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**Effect Of Sowing Season and Irrigation
Level on Establishment of Alfalfa**

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Summary

Alfafa establishment is a critical stage for Alfalfa production .In Saudi Arabia alfalfa is sown in fall and sometimes in Spring . However the studies in this field is scarce , therefore this study was conducted to sowing season and the moisture effect on Alfalfa establishment and development.

This study was conducted in fall 2000 and spring 2001 in Dirab Experiments and Research Station. The experiment design was split plots for each sown season with 4 replicates, in which moisture levels was assigned to main plots and sub-plot was arranged to two commercial cultivators (Hassawi) and (CUF 101) .

Time of irrigation was determined by using pan evaporation, in which three levels of evaporation (30, 60 ,and 90 mm) were used and the application of water amount was at 5 cm depth for each irrigation. The total amount water applied for each treatment was estimated by using water counter.

Forage yield and its components were determined for each experimental plot as follow: plant height "cm" ,number of plants /m², number of branches /m², fresh forage yield, dry forage yield and dry matter percentage.

Data were analyzed using SAS program and the differences between means were estimated by using least significance difference (LSD).

The results showed that the effect of sowing season was highly significant in all the studied characters . The fall season surpassed the spring in height, number of plants/m², number of branches /m² , which reflected on yield production forage in all studied cuts. Variation between seasons decreased

with time ranging from 63.15% to 17.74% for first and fourth cut, respectively.

The results also showed that moisture level had significant effect on all studied character. Moisture level at 30mm evaporation the highest value of plants height , number of plants /m², number of branches /m² , which then was reflected on increasing fresh forage yield significantly for all cuts compared with 60 or 90 mm moisture level.

The relative increase in forage yield due to the irrigation at moisture level 30 mm evaporation compared to 60 or 90 mm was about 16% and 30% for the first cut. However the relative increase in forage yield decreased with cutting frequency to 6.6% and 24% for the fourth cut.

The results cleared that, the wet treatment (30mm) had more water lost compared with the 2nd (60mm) and the 3rd one (90 mm) . The total water used for the 3rd One (90mm) was 35% from the 2nd one .

Therefore, by water use efficiency calculation, the 3rd treatment (90 mm) had the highest values and the 1st one .

The result also, showed that Hasswi cultivar surpassed CUF 101 significantly for all the studied characters and all the cuts.

Hasswi cultivar had taller plants, highest number of plants and branches/ m² and this was reflected on more increased forage yield. The relative increase in forage yield due to raising Hasswi cultivar was 38%, 29%, 34% and 33% for the 1st, 2nd, 3rd and 4th cut respectively.

The results also , showed that Hasswi cultivar surpassed CUF 101 in dry matter percentage.

The results obtained indicated that the interaction between sowing and soil moisture level for all the most studied characters was significant with the exception of dry matter percentage. The interaction effect at the 3rd moisture level (90mm) was more clear on growth characters at the spring season compared with the fall season, which the relative decrease in plant height, number of plants and branches/m² was increased.

This result reflected more difference in fresh weight in spring season compared with fall season. The results also, cleared that the interaction between sowing season and cultivators was significant Hasswi cultivator surpassed CUF 101 in fall season in plant height, number of plants and number of branches/m².

This results reflected on fresh weight. The results showed that the interaction between cultivators and soil moisture was significant. The differences between moisture levels for the studied characters with Hasswi cultivator were less compared with CUF 101, especially at 60mm moisture levels, which the difference was small.

We can conclude from this study that seeding Alfalfa in fall season is more suitable under Riyadh region conditions. Irrigate alfalfa at moisture level (30mm) increased seedling establishment and plants capacity for branches but cutting frequency led to decreasing moisture level at (60mm) is the best to save more water.

This study also, cleared that Hasswi cultivator was the suitable for production under different moisture levels in both seasons.