SUMMARY

Two field experiments were conducted at the Agricultural Research and Experimental Station, Faculty of Agriculture at Moshtohor, during the 1984/85 and 1985/86 seasons. The aim of the experiments was to study the effect of sowing methods, weed control, irrigation frequency and fertilization on yield, yield components, chemical content of lentil (Lens esculenta, Moench) and associated weeds of lentil.

The soil of the experiments was clay textured having a ph 7.85, organic matter content 2.54% and available P of 40 ppm.

This study included two experiments in each season.

A. The first Experiment :

Two field experiments were conducted, each included 18 treatments which were the combinations of two sowing methods and nine weed control treatments. The treatments were arranged in a split-plot design with four replications. The two sowing methods were randomized in the main plots and weed control treatments were assigned randomly in the sub-plots.

Results could be summarized as follows :

1. Effect of Sowing Methods :

1.1 Herati method is an effective method in depressing weed density. Herati method decreased the total dry weight of weeds by 21 and 14 ; 32 and 32 ; 15 and 16 and 12 and 14% compared with afir method after 45,75,105 and 160 days from sowing in the first and second seasons, respectively.

1.2. The effect of sowing methods on plant height of lentil showed seasonal variation. The plant height in herati method was significantly higher than that of afir in the first season only. On the other hand, there was no relevance between the sowing methods and number of branches/plant in both seasons.

1.3 Number of pods/plant as well as weight of seeds/plant were significantly affected with sowing methods in the first season only. Herati method significantly increased the previous characters than the afir method.

1.4 Sowing methods did not show any significant effect on number of seeds/pod, number of seeds/plant, percentage of abortive seeds and weight of 1000-seed in the two seasons.

1.5 Yields of seed and protein were significantly influenced by different sowing methods in the first season only. Herati method gave higher seed yield/fad. compared with

afir method. On the contrary, sowing methods had no significant effect on straw as well as biological yield in the both seasons.

1.6 Sowing methods showed significant effect on the harvest index in the first season only. In that season , afir method significantly decreased harvest index compared with herati method.

1.7. In the both seasons, sowing methods did not exert any marked effect on seeds protein content. Whereas, herati method significantly increased P-content of lentil seeds compared with afir method in the first season only.

2. Effect of Weed Control :

2.1. All mixtures of sencor with other herbicides followed by hand weeding twice treatment were superior in controlling the broad-leaved as well as grass weeds than other treatments. On the other hand, the single herbicide namely topogard, prometryne, igran and sencor gave lowest controlling effect on the same weeds.

2.2. Weed control treatments showed significant effect on plant height and number of branches of lentil. The mixture of sencor with topogard or prometryne or igran as well as hand weeding treatments showed favourable effect on plant height and number of branches/plant in the both seasons.

2.3Yield components characters of lentil plants, i.e., number of pods/plant, number of seeds/plant, weight of 1000-seed as well as weight of seeds/plant significantly influenced with weed control treatments. The mixture of sencor with topogard gave the highest values followed by sencor + prometryne, sencor + igran and hand weeding treatments. On the other hand, percentage of abortive seeds significantly decreased with application of chemical herbicides as well as hand weeding treatment in the both seasons.

2.4.Chemical herbicides and hand weeding treatments had no significant effect on the number of seeds/pod in the two successive seasons.

2.5. All weed control treatments significantly increased the seed yield/fad. and protein yield/fad. in the both seasons. Thus, the highest seed yield was obtained by mixture of sencor with topogard or prometryne, which increased it by 260 and 245% in the first season and 240 and 235% of the unweeded treatment in the second season.

2.6. Treatments of weeds control showed significant effect on the yields of straw and biological in the two successive seasons. The best treatment in that respect was sencor which increased the yield of straw/fad. by 111 and 101% over the unweeded treatments. Whereas, the best treatments which gave higher biological yield were igran and topogard in the first and second seasons, respectively.

2.7. There were significant differences between all weed control treatments and the unweeded treatment on harvest index in the two seasons. The mixture of sencor and topogard caused a significant increase in this trait compared with the other treatments of weed control.

2.8. Protein percentage in lentil seeds was not significantly influenced by weed control treatments in the two successive seasons. On the other hand, some of weed control treatments significantly increased the percentage of P. The highest percentage was recorded with the mixture of sencor with topogard in the both seasons.

3. Effect of the interaction :

The interaction effect was not significant on all previous characters. Such result indicated that each experimental factor acted separately in affecting the weeds, growth, yield and chemical composition of lentil seeds.

B. The Second Experiment :

Two experiments were conducted, each included 24 treatments which were the combination of four irrigation treatments and six fertilization treatments. The experiments were designed according to split-plot design with four replications. The irrigation treatments were arranged

at random in the main polts, while the fertilization treatments were assigned at random in sub-plots.

Results sould be summarized as follows :

1. Effect of Irrigations Number :

1.1. In both seasons, number of irrigations showed significant effect on fresh as well as dry weight of weeds/m^2 at different stages of growth, namely, 45,75,105 and 160 days from sowing. The weight of weeds/m^2 significantly increased as the number of irrigations increased up to three irrigations.

1.2. Increasing irrigation frequency up to three irrigations during the two growing seasons significantly increased plant height and number of branches/plant of lentil. On the other hand, increasing irrigation number up to four times decreased these characters in both seasons.

1.3. Yield components characters of lentil crop, i.e., number of pods/plant, number of seeds/pod, number of seeds/plant and 1000-seed weight were significantly influenced by the number of irrigations in the two successive seasons. The plants recieved three irrigations gave the highest number of pods/plant, number of seeds/pod and number of seeds/plant. On the contrary, increasing number of irrigations up to four irrigations significantly decreased the

previous characters.

1.4. Percentage of abortive seeds was inversely correlated with the number of irrigations. In other words, percentage of abortive seeds significantly decreased as the number of irrigations increased up to four irrigations in the two seasons.

1.5. Weight of seeds per plant was significantly affected by irrigation frequency. In 1984/85 season, weight of seeds/plant significantly increased with increasing number of irrigations up to three irrigations. Whereas, increasing number of irrigations until two irrigations significantly increased seeds weight/plant in 1985/86 season.

1.6. Increasing irrigations number up to three times significantly increased the seed yield of lentil/fad. in the two successive seasons. On the other hand, the plants recieved four irrigations significantly decreased the seed yield/fad. The relative seed yield of lentil which received 2,3 and 4 irrigations was higher than that of one irrigation by 14,34 and 21% in the first season, and 14,38 and 17% in the second season.

1.7. Irrigation frequency had significant effect on yields of straw as well as biological yield/fad. in the two successive seasons. Increasing irrigation number up to three times significantly increased straw and biological yield compared with one and two irrigations.

1.8. Harvest index was significantly affected by number of irrigations. It tended to significant increase with increasing irrigations number up to two times in the two successive seasons.

1.9. The number of irrigations had no significant effect on protein % of lentil seeds. On the contrary, the protein yield/fad. significantly increased by increasing irrigation up to three irrigations in the both seasons.

1.10. Phosphorus content of seeds was not significantly affected with the number of irrigations in the 1984/85 and 1985/86 seasons.

2. Effect of Fertilizer :

2.1. Fertilization of lentil plants with nitrogen and phosphorus significantly increased weed denisity, expressed as fresh and dry weight in lentil plots. On the other hand, the unfertilization treatment contained the lowest fresh and dry weight of weeds/m^2.

2.2. In the both seasons, plant height and the number of branches/plant were significantly affected with fertilization. Increasing levels of N and P up to 15 Kg N + 48 Kg P_2O_5/fad. Produced higher values of plant height and number of branches/plant.

2.3.Application of 15Kg N+24Kg P_2O_5/fad. significantly increased the number of pods/plant as well as the number of

seeds/pod in the two successive seasons. Whereas, increasing levels of up to 15Kg N+48Kg P_2O_5/fad. in the first season and till 15Kg N+24Kg P_2O_5/fad. in the second season significantly increased the number of seeds/plant.

2.4. The effect of fertilization on the percentage of abortive seeds of lentil showed seasonal variations. Percentage of abortive seeds was significantly increased by increasing level of fertilizers up to 15 Kg N + 48 Kg P_2O_5/fad. in the first season only.

2.5. The effect of nitrogen and phosphorus application on 1000-seed weight and the weight of seeds/plant showed similar trend. The weight of 1000-seed and weight of seeds/plant significantly increased with increasing levels of fertilization up to 15 Kg N + 24 Kg P_2O_5/fad. in the first season, and till 15 Kg N + 48 Kg P_2O_5/fad. in the second season.

2.6. Yield of seeds/fad. was significantly increased by increasing fertilizer's level up to 15 Kg N + 48 Kg P_2O_5/fad. in the two seasons. The relative yields were 100, 129,111,138,121 and 146%in the first season, and 100,129, 111,136,121 and 145% in the second season for fertilizer treatments N_oP_o, N_1P_o, N_oP_1, N_1P_1, N_oP_2 and N_1P_2, respectively.

2.7. Straw yield/fad. was not significantly affected by increasing nitrogen and phosphorus levels. On the other

hand, increasing level of fertilizer up to 15 Kg N + 48 Kg P_2O_5/fad. significantly increased the biological yield/fad. in the both seasons.

2.8. Harvest index significantly increased as the levels increased up to 15 Kg N + 48 Kg P_2O_5/fad. in the first season, and up to 15 Kg N + 24 Kg P_2O_5/fad. in the second season.

2.9.The effect fertilization treatments on protein content of lentil seeds showed seasonal variation. Percentage of protein significantly increased as the fertilizer increased till 15 Kg N + 48 Kg P_2O_5/fad. in the first season only. While, application of 15 Kg N + 48 Kg P_2O_5 Kg/fad. significantly increased protein yield/fad. by 53 and 45% over the control treatment in the first and second seasons, respectively.

2.10. Application of fertilizer had significant effect on P-content of lentil seeds. The maximum P-content was obtained by the application of 15 Kg N + 48 Kg P_2O_5 in the both seasons.

3. Effect of the interaction :

The effect of the interaction between number of irrigations and NP fertilizers was not significant on all studied characters.

ACKNOWLEDGMENT

It gives me a great pleasure to express my gratitude to Prof. Dr. G.A. Sary, Prof. Dr. M.S. Salem and Associate Prof. Dr. H.R.A. El-Deepah, at the Department of Agronomy, Faculty of Agriculture at Moshtohor, Zagozig University, for their valuable advice, supervision, continuous help and constructive crisicism throughout the course of this study, and for the guidance and ecourgement during the stage of writing this manuscript.