Toweards effictive water managment fpr some filed crops in north nile delta region

Kassab, M.M.E

The present study was carried out at the crop Water Requirements Research Field, Sakha Agricultural Research Station, Kafr El-Sheikh Governorate. The site lies at 30’ 57N. latitude, 31. 07 E longitude with an elevation of about 6 meters above mean sea level. The location represents the conditions of Northern Middle Nile Delta region. The aim of this investigation was to assess the effect of irrigation regimes (accumulated depth of water above soil surface) and furrow spacings, on water parameters and crop yield of faba beans(vicia faha c. v. Giza 461), and sunflower (Ifelianthus annus L. c. V erolloor). The field experiment was in a factorial split-plot design. Irrigation regimes (main plots) were 2.5, 5.0, and 7.5-cm water depth.; designated (DI, D2, and D3 respectively). Furrow spacings were 60-cm with 1 plant row/furrow; 120-cm with 2-plant rows/furrow, and 120-cm with 3-plant rows/furrow; designated as F1, F2, and F3respectively. Increasing the spacing between furrows involved widening the width of soil ridges.Treatment DI (with the lowest amount of watering) was the lowest regarding soil wetness status, while D2 is the moderate of soil wetness, and D3 is the highest of soil wetness. Farmers of the region where the study was carried out practice in-igation on the line of D3. Intervals between irrigations were the same for all treatments. Sunflower was cultivated in the two seasons of 1999 (season 1; lst — 23 rd Sep.) and 2001 (season 2; 9111 Jun. — 9111 Sep.) whereas faba bean was cultivated in the two seasons of 1999-2000 (season 1; 17th Nov. — 15th May) and 2000-2001 (season 2; 151h Nov. — 101h May).MAIN FINDINGS:1- IRRIGATION WATER (I.W.)A-SunflowerD2 was the most effect treatment, its use instead of D3 would give water saving of 405 m3/fd, (18.7% saving) increasing the spacing between furrows from 60 to 120-cm, (means F2 and F3) involved irrigation water saving of 22.8 m3/fd, (13.4% saving). Using D2F3 which gave the highest yield involved application of 1741 m3/fd and gave a saving of 324 m3/fd as compared with D3F3 which gave the third highest yield (15.7% saving) compared with D3F1 method (traditional method) the saving was 610 m3/fd (25.9% saving)With D2F3 water application was 1741 m3/fd., and with D3F, (the tradional method it was 2351 m3/fd. The lowest was that of Di F3 (1339 m3/fd).B-Faba bean:D2 was most effective; its use instead of D3 gave water saving of 358m3/fd(19.8% saving). Increasing the sapacing between furrows from 60 to 120-cm (mean of F2 and F3) involved irrigation water saving of 183 m3/fd (saving of 11.3%). Using D2F3 which gave the highest yield involved application of 1430 m3/fd and a saving of 326 as compared with spacing of 3-plant rows, with water amount with D3F3 which gave the second highest yield (18.6% saving), compared with D3F1 method (traditional method) the saving was 577 m3/fd (28.7% saving) with D2F3, the water application was 1430 m3/fd; with D3F1 (the traditional method) it was 2007 m3/fd. The lowest was that of D, F3 (1307 m3/fd).2- SEASONAL CONSUMPTIVE USE AND DAILY CONSUMTIVE USE (SEASONAL CU, and DAILYCU):A- SunflowerIncrease applied water was associated with an increase inCU.Under 60-cm furrow spacing (F1), mean values of seasonal CU were 41.4, 45.0 and 50.4 cm for the D 1 , D2, and D3 respectively. Corresponding values under 120-cm furrow spacing (means over F2 and F3) were 38.6, 42.4 and 45.6 cm, respectively.Seasonal and daily rate of CU decreased with the increase in the spacing between furrows. With highest yield obtained by D2F3 the seasonal CU of 43.2 cm and Cu rate of 0.37 cm/day.B- Faba bean:Increase in applied water was associated with an increase in CU.Under 60-cm furrow spacing(F1), mean values of seasonal CU were 38.9, 43.4 and 45.8 cm for the D1, D2, and D3, respectively. Corresponding

mean values under the 120-cm furrow spacing (mean over F2 and F3) were 33.5, 36.8, and 39.9, respectively.Seasonal and daily rate of CU decreased with the increase in the spacing between furrows. With the highest yield obtained by D2F3, seasonal Cu was 37.3 cm and Cu rate was 22 cm/day.With both crops. highest yields was caused by D2F3 treatments. The highest sunflower seed yield (1548 kg/fd) was given by D2F3 with a seasonal CU of 1816 m3/fd and CU rate of 0.37 ctn/day; lowest (856 kg/fd) was given by D3F1 with a seasonal CU of 2114 m3/fd and CU rate of 0.44 cm/day. The highest faba bean seed yield (1806 kg/fd) was given by D2F3 with a seasonal CU of 1568 m3/fd and a CU rate of 0.22 cm/day. the lowest yield (1023 kg/fd) was given by D3F2 with a seasonal CU of 1642 and CU rate of 0.22 cm/day.4- YIELD COMPENENTS:For sunflower D2F1 treatment gave the highest of each of: plant height sunflower (185.9 cm); stem diameter (3.9 cm) head diameter (24.2 cm). For faba beans D3F1 gave highest height (141 cm), and number of branches (5.4 plant), and number of pods (28/plant); D2F1 gave highest 100-seed weight (74.2g).5-WATER UTILIZATION AND WATER-USE EFFICIENCY (W Ut E AND W Us E):For sunflower D1F3 gave the highest W Ut E (0.98 kg/m3); but D2F3 gave the highest W Us E (0.86 kg/m)For faba beans D2F3 gave the highest W Ut E (1.27 kg/m3) as well as W Us E (1.16 kg/m3)RECOMMENDATION:Lowering the traditional depth of irrigation water which is practiced by farmers of North Delta, from 7.5 cm to 5.0 cm along with increasing the 60-cm distance between furrows which involves widening of soil ridges having 3-plant rows instead of 1-plant row pr ridge increases yield and decreases water application as well as water efficiency.