تأثير بعض الظروف البيئية على إنتاج اللبن وبعض مكوناته

في مزارع الألبان

إبراهيم شحاتة، حامد ساحة

لاحظ أن لدرجة الحرارة والرطوبة النسبية خلال مواسم السنة لها تأثير معنوي على إنتاج اللبن، وأن لارتفاع درجة الحرارة بنسبة الرطوبة تأثير مضاد لانتاج اللبن ومكوناته.

كانت درجة الحرارة والرطوبة النسبية في الحظائر المغلقة 22 ± 3 درجات مئوية، 71 ± 9% على الترتيب. أما في الحظائر المفتوحة فكانت 34 ± 8% على الترتيب.

وجد أن متوسط إدرار اللبن في الصيف والشتاء كان 18 ± 1288 ± 404 رياضيات، بينما كان متوسط نسبة الدهون 31 ± 1407 كجم على الترتيب. بينما كان متوسط نسبة الدهون 33 ± 1767 % في نفس الفصول من السنة على الترتيب. ومن ناحية أخرى كانت نسبة المواد الصلبة في اللبن 42 ± 38 رياضيات، 12 ± 53 ± 12 في الشتاء والصيف على الترتيب.
لا يوجد نص يمكن قراءته بشكل طبيعي من الصورة المقدمة.
THE EFFECT OF SOME ENVIRONMENTAL CONDITIONS ON MILK YIELD AND ITS CONSTITUENT IN DAIRY FARMS
(With 3 Tables)

By
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SUMMARY

The authors studied the climatic conditions under which dairy animals at Behera, Alexandria and Kafr El-Sheikh Provinces were managed. The results showed that the temperature and relative humidity had an influence on the milk yield of the animals. Increase in both temperature degree and humidity percentage mainly affects the constituents.

Temperature degree and humidity percentage in closed stables were 22.45±1.3, 70.47±8.5 and 23.85±2.9, 74.35±7.4 for indoors and outdoors respectively.

The average milk yields in summer and winter were 212.64±1400 and 2637.3±1145 Kg respectively. The average fat percent in the respective two seasons was 3.57±0.28 and 3.86±0.26. At the same time total solids were 12.35±0.51 and 12.52±0.48 in summer and winter respectively.

INTRODUCTION

Structures for livestock have the basic function of climatic modification. Protection from extreme hot, humid and cold atmospheres is necessary for animal health and production, since they can upset the metabolic processes.


The present investigation was done to show the effect of climatic conditions on milk yield and its major constituents.

Part of a thesis submitted at Fac. of Vet. Med. Alex. Univ. for partial fulfillment of the master degree in Animal husbandry.

MATERIAL and METHODS

Ten Governmental dairy farms located in Alexandria Province (3 farms), Behera Province (6 farms) and Kafer El-Sheikh Province (one farm) were investigated from the view of micro-climatic condition and its effect on milk yield and its constituents.

1- Micro-climatic conditions:
   a- Air temperature:
      Ambient temp. were recorded inside the investigated building by using a maximum and minimum thermometer placed at a distance of few inches from the floor level of each enclosure.
   b- Relative humidity:
      R.H. % inside each animal stable were recorded by using the hair hygrometer.

   Several reading of temperature and relative humidity percentage were recorded at different times and the average was calculated for each season.

3- Milk constituents:
   Butter fat percentage, total solid and solid not fat were determined according to A.O.A.C (1975).

RESULTS

Climatic is a combination of several elements, the most important of which are the prevailing temperature and the moisture content. Animal husbandry is affected by climatic conditions in two ways, first through the direct influence on animal and secondly by the indirect effect on its environment.

Table (1)
The relationship between variation in environmental temperature, relative humidity and milk yield

<table>
<thead>
<tr>
<th>System of</th>
<th>Temperature (°C)</th>
<th>Relative humidity (%)</th>
<th>Milk yield (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoors</td>
<td>22.45 ± 1.3</td>
<td>70.47 ± 8.5</td>
<td>2919.5 ± 723.9</td>
</tr>
<tr>
<td>Outdoors</td>
<td>23.85 ± 2.9</td>
<td>74.35 ± 7.4</td>
<td>2239 ± 249.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Season</th>
<th>Temperature (°C)</th>
<th>Relative Humidity (%)</th>
<th>Milk Yield (%)</th>
<th>FCM (%)</th>
<th>Milk Constituents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>12.3 ± 0.23</td>
<td>80.8 ± 0.28</td>
<td>2127.3 ± 1400.34</td>
<td>3.57 ± 0.17</td>
<td>7.4 ± 0.74</td>
</tr>
<tr>
<td></td>
<td>12.5 ± 0.22</td>
<td>68.6 ± 0.26</td>
<td>2673.1 ± 1145.41</td>
<td>3.06 ± 0.15</td>
<td>6.6 ± 0.67</td>
</tr>
<tr>
<td>Summer</td>
<td>20.6 ± 0.37</td>
<td>73.7 ± 0.17</td>
<td>1800.3 ± 1050.42</td>
<td>3.95 ± 0.19</td>
<td>8.4 ± 0.81</td>
</tr>
<tr>
<td></td>
<td>19.9 ± 0.34</td>
<td>62.9 ± 0.14</td>
<td>1400.6 ± 1055.14</td>
<td>3.62 ± 0.17</td>
<td>7.2 ± 0.78</td>
</tr>
<tr>
<td></td>
<td>19.3 ± 0.31</td>
<td>58.3 ± 0.12</td>
<td>1075.4 ± 750.27</td>
<td>3.23 ± 0.15</td>
<td>6.2 ± 0.64</td>
</tr>
</tbody>
</table>

Table (2) Seasonal Variation between At Temperature, Relative Humidity, Milk Yield and Its Major Constituents.
DISCUSSION

It has been found that the average air temperature recorded during the period of investigation varied between 22.45±1.3 and 23.85±2.9 °C (Table 1) which lie within the comfort zone of dairy cattle reported by BARRET and LARKIN (1977) and SAINSBURY and SAINSBURY (1979). Moreover, RENNER, et al. (1976), BASLIN and ANDJICIC (1979) and PASCHKE (1982) recorded nearly similar temperatures in dairy cattle byres. However, much higher ambient temperatures were reported by DONALD, et al. (1978) and LANGE (1978). It has been found that too high air temperatures above 27°C in case of temperate type cattle, the thermoregulative mechanism begin to fail resulting in a number of harmful complications to animal health and production.

Many field studies have given more detailed information on the effect of air temperature on milk, butter fat, solids not fat and total solids production. With an increased ambient temperature, the appetite is depressed, food intake is reduced and heat production correspondingly lowered, which can lead to a decrease in productivity. These phenomena partly explain the variation in milk yield noticed in the present investigation (Table 2 and 3).

It can be recognized from the results presented in Table (3) that the daily milk yield was substantially reduced during summer when the environment temperature reached its maximum level (28.9±2.06°C). Similar findings were previously reviewed by MIESCKE, et al. (1979). Moreover, a decrease of 2.84 Kg in milk production was recorded in cows kept in enclosed housing systems following an elevation of air temperatures from 17.4 to 27.5°C, while the increase in outdoor ambient temperatures from 18.8°C to 28.9°C resulted in a reduction of 2.39 Kg in milk production (Table 3). These findings are in agreement with those recorded by SASTARY and THOMAS (1976), DONALD, et al. (1978), LANGE (1978) and PASCHKE (1982) however DRAGOVICH (1979) has reported the reverse.

The data presented in Table (1) revealed a negative correlation between relative humidity and milk yield. The humidity percentage determined in indoors and outdoors dwelling were found to be 70.47±8.5 and 74.35±7.4 respectively.

The moisture content of the air has a pronounced effect on health and production of animals since it influences the important channels of extraction of surplus body heat. It would be responsible therefor to suppose that has some effect on food intake and consequently production. These results are in agreement with those of RENNER (1976) and DONALD, et al. (1978) however, a contradictory opinion was reported by DRAGOVICH (1979).

It can be noticed from Table (2) that the increase of both air temperatures and relative humidities resulted in a decrease of the percentages of butter fat, total solids and solids-not-fat. These results support those demonstrated by SASTRY and THOMAS (1976) and SAINSBURY and SAINSBURY (1979).

It seems clear therefore from the abovementioned investigations and supporting arguments, that the relative contribution of the major component of climatic conditions that demoned our particular attention. The environment must be optimized to develop potential of confind animals through ventilation, protection against extreme weather, excessive watering, concentrated rations and methods of husbandry. In general, changes in animals husbandry through good management of livestock can probably facilitate acclimatization and physiological adaptation for benefit of animal health and productive performance. Moreover, warm weather prevailing during winter was found to be advantageous than hot weather existing in summer for high milk yield.

REFERENCES

