NEW TOTAL MERIT INDEX (GZW)

CURRENT STATUS

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Mainly based on results of Working Group ‚Breeding goal'

# Working Group 'Breeding goal'

Members: breeding organisations and geneticists

Dr. Egger-Danner, Dr. Fürst, Dr. Götz, Dr. Herold,
Dr. Krogmeier, Dr. Kucera, Dr. Röhrmoser, Ing. Tanzler,
Dr. Weidele, DI Winkler, (Dr. Fürst-Waltl)

Tasks:

- Preparation of information on possible breeding goals and economic weights

- Coordination of discussion on new total merit index

- No decisions!

GZW in past and future
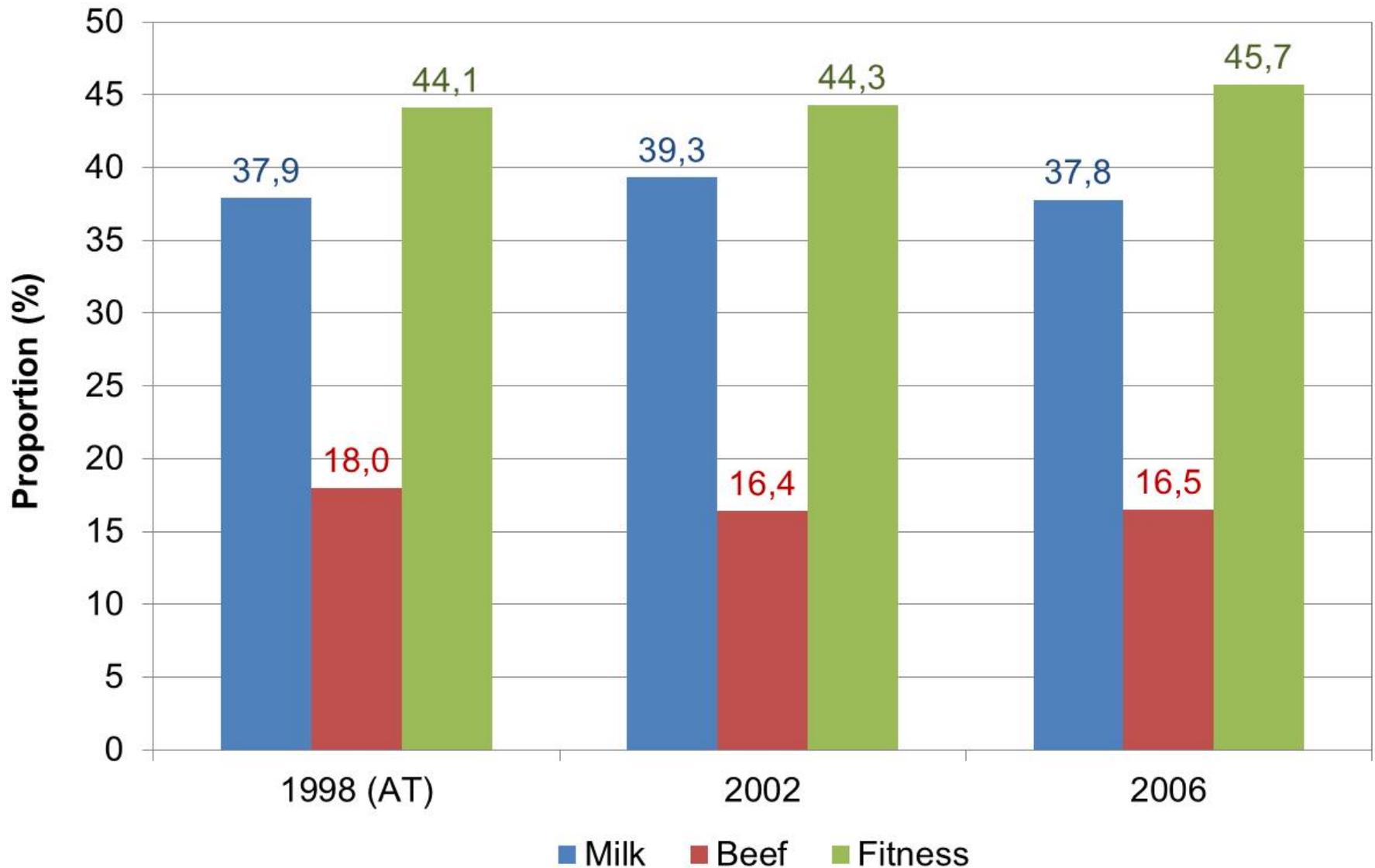
Outline

- **Background**

- **Affected Topics**
  - **Method**
  - **Traits**
  - **Weights**

- **Current status**

- **Timetable**

Background

Background – why?

- **Method:**
  - Some weaknesses in method
  - Simplified correlations used

- **New traits:**
  - Rearing loss of calves/heifers
  - Health

- **Changes in existing traits:**
  - E.g. problems with data for dressing percentage

Genetic trend – cows – milk

Genetic trend – cows – beef

FW = beef index
NTZ = net daily g.
AUS = dressing p.
HKL = EUROP
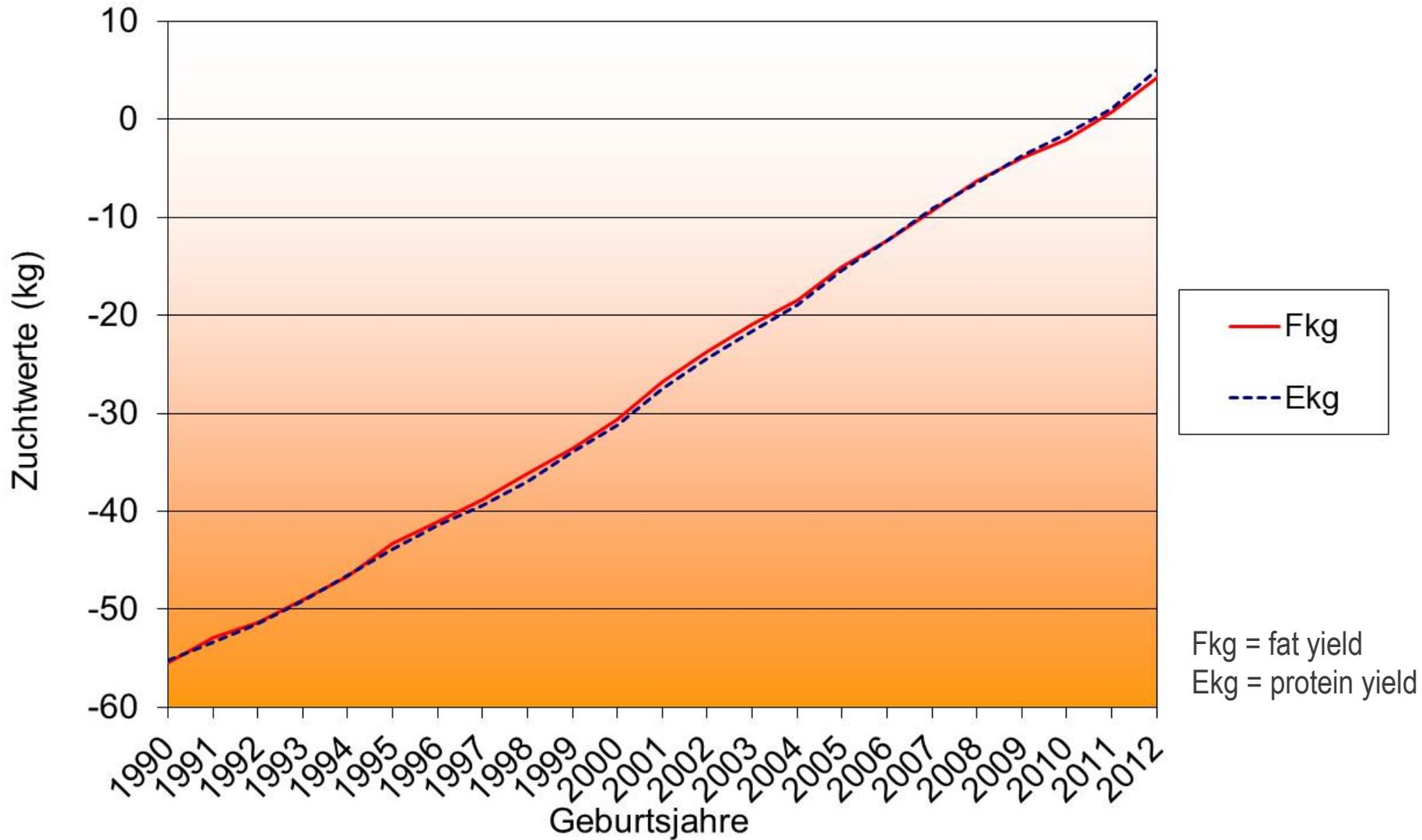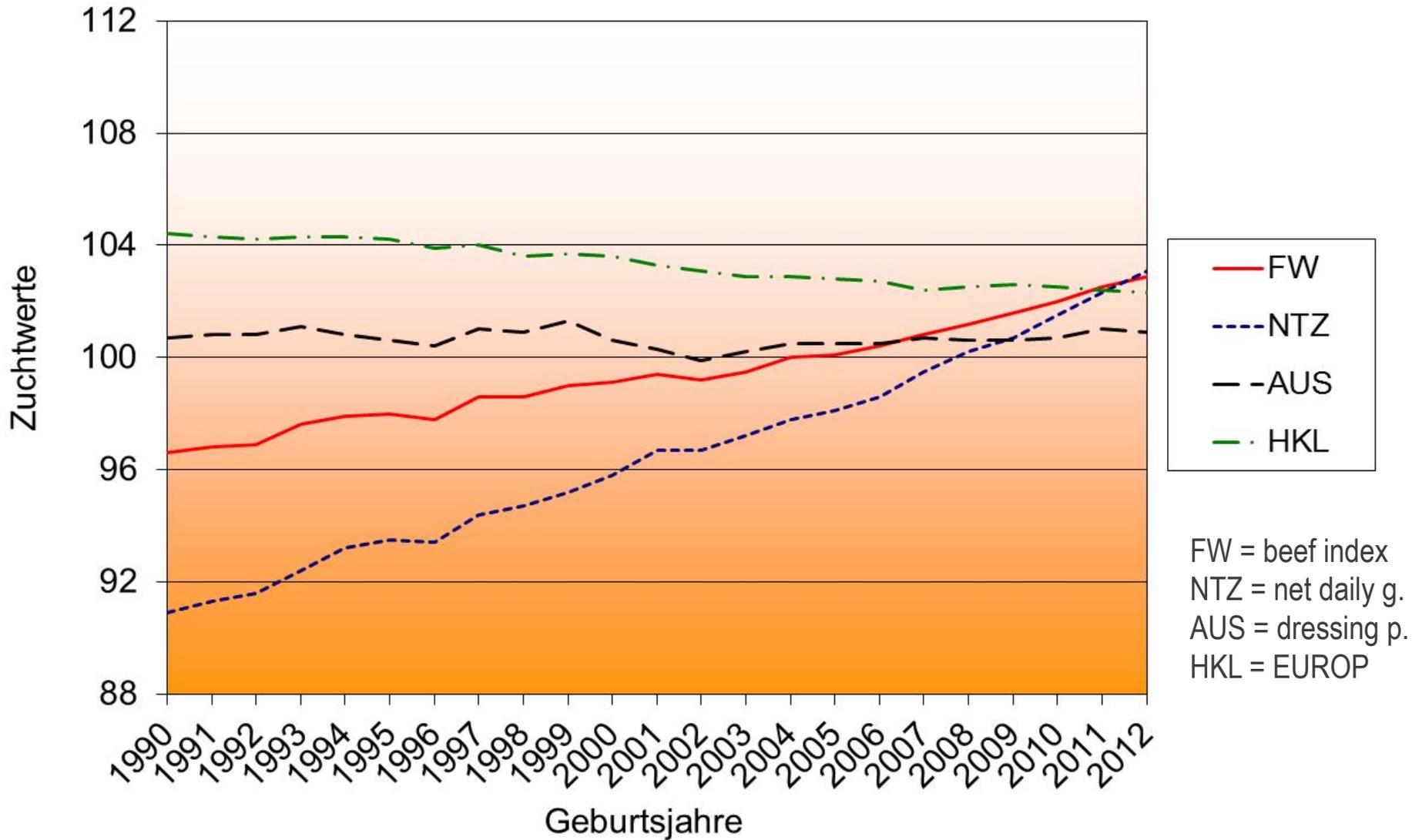
Genetic trend – cows – fitness

ND = longevity
FRW = fertility
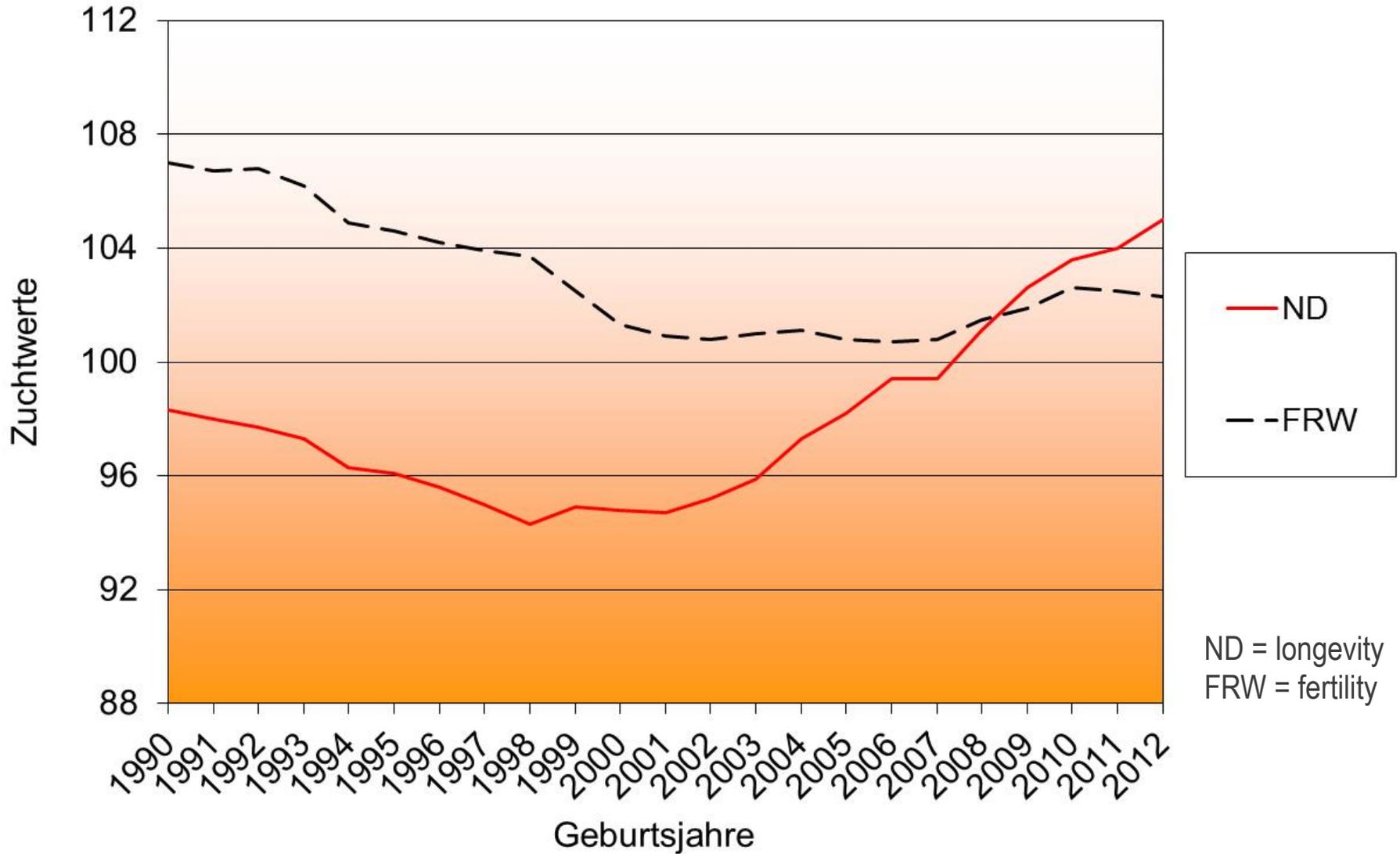
Genetic trend – cows – conformation

Ra = Frame
Bem = Muscling
Fu = Feet&legs
Eu = Udder
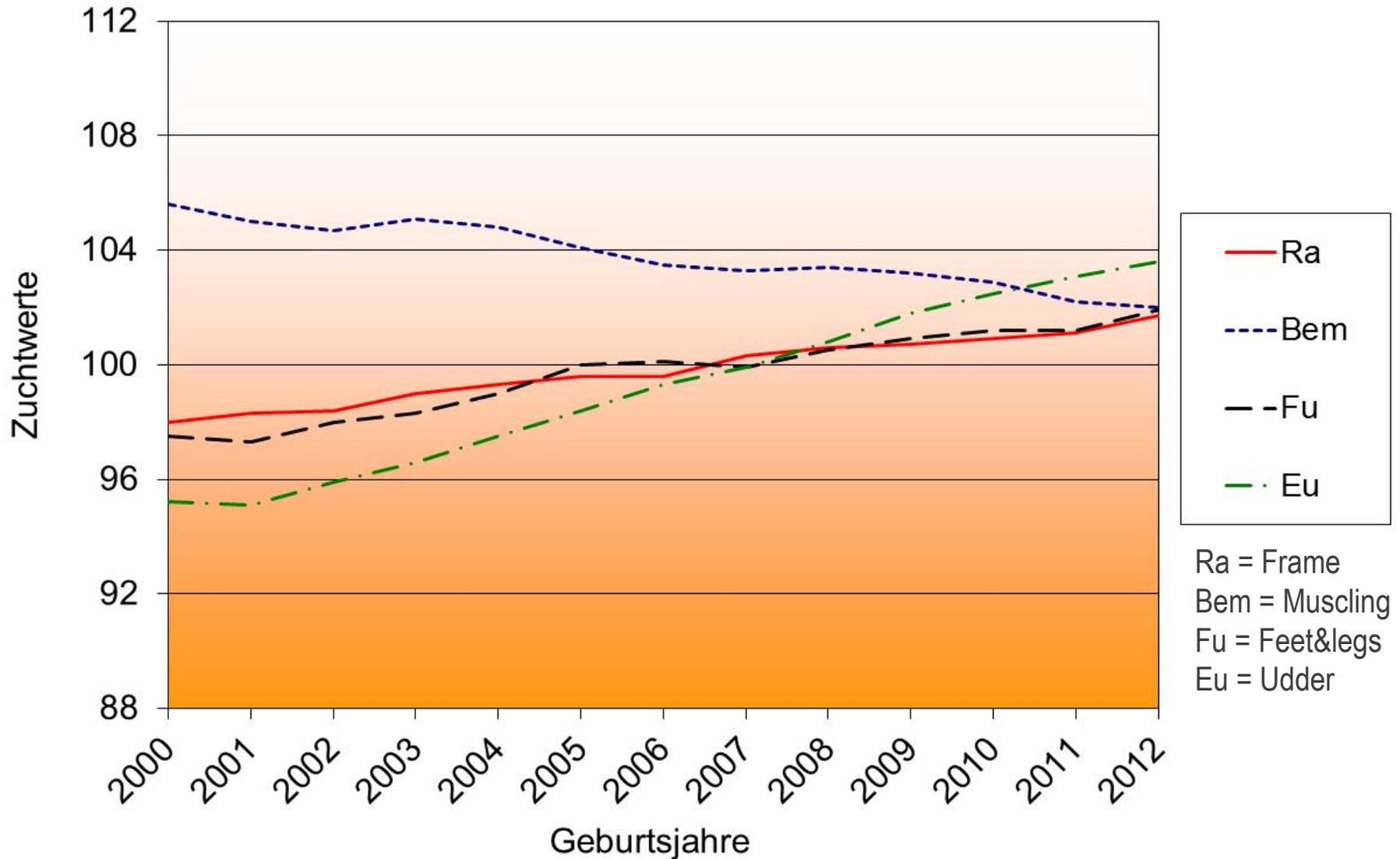
Background – genetic trends

- high selection response for milk traits

- slightly negative development for EUROP grade and muscling

- stable to slightly positive trends for most fitness traits

- positive trend for feet&legs and udder

→ **in general very positive development**

Background – why?

- Did genetic parameters change?

- What about economic situation?

- **Desires of breeders, consumers and politics**:
  - 'age of animal welfare'
  - increasing focus on fitness traits

Breeders survey – OptiGene (Steininger et al., 2013)
personal breeding goal
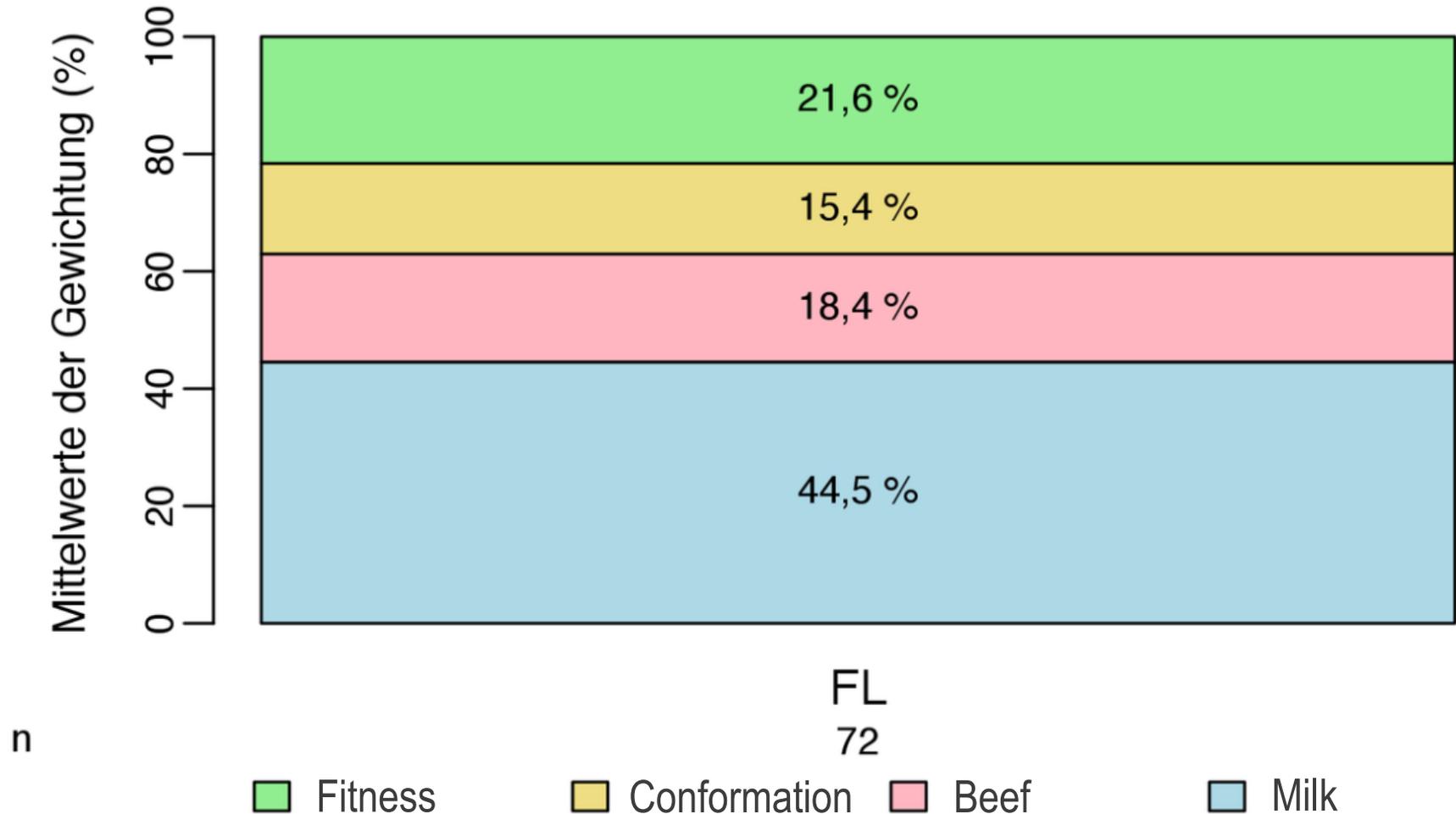
Background – additional aspect

- **Genomic selection offers the chance to keep the high selection response for milk and simultaneously put more weight on fitness!**

Affected topics

- **Method**
- **Traits**
- **Weights**

METHOD

Method

- current method ('Miesenberger') shows too high spread with low to medium reliabilities

- alternative method necessary
  → adapted selection index method

- new genetic correlations between traits

- other 'traits' which are indices are also affected (MW-milk, FIT-fitness, ND-longevity, EGW-udder health)

TRAITS

What was/is under discussion?

delete?

- Dressing percentage – no
- Persistency – no
- Milking speed – no?
- Calving ease (direct) – no?

include?

- Rearing loss – yes
- Milk fever – not yet
- Farmer-observed health data – yes (addition to vet data)
- Conformation – no

Why no conformation?

- **15% in Holstein**

- **but:**

  - Direct economic weight just for herds selling heifers

  - Low realization for whole population

  - Functional effect of conformation on longevity and udder health is already included!

  - Conformation has already high importance in selection (EBV limits)

  - Danger of double counting

  - The weights for which traits should be reduced to include conformation?

ECONOMIC WEIGHTS

GZW current
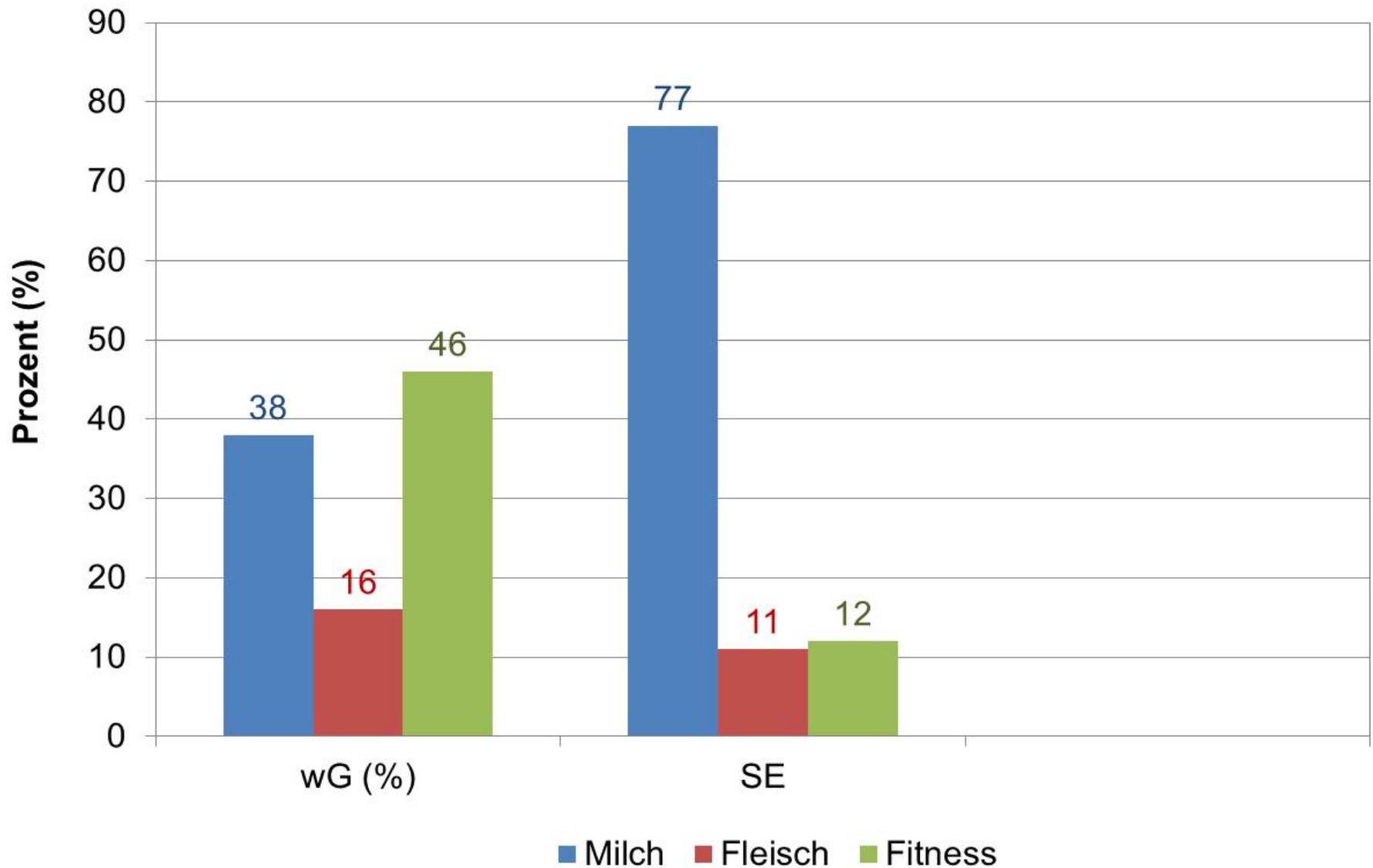
GZW current
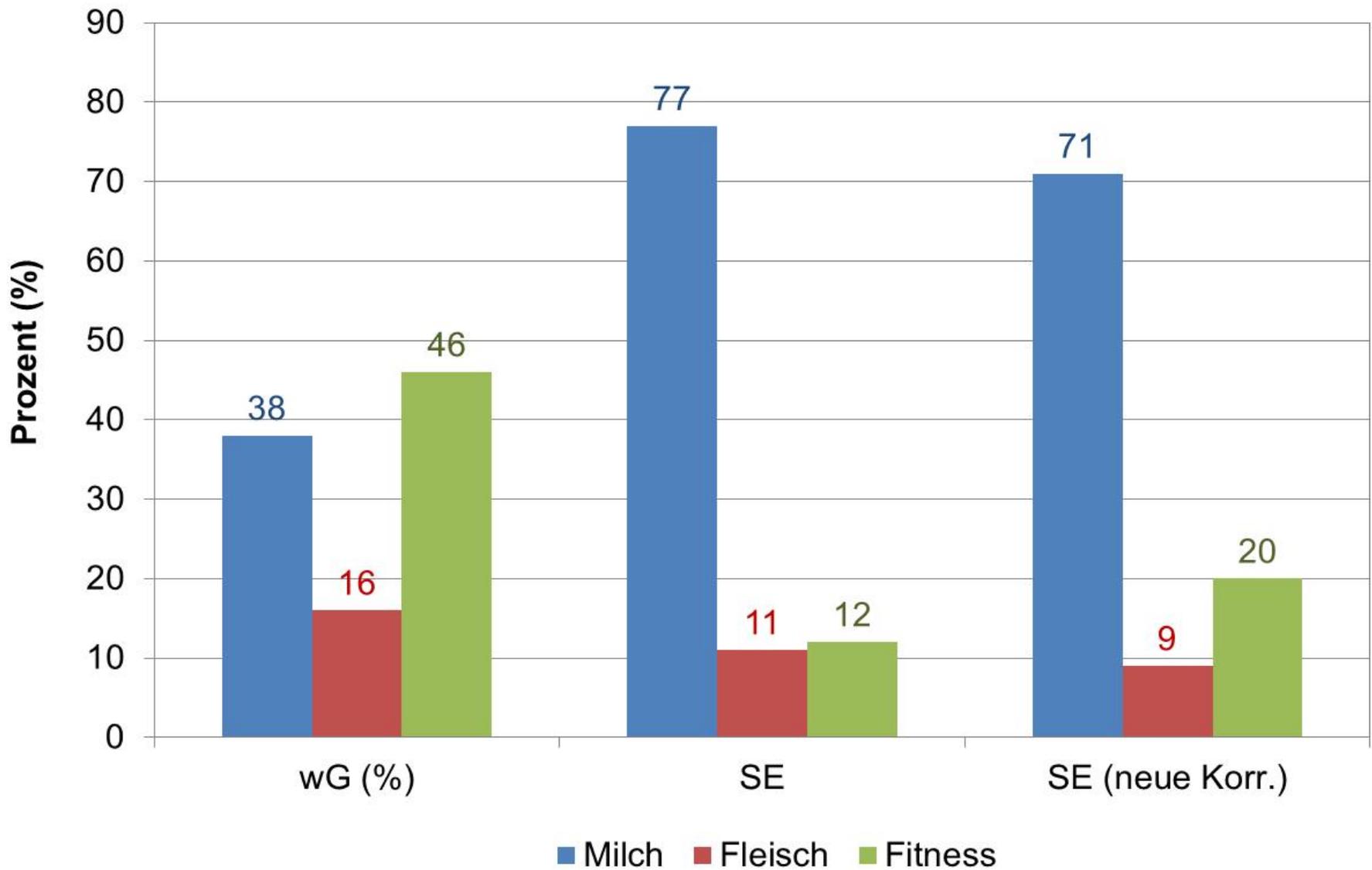
Economic weights

- Part of project Optigene (Birgit Fürst-Waltl, 2015)

- Method like Miesenberger (1997) and Lind (2007)

- Herd with milk production (without quota), heifer rearing and bull fattening

- **Principle:** how much does the profit increase, if you change the trait by 1 unit?

Variant 2 (without milk yield) (Fürst-Waltl, 2015)
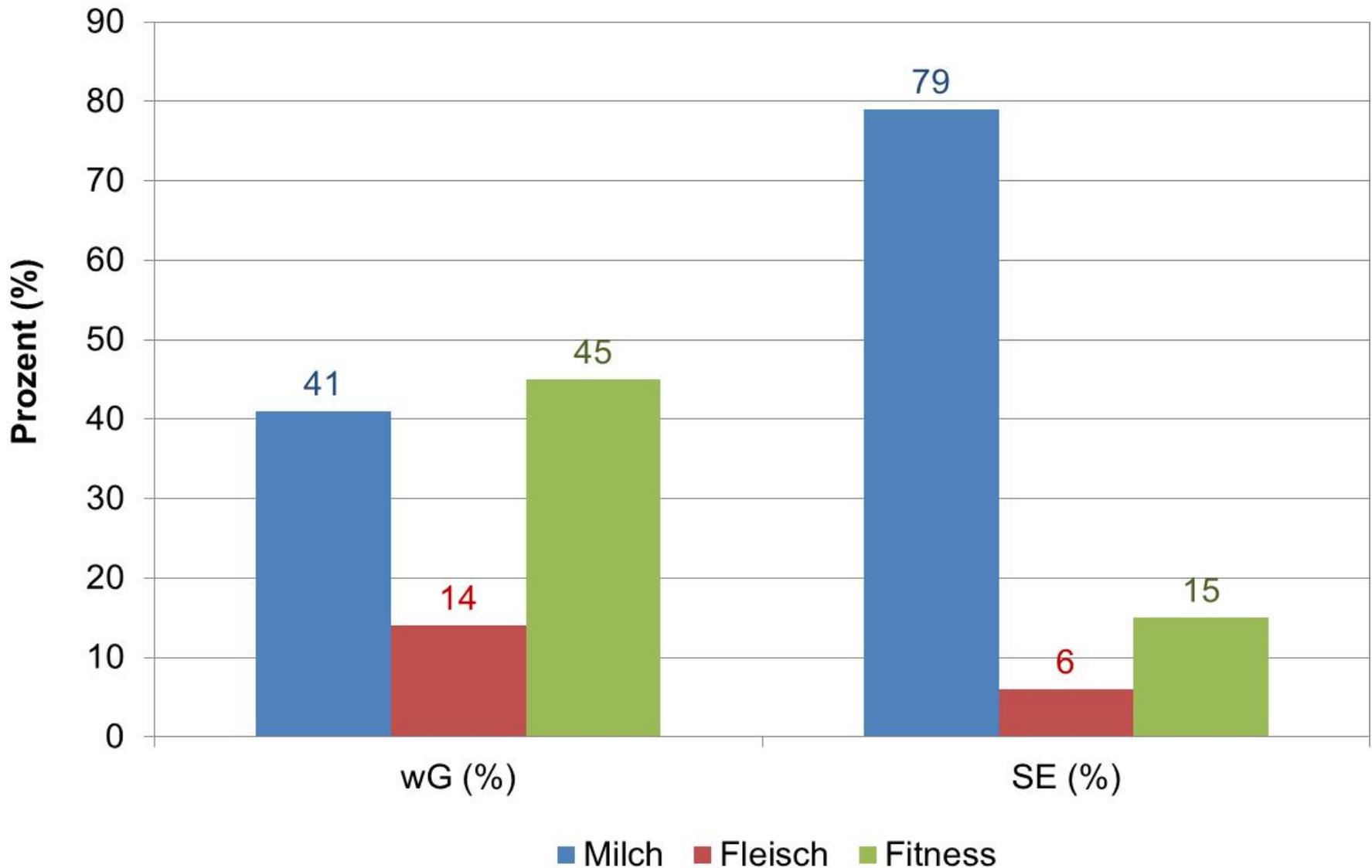
Economic weights

	current	Fürst-Waltl, 2015
MILK	**38**	**41**
Fat-kg		
Protein-kg		
BEEF	**16**	**14**
Net daily gain		
Dressing percentage		
EUROP grade score		
FITNESS	**46**	**45**
Longevity		
Persistency		
Fertility		
Calving ease		
Stillbirth		
Udder health		
Milking speed		

Economic weights

	current	Fürst-Waltl, 2015
MILK	**38**	**41**
Fat-kg	4,4	19,9
Protein-kg	33,4	20,8
BEEF	**16**	**14**
Net daily gain	7,3	9,3
Dressing percentage	4,6	2,9
EUROP grade score	4,6	1,5
FITNESS	**46**	**45**
Longevity	13,4	10,9
Persistency	2,0	4,3
Fertility	6,8	11,3
Calving ease	3,6	2,2
Stillbirth	8,0	**New: rearing loss 4,4%**
Udder health	9,7	8,7
Milking speed	2,0	3,1

Current status of discussions

Current status

- **Milk : Beef : Fitness =** 35(-40) : 15 : (45-)50%

- **Milk:**

  - Closer fat:protein ratio (as derived)

  - Selection response should not decrease

- **Beef:**

  - Selection response for EUROP grade not negative
    → higher weight

- **Fitness:**

  - Higher weight for fertility

  - Rearing loss (+stillbirth) included

GZW-Variants

	V0 (current)		V2 (new weights)		V4 (adapted)	
	e.w. (%)	SR	e.w. (%)	SR	e.w. (%)	SR
MILK	**38**	**77**				
Milk-kg						
Fat-kg						
Protein-kg						
BEEF	**16**	*11*				
Net daily gain						
Dressing perc.						
EUROP grade						
FITNESS	**46**	*12*				
Longevity						
Persistency						
Fertility						
Calving ease dir.						
Calving ease mat.						
Stillbirth dir.						
Stillbirth mat.						
Udder health						
Milking speed						

GZW-Variants

	V0 (current)		V2 (new weights)		V4 (adapted)	
	e.w. (%)	SR	e.w. (%)	SR	e.w. (%)	SR
MILK	**38**	**77**				
Milk-kg	0,0	364				
Fat-kg	4,4	15,3				
Protein-kg	33,4	11,9				
BEEF	**16**	**11**				
Net daily gain	7,3	4,4				
Dressing perc.	4,6	0,8				
EUROP grade	4,6	1,9				
FITNESS	**46**	**12**				
Longevity	13,4	2,2				
Persistency	2,0	1,6				
Fertility	6,8	**-0,4**				
Calving ease dir.	1,8	**-0,4**				
Calving ease mat.	1,8	3,0				
Stillbirth dir.	4,0	1,0				
Stillbirth mat.	4,0	1,8				
Udder health	9,7	0,0				
Milking speed	2,0	2,9				

GZW-Variants

	V0 (new corr.)		V2 (new weights)		V4 (adapted)	
	e.w. (%)	SR	e.w. (%)	SR	e.w. (%)	SR
MILK	**38**	**71**				
Milk-kg	0,0	351				
Fat-kg	4,4	11,6				
Protein-kg	33,4	10,6				
BEEF	**16**	**9**				
Net daily gain	7,3	3,6				
Dressing perc.	4,6	1,5				
EUROP grade	4,6	0,4				
FITNESS	**46**	**20**				
Longevity	13,4	3,1				
Persistency	2,0	1,7				
Fertility	6,8	**-1,1**				
Calving ease dir.	1,8	0,3				
Calving ease mat.	1,8	3,4				
Stillbirth dir.	4,0	1,1				
Stillbirth mat.	4,0	2,0				
Udder health	9,7	1,7				
Milking speed	2,0	3,7				

GZW-Variants

	V0 (new corr.)		V2 (new weights)		V4 (adapted)	
	e.w. (%)	SR	e.w. (%)	SR	e.w. (%)	SR
MILK	**38**	*71*	**41**	**79**		
Milk-kg	0,0	351	0,0	371		
Fat-kg	4,4	11,6	19,9	14,0		
Protein-kg	33,4	10,6	20,8	10,8		
BEEF	**16**	*9*	**14**	**6**		
Net daily gain	7,3	3,6	9,3	2,9		
Dressing perc.	4,6	1,5	2,9	0,4		
EUROP grade	4,6	0,4	1,5	**-1,0**		
FITNESS	**46**	*20*	**45**	*15*		
Longevity	13,4	3,1	10,9	2,8		
Persistency	2,0	1,7	4,3	2,0		
Fertility	6,8	**-1,1**	11,3	**-0,8**		
Calving ease dir.	1,8	0,3	1,1	**-0,1**		
Calving ease mat.	1,8	3,4	1,1	3,6		
Stillbirth dir.	4,0	1,1	2,6	0,5		
Stillbirth mat.	4,0	2,0	2,6	1,5		
Udder health	9,7	1,7	8,7	1,2		
Milking speed	2,0	3,7	3,1	4,3		

+4,4% rearing loss

GZW-Variants

	V0 (new corr.)		V2 (new weights)		V4 (adapted)	
	e.w. (%)	SR	e.w. (%)	SR	e.w. (%)	SR
MILK	**38**	*71*	**41**	**79**		
Milk-kg	0,0	351	0,0	371		
Fat-kg	4,4	11,6	19,9	14,0		
Protein-kg	33,4	10,6	20,8	10,8		
BEEF	**16**	*9*	**14**	**6**		
Net daily gain	7,3	3,6	9,3	2,9		
Dressing perc.	4,6	1,5	2,9	0,4		
EUROP grade	4,6	0,4	1,5	**-1,0**		
FITNESS	**46**	*20*	**45**	*15*		
Longevity	13,4	3,1	10,9	2,8		
Persistency	2,0	1,7	4,3	2,0		
Fertility	6,8	**-1,1**	11,3	**-0,8**		
Calving ease dir.	1,8	0,3	1,1	**-0,1**		
Calving ease mat.	1,8	3,4	1,1	3,6		
Rearing loss	4,0	1,1	2,6	0,5		
~~**Stillbirth mat.**~~	4,0	2,0	2,6	1,5		
Udder health	9,7	1,7	8,7	1,2		
Milking speed	2,0	3,7	3,1	4,3		

+4,4% rearing loss

GZW-Variants

	V0 (new corr.)		V2 (new weights)		V4 (adapted)	
	e.w. (%)	SR	e.w. (%)	SR	e.w. (%)	SR
MILK	**38**	**71**	**41**	**79**	**37**	**63**
Milk-kg	0,0	351	0,0	371	0,0	308
Fat-kg	4,4	11,6	19,9	14,0	18,1	11,6
Protein-kg	33,4	10,6	20,8	10,8	18,9	9,0
BEEF	**16**	**9**	**14**	**6**	**15**	**4**
Net daily gain	7,3	3,6	9,3	2,9	4,5	2,7
Dressing perc.	4,6	1,5	2,9	0,4	2,0	1,0
EUROP grade	4,6	0,4	1,5	-1,0	8,5	0,0
FITNESS	**46**	**20**	**45**	**15**	**48**	**33**
Longevity	13,4	3,1	10,9	2,8	10,0	4,2
Persistency	2,0	1,7	4,3	2,0	3,0	2,2
Fertility	6,8	-1,1	11,3	-0,8	14,0	0,5
Calving ease dir.	1,8	0,3	1,1	-0,1	1,0	0,6
Calving ease mat.	1,8	3,4	1,1	3,6	1,0	3,7
Rearing loss	4,0	1,1	2,6	0,5	8,0	5,2
~~**Stillbirth mat.**~~	4,0	2,0	2,6	1,5	-	-
Udder health	9,7	1,7	8,7	1,2	10,0	2,2
Milking speed	2,0	3,7	3,1	4,3	1,0	3,2
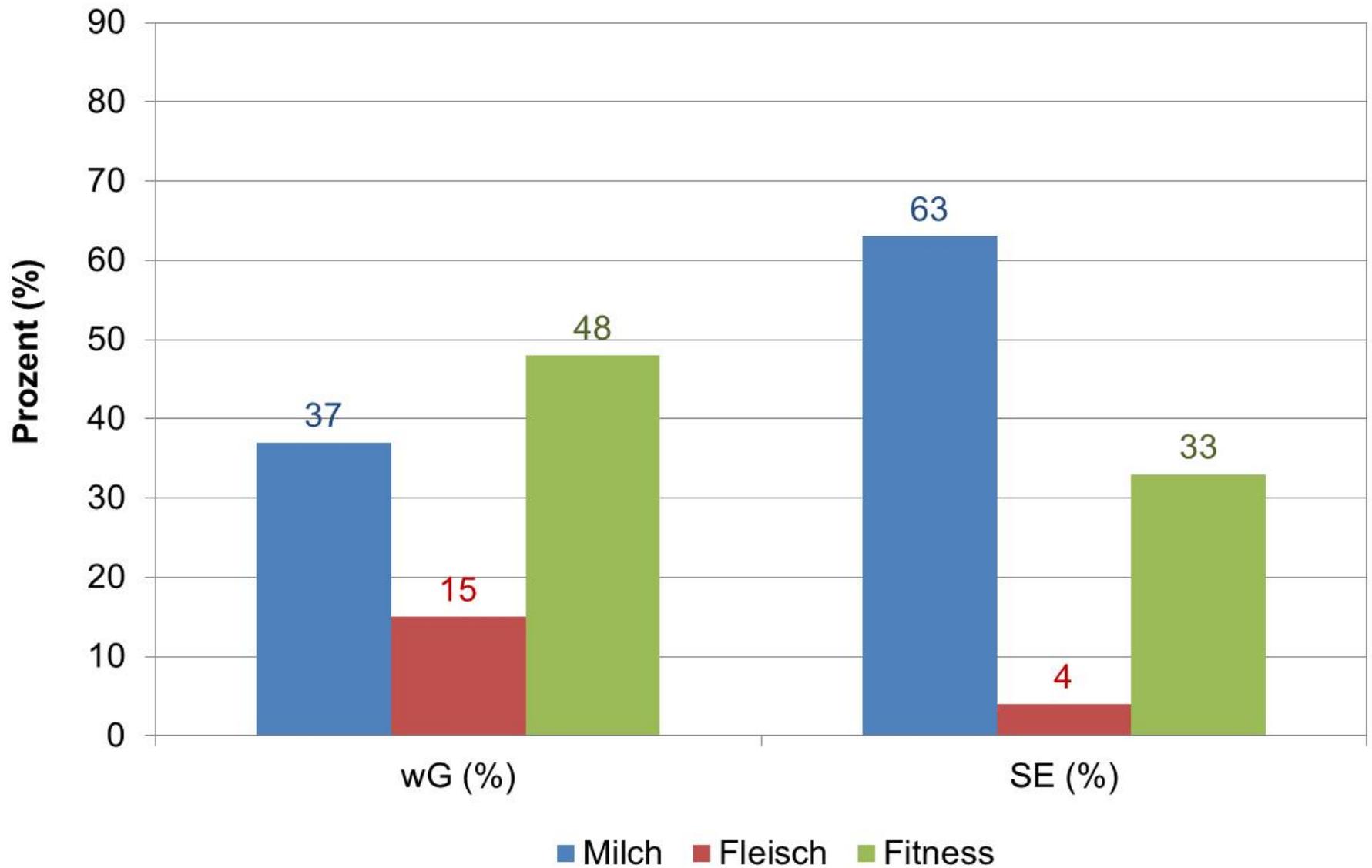
GZW-Variants – Conclusions

- **no significant changes necessary!**

- **not possible to satisfy all desires!**

Timetable

Timetable

- **Beratender Ausschuss ZWS (23.9.):**

  - Decision on new correlations, general method and EBV-changes (e.g. rearing loss)

- **Meetings with breeding organisations:**

  - 16.9.: CZ

  - 25.9.: AT (?)

  - 13./14./16.10.: Bavaria

  - 24.11.: joint meeting → decision (Salzburg)

  - 10.3.2016: public seminar (ZAR-Seminar, Salzburg)

- **Introduction:** April 2016

THANK YOU FOR YOUR ATTENTION!

Methode Ducrocq
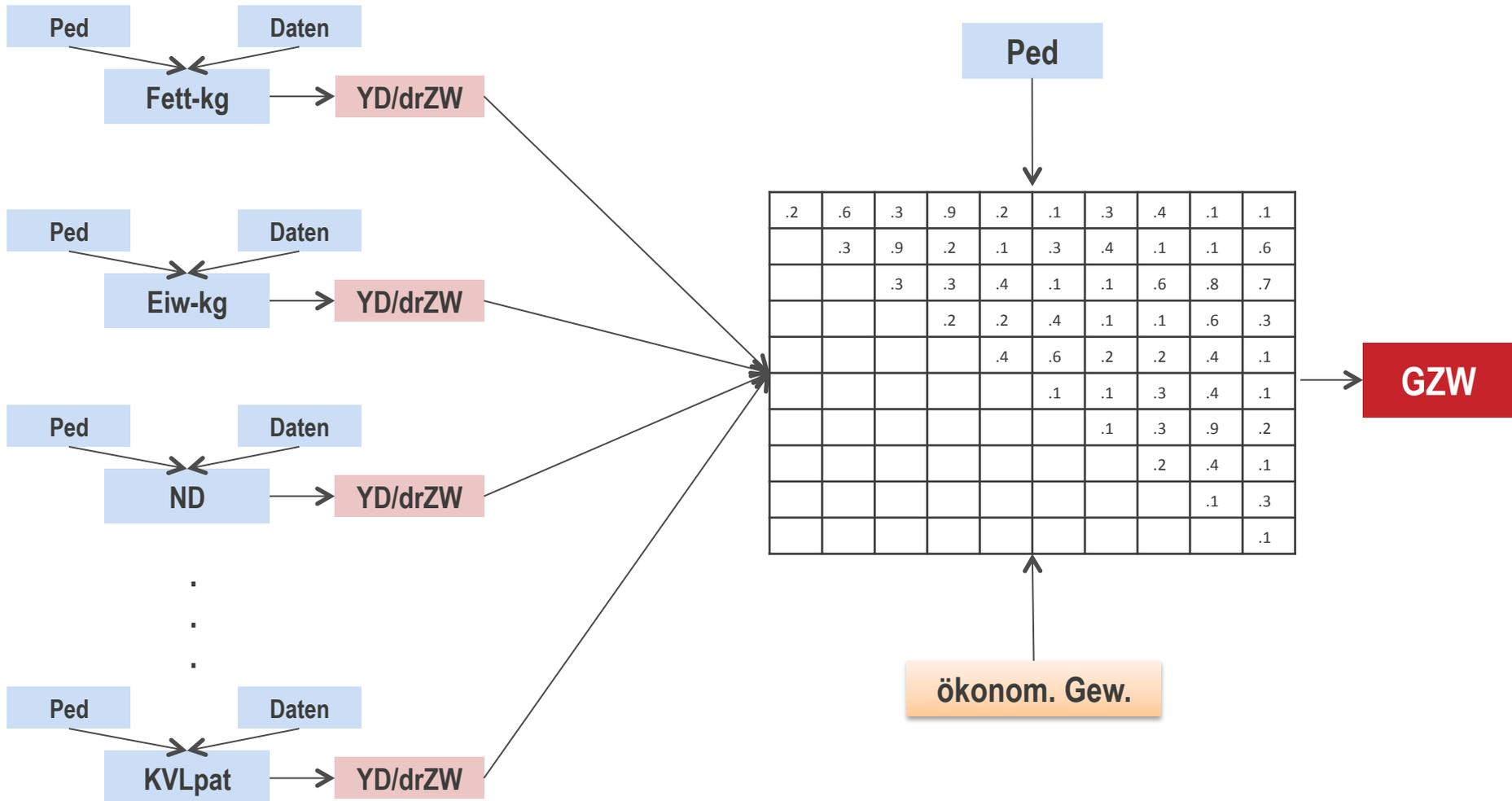
Genet. Korrelationen in GZW (Stand bis 2015)

	Fkg	Ekg	NTZ	AUS	HKL	ND	Pers	FRW	KVLp	KVLm	TOTp	TOTm	EGW	DMG
Fkg	1,00													
Ekg	0,85	1,00												
NTZ	0,10	0,10	1,00											
AUS	-0,15	-0,15	0,51	1,00										
HKL	-0,05	-0,05	0,46	0,59	1,00									
ND	-0,10	-0,10		-0,10	-0,10	1,00								
Pers						0,10	1,00							
FRW	-0,20	-0,20			-0,10	0,10	0,20	1,00						
KVLp	-0,10	-0,10	-0,10	-0,10					1,00					
KVLm	0,10	0,10	0,10			0,15			-0,35	1,00				
TOTp			-0,10	-0,10					0,70		1,00			
TOTm						0,15				0,60	-0,10	1,00		
EGW	-0,25	-0,25				0,10	0,10	0,10					1,00	
DMG	0,25	0,25											-0,20	1,00

Genet. Korrelationen in GZW (neu - vorläufig!)

	Fkg	Ekg	NTZ	AUS	HKL	ND	Pers	FRW	KVLp	KVLm	AUF	EGW	DMG
Fkg	1,00												
Ekg	0,75	1,00											
NTZ	0,00	0,10	1,00										
AUS	-0,15	-0,15	0,50	1,00									
HKL	-0,20	-0,15	0,45	0,55	1,00								
ND	-0,25	-0,25	-0,10	0,15	0,00	1,00							
Pers	-0,15	-0,15	-0,10	-0,10	-0,10	0,50	1,00						
FRW	-0,40	-0,40	-0,10	-0,05	-0,10	0,50	0,20	1,00					
KVLp	0,00	0,00	-0,20	-0,15	-0,15	0,00	0,00	0,00	1,00				
KVLm	0,10	0,10	0,00	-0,05	-0,10	0,15	0,00	0,40	-0,25	1,00			
AUF	0,10	0,10	0,00	0,00	-0,10	0,20	0,00	0,10	0,45	0,10	1,00		
EGW	-0,25	-0,25	0,00	0,00	-0,10	0,50	0,30	0,10	0,00	0,00	0,10	1,00	
DMG	0,35	0,35	0,00	-0,10	-0,10	0,00	-0,10	-0,10	0,00	0,00	0,00	-0,20	1,00