Incidence of Subclinical Mastitis on the Farms with Various Number of Cows*

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Summary

Incidence of subclinical mastitis on the farms with various number of cows has been investigated. The 1209 milk samples from individual farmers from 42 West Slavonija villages were collected in the 1998.

The arithmetic mean of bulk milk SCC was 518 000 cells/ml indicating that the cows udder health was generally poor. The geometric mean bulk milk SCC was 219 000 cells/ml. In the case of farmers possesing three or four cows as well as those with more than four cows a higher somatic cell count (SCC) compared to farmers possesing one or two cows ($P<0.001$) was ditected. One third of the farmers were delivering hygienically unsatisfactory milk with more than 400 000 cells/ml. By increasing the milk production per farm SCC and incidence of subclinical mastitis per farm increased as well. Introduction of the SCC in the raw milk payment and proper preventive control will obstruct the SCC increment in the milk with the increased number of cows and milk production per farm.

Key words: somatic cell count, herd size, Croatia

Introduction

Subclinical mastitis is the major disease of present day dairy herds, causing losses both on the farms and dairy plants (Reneaul et al., 1983; Schutz, 1994.). Economical losses due to mastitis reduced milk production per cow (Bartlett, 1990; Žitny et al., 1995.), treatment and culling of cows (Poso and Mantysaare, 1996.). Changes in the chemical composition of milk impair processing properties of milk (Kitchen, 1981; Žitny et al, 1995.). Somatic cell count (SCC) is an important indicator of herd management, and allows monitoring of both udder health and subclinical mastitis, and elimination of chronic mastitis (Danuser, 1991; Pengov and Zadnik, 1993.). Therefore many European countries introduce a SCC, as indicator of subclinical mastitis, in the

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payment of row milk (Hurst, 1993.). Milk with more than 400 000 cells/ml is hygienically unacceptable and is rejected by the dairies (Meaney, 1989.).

Our preliminary investigation showed that SCC in the milk from individual farmers in Croatia is on a very high level. At least one third of the farmers supplied milk with more then 400 000 cells/ml. The reason for this is in fact that milk is not paid according to hygienic quality and SCC (Kalit and Havranek, 1998.).

The production of milk in Croatia is quite extensive and many farmers increased the number of dairy cows in quite a short time. The aim of this report is to investigate the incidence of subclinical mastitis on the farms with various number of cows, and to find out if the herd size had an influence on incidence of subclinical mastitis on the farm.

Materials and methods

The 1209 bulk milk samples from individual farmers in 42 West Slavonija villages were taken in the year 1998. The samples were collected from the morning milking. Each farmer provided an information an number of cows in lactation, the way of milking (by hand or machine) and the time of sampling. Samples were preserved with bronopol at concentration of 200 mg/l and sent to the laboratory. Somatic cell count determination was performed using Fossomatic 90 in the Dairy Department, Faculty of Agriculture in Zagreb.

Concerning the number of cows, farmers were divided into three groups. The first group included farmers with one or two cows, the second group farmers with three or four cows, and the third group farmers with five or more cows in lactation. In the first group, nearly all the farmers milked cows by hands. In the second group, many farmers used milking machines. In the third group nearly all farmers used milking machine.

Bulk milk SCC values were transformed as follow: $\log_e (Y + 10)$ where Y = bulk milk SCC value (Ali and School, 1980.). One of the factors of analysis of variance, with transformed value of SCC as variable, was used to determine the differences in SCC values between groups of farmers with the various numbers of cows using SAS (1989.) statistical program.

Results and discussion

Dairy farmers in Croatia progressively increase the production of milk. But our investigation has showed that we still have many farmers with one or two cows (Table 1.). At the same time there are farmers with more then 40 cows (3.89%). Great percentage of farmers with one or two cows (45.24%) is the

indicator of the extensive production of milk in Croatia. The average milk production per farmer was 69 kg/day.

Overall arithmetic mean of bulk milk SCC was 518 000 cells/ml indicating that the cows udder health was generally poor. Overall geometric mean of bulk milk SCC was 219 000 cells/ml. In order to improve this situation it is necessary to introduce bulk milk SCC in the scheme for payment of milk (Hurst, 1993.).

One of the factors of the analysis of variance has showed that there is a significant differences in SCC between farmers with more than 4 cows and farmers with 1-2 cows. There were significant differences between farmers with 3-4 cows and farmers with 1-2 cows, as well. There was no significant difference between the farmers with 3-4 cows and the farms with more than 4 cows (Table 1.).

Table 1: Percentage of farmers according to herd size and means of transformed somatic cell count of bulk milk from individual farmer ($\bar{x}$)

Tablica 1: Postotak proizvođača s obzirom na veličinu stada i transformirane srednje vrijednosti broja somatskih stanica skupnog mlijeka individualnih proizvođača ($\bar{x}$)

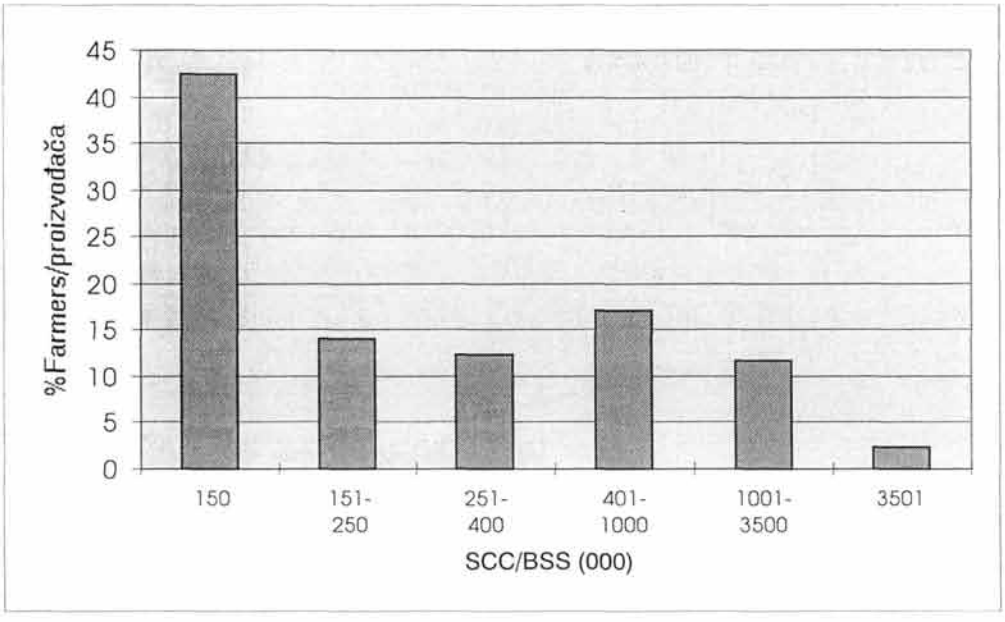
Herd size Veličina stada	n	% of farmers % proizvođača	$\bar{x}$
1-2 cow(s) 1-2 krave	547	45.24	5.172[a]
3-4 cows 3-4 krave	280	23.16	5.547[b]
>4 cows >4 krave	382	31.60	5.573[b]
Total Ukupno	1209	100	5.398

The means within the same column not sharing the same letter are different ($P<0.001$)
Srednje vrijednosti iste kolone koje nemaju isti natpis se razlikuju ($P<0,001$)

In order to determine the percentage of the farmers providing hygienically unacceptable milk samples (more than 400 000 cells/ml) (Mijovič et al, 1996), all farmers were divided in different groups according to the bulk milk SCC (Figure 1.)

One third (30.86%) of the farmers supplied milk with more then 400 000 cells/ml. This data confirmed previous investigation (Kalit and Havranek, 1998.). The percentage of farmers who produce more than 55 l milk per day was 15.47%. 40.2% of these farmers were delivering unacceptable milk with more than 400 000 cells/ml. The increase of herd size increased bulk milk SCC and the incidence of subclinical mastitis. This is in a good agreement with Harman, (1992.) data. The reason for this could be the installation of milking equipment (Zecconi, 1988.) and increased possibility for a new infection from cow to cow

Figure 1: Percentage of farmers divided in various group according SCC
Slika 1: Postotak proizvođača po grupama prema broju somatskih stanica (BSS)



on the farm with higher number of cows (Hanus and Tichacek, 1997.; Rupić, 1988.). It is well known that good milking machine function and good hygiene must be maintained for the production of milk with lower bulk milk SCC (Lee et al., 1993.). Postmilking teat dipping and total dry cow treatment are important to prevent new infection in the herd (Erskine, 1992.). Further investigation is necessary in order to check how these parameters are spread within various herds size in Croatian milk production circumstances.

Conclusion

By increasing the herd size bulk milk SCC increased as well. Introduction of the SCC in the raw milk payment and proper preventive control will obstruct an increasing SCC in the milk, and incidence of subclinical mastitis with the increased herd size and milk production per farm.

OTKRIVANJE SUPKLINIČKOG MASTITISA NA FARMAMA S RAZLIČITIM BROJEM KRAVA

Sažetak

Istražena je pojava supkliničkog mastitisa na farmama s različitim brojem krava. Sakupljeno je 1209 uzoraka mlijeka individualnih proizvođača u 42 sela zapadne Slavonije tijekom proljeća 1998. godine.

Aritmetička srednja vrijednost broja somatskih stanica (BSS) je bila 518 000 stanica/ml, što ukazuje na općenito loše zdravstveno stanje vimena krava. Geometrijska srednja vrijednost BSS je bila 219 000 stanica/ml. Proizvođači s tri ili četiri krave, kao i proizvođači s više od četiri krave su imali veći BSS u odnosu na proizvođače s jednom ili dvije krave ($P<0,001$). Jedna trećina proizvođača predaju higijenski nezadovoljavajuće mlijeko s više od 400 000 stanica/ml. Povećanje proizvodnje mlijeka po farmi povećava BSS i pojavu supkliničkog mastitisa u uzgoju. Uvođenje BSS u cijenu plaćanja sirovog mlijeka i odgovarajuće kontrolno-preventivne mjere su čimbenici koji će spriječiti povećanje BSS u mlijeku s povećanjem broja krava i proizvodnje mlijeka na farmama.

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