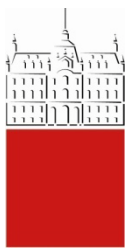# Body measurements of one week old Lipizzaner foals
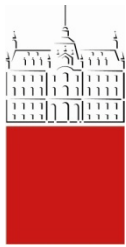
Klemen Potočnik

University of
Ljubljana

Biotechnical
Faculty

Objectives

* Study body measurements of one week old Lipizzaner foals from Stud farm Lipica:

  ~ The relationship among traits

  ~ What affect foals body measurements

  ~ Genetic effects

Stud Farm Lipica

* Herd of Lipizzaner horses
    ~ 40 breeding stallions, 6 lines
    ~ 77 breeding mares, 16 families
    ~ 113 young horses, 60 ♂ and 53♀
    ~ 130 other horses, training and work
* Breeding management of mares
    ~ Free kipping: during the day in the pasture, during the night in the mother stable with big paddock
    ~ Foaling and one or two weeks in individual box

Material

* Body measurements of 272 foals (34 stallions, 95 mares):
    ~ age: 5 to 7 days
    ~ born from 2003 to 2010
    ~ Traits:
        • Height of wither – stick (cm)
        • Height of wither – band (cm)
        • Chest girth (cm)
        • Cannon bone girth (cm)
        • Body weight (kg)
* Pedigree information

Method

* Estimation of fixed effects:
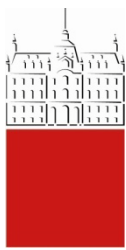 - Sex, Sire line and Season
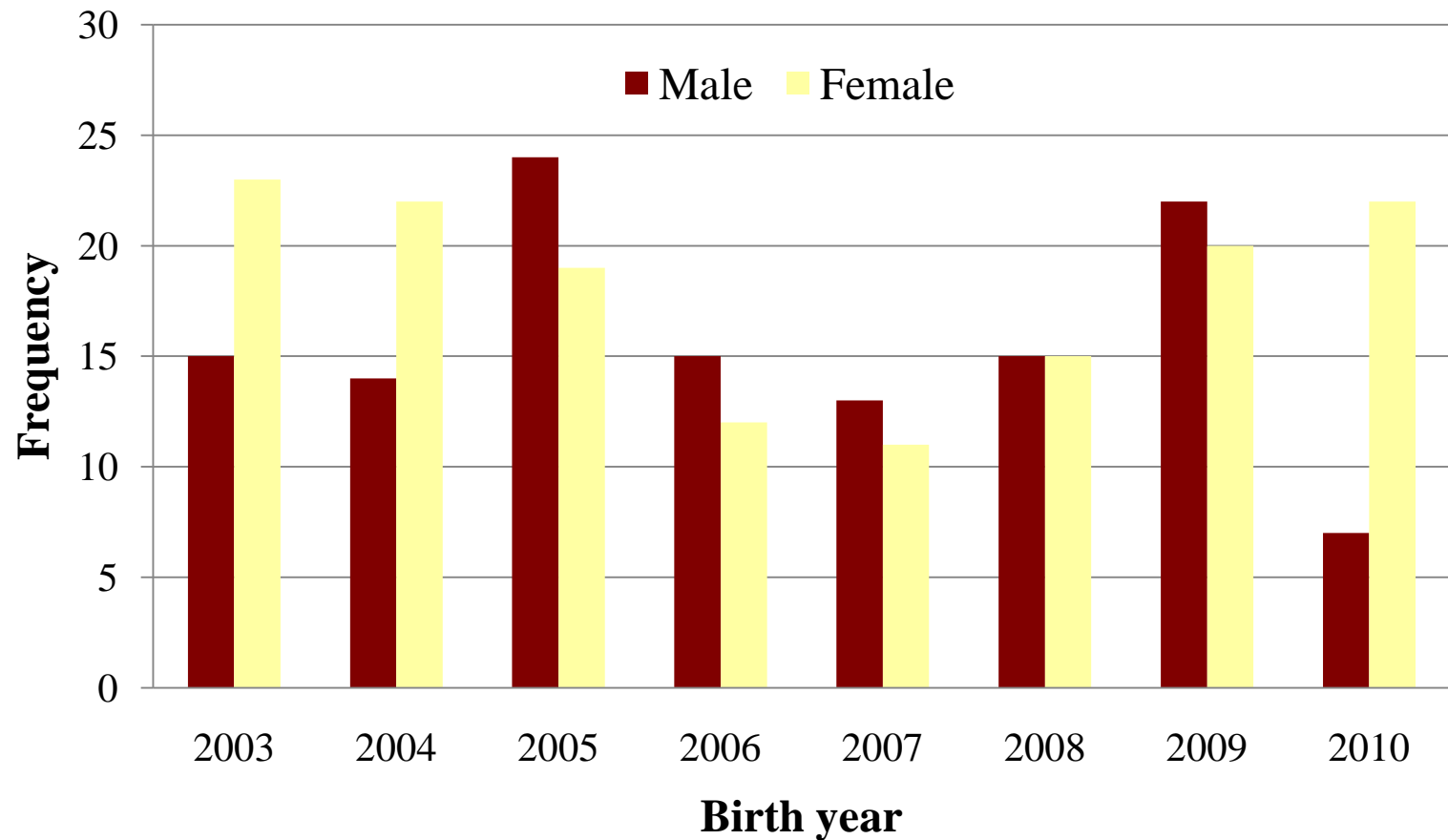 ~ Prediction of random effects:
  - Sire and dam

  with variance analysis - SAS software
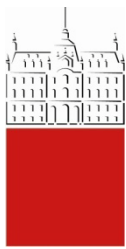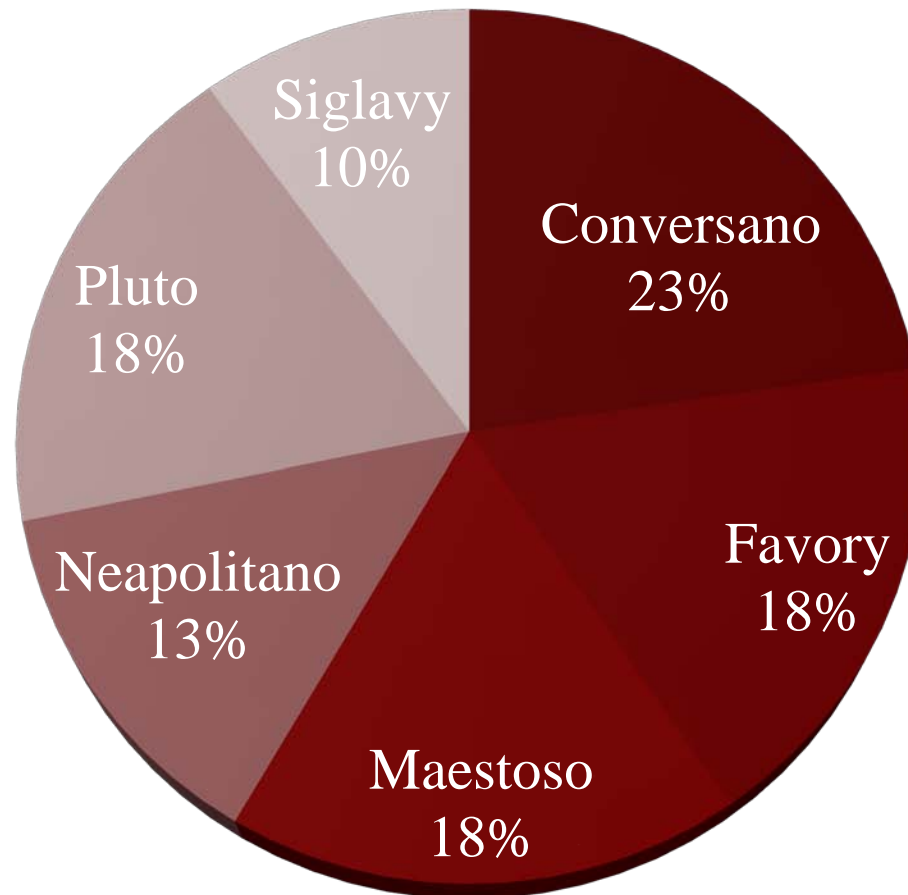* Variance component estimation with AM
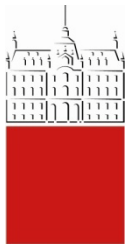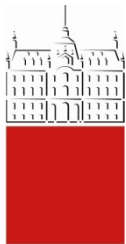 ~ REML method?
  ~ Gibbs sampling?

The foals per sex and year
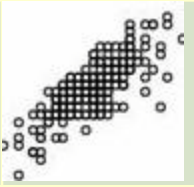
Fathers of foals per Sirelines
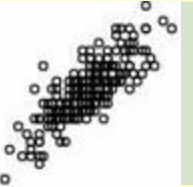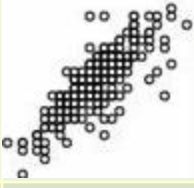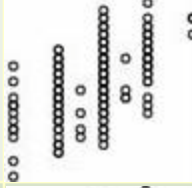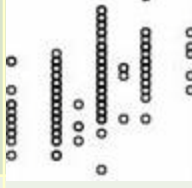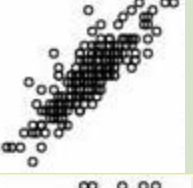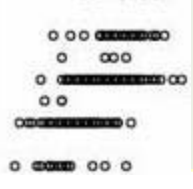
Simple Statistics

Trait	N	Mean	SD	MIN	MAX
HWs	264	96.7	3.61	85.0	108.0
HWb	264	102.0	4.04	90.0	112.0
CG	241	84.9	4.25	73.0	97.0
CBG	264	11.8	0.82	10.0	14.0
Weight	248	52.3	6.79	33.0	72.0

Correlations

Trait	HWb	CG	CBG	Weight
HWs	0.92	0.80	0.55	0.80
HWb		0.81	0.58	0.80
CG			0.49	0.85
CBG				0.56
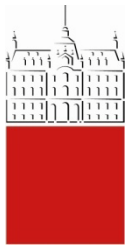
Variance analysis

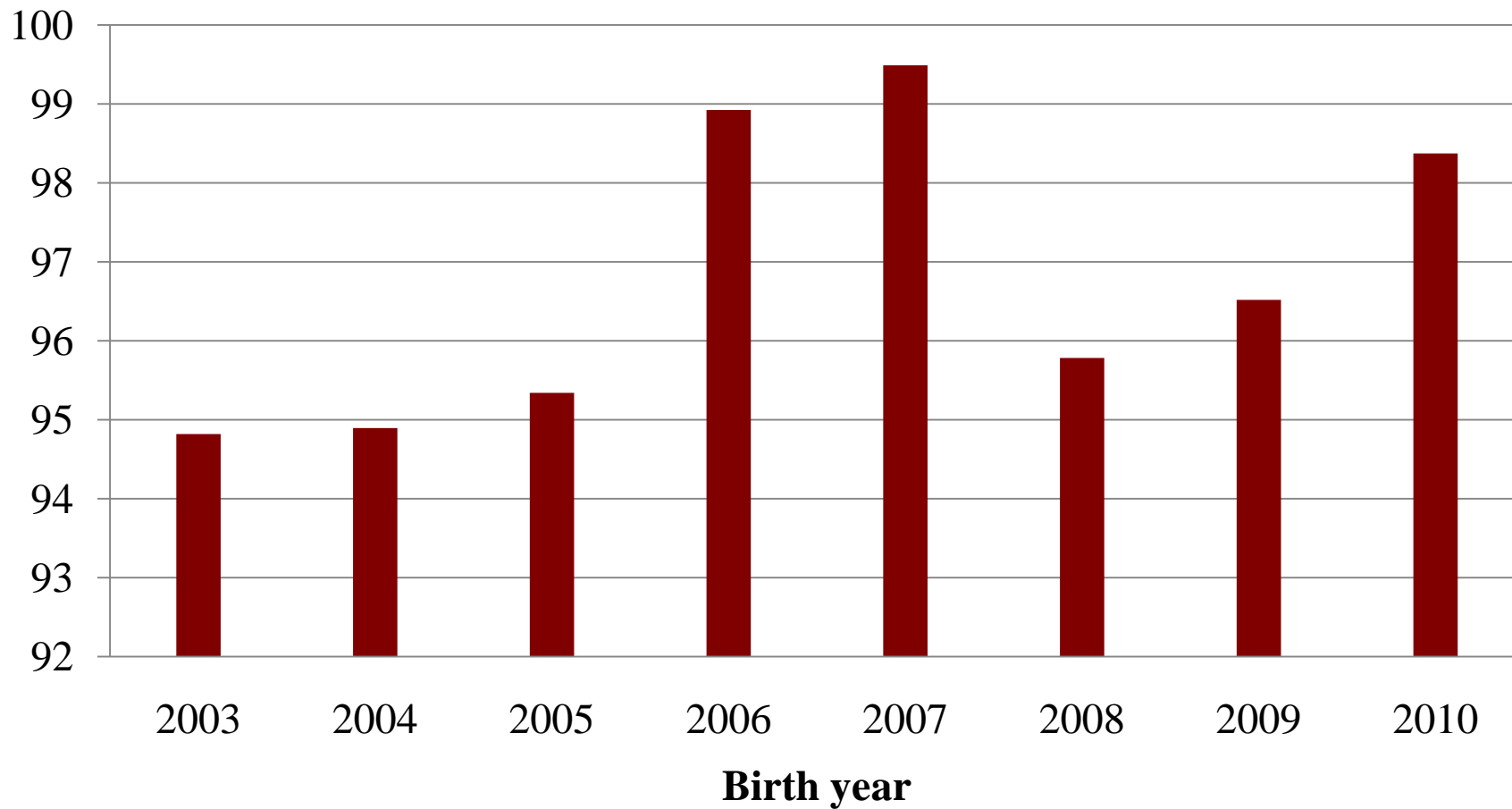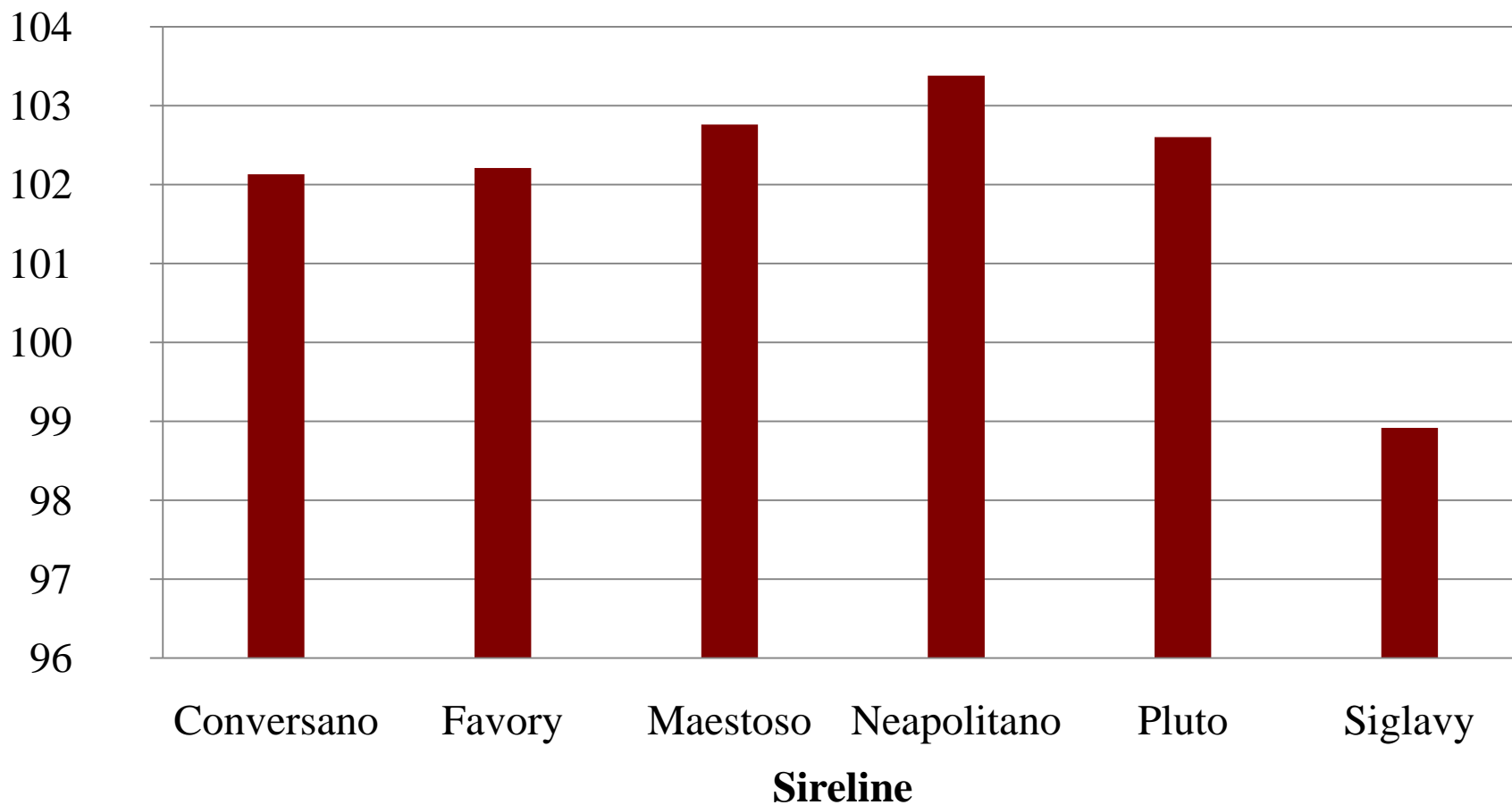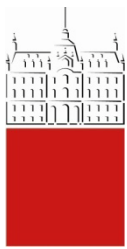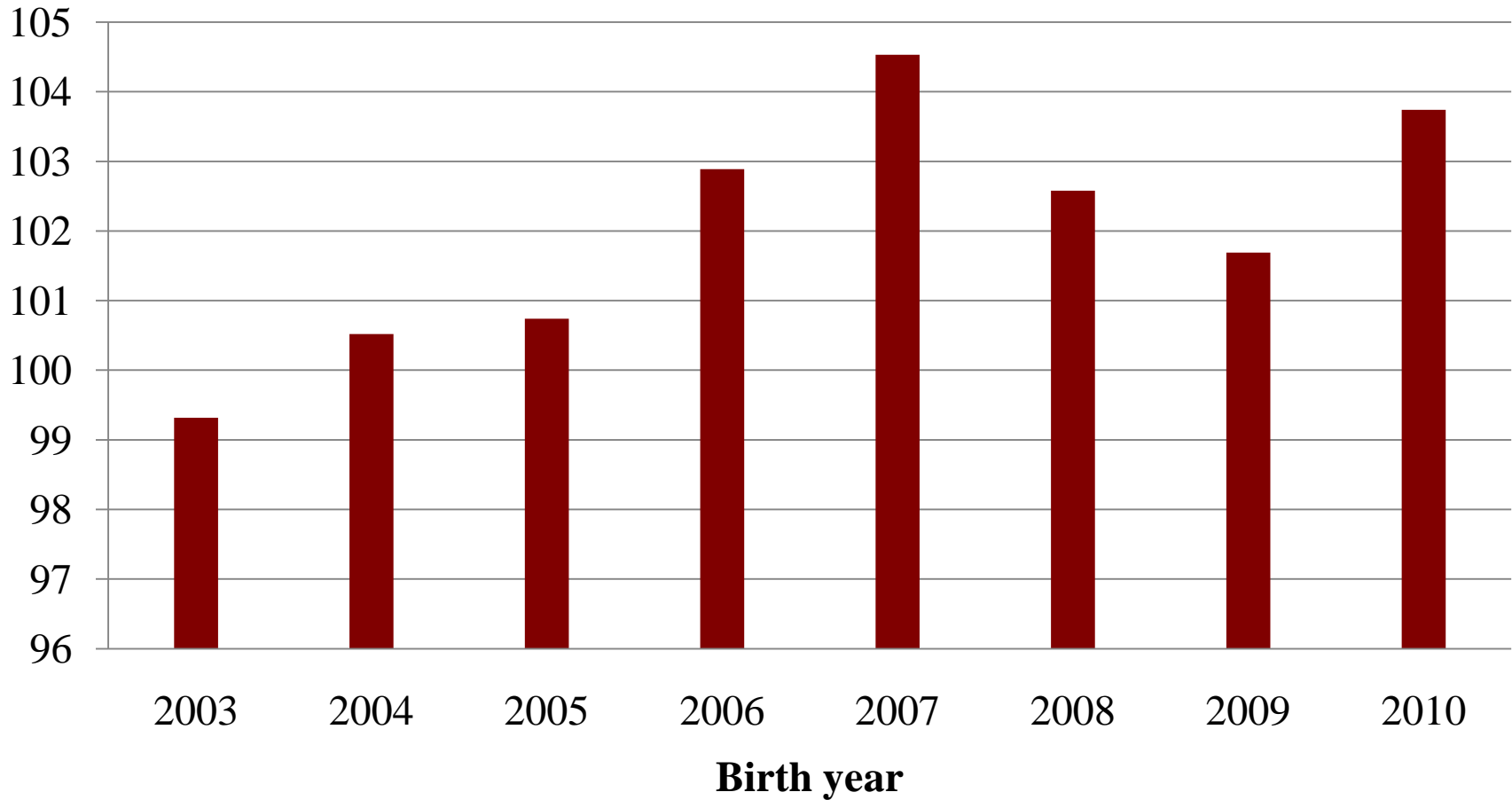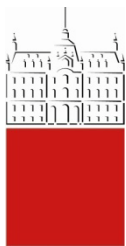| Effect	Sex	Sireline	Year	Dam	Sire
HWs	n.s.	**	***	***	n.s.
HWb	n.s.	***	***	***	n.s.
CG	n.s.	*	***	***	n.s.
CBG	*	**	**	**	n.s.
BW	n.s.	*	*	*	n.s.
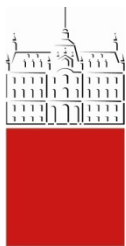
Height of Withers stick
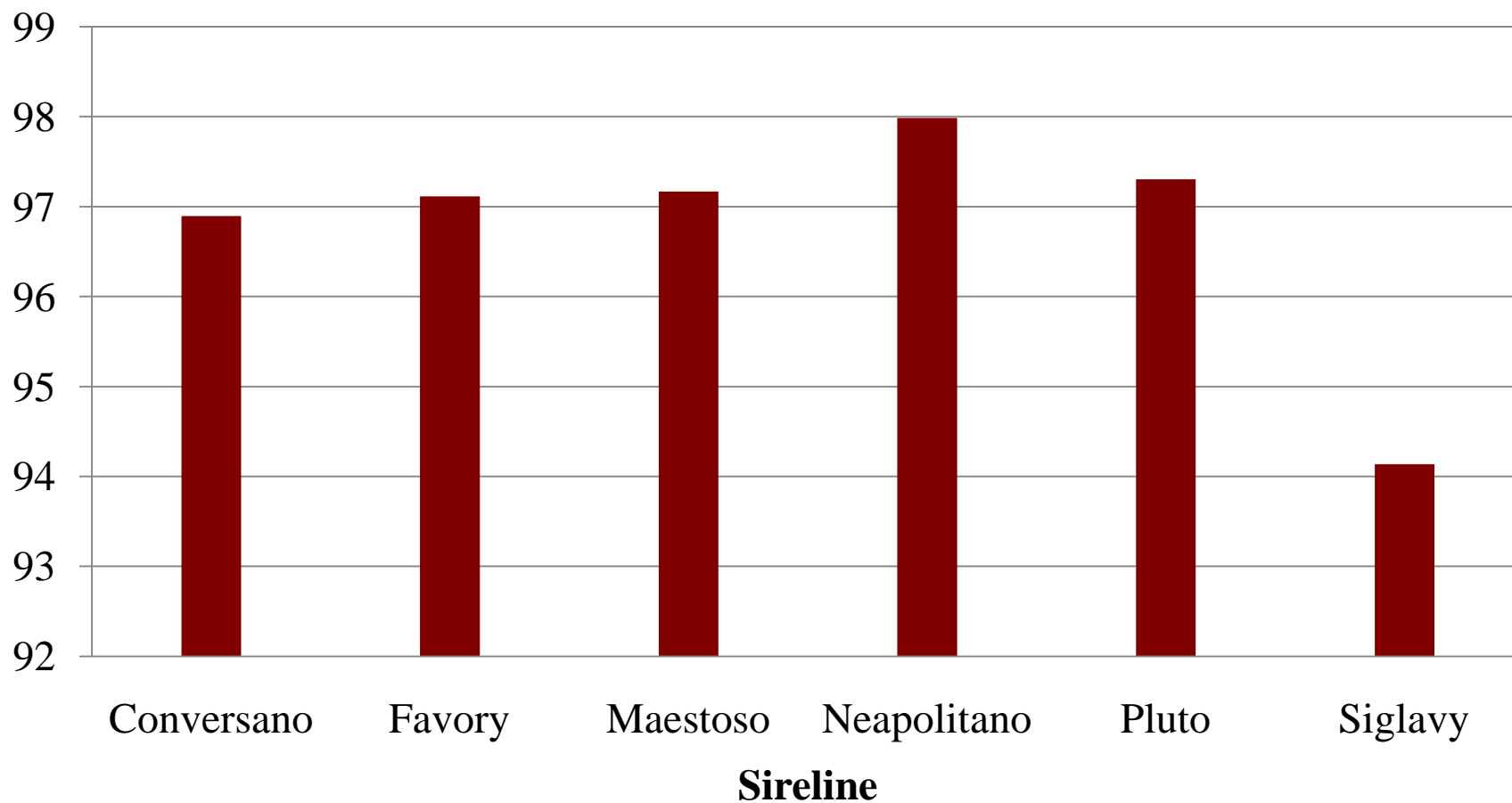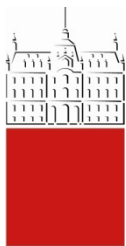
Height of Withers stick

Height of Withers band

Height of Withers band
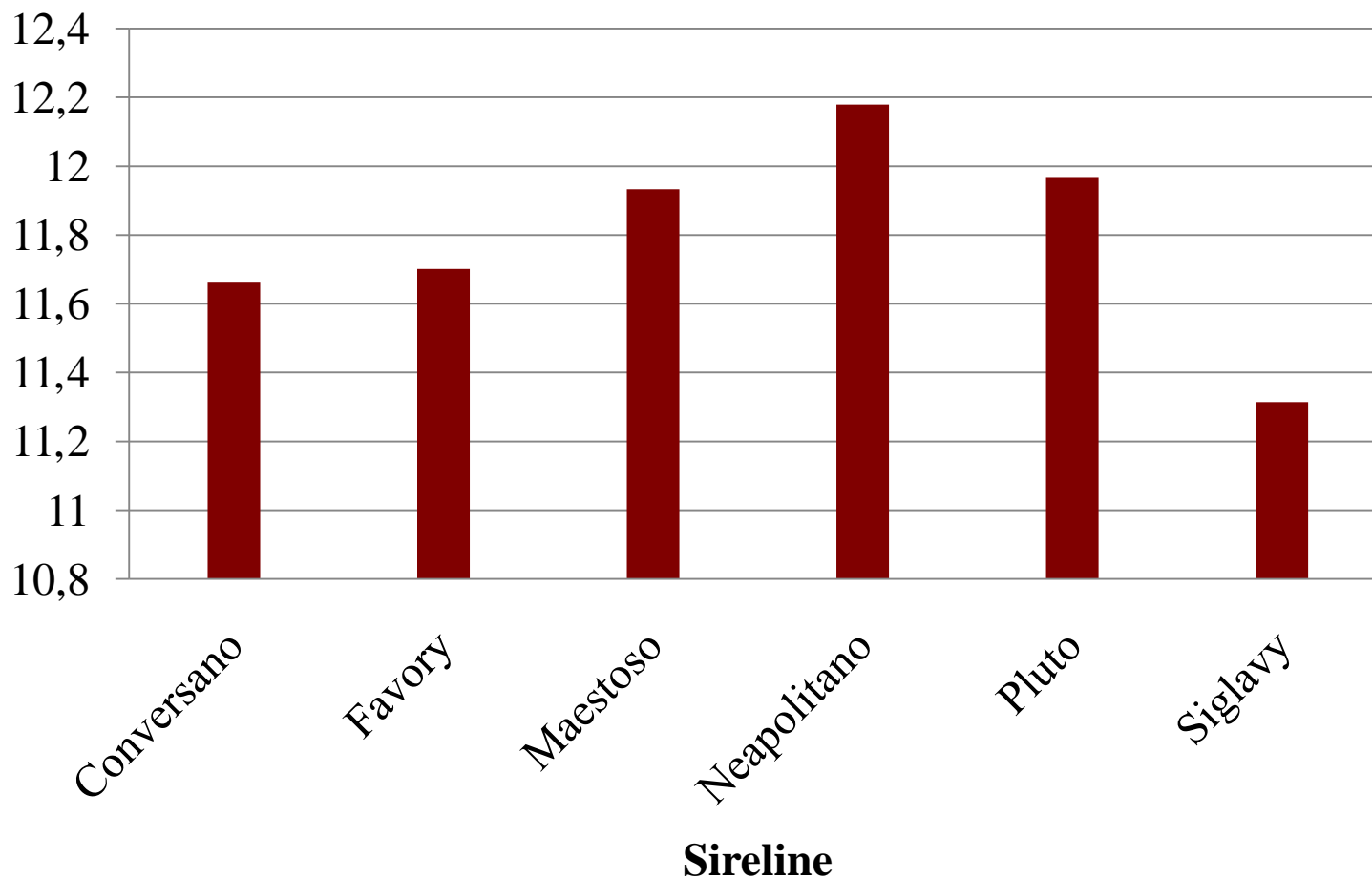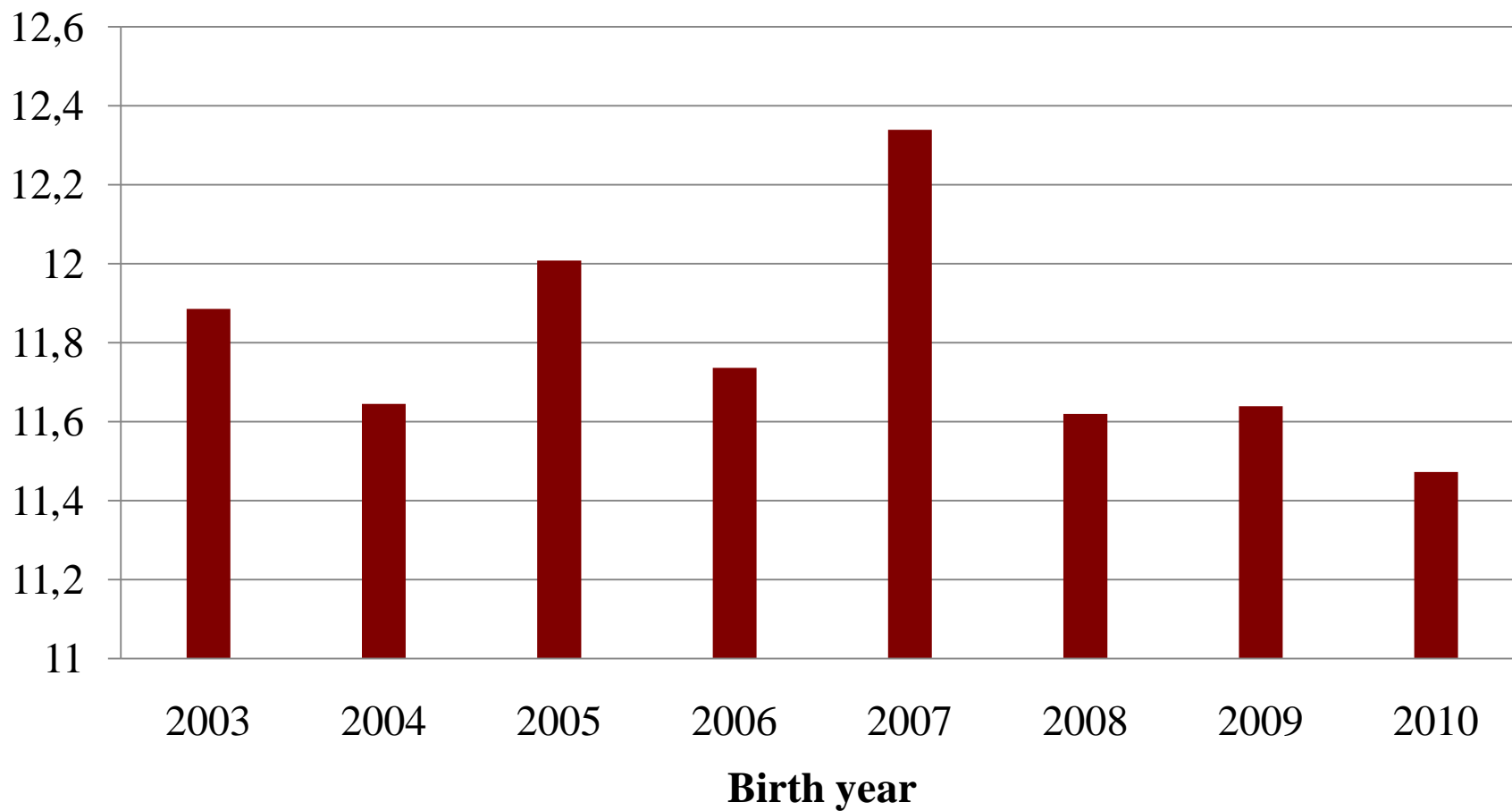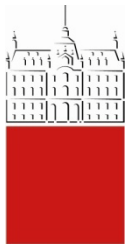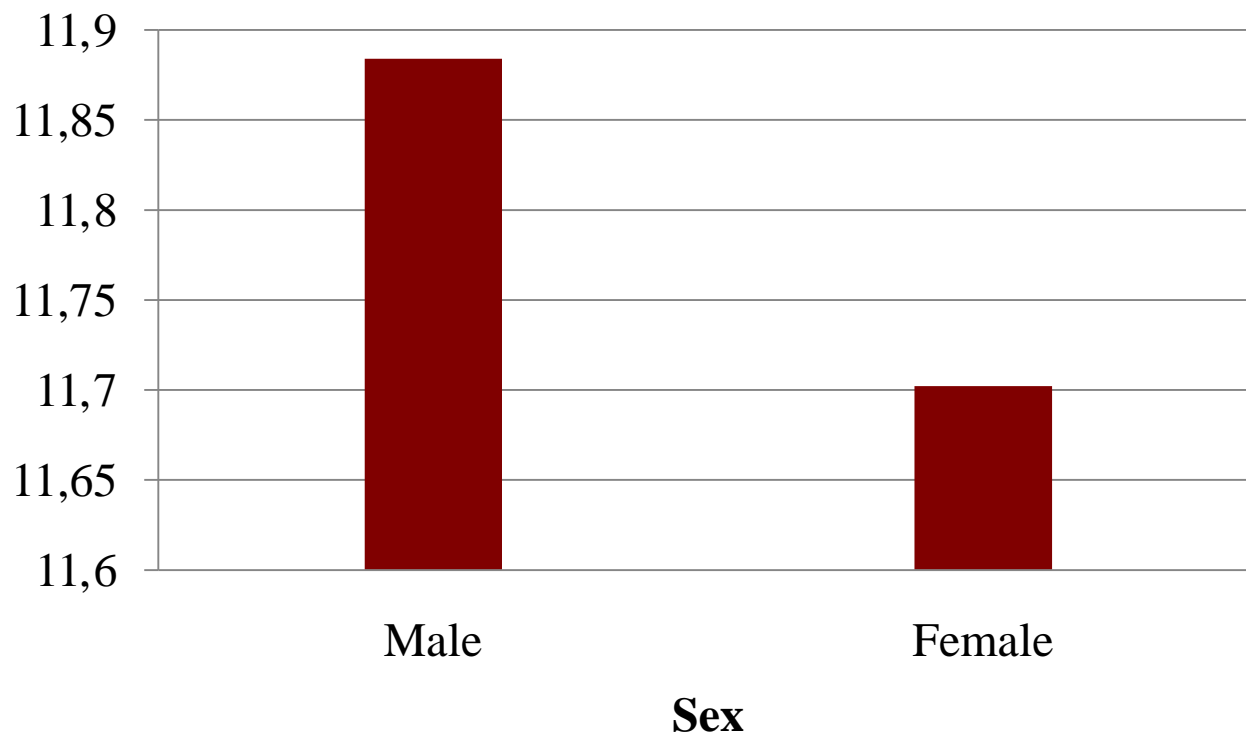

Birth year

Chest girth

Chest girth

Birth year
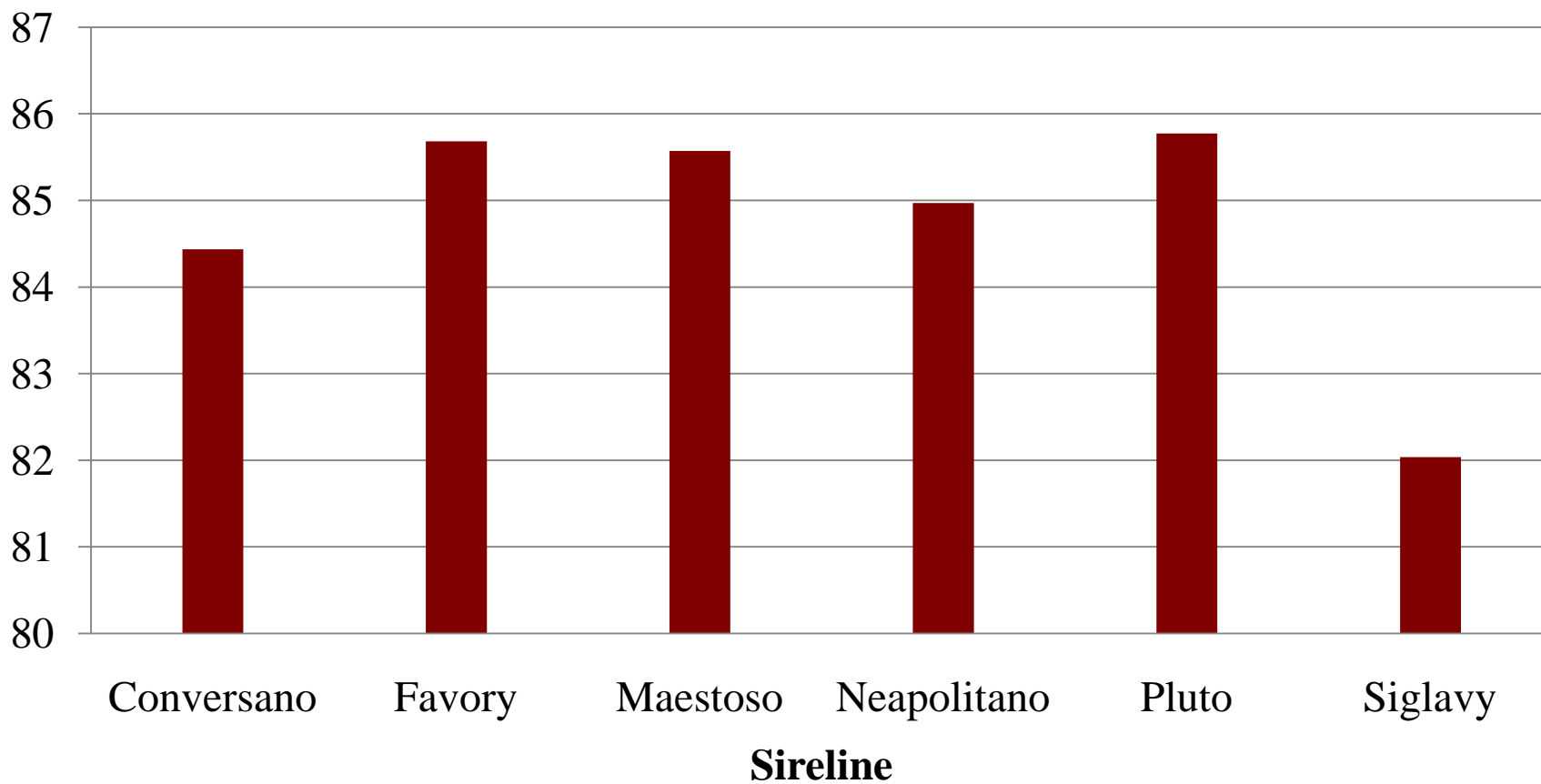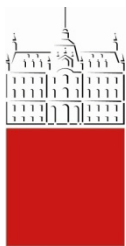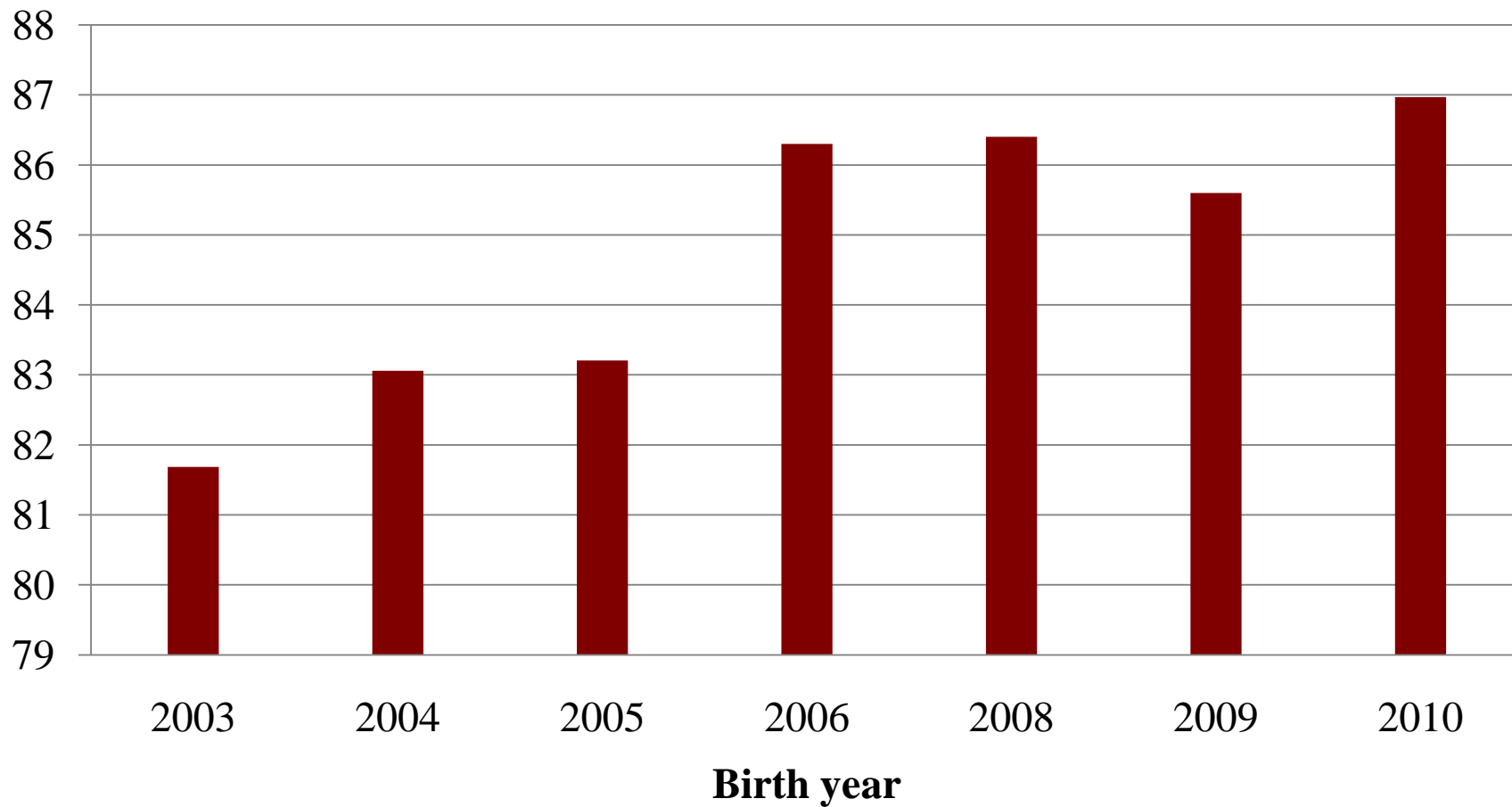
Canon bone girth
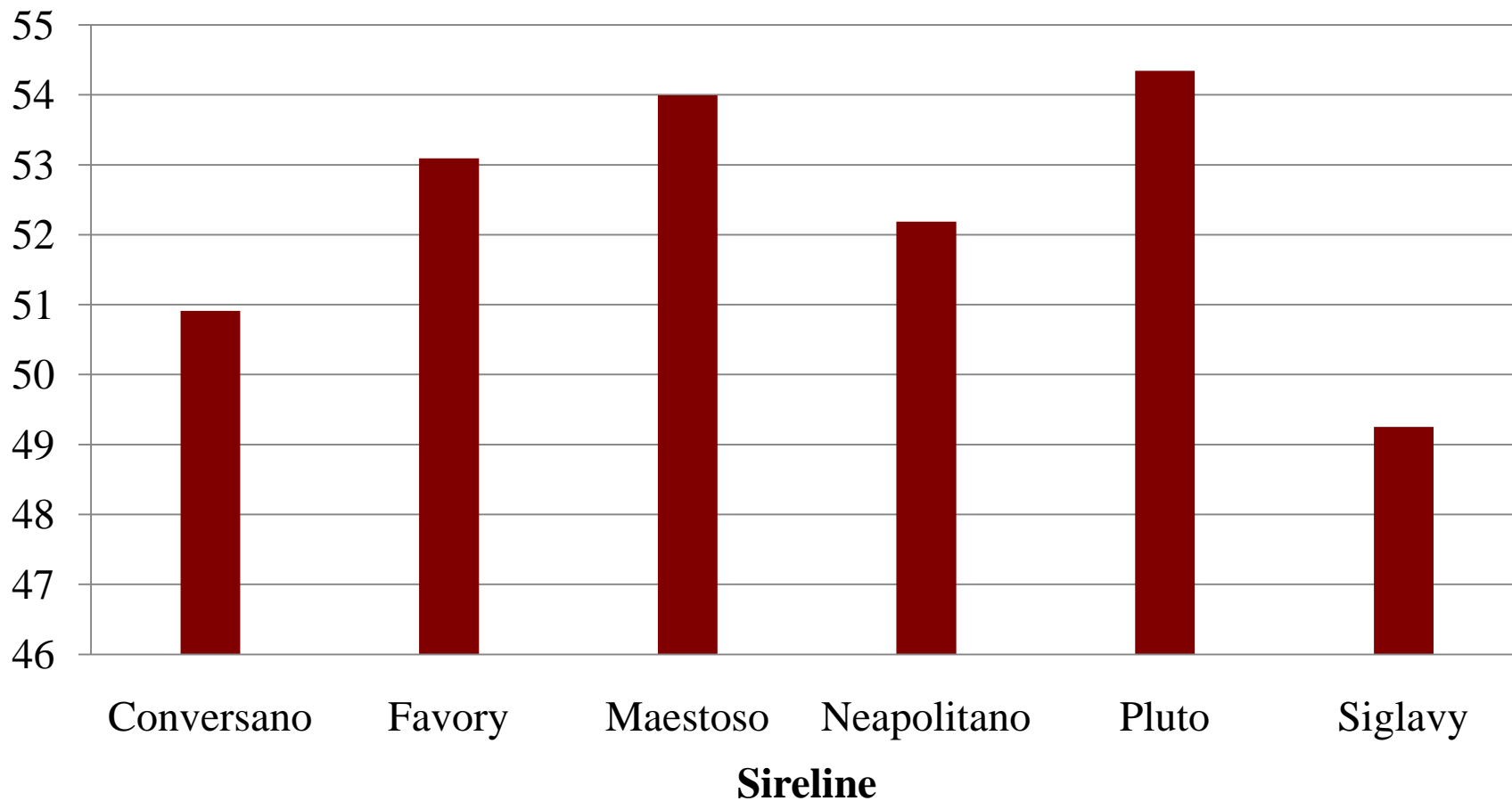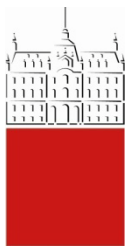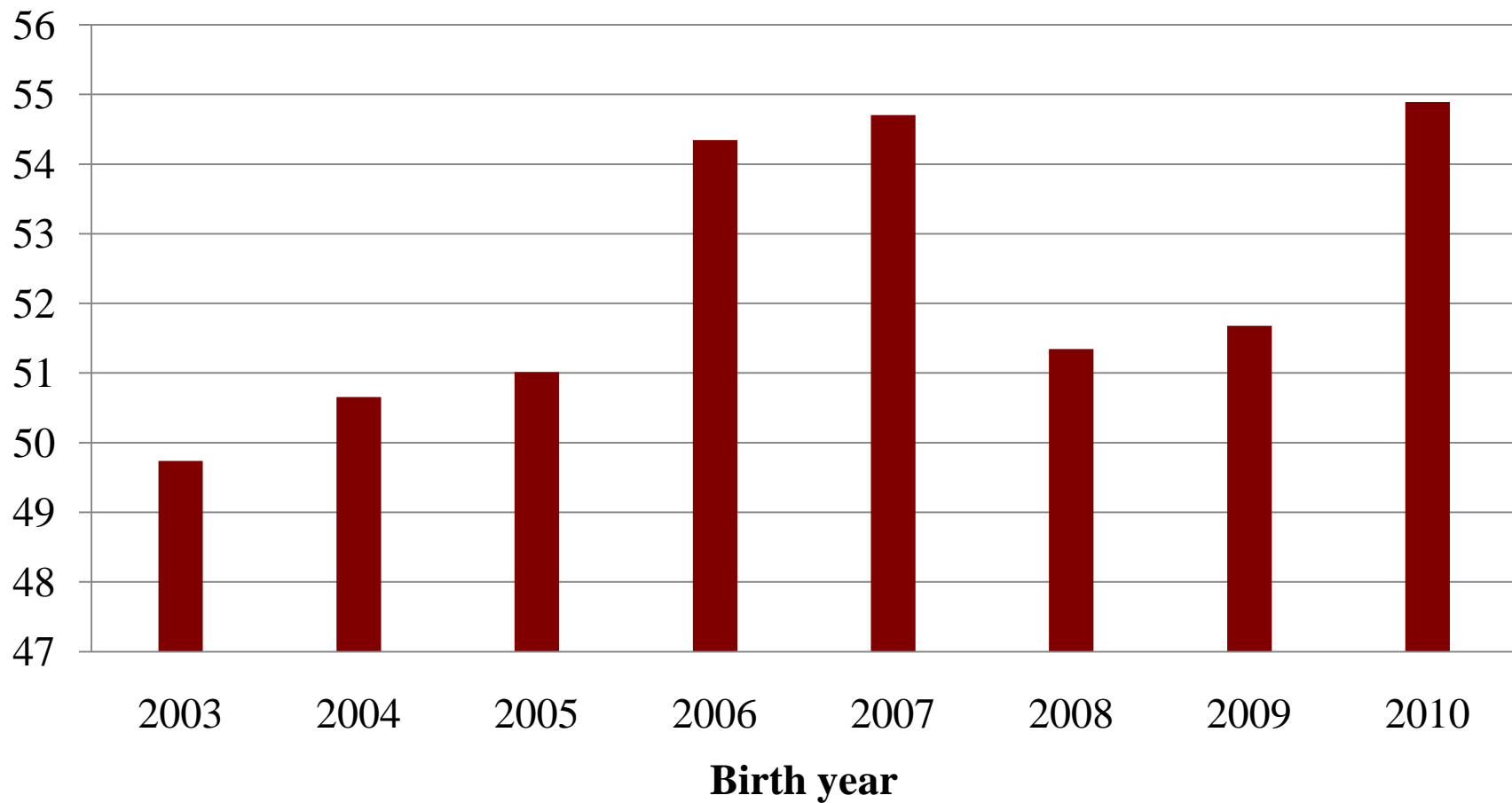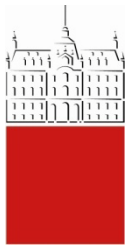
Canon bone girth

Canon bone girth

Body weight

Body weight

Genetic parameters

* Genetic correlations

* Heritabilities

* REML method:

  ~ Problems with convergence

  ~ Extrem heritabilities and correlations

* Gibbs sampling method:

  ~ Results will come

Conclusions

* Sireline and year have statistical significant effect on body measurements and body weight on one week old Lipizzan foals

* Sex is not statistical significant (just CBG)

* Slight positive phenotypic trend can be observed for most of traits with
  ~ positive deviation of birth years 2006-07?
    * More space per animal?
    * Change of stable manager?
    * Different weather condition?

Conclusions

* REML method is not suitable for estimated of genetic parameters for this small example

* Future work:

  ~ Estimation of genetic parameters with Gibbs sampling method

  ~ Correlation with body measurements of mature horses

Thank you for your attention