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## **ARABIC SUMMARY**

## SUMMARY AND CONCLUSION

The different environmental stresses under which the medicinal plants grow in the desert conditions characterized its growth by scarcity in number and limited number of leaves and branches per plant and small average leaf area. However, the concentration of active ingredients is usually high. Wadi Allaqi is a major part of the drainage system of the eastern desert in Egypt. It drains from the Hills of the Red Sea to the Nile Valley in southern Egypt. When Lake Nasser was filled with water after 1967, about 80 km of the wadi were inundated and remained under water for a number of years. As the level of water in the lake fell down in 1980, this receded water exposed about 40 km of the wadi bed and the farmers quickly exploited this area for small scale agriculture.

Recently, expansion in production of indigenous medicinal plants in Egypt became very important. A good number of these plants including: *Hyoscyamus muticus*, *Solenostemma arghel*, *Citrullus colocynthis*, *Senna alexandrina*, *Salvadora persica* and *Balanites aegyptiaca* are regularly collected from Wadi Allaqi by nomads for sale in Aswan.

Modification of some environmental stresses under which the medicinal plants grow in Wadi Allaqi was expected to improve its growth and yield and might also affect the plant contents of the active ingredients. Two of these indigenous medicinal plants were selected (*Hyoscyamus muticus* L. and *Solenostemma arghel*) to evaluate its responses to different irrigation regimes and different rates of applied nitrogen. These plants were cultivated either on the desert soils of Wadi Allaqi or on the exposed soils of Lake Nasser shore (ecotone soils). During the first growth seasons summer (1999/2000) two pot experiments were conducted for *Hyoscyamus muticus*, one using the desert soil, while the second experiment was conducted using the ecotone soil. In both experiments two irrigation regimes were tested which included the

intervals between irrigation of two and four days. In the same time, four levels of nitrogen (0, 40, 80 and 120 kg N/feddan) were applied.

During the first season summer (1999/2000), another two experiments were conducted for *Solenostemma arghel*, one for the desert soil of Wadi Allaqi and second for the ecotone soils. Irrigation intervals for the arghel plants were one and two weeks, while rates of nitrogen were 0, 40, 80, 120, 160 kg N/feddan.

In the second growth season, winter of (2000/2001) another two experiments for *Hyoscyamus muticus*, and two experiments for *Solenostemma arghel* were conducted. In the second season, based on the results of the first one, some modification in the irrigation regimes and nitrogen fertilization were found to be necessary. For the muticus plants the intervals between irrigation became 5, 10 and 15 days and rates of nitrogen became 0, 100 and 150 kg N/feddan, on both types of soils, (desert and ecotone). With respect to the arghel plants, irrigation intervals became 5, 10, 15 and 20 days, while rates of nitrogen were 0, 100 and 150 kg N/feddan.

**The most important results obtained were:**

- 1 – Growth and shoot yields of *Hyoscyamus muticus* were the best with two days irrigation intervals compared with four days during the first growth season (summer), on both types of soils.
- 2 – Addition of 80 and 120 kg N/feddan to both soils gave the highest growth and yield responses of muticus plants. Shoot yield under these treatments were approximately eight times more than non fertilized treatment.
- 3 – The control treatment of nitrogen ( $N_0$ ) did not enable the muticus plants to produce flowers or inflorescences indicating the importance of nitrogen to these plants. This was happened during both growth seasons and in both types of Wadi Allaqi soils (desert and ecotone soils).
- 4 – The combined effect between irrigation and nitrogen fertilization treatments on growth and yield of plants grown on both types of soils indicate



that the best treatment was  $I_1N_3$  (two days irrigation intervals and 120 kg N/feddan).

5 – The highest N, P and K percentages and total uptake in different plant parts were obtained with the  $I_1$  (two days irrigation treatment) and with  $N_2$  and  $N_3$  treatments (80 and 120 kg N/feddan respectively ) on the desert and ecotone soils.

6 – Percentages and total contents of alkaloids in different plant parts were the highest with the two days irrigation intervals. This was also observed with the  $N_2$  and  $N_3$  treatments (80 and 120 kg N/feddan respectively) with respect to the total alkaloids only on both soil types.

7 – Results obtained for *Hyoscyamus muticus* plants during the second growth season, winter (2000/2001) on both types of soils were similar to the results of the first growth season. The best results obtained for growth, yield, nutrient contents and active ingredients (alkaloids) in the plants were obtained with  $I_1$  (5 days) irrigation treatment, and  $N_1$  (100 kg N/feddan) nitrogen fertilization treatment.

8 - *Solenostemma arghel* plants were also cultivated on both soils of Wadi Allaqi area during the first and second growth season. On the desert soils the growth was successful, meanwhile, the germinated plants on the ecotone soils died quickly and were not able to complete its growth period, in the first growth season (1999/2000). In spite of the treatments modifications in the second growth season (2000/2001), this behavior was repeated again.

9 – On the desert soils, the arghel plants behave similarly during both growth season. Trends of the results obtained were rather similar to those obtained with muticus plants, where the shortest irrigation intervals and the 80 to 100 kg N/feddan, treatments gave the best growth, yield, nutrient contents and the glycosides total content of the plants.

10 – Finally it could be concluded that the best results for cultivating *Hyoscyamus muticus* and *Solenostemma arghel* on the desert as well as on the

ecotone soils could be obtained when these plants were irrigated every five days and fertilized with 80 to 100 kg N/feddan. This was found to be true for plant growth, yield and active ingredients. The only exception is the ecotone soils with arghel plants, where the growth was not completed. This point needs more investigations.