

S u m m a r y

5. SUMMARY

This study was conducted at Arab El-Ghodery, Kalubia governorate during the two successive seasons of 1998-1999 and 1999-2000 to elucidate the effect of some-preharvest treatments on vegetative growth, fruit yield and its quality as well as incidence of fruit rot. Such pre-harvest treatments were tested in combination with storage temperature as post-harvest treatments to study their effect on storage behaviour of produced fruits for two strawberry cultivars, *i.e.*, Chandler and Sweet Charlie. Therefore, to achieve the forementioned objectives of this study, three experiments were carried out as follows :

1- First experiment :

This experiment was performed to investigate the effect of pre-harvest foliar spray with fungicides, Rovral and Euparen as well as bio-products Promote and Plant-Guard at 1.0, 2.5, 4.0 g/L and 2.5 ml/L for each, respectively, during the flowering stage, in addition to the control treatment, on vegetative growth, total fruit yield and its component as well as fruit quality. Strawberry cultivars Chandler and Sweet Charlie were used in this experiment. Obtained results revealed that :

- There were significant differences between the studied cultivars in all vegetative growth aspects expressed as fresh and dry weight per plant as well as average petiole length of leaf. In this respect, cv. Chandler show the highest values for all the studied vegetative growth parameters.
- Pre-harvest spraying with either fungicides or bio-products significantly increased all the recorded growth measurements compared with the control treatment. In this regard, chemical fungicides were effective in increasing the vegetative growth of plant compared with the bio-products.

- Fresh and dry weights/plant as well as average petiole length of leaves were significantly affected by the interaction between the tested control agents and the used cultivars.
- Total fruit yield and its components expressed as number and weight of fruits per plant, early yield for plant and feddan as well as marketable fruit yield and percentage of infected fruits were affected by the used cultivar. In this concern, cv. Sweet Charlie recorded the highest values for all the studied yield parameters.
- Application of either fungicides or bio-products significantly increased the total fruit yield and its components and decreased the percentage of infected fruits compared with the check treatment. In addition, fungicides were more effective on increasing the total produced yield and its components compared with the bio-products.
- Total produced yield and its components as well as the percentage of infection were significantly affected due to the interaction between the tested treatments. In this regard, spraying strawberry plants of cv. Sweet Charlie with Rovral reflected the best results.
- Physical fruit characters, *i.e.*, average fruit weight, length, diameter and firmness as well as chemical fruit constituents, *i.e.*, T.S.S., T.A., V.C. and T.S. were significantly affected by tested cultivars. In this concern, cv. Chandler scored the highest values for physical characteristics of fruits, while cv. Sweet Charlie reflected the highest content for all assayed chemical constituents.
- Spraying strawberry plants either with fungicides or bio-products increased significantly all the measured physical and chemical traits of fruit quality. Moreover, fungicides showed the highest positive effect in this connection.

- Both physical and chemical characteristics of fruit quality were significantly affected by the interaction between the tested spray treatments and used cultivars. In this regard, application of Rovral at 1.0 g/L reflected the highest values for physical fruit quality in case of cv. Chandler and chemical constituents in case of cv. Sweet Charlie.

2- Second experiment :

This experiment was conducted to elucidate the response of vegetative growth, fruit yield and its components as well as fruit quality of cv. Sweet Charlie to the number of pre-harvest sprays with some fungicides and bio-products. In this study, the same control spraying agents used in the first experiment with their concentrations were used but for one, two, three, four or five times during flowering stage in addition to the control treatment forming 24 treatments. Obtained results showed that :

- Spraying Sweet Charlie plants with either fungicides (Rovral at 1.0 g/L and Euparen at 2.5 g/L) or bio-products (Promote at 4.0 g/L and Plant-Guard at 2.5 ml/L) affect fresh and dry weights per plant as well as average leaf petiole length. In this concern, Rovral exhibited the highest values in all traits compared with other tested substances.
- Increasing the number of sprays up to four or five times led to a significant increase in all the studied vegetative growth measurements compared with the non-sprayed treatment.
- Fresh and dry weights of plant as well as average petiole length of leaf were positively affected due to the interaction between the control-agents and the number of sprays. In this regard, using Rovral four or five times during the flowering stage reflected the highest values compared with other tested materials and the control one.

- There were significant differences among the tested control-agents in total fruit yield and its components expressed as number and weight of fruits per plant, early yield either for plant or feddan, and the marketable fruit yield as well as the % of infected fruits. In this respect, fungicides were superior.
- Spraying the plants four or five times with either fungicides or bio-products significantly increased total fruit yield and its components compared with the unsprayed treatment.
- The interaction between the tested control-agents and the number of sprays significantly affected the total fruit yield and its components as well as the percentage of infected fruits. In this respect, Rovral exhibited the highest values in yield and its components and the lowest values in case of infected fruits compared with other used treatments and the control one.
- There were significant differences among the control-agents in physical fruit characters, *i.e.*, average fruit weight, length, diameter as well as fruit firmness and chemical fruit constituents, *i.e.*, T.S.S., T.A., V.C. and T.S. contents. Moreover, the highest values were connected with the use of Rovral, while the lowest values were noticed in case of using Plant-Guard.
- Increasing the number of sprays up to four or five times during the flowering period reflected the best physical fruit quality characters combined with the highest content of fruit chemical constituents.
- Spraying the plant with fungicides especially Rovral at 1.0 g/L four or five times resulted in the highest values for both physical and chemical fruit quality compared with other tested treatments.

3- Third experiment :

This experiment was carried out to study the effect of pre-harvest foliar spray with fungicides and bio-products as well as the storage temperatures as post-harvest treatments on storage behaviour of strawberry fruits for Chandler and Sweet Charlie cultivars. Obtained results showed that :

- There were significant differences between the tested cultivars in weight loss and decay percentages of the fruits during the different periods of storage (3, 6 and 9 days). In this respect, the lowest values for weight loss and decay percentages of fruits were obtained in case of Chandler fruits.
- Pre-harvest application of fungicides or bio-products decreased the loss in weight and the percentage of decayed fruits compared with the control treatment. In addition, chemical fungicides (Rovral and Euparen) reflected the lowest values for both decay and loss in weight during the holding period of fruits.
- Under cold storage temperature, storing strawberry fruits at 0°C showed the lowest values of weight loss and decay percentages at the end of storage period.
- Fruit weight loss and decay percentages at the end of storage period (9 days) were significantly affected due to the interaction between the tested cultivars and control-agents, tested cultivars and storage temperature and the tested cultivar with control agents and storage temperature.
- In this regard, spraying the plants of cv. Chandler with Rovral 1 g/L and storing the produced fruits at 0°C reflected the lowest values of weight loss and decay percentages.
- Fruits of cv. Chandler had higher value of firmness compared with cv. Sweet Charlie during the storage period. In addition,

fruit firmness was gradually decreased with prolongation of storage period up to the end of holding period (9 days).

- Spraying the plants with either fungicides or bio-products led to the increase in fruit firmness compared with the control. In this concept, fruit resulted from plants sprayed with Rovral at 1.0 g/L showed the highest values of fruit firmness.
- Fruit firmness was significantly affected with storage temperature. Stored fruit at 0°C had higher fruit firmness values during the different storage period (3, 6 and 9 days of storage) compared with that fruits stored at 5°C.
- Fruit firmness was affected by the different interactions (double and triple) between each two factors or among the three studied factors. In this regard, the highest fruit solidity was reported in case of cv. Sweet Charlie when the plants were sprayed with fungicides or bio-products and the fruits were stored at 0°C compared with the control treatment and other tested control agents and storage at 5°C.
- Total soluble solids and total titratable acidity of fruits were significantly affected by the tested cultivars. In this respect, fruits of cv. Sweet Charlie had higher total soluble solids and acidity than those of fruits of cv. Chandler.
- Spraying the plants with either fungicides or bio-products led to gradual decreases in T.S.S. and T.A. contents during storage compared with the non-sprayed treatments.
- Under cold storage conditions, fruits stored at 5°C gave higher values of T.S.S. content and lower values of T.A. compared with those stored at 0°C. In addition, prolongation of storage period gradually decreased T.S.S. and on the other hand it increased the T.A.

- The T.S.S. content of fruits was decreased while that of T.A. was increased during the storage as a result of spraying the plants with either fungicides or bio-products.
- Fruit of both tested cultivars stored at 5°C gave the higher values of T.S.S. during the storage. In the same time such fruits showed the lowest values of T.A. Contra results were found when the fruits were stored at 0°C.
- Spraying the plants at flowering stage with either fungicides or bio-products and storing the produced fruits under cold storage condition (0 or 5°C) decreased the content of both T.S.S. and T.A. during storage.
- The interaction between pre-harvest treatment (cultivars and spray-agents) and post-harvest storage temperature led to reductions in total soluble solids and acidity contents of fruits at the end of storage period (9 days).