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Carcass traits and meat quality of Charolais×Wagyu and Simmental×Wagyu cattle in an Austrian fattening system

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Project partners

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和牛 OKAMI WAGYU

kärntner rind

... wir züchten Qualität.

What is Wagyu?

- Japanese cattle breed
- Used for beef production
- Medium-sized breed

	bull	cow
Wither height (cm)	130-140	122-126
Weight (kg)	900-1,000	500-600

(Source: Sambraus (2001): Farbatlas Nutztierrassen)

- High quality meat
  - abundant marbling
  - very tender and juicy
  - excellent taste
- Prices for breeding animals and meat are very high

Research question

Which **daily gains**, **carcass traits** and **meat quality** can be expected,

if **Charolais×Wagyu** and **Simmental×Wagyu**

heifers and **steers**

are fattened in an Austrian fattening system?

Animals, material and methods

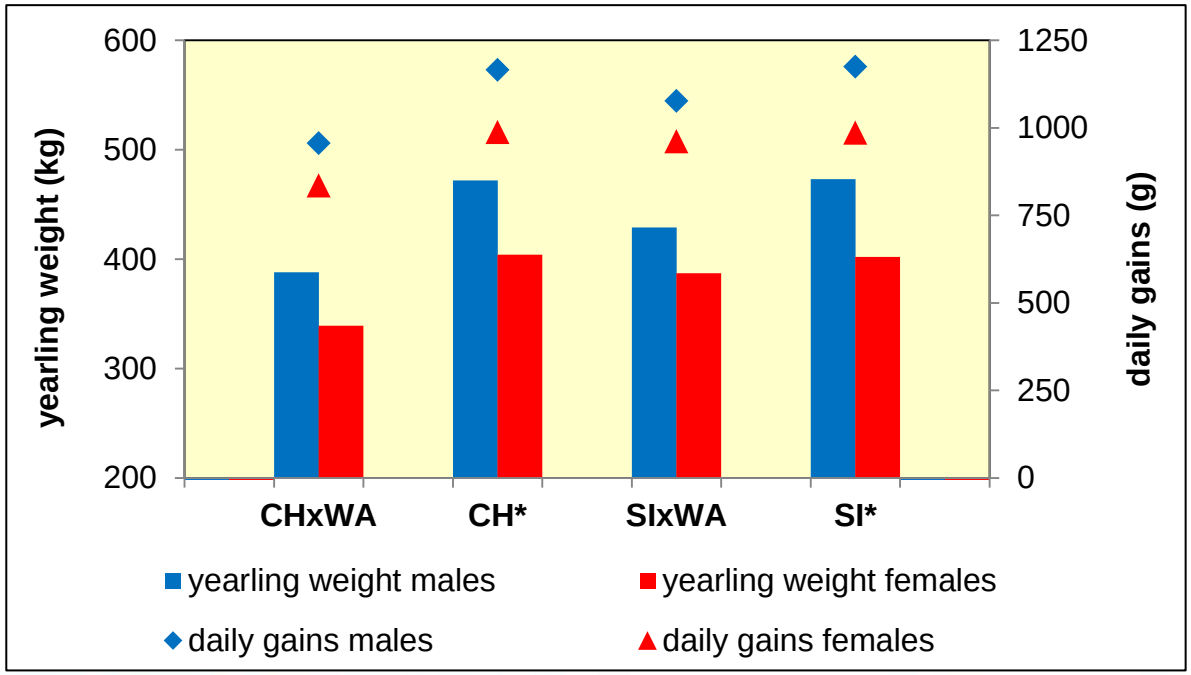
- Animals
  - Pilot study with 18 animals (10 CH×Wagyu: 6 ♀, 4 ♂; 8 SI×Wagyu: 5 ♀, 3 ♂)
  - from two suckler cow herds (weaning at age of 8-9 months)
  - fattening on a farm in Carinthia

- Feeding ration:
  - Forage was fed *ad libitum*
    - 60% maize silage
    - 30% grass silage
    - 10% hay
  - In addition 2 kg concentrate/day
- Target live weights at slaughter:
  - Heifers: 550 kg
  - Steers: 650 kg
- After slaughter carcass traits and meat quality parameters were examined
- Statistical analysis with SAS (Proc GLM)

Daily gains

	genetic group		sex		s_e	p-value gen. gr.	p-value sex
	CH×WA	SI×WA	steer	heifer			
daily gains rearing, g	857 [b]	1,136 [a]	1,055 [a]	938 [b]	74	<0.001	0.005
daily gains fattening, g	936 [a]	828 [b]	891	874	94	0.029	0.718
daily gains whole life, g	**902**	**954**	**951**	**906**	**73**	**0.151**	**0.221**

[a,b] different upper indices show significant differences between genetic groups and sexes



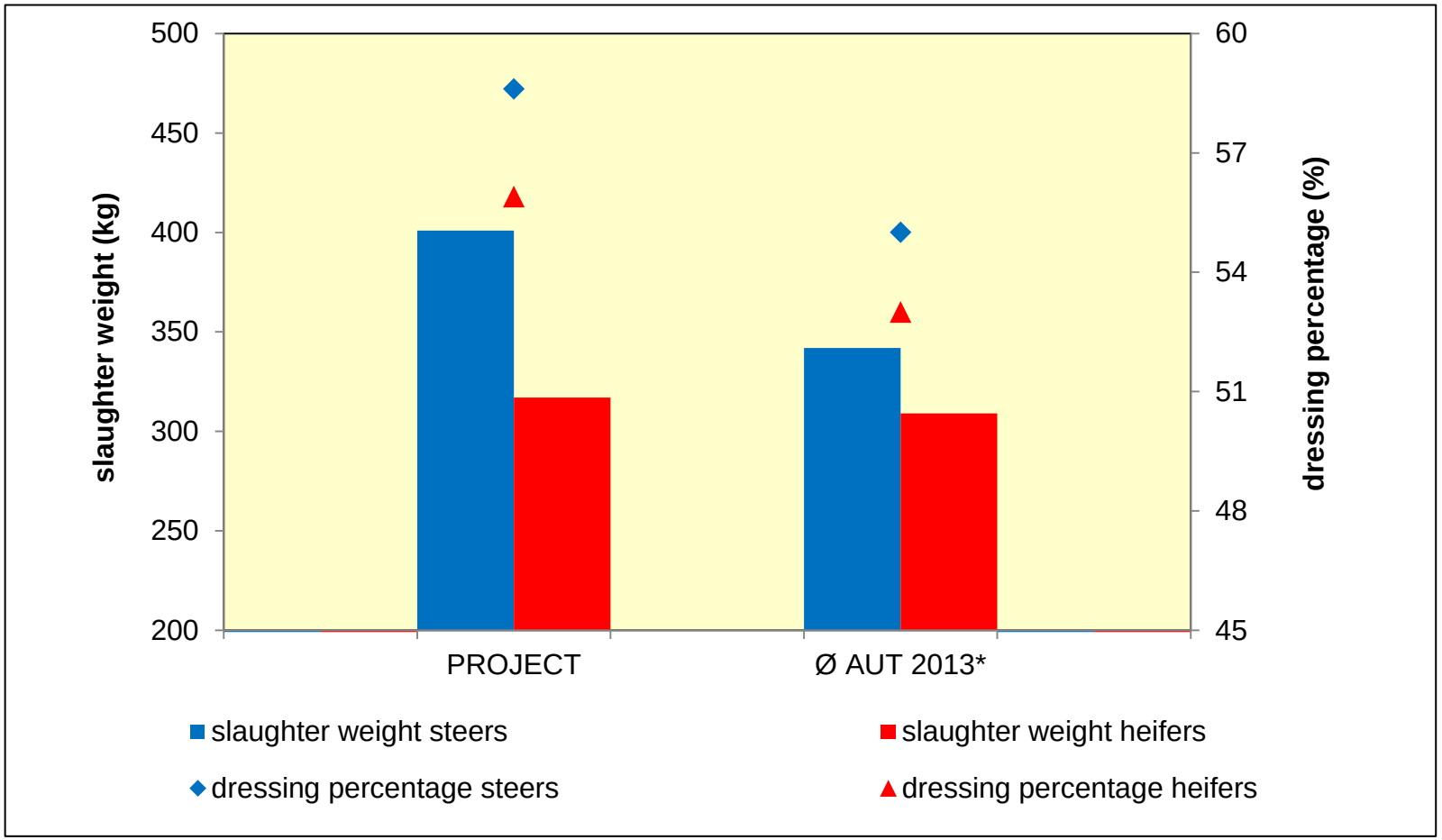
* Values for CH and FV:
Source: ZuchtData (2014): Ergebnisse der Fleischleistungskontrolle 2013.

Carcass traits I

	genetic group		sex		s_e	p-value gen. gr.	p-value sex
	CH×WA	SI×WA	steer	heifer			
slaughter weight, kg	367	350	401 [a]	317 [b]	19	0.066	<0.001
dressing percentage, %	57.6	56.9	58.6 [a]	55.9 [b]	1.7	0.381	0.004
EUROP-classification (1=P, 5=E)	3.0	3.0	3.0	3.0		1.000	1.000
fat classification (1=lean, 5=fat)	4.2	4.0	4.6 [a]	3.8 [b]		0.488	0.008
share of valuable cuts, % [1]	42.7	43.5	42.6	43.6	1.5	0.307	0.197

[a,b] different upper indices show significant differences between genetic groups and sexes
[1] share of entrecote, rump, round, shank and tenderloin in the carcass

Carcass traits II



* (Source: Statistik Austria (2014): Lebend- und Schlachtgewichte 2013)

Meat quality I

Meat quality of Musculus longissimus dorsi (9th rib)

	genetic group		sex		s_e	p-value gen. gr.	p-value sex	SI×CH heifer*
	CH×WA	SI×WA	steer	heifer				
water holding capacity								
drip loss, %	1.1	1.5	1.2	1.4	0.5	0.139	0.553	2.4
cook loss, %	14.9	16.5	16.3	15.1	2.1	0.160	0.254	25.8
grill loss warm, %	22.6	23.2	23.5	22.2	3.1	0.663	0.413	19.1
Intramuscular fat content and tenderness								
intramuscular fat content, g/kg FM	94.2	79.8	85.4	88.6	23.21	0.209	0.780	30.5
shear force grilled, kg	2.61	2.95	3.08	2.48	0.87	0.423	0.176	3.20

* (Source: Velik et al. (2012): Färsenmast auf Kurzrasenweide oder im Stall – Einfluss auf Mastleistung, Schlachtleistung und Fleischqualität. Feeding: 30% maize silage, 70% grass silage + 2kg concentrate/day)

Intramuscular fat content was also examined in Musculus semidentinosus

- About half of content in Musculus longissimus dorsi (means approx. 40-45 g/kg FM)

Meat quality II

Entrecote of CH×Wagyu heifer
IMF content: 11.2%

Entrecote of CH×SI heifer
IMF content: 1.8%

In an organoleptic test meat of CH×Wagyu and SI×Wagyu crossbreeds was very tender and juicy and tasted marvellous.

Fatty acids I

Fatty acid profile of Musculus longissimus dorsi (9th rib) (in g/100 g fatty acids)

	genetic group		*sex*		s_e	p-value gen. gr.	p-value sex	SI×CH heifer*
	CH×WA	SI×WA	*steer*	*heifer*				
SFA	47.8	48.3	48.0	48.1	2.1	0.591	0.877	48.8
MUFA	48.9	48.0	48.4	48.6	1.9	0.313	0.807	46.0
PUFA	3.2	3.4	3.4	3.3	0.3	0.227	0.321	5.2
Ω6	2.31	2.39	2.38	2.32	0.25	0.533	0.609	3.30
Ω3	0.65	0.74	0.75 [a]	0.64 [b]	0.10	0.085	0.034	1.40
CLA	0.27 [b]	0.33 [a]	0.30	0.30	0.05	0.048	0.744	0.53

[a,b] different upper indices show significant differences between genetic groups and sexes

* (Source: Velik et al. (2012): Färsenmast auf Kurzrasenweide oder im Stall – Einfluss auf Mastleistung, Schlachtleistung und Fleischqualität. Feeding: 30% maize silage, 70% grass silage + 2kg concentrate/day)

Fatty acid profile was also examined in Musculus semidentinosus

- SFA percentage was lower than in Musculus longissimus dorsi
- MUFA, PUFA, Ω6, Ω3 and CLA percentages were higher than in Musculus longissimus dorsi

Fatty acids II

Correlation between intramuscular fat content (IMF) and groups of fatty acids
(independent from genetic group, sex and muscle)

parameter 1	correlation coefficient (Pearson)	parameter 2
IMF	0.689	SFA
IMF	-0.520	MUFA
IMF	-0.765	PUFA
IMF	-0.811	Ω6
IMF	-0.626	Ω3
IMF	-0.180	CLA

- Strong **positive** correlation between IMF and **SFA**
  - Rising IMF contents lead to higher SFA percentages
- Strong **negative** correlation between IMF and **MUFA**, IMF and **PUFA**, IMF and **Ω6**, IMF and **Ω3**
  - Rising IMF contents lead two lower MUFA, PUFA, Ω6 and Ω3 percentages

➢ The higher the IMF content the more unfavourable the fatty acid profile

Conclusions

- Only few differences between CH×Wagyu and SI×Wagyu cattle in daily gains, carcass traits and meat quality
- Lower daily gains of Wagyu-crossbreeds compared to purebred CH and SI
- Wagyu-crossbreed meat
  - High intramuscular fat content (approx. 3 times higher than in meat of SI×CH heifers)
  - Excellent tenderness, juiciness and taste
  - Rather unfavourable fatty acid profile

Fattening CH×Wagyu and SI×Wagyu cattle is a good possibility to produce high quality meat.

However, Wagyu meat is still a niche product in Austria.

The challenge will be to find consumers paying high prices for this meat.

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Thank you!

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