Ecological studies and weed control methods on some perennial weeds in egypt

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The present work included five studies carried out in the three different conditions in Weed Research Central Laboratory, Agricultural Research Center, Giza and Horticulture Research Station, El- Kanater El-Khiria, Kalubia. The aim of these studies were to determine the effect of some ecological factors and weed control methods on some perennial weeds as follows:I- First studyThe effect of weed control treatments on mixture of perennial weeds:Two- field experiments were carried out in mango horticulture crop naturally infested with the three perennial weeds i.e. bermudagrass, nutsedge and field bindweed during 2003 and 2004 seasons. Each experiment included eight weed control treatments used to control the previous weeds, and the data wereResults indicated that all weed control treatments gave significant effect on controlling mixture of perennial weeds as perennial weeds. That is true in the four surveys and in two seasons. The herbicidal treatments Roundup twice each equal at 4.0 1./fed. , Roundup once at 4.0 1./fed. and Fusilade Super twice each equal at 2 1./fed., were the superior on controlling the three pervious weeds. The following treatments in effective control were hesitated between Fusilade Super once at 2.01./fed. and mulching method. While, four hand hoeings and three cuttings were the last two treatments, respectively.Overall, the four surveys in two seasons, visual estimation percent, number of the three previous weeds mixture/m2 and their dry weight in g/m2 significantly reduced with Roundup twice by 91.6%, 89.1% and 89.8 %, respectively; Round up once by 89.4 %, 86.0 % and 87.0 %, respectively; Fusilade Super twice by 84.6 %, 78.4 and 84.5, respectively; Fusilade Super once by 81.3 %, 68.6% and 77.2 %, respectively; mulching by 83.4 %, 75.0 % and 79.3 respectively; Hand hoeing by 81.7%, 71.4 %, 75.7 %, respectively and Cutting by 76.2 %, 63.4 % and 76.0 %, respectively.II- Second study.The effect of planting depth treatments on perennial weeds:Eight pot experiments were conducted in pots during 2002and 2003 seasons. Two experiments for each of cogongrass, field bindweed, nutsedge and bermudagrass. Every experiment included five planting depths i.e. 2, 5, 10, 15 and 20 cm from soil surface, aimed to study theeffect of the aforementioned depths on germination percentage, length of above ground parts, length of under ground parts, dry weight of above ground parts and dry weight of under ground parts. Main results are as follows:1- On cogongrass.1-That germination percentage at 45 days from planting of cogongrass was significantly reduced with increasing depth of placement. The highest reduction (100%) was achieved at 20 cm depth, while, the reduction percentage at 15, 10, 5 and 2cm reached to 85, 60, 25 and 10%, respectively in the first season. Similarly in the second season, planting depths at 20, 15, 10, 5 and 2 cm caused reduction percentage 90, 50, 60, 10% and 0, respectively.2-A progressive and consistent reduction in the stand /pot of cogongrass occurred with increasing planting depth .The highest value (5) occurred at the smallest planting depth at 2 cm from soil surface. The rest depths at 5,10, 15 and 20 cm caused reduction in the stand /pot as follows: 3.8, 2.0, 0.8 and o, respectively in the first season. Similarly in the second season, planting depths at 2, 5, 10, 15 and 20cm caused reduction values by 7.3, 4.5, 2.0, 2.5 and 0.5, respectively.3-A progressive and consistent reduction in the length of above ground parts of cogongrass occurred with increasing planting depth. The highest value (29.8 cm) occurred at the smallest planting depth at 2 cm from soil surface .The rest depths at 5, 10, 15 and 20 cm caused reduction in the length of above ground parts as follows: 23.3, 14.5, 5.0 and 0, respectively in the first season. Similarly in the

second season, the reduction of the length of above ground parts of cogongrass could be arranged in a descending order as follows: 32.3 cm at 2 cm depth, 20.8 cm at 5cm depth, 19.03 cm at 10 cm depth, 17.3 cm at 15 cm depth and 3.9 cm at 20 cm depth.4-A progressive and consistent reduction in the length of under ground parts of cogongrass occurred 3ith increasing planting depth. The highest value (25cm) occurred at the smallest planting depth at 2 cm from soil surface. The rest depths at 5, 10, 15 and 20 cm caused reduction in the length of under ground parts by 21.8, 12,5, 5.0 and 0, respectively in the first season. Similarly in the second season, the reduction in value of the length of under ground parts could be arranged in a descending order as follows: 15.3 cm at 2 cm depth, 13.0 cm at 5 cm depth, 11 cm at 10 cm depth, 6.8 at 15 cm depth and 1.8 cm at 20 cm depth.5-Total dry weights were significantly reduced with increasing depth of sprouting placement. The highest value (1.8 g/ pot) was obtained by using 2 cm depth from soil surface .The rest depths at 5,10,15 and 20c cm caused reduction of total dry weight by 1.6, 0.8,0.3 and 0 g, respectively in the first season. Similarly in the second season, the reduction values of total dry weight of cogongrass could be arranged in a descending order as follows: 1.8 g/pot at 2 cm depth, 0.7 g /pot at 5 cm depth, 0,4 g /pot at 10 cm depth, 0.3 g /pot at 15 cm depth and 0.03 g /pot at 20 cm depth.11-2- On bermudagrass1-Germination percentage of bermudagrass was significantly reduced with increasing of depth sprouting placement. The highest reduction in germination percentage (60 %) was achieved at 20 cm depth, while, the reduction percentage at 15, 2, 10 and 5 cm reached to 60, 20, 0 % and 0 respectively in the first season. Planting depth treatments at 20, 15, 10, 5 and 2 cm caused reduction percentages 100, 75, 55, 5 % and 0, respectively in the second season.2-Length of above ground parts of bermudagrass was significantly reduced with increasing planting depth. The smallest reduction (100.8cm) occurred at the lowest planting depth at 2 cm from soilsurface. The rest depth at 5, 10, 15 and 20 cm caused reduction of length above ground parts by 72.5, 73.0, 62.3 and 48.5, respectively, in the first season. Similarly in the second season, the reduction value of this trait could be arranged in descending order as follows 100.3 at 2 cm depth, 76.7 at 5 cm depth, 53.1 at 10 cm depth, 33.8 at 15 cmdepth and 0.0 at 20 cm depth.3-The differences between the average values of length of under ground after 45 days from sowing was significant in both seasons. Planting depth at 2, 5, 10, 15 and 20 cm depth caused reduction of lengthunder ground parts by 76.0, 67.5, 59.5, 39.5 and 21.25 cm, respectively in the first season. The same trend was also evident in thesecond season, were planting depths at 2, 5, 10, 15 and 20 cm depth caused reduction values 79.5, 53.8, 41.56, 22.9cm and 0, respectively.4-Total dry weight of bermudagrass was significantly reduced with increasing planting depth. The highest value (25.8 g/pot) occurred at the planting depth at 2 cm from soil surface. The rest depths at 5, 10, 15 and 20 caused reduction in total dry weight as follows: 19.9, 16.7, 13.4 and 8.2 g/pot, respectively in the first season. Similarly in the second season planting depths at 2, 5, 10, 15 and 20 cm caused reduction values by 30.3, 16.5, 6.8, 3.4 and 0 g/pot, respectively11-3- On field bindweed1-The germination percentage of field bindweed was significantly reduced with increasing depth of sprouting placement. The highest reduction (100 %) was achieved at 20, 15 and 10 cm depths followed by 5 and 2 cm depths (70.1 and 60 %), respectively in the first season. This results were similar with the results in the second season. Planting depths 20, 15, 10, 5 and 2 depth caused reduction percentages 100, 90, 60, 35 % and 0, respectively.2-Planting depth treatments significantly affected stand/pot after 45 days from planting in both seasons. The values of stand/pot could be arranged in the following descending order 2, 5, 10, 15 and 20 cm depth were 2, 1.5, 0, 0 and 0, respectively in the first season. Similarly in the second season, the values of this trait could be arranged in descending order as follows 6.25 at 2 cm depth, 3.3 at 5 cm depth, 2.8 at 10 cm depth, 0.5 at 5 cm depth and 0 at 20 cm depth.3-Results showed that planting depth treatments had significant effect on length of above ground parts after 45 days from sowing in both seasons. The highest value (35 cm) occurred at the smallest planting depth at 2 cm from soil surface. The rest depths at 5, 10, 15 and 20 cm caused reduction values 16.8, 0, 0 and 0, respectively in the first season. Similarly in the second season, the values of this trait could be arranged in descending order as follows 28.9 at 2 cm depth, 22.5 at 5 cm depth, 9.1 at 10 cm depth, 2.3 cm at 15 cm depth and 0 at 2 cm depth.4-Planting depth treatments significantly affected length of under ground parts after 45 days from sowing in both seasons. The values of this trait could be arranged in the following

descending order 2, 5, 10, 15 and 20 cm were 49.5, 24.3, 0, 0 and 0, respectively in the first season. Such responses are similar trend to those obtained in the second season. Planting depths at 2, 5, 10, 15 and 20 cm caused reduction values 11.9, 15.1, 6.1, 1.5 cm and 0, respectively.5-Also, planting depth treatments significantly affected total dry weight of field bindweed. The smallest reduction (3.1 g /pot) of this trait was recorded with 2 cm depth from soil surface. Meanwhile, the following significant reduction values could be obtained by 5 cm depth (1.8g /pot), 10 cm depth (0), 15 cm depth (0) and 20 cm depth (0) in the first season. These results are similar to those obtained in the second season. Planting depths at 2, 5, 10, 15 and caused reduction values 1.9, 1, 0.3, 0.02 g/pot and 0, respectively.11-4- On nutsedge1-The germination percentage of nutsedge was significantly reduced with increasing depth of sprouting placement. The smallest reduction (10 %) was achieved at 20 cm depth, while the reduction percentage reached to 0 by using 2, 5, 10, and 15 cm depth, respectively in the first season. Similarly in the second season planting depth at 20, 15, 10, 5 and 2 cm depth caused reduction percentage 35 %, 0, 0, 0 and 0, respectively caused reduction percentages 90, 60, 0, 0 and 0, respectively.2-Length of above ground parts of nutsedge was significantly reduced with increasing depth of sprouting placement. The highest value (52cm) was achieved at 2 cm depth, while the reduction value at 5, 10, 15 and 20 cm reached to 46.8, 50.8, 45 and 33 cm, respectively in the first season. Similarly in the second season, planting depths at 2, 5, 10, 15 and 20 cm caused reduction values 51.1, 49.7, 41.9, 30.5 and 15.1 cm, respectively.3-The length of under ground parts of nutsedge was significantly planting depth. The highest value (52.5 cm) occurred at the smallest planting depth at 2 cm from soil surface. The rest depths at 5, 10, 15 and 20 cm caused reduction in this trait by 46.8, 39.3, 31.8 and 27 cm, respectively in the second season. The reduction in value of this trait could be arranged in a descending order as follows; 44.75 cm at 2 cm depth, 37.3 cm at 5 cm depth, 31.8 cm at 10 cm depth, 30.5 cm at 15 cm depth and 15.1 cm at 20 cm depth.4-Total dry weight was significantly decreased with increasing planting depth. The greatest value (28.8 g/pot) of this trait was recorded with 2 cm depth from soil surface. While, the following reduction values could be obtained by 5 cm depth (25.2 g/pot), 10 cm depth (22.7 g/pot), 15 cm depth (16.4 g/pot) and 20 cm depth (13.3 g/pot) in the first season. Such responses are similar to those obtained in the second season. Planting depth at 2, 5, 10, 15 and 20 cm caused reduction values by 28.5, 25.6, 22.9, 14.6 and 4.2 g/pot, respectively.III- Third study.The effect of temperature degree treatments on perennial weeds.Eight laboratory experiments were conducted in a cubater, to study the effect of temperature on germination percentage, speed of germination, length of plumule and radical and dry weight of seedling of cogongrass, bermudagrass, nutsedge and field bindweed. Twoexperiments were conducted for each of aforementioned weeds. Every experiment included three temperature degrees were 15° C, 25° C and 35° C.HI-1. Effect of temperature degree on cogongrass:The significant increasing percentage between the highest degree at 35° C and the lowest degree at 15 ° C was 96.6 and 91.7% for germination percentage, 66.1 and 3o.3% for speed of germination, 68.8 and 34.8% for length of radical, 0.67 and 0.4% for dry weight of seedling in both experiments, respectively and 43.8% for length of plumule in the second experiment. While, the medium temperature degree at 25° C gave the following significant effect of increasing all the previous respective characteristics by 48.75%, 0.44, 2.61 cm, 0.25 cm and 4 mg in the first experiment and 56.25%, 0.45, 2.4 cm, 0.25 cm and 4 mg in the second experiment, respectively.111-2. Effect of temperature degree on bermudagrass:The increasing percentage between the highest degree at 35° C and the lowest degree at 15° C was 85 and 84.2% for germination percentage, 13.7 and 13.7% for speed of germination, 51.9 and 56.5% for length of plumule, 52.4 and 50.6% for length of radical and 85 and 84.4% for dry weight of seedling in the first and second experiments, respectively. Meanwhile, the medium temperature degree at 25 ° C gave the following significant effect of increasing all the previous respective characteristics by 83%, 0.53,2.3 cm, 1.23 cm and 25 mg in the first experiment and 81%, 0.53,3.18 cm, 1.15 cm and30 mg in the second experiment, respectively.111-3. Effect of temperature degree on nutsedge:The significant increasing percentage between the highest degree at 35 ° C and the lowest degree at 15 ° C was 0.06 and 0.08 % for speed of germination, 87.2 and 85.1% for length of plumule, 86.3 and 86.2% for length of radical in both experiments and 45.3% for dry weight of seedling in the second experiment only, respectively. Meanwhile, the following significant effect of increasing all the

previous respective characteristics by 92.5%, 0.62, 6.4 cm 3.8 cm and 33 mg in the first experiment and 95%, 0.62, 6.78 cm, 3.8 cm and 41 mg in the second experiment were gaven111-4. Effect of temperature degree on field bindweed:The significant increasing percentage between the highest degree at 35° C and lowest degree at 15 ° C was 38.8and 36.1% for germination percentage, 57.5 and 52.5% for length of plumule, 32.9 and30.2% for length of radical, 29.3 and 25.6 % for dry weight of seedling in bothexperiments and 0.09 % for the speed of germination in the second experiment only. The medium temperature degree at 25 ° C gave the following significant effect of increasing all the previous respective characteristics by 81.25%, 0.55, 7.53 cm, 11.1 cm and 33 mg in the first experiment and 80 %, 0.56, 7.9 cm, 9.83 cm and35 mg in the second experiment, respectively.IV-Fourth study.The effect of cutting intervals on perennial weeds:Six experiments were conducted out in wire house, to study the effect of cutting intervals (one week, two weeks and three weeks) on regrowth percentage and dry weight of the three perennial weeds: cogongrass, bermudagrass and nutsedge in 2004 and 2005 seassons.IV-1. On cogongrassIV-1-1. Regrowth percentage:The significant reduction percentage of regowth can be arranged in a scending order according to decrease cutting intervals from three weeks, two weeks and one week interval as follows: 60.5, 57.3 and 48.4%, respectively in 1a cutting; 48.5, 44.5 and 36.2 % respectively in 214 cutting; 40.8, 35.2 and 30.3 % respectively in 3’1 cutting; 33.1, 27.6 and 21.9% respectively in 41 cutting; 27.4, 23.0 and 17.8% respectively in 5th cutting; 19, 15.3 and 13.2 % respectively in 6th cutting and 14.1, 10.8 and 7 % respectively in 71 cutting in the first season; as well as 56.2, 51 and 48% respectively in la cutting: 49.3, 45.9 and 40.1%, respectively in 2’ cutting; 40.4, 38 and 32 %, respectively in Pt cutting; 31.2, 29.8 and 25.2 %, respectively in 41 cutting; 27.2, 22.3 and 17.7%, respectively in 5th cutting; 21.5, 16.5 and 12.1 % respectively in 61 cutting and 15, 11.3 and 8.7 %, respectively in 7th cutting in the second season.IV-1-2. Dry weight:The reduction in values of dry weight of cogongrass did not reach to significant effect by the cutting intervals in the first season.In the second season the reduction in values can be arranged in a descending order to increase cutting intervals from one week, two weeks and three weeks as follows 3.4, 3.7 and 4.8 g, respectively in la cutting; 2.8, 3.4 and 4.2 g, respectively in 2’1 cutting; 2.2, 2.8 and 3.4 g, respectively in 3rd cutting; 1.7, 2.2 and 3 g, respectively in 4th cutting; 1.2, 1.6 and 2.3 g, respectively in 5th cutting; 0.8, 1.2 and 1.8 g, respectively in 6th cutting and 0.6, 0.8 and 1.3 g, respectively in 7th cutting.IV-2 On bermudagrass. IV-2-1. Regrowth percentage:The significant reduction percentage of regrowth can be arranged in a scending to decrease cutting intervals from three weeks, two weeks and one week as follows: 67.7, 60.6 and 47.7 %, respectively in 0 cutting; 60.4, 53.9 and 43.9 %, respectively in 2’1 cutting; 48.3, 48.1 and 39.3 %, respectively in Pcutting; 42.1, 35.7 and 25.3 %, respectively in 4th cutting; 35.9, 31.0 and 20.4 %, respectively in 5th cutting; 28, 87, 24.3 and 14.9 %, respectively in 6th cutting and 19.5, 15.4 and 6.8 °A, respectively in 7th cutting in the first season; as well as 60.0, 54.9 and 50.1 %, respectively in 0 cutting; 51.3, 47.8 and 43.3 %, respectively in 2-`{ cutting; 42.0, 37 and 35.5 %, respectively in 3”d cutting; 37.3, 32.6 and 28 %, respectively in 4th cutting; 30.8, 25.4 and 18.3 %, respectively in 5th cutting; 25, 17.7 and 11.8 %, respectively in 6th cutting and 16.9, 13.2 and 6.6 %, respectively in 7th cutting in the second season.IV-2-2. Dry weight.Dry weight of bermudagrass was not significantly affected by cutting interval treatments in the first season.In the second season, the reduction in values of this trait can be arranged in a descending order to increase cutting intervals from one week, two weeks and three weeks as follows: 4.1, 5.4 and 6.5 g, respectively in l cutting; 3.4, 4.7 and 5.6 g, respectively in 2’1 cutting; 2.8, 3.6 and 4.1 g, respectively in 3’1 cutting; 2.2, 3.2 and 4.1 g, respectively in 4th cutting; 1.4, 2.5 and 3.4 g, respectively in 5th cutting; 0.9, 1.7 and 2.7 g, respectively in 6th cutting and 0.5, 1.3 and 1.8 g, respectively in 7th cutting.IV-3. On nutsedge:IV-3-1. Regrowth percentage.The reduction percentage of regrowth seedling can be arranged in a scending order according to decrease cutting intervals from three weeks, two weeks and one week as follows: 68.1, 52.6 and 40.8 %, rsepectively in 0 cutting; 50.5, 44.0 and 33.6 %, respectively in 2”1 cutting; 43, 38.3 and 29 %, respectively in 311I cutting; 36.1, 32.2 and 24.3 %, respectively in 4th cutting; 29.4, 28.4 and 21.9%, respectively in Sth cutting; 25, 24.8 and 19.2 °A, respectively in 6th cutting and 16.7, 10.6 and 7.5%, respectively in 7’1’ cutting in the first season; as well as 56.7, 51.8 and 46.8 %, respectively in 0 cutting; 51.4, 42.7 and 39.5 %, respectively in cutting; 40.6, 35 and 30.5%, respectively in 3rd cutting; 32.6, 27.6 and 23.1 %, respectively in 4th

cutting; 27.0, 21.1 and 15.7 %, respectively in5th 18, 14.6 and 9.2 %, respectively in 6th cutting and 12.8, 10.9 and 7 %, respectively in 7th cutting in the second season.1V-3-2. Dry weight.Also, the dry weight of nutsedge had similar the non-significant effect of cutting intervals to those observed in cogongrass and bermudagrass in the first season, in all cutting intervals except the later 7th cutting.In the second season, the reduction in values can be arranged in order to increase cutting intervals from one week, two weeks and three weeks as follows: 2.8, 3.3 and 3.6 g, respectively in 18 cutting; 2.4, 2.7 and 3.3 g, respectively in 2”i cutting; 1.9, 2.2 and 2.6 g, respectively in PI cutting; 1.4, 1.8 and 2.1 g, respectively in 4th cutting; 1, 1.4 and 1.7 g, respectively in 5th cutting; 0.6, 0.9 and 1.2g, respectively in 6th cutting and 0.4, 0.7 and 0.8 g, respectively in 7th cutting.V. Fifth experimentEffect of the effective dose on perennial weeds.The aim was of this study to determine controlling percentage and effective dose in the dry weight reduction both at 25, 50 75, 90 and 95% by glyhposate (Herbazed) in field bindweed, nutsedge, cogongrass and bermudagrass.All Herbazed rates gave significant effect in controlling the previous perennial weeds and their dry weight reduction, in both 2003, 2004, 2005 seasons.V-1- Controlling percentage:Results show that controlling percentage at 25, 50, 75, 90 and 95% for field bindweed, cogongrass, bermudagrass and nutsedge was -0.386, 0.956, 2.298, 3.103 and 3.371 for field bindweed; -0.155, 1.11, 2.375, 3.134 and 3.387 for cogongrass; 0.011, 1.194, 2.376, 3.085 and 3.322 for bermudagrass and 0.014, 1.250, 2.487, 3.229 for nutsedge liter (Herbazed)/fed., respectively, in the first season as well as -0.359, 1.030, 2.42, 3.253 and 3.531 for field bindweed; -0.241, 1.097, 2.436, 3.239 and 3.506 for cogongrass; 0.003, 1.197, 2.391, 3.107 and 3.346 for bermudagrass and 0.267, 1.073, 2.413, 3.216 and 3.484 for nutsedge liter/fed., respectively, in the second season.V-2. Dry weight of above ground parts of weeds.Data show that effective dose of Herabzed at 25, 50, 75, 90 and 95 % in dry weight reduction percentage of above ground parts of cogongrass, bermudagrass, nutsedge and field bindweed was -0.122, 1.135, 2.392, 3.147 and 3.398 for cogongrass, -0.321, 0.958, 2.237, 3.004and 3.026 for bermudagrass, -0.098, 1.149, 2.396, 3.144 and 3.393 for nutsedge and -0.537, 0.858, 2.268, 3.109 and 3.039 for field bind weed liter (herbazed)/fed, respectively, in the first season as well as -0.244, 1.094, 2.433, 3.236 and 3.503 for cogongrass, -0.008, 1.201, 2.394, 3.109 and 3.348 for bermudagrass, -0.257, 1.080, 2.418, 3.22 and 3.488 for nutsedge and -0359, 1.031, 2.421, 3.225 and 3.532 liter/fed, respectively, in the second season.