CONTENTS

CONCLUSION AND RECOMMENDATION

Summing up the points of comparison between the two cooling treatments and control group during the experimental months, under study, and their effects on the physiological responses of the animals could be discussed in accordance with the obtained data from this study.

It's clear that, using spraying cooling system was the best systems enhancing for animals performance, whereas, it decreased significantly water consumption (WC), feed conversion (FC), rectal temperature (RT) and respiration rate (RR). While, it increased significantly daily weight gain (DWG), white blood cells (WBC), triiodothyronine (T_3), feed efficiency (FE), hemoglobin% (Hb%), total protein (TP), thyroxin (T_4) and testosterone, comparing with control group.

Showering cooling system also, enhanced animal's performance, but less than the previous system and more than control group, whereas, it decreased WC (more than the others systems), RT and RR. While, it increased DWG, WBC, Hb%, TP, T_4 and T_3. Also, showering had no significant effect on FC, FE and testosterone comparing with the spraying group.

Also, experimental months affected significantly on some parameters, whereas, it was increased significantly WC, dry matter intake (DMI) and WBC ascending through experimental months. And decreased DWG, TP and T_4, also increased RT and RR during Jul. (M_2) and Augu. (M_3). The opposite was happened during Jun. (M_1) and Sept. (M_4). The second and third month had a positive effect on FC, FE and T_3, whose began increase significantly through M_4.

Experimental months affected on Hb% and testosterone by the same trend, whereas, they had no any significance through the first three months, then had a significant difference through M_4.

In conclusion, using spraying system as mean for elevating heat stress on exotic breeds to improved their performances under hot seasons, was the best economically way of the two experimental means and recommended for great farms. Also, using showering system was less effective than the previous system and more positive effect than control only. It was simple mean for dissipating heat stress of animals during hot summer, so that, it recommended for small farms and farmers owned remarkable animals.

6-SUMMARY

This study was carried out at Animal Production Research Institute in participation with Animal Production Department, Faculty of Agriculture, Moshtohor. The experimental work was conducted at Ali-Ezet farm- Meat Land Company- during summer (from Jun. to Sept. 1999).

This study aimed to improve productivity of European and exotic breeds under hot-humid summer conditions in Egypt. The experimental part wes condacted on15 growing Holstein Friesian calves, aged about 8 months and weighted about 210 kg, assigned into 3 equal groups, kept separately under loose semi shaded yards, and fed ad-lib. at 8 am. (berseem hay, rice straw, great millet fodder and concentrate mixture).

The first group (G_1) was used as a control group for G_2 and G_3. The second group (G_2) was treated with spraying cooling system. The third group (G_3) was treated with showering cooling system.

The mean results could be summarized as follows: -

1- Thermoregulation responses:

-Rectal temperature (RT) and respiration rate (RR) decreased significantly by using cooling systems in G_2 and G_3 comparing with G_1, they were (38.94±0.01 and 38.94±0.01c° vs.39.0±0.01c°; and 50.02±0.34 and 49.94±0.34 r.pm vs. 52.78± 0.19 r.pm), respectively.

-Also, RT and RR increased significantly through M_2 (Jul.) and M_3 (Augu.) than that of M_1 (Jun.) and M_4 (Sept.).

-Both of RT and RR affected by daytime; at 7am., they decreased significantly ($p<0.05$) for G_1 than those of G_2 and G_3. At 2pm. (under using cooling system), RT and RR of G_2 and G_3 decreased significantly than G_1. But, at 7pm. (after cessation of cooling systems), both of RT and RR of G_2 and G_3 increased significantly than G_1.

2- Water consumption (WC):

-The water consumption (WC) decreased significantly ($p<0.05$) by the effect of cooling systems. And, the lowest WC was obtained in calves exposed to showering cooling system in G_3 (35.15 L/d). Also, calves exposed to spraying cooling system in G_2, had a lower WC (36.47 L/d.) than control shaded calves in G_1 (45.56 L/d.).

-Water consumption (WC) gradually increases significantly through experimental months from M_1 (Jun.) to M_4 (sept.). Whereas, the lowest value (34.75 L/d) was obtained in M_1, and the highest one (42.82 L/d) was obtained in M_4.

3- Dry matter intake (DMI):

-It did not affected significantly as a function of cooling water applications.

-Months affected significantly ($p<0.001$) on DMI, whereas, it increased gradually from M_1 (Jun.) to M4 (Sept.) by increasing the requirements of the animals.

4- Daily weight gain (DWG):

-Daily weight gain enhanced significantly ($p<0.001$) by cooling systems in G_2 and G_3 than in G_1, they were (1.46 and 1.34 vs. 1.23 kg/d, respectively) whereas, spraying cooling system improved DWG more significantly than using showering by about 8.3%.

-Also, DWG affected significantly by month, whereas, DWG means of M_1 (Jun.) and M_4 (Sept.) were higher than that of M_2 (Jul.) and M_3 (Augu.). The highest gain observed in M_4 and the lowest one was obtained in M_3.

5- Feed utilization (FU):

-Spraying improved significantly ($p<0.05$) FC and FE in G_2 compared with G_1. Also, as values, showering increased FC and decreased FE than G_2, although, no significant statistical differences between them.

-Feed conversion (FC) increased gradually during the first three months, reached its maximum at M_3 (from 5.48±0.112 for M_1 to 7.8±0.128 kg DMI for M_3) then, decreased then after at last month M_4 (7.14±0.21 kg DMI). The opposite trend was observed for FE, which decreased until M_3 (0.129±0.002 kg gain), then began increased in M_4, where, reached to 0.141±0.004 kg gain.

6- Hematological responses:

-Using spraying cooling system improved significantly ($p<0.05$) Hb%, WBC_s and TP. Whereas, using showering cooling system enhanced Hb% and TP without significant

differences with spraying system, also it improved WBC a little lower than spraying. Control group recorded the lowest values in Hb%, WBC and TP. Also it had no significant difference in TL.

-Experimental months had significant ($p<0.05$) effect on Hb%. Whereas, M_4 had the highest value than the others months, which had no significant differences between them. WBC's increased gradually significantly from M_1 to M_4. TP increased significantly through M_1 and M_4 and decreased in M_2 and M_3 (4.52±0.14 and 4.58±0.16 g/dl ver. 4.09±0.14 and 4.08±0.13g/dl, respectively). Whereas; experimental months had no significant effect on TL.

7- Hormonal responses:

-Using spraying system improved significantly ($p<0.05$) T4, T_3 and testosterone than control group. Also, using showering system enhanced T_4 and testosterone, without significant differences with the spraying system. Whereas, showering improved significantlyT_3, but it was a little pet lower significance than spraying system.

-Experimental months affected significantly ($p<0.05$) on T_4, T_3 and testosterone. T_4 improved significantly during M_1 and M_4 but it affected negatively by M_2 (Jul.) and M_3 (Augu.), without significant differences between each two months. Whereas, T_3 recorded the highest significant concentration in M_4 (Sept.), then in M_1 (Jun.), and the lowest one was observed in M_3. Testosterone concentration mean through M_1 was (4.35±0.57 ng/dl) and then it decreases through M_2 and M_3, without significant differences between these months (3.67±0.4 and 3.69±0.41 ng/dl, respectively), then after, it reached its maximum in M_4 (6.48±0.38 ng/dl).