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Effect of size of cows in a pasture-based production system on body weight-, body condition- and ketone body concentration changes during lactation

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Introduction

Pasture-based dairy production (block-calving in spring, exclusively pasture during summer, minimal amounts of concentrates at start of lactation) is a future strategy for a number of Swiss milk producers in a liberalized market. Compared to cows in countries with pasture-based milk production, Swiss dairy cows are big and bred for high milk yields. Is the cow type bred in Switzerland suitable for pasture-based milk production? If yes, which type has advantages, the small and light or the big and heavy cow type ?

Materials and Methods

In a 3-year trial, two herds of multiparous Red-Holstein-Simmental crossbred and Brown Swiss cows were formed: herd B consisted of 13 (2004: 14) large and heavy cows [726 ± 62 (mean ± SD) kg body weight (BW) of the cows having calved at turnout to pasture, 147 ± 3 cm withers height] and herd S of 16 smaller and lighter cows (558 ± 34 kg BW, 138 ± 3 cm withers height). Each herd had access to 5.8 ha pasture in a rotational system, so that the same overall stocking rate was obtained (1700 kg/ha).

Results

Table 1: Body weight changes between calving and nadir

year	Big, heavy type (B)	Small, light type (S)	significance
2003	- 183.9 ± 58.1	- 138.0 ± 26.1	*
2004	- 145.9 ± 19.2	- 127.1 ± 36.8	NS

In 2003 the cows of the light type (S – type) lost significantly less body weight compared to the cows of the heavy type (B – type). In 2004 there were no statistically significant differences between the two types.

Figure 1: Body weight of both herds during the years 2003 and 2004

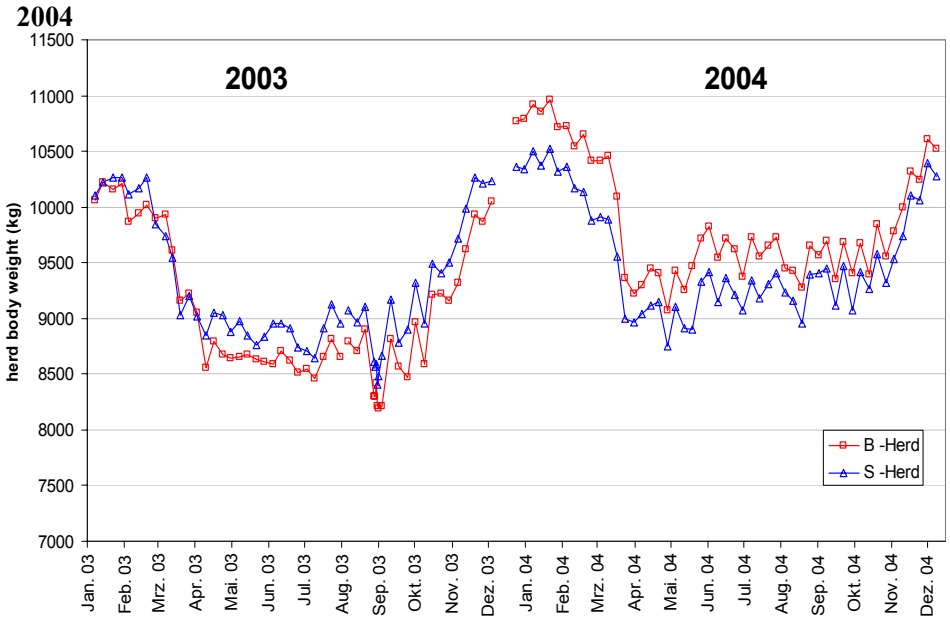
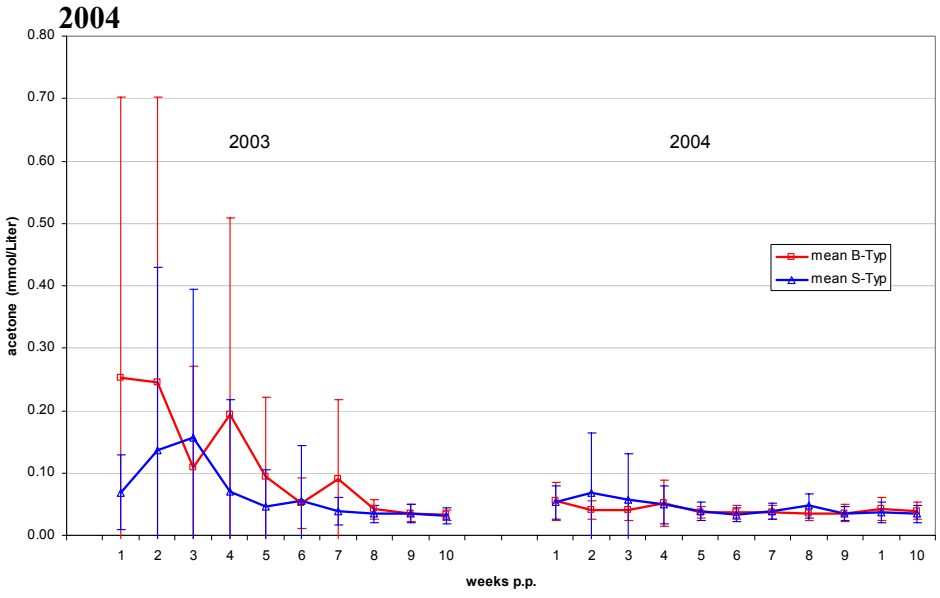


Figure 2: concentration of acetone in milk during the years 2003 and 2004



The changes in body weight of the two types of cows (figure 1) show that the light herd lost less body weight during both lactations despite higher milk yields (2003 + 9.1%, 2004 + 5.8%). Concentrations of acetone in milk were statistically not significantly different between the two herds (figure 2)

Conclusions

As practised in this trial both types of cows, the big and the small type of the Swiss breeds Red Holstein and Brown Swiss are suitable for pasture-based milk production with block–calving in spring. In both experimental years the small cows lost less body weight compared to the big cows even though the milk yield of the herd of the small cows was bigger. This indicates that the small herd converts the grass into milk more efficiently. The differences can be put down mainly to the fact that the herd of small cows ate more of the available biomass.