Physiological studies on some annual plants

Abeer Abd Allah Frahat Ahmed

This study was carried out at the Experimental Station of Factory of Agriculture at Moshtohor, Zagazig University, Benha Branch during two successive seasons of 1995/96 and 1996/97. The study was divided into three experiments on Iberis amara and Antholyza aethiopico: -I-The first experiment aimed to study the effect of two amino acids (tryptophan and aspartic acid) at different concentration (ie 0, 25, 50 and 75 p.p.m.) on vegetative growth, flowering and chemical content of two plants.II-The second experiment aimed to study the effect of sulfur and phosphorus on vegetative growth, flowering and chemical content of two plants as follows : a-Sulfur addition by two methods; the first one on the soil at different concentrations as 0.5, 1, 1.5 g/plant and the second methd as foliar application at three concentrations as 1.25, 2.5, 5 g/L.b-Phosphorus addition as super phosphate with two methods, the first on the soil at different concentrations as 1, 2, 3 g/plant, the second method as spraying at 2, 4, 6 g/L concentrations.III-The third experiment [biological experiment] aimed to stydy the effect of two extractions of both plants withpertroleum-ether and acetone on cotton leafworm as toxic and antifeedant effects. Important Results1-Amino acids experimenta-Iberis amara 1-The treatment of amino acids at all concentrations (25, 50 and 75 p.p.m.) increased the length of plant, number of branches, fresh and dry weight of leaves. Tryptophan at 75 p.p.m. and 50 p.p.m. at aspartic gave the best results in this regard.2-Spraying the plants with tryptophan and asparatic at all concentrations especially at 75 p.p.m. resulted an increase length of receptecal, number of corymb and fresh weight or corymb.3-Tryptophan and asparatic at all concentration increased content of plant from nitrogen, phosphorus, potassium, total carbohydrates, total glucosinolates and fixed oil.4-The highest concentration (75 p.p.m.) of tryptophan and aspartic acid increased the percentage and yield of glucosinolates and fled oil.b-Antholyga aethiopica: -1-Spring with tryptophan and aspartic acid of 25, 50 and 75 p.p.m increased the vegetative growth flowering and yield of corms.2-Tryptophan at 75 p.p.m. increased number of leaves and flowers, diameter and dry weight of corms, while treptophanat p.p.m. increased the fresh and dry weights of leaves during two seasons while, tryptophan at 25 p.p.m. increased numberof corms. 3-Aspartic acid at 75 p.p.m gave the best results for diameter of spike, while the concentration at 50 p.p.m increased thediameter of the fourth leaf4-The percentages of N.P.K. and carbohydrates and cumarins increased with the application of tryptophan and asparatic at all concentrations as compared to control plants. The maximum values of nitrogen and potassium were with 75 p.p.m. of tryptophan, while the highest value of phosphorus was with 25 p.p.m. while, the percentage of cumarins in scale leaves of corms increased with 50 ppm of asparatic acid.II-1-Sulfur experiment: a-Iber& amara1-The application of sulfur addition at 0.5 g/plant on the soil increased the length of plant, number of branches, fresh and dry weight of leaves whereas spraying the sulfur at 1.25 g/L gave the highest value of fresh and dry weight of leaves, while the application of sulfur micron at 5 g/L showed stimulating effects on increasing the fresh and dry weightleaves.2-Sulfur addition at 1.5 g/plant and sulfur micron at 5 g/L improved the most of parameter of flower, while using sulfur addition at 1.5 g/plant and sulfur micron at 2.5 g/L raised the fresh weight of flower.3-In both seasons, the application of sulfur micron at 5 g/L increased the percentage of N, P, K, and total carbohydrates while highest percentage and yield of glucosinloles in seeds were corncided with sulfur micron at 2.5 g/L. 4-The highest percentage and yield of fixed oil in seeds obtained with the high level of sulfur addition (1.5 g/plant). b-Antholyga aet/ziopica Application of sulfur at 1 g/plant increased the length of plant, number of leaves and diameter of leaf number

fourth as compared to control plants, while the concentration at 1.5 g/plant gave the highest value of fresh and dry weights of leaves.Spraying of sulfur micron at 1.5 g/L increased the length of plant, number of leaves, fresh and dry leaves. Sulfur micron at 1.25 g/L increased the diameter of spike, number of flower and fresh weight of flower as well as diameter and number of corms.The percentages of nitrogen, phosphorus, potassium and total carbohydrates increased with sulfur micron at 5 g/L during the first and second seasons, while the high level of sulfur addition at 1.5 g/plant recorded the highest value of cumarins. 2- Phosphorus experiment : a-Iberis amara1-Super phosphate addition at 2 g/plant significantly increased the number of branches and length of receptacle, while the concentration at 3 g/plant gave highest value of fresh and dryweight of leaves.2-Spaying the phosphorus at 2 g/L increased the number of branch / plant. On the other hand, the concentration at 4 g/L increased the fresh and dry weight of leaves, number of flower and fresh and dry weight of flowers.3-The percentage of total carbohydrates in leaves was higher in plants treated at 4 g/L while phosphorus addition at 3g/plant gave the highest of percentage of total glucosinolates. The highest percentage and yield of fixed oil in seeds of Iberis amara were obtained by application of phosphorus spray at4g / L.b-Antholyza aethiopica: -1-Phosphorus addition at 3 g/plant increased the number of leaves, fresh and dry weight of leaves, length diameter of spike, number of flowers, number, diameter and dry weight of corms.2-Spraying phosphorus at 4g/L increased the length and diameter of spike, while the concentration at 6g/L increased the diameter and dry weight of corms.3-The percentage of nitrogen in dried leaves reached their maximum value with the concentration at 2g/L, while the highest value of phosphorus was with the concentration at6g/L. 4-The percentage of total carbohydrate in dried leaves and total cumarins in scale leaves of corms were obtained with the concentration at 4g/L of phosphorus spray treatment.III-Biological experiment.- Successive extraction of the Iberis amara (seeds) and Antholyza aethiopica (Scale leaves) with two Solvents andindicated that.- The two extracts (Petroleum ether & acetone) of the two plant under study gave higher toxic activity against the lst instar than the 41 instar larvae of S.L. ttoralis. Plant extracts possess antifeeding activity and this activity increase by increasing the concentration of extracts. Petroleum ether selvent better than the other one in the extraction of antifeeding components from plant materials.