SUMMARY AND CONCLUSION

V- SUMMARY AND CONCLUSIONS

The present study was conducted during two successive seasons, 1983-1984 and 1984-1985 to investigate the effect of some growth regulators foliar sprays, applied in November, on vegetative growth, flowering, fruiting and fruit quality of "Balady" mandarin trees. The major aim was to induce a shift in vegetative growth, flowering and fruiting activities of the Balady mandarin trees in favor of reducing the alternate bearing habit known to be a chronic problem facing the producers of Balady mandarin in Egypt.

Twenty eight bearing Balady mandarin trees grown on sour orange rootstock in a private orchard at shubra--Bakhum, Menofia Governorate were devoted for this study. All trees were healthy, nearly uniform in size and vigor and selected to be at the same state of bearing at the time of treatments (all were bearing a rather heavy crop at the time of spray).

Foliar spray treatments were applied in November in a complete randomized design using the whole tree as a single replicate, with four replicates for each treatment. The spray treatments included:

1- Control (water spray) on both Nov. 7th and 21st.

2- NAA at 500 PPm applied Nov. 7th.

3- NAA at 750 PPm applied Nov. 7th.

4- NAA at 500 PPm applied Nov. 21st.

5- NAA at 750 PPm applied Nov. 21st.

6- SADH at 2000 PPm applied Nov. 21st.

7- CCC at 2000 PPm applied Nov. 21st.

The obtained results could be summarized as follows:

A- Vegetative growth:

1- Spring flush of growth, following the application of spray treatments showed a significant effect of the date of foliar spray treatment on shoot growth of the following spring. Nov. 7th sprays with 500 or 750 PPm NAA induced the formation of taller shoots with higher number of leaves early during the spring flush over the control. However, such differences disappeared toward the end of the spring cycle. Application of NAA at the same concentrations but later on Nov. 21st. caused an opposite trend resulting in shorter shoots with less number of leaves than the control that persisted until the end of the growth cycle for both seasons of study.

2- In response to foliar spray treatments on Nov. 21st. CCC at 2000 PPm induced the most retardation of spring cycle shoot growth, in both seasons of study, followed by SADH at 2000 PPm, then NAA at 500 PPm.

However, 750 PPm NAA failed to induce the degree of retardation showed by the lower concentration of NAA sprays (500 PPm).

3- Seasonal changes in dry matter content of both leaves and shoots revealed that Nov. 7th sprays with NAA showed generally the same trend for leaf and shoot dry matter % as the control indicating a decrease from June till Nov. followed by a gradual increase till March for both seasons. However, Nov. 21st. sprays with NAA, SADH and CCC all showed a different trend than the control where a steady gradual increase in leaf and shoot dry matter % took place from June to the following March with minor interruptions.

4- In the untreated trees leaf nitrogen % dropped gradually from June till August followed by a sudden but limited rise in N level till Nov., followed by a gradual decrease till March. In response to foliar spray treatments in Nov. 21st with NAA, SADH and CCC leaf nitrogen content differed significantly in values and trend during the season than the control. This may be a reflection of the shift in nitrogen consumption during the season in different growth activities in response to the treatments used.

5- Leaf and shoot N % differed significantly in trend and actual values between the control trees and those sprayed on Nov. 21st. such differences were highly significant for both SADH and CCC sprays but not significant for NAA sprays on Nov. 7th. such differences may reflect the shift in vegetative growth and/or fruiting in response to those spray treatments.

6- Seasonal changes in leaf P and K contents in response to early Nov. sprays with NAA were similar to that of the control. However, in June, following late Nov. sprays with 2000 PPm SADH, 2000 PPm CCC and 750 PPm NAA, both P and K levels in leaves were significantly lower than those of the control. These findings could be a reflection to the more vigorous vegetative growth showed by the control trees, resulting in a shift in consumption activities of these nutrients. As the season progressed, growth regulators foliar sprays on Nov. 21st. continued to induce a change in trend and actual values of leaf P and K contents of Balady mandarin trees, in the two seasons of the study, than the control trees. Such differences were highly significant throughout the season except those of January for P levels and these of March for K levels.

7- Total carbohydrates content and carbohydrates nitrogen ratio in shoots of Balady mandarin trees was affected by late Nov. foliar sprays with growth regulators in June, the untreated control trees showed a significantly higher level of shoot carbohydrates over sprayed trees. Such higher level continued throughout the season in both seasons of study. Vigorous spring cycle vegetative growth on the control trees may have induced higher total carbohydrates and higher C/N ratio in shoots starting from June and continued throughout the season. On the other hand, late Nov. foliar sprays with growth regulators induced much limited spring cycle vegetative growth. This condition may be responsible for the lower total carbohydrates levels as well as lower C/N ratio in shoots of such treated trees than the untreated controls.

B- Flowering, fruit set and yield:

Flowering, fruit set and yield were not appreciably affected by early Nov. foliar sprays with 500 PPm or 750 PPm NAA. However, NAA foliar sprays on Nov. 21st. appreciably enhanced flowering and fruit set of Balady mandarin trees in the expected off-year. 500 PPm NAA sprays were even more promising in this respect than the higher concentration (750 PPm). But total yield,

showed an opposite trend where 750 PPm NAA developed higher yield per tree than the 500 PPm level.

Concerning SADH sprays at 2000 PPm on Nov. 21st it significantly enhanced flowering, increased percentages of fruit set and resulted in the production of higher yield/tree whether as number of fruits or Kgs. of fruits per tree. Generally SADH sprays surpassed all other growth regulators in promoting higher percentages of fruitset and yield.

Spraying Balady mandarin trees on Nov. 21st. with 2000 PPm CCC significantly promoted flowering in the expected off-year, increased percentages of fruit set and yield over the control. Generally we may conclude that in both seasons of study the highest yield was born on trees sprayed on 21st. Nov. with 2000 PPm SADH followed by 2000 PPm CCC, 750 PPm NAA and 500 PPm NAA in a descending order.

Concering the number of developing fruits remaining on the tree after fruit-set, SADH foliar sprays at 2000 PPm in late November was the most promising treatment in reducing fruit drop and maintaining a higher number of developing fruits of Balady mandarin trees in the expected off-year. Both CCC and NAA sprays induced higher number of remaining fruits than the control but were less than SADH sprays in this respect.

C- Fruit quality:

Study of fruit physical characteristics in response to Nov. foliar sprays with NAA, SADH and CCC revealed that such regulators had reduced fruit weight and size as compared with the control. Such effect could be attributed to the increased number of fruits produced on the sprayed trees. Accordingly, fruit dimensions were also reduced under such treatments. In the mean time, all treatments had no effect on fruit index. Late Nov. sprays with NAA, SADH and CCC induced a reduction in fruit juice volume below that of untreated control trees.

Generally, fruit chemical properties were only slightly affected by the foliar spray treatments. The T.S.S. in fruit juice was decreased and juice acidity was increased (except 2000 PPm CCC) in response to growth regulator foliar sprays. The T.S.S./acid ratio indicated that late Nov. NAA sprays induced the production of late maturing fruits, while 2000 PPm CCC sprays induced earlier maturing fruits. The ascorbic acid content in fruit juice was singificantly increased in response to Nov. 21st. sprays with 2000 PPm SADH, 2000 PPm CCC, 750 PPm NAA and 500 PPm NAA over the control. However, early Nov. sprays with NAA failed to show such response.

Finally we may conclude that alternate bearing in Balady mandarin trees could be reduced by the application of growth requlator foliar sprays, in late November, on trees bearing a rather heavy crop. Specifically, 2000 PPm SADH, 2000 PPm CCC and 500 PPm NAA showed promise in this respect. Beneficial results may be obtained only if a healthy tree status and a balanced nutritional condition could be maintained. The obtained results also indicate the importance of proper timing of growth regulators application in determining the kind of response displayed by the tree according to its physiological condition and stage of development in relation to factors of the environment.