Productivity of Slovenian Alpine goat in the conventional and organic farming system

D. Kompan, M. Kastelic

University of Ljubljana
Slovenia

Sustainable farming system

Goat production can be considered as a valuable part of this

Furthermore, integration of livestock can increase economic and environmental benefits as well as diversity

thereby making important contributions to the farm's sustainability.

Goats can be used for the **control of weeds and bush** to help utilize a **pasture's diversity**, as long as they are n**ot allowed to overgraze**

Controlled grazing is to use livestock as a **tool** to manage forage growth.

Animals use up very few of the nutrients from the plants they eat; most minerals are returned in animal wastes and can be considered as part of a **natural cycling** of nutrients

This are some goals for rearing and breedeng of goat in small (hobby) herds

Many organizations have adopted goal statements that focus on achieving a sustainable future

Show a surprising degree of convergence around several key ideas:

- **Whole-systems thinking**- the integration of social, environmental, and economic forces, also known as the triple bottom-line;
- **Long term thinking**–understanding the consequences of actions over time, and preserving choices and opportunities for future generations;
- **Recognizing limits**–an acknowledgement that people, economies, and the entire life depend on healthy functioning ecosystems; and
- **Improved livelihoods**–a better “quality of life,” both today and for future generations.

Comparison cattle milk production organic vs conventional

- Some studies were done on dairy cattle and conclusions are maybe applicable also on dairy goats.
- Results are different from case to case. Nauta et al. (2006) found the production of **6,440 kg** of milk per cow and lactation in organic and **7,156 kg** milk in conventional management in the same geographic area.
- Farms which are in the phase of conversion from conventional to organic farming had an average production of **6,622 kg** per cow and lactation.

Comparison cattle milk production organic vs conventional

- The total production of **fat and proteins** per cow and lactation in **conventional production was larger** mostly because of larger milk production and not because of different milk composition. Toledo et al (2002) didn't find the differences between the milk composition in conventional and organic farming in Swedish conditions

The productivity of dairy goat reared in organic farming was not very widely studied

The aim of this study is to find out the differences between two production systems and if the special selection program for the organic farming is necessary

In Slovenia milk recording of goats **using A4** method was practiced in the years 1996 to 2002.

The **AT4** method has been used since 2003

Till the year 2000 there were no officially recognised organic goat farms in Slovenia

The selection procedure and the selection criteria do not differ between the organic and conventional farming system

Our research focuses on goat farms that have been included in selection programme since 1999 or before.

In 2002 the rural development programme was initiated, followed by the subsidies offered to certain kinds of sustainable agriculture, among them the ecological farming

In 2007 milk yield and milk composition were compared between the flocks of Alpine goats in **organic** and in **conventional** farming system.

Another comparative study was conducted **in 1999** when flock results were compared between those that stayed in the **conventional** system, and those that were **later changed** to **organic** farming

Model

$$Y_{ijklm} = T_i + F_{ij} + L_k + b\left(\bar{x} - x_{ijklm}\right) + e_{ijklm}$$

Where :

- Yijklm=ijklm-th observation of studied trait;
- Ti=i–th farming (conventional, organic);
- Fij=j-th farm (flock) nested in breed I;
- Lk=k-th lactation;b=regression coefficient xijklm=ijklm-th observation of lactation length
- eijklm=residual for observation ijklm.

	conventional				preorganic			
	n	mean	SD	CV	n	mean	SD	CV
year 1999								
lactation (days)	287	252,9	24,7	9,77%	131	246,6	33,4	13,53%
total milk (kg)	287	**541,7**	185,4	34,22%	131	**514,6**	228,6	44,42%
milked milk (kg)	287	419,0	170,0	40,56%	131	395,0	215,7	54,61%
fat (kg)	285	16,59	5,59	33,68%	130	15,80	6,77	42,83%
fat (%)	285	**3,10**	0,46	14,88%	130	**3,15**	0,51	16,25%
proteins (kg)	285	15,08	5,04	33,41%	130	14,67	6,61	45,03%
proteins (%)	285	2,80	0,25	9,02%	130	2,84	0,30	10,49%
lactose (kg)	285	22,86	7,83	34,24%	130	21,14	9,93	46,96%
lactose (%)	285	**4,23**	0,23	5,37%	130	**4,06**	0,31	7,71%
dry matter (%)	285	10,13	0,66	6,51%	130	10,05	0,83	8,29%

	conventional				organic			
	n	mean	SD	CV	n	mean	SD	CV
year 2007								
lactation (days)	240	242,9	19,7	8,11%	250	243,7	23,9	9,82%
total milk (kg)	240	**574,0**	180,9	31,52%	250	**502,5**	267,0	53,13%
milked milk (kg)	240	464,2	178,4	38,43%	250	402,5	267,0	66,33%
fat (kg)	239	18,54	6,06	32,68%	246	13,82	7,61	55,09%
fat (%)	239	**3,26**	0,56	17,17%	246	**2,77**	0,58	21,02%
Proteins (kg)	239	17,17	5,60	32,61%	246	14,69	7,88	53,63%
proteins (%)	239	3,00	0,36	11,96%	246	2,94	0,38	13,00%
lactose (kg)	239	24,87	8,19	32,92%	246	21,19	11,90	56,17%
lactose (%)	239	**4,31**	0,39	9,08%	246	**4,19**	0,43	10,25%
dry matter (%)	239	10,58	1,08	10,20%	246	9,90	1,13	11,39%

Analysis of variance

year 1999	p
lactose (%)	<0,0001
dry matter (%)	0,0172

Analysis of variance

year 2007	p
fat (kg)	<0,0001
fat (%)	<0,0001
dry matter (%)	0,0003

The **major variability** source was a **flock**, which had a statistically significant effect on **all** the studied **traits**

Different farming system (organic, conventional) statistically significantly affected only the percentage of fat and dry matter in 2007

The change to organic system was performed mostly by producers who already had poor production results beforehand.

The entry to organic system made the production method »formal«, although it had been practiced previously, but not formally yet

Conclusions

Composition of milk indicate that some traits such as **milk yield and milk fat content** are **lower in organic farming** system compared to the conventional one

Most parameters the differences are not significant

Apparently, even the conventional systems have low input (lower quantities of concentrates)

It is evident that mostly those farms with relatively extensive production decided to change to organic farming

According to our results we can conclude that the recording methods and breeding goals can be the same for both production systems

Therefore, the differentiation of selection index is not necessary

Thank you