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Milk production, milk components content and reproduction of cows in conventional (C) vs. ecological (E) system of farming

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Summary:
Presented results of cattle breeding implicated 2 periods of different way of farming – first way was conventional farming (C - from 1995 to 1999) and second way is ecological farming (E - from 2000 to 2004). Agriculture enterprise is situated in the 3rd and in protected level of Krkonoše National Park in altitude from 550 to 750 m. Farming area had 1432 ha in period K and pasture areas were fertilized with industrial fertilizers (2-3 q of NPK (12,19,19) and 1-2 q of superphospate per ha) with termination in 1993. Farming area had 1320 ha in period E. Fertilizing implicates dung-water (15 t per ha) and manure (8 t per ha). The average number of Czech Pied cows in the herd was from 167 to 174 in period K and from 164 to 174 in period E. Milk production amounted from 4219 to 4643 l of milk with 4.53% of fat and 3.26% of protein in period K and from 3796 to 4268 l of milk with 4.24% of fat and 3.30% of protein. The average of natality was from 93 to 110% in period K and from 92,6 to 101% in period E.

Introduction

The goal of present and future agriculture is to produce health food materials and foodstuffs, to maintain social and economic environment of countryside and to care of landscape to make a space for using of leisure time of increasing number of town populations.

All forms of ecological farming start from knowledges of in history tested technological procedures and they significantly support protection of landscape.

Material and methods

Research was performed in agriculture enterprises, which is situated in the 3rd and in protected level of Krkonoše National Park in altitude from 550 to 750 m. Presented results of cattle breeding implicated 2 periods of different way of farming – first way was conventional farming (C - from 1995 to 1999) and second way is ecological farming (E - from 2000 to 2004). Farming area had 1432 ha in period C and pasture areas were fertilized with industrial fertilizers (2-3 q of NPK (12,19,19) and 1-2 q of superphospate per ha) with termination in 1993. Farming area had 1320 ha in period E. Fertilizing implicates dung-water (15 t per ha) and manure (8 t per ha). The average number of Czech Pied cattle in the herd was from 277 to 312 heads and of this from 167 to 174 cows in period C and from 286 to 356 heads of cattle and of this from 163 to 174 cows in period E.
The average of air temperature is 5.6°C, during growing season, which is 138 days in average, is 11.9°C. The first vroste start from 23th September and 10th November, end of frost period is from 4th April to 2nd June.

Results

The average of daily milk yield was from 11.56 to 12.72 l in period C and from 10.40 to 11.59 l in period E. Total milk production was higher in period C than in period E – figure 1. Higher milk production about 5.62-18.94% was achieved in C farming period in summer months than in E farming. Similar trend of higher milk yield about 7.66-16.00% was determined in E farming period in summer months in relation to months of winter. Higher daily milk yield in C farming period was induced by higher using of industrial fertilizers (2-3 q NPK) and 1-2 q of superphospate per ha. About 10 ha of pasture was periodically recover by sowing of Trifolium pratense and Lolium perence. Fertilizing implicates dung-water (15 t per ha) and manure (8 t per ha) in E farming period. Content of milk fat was from 4.25 to 4.88%, content of milk protein from 3.20 to 3.33% and content of lactose from 4.73 to 4.80% in C farming period and in E farming period it was from 4.15 to 4.32% of fat, from 3.27 to 3.34% of protein and from 4.82 to 4.84% of laktose – figure 2.

Number of calves per 100 cows of basic herd is in figure 3. The effect of farming system (CxE) was not statistically significant. Low tendency of longer service period about 1-2 days was determined in E farming period. Calving interval was similar in both farming systems and is about 17 days (E) and 20 days (C) higher than national average for mountain areas of Czech republic.

Conclusion

Higher milk production about 620 kg in lactation was determined in C farming period in 1998 in relation to national results of Milking recording system. Milk production declined during E farmig period by 2107 kg of milk in relation to national results of Milking recording system, while cow reproduction did not change under ecological farming. Reserves exist in care about pasture and feed components conservation for winter period. New problem started in E farming period, invasion of Rumex obtusifalius, Rumex crispus, and Rumex alpinus to pastures.

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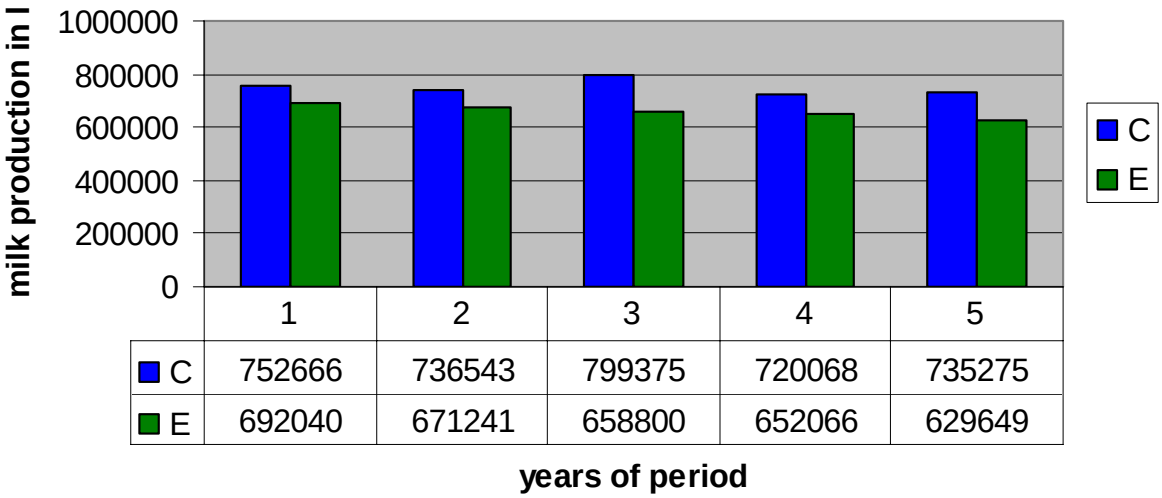
Figure 1: Comparison of total milk production in periods of conventional (C) and ecological farming (E)



	1	2	3	4	5
C	752666	736543	799375	720068	735275
E	692040	671241	658800	652066	629649

Figure 2 : Comparison of milk components content in milk in periods of conventional () and ecological (E farming

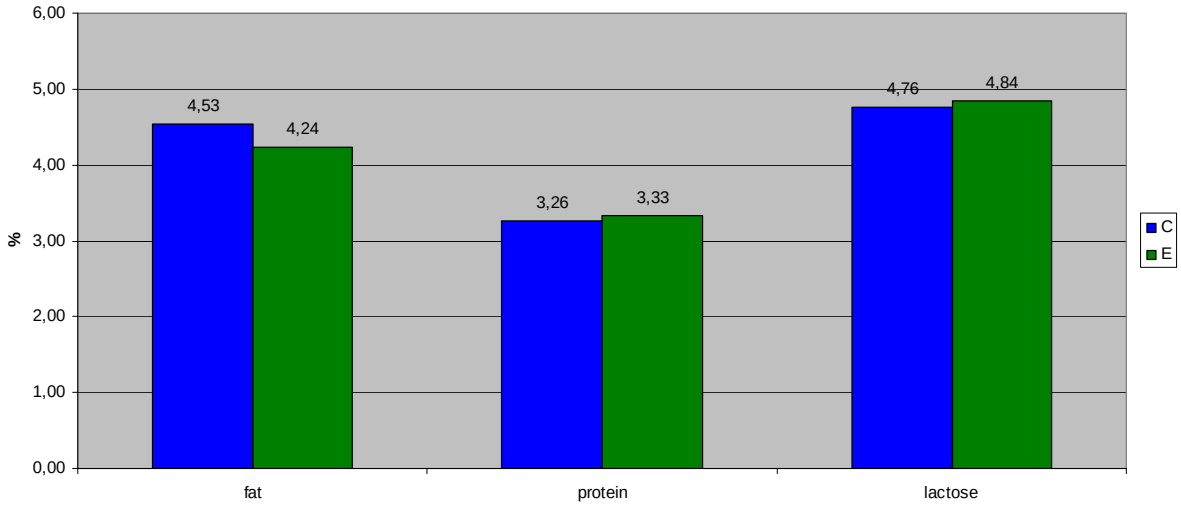
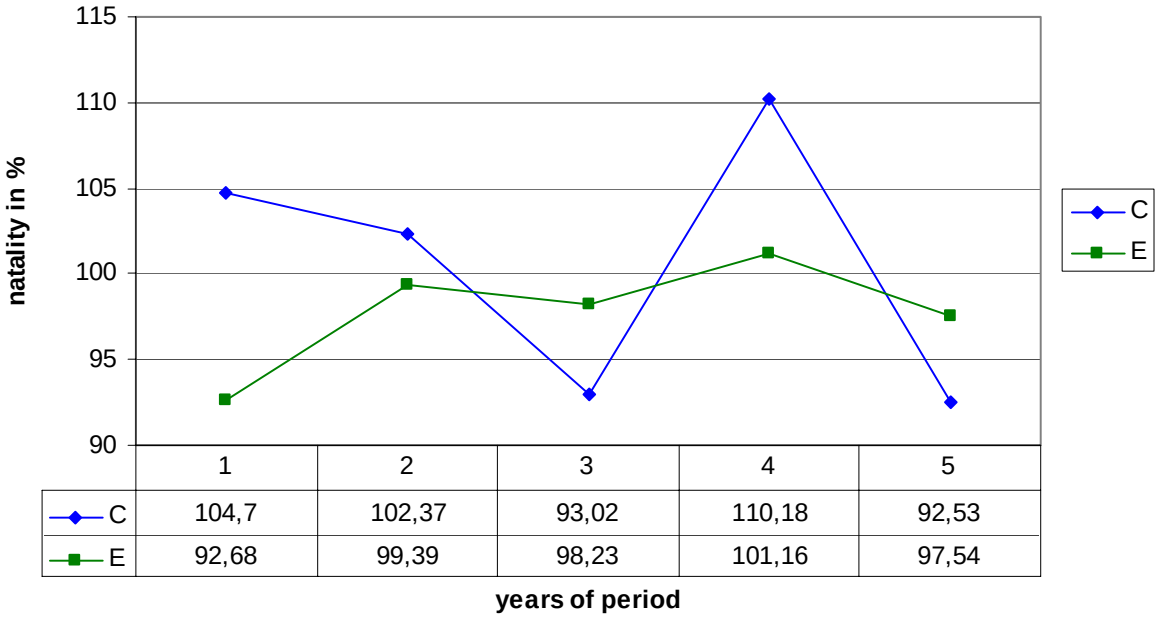


Figure 3: Comparing of cow´s natality in % in periods of conventional (C) and ecological (E) farming



	1	2	3	4	5
C	104,7	102,37	93,02	110,18	92,53
E	92,68	99,39	98,23	101,16	97,54

years of period