

5. SUMMARY

Two field experiments were conducted during the two successive winter seasons of 2005/2006 and 2006/2007 at the experimental farm of the Faculty of Agricultural, Moshtohor, Benha University to elucidate the effect of nitrogen fertilizer at the recommended dose (200 kg N/fed) levels as organic or mineral fertilization and natural antidisease substances as well as their interaction on growth, chemical constituents, fruit yield and quality as well as storability of strawberry fruits cv. Camarosa. Each experiment included 20 treatments resulted from the combinations of five nitrogen treatments i.e., 100% compost-N, 75% compost-N + 25 mineral-N, 50% Compost-N + 50% mineral-N, 25% compost-N + 75% mineral-N, 100% mineral-N and three natural antidiseases substances i.e., garlic extract at 10%, plant guard at 3ml/l and salicylic acid at 5mM/l in addition to the control treatment (sprayed with distilled water). Split plot design with four replicates was adopted where nitrogen treatments were distributed in the main plots and the natural antidiseases substances were randomly located in the sub-plots. Other agricultural practices for strawberry production under frigo system plantation were done as commonly followed in the district. Obtained results were statistically analyzed and revealed the following,

I. Vegetative growth characteristics:

1. Application of nitrogen fertilizer in the form of compost along with mineral nitrogen fertilizer at a rate of 25, 50 or 75% at

the recommended dose (200kg-N/fed.) positively affected plant growth aspects expressed as plant height, number of leaves and crown per plant, fresh and dry weight of plant as well as total leaf area per plant

In addition, supplementation of 50 or 25% mineral-N by compost-N reflected the highest values in all measured growth traits compared with 25 and 100% mineral nitrogen or 100% organic-N.

2. Spraying strawberry plants with natural antidisease substances i.e., garlic extract, plant guard and salicylic acid increased plant height, number of leaves and crowns per plant, fresh and dry weight per plant as well as leaf area per plant compared with the control treatment. In this regard, salicylic acid exhibited the highest values in all aforementioned growth parameters.
3. Application of nitrogen fertilizer in the form of mixture of 50% compost plus 50% mineral nitrogen combined with spraying the plants by salicylic acid resulted in the best growth parameters.

II. Chemical composition of plant foliage:

1. Using half of the recommended dose (200kg N/fed.) of nitrogen fertilizer in the form of compost and the other half as mineral nitrogen recorded the highest values in chlorophyll-a, b as well as carotenoids and total nitrogen percentage. However, using nitrogen fertilizer as 100% compost only reflected the highest concentration of phosphorus and potassium in plant foliage.

2. Application of natural antidiseases substances improved all assayed photosynthetic pigments and macro-nutrient concentration in plant foliage. In addition salicylic acid proved to be the best treatment.
3. Spraying strawberry plants with 5mM/l salicylic acid combined with applying nitrogen fertilizer as 50% compost plus 50% mineral nitrogen recorded the highest concentration of photosynthetic pigments and total nitrogen percentage while using salicylic acid combined with 100% compost gave the highest percentage of phosphorus and potassium.

III. Fruit yield and its components:

1. Application of nitrogen fertilizer at the recommended dose (200kg N/fed.) as organic-N (compost) produced the highest early fruit yield and the lowest percentage of infected fruits. However, using nitrogen fertilizer as 50% compost and 50% as mineral nitrogen reflected the highest total fruit yield either per plant or feddan as well as the highest marketable yield/fed.
2. Spraying the plants with different tested natural antidisease substances positively increased early, total and marketable fruit yield and reduced the percentage of infected fruit. Moreover, salicylic acid was superior in this respect.
3. The highest total produced yield either per plant or feddan as well as marketable yield were obtained as a result of fertilizing the plant with nitrogen as 50% compost plus 50% mineral fertilizer combined with spraying the plants by 5mM/l salicylic acid. On the other hand using nitrogen

fertilizer in the form of compost only (100%) and spraying plants with salicylic acid recorded the highest early yield and the lowest percentage of infected fruits.

V. Fruit quality:

a. Physical fruit quality:

1. Application of nitrogen fertilizer at the recommended dose (200kg-N/fed.) in the form of mineral fertilizer only exhibited the highest values in all measured fruit physical parameters i.e., average fruit length, diameter and weight.
2. Spraying the plants with natural antidisease substances increased the tested fruit physical quality aspects. In addition, the highest average fruit length, diameter and weight was recorded in case of using salicylic acid.
3. The highest values of all measured fruit parameters were recorded as a result of the combination between nitrogen fertilization at 200kg N/fed. as 100% mineral form and spraying the plants with salicylic acid at 5mM/l.

b. Chemical fruit quality:

1. Application of nitrogen fertilizer as 100% organic nitrogen in the form of compost showed the highest concentration of TSS, vitamin-C, anthocyanin, total and reducing sugars and the lowest percentage of total titratable acidity.
2. Spraying the plants with salicylic acid at 5mM/l recorded the highest concentration of Tss, vitamin-C, anthocyanin and total and reducing sugars as well as the lowest total titratable acidity.

3. The highest concentration in Tss, vitamin-C, anthocyanin, total and reducing sugars and the lowest percentage of total titratable acidity were recorded as a result of using nitrogen fertilizer as 100% organic nitrogen (compost) and spraying the plant with 5mM/l salicylic acid.

VI. Fruit storability:

1. Application of nitrogen fertilizer as 100% compost at the recommended dose (200 kg N/fed.) recorded the lowest percentage of total weight loss and decay followed by using nitrogen as 75% or 50% compost and other part in the form of mineral nitrogen.
2. Spraying the plants with natural antidiseases substances (garlic extract, plant guard or salicylic acid) significantly reduced the percentage of both total weight loss and decay during storage. In addition, the lowest value was recorded in case of salicylic acid.
3. Generally increasing the storage period up to 20 days increased the percentage of total weight loss and decay- of fruits
4. Using nitrogen fertilizer as compost at a rate of 200kg-N/fed. combined with spraying with salicylic acid at 5mM/l exhibited the lowest total weight loss and decay percentage within the different inspection periods of fruit during the storage up to 20 days of storage.
5. Fertilizing strawberry plants with 100% organic nitrogen (compost) at 200 kg-N/fed. increased Tss, vitamin-C,

- anthocyanin pigments, total and reducing sugar. In the same time, it decreased the total titratable acidity.
6. Preharvest spraying the plant with salicylic acid significantly increased TSS, total and reducing sugars as well as anthocyanin while it decreased vitamin C and total acidity with increasing the storage periods compared with other tested natural antididases substances and the control one.
 7. Concentrations of Tss, total and reducing sugars and anthocyanin concentration were increased while total acidity and vitamin C were decreased with the extending of the storage period up to 20 days of storage.
 8. The highest values of Tss, vitamin C anthocyanin pigment, total and reducing sugars as well as the lowest value of total acidity were recorded within different period of storage as a result of application of compost at 200kg-N/fed. and spraying the plant preharvest with salicylic acid at 5mM/l during the two seasons of study.

CONCLUSION

Under such conditions of the experiment fertilization strawberry plants with the recommended dose of nitrogen (200kg N/fed.) as 50% in the form of mineral nitrogen and 50% as compost and spraying plants with 5mM/l salicylic acid starting 75 days after transplanting and every 2 weeks intervals were the most affective agricultural stratige for increasing vegetative growth, total and marketable yield, Moreover, the highest early yield and the lowest infected fruit percentage and chemical fruit

quality and storability were recorded as a result of using 100% compost –N plus spraying plants with salicylic acid at 5mM/l.