Abstract:

A field experiment was carried out during growth seasons (2020-2021) and (2021/2022) in the eastern district of Al-Hamza, located in the south of Al-Diwaniyah Governorate, to study the effect of spraying with nano-potassium and flowering stimulants in reducing falling flowers of two variety of Bean (*Vicia faba* L.) The experiment included three factors: two types of bean (*Vicia faba* L.): Luz De Otono (V_1) and Aquadulce (V_2) for different spray treatments namely, control (E_1), 40mg $IAA.L^{-1}$ (E_2) and 10g for both of licorice and yeast (E_3) ,and different spray of Nano K treatments namely, control (T1), $1gL^{-1}$ (T2) and $2gL^{-1}$ (T3) . The treatments were assigned to experimental plots following a randomized complete block design (R.C.B.D). Each treatment replicated trice time. Means were compared based on least significant differences (LSD) at 0.05 of probability.

The results showed :

K_2 treatment was significantly superior in elements concentration in leaves of the plant and all the vegetative growth characteristics of the plant, as well as in the percentage of fertilization (21.26 , 20.73%) the number of pods per plant (27.66 , 25.26 pods) , weight of 100 seeds (139.45 , 142 g) and yield total seeds (4114 , 4089 kg ha^{-1}), the number of seeds in pod (5.89 , 5.83 seed), and the percentage of carbohydrates in seeds (30.46% ,29.22%) respectively and for both seasons.

E2 treatment was significantly superior to other treatments in plant height (68.28 , 82.23 cm), leaf area (50.22 ,54.59 dm2), chlorophyll pigment content (23.98 ,28.05 SPAD), nitrogen and potassium content (4.823, 4.721, 3.120 and 3. 147%) respectively for two seasons. The fertility rate (21.25 , 21.19%), number of pods per plant (29.22 and 25.53 pods $plant^{-1}$), weight of 100 seeds (145.82 , 146.93 g), total seed yield (4394 , 4343 kg ha^{-1}) , number of seeds in a pod (6.25 , 6.56 seeds pod^{-1}) , percentage of protein in seeds (24.46 , 26.54%) and the percentage of carbohydrates in the seeds (31.65 , 30.98%) respectively for both seasons.

The cultivars differed significantly among themselves in most of the studied traits, as Aquadulus cultivar was superior in all growth traits, yield, and fertilization percentage compared to Luz De Otono cultivar , which was superior in harvest index trait, which amounted to 35.98 and 35.67% for

both seasons, and the cultivars did not differ significantly in potassium percentage in seeds for two seasons .

The interaction between potassium and cultivars (V_2K_2) had a significant effect on some characteristics of dry and fresh weight, leaf area and pod length for the first season only, which amounted to 134.83 g, 760.67 g, 56.67 dm^2 and 24.89 cm, respectively.

The interaction treatment between cultivars and licorice with yeast for treatment V_2E_2 showed a significant increase in leaf area (54.68 , 59.38 dm^2), fresh weight of the vegetative growth plant (717.19 , 759.04 kg $plant^{-1}$) , dry weight (132.83 , 137.10 kg $plant^{-1}$), the same treatment also gave the highest averages of total seed yield, number of pods per plant, yield and percentage of potassium and carbohydrates in seeds which amounted to (4468, 4457 kg ha^{-1}), (29.51 , 27.27 pods $plant^{-1}$) , (14008, 13951 kg ha^{-1} 1.026. 1.041 and 33.68, 32.17%) respectively and for two seasons.

The appearance of significant differences in interactions of potassium nanoparticles and licorice with yeast. The treatment of K_2 E_2 interaction was superior on number of leaves, leaf area and plant dry matter weight, which reached (276.02 ,71.21 leaves $plant^{-1}$), (57.42 ,58.11 dm^2), (131.84 , 138. .25 g) respectively for two seasons .

The triple interaction treatment was significantly superior in $K_2E_2V_2$ treatment in growth characteristics, leaf area, plant wet weight and number of leaves (60.67 , 61.21 dm^2), (780.63 , 779.69 kg $plant^{-1}$), (306.10 , 415.34 leaf $plant^{-1}$) respectively for both seasons . The highest number ofseeds in pod in the first season was recorded (7.84 seeds pod^{-1}) .

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