KNO_3 at 5.0 % and Urea at 10.0 % on one-year old wood during dormancy can be recommended to induce early ripening of Thompson Seedless grapevines. From obtaining highter yield spraying GA_3 at 50 ppm, Zn SO_4 at 25 % and NAA at 25, 250 ppm at dormant season can also be recommended.