Effect of gamma radiation on biochemical components in rapeseed

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The aim of this investigation was to evaluate some sorghum mutant lines induced by gamma-rays and ethylamin treatments under two stress conditions drought and salinity on later generation to some growth, forage and grain yield characteristics and chemical components. On the other hand, stability of these genotypes were estimated under three different irrigation intervals in both seasons to select the best genotype under these environments.This study was carried out in Desert Research Center Stations at two locations.- The first study were carried out at Maryout Experimental Station, Alexandria Governorate, during three successive seasons, 1990, 1991 and 1992. In 1990 season, Giza-1 cultivar and forty-eight mutant lines were evaluated in a randomized complete block design with four replications for some growth, forage and grain yield charactersThe best nine mutant lines for dry forage and grain yield were selected to evaluate under three irrigation intervals i.e. 10, 20 and 30 days as compared with Giza-1 cultivar as a check cultivar. Three adjacent experiments for ten genotypes were conducted in each season (1991 and 1992). The first, second and third experiments were irrigated by 10, 20 and 30 days intervals, respectively. Each experiment was grown in a randomized complete block design with six replications. Three of them used to evaluated forage yield in two cuts and the others used to evaluat forage and grain yield after maturity. The characters studied were plant height, stem diameter, fresh and dry forage yield, leaf area, leaves/stem ratio, flowering date, main head weight, grain weight per main head, grain yield, 1000-grain yield. The chemical components as well as protein, total carbohydrates percentages (in leaves, stems and grains), fibers and ash percentages (in leaves and stems) and total yield of chemical components. Also, proline percentage was estimated to determined the effect of irrigation intervals on accumulation of proline in plants and studied the relations between proline accumulation with drought resistance.- The second study was carried out at Wadi Sudr (South West of Sinai) during 1992 and 1993 seasons. A split-plot design with three repliations was used in this respect where the three levels of nitrogen occupied the main plots and the ten genotypes the sub-plots.In 1992 season, the levels of nitrogen fertilizer were 30, 60 and 90 kg N/fed. with high salinity levels of water irrigation water at the experimental field, while in 1993, the levels of nitrogen fertilizer were 15, 30 and 45 kg N/fed. with low salinity of irrigation water at the experimental field. The important results were summarized as follows:A). Four mutagenic generation (M-.):The mutant lines No. 2, 15, 16, 17, 21, 26, 28, 32 and43 considered the best mutant for the fodder and grain yield. Therefore, these mutants were evaluated in the following generations under different stress and/or culture practices.B). The First Study:a). First Part:TI4 LI T. 1.The second season had the highest mean values for forage and grain yield.2.Application of irrigation inteval 10 days gave the highest mean values of all characters studied except date, but the lowest mean values were obtained by 30 days. The interaction between and seasons was significant for plant leaves/stem ratio, fresh forage yieldand 1000-grain weight.3.Mutant line No. 32 gave the highest mean values for all characterrs except the main head weight but it was delayedin mature. flowering irrigation everyirrigation intervals height, leaf area,4. Mutant line No. 32 was considered the best genotypes to be cultivated followed by mutant lines No. 15 and 2 for forage and grain yield under Experimental Station at Maryout conditions.5.Mutant lines No. 32 and 21 gave the highest grain yield per feddan.6.Effect of interaction between genotypes and seasons was significant for all growth traits except leaves/stems

ratio.7.Effect of interaction between genotypes and irrigation intervals over two seasons had a significant for all growth traits under testS. The diffeences between the averages of the interaction between mutant lines, irrigation intervals and years were not significant for plant height, stem diameter, leaves/stems ratio, fresh forage yield and flowering date, but its significant to another traits- Chemical components:9.Decreasing soil moisture content caused,a significant reduction of mean values of total carbohydrates, fibers and ash percentages and total yield in addition to protein yield.10.Protein and proline percentages increased by increasing irrigation interval.11.Irrigation every yield/fed.10 days significantly increased T.C.12.Mutantlines No. 2,15,16,21, 26 and 32 should besubjectedto furthertestingat different locations andyears.13.Themutant linesNo21,17, 43 and 32 had asignificantly highest mean values of proline (%) than the check cultivar, revealing that these mutant lines were stable or resistance to stress conditions especially drought.b). Second part:- Growth and forage yields:1.The second season had the highest mean values for most characters.2.In the first cut, the eight mutants lines No. 32, 26, 43, 15, 28, 17 and 21 surpassed the check cultivar Giza-1 in dry forage yield/fed. and most of its components.3.Mutant line No 32 was considered the best lines to be cultivated under low stress soil moisture. While, mutant line No. 15 was the best line under stress soil moisture for forage yield at Maryout conditions.4.The effect of interaction between genotypes, irrigationintervals and seasons was insignificant for all growthtraits except dry forage yield in the first and second cuts and the total of both cuts, and fresh forage yield in thefirst cut.- Chemical components:5.High soil moisture stress (wide irrigation interval) significantly decreased the mean values of protein, T.C., fibres and ash percentages in leaves, and fibers and ash percentages in stem at the first and second cuts.6.Mutant lines No. 32, 2, 15, 26, 21 and 43 exhibited significant in mean values of one or more of chemical components than the check cultivar Giza-1. B). The Second Study:1.The highest mean values for all characters were obtained by plants received 30 kg N/fed in both seasons except the flowering date and proline percentage in the second season which the highest averages were detected by plants received 60 and 45 kg N/fed. in the first and second seasons,respectively. 2.In the first season under high salinity levels, increasing nitrogen fertilizer level decreased the plant height, fresh and dry weight of blades and stem + sheathes, forage yield/fed., the main head weight and grain yield per plant or feddan.3.Increasing nitrogen application more than 30 kg N/fed. under saline condition did not significant increase in all the studied characters.4.Both mutant lines No. 15 and 43 had the highest mean values of fresh and dry leaves and stem, and forage yield/fed. under saline codnition in both seasons.5.Mutant lines No. 15, 32, 2 and 43 had the highest mean values of protein and T.C. yields/fed. While, the mutant lines No. 15, 32 and 43 gave the highest mean values of fibers and ash yield/fed. Stability:1.Mutant lines No. 2, 15 and 17 were more stable than mutant lines No. 21, 32 and 43 for fresh forage yield.2.Mutant lines No. 17, 28 and 43 were more stable than the others under the studied environments for dry forage yield/fed. 3.Mutant lines No. 15, 17 and 21 appeared to be the minimum deviations means squares. Also, these mutant lines were more stable than the others mutant lines for grain yield/fed. under the studied environments.