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ADAPTABILITY OF RABBITS TO THE HOT CLIMATE

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SUMMARY- *The rabbit as a nocturnal animal happening and being very active at night, is recommended to feed during the cool period of the nights which characterized with lower ambient temperature and lower humidity in summer months and the other hot months of the year round. The maximum and minimum temperature and the relative humidity in the morning and after noon were analysed statistically and revealed seasonal, month, season X month significant difference. The hot months in summer and other hot months were discussed. The favourable effect of lower temperature on the performance and behaviour of the rabbit supported the proposal of the nocturnal feeding and diurnal feed utilization for rabbits under the different production systems.*

Key Words: *Rabbits; hot climinate Summer, Nocturnal, Diurnal Feeding system, Performance and behaviour.*

The rabbit, both wild and domestic, has enormous adaptability to exist in conditions ranging from the tropical to the arctic (very cold) on an exceptionally wide and varied diet. Rabbits can adapt to intensive husbandry systems in relation to the environment characteristics in which they are kept with the aid of man (Sanford, 1992).

The response of growing rabbits chronically exposed to high ambient temperatures has some times generally shown a masked decrease in live weight gain and food intake (Prud'hon, 1976 and Steplan, 1980).

Crimella et al. (1991) assessed the influence of season, temperature and relative humidity on the total weight loss (%) in rabbits. The results show that mainly the climate can affect animal performance. The summer (4.2% weight loss) and 90-95% relative humditiy (3.0%) vs. 3.8% for 70-75%

while 80-85% the weight loss was 2.5% only. The higher the air temperature the higher was the weight loss.

One of the main causes for abnormal maternal and sexual behaviour is the hot climate (Verga Marina, 1992). Although the doe rabbit is capable to produce 10 litters a year, it gives only 4 to 5 litters in hot climate. Summer, is the main point as well as the hot months of the whole year round, to be studied in this conference of rabbit production in hot climates. It needs further investigation to give high lights to be considered to overcome the negatively and adverse effects on rabbit behaviour and performance.

Some times, beside the hot seasons and months of the year, the daily temperature raises over 32°C and may reach 45°C. At environmental temperatures of 32°C and higher, heat stress occurs, leading to production losses. When temperatures of 35°C and higher persist; the greatest losses from heat stress may result. Mortality is the most obvious sign of heat stress. Poor weight gains, impaired feed conversion, increased disease incidence, decreased fertility, reduced reproductive efficiency and other conditions may also result, all of which adversely affect production economics.

Prior to covery and to delivery of the presexual maturity of the female rabbit the heat stress will decrease the live weight. The breeding doe, after that, will decrease the feed intake, the litter weight, the litter size and the ability to live.

Breeding does were fertilized under conditions of 34°C ambient temperature and had natural parturition at 36°C ambient temperature. However, the optimum mating and kindling took place between 26-30°C (Xulide et al., 1992).

Rectal temperature ranged between 38.4°C in Automn up to 39.6°C in Summer. The difference between Automn and Summer and the interactions of seasons and temperature were significant, but there appeared no change for the season. Both indices, rectal temperature and respiratory rate suggested a compensatory response of the animals to the imposed thermal stress.

The rabbit is a nocturnal animal happening at night and seeking its food at night. During different hours of the day, the lowest feed intake of the rabbits was recorded in Summer. During the different hours of the day, feed intake was 9% from 8 to 13 h., 17% from 13 to 18h and 74% from 18 to 8h. (Battaglini Marcella and Grandi Augusta, 1988).

The seasonal effect was also observed during the night hours. The animals consumed 82% of the diet during the night hours of the Summer season, while in Winter the rabbits consumed 70%. The worse digestibility

was obtained in Autumn, but the worst in Summer.

The diet was utilized much better during diurnal hours because of the small feed quantity passing through the digestive tract. The rabbits are more active during darkness mainly in relation to grazing (Mykytowiez and Rowley, 1958).

Air temperature and relative humidity according to different seasons and months in Sharkiya Governorate, Egypt:

The overall mean for air temperature and relative humidity during the year are presented in Table 1 in Sharkiya Governorate, Egypt. It seems that the minimum and maximum temperature may mask the high temperature in Summer days and the low temperature in Winter days, which may reach more than 34°C and less than 10°C in the two seasons; respectively. However, the difference between the minimum and maximum air temperature among lowest air temperatures among seasons and among months are highly significant ($P \leq 0.01$). The lowest air temperatures are in January and the higher is July. The highest difference in humidity % is in Summer and the lower is in Winter between the early morning (8 h) and the afternoon (15 h) and the lowest humidity is in Spring. However, the difference among seasons and months is highly significant between the morning and the afternoon in this respect, but the humidity is not effective in comparison with the temperature as the rabbit may live in wide range of humidity.

It is worthy to mention that rather than the average, the air temperature may reach more than 34°C during the days and 100% relative humidity during the nights of the hot months.

Nocturnal feeding system is suggested for the production systems of rabbits in the hot months from 13 h to 8 h. daily. Hot months in Egypt are August, July, June, September, October and May (Table 1). Offering feed during cooler periods of the nights of these months means to adjust the feeding time clock and the workers schedules. The diurnal feed utilization will improve as the rate of passage of feed in the ingesta will be slower during the hours of the day. The feed intake, appetite, daily gain and feed conversion will improve in the lower ambient temperature (20-26oC) than in higher (26-31oC).

The cooler period during the night suggested to be the time of feeding and drinking in the hot months during the year; not only for the growth performance but also for better reproductive efficiency of the rabbit as well as in poultry (Miller, 1983).

Further investigations should be carried out to practice the nocturnal feeding for the nocturnal animal (the rabbit) under all the production systems

intensive, semintensive and the traditional system as the prevailing system in the countryside in Egypt. Similar studies should be carried out in this respect for all the countries of tropical and subtropical climates to get benefit for the welfare of rabbits production.

However, selecting a strain of rabbits that has shown the greatest degree of heat tolerance should be considered as well.

REFERENCES

Battaglini Marcella Grandi Auguste (1988).: Some observation on feeding behaviour of growing rabbits. 4th World Congress, WRSA Proceeding. Nutrition & Pathology: Budapest, Hungary: 79-987.

Crimella C., Luzi F. and Verga M. (1991): Influenza del transporta sulacluni peramnetri production nel coniglio dacarne Atti XLV Conv. S.I.S. Vet., Palermo, in Stampa.

Mykytowicz R. and Rowley I., (1958): Continuous observations of the activity of the wild rabbits. Oryctolagous cuniculus (L.); during 24-hour periods. C.S. I.R.O. Wildl. Res., 26-31.

Prud'hon M. (1976): Compartment alimintaire due lapin sounies aux temperatures de 10, 20 et 30°C.

Miller, C. Paul (1983): Commercial poultry production. Mideast M.S. Feed Grains Council, XXSettembre 5- Rone Italy.

Sanford, J.C. (1992): Notes on the history of the rabbit. J. AQppl. Rabbit Res. 15: 1-28.

Stephan, E. (1980): The influence of temperature on meat rabbits of different breeds. I Congs. Inte. Cunicola, Barcelona,: 399-409.

Verga marina (1992): Some characteristics of rabbits behaviour and their relationship with husbandry systems. J. Appl. Rabbit Res. 15: 55-63.

Xu Lide, Uang Ganumfu, Chen Zanmau, Huang Sheorong, Chen Jianree, Jin Shinuan and Ye Yofu (1992): Studies on integrative measures for raising the reproductive ability of the domestie rabbits during hot season. J. Appl. rabbit Res. 15: 569-574.

Table (1): Least squares means ± S.E. of air temperature and relative humidity according to different seasons and months.

Items	Air temperature (°C)			Relative humidity %		
	Minimum	Maximum	Difference	8 hour	15 hour	Difference
Overall mean	21.3	25.7	4.37	89.9	63.4	26.48
Season:						
Winter	17.7±0.18a	20.3±0.26a	2.54±0.20a	98.2±0.73	80.5±0.94a	17.69±0.96
Spring	19.5±0.18b	24.0±0.26b	4.50±0.20b	72.1±0.73b	47.7±0.93b	24.40±0.96b
Summer	24.7±0.18c	30.8±0.26c	6.07±0.20c	92.1±0.73c	59.1±0.73c	32.99±0.96c
Autumn	32.2±0.18d	27.6±0.26d	6.34±0.20b	97.2±0.73d	66.4±0.94d	30.77±0.96c
Months:						
January	17.6±0.25h	20.4±0.35hi	2.71±0.31ef	98.2±0.99a	87.3±1.51a	15.97±1.55d
February	16.8±0.25i	19.6±0.37i	2.76±0.32ef	99.0±1..03a	97.1±1.56a	19.83±1.60cbd
March	17.7±0.25h	21.8±0.35g	4.13±0.31cd	67.7±0.99f	47.4±1.51d	20.32±1.55cbd
April	20.1±0.25f	23.7±0.36f	3.57±0.32ed	70.3±1.02f	48.3±1.54d	22.00±1.58cb
May	20.7±0.25d	26.5±0.35e	5.77±0.31b	78.2±0.99e	47.4±1.51d	30.81±1.55a
June	23.2±0.25d	30.0±0.36bc	6.80±0.32a	82.5±1.02d	50.8±1.54d	31.67±1.58a
July	25.0±0.25b	30.6±0.35b	5.65±0.31b	94.2±0.99c	61.9±1.51c	32.26±1.55a
August	26.0±0.25a	31.7±0.35a	5.77±0.31b	99.4±0.99a	64.4±4.51c	35.00±1.55a
September	24.0±0.25c	29.4±0.36cd	5.37±0.32b	97.7±1.02a	64.5±1.54c	33.17±1.58a
October	23.8±0.25dc	28.6±0.35d	4.84±0.31cb	99.2±0.99a	64.7±1.51c	34.52±1.55a
November	21.8±0.25e	24.7±0.36f	2.87±0.33ef	94.7±1.02bc	70.2±1.54b	24.50±1.58b
December	18.7±0.25g	20.9±0.31f	2.16±0.31f	97.4±0.99ab	80.0±1.51a	17.42±1.55cd

Within each classification means with the same letter are not significantly different.