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# Factors influence the behavioural parameters displayed during milking in dairy ewes

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# Introduction (1)

- Several factors affect milk yield in ruminants → **breed, age, milking frequency** etc.
- In modern farms, the **stockperson** is also largely responsible for the animal's care and maintenance
- The frequent contact between the farmer and his/her animals could have negative or positive effects on animal **welfare, behaviour, physiology** and **productivity** depending on the personality and the nature of the behaviour that the stockperson directs towards them (data on dairy cows)

## Introduction (2)

- Fear is generally considered as an undesirable emotional state of suffering and frequently is a result of **aversive** handling
- Fearful animals may sustain **injuries** in trying to avoid humans during routine inspections and handling (acute stress)
- In some situations evidences of chronic stress are observed that could lead to immunosuppression with negative implications on the **health status** of the animals

## Objective of the study

- Effects of breed (Chios or Karagouniko), age (primiparous or multiparous), milking frequency (once or twice per day) and human handling (friendly or aversive) on behavioural parameters displayed during milking in dairy ewes
- An isolation - flight distance test was also implemented to estimate the emotional state of animals

# Material and Methods (1) – Animals and Groups

- 32 ewes → 16 Chios & 16 Karagouniko → 8 multiparous & 8 primiparous (estrus synchronization → same stage of lactation ~ 60 days after parturition)
- Assigned to 2 groups → milked twice (7:00 a.m. and 15:00 p.m.) or once (7:00 a.m.) daily for 2.5 months
- Milked in a random order in two subgroups of eight animals for each treatment in a 12 unit milking parlour
- Animals had the same body score (2.5-3.0) and feeding regime & handlings were similar between the groups throughout the experiment



**Chios**



**Karagouniko**

## Material and Methods (2) – Parameters during milking

- Milk yield, milk flow rate and number of kick responses (the hoof raised at the height of the udder) during milking were weekly recorded
- Each milking was randomly conducted by an aversive or a friendly handler. Interaction was classified as aversive, when included slaps, pushes or hits with the hand, loud shouting and fast speed of movement
- The position (left, middle or right) in milking parlour was also recorded (the 12 unit milking parlour was divided in three parts → 1-4: left, 5-8: middle and 9-12: right)



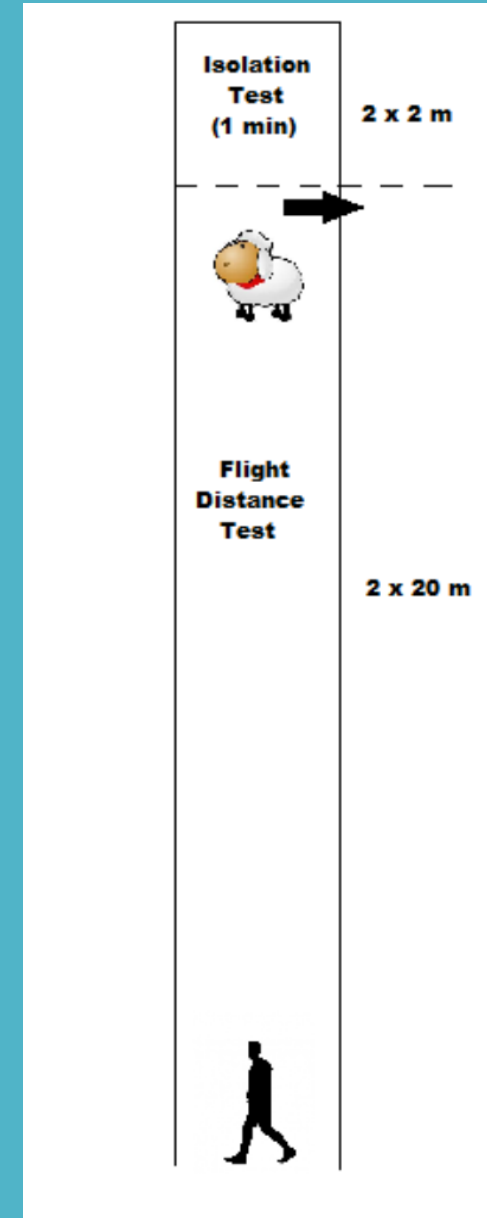


## Material and Methods (3) – Isolation Test

- At the end of the first and second month, an isolation - flight distance test was also implemented to estimate the emotional state of animals
- Each ewe was positioned in a visual isolated metal cage (floor size 2

# Material and Methods (4) – Flight Distance Test

- The front gate was then remotely opened (from behind a hessian screen at the back of the cage)
- As it did so, a person appeared at the opposite end of the 20 m race and walked towards the sheep at approximately 1 m/s of speed. The distance between human and sheep, when the sheep began its run past an approaching experimenter was defined as the flight distance
- Persons participated in this test were present at milking, but only as observers. Sheep were visually isolated from conspecifics during test



# Statistical analysis

- A mixed model appropriate for repeated measures was used with **breed** (Chios, Karagouniko,) **age** (primiparous or multiparous), **milking frequency** (once or twice per day) and **human handling** (friendly or aversive) as fixed effects and the **week** of experiment as the repeated factor. Interactions were tested and in case of significance remained in the model
- Position preference was determined by performing a Chi-square test
- Differences were tested at 0.05 significance level by Bonferroni test and results are presented as LS Means  $\pm$ SEM (Sas/Stat, 2011)

# Results (1)

Table 1. Effect of breed on milk yield (ml), milk flow rate (ml/s) and number of kick responses during the milking (LS means  $\pm$  SEM)

	Chios	Karagouniko	
	1311 $\pm$ 66	789 $\pm$ 75	<0.001
	6.00 $\pm$ 0.59	10.32 $\pm$ 0.67	<0.001
	1.03 $\pm$ 0.18	1.02 $\pm$ 0.20	NS

## Results (2)

Table 2. Effect of age on milk yield (ml), milk flow rate (ml/s) and number of kick responses during the milking (LS means  $\pm$  SEM)

## Results (3)

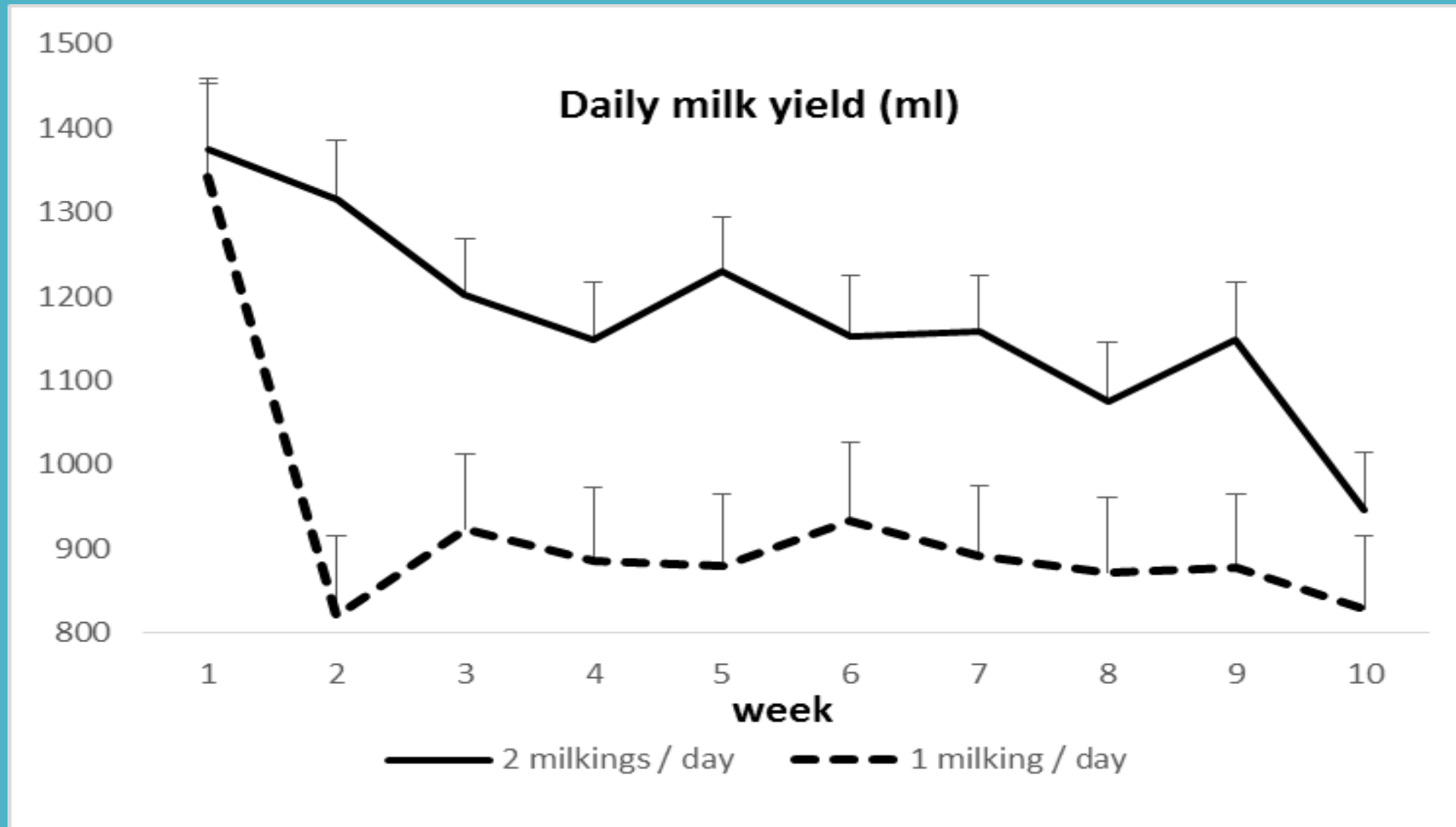
Table 3. Effect of handler behavior on milk yield (ml), milk flow rate (ml/s) and number of kick responses during the milking (LS means  $\pm$  SEM)

## Results (4)

Table 4. Preference (%) for a specific area (left, center or right for units 1-4, 5-8 or 9-12, respectively) in the milking parlour

Preference (%) - Choice	Total ewes	Milking Frequency		Breed		Parity	
		Once	Twice	Chios	Karagouniko	Primi-	Multi-
First	<b><u>60.7</u></b>	66.5	58.1	55.7	66.9	53.7	62.3
Second	27.4	23.7	29.1	30.2	23.9	33.3	26.0
Third	11.9	9.8	12.8	14.1	9.2	13.0	11.7
P	<0.001	NS		<0.01		NS	

# Results (5)



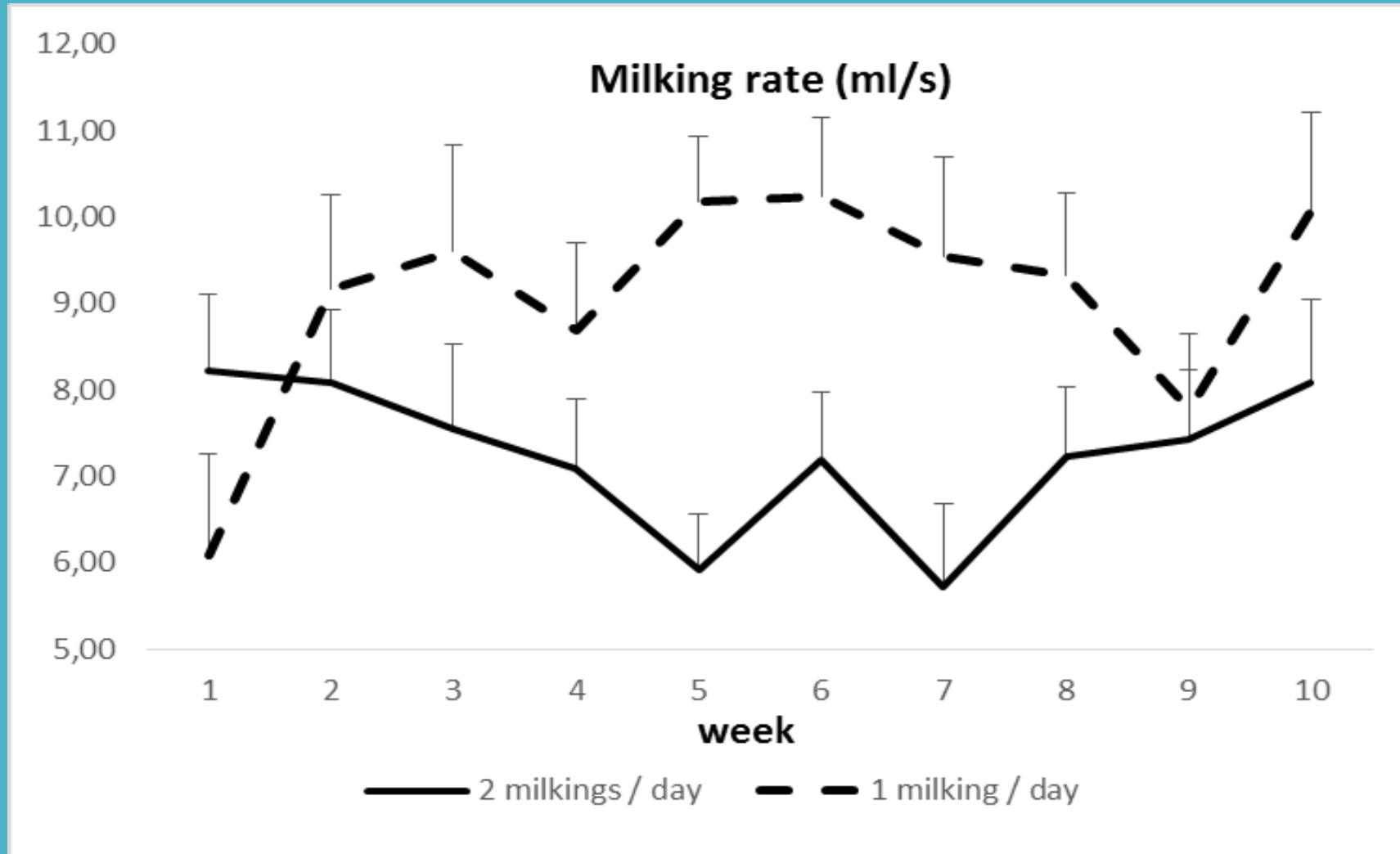
\*Milking frequency was changed from two to one during the second week of the experiment.

Significant differences were observed from the 2nd till the 9th week between the experimental groups

Figure 1. Effect of milking frequency on milk yield (ml) during milking throughout the experiment (LS means  $\pm$  SE)



# Results (6)

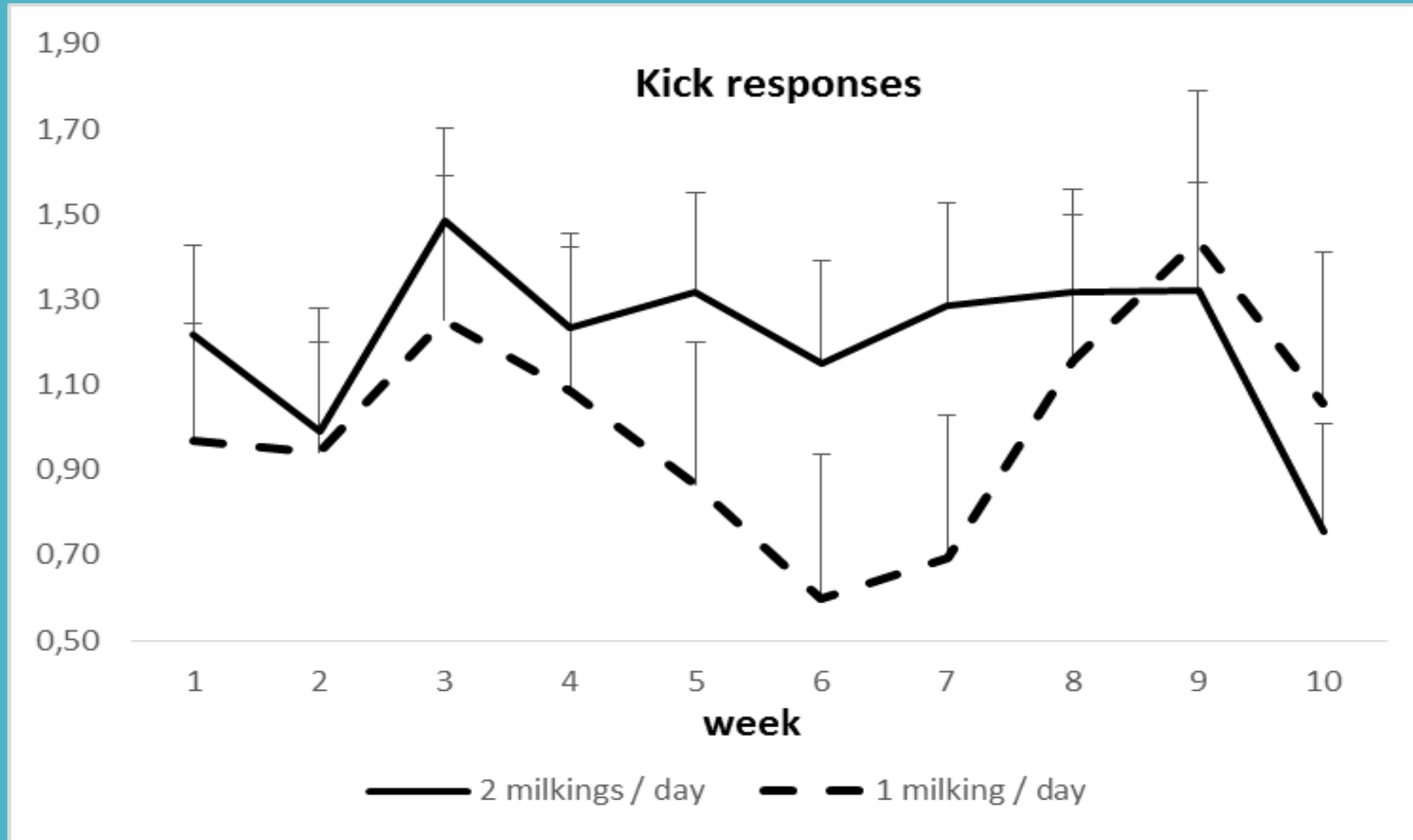


\*Milking frequency was changed from two to one during the second week of the experiment.

In general, milk flow rate was higher in the group milked once per day compared to that milked twice. However, significant differences were observed the fifth, sixth and seventh week between the experimental groups

Figure 2. Effect of milking frequency on milk flow rate (ml/s) during milking throughout the experiment (LS means  $\pm$  SE)

# Results (7)



\*Milking frequency was changed from two to one during the second week of the experiment. No significant differences were observed between the experimental groups

Figure 3. Effect of milking frequency on number of kick responses during milking throughout the experiment (LS means  $\pm$  SE)

## Results (8)

Table 5. Effect of breed on number of bleats and jumps and flight distance during the isolation – flight distance test (LS means  $\pm$  SEM)

# Results (9)

Table 6. Effect of age on number of bleats and jumps and flight distance during the isolation – flight distance test (LS means  $\pm$  SEM)

# Results (10)

Table 7. Effect of milking frequency on number of bleats and jumps and flight distance during the isolation – flight distance test (LS means  $\pm$  SEM)

# Discussion (1)

- Results indicated that Chios had higher milk yield but lower milk flow rate compared to Karagouniko ewes (2 separate emissions or 1 rapid peak flow of oxytocin)
- As it was expected, ewes milked twice produced more milk than those milked once
- No significant effect of ewe age was demonstrated in the parameters during milking
- The presence of an aversive handler decreased milk yield and increased the number of kick responses during milking (fear – anxiety responses)
- A preference of ewes for a specific position in the milking parlour was also recorded

## Discussion (2)

- During the isolation - flight distance test, Chios ewes bleated more, but had shorter flight distances compared to Karagouniko ones (breed origin)
- Flight distance was also shorter in multiparous than primiparous ewes (flight zone)
- Finally, ewes milked twice per day displayed less jumps and more bleats compared to those milked once (more frequent interaction with the handler → mild – moderate display of stress symptoms)

# Conclusion

- The significant effects found in the present study indicate that stockperson's handlings significantly affect behaviour and productivity of dairy ewes
- Breed of lactating ewe also played an important role in the exhibition of the recorded behavioural parameters
- Further experimentation is warranted to elucidate the mechanisms involved in the procedure of milking in dairy ewes





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