# Relationships between udder health, milking speed and udder conformation in Austrian Fleckvieh

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# Overview

- Background and Aims
- Calculations
- Results
- Conclusions

# Background and Aims

- **Udder health of high economic importance**

  - direct costs for treatments
  - reduced income for milk
  - udder diseases among most important disposal reasons

- **Routine genetic evaluation** for **SCS**, **mastitis** (direct health trait), **udder conformation**, **milking speed**

- **Relationship** between udder health and other traits in the breeding goal?

- Possible **auxiliary traits?**

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# Phenotypic relationships

- **~ 6,900 Fleckvieh cows with health monitoring and linear scoring, 1st to 150th day of lactation**
- **Mastitis:** first diagnoses (acute+chronic), 6.4%
- **Somatic cell score:** averaged over all test days
- **Milking speed:** Ø milk yield/min at 1st (or 2nd) test day
- **Linear Scoring:** in first lactation
- **Fixed effects as in routine evaluations**

# Breeding value and genetic correlations

- **Breeding value correlations:** official breeding values of Fleckvieh bulls born since 2000 (reliability >70% except mastitis >30%)

  → **610 (mastitis) to 3,539 (milk) Fleckvieh bulls**

- **Genetic correlations:** ~20.000 records for linear scoring and milking speed, lactations 1-3 for mastitis (frequency 8.6%, n=43,747) and SCS (~300.000 test days)

  → **animal model**

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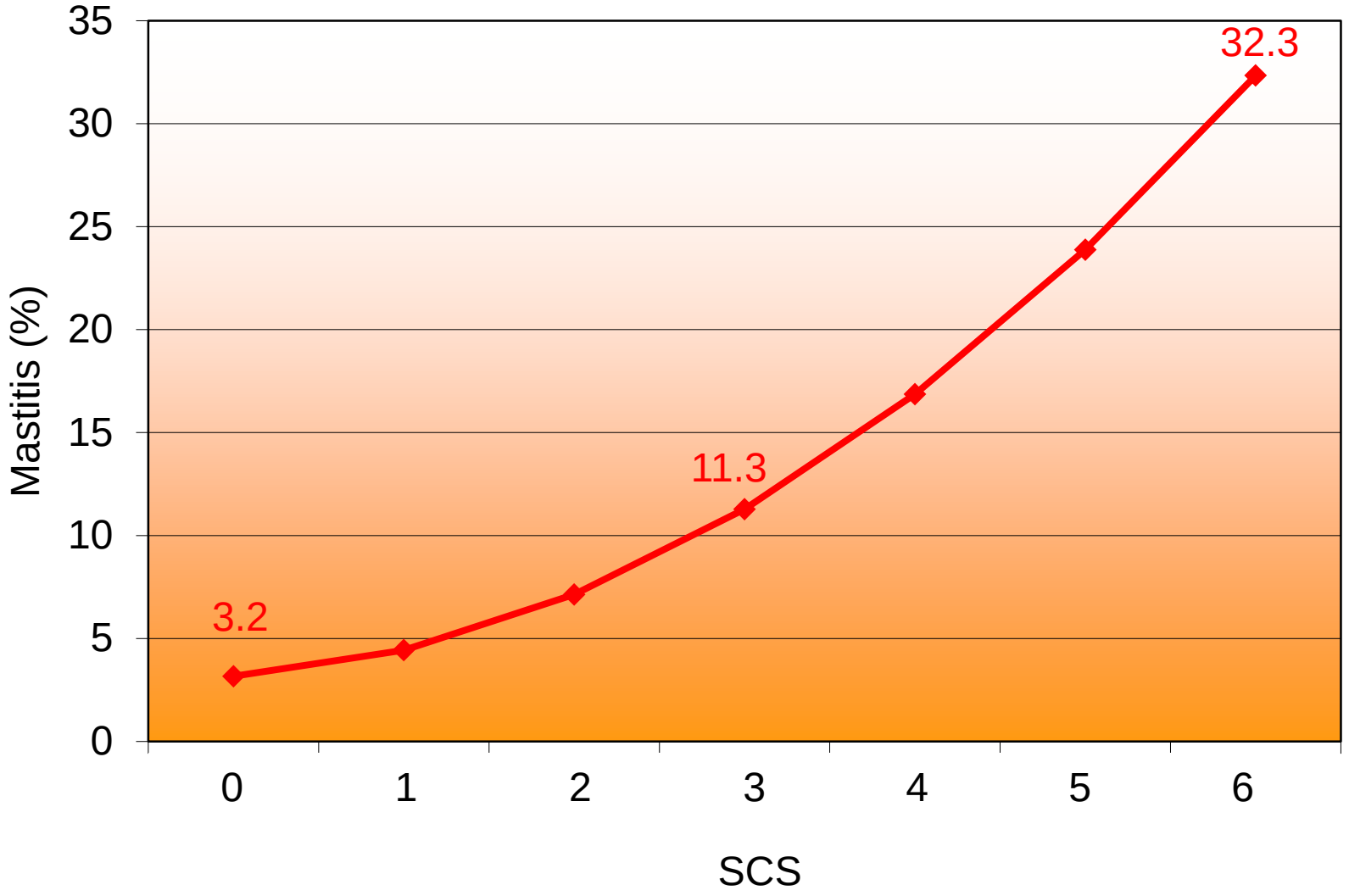
# Phenotypic relationships - SCS



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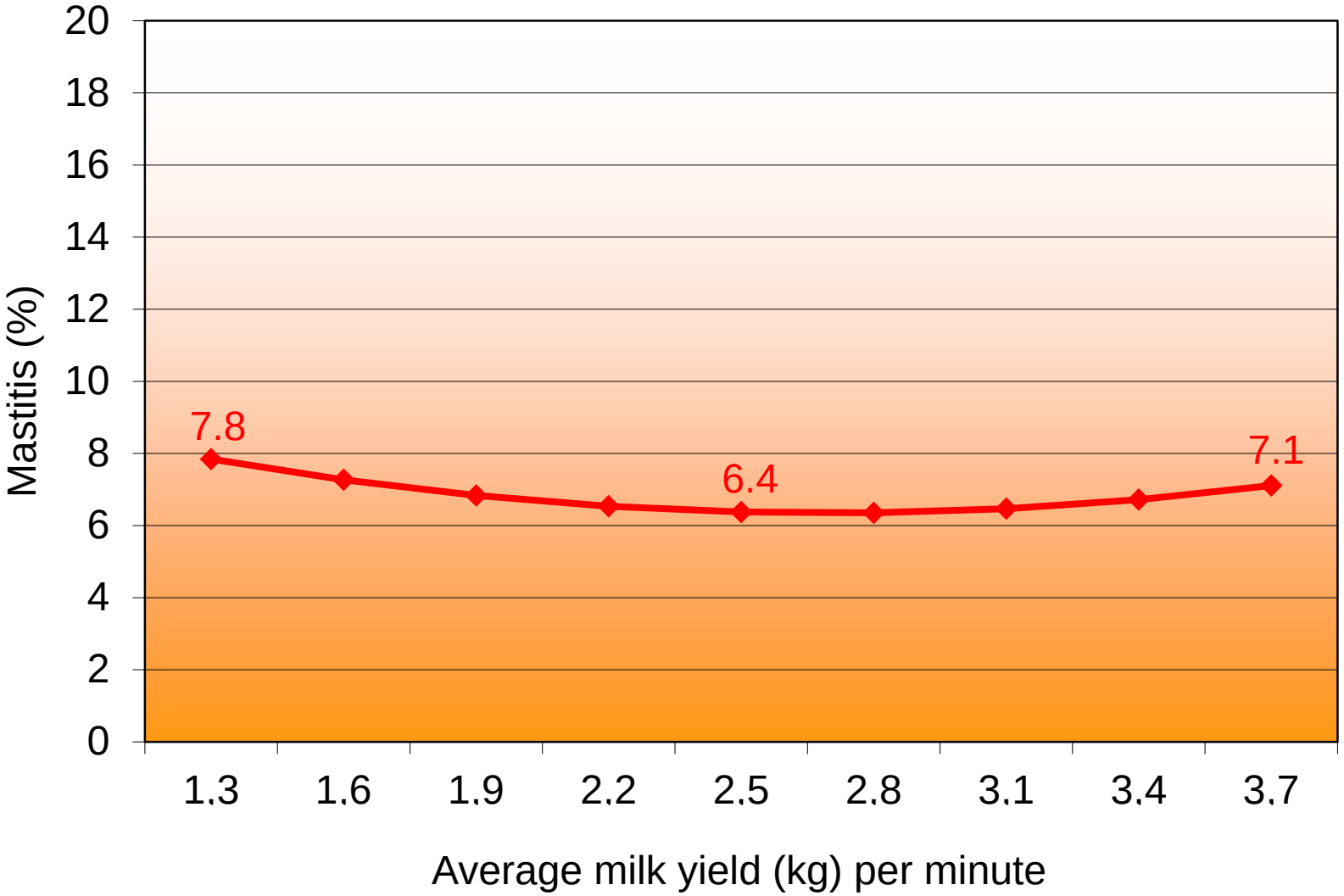
# Phenotypic relationships – milking speed



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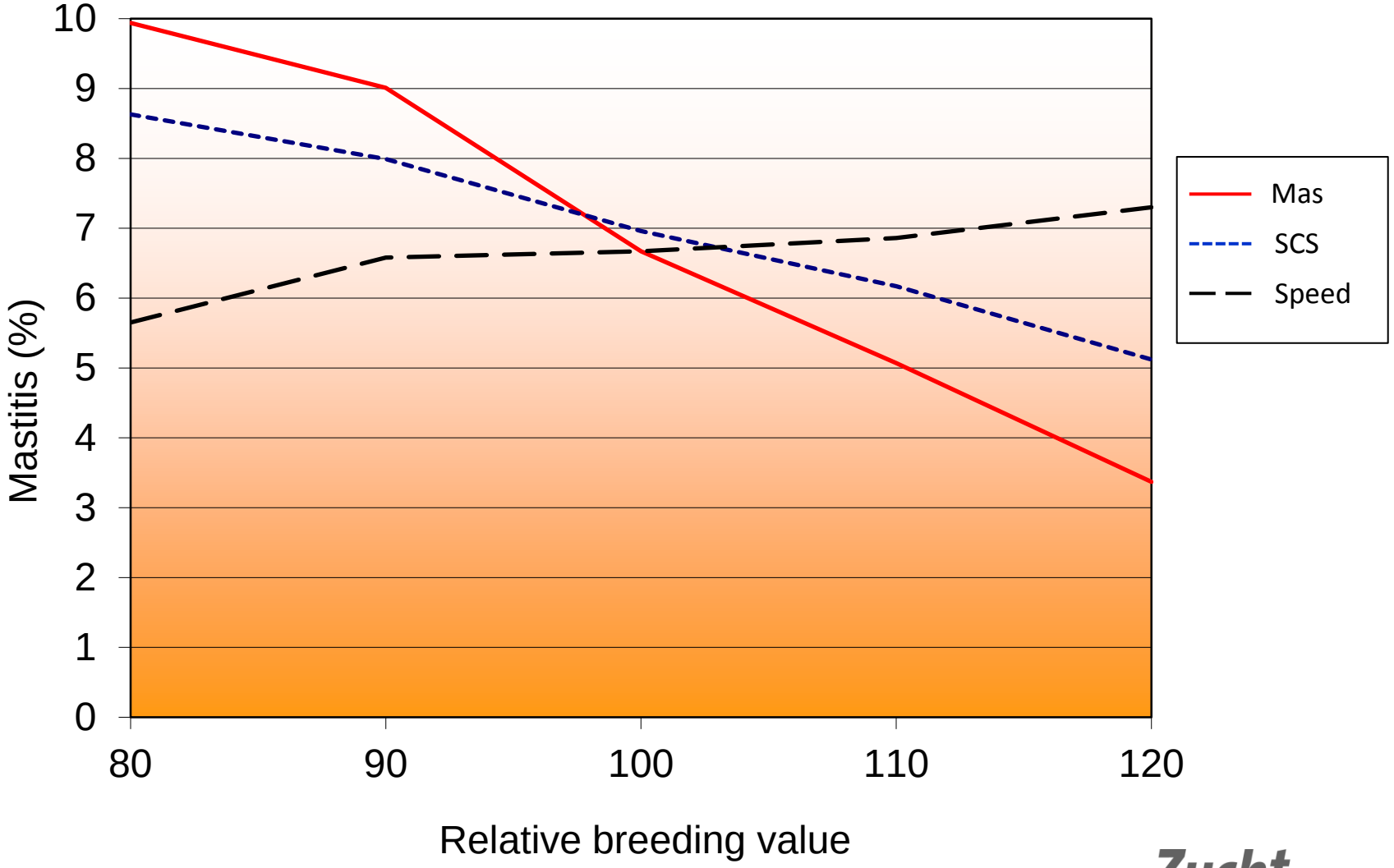
# Breeding value relationships

## Mastitis, SCS, Milking speed



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# Correlations to other traits

## ($r_{BV}$= breeding value correlation, $r_a$ = genetic correlation)

| | Mastitis | | SCS | |
|---|---|---|---|---|
| | $r_{BV}$ | $r_a$ | $r_{BV}$ | $r_a$ |
| **FIT** | +0.26 | | +0.63 | |
| **Longevity** | +0.10 | | +0.29 | |
| **Persistency** | +0.16 | | +0.21 | |
| **SCS** | +0.42 | | | |
| **Milking speed** | -0.07 | | -0.33 | |

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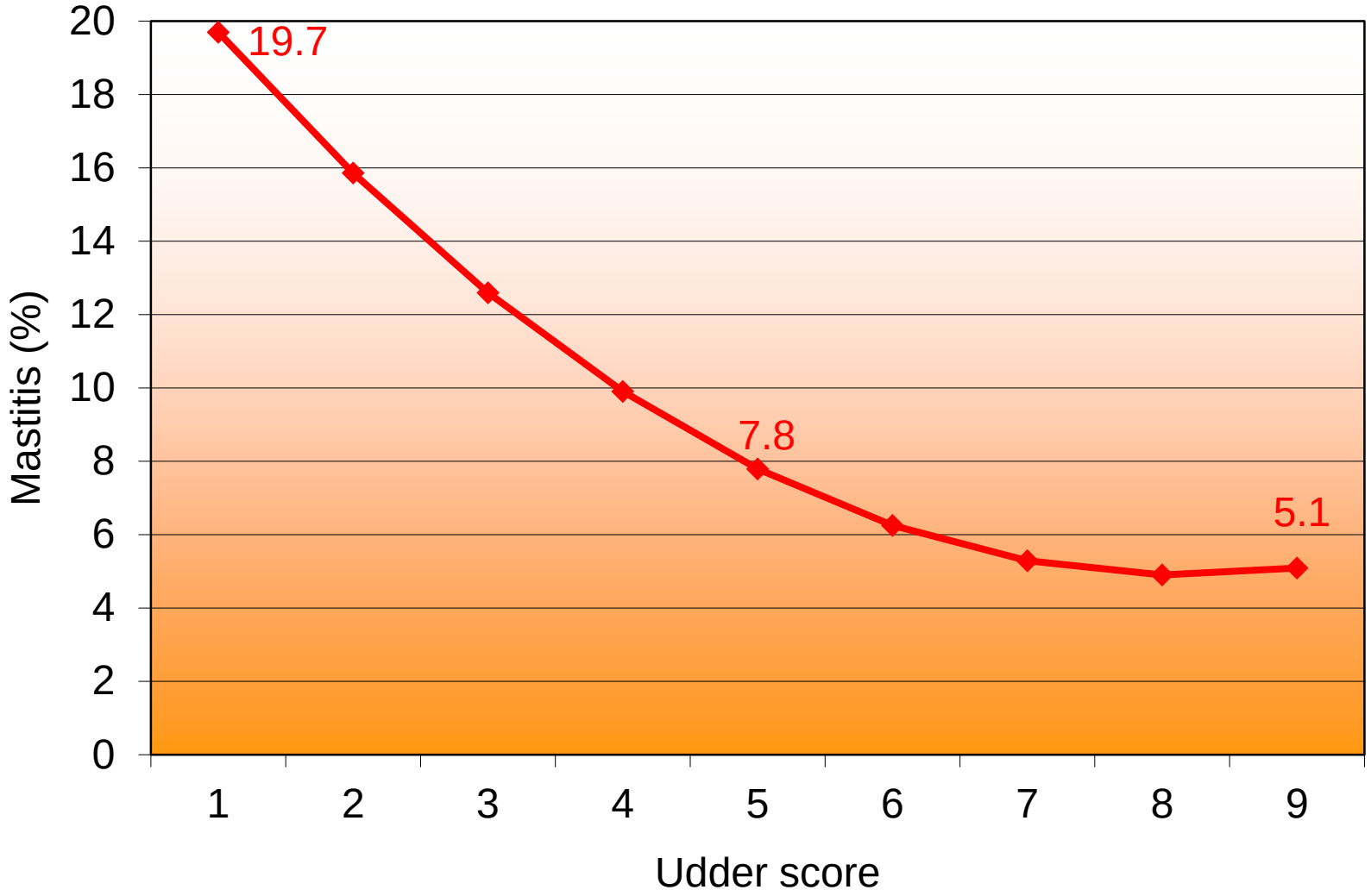
| **Longevity** | +0.10 | | +0.29 | |
| **Persistency** | +0.16 | | +0.21 | |
| **SCS** | +0.42 | **+0.71**$_{0.12}$ | | |
| **Milking speed** | -0.07 | **+0.28**$_{0.09}$ | -0.33 | **+0.51**$_{0.04}$ |

→ Udder health-Fitness Index synergistic

→ Udder health-Milking speed antagonistic

→ Both, SCS and direct mastitis required

# Phenotypic relationship – Udder score



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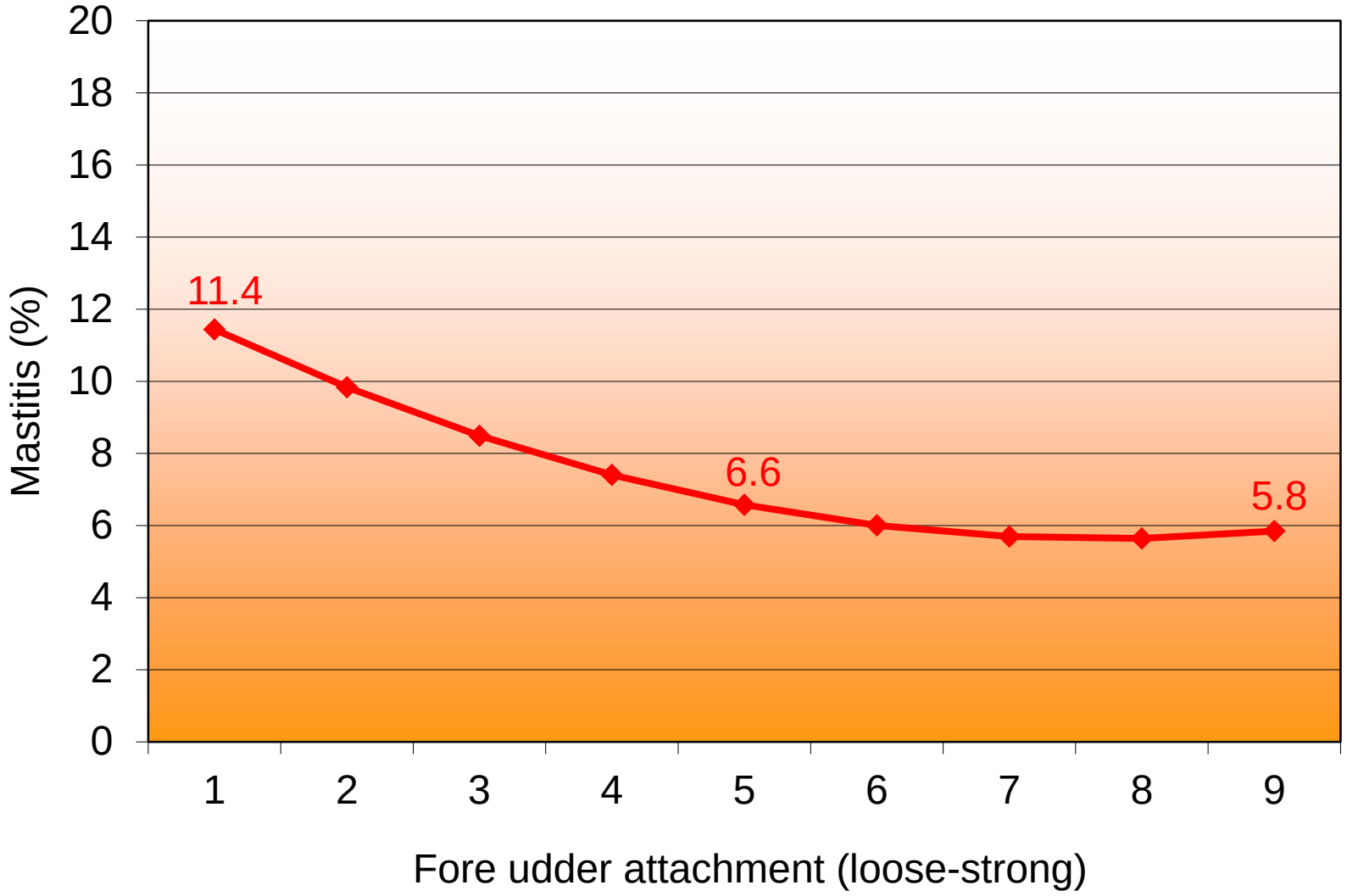
# Phenotypic relationship - Fore udder attachment



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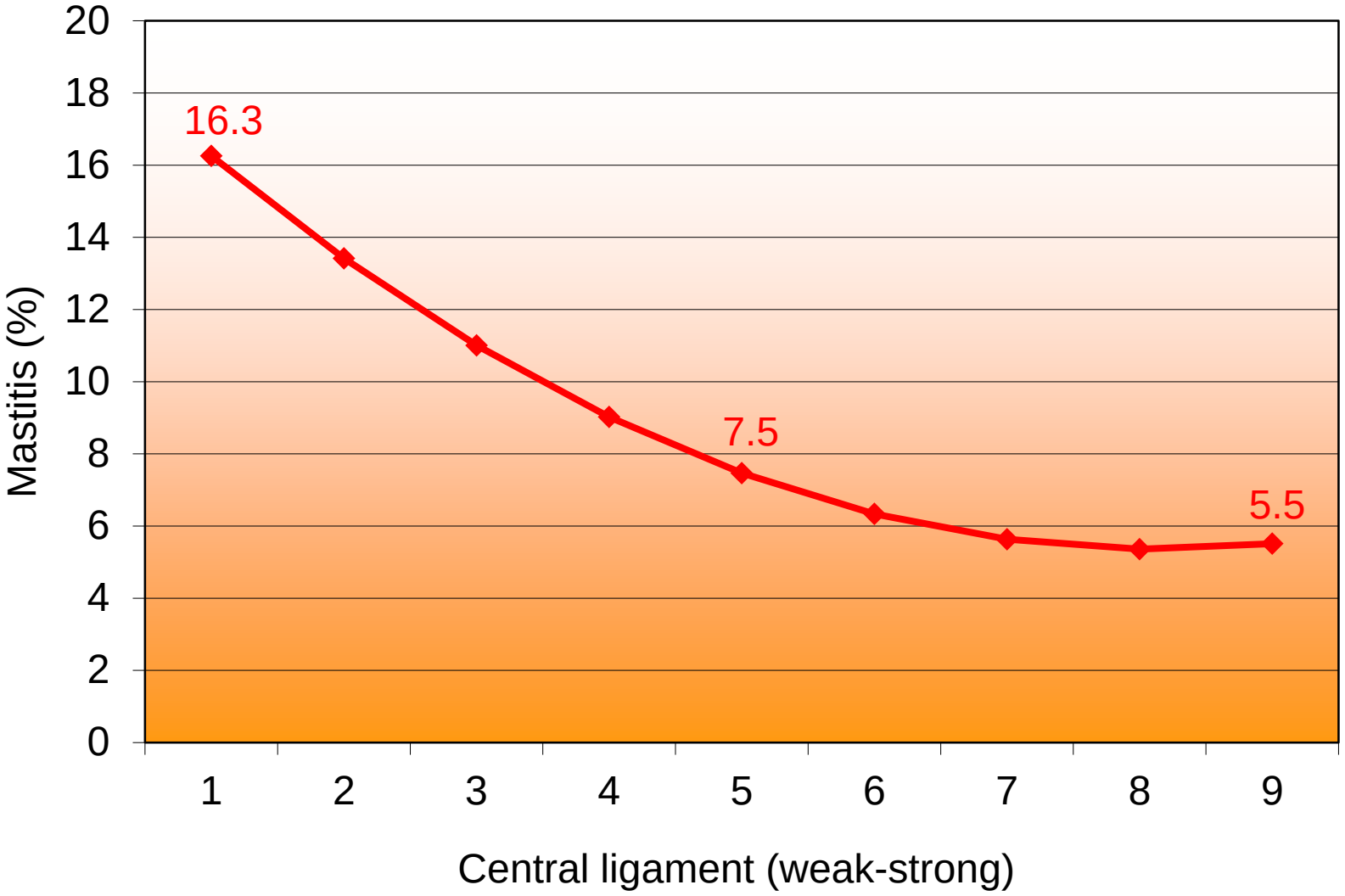
# Phenotypic relationship – Central ligament



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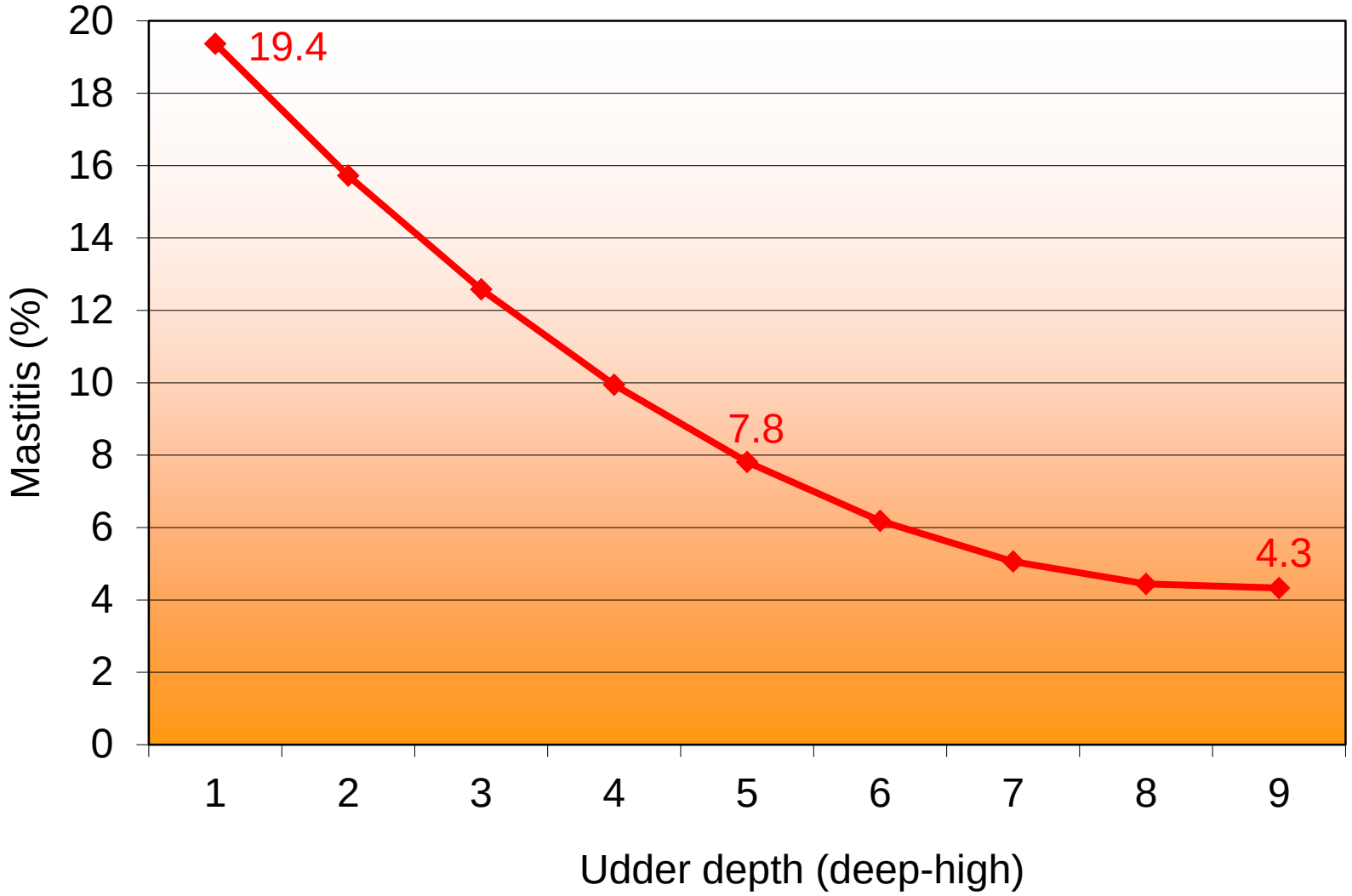
# Phenotypic relationship – Udder depth



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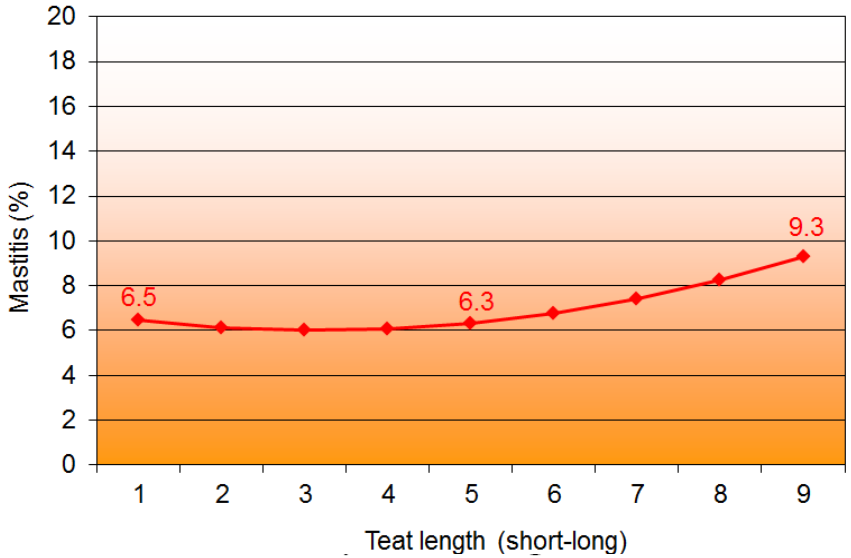
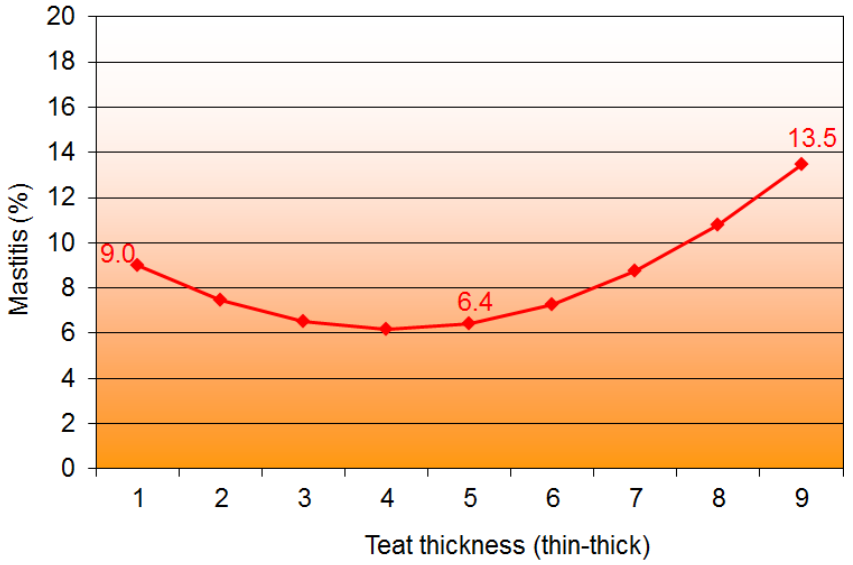
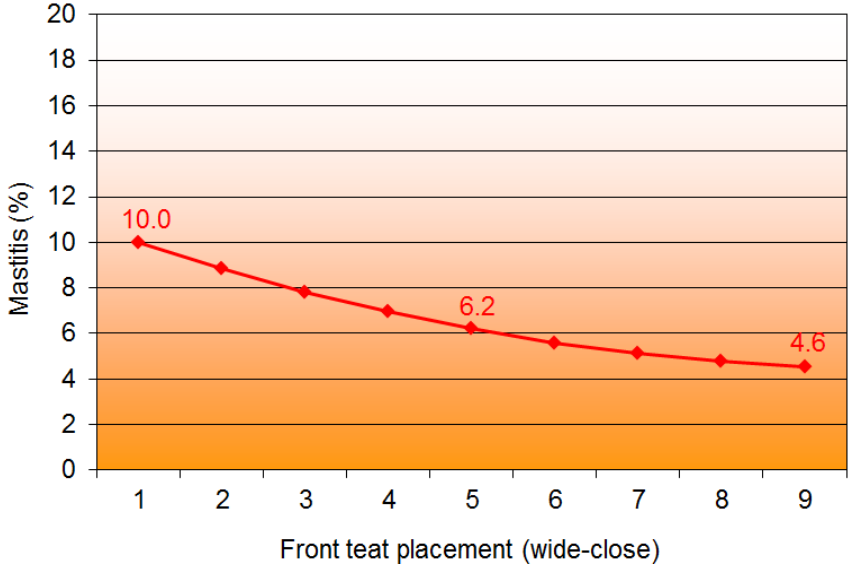
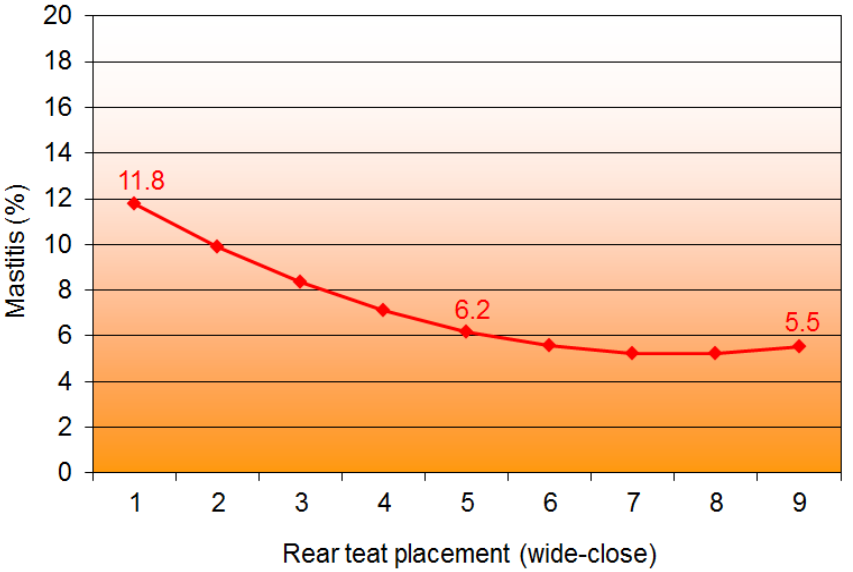
# Phenotypic relationship - Teats



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# Correlations to other traits

## ($r_{BV}$= breeding value correlation, $r_a$ = genetic correlation)

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|---|---|---|---|---|
| | $r_{BV}$ | $r_a$ | $r_{BV}$ | $r_a$ |
| **Udder score** | +0.12 | | +0.19 | |
| **Central lig.** | -0.01 | | +0.10 | |
| **Udder depth** | +0.31 | | +0.30 | |
| **F. udd. att.** | +0.01 | | +0.14 | |
| **Teat pl. f.** | +0.13 | | +0.11 | |

# Correlations to other traits

## ($r_{BV}$= breeding value correlation, $r_a$ = genetic correlation)

| | Mastitis | | SCS | |
|---|---|---|---|---|
| | $r_{BV}$ | $r_a$ | $r_{BV}$ | $r_a$ |
| **Udder score** | +0.12 | **-0.54**$_{0.07}$ | +0.19 | **-0.34**$_{0.03}$ |
| **Central lig.** | -0.01 | **-0.37**$_{0.08}$ | +0.10 | **-0.25**$_{0.03}$ |
| **Udder depth** | +0.31 | **-0.64**$_{0.08}$ | +0.30 | **-0.40**$_{0.03}$ |
| **F. udd. att.** | +0.01 | **-0.38**$_{0.09}$ | +0.14 | **-0.28**$_{0.05}$ |
| **Teat pl. f.** | +0.13 | **-0.28**$_{0.09}$ | +0.11 | **-0.18**$_{0.04}$ |

→ Healthy udders:
high udder depth, strong central ligament,
strongly attached fore udder, slightly close teats

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# Conclusions

- Considerable (genetic) relationships between udder health and other traits
- High, strongly attached udders with strong ligament and in tendency average and slightly close teats are healthier
- SCS (SCC) alone not sufficient
- Considering direct mastitis (plus auxiliary traits) in an udder health index and in TMI desirable

→ introduced for Fleckvieh and Brown Swiss in joint Austrian-German evaluation in August



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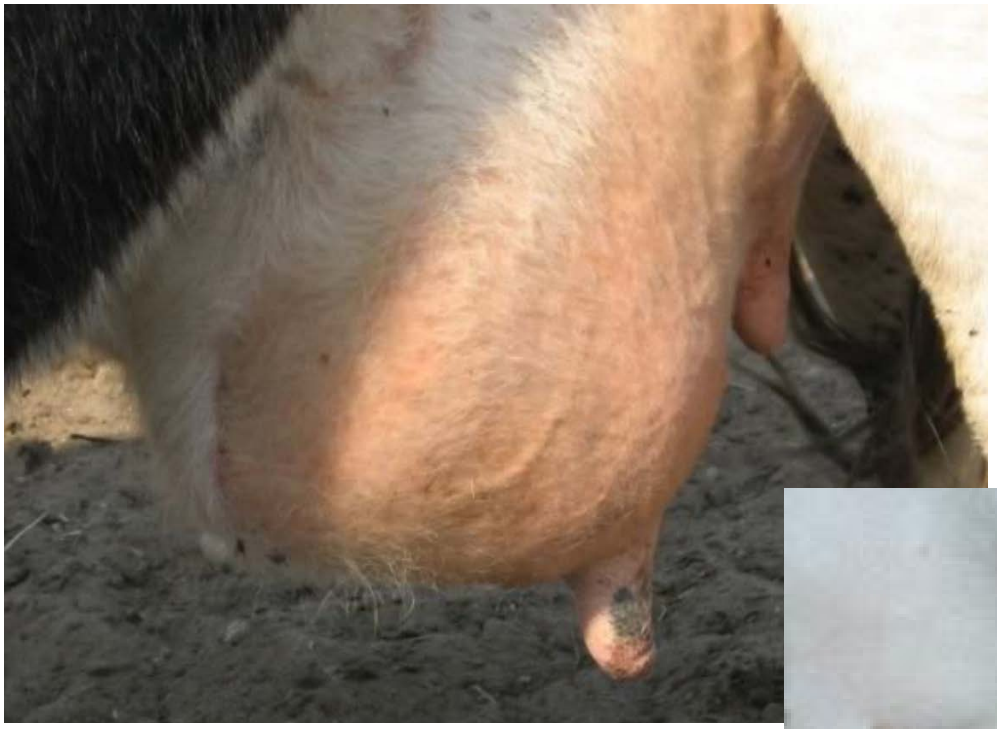

# Thank you for your attention!



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# Udder health index

- Overall weight in TMI: 9.7% (Fleckvieh) and 10% (Brown Swiss)
- SCS:Mastitis = 70:30%
- Auxiliary traits: Udder depth, fore udder attachment, fore teat placement