Physiological studies on rosa gallica var aegyptiaca

Hesham Abd El-Hamled Mohamed Migahid

SUMMARY AND CONCLUSIONSThe stUdy was conducted throllqh seasons, 1984/1985,1985/1986, and 1986/1987 onRosa 9.c!.Ll,.viacra. aegyptiaca plants of18 months age.'l'lip Jnvestiqation waf> oert ormed 111 t.tlf' pxpprimf'ntdl t arm oft.he l"dcully o t AqrlCl.lllure, Zc.HldZlq lJ/llvt,·r~~ll.y, ott. M()~,III.ullf~r.The present investigation includes three parts; the effectof qrowth regulators, kinetin (in the concentration of 50 and100 ppm) and B (in lOOO and 4000 ppm), the effect of nitrogen 9fertilization at the levels of 150, 300 and 450 kg/Feddan asammonium nitrate, and the interaction between growth substancesand nitrogen fertilization. The effect of these factors werestudied to .i. nvestigate their effects on growth and flowercharacters anatomical changes of buds and some chemical analysis.The results obtained could be summarized in the following :I. Vegetative Growth:a. Kinetin:Kinetin increased plant height by 50 and 76% over thecontrol in the two cencentrations used. This increase was 100and 179% in number of canes/plant. In fre~h weight of canes th.epercentage increases due to the two levels of kinetin were 106and l~O". While with fresh weiqht of leaves kinetin produced 32and 50':increase over the control.Ury matter percentages ot canes and leaves were increased bythe first level of kinetin only.b. B9B9 influenced all the growth characters studied, in which thefirst level was the most effective. This differ than the trend•182obtained by kinetin which produced its effect ~ith increasing theconcentration. B i~ a growth retardant and exhibited a9stimulant effect with the lover concentration only.II. Nitrogen FertilizationNitrogen vas applied in three doses 150, JOO and 450 kgammonium nitrate/Feddan. Nitrogen increased plant height byadding deifterent nitrogen levels. The increases due to the 3nitrogen levels were 34.83, 31.12 and 42.91 over the controlrespectively.The canes number corresponding to each level of nitrogen was22.66, 35.33, 39.66 and .44.00 per plant for 0, 150, 300, and 450kg ammonium nitrate. With respect to the fresh weight of canes,it vas found ~that the second level of nitrogen had the mostpromising and highly significant effect. Gradual increase in drymatter percentages of canes were found due to the addition o[-:" . ' nitroQen.Fresh veight of· leaves per plant increased as nltroqenlevels increased. The values were 30.46, 35.71, 37.76 and 41.55grams for N, N , Nand N respectively. On the other hand012 3the percentage increases of dry matter of leaves over the controlwere 8.U.~ 7.49 and 19.04 due to the three nitrogen levels.3. I:hteraction Between Growth Regulators and NitrogenFertilizationa. .th the Combination of kinetin and nitrogen the highervalues could be pointed out as follovs :Plant heiCjht ..The optimum treatment vas higher kinetincombined with the first level of nitrogen.Nuaber of canes: The higher values vas with treatment took••183higher kinetin with medium nitrogen level.Fresh weight of canes/plant : The optimum treatment was higherkinetin with lower nitrogen dose.Dry matter percentage of canes The higher values wereobtained by both higher levels of kinetin and nitrogen. Fresh·and dry weiqht of leaves, the higher values were obtained by K N 1 3and K'1.b.N1respectively.and nitrogen the followingeachaspect studied :Plant height B9 1 N , Number of canesl .of canes/piant: nono interactionoccur red, to'resh weight interaction, Dry ..matter % of canes B in its two doses combined with nitrogen9with the medium level, fresh and dry weight ot leaves . nointeraction occurred.II. Io'lovering:1. Growth Regulatorsa. Kl.netina.l. Flowering period started from March and continue to Mayin which maximum production was obtained in all the treatmentsconducted. Kinetin increased the monthly and flower yield/plantcompared with control. The yield was 25.10, 55.0 and

118.05grams in March, April and May respectively by the first ~evel,however the second one gave smaller values. The total floweryield per plant was influenced by kinetin treatment. The yieldwas 198.25 and 144.15 for K and k versus 71.23 grams for1 2control in 1986, while were 189.35, 139.13 versus 73.36 in 1987.a.2. Kinetin influenced bud development by increasing rateat development and differentiation.b. Bb.1.9B in its two doses intluenced9yield per plant in the twoflower yield, monthlyo.r total growth seasons. Theyield/plant was 119.24 and 158.24 for B9 and B9 versus 11.231 2grams for control in 1986, while were 99.18 154.16 verrus 73.36in 198'7.•b.2. B affect bud development, in picture opposite to that9with kinetIn. The cells were minute in shape and size and verynarrow in its diameter, all gland Is clear, leaf perrnordla 1sdelayed and less in length.11. Nitrogen Fertilization1. Nitrogen in the second level (300 Kg) increaced floweryield as monthly or as total per plant in the two seasnns. Theyield was 188.61, and 181.26 for seasons 1986, and 1987respectively versus 71.23 and 73.36 grams for control in the twoseasons.2. Bud development was not influenced byfertilization as detected by the anatomical studies.nitrogen3.a.l. As the interaction between kinetin and nitrogen theireffect on flower yield per plant was considered a synergismeffect was accurred between the first dose of kinetin and thethird level of nitrogen which preducedthe highe~ yield.3.a.2. No changes in tissues of transverse section wereobserved as influenced by combination of nitrogen and kinetin.3.b.1. B the higher values of flowers per plant, and 9consequently per feddan vere obtained with the treatment of·higher doses ot· B and nitrogen.93.b.2. No anatomical changes could be observed in thecombination between B and nitrogen.9Ill. Chemical Analysis1. Growth Regulatorsa. Kinetin1. Concrete percentage increased by applying kinetin withits two levels. However, with the concrete yield per plant orper teddan, ttJ(~first level <Jav(~the h lqtre at; yield and the firstseason aJw~ys qave the hlqher yleld.2. WIth reqard to plant piqment chlorophylls increased bykinatin application but the low concentration was most effective.'l'hevalues obtaived were 4.21, 4.12 for Kland k2effective. Onthe other hand, carotenoids increased linearly with kinetinconcentr~tion trom 0.14 to 1.14, to 1.1tl tor k k and krespectively. 0 I 23. With respect to carbohydrates, no effect of kinetin wasobserved.4. NItrogen percentage in leaves was highly influenced bykinetin treatments, but the low dose of kinetin was the superiorWhiCh qave 1.tl8~ versus 0.73 and 1.~3 tor control and k2b. 891. Concrete percentage and concrete yield increased by 89with its two doses. The higher yield of concrete was obtained at4000 ppm concentration, since it produced the higher yield offlower with hihg percent of concrete.2. 89 treatments increased chlorophyll "a", ~b" and theirtheir ratio. Chlorophyll ~a" increased from 4.53 to 5.28 with 89land B92 Carotenoids also were raised with the two levels of B9 ,to reach 1.18, and 1.'11 respectively.3. With regard to-the total carbohydrates, tne first doseof 89 stimulated the carbohydrate content in the leaves of roseplant, the value was 5.1~however, the second level inhibited thecarbohydrate content, since so it is less than the control~ itqave 2.50 mg/gm whill with the control it was 3.16.4. Nitrogen percentage in leaves was remarkably influencedby B9 application, the low dose promote the nitrogen percentagein plant leaves, it was 1.74%.2. Nitrogen Fertilization1. Nitrogen in its three levels applied create an increaseon concrete percentage, but when dealing with concrete yield perplant or teddan, the picture differed. The second dose ofnitrogen produced the higher yield of concrete. The yield perplant due to this level was 0.647 and U.633 gm for the first andsecond sensons respectively.2. Plant pigments,> lncluding chlorophylls and carotenoidsincreased also by nitrogen doses added. For chlorophyll thepercentaqes increase over control were 14.92, 69.40 and 164.92%lor NI, Nl and NJ. However with carotenoids, the second doseof nitroQen was the most effective.3nitrogenabtainedN3When dealing with carbohydrates, it was obvioustill 300 kg stimulated total carbohydrate, thewith that level was 4.19 versus 3.60 and 3.80 forthatvalueNand14. Nitrogen percentage in the leaves generally increased by, the different nitrogen doses applied.The Interaction Between kinetin, BFertilization. 9and NitrogenIn general, no constant trend could be postulated from theinteraction between kinetin and nitrogen on one hand and B9 andnitrogen in the other hand. The three factors studied, i.ekinetin, B 9 and Nitrogen gave the higher values when usedlonely. However synerqetic effects occurred between difterentcombination.4. Chealcal Composition of Absolute 011Gas liquid chromatoqraphYlc analysls revealed 26 cumpoundsfrom which 8 compounds were identified. The major compound vasphenyl ethyl alcohol vhich comprised about 31% of oil. All thecompounds exerted· in the 011

resembles that of all rose oiltypes. The tollowing compounds were identitied :Phenyl ethyl alcohol, citronella!,caryophyllene, eugenol methyl ether,sesquiterpene alcohol.nero!, geraniol,sesquiterpeneBand