5. SUMMARY

Two experiments were carried out for studying some productive traits of Nile tilapia *(O. niloticus)*.

First experiment:

The first experiment was conducted during the period between 15 May and the first of September 1995 in six fresh water earthen ponds at the Central Laboratory for Aquaculture Research at Abbassa village, Sharkia Governorate. The aim of this experiment was to find the optimal stocking rate of silver carp which was stocked with Nile tilapia, under the polyculture system of aquaculture, using two types of feeding, natural food which enhanced by organic fertilization (poultry litter) and supplementry feeds (artificial feed). Tilapia fingerlings were obtained from Abbassa hatcheries, the average weight of fingerlings was 11.3 gm. Silver carp was 164 gm.

Six ponds were stocked by 1000 of Nile tilapia fingerlings for each pond (4000 fingerlings/feddan). The six ponds assigned into two groups, each group composed of three ponds, the first pond of each group stocked with the first stocking rate (SR1) of silver carp (100 fish/pond), the second pond of each group stocked with the second stocking rate (SR2) of silver carp (200 fish/feddan) and the third pond of each group stocked with the third stocking rate (SR3) of silver carp (300 fish/pond). The three ponds of the first group had the first feeding treatment (fertilized with 50 kg poultry litter every week for each pond) and the three ponds of the second group had the second feeding treatment (fish feed containing 30% crude protein).

Random samples (50 fish from tilapia and 30 fish from silver carp) were taken from each pond biweekly during the experimental period. Body weight (in gm), body length and body depth (in cm) were recorded eight times biweekly. The first one recorded at the time of pond stocking with fish and the last one at harvesting at the 14th week from initiation. Condition factor (K) and specific growth rate was calculated using the measurements of body weights and body lengths. Random samples (10 fish of tilapia and 5 fish of silver carp) were used for testing carcass traits (dressing percentage, by products percentage and chemical analysis of flesh and by-products).

Results obtained from the first experiment could be summarized as follows:

A. Growth traits:

I. Body weight (BW):

1. Means of body weights of Nile tilapia from the 4th week up to the 14th week of the experiment, fed the supplementry feed (containing 30% crude protein) were significantly higher than the same specie fed natural food enhanced by poultry litter as organic fertilization. Body weights of silver carp showed the opposite results.
2. Body weight of Nile tilapia increased with increasing silver carp stocking rate and amount of supplementry feed. Increasing silver carp stocking rate was followed by decrease in body weight of silver carp and this result may be attributed to the competition between tilapia and silver carp for the natural food in the pond.
3. The interaction effect of feeding treatment and stocking rate showed that the two factors act dependently on each other and also each of them had its own significant effect. The interaction was more effective with respect to tilapia fish.

II. Total yield:

1. Tilapia fish gained the largest total gained (462 kg) when fed the supplementry feed compared with 324 kg gained by the same specie raised in the ponds fertilized with poultry litter. The opposite results were obtained with silver carp raised in the ponds fertilized with poultry litter where gained 291 kg compared with 206 kg for the same specie fed supplementry feeds.
2. The total yield for Nile tilapia and silver carp at harvesting, after 14 weeks increased with each increase in stocking rate. This result indicated the rapid growth rate of tilapia which reflect on total fish production.

In general the largest fish production (270 kg) for tilapia and silver carp was recorded from the pond had the supplementry feed and the third stocking rate (SR3), and the lowest fish yield (180 kg) obtained from the pond fertilized with poultry litter and had the first stocking rate (SR1).

III. Specific growth rate:

1 The values of SGR of Nile tilapia from the first week up to 14th week of the experiment and within biweekly intervals, show that, using supplementry feed gave

higher values than using poultry litter in most intervals. The opposite results was obtained with respect to silver carp.

2. Increasing stocking rate by silver carp was followed by increasing the amount of supplementry feed which was more suitable for tilapia fish in the presence of natural food, therefore, with the increasing stocking rate, SGR of Nile tilapia increased, while SGR of silver carp decreased.
3. The best SGR values for tilapia, due to the interaction between feeding treatment and stocking rate, were recorded with fish during the first four weeks as the rates ranged between 3.76-4.57 while in the rest weeks the rates ranged between 0.96-2.86. The best SGR values for silver carp were recorded with fish during the first eight weeks (0.37-1.83) while in the rest weeks the rates ranged between 0.38-1.13.

IV. Body length and depth (BL & BD):

Using supplementry feed increased body length and body depth of Nile tilapia more than the other feeding treatment. The opposite trend was obtained with silver carp. Due to the effect of the 3rd stocking rate, the increase of each of body length and depth of Nile tilapia was more compared with the other two rates, and the significance among means began early from the 2nd week increase of body length and from the 4th week in the case of body depth while with respect to silver carp, the increase was more due to the effect of the 1st stocking rate and the significance began lately from the 8th week of the experiment in the case of body length and from the 6th weeks for body depth. These results are in accordance with the results obtained for body weight and specific growth rate of the two fish species.

V. Condition factor (K):

1. Condition factors for Nile tilapia and silver carp were paralleled with previous fish growth results.
2. The effect of stocking rate on condition factor of Nile tilapia and silver carp are different within the whole period of the experiment.

VI. Correlation coefficients between body measurements:

The coefficient of correlation between BW and each of BL and BD and also between BL and BD of both Nile tilapia and silver carp were high, positive, significant

($P<0.001$) and values ranged from 0.66 to 0.94 from the first week up to the 14th week of the experiment.

B. Carcass traits:

I. Nile tilapia carcasses:

1. Tilapia fish fed the second feeding treatment (supplementry feeds) compared with fish fed the first feeding treatment (natural food) show higher percentages of dressing (50.3 vs. 47.7%) and flesh (39.2 vs. 37.3%) and lower percentage of head (30.8 vs. 33.3%), viscera (7.1 vs. 7.7%) and by-products (54.5 vs. 56.8%). The differences between these components, due to feeding treatment were significant ($P<0.05$) for dressing and head percentages. The balanced supplementry diet beside the natural food available in the pond water provided tilapia fish with extra amounts of protein, fat, minerals and vitamins required for fish.
2. The second stocking rate (SR2) had higher percentage of dressing (50.1%) compared with 49.2 and 47.6% for the first and third stocking rate, respectively. The differences between dressing percentages were significant ($P<0.05$). The same trend was obtained in case of skeleton percentage. The highest dressing percentage was obtained by fish in the second stocking rate and fed the supplementry fed (52.9%) but the lowest one was obtained by fish in the third stocking rate and fed natural food enhanced by poultry litter. The flesh percentages of fish fed the first feeding treatment decreased with increasing the stocking rates but in the second feeding treatment the flesh percentage increased from the first to the second stocking rate only.

II. Silver carp carcasses:

1. The carcasses of fish affected by the first treatment (fertilization) had higher percentages of skeleton (7.4 vs. 6%), by-products (51.3 vs. 49.%) and lower percentages of flesh (48.2 vs. 50.8%).
2. The three stocking rates had non-significant effect on carcass traits.

III. Correlation coefficients between measurements and carcass traits:

For Nile tilapia there are high positive and correlation between dressing percentage (DP) and each of BW (0.35), BL (0.41), BD (0.47) and flesh percentage (0.86). For silver carp, there are positive correlation between DP and each of BW (0.38) and flesh

percentage (0.90), and negative, non-significant correlation between DP and each of BL (-0.30) and BD (-0.32).

C. Chemical composition of flesh and by-products:

1. Tilapia flesh of the first treatment compared with the flesh from fish fed supplementry feed, had higher percentages of protein (87.02 vs. 84.00%) and ash (7.54 vs. 6.23%) but lower percentages of fat (6.12 vs. 10.53%) and the differences between percentages under the two feeding treatments were significant. The same trend of results was obtained with respect to chemical composition of by-products. Tilapia flesh raised in the first stocking rate had the lowest protein percentages (82.82%) and the largest fat percentage (9.98%), whereas the third stocking rate had the largest protein percentage (87.37%) and the lowest ash percentage (6.21%). The same trend of results was obtained with respect to chemical composition of by-products.
2. Silver carp flesh from fish raised under the first feeding treatment compared with that fed the supplementry fed had larger percentages of dry matter (22.14 vs. 20.98), protein (84.39 vs. 77.65%), fat (9.52 vs. 6.48%), and lower percentages of ash (6.99 vs. 8.67%) and moisture (78.86 vs. 79.02%). Stocking rates of silver carp had non-significant effect on percentages of protein, fat and ash, but there was significant effect on the moisture and dry matter percentages of silver carp flesh.
3. The interaction between stocking rate and feeding treatment had non-significant effect on chemical composition of tilapia and silver carp flesh and by-products.
4. The coefficients of correlation between protein percentages of tilapia flesh and each of BW, BL, and BD were moderate, negative and statistically significant, while in the case of silver carp the coefficients were low, positive and not significant. The coefficients of correlation between fat percentage of tilapia flesh and each of BW, BL and BD were moderate, positive and significant, while in the case of silver carp, the coefficients were high, positive and significant.

Second experiment:

The second experiment was conducted during the period between April 1997 and December 1997 at the warm water recirculation system of Institute of Animal

Husbandry and Genetics, University of Gottingen, Germany. The aim was to compare the growth , sexual maturation, carcass traits and the chemical composition of flesh and by-products of *O. niloticus* triploids and their diploid sibs. Producing diploid and triploid full sibs was carried out according to Puckhaber and Horstgen-Schwark (1993). Random samples (50 fish of each of diploid and triploid) were taken biweekly during the experimental period and used for measuring body measurements and growth traits by using the same methods used in the first experiment. Carcass traits and chemical analysis of fish flesh and by-products were determined. Gonado-somatic index (GSI) and Hepato-somatic index (HSI) using body weight (gm) and gonad and liver weight (gm). The results are summarized as follows:

1. Triploid *O. niloticus* had heavier and longer bodies than diploids from 3 to 7 months of age, and the differences were not significant only for body length. This trend was also observed for condition factor, body depth, daily gain and specific growth rate. Feed conversion ratios was better for triploids at some studied ages.
2. In triploid of both sexes GSI were smaller than diploids with significant differences between the two ploidy groups. But HSI of triploid *O. niloticus* males were larger than that of diploid with significant differences between the two groups. However, HSI of triploid females were smaller than that of diploid females, but the differences were not significant.
3. Carcass traits of Triploid *O. niloticus* had the higher percentages of dressing, viscera, by-products and lower percentages of flesh as compared with that obtained from the diploid fish.
4. Chemical analysis of flesh indicated that protein, fat and ash percentages in triploid flesh were higher than in diploids, while the opposite trend was obtained with respect to moisture percentage.
5. Triploid by-products had the higher percentages of fat and ash and the lower percentage of crude protein and moisture with significant differences for moisture only. °