Effect of planting date, plowing depth and nitrogen fertilizer on yield and quality of sugar beet at noubaria

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Three field experiments were carried out in the Research Experimental Farm of Noubaria Agricultural Research Station during the successive growing seasons of 2000/ 2001 and 2001/ 2002 in order to study the effect of planting dates, plowing depths and nitrogen fertilizer on growth, yield and quality of Kawamera sugarbeet (Beta vulgaris L.) cultivar. Each experiment included planting date (15th Sep., 15th Oct. and 15'" Nov.), where each planting date take placing in the independent experiment, and each one of them implies two factors in split-plot design with four replications. Three plowing depths (30, 40 and 50 cm) were allotted randomly in the main plots, whereas, three nitrogen levels (80 Kg N/ fad, 60 Kg N/ fad + Cerealine and 40 Kg N/ fad + Cerealine) were randomly allotted in sub-plots. Data Recorded: I- Leaf characters:1-Leaf areal plant (L.A) [cm2].2-Leaf area index (L.A.I).3-Leaf weight ratio (L.W.R).4-Leaf area ratio (L.A.R) [cm2/g].5-Specific leaf area (S.L.A) [cm2/g].6-Net assimilation rate (N.A.R) [mg/ cm2/ day].7-Relative growth rate (R.G.R) [mg/ g/ day].8-Crop growth rate (C.G.R) [mg/ day].II- Growth attributes:1-Root length (cm).2-Root diameter (cm).3-Fresh weight of root / plant (g).4-Fresh weight of leaves/ plant (g).5-Total fresh weight of plant (g).6-Dry weight of root/ plant (g).7-Dry weight of leaves/ plant (g).8-Total dry weight of plant (g).III- Yield and yield components:1-Root yield (ton/ fad.).2-Top yield (ton/ fad.).3-Biological yield (ton/ fad.).4-Sugar yield (ton/ fad.).5-Sugar production (Kg/ day/ fad.).6-Root/ top ratio.7-Harvest index. IV-Technological quality:1-Total soluble solids percentage (T.S.S).2-Sucrose percentage.3-- Juice purity percentage.The main results were summarized as follows: A- Effect of planting date:1-Early planting in 15th Sep. of sugar beet had a significant increase in leaf area/ plant, leaf area index, net assimilation rate, relative growth rate and crop growth rate, where recorded the highest value of them. While, there was no significant difference between the two planting dates 15th Sep. and 15th Oct. on these characters.2-There was no significant difference between the three planting on leaf weight ratio. While, the delaying of sugar beet due to increase of leaf area ratio, specific leaf area, root/ top ratio and harvest index compared the early planting.3-Planting sugar beet in 15th Oct. had a significant increase in root and diameter root/ plant, where recorded the highest values of them 35.24 and 12.08 cm respectively. While, there was no significant difference between the two planting dates 15th Oct. and 15th Sep.4-Early planting in 15th Sep. of sugar beet had a significant increase in fresh weight of root, leaves, total/ plant and dry weight of leaves. The corresponding data recorded, 748.2, 627.5, 1375.8 and 49.5 g/ plant respectively. While, there was no significant difference between the two planting dates 15th Sep. and 15th Oct. on these characters.T11 p.n.. vitae nn significant difference between the three5-Early planting in 15th Sep. of sugar beet had a significant increase in dry weight of root and total dry weight and achieved the highest value of them, 142.0 and 191.5 g/ plant. While, the delaying of sugar beet due to reduced for thesecharacters.6-The highest value of root yield (25.528 ton/ fad) was obtained when sugar beet planted in 15th Oct. There is no significant difference between the two planting dates (15th Sep. and 15th Oct.). The early planting of sugar beet (15th Sep. and 15th Oct.) increased root yield/ fad over the later planting (15th Nov.) by more than 7.6% and 8.0% respectively.7-Early planting in 15th Sep. of sugar beet had a significant increase in top,

biological and sugar yield ton/ fad and sugar production Kg/ day/ fad. The corresponding data recorded, 14.290, 39.713, 4.709 and 22.423 respectively.8-The highest values of total soluble solids percentage (22.25%), sucrose percentage (18.49%) and purity percentage (83.10%) were recorded from planting sugar beet in 15th Sep. B- Effect of plowing depth:1- Increasing plowing depth till 50 cm led to increase of specific leaf area to reach the maximum value (122.07 cm2/ g) compared to the other plowing depth. While, plowing depth of 40 cm recorded the highest value of leaf weight ratio (0.027). On the other hand, plowing depth of 30 cm achieved the highest value of leaf area/ plant (5635.6 cm2) and leaf area ratio (5.64).C- Effect of nitro en fertilizer:day/ fad). The corresponding data recorded, 26.404, 13.469, 39.874, 4.856 and 23.122 respectively.5-There was no significant different between the three levels of nitrogen fertilizer on root/ top ratio and harvest index.6-Inoculation sugar beet seeds with biofertilizer (Cerealine) + 60 Kg N/ fad caused an increase in total soluble solids percentage, sucrose percentage and purity percentage and achieved the highest values compared the other treatments. The corresponding data recorded, 22.155, 18.39% and 83.0%. D- effect of the interaction:1- The interaction between planting date and plowing depth had a significant effect on dry weight of root and leaves/ plant, total dry weight of plant, total soluble solids percentage and sucrose percentage. Planting sugar beet plant early in 15th Sep. with plowing depth of 40 cm recorded the highest values of these characters. As well as, planting sugar beet plant in 15th Oct. with plowing depth of 40 cm recorded the highest values of leaf weight ratio and leaf area ratio. On the other hand, the delaying of sugar beet plant till 15th Nov. with plowing depth of 50 cm recorded the highest value of specific leaf area.2- The interaction between planting date and nitrogen fertilizer levels had marked effects on total dry weight of plant, crop growth rate, top yield, biological yield, total soluble solids percentage and sucrose percentage. Planting sugar beet plant early in 15th Sep. and inoculating sugar beet seeds withbiofertilizer (Cerealine) + 60 Kg N/ fad gave the maximum values of previously characters. As well as planting sugar beet plant in 15th Oct. with 80 Kg N/ fad only without biofertilizer gave the maximum values of fresh weight of leaves/ plant and leaf weight ratio. Also, planting sugar beet plant in 15th Oct. and inoculating sugar beet seeds with biofertilizer (Cerealine) + 60 Kg N/ fad gave the maximum value of root diameter. On the other hand, the delaying of sugar beet plant till 15th Nov. with 80 Kg N/ fad without biofertilizer recorded the highest value of harvest index. As well as the delaying of sugar beet plant till 15th Nov. and inoculating sugar beet seeds with biofertilizer (Cerealine) + 40 Kg N/ fad gave the maximum value of specificleaf area.3- The interaction between plowing depth and nitrogen fertilizer levels had marked effects on total soluble solids percentage and sucrose percentage. Plowing depth of 30 cm and inoculating sugar beet seeds with biofertilizer (Cerealine) + 60 Kg N/ fad gave the maximum value of previously characters. While, plowing depth of 50 cm with 80 Kg N/ fad without biofertilizer recorded the highest value of relative growth rate.4- Early planting of sugar beet plant in 15th Sep. with plowing depth of 40 cm and inoculating sugar beet seeds with biofertilizer (Cerealine) + 60 Kg N/ fad gave the maximum value of purity percentage. As well as Early planting of sugar beet plant in 15th Sep. with plowing depth of 50 cm and inoculating sugar beet seeds with biofertilizer (Cerealine) + 60 Kg N/ fad gave the maximum value of net assimilation rate. On the otherhand, planting date of 15th Oct. with plowing depth of 40 cm and inoculating sugar beet seeds with biofertilizer (Cerealine) + 60 Kg N/ fad gave the maximum value of root, biological, sugaryield and sugar production.ConclusionAccording to the presented resulted from this investigation, it can be concluded that sugar beet in the period from 15th Sep. to 15th Oct. with plowing depth 40 cm and inoculating sugar beet with biofertilizer (Cerealine) before sowing and applied 60 Kg N/ fad could be recommended for maximizing sugar beet productivity under the environmentalconditions of Noubaria region.