University of Ljubljana

The effect of Pinzgauer introgression on the red pied sided coat colour of Cika cattle

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Introduction

Colour sidedness

- a dominantly inherited phenotype of cattle
- documented at least since the Middle Ages
- presently segregating in several cattle breeds around the world

Tux-Zillertaler

Berrenda en Negro

Blacksided Trondheim

Dagestan Mountain

Ennstal Bergschecke

North Finncattle

Felius et al., 2011

Red pied sided coat colour

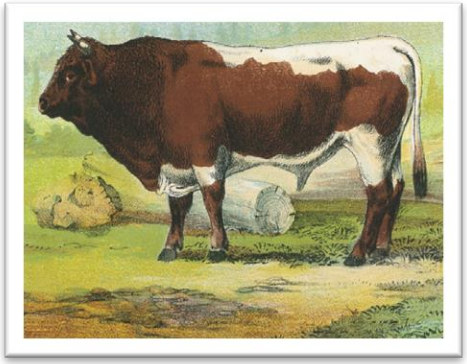
Cika -
autochthonous in Slovenia

Pinzgauer -
autochthonous in Austria

- *a characteristic white stripe over the withers, back, thigh, belly and lower breast*
- *the tail is always white*
- *the upper arms and the upper part of the hind legs are usually white*

The history of Cika cattle

♀ - local single-coloured cattle



♂ - Mölltaler cattle

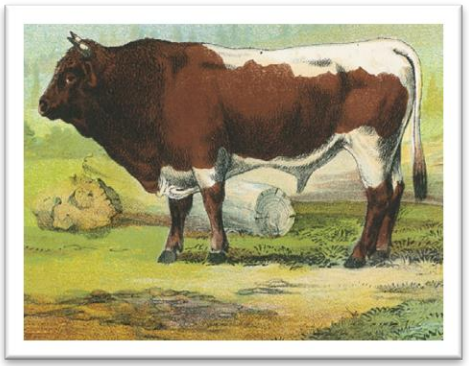
The Mölltaler cattle was assimilated in the Pinzgauer herd-book in 1925

Cika cattle

Adopted the red-pied coat colour pattern during the second half of the 19th century

The history of Cika cattle

♀ - local single-coloured cattle



♂ - Mölltaler cattle

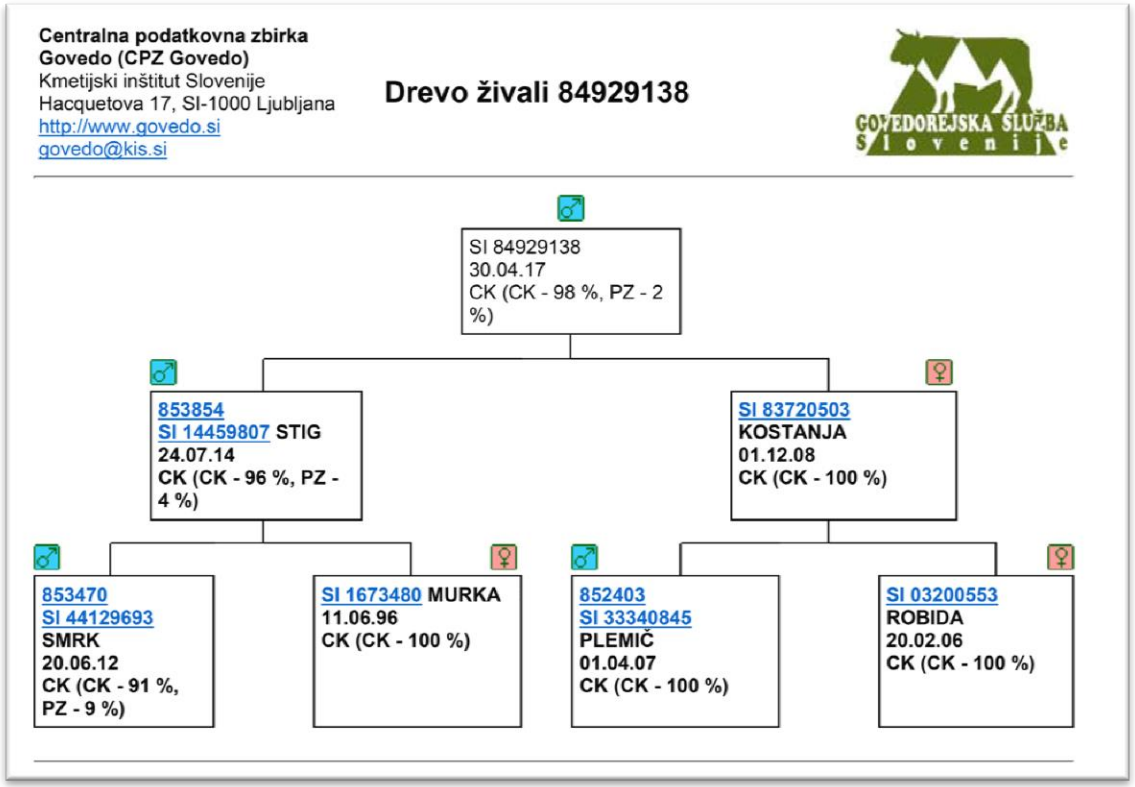
Cika cattle

Pinzgauer cattle

Pinzgauer sires were widely used for the upgrading of the Cika cattle in some farms from 1976 till 1992; only a part of the Cika cattle population was introgressed

The aim

- to evaluate the effect of the proportion of Pinzgauer cattle in the pedigree of Cika cattle on the coat colour pattern of Cika cattle



Material and methods

- 303 Cika cattle measured
  - 66 males
  - 237 females
- 4 days to 13.1 years old (all animals in the farm)
- springtime 2013, after the housing period
- 34 farms all over the country

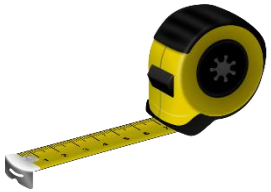
Measurements

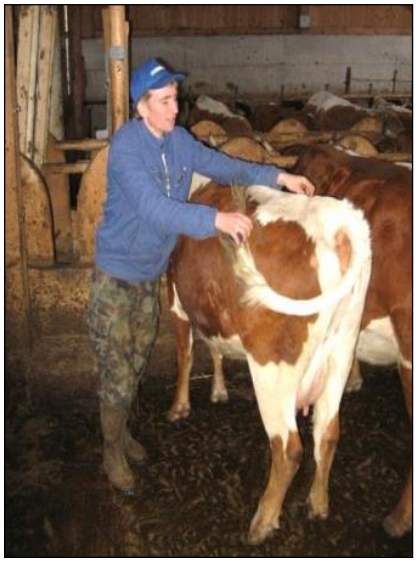
Width of the white stripes

- on the back
- on the rump
- on the front legs
- on the rear legs

- wither height

- the tape



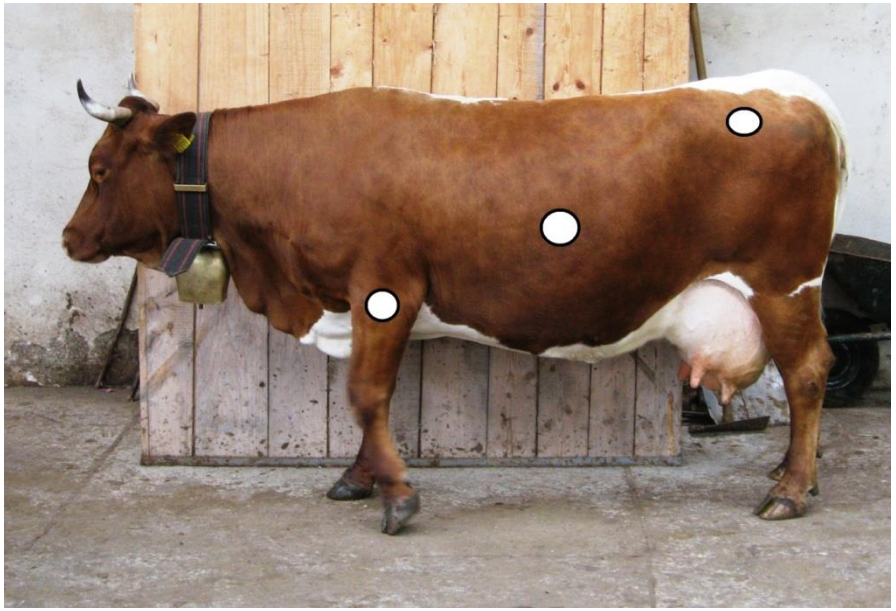


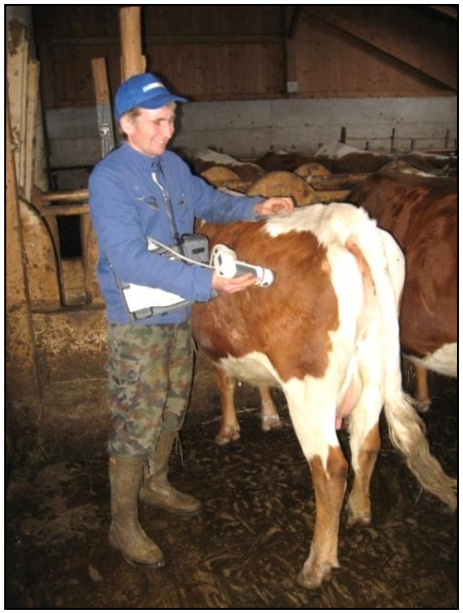
- Lydtin stick

Width of the white stripes were considered as the proportion to the wither height.

Red basic coat colour intensity

- performed by Minolta CR-300 Chroma meter
- using CIE (L*a*b) colour system
- 3 parts of the body (shoulder, rare ribs, round)





Statistical analysis

- The GLM procedure (SAS/STAT)

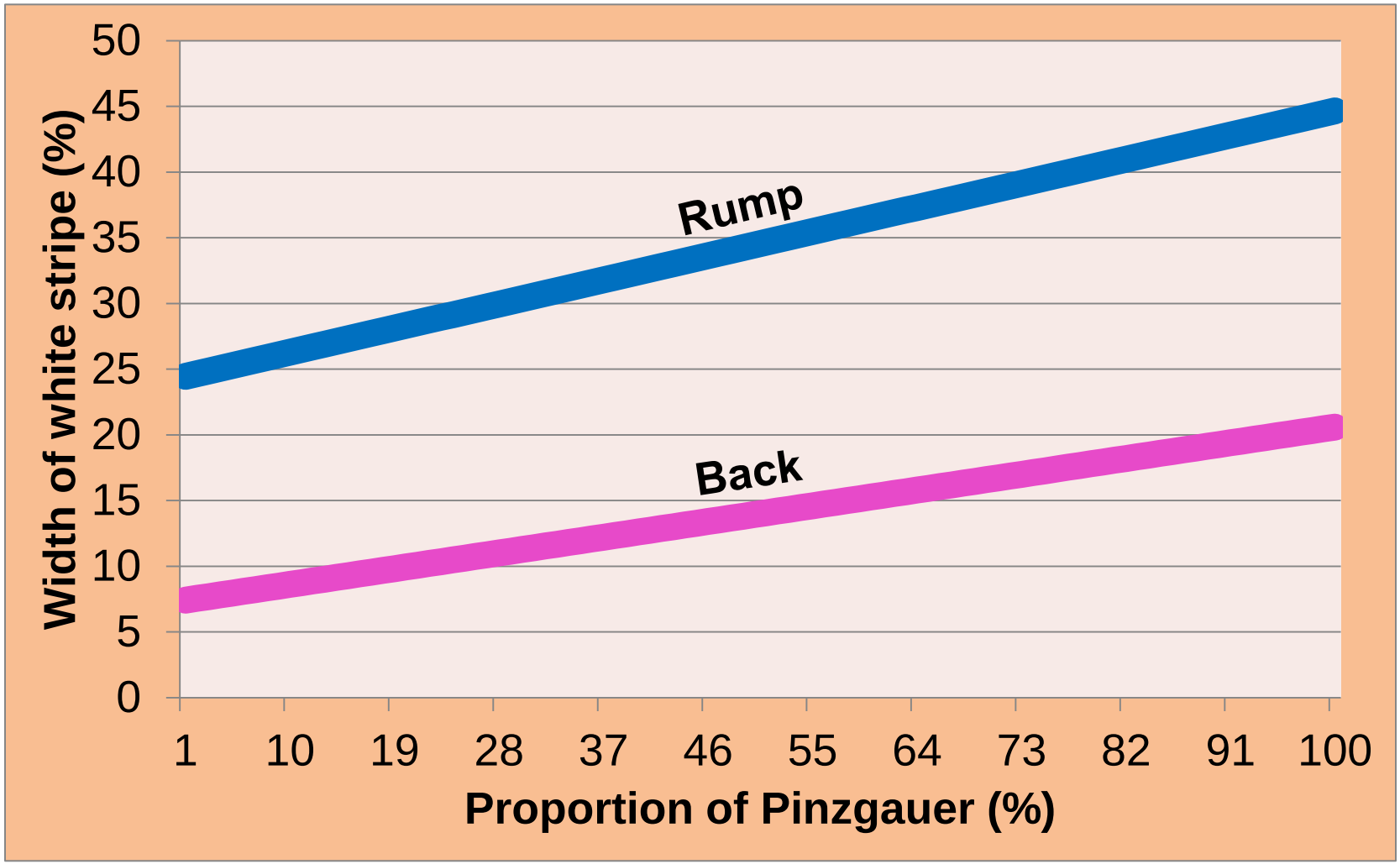
- $y_{ij} = \mu + S_i + b_I(x_{ij} - \bar{x}) + e_{ij}$

- S_i - fixed effect of sex
- b_I - the proportion of Pinzgauer cattle in the pedigree of each Cika cattle as linear regression

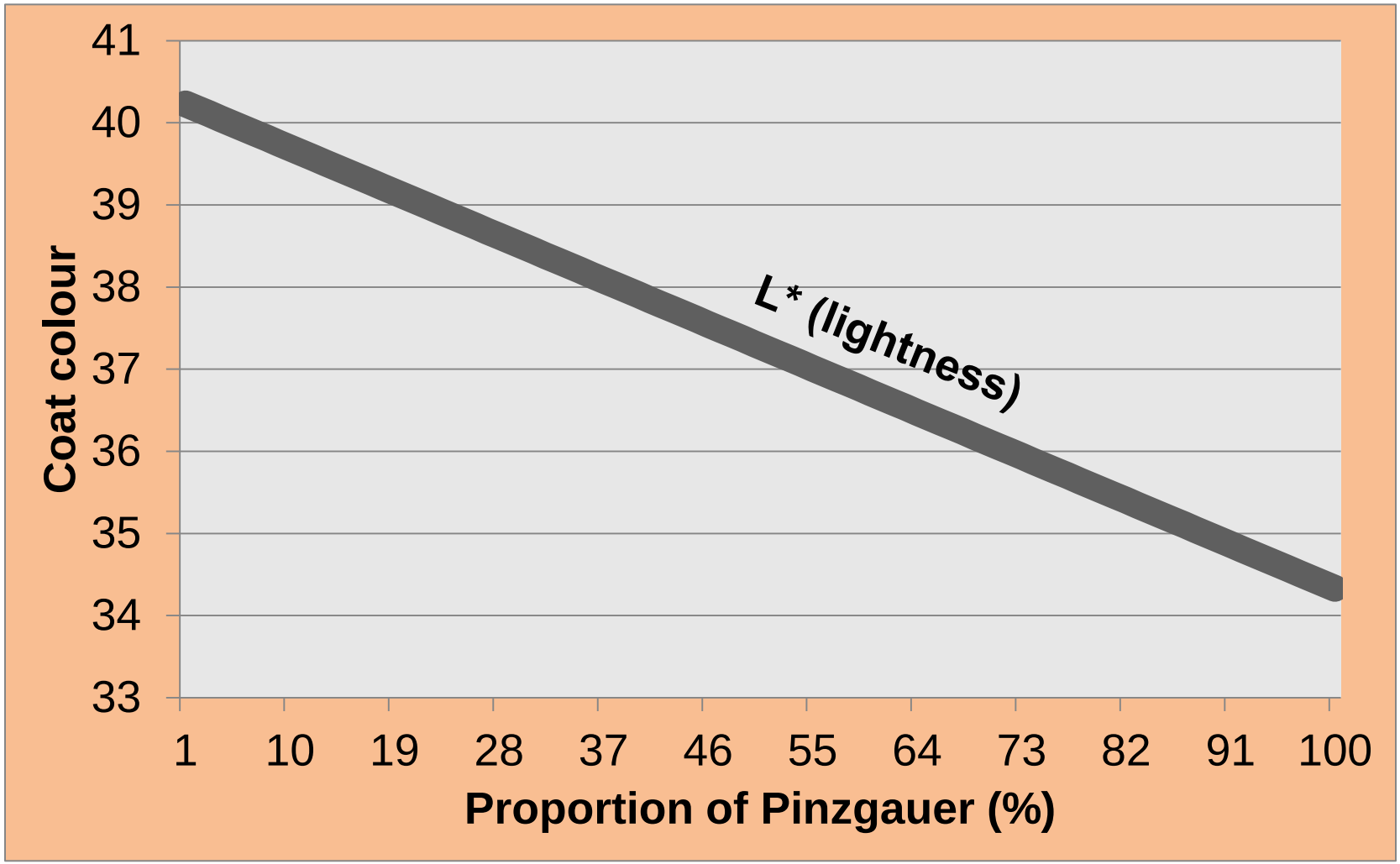
Results (LSM ± SE; p-values)

Trait	LSM ± SE		p-values	
	Males	Females	Sex	Proportion of Pinzgauer in the pedigree
Width of white stripe (% of wither height)				
- on the back	4.99 ± 0.95	7.92 ± 0.50	**0.007**	**0.001**
- on the rump	19.10 ± 1.46	25.66 ± 0.77	**<0.001**	**0.001**
- on the front legs	2.13 ± 0.48	1.82 ± 0.25	n.s.	n.s.
- on the rear legs	4.78 ± 1.00	7.95 ± 0.59	**0.003**	n.s.
Basic coat colour intensity				
L* (lightness)	40.72 ± 0.39	40.17 ± 0.20	n.s.	**<0.001**
a* (redness)	5.36 ± 0.09	5.85 ± 0.05	**0.002**	**0.001**
b* (yellowness)	7.92 ± 0.29	7.54 ± 0.15	n.s.	**<0.001**

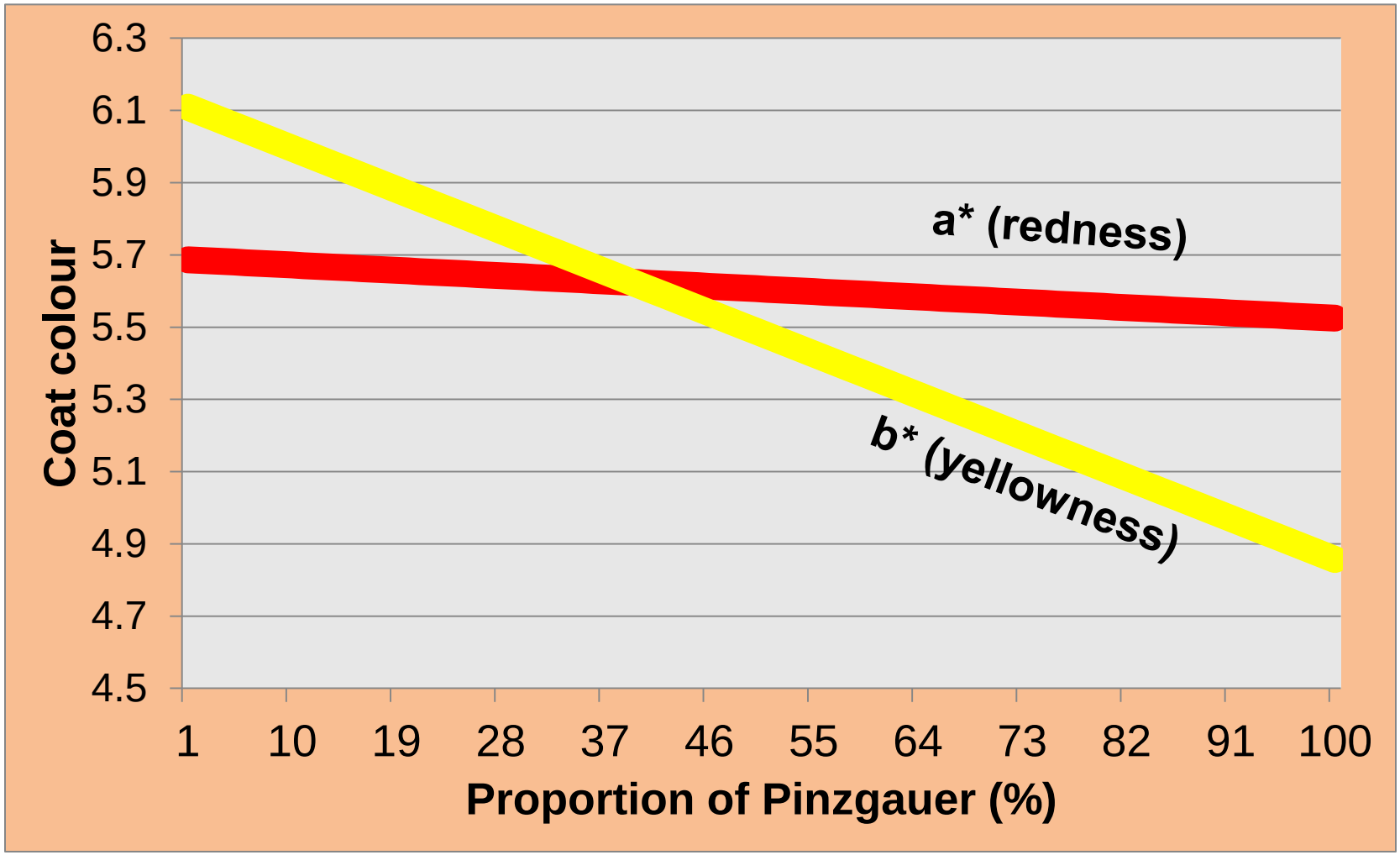
The effect of the proportion of Pinzgauer in the pedigree **on the width of white stripes**



The effect of the proportion of Pinzgauer in the pedigree on the **L* parameter**



The effect of the proportion of Pinzgauer in the pedigree on the **a* and b* parameters**



Thank you for your attention!

Conclusion

- Females had significantly wider white stripes and more intensively red coat colour than males

- Cika cattle animals introgressed with Pinzgauer had wider white stripes and darker coat colour with less intensively red and yellow shades

- Genetic characterisation found introgression of other breeds besides Pinzgauer in some Cika animals, which could influence the coat colour as well