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SUMMARY

Thirteen experiments were conducted at Sakha Agricultural Research Station, Ministry of Agriculture during 1996/97 and 1997/98 seasons. The aim of these experiments is to study the effect of some plant growth regulators, temperature, nitrogen forms, NaCl concentrations and pH levels on broomrape seed germination, as well as the effect of sowing dates, broomrape infestation and broomrape control treatments on broomrape establishment and faba bean and peas productivity in incubater, pots and field conditions.

I : Laboratory experiments:

Five experiments were conducted in incubator under dark conditions to evaluate the effect of (1) some plant growth regulators (2) temperature levels (3) nitrogen forms (4)NaCl concentrations and (5) pH levels on the germination of broomrape seeds. The germination percentage were estimated at 35 days after the beginning of the experiment.

The results could be summarized as follows:

1- The highest broomrape germination percentage was obtained by applying gibberellic acid at 100 ppm or ethrel at 30 ppm while, the lowest one was obtained by applying indole acetic acid at any concentrations.

2- The maximium broomrape germination % was obtained at 25° C compared to the other tested temprature degrees (5,10,15,20 and 30 ° C) with three plant growth regulators.

3- Application of the three nitrogen forms (urea , ammonium nitrate and ammonium sulfate)at a concentration of 60 ppm prevented the seed germination of broomrape.

4- Increasing NaCl concentration decreased germination percentage of

broomrape seeds up to 5000 ppm.

5- Broomrape germination percentage decreased gradually with increasing pH values from 6 to 8.

II . Pot expremints:

II.A. The effect of sowing dates and broomrape infestation on broomrape establishment and faba bean productivity:

Two pot experiments were conducted to study the effect of three sowing dates (October 15th , November 1st and November 15th) and broomrape infestation (infested and non infested) on attachment, emergence and devlopment of broomrape as well as yield and its components of faba bean (Giza 461 cultivar).

The results could be summarized as follows:

1- Sowing faba bean on November 15th delayed the time of broomrape attachment and broomrape emergence, and decreased the number of broomrape spikes per faba bean plant and number of capsules per broomrape spike but increased the fresh weight of broomrape spike as compared with sowing faba bean on October 15th and 30th.

2- Delaying sowing date of faba bean from October 15th to November 15th significantly increased number of pods, dry weight of pods, number of seeds and seed weight per plant as compared with faba bean plant sowing on October 15th in the two seasons.

3- Faba bean infestation with broomrape significantly decreased number of pods, dry weight of pods , number of seeds and seed weight per plant as compared with non infested faba bean plants in the two seasons.

4- The interaction between sowing dates and broomrape infestation showed that the highest values of number of pods , dry weight of pods , number of seeds and seed weight per faba bean plant were

obtained when faba bean was sown on November 15th under non infested condition in both seasons.

II. B.The effect of sowing date and broomrape infestation on broomrape establishment and peas productivity:

Two pot experiments were conducted to study the effect of three sowing dates (October 15th, November 1st and November 15th) and broomrape infestation (infested and non infested) on attachment, emergence and devlopment of broomrape as well as yield and its components of peas (Little Marvel cultivar).

The results could be summarized as follows:

1- Delaying peas sowing date from October 15th to November 15th delayed the time of broomrape attachment and broomrape emergence, and decreased the number of broomrape spikes per peas plant and number of capsules per broomrape spike but increased the fresh weight of broomrape spike.

2- Delaying peas sowing from October 15th to November 15th significantly increased number of pods,dry weight of pods, number of seeds and seed weight per peas plant in the two seasons.

3- Peas infestation with broomrape significantly decreased number of pods, dry weight of pods , number of seeds and seed weight per peas plant as compared with non infested peas plant in two seasons.

3- The interaction between sowing dates and broomrape infestation indicated that the highest values of number of pods , dry weight of pods, number of seeds and seed weight per peas plant were obtained when peas was sown on November 15th under non infested condition in the two seasons.

III: Field experiments:

III.A.The effect of sowing date and broomrape control traetments on broomrape development and faba bean productivity:

Two field experiments were carried out to study the effect of two sowing dates (October 15th and November 15th) and eight broomrape control treatments (glyphosate at a rate of 36 g/fed as foliar application two or three times with either hand pulling or non, imazethapyr at a rate of 25 and 31.5 g/ fed as soil incorporation, hand pulling three times, and untreated as a check) on broomrape and yield and its components of faba bean (Giza 461 cultivar). The results could be summarized as follows:

1- Delaying sowing date faba bean from October 15th to November 15th significantly decreased number of broomrape spikes / m^2, dry weight of broomrape spikes / m^2, broomrape spike length, number of capsules per broomrape spike, number of broomrape spikes per faba bean plant in the two seasons.

2- Using any of the tested broomrape control treatments significantly decreased the number of broomrape spikes / m^2, dry weight of broomrape spikes / m^2, broomrape spike length, number of capsules per spike, number of broomrape spikes per faba bean plant compared to untreated plants. The highest reduction in the above mentioned traits was obtained by hand pulling three times followed by the foliar application of glyphosate at a rate of 36 g a. i./ feddan three times with hand pulling once in the two seasons.

3- The interaction between sowing dates and broomrape control treatments indicated that the lowest values of number of broomrape spikes / m^2,dry weight of broomrape spikes / m^2, broomrape spike length, number of capsules per broomrape spike and number of broomrape spikes per faba bean plant were obtaind

by late sowing date (November 15th) with hand pulling three times in the both seasons.

4- Delaying sowing date of faba bean from October 15th to November 15th significantly increased the number of pods, 100 – seed weight, number of seeds, seed yield per plant and straw and seed yields per feddan in the two seasons.

5- Number of pods, number of seeds, 100 – seed weight, seed yield / faba bean plant, and straw and seed yields / fed were significantly increased by the application of the tested broomrape control treatments compared to untreated plants.The highest values of those traits were recorded generally by foliar application of glyphosate at a rate of 36 g a. i. /fed. two or three times with hand pulling one time.

6- The results of the interaction between faba bean sowing date and broomrape control treatments indicated that sowing faba bean on November 15th with the application of glyphosate at rate of 36 g /fed three times as foliar application with hand pulling once or hand pulling thrice generally, produced the highest values of number of pods , 100 – seed weight, seed yield per faba bean plant ,straw and seed yields per fed. in the two seasons.

III.B.The effect of sowing date and broomrape control treatments on boomrape development and peas productivity:

Two field experiments were carried out to study the effect of two sowing dates (October 15th and November 15th) and eight broomrape control treatments (glyphosate at a rate of 18, 24 two times and 36 g/fed as foliar application once or two times, imazethapyr at a rate of 31.5 and 42 g/ fed as soil incorporation, hand pulling three times, and untreated as a check) on broomrape

and yield and its components of peas (Little Marvel cultivar). The results could be summarized as follows:

1- Peas sowing on November 15th significantly decreased number of broomrape spikes / m^2, dry weight of broomrape spikes / m^2, broomrape spike length, number of capsules per broomrape spike, number of broomrape spikes per peas plant as compared with peas plant sown on October 15th in the two seasons.

2- Application of all tested broomrape control treatments significantly decreased the values of number of broomrape spikes / m^2 and dry weight of broomrape spikes / m^2, broomrape spike length, number of capsules per broomrape spike and number of broomrape spikes per peas plant compared to untreated plants. The lowest values for the most of those traits were obtained by hand pulling three times treatment followed by the application of imazethapyr at a rate of 42 g/fed as soil incorporated.

3- The interaction between peas sowing date and broomrape control treatments had a significant effect on all broomrape traits studied in the two seasons. Growing peas on November 15th with hand pulling three times produced the lowest values of the number of broomrape spikes / m^2, dry weight of broomrape spikes / m^2, broomrape spike length and number of broomrape spikes per peas plant. However, the lowest values of the number of capsules per broomrape spike were obtained by sowing peas plants on November 15th and weeded with imazethapyr at a rate of 42 g a.i. / fed as soil incorporation.

4- Delaying peas sowing date from October 15th to November 15th significantly increased the 100 – seed weight and number of pods, number of seeds, seed yield per plant and straw and seed yields of peas per feddan in the two seasons.

5- Seed yield of peas / fed and the yield components studied significantly increased by the application of all tested broomrape control treatments as compared with untreated plants in both seasons. The application of imazethapyr at a rate of 42 g/ fed produced the highest values of the number of pods and number of seeds / plant in both seasons and seed yield / fed. in the first season. However, the highest values of 100- seed weight, seed yield /plant and straw yield / fed. were obtained by the applcation of glyphosate at rate of 36 g /fed. tiwce as foliar application in the two seasons.

6- The results of the interaction between peas sowing date and broomrape control treatments indicated that sowing peas on November 15th with the application of glyphosate at rate of 36 g /fed. tiwce as foliar application produced the highest values of 100 – seed weight, seed yield per peas plant and straw yield per fed. in the two seasons. However, the highest values of number of pods and number of seeds/ plant and seed yield per fed were obtained by sowing peas on November 15th with the application of imazethapyr at a rate of 42 g / fed. as soil incorporation in the first and /or second seasons.