# Effect of some minor elements and growth regulators on growth and dry seed yield of Giza-3 common bean cultivar

Fathy Mohamed Mahmoud El-Assiouty

This study aimed to elucidate the effect of some micronutrients and growth regulators foliar spray on the morphological characteristics, plant constituents, flower-ing, seed yield and its components and seed quality of common bean cv. Giza-3. Two field experiments were carried out at the Experimental farm of the Faculty of Agriculture Moshtohor, Zagazig University during the summer seasons of 1981 and 1982. First experiment:Three micronutrients each of 3 concentrations; 10, 20and 40 ppm Cu, 25, 50 and 100 ppm Mn, 25, 50 and 100 ppm Znwere added as foliar spray at 2th, 4th, 6th true leaf stages. Obtained results were as the following:1)Spraying bean plants with the micronutrients i.e. Cu, Mn and Zn at the concentration of 10-40 Cu and 25-100 ppm Mn or Zn resulted in inhibiting different plant morpholo-gical characteristics and plant growth in general.2)Spraying bean plant with Cu, Mn or Zn led to a significant increase in chlorophyll a, b and total chlorophyl content of leaves. The most favourable treatments in this respect were ; 40 ppm Cu, 50 ppm Mn and 25 ppm Zn.3)Cu, Mn and Zn foliar application significantly decreased NPK uptake and total carbohydrates accumulation expressed as mg per plant, unique exception in this respect is that of Zn when plants sprayed with 50 ppm Zn had high phospho-rus content.4)The number of days from sowing up to the first flower anthesis was significantly decreased as a result of spraying plants with Cu, Mn or Zn within all used concen-trations. Meanwhile, it is obvious that treated plants flowered 3-7 days earlier than control ones.5)Spraying plants with 40 ppm Cu, 25 ppm Mn or 25-50 ppm Zn had a good enhancing effect on number of flowers per plant.6)The percentage of pod setting was significantly improved by the foliar application of 10-20 ppm Cu or 25 ppm Zn compared with ,the other treatments.7)Treatments of Cu at 40 ppm, Mn at 25 ppm and Zn either 25 or 50 ppm significantly increased number of pods per plant than the control, but failed to increase dry seed yield.8)The different micronutrients used treatments increased number of seeds per pod but no significant differences were detected, however treatments resulted in highest number of pods per plant showed the least number of seeds per pod.9)Different used treatments led to an decrease in weight of 100 seeds compared with control except the weight of 100 seeds obtained from plants sprayed with 100 ppm Mn which significantly exceeded that of the control.10)However, few teatments increased the netting percentage of bean pod, no significant variation were detected.11)Most used micronutrients treatments were of favourable effect cn the seed yield compared with untreated plants. Moreover, Cu application at 20 ppm, Mn at 100 ppm and Zn at at either 50 or 100 ppm significantly increased the dry seed yield of common bean cv. Giza-3. The max-imum increment reached 31-38% with the application of 100 ppm Mn compared with the control and mainly could be refered to the increase in seed index and not to number of pods per plant.12)Mn and Zn application at 50-100 ppm and Cu at 20 ppm significantly increased NPK uptake and total carbohydrates accumulation in dry seeds than that in the control. In this respect, Zn or Mn application was more favourable than Cu-application.13)Percentage of germination was not increased while the emergency rate was improved as a result of micronutrient application. CONCLUSION:Finaly, spraying plants three times at 2, 4, 6 true leaf stages with MnSO4 at 100 ppm Mn may be recommended for the high productivity of dry seed yield of bean plants grown in summer

season under such the experimental conditions of this work. Second Experiment:Two growth regulators i.e. NAA or GA3 at 25, 50 and 100 ppm of each were sprayed on common bean foliage as the-91-same pattern followed in the first experiment. The most results were:1)Generally, either NAA or GA3 at 100 ppm promoted plant height and internode length. Furthermore, the foliar application of(number kAK.v.L,J25 ppm NAA or 50 ppm GA33( of leaves per plant, whichconsequenthy increased fresh and dry weight per plant.2)There were significant consistent decrease in the contents of chlorophyll a, b and consequently total chlorophyll concentration in bean leaves by increasing levels of NAA application from 25-100 ppm, on the other hand there was a progressive and consistant increase in'chlorophyll content by increasing the concentration of GA3 application from 25 to 100 ppm. Therefore, the maximum chlorophyll content was found in plants sprayed with 25 ppm NAA or 100 ppm GA3.3)Increasing levels of NAA or GA3 application from 50 ppm up to 100 ppm greatly decreased NPK uptake and total carbohy-drates accumulation. However, low concentration 25 ppm of both NAA or GA3 did not increase NPK or total carbohydrates content of plant foliage than the control.4)Number of days from sowing to the anthesis of the first flower seemed to decrease as a result of spraying plants with NAA or GA3.5)Spraying plants with 25 ppm NAA or 50 ppm GA3 significantly increased number of flowers per plant than in the untreated ones.6)The pod setting percentage considerably increased as a result of spraying plants with 25 ppm NAA or 50 ppm GA3.7)The application of NAA at 25 ppm and GA3 at 50 ppm significantly increased the number of pods per plant.8)NAA or GA3 had no significant effect on number of seeds per pod except in 1982 when plants which received 25 ppm NAA produced a slight increase in this characteristic than other treatment.9)Increasing levels of NAA or GA3 application from 25 to 100 ppm seemed to increase values of seed index, the heaviest seeds were resulted from plants received 50 and 100 ppm NAA compared with the other treatment.10)Both GA3 or NAA application had no considerable effect on the netting percentage. 11)The maximum dry seeds yield was obtained from plants treated with 25 ppm NAA or 50 ppm GA3. This increase in dry seed yield could be mainly refered to the promoting effect of growth regulators at these specific concentrations on number of flowers per plant, fruit setting % as well as number of pods per plant.12)The maximum NPK and total carbohydrates in dry seed resulted in plants sprayed with 25 ppm NAA or 50 ppm GA3 compared with the other treatments including the control.13)Germination percentage and emergency rate were not consi-derably improved either by NAA or GA3 compared with the control.Generally it could be concluded that spraying bean plants with 25 ppm NAA or 50 ppm GA3 3 times at 2nd, 4th, and 6th true leaf stages were the best treatment for the production of high dry seed yield and therefor it may be recommended in this respect.