# physiological studies on growth, flowering and component of carthamus tinctorius plant

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The current investigation was carried out to studythe effect of organic m a n u re , mineral f e r t i l t z e r s andartificial feed on both different soil properties andfish production. Moreovert the effect of differentstoc ing rates on the fish production was also studied.(A) To achieve the first p u rp o se , five ponds inEl-$ row Fish Farmt Dakahlia Governoratet were chosen tocarr out the following treatments:1. T e first pond was fertilized with organic manurea ly.2. T~e second pond was fertilized with two mineral fertilizersi.e ammonium sulphate and superphosphate.3. T~e third pond was fertil i ze d with organic manuret~gether with mineral fertilizers.4. A~tificial feed was used in the 4th pond alone.I5. T~e fi vth pond wa s control t i. e no fert i 1 izers orartificial feeds were used.All these ponds were stocked with Tilapia s pp .,Cyprinus carpio and Mugil cephalus at the rate of 1800fish per feddan for a growth period of 160 days.To study the effect of di fferent treatments onsomej soil physical and chemical properties, soil sampleswe reii t a ken fro m 0 - 10 , LO- 2 5 and 2 5 - 6 0 c m s 0 i 1 d e p t h 5at: lt he beginning of the study, after three months andia t tl h e end 0 f stu dy, i .e aft e r h a r v est i ng the f ish and!dryilng ponds of the farm.!Al so, water samples were taken monthly for analy s ns from the five ponds and from the source and drainagewater. In the same time, random samples from allreared fish species were taken and weighted every monthfrom June 1989 to November 1989.The obtained results can be summarized as follows:(I) The effect of di fferent treatments on somesoil physical properties:1. Particle size distribution was not affected by theused treatments.2. The values of soil bulk density were decreased in allfertilized ponds, except in the pond recieved mineralfertilizers. So i 1 bulk dens i ty increased wi thincreasing soil depth. The values of soil bulk densitywere significantly and negatively correlatedwith OM%, AS% and EMgP. While they significantly andpositively correlated with both of Sol-Na ESP.Moreover, the addition of organic manure with orwi thout mineral fertil izers significantly increasedtotal soil porosity.3. No clear trend was observed, concerning the effect ofdifferent treatments on the values of soil hydrau'iiCconductivity (K). They decreased on most ponds andincreased in few ones.4. The values of DSA% of 4.8-2.5 mm in diameter wereincreased by the addition of organic manure with orwithout mineral fertilizers. While, both mineral fertiz1iersand artificial feed did not significantlyaffected DSA%. On the other hand, a significant andnegative correlations were found between DSA% andboth of AU and ESP, while the opposite was true for5. WSA% of 1.6-0.8 mm and 0.8-0.4 mm in diameter wereincreased by manuring in the surface soil layer,also the WSA% of 0.8-0.4 mm and 0.4-0.2 mm indiameter were increased in the deepest one. It wasalso found that, the addition of organic manure plusmineral fertilizers raised the values of WSA% of0.8-0.4 mm and 0.4-0.2 mm in diameter in the surfaceand subsurfae soil layers.The opposite trend wasfound in the case of mineral fertilizers andartificial feed where, their additions lowered theWSA% of 0.8-0.4 and 0.4-0.2 mm in diameter in allsoil depths. The values of WSA% were significantlyand positively correlated with OM%, EMgP and ECaP.While, they significantly and negatively correlatedwith rc, Bd and ESP.- 174 -3. Soluble cations and anions:a) Soluble Na was decreased in most experimentalponds especially in the surface layer and in thepresence of organic manure. The concentration ofSol-Na at the end of the study was between one tofour fivth of the original levels.b) Soluble-K followed nearly the same trend of Sol-Na.c) The changes of Sol-Ca were unlimited, and there wasno clear trend concerning the effect of differenttreatments at the end of study.d) Soluble-Mg was decreased by about 10% to

68.64% atthe end of study and as a result of differenttreatments.e) Soluble-Cl was decreased rapidly in the pondsinitially contained high concentration of Cl-,f) There was no measurable amounts of C03,The values of HC03 were decreased in the fertil izedponds~ while~ they increased in the pond treated withartificial feed in the surface layer. The opposite was truefor the deep layers.g) Soluble-S04 decreased in all experimental ponds in allall soil depths.4. OM% was considerably increased in most ponds, Thepercentages of increase were 10.31% and 12.22 in theponds fertilized with organic manure only or organicmanure plus mineral fertilizers, respectively. OM%was significantly and positively correlated with AS%,while it negatively correlated with soil pH.5. The values of soil CEC increased in most investigatedponds, but this increase was not significant. Asa general trend, soil CEC increased with increasingsoil depth.6. Soil ESP slightly increased (0.42-15.69%) at the endof study in the pond fertilized with organic manure,while, it decreased by about 4.99 and 50.19% in theother ponds.Similar trend was also noticed for EKP.7. The values of both ECaP and EMgP were increased inmost investigated ponds at the end of experiment. Theobserved increases of both ECaP and EMg P were correlatedwith the increases of soluble calcium and magnesiumin the pond1s water.( I I I ) Effee t a f d iff ere n t t rea t men t son f ishproduction:Results of the first experiment showed that:1. The growth rates of different fish species reared inthe pond fed wi t h art i f i cia 1 feed were higher thanthat reared in the fertilized ponds.2. The addition of organic manure to the fish pond gavebest production of Mugil cephalus as compared withmineral fertilizers which were not useful.3. Total fish production of fish reared in the pond fertilizedwith organic manure plus mineral fertilizerswas less than that of the pond treated with artificialfeed. But it was higher than the production ofthe ponds fertilized with either organic manure ormineral fertilizers alone.4. Statistical analysis showed that, there was no significantdifference between the fish production inthe pond fertil ized with organic manure alone andthat fertilized with organic manure together withmineral fertilizers. The lowest production wasobtained in the pond fertilized with mineralfertilizers alone.So it can be said that, the addition of mineralfertilizers to the fish farms is not important. While,it can be recommended the use of organic manure - withcare _ in the fish farms instead of the artificial feedto reduce the cost of production.(B) In order to realize the second purpose of thestudy, i.e. the effect of different stocking rates onfish production. three ponds were chosen. These pondswere stocked with Tilapia spp .• Cyprinus carpio andMugil cephal us in polyculture system with threedifferent stocking rates i.e, 2100, 3150 and 4200 fish/feddan. The ratios between the three fish species were75 : 18.3 and 6.7% for Tilapia Cyprinus carpio and M.cephal us, respectively.The reared f is hes were fed wi th a mi xture oforganic manure, mineral fertilizers and artificialfeed. The experiment lasted 160 days.The obtained results can be summarized as follows:1. Growth rates of Tilapia spp. decreased with increasingthe stocking rate, while the total productionwas increased.Statistical analysis showed that, although thefinal weight of tilapias in the lowest stocking ratewas higher than the other two rates, the differencebetween their final weightrwere not significant.it can be recommended the use of organic manure _ withcare - in the fish farms instead of the artificial feedto reduce the cost of production.(B) In order to realize the second purpose of thestudy, t . e . the effect of different stocking rates onfish p r o duc t t nn , three ponds were chosen. These pondswere stocked with Tilapia spp., Cyprinus carpio andMug;l cephalus in polycu1ture system with threedifferent stocking rates i.e, 2100, 3150 and 4200 fish/feddan. The ratios between the three fish species were75: 18.3 and 6.7% for Tilapia Cyprinus carpio and M.cephal us, respectively.The reared fi shes were fed wi th a mi xture oforganic manure, mineral fertilizers and artificialfeed. The experiment lasted 160 days.The obtained results can be summarized as follows:1. Growth rates of Tilapia ~ decreased with increasingthe stocking rate, while the total productionwas increased.Statistical analysis showed that, although thefinal weight of ti1apias in the lowest stocking ratewas higher than the other two rates, the differencebetween their final weightt!were not significant.