Response of pea plants to organic and biofertilizers under saline conditions

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Two field experiments were carried out at Ras Sudr region in South Sinai Governorate, Egypt during the two successive winter growing seasons of 1999 / 2000 and 2000 / 2001.This study was divided into two major experiments, the first one was to study the effect of three different organic manures and bio-fertilizers (microbial varieties) as well as their interaction on pea plant growth and productivity grown under saline conditions. The second one was carried out to determine the effect of three organic manures and their combination on growth and yield of pea plants grown under saline conditions.I. The first experiment:This experiment included 18 treatments arranged in a split plot design with three replicates. Treatments were three sources of organic manures (farmyard, sheep dung and chicken manures) arranged in the main plots and 6 treatments of three microbial varieties and their mixed as well as the recommended dose of NPK fertilizer and the control treatment in the sub plots. The obtained results were as follows:1. Vegetative growth characteristics:-There were significant differences among the used organic manures on all studied vegetative growth characteristics.The inoculation with mixed bio-fertilizers significantly produced the highest values in all studied parametersThe inoculation by mixed bio-fertilizers combined with farm yard manure significantly increased most of vegetative growth characteristics.2.Photosynthetic pigments:There were significant increments in a, b and total chlorophyll values actualized from chicken manure or mixed bio-fertilize s treatments compared with other manuring treatments, while the carotene pigments were significantly increased with farm yard manure or NPK in the two growing seasons.3.Endogenous hormones:The hig est values of gibberellins, indole acetic acid and cytokinins ere recorded in plants treated with farm yard manure an microbial inoculation as individual or in combinatio treatments in the two growing successive seasons.4.Foliage mineral content:Applicafon of farm yard manure significantly increased phosphorus, potassium and calcium while nitrogen content were increa ed with chicken manure application. Moreover, the plants treate i with sheep dung absorbed more quantity of Na.The treatment of mixed bio-fertilizers increased N concentration in pea foliage while NPK fertilizers increased P, K and Ci concentration. Meanwhile, Nal” significantlydecreased sly with inoculation in this case.The significantly highest concentration of nitrogen in pea plants was resulted with chicken manure included with mixedbio-fertilizers. The highest values of phosphorus, potassium and calcium increases were actualized from NPK or farm yard manure application compared with control and all other treatments.5.Yield and its component of peas:-The effects of different used organic manures as well as recommended dose of NPK or used bio-fertilizers either as single mixture or in combination with organic manures were as follows:The application of chicken manure significantly increased the average of pod number per plant and the average of plant yield. Moreover, farm yard manure treatment significantly increased the average of pod weight and enhanced plant yield and the total green pod yield per feddan.When plants were treated with farm yard manure and mixed bio-fertilizers or individual Bacillus treatment significant increases in the total green pods yield per feddan and its components were obtained compared with other treatments.6.Pea physical characteristic:The application of sheep dung manure or chicken manure as individual or in combination with mixed bio-fertilizers led to significant increase in average pod length, pod diameter, number of seeds / pod and weight of 100 seeds.SUMMARY AND CONCLUSION 1037. Nutritio al value of seeds:7.1. Or anic chemical composition in dried pea

seeds:The ap • lication of chicken manure significantly increased crude protein while total carbohydrates were increased with sheep du g in both growing seasons. Meanwhile, the decrement • f fiber percentage was achieved with sheep dung and chick • n manure in the first and second seasons, respectivel . whereas, the increment of crude protein and carbohydra es and the lowest value of fiber percentage were significantly affected with recommended dose of NPK and bio-fertilizers e'ther as single or in combination.The hi hest crude protein contents in green pea seeds were achieved' om the chicken manure in corporate with NPK fertilizers or with mixed bio-fertilizers while the fiber percentage was significantly decreased with the application of chicken manure and Azospirillum treatment.7.2. Mineral composition in dried pea seeds:The seeds of plants treated with chicken manure contained the highest amount of nitrogen while the highest amounts of phosphorus, potassium and calcium were established in seeds of plants received farm yard manure, NPK and single or mixed bio-fertilizers. On the other hand, sodium content in seeds sharply decreased with application of farm yard manure, NPK and single or mixed bio-fertilizers.ConclusionIt may be generally concluded that fertilizing pea plants cv. Little Marvel with farm yard manure at rate of 30 m3 / fed. + mixed bio-fertilizers (Azospirillum, Azotobacter and Bacillus) are recommended for the highest values of vegetative characteristics and green pod yield.II. The second experiment:This experiment included eight treatments arranged in complete randomized block design with three replicates. The treatments were recommended dose of NPK fertilizers, farmyard manure (FYM) at rate of 40 m3 / fed., chicken manure (Ch.M.) at rate of 10 m3 / fed., sheep manure (Sh.D.) at rate of 30 m3 / fed., 20 m3 of FYM plus 5 m3 Ch.M. / fed., 20 m3 of FYM plus 15 m3 Sh.D. / fed., 5 m3 of Ch.M. plus 15 m3 Sh.D. / fed. and 20 m3 of FYM, plus 15 m3 Sh.D. plus 5 m3 Ch.M. / fed.The obtained results could be summarized as follows:1.Vegetative growth characteristic:The morphological characteristics were significantly increased when the soil was amended with 20 m3 FYM plus 5 m3 Ch.M plus 15 m3 Sh.D / fed.2.Photosynthetic pigments:Using the combination between the three different organic manures significantly increased chlorophyll a, b and totalSUMMARY AND CONCLUSION 105chlorophyl and decreased carotenoides pigments in foliage of pea plants.3.Endoge ous hormones:Concerning the effect of different organic manures and their com inations on gibberellins, indole acetic acid and cytokinins, mixing the three used organic manures as farm yard manure, heep dung and chicken manure each at half recommen a ed dose was of superior effect in this respect.4.Foliage ineral content:The hi hest values of nitrogen, phosphorus and calcium and the lo est values of sodium content were obtained with the combinatio of the three used organic manures. The highest potassium concentration in pea foliage was achieved from mineral fe ilizers.5.Yield an i its component of peas:The h ghest values of total produced yield and its compnents were achieved from the application of the combinatio s between half amounts of farm yard manure plus half amou t of sheep dung plus half amount of chicken manure.6.Pod phy ical characteristic:The a lication of FYM at rate of 20 m3/fed + Sh.D at rate of 15 m3/f d + Ch.M at rate 5 m3/fed treatment accomplished the highest alues for pods physical characteristics.SUMMARY A CONCLUSION 1067. Nutritional value of green pea seeds: 7.1. Organic chemical constituents:There were significant increase in crude protein and significant decrease for fiber percentage in seeds of plants fertilized with the mixture of 20 m3 FYM + 15 m3 Sh.D + 5 m3 Ch.M / fed followed by 20 m3 FYM + 5 m3 Ch.M / fed treatment, while as total carbohydrates percentage was significantly increased when plants were fertilized with mineral fertilizer.7.2. Mineral chemical constituents:The application of FYM at half amount + half amount of Ch.M + half amount of Sh.D significantly increased the concentration of nitrogen, phosphorus and calcium and significantly decreased sodium content in dried green pea seeds while the concentration of potassium in seeds was significantly increased with the application of NPK fertilizer.ConclusionGenerally, it could be concluded that under such conditions the application of 20 m3 FYM + 15 m3 Sh.D + 5 m3 Ch.M / fed. to the pea plants cv. Little Marvel are recommended to give the most favorable growth characteristics, the highest green pod yield with best quality.