

## PINZGAUER CATTLE IN SLOVAKIA

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### ABSTRACT

The decrease in the population of Pinzgau cattle leads to changes in the production type from dairy to beef in system of suckler cows. Limousine breed was used as referential population for better description of results of Pinzgau cattle. The aim of the investigation was to compare growth intensity and muscle thickness measured by ultrasound of Pinzgau (39 heads) and Limousine (37 heads) heifers kept under low input condition in mountain region of Upper Orava in Slovakia. Live weights were obtained at birth (W0) and before pasture seasons at average age of 21 months (W1) and 33 months (W3) and after pasture season at average age of 26 months (W2). Ultrasound measurements of *musculus longissimus thoracis et lumborum* at loins part and *musculus gluteus* above rump were done at 21 months. Growth intensity was calculated for periods within WB, W1, W2 and W3 respectively. Average muscle thickness measured by ultrasound in Pinzgau heifer group was 49.03 mm at loins and 91.74 at rump. Both ultrasound measured values were significantly higher in Limousine heifers (12 mm in loin and 13 mm at rump). Because of the fact that fat layers were higher in Pinzgau cattle, the portions of muscle layer from whole tissue layer were lower. W1, W2 and W3 were higher in Limousine group; the differences were 50.66, 55.33 and 37.37 kg, respectively. Average daily gain from birth to W1, W2 and W3 was significantly higher in Limousine heifers. Due to lower weight gain increase in Limousine heifers for last two controlled periods, average daily gain between WB and W2 or W1 and W2 was higher in Pinzgau than in Limousine heifers. This pilot study proved hypothesis that Pinzgau cattle has less musculature in the hind part of the body. More research is needed for better characteristics of beef production traits important for suckler cow's low input production system to create enhanced breeding protocol for Pinzgau breed.

**Key words:** Pinzgau cattle; ultrasound; muscle thickness

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### INTRODUCTION

As a consequence of the farm animal breeding and intensive use of a relatively small breed number there is a progressive decrease in the genetic variability. The loss of genetic variability can lead to decrease in breed adaptation abilities, to worsening of the health state and, as a final consequence, to the reduction in its farm use. Many of the original (autochthonous) farm animal breeds, which were substituted by more efficient breeds in the past, are now endangered and preserved “*in situ*” as small populations in some regions. Possible extinction of these breeds would also mean irrecoverable loss of the genetic variability and so the loss of unique gene and

allele combinations that would be very useful in future e.g. for the generation of new farm animal genotypes. (Table 1). The Slovak Pinzgauer cattle belong to these endangered breeds in the Slovak Republic.

Since early 90's here is visible decreasing trend of Pinzgau cattle population in Slovakia. Milk production has been the most important trait in the majority of farms. Pinzgau cows were considered as non-sufficient in milk yield, what led to crossing with dairy breeds, most likely Red Holstein. Pinzgau is, however, suitable to very extensive production systems (low input) with using seasonal grazing of permanent pastures in mountain regions of Slovakia. Its walking ability, rusticality and overall robustness with milk

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production above 3500 kg from grazing let it to be appropriate to produce heavy weaners for later fattening in suckler cow's production systems. Kica *et al.* (2001) proved that young bulls of the breed are good for fattening. In our previous work (Polák *et al.*, 2005) we proved that muscle thickness of Pinzgau bulls is slightly smaller than in Simmental but significantly higher than in Holstein. Farmers in mountain regions have not been competitive in comparison to lowland dairy farms, and have been changing production from dairy to beef in system of suckler cows. This trend is visible in Table 2

after year 2008. In 2008, significant decrease in number of Pinzgau cows was recorded in milk performance, but in 3 consequent years the trend was increasing.

The experiment was set in order to help breeders not only by subsidies for keeping animal genetic resources. The aim of our investigation was to characterise growth intensity and muscle development in purebred Pinzgau cattle under suckler cow's (cow-calf unit) production system in comparison to specialised beef breed, Limousine, kept under the same condition of mountain region of Upper Orava.

**Table 1: Breed standard of Pinzgauer cattle in different countries**

Country	Performance Type	Live weight bull/cow (kg)	Height of withers bull/cow (cm)	No. of cows
Austria	meat-milk	1100/650	147/138	2500
Slovakia	meat-milk	1150/590	150/138	2000
Germany	meat-milk	1000/700	144/135	1000
Italy	meat-milk	1150/675	140/132	2300
Romania	meat-milk	900/500	134/127	36000
South Africa	meat	1050/600	147/137	-
USA	meat	1100/650	-/-	26000

**Table 2: Number of Pinzgau cows in milk and beef performance**

Breeding year	Number of first lactations	Milk yield in first lactation	Total number of lactations	Average milk yield all lactations	Average number of finished lactations per cow	Percentage of cows in performance control	Number of cows in beef performance control	Number of purebred calves in beef performance control
2011/2012	525	4044	2299	4567	3,40	82.00	1071	623
2010/2011	607	3756	2564	4420	3,57	82.20	1943	608
2009/2010	584	3755	2865	4506	3,64	85.12	1589	569
2008/2009	807	4155	3978	4777	3,65	80.82	1490	492
2007/2008	762	4015	3798	4653	3,75	70.17	1628	673
2006/2007	926	3943	4553	4543	3,35	85.63	1853	883

(Breeding Services of Slovak Republic, state enterprise, Results of milking, beef and suckler cows performance control in Slovakia, 2008, 2009, 2010, 2011, 2012 and 2013)

## MATERIAL AND METHODS

Limousine breed was used as referential population for better description of results of Pinzgau cattle. Growth intensity and muscle thickness measured by ultrasound were determined on 39 Pinzgau and 37 Limousine heifers. All heifers were contemporaries came from the same herd and were kept in low input system in mountain region of Upper Orava in Slovakia.

Live weights were measured before second pasture seasons at average age of 21 months (W1), after second pasture season at average age of 26 months (W2) and before third pasture period at average age of 33 months (W3). Ultrasound measurements of *musculus longissimus thoracis et lumborum* at loins and *musculus gluteus* above rump (Polák *et al.*, 2001) were done on 21 months before first pasture season and before this date. Echocamera Aloka PS2 with UST 4403 probe, 3.5 MHz; 1720 mm was used for measuring muscle thickness. SAS 9.2. was used.

The age was selected due to the fact that growth ability and muscle thickness are minimally affected by gravidity in this age because heifers are just before first conception or only at very early stage of gravidity. Growth intensity was calculated for periods among W1, W2 and W3, respectively.

## RESULTS AND DISCUSSION

It is difficult to discuss our results with other authors, because Pinzgau cattle and its beef production has not been analysed, or existed results were obtained on bulls or steers growing under different conditions. Average muscle thickness measured by ultrasound in Pinzgau heifers group was 49.03 mm on loins and 91.74 at rump (Table 3). Both ultrasound measured values were significantly higher in Limousine heifers (12 mm in loin and 13 mm at rump). In our previous works (Polák *et al.*, 2004; Polák *et al.*, 2007) ultrasound measurements were obtained smaller. It can be due to the fact that in those studies 9 months young bulls or steers kept in extensive pastures in high latitude were used. Because of the fact that fat layers were higher in Pinzgau cattle, the portions of muscle layer from whole tissue layer were lower. W1, W2 and W3 were higher in Limousine group; the differences were 50.66, 55.33 and 37.37 kg, respectively. Average daily gain from birth to W1, W2 and W3 was significantly higher in Limousine heifers (Table 4). Due to lower weight gain increase in Limousine heifers for last two controlled periods average daily gain between WB and W2; W1 and W2 was higher in Pinzgau than in Limousine heifers.

**Table 3: Ultrasound measurements of Pinzgau and Limousine heifers**

Variable	Limousine	Pinzgau
Muscle thickness on rump	105.05	91.74
Whole tissue layer on rump	113.11	100.64
Muscle percentage from tissue layer on rump	92.85	91.15
Muscle thickness on loin	61.03	49.03
Whole tissue layer on loin	69.49	58.15
Muscle percentage from tissue layer on loins	87.74	84.28

**Table 4: Weights and average daily gains at different ages of Pinzgau and Limousine heifers**

	Limousine	Pinzgau
W1	442.51	391.85
W2	514.89	459.56
W3	588.22	550.85
ADG 1 – 2	458.38	452.56
ADG 1 – 3	402.95	424.36
ADG 2 – 3	360.03	406.23

## CONCLUSION

Since early 90's here is visible decreasing trend of Pinzgau cattle population in Slovakia. Milk production has been the most important trait in the majority of farms. Pinzgau cows were considered as non-sufficient in milk yield, what led to crossing with dairy breeds, most likely Red Holstein. Pinzgau is, however, suitable to very extensive production systems (low input) with using seasonal grazing of permanent pastures in mountain regions of Slovakia. Its walking ability, rusticality and overall robustness with milk production above 3500 kg from grazing let it to be appropriate to produce heavy weaners for later fattening in suckler cows production systems. This pilot study proved hypothesis that Pinzgau cattle has less musculature and high fat layer in hind part of the body. However, heifers of Pinzgau breed are able to growth rapidly in a certain period of their life, than their contemporaries from Limousine breed. Additional research is needed for better characteristics of beef production traits important for suckler cow's low input production system to create enhanced breeding protocol for Pinzgau breed.

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