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Influence of milking number and frequency on milk production in Martina Franca breed asses

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ABSTRACT - Two experiments were carried out in Martina Franca asses in order to study milk yield and udder healthy conditions in relation to daily milking number and frequency. Experiment I - A total of 15 asses were subdivided into three groups (N.5) corresponding to: one milking per day, after a 3 hour interval from foal separation by dams (Group A); three milkings per day with 3 hour frequency (Group B); three milkings per day with 2 hour frequency (Group 3M). Experiment II - Evaluation was made of the effect of a schedule of 6 milkings per day with frequency of 2 hours on milk yield (Group 6M; N. 5), compared to Group 3M). Healthy udder conditions in relation to the number of milking per day was monitored in 3M) and 6M) Groups, by somatic cell count. Average yield per milking was highest (P<0.01) following 3 rather 1 milkings per day and with milking frequency of 3 hours rather than 2 hours (P<0.01). A schedule of six milkings per day did not improve mean milk yield and determined an increase in somatic cell count compared to 3 daily milkings regimen (63.2 vs 17.5 x 1000/mL; P<0.05).

Key words: Ass, Milking, Milk production.

INTRODUCTION - For milk yield purposes, equids require a higher number of milking per day with a shorter interval between the milkings compared to ruminants, due to the different structure and low storage capability of their udder (2 L in mare; Doreau and Boulot, 1989). In mares it has been pointed out that the amount of milk yield depends on the length of mammary gland secretion, i.e. time elapsed between the last suckling of foal and milking (Doreau et al., 1986). On the basis of these observations, 2 or 3 hours interval for 5 to 6 daily milkings are indicated (Doreau, 1991). In ass, knowledge on galactopoiesis process and factors affecting milk secretion are limited. Defining such basic parameters of milking management as number of daily milkings and milking frequency, are thus of primary importance in order to define the technique of ass-breeding for milk production.

The aim of this study was to evaluate the effects of daily milking number and frequency on milk yield in ass. The effect of milking numbers on udder healthy condition was also considered.

MATERIAL AND METHODS - Two experiments were carried out on a total of 20 healthy adult jennies of the Martina Franca breed. The experimental animals, bred in semi-extensive conditions in Southern Italy (South-Eastern Murgia, Apulia region) and trained to machine milking, were selected for homogeneity of foaling date. Milking was carried out daily using a modified sheep milking machine operating with a vacuum level 42kPa, pulse ratio 50% and pulse rate 120 cycles/min. For all animals the first milking was performed at 8:00 a.m., with foals previously separated from dams according to experimental milking frequency.

Experiment I aimed at evaluating the effect of milking number and frequency on mean milk yield. The trial lasted 30 days, corresponding to the 4th lactation month of the jennies. Three experimental groups (N. 5) were considered: Group A, milked once a day after a 3 hours interval from foal separation by dams; Group B, milked three times per day with a frequency of 3 hours; Group 3M, milked three times per day with a frequency of 3 hours.

Experiment II - In order to evaluate the effect of milking number on milk production and health conditions of the mammary gland, this trial considered two groups (N.5) of jennies: Group 6M milked 6 times per day with a fre-
frequency of 2 hours, for 30 days; Group 3M corresponding of Experiment I, milked 3 times per day with a frequency of 2 hours. Health condition of the udder was monitored by somatic cell count (SCC; Fossomatic 360) of individual samples. The log10 was calculated to normalize the SCC distribution. Statistical analysis of data was conducted by ANOVA using the SPSS package (2003), with means compared by Scheffè’s test.

RESULTS AND CONCLUSIONS - Experiment I – Mean milk yield per milking was significantly (P<0.01) affected by milking frequency, proving to be significantly (P<0.01) higher at 3 compared to 2 hours (Table 1). In other studies as well higher milk yield per milking was found with a longer interval between milkings (6h: Alabiso et al., 2006; 5h: D’Alessandro and Martemucci, 2006). In this study, the increase from one to three milkings per day, with 3 h interval, resulted in an increase of mean milk yield (P<0.01; Table 1). In asses, the positive influence on milk secretion of a greater number of milkings (3 vs 2 milking/ day) has been reported by Alabiso et al. (2006). In this study milk production per milking covered a very broad range (40 to 1640mL), according to Salimei et al. (2005).

Experiment II – Considering the amount of milk drawn by each of the six milkings (Table 2), the lowest value corresponded to the first milking of the morning. This finding is in agreement with other studies carried out in other ass breeds as well and, although attributed to an adaptation phenomenon of the dam to the suckling rhythm of the foal (Chiofalo et al., 2004; Salimei et al., 2004; Alabiso et al., 2005), thorough analysis of this productive aspect of the ass is required. Following six milkings per day (Group 6M), mean milk yield showed no improvement compared to the 3-times regimen (Group 3M, Experiment I) (282.3 vs 325.5 mL/milking; Table 2). Neither an increase from 3 to 6 milkings per day nor the 2 hour milking interval appear likely to exert a positive influence on milk secretion. Here again, milking numbers influenced mammary health. Milk somatic cell count was higher (P<0.05) in group 6M compared to Group 3M (63.2 < 17.5 x 1000/ mL; P<0.05; Table 2), indicating a more stressful condition for udder. The increase of somatic cell count in asses as due to a greater number of daily milkings was also showed by Alabiso et al. (2006).

Table 1. Effect of milking number per day, with 3 hour frequency, on milk production (X ± SE) (Experiment I).

| Milking Parameters | Number | Frequency | Mean / milking (x ± SE) | Range |
|--------------------|--------|-----------|------------------------|-------|
| Group A            | 1      | 3 h       | 346.0 ± 7.2A           | 40-1220|
| Group B            | 3      | 3 h       | 512.2 ± 7.6B           | 50-1500|
| Group 3M           | 3      | 2 h       | 325.5 ± 10.9A          | 40-1640|

A, b = P<0.01.

Table 2. Effect on milk production (mL) and somatic cells content of number of milkings per day with a frequency of 2 h (Experiment II).

| Milking Order | Mean / milking (x ± SE) Group 6M | Group 3M |
|---------------|----------------------------------|----------|
| 1st M         | 172.7 ± 15.6 a                   | 321.1 ± 25.4ab |
| 2nd M         | 301.4 ± 12.6 b                   | 383.5 ± 16.5a |
| 3rd M         | 281.9 ± 13.5 b                   | 267.5 ± 10.1b |
| 4th M         | 304.6 ± 22.5 b                   | /         |
| 5th M         | 332.6 ± 27.0 b                   | /         |
| 6th M         | 316.5 ± 20.1 b                   | /         |
| TOTAL         | 282.3 ± 7.7                      | 325.5 ± 10.9 |

Somatic Cell (x 1000/mL) X ± SD

| X ± SD | 63.2 ± 23.1 * | 17.5 ± 4.3 * |

a, b = Differences within the same Group, P<0.05; * = Difference between Groups; P<0.05.
In conclusion, the results of this study indicate that the highest mean milk yield corresponded to 3 milkings per day every 3 hours. Daily milking regimens of 6 milkings with the frequency of 2 hours did not increase milk production and had a negative influence on the health of the mammary gland.

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