CATTL E PRODUCTION – PR CHINA AND REPUBLIC OF SERBIA

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Review paper

Abstract: The paper presents data on the cattle industry in the People's Republic of China and the Republic of Serbia. China is the third largest dairy producing country and the third largest beef producing country in the world. In 2011, the dairy cow population in China was 14.4 million. Chinese dairy breed is mainly obtained by grading hybridization from Holstein, Simmental, etc. which were introduced from foreign countries, and local cattle breeds for long time to form the offspring with stable genetic characteristics. Currently, the dairy breeds cultured in China mainly include Chinese Holstein, Chinese Simmental, dairy buffalo, Brown cattle, Sanhe cattle, etc. Chinese Holstein accounts for about 80% of the total dairy cattle. From 2000 to 2007, Chinese beef production has always been in a rapid growth phase, with an increase from 5.054 million tons to 6.134 million tons, reached a historical highest level of 6.355 million tons in 2009, but rapidly declined since 2009, and dropped to 5 million tons in 2011. In addition, the amounts of reproduction cow and beef cattle in stock were also declined. In 2011, there were about 32.7 million beef cattle slaughtered, and the beef cattle population was about 80 million at the end of 2011, the beef carcass yield was about 5.5 million tons, the national average carcass weight was 201.5kg/cow, and the production value of beef cattle was about 200.75 billion Yuan. Currently, the amount of reproduction cow in stock declined sharply; the contradiction between the lack of cattle resource and the continued growth of beef consumption is more and more serious. Chinese dairy farming is mainly concentrated in the North, Northeast and Northwest of China, the dairy cows population in Inner Mongolia, Xinjiang, Heilongjiang and Hebei account for 60% of the total population in China; the beef cattle is mainly concentrated in rural areas as Henan, Shandong and Hebei provinces, accounting for 80% of the national amount of slaughtered beef cattle. In recent years, the superior regions of beef cattle breeding have been gradually shifted towards north and southwest. The beef cattle industry in Heilongjiang
Province, Sichuan Province, Yunnan Province and Guizhou Province has been developed rapidly. The beef cattle breeding in pastoral areas are mainly concentrated in Inner Mongolia, Xinjiang and Gansu province. Cattle production is important branch of livestock production in Republic of Serbia. Current situation in cattle production is not satisfactory in regard to the production per head and number of heads which has been constantly decreasing in recent years. Based on official statistical data, current situation in cattle production is considered as unfavourable (Bureau of Statistics of Republic of Serbia). Number of cattle in 2011 was 936,000 heads and constantly decreasing over the last 11 years. In this period, number of cattle is reduced by 18%, and number of cows and pregnant heifers by 14%. Data on number and categories of cattle also indicate considerable reduction, so category of cattle at the age of 1 to 2 years has been reduced by 24.5%, and number of calves by 29.2%. Production of cow milk is relatively steady. In 2011 milk production was 1,434,000 liters. This can be explained by increased production of milk per cow. Genetic progress in milk traits was achieved by utilization of progeny tested bulls on milk and increased scope of artificial insemination of cows and heifers. Production of meat is in constant decrease which is consequence of reduction of total number of cattle as well as insufficient number of slaughterhouses with EU certificate. Meat production in 2011 was 81,000 t. Our country, although without developed cattle breeding, has been traditional exporter of beef, meat products and fattening young cattle into many countries, even the most developed ones, for instance Italy and Greece. Export of beef was in expansion prior to Italy (1974) and Greece (1980) entering the EEC. For instance, in year 1974, we exported 50,500 t annually on Italian market, i.e. in 1980 51,310 t and there were 24 registered slaughterhouses with EEC certificate. Today, there are only a few slaughterhouses with EU certificate, and approved export quota of close to 8,000 t of beef we cannot realize. Total production of milk is 1,434,000 l. Cattle production is expected to provide high quality products for export, primarily beef and quality cheeses with defined origin and quality.

**Key words:** Cattle breeding, milk production, meat production, the National Republic China, the Republic of Serbia

**Introduction**

In 2011, the grain plant area of the People's Republic of China reached 110.57 million hectares. The total land area of the People's Republic of China is 9.6 million square kilometres, per capita arable land area was 0.085 ha. China is a large agricultural country and owns more than 900 million farmers. In 2011, agricultural output accounted for 10.12% of the total value of national economic output, animal husbandry accounted for 33% of the total agricultural output value, the beef cattle
industry accounted for 19.8% of the total value of livestock product, which was ranked the third place behind the pigs and poultry industry.

In 1970s-1980s, with the economic development and the improvement of living standards of the majority of residents in China, the draft cattle has exited the stage of history, and the dairy industry and beef cattle industry have been gradually arisen, especially in the late of 1990s, the dairy industry and beef cattle industry obtained rapid development and steady improvement in industrial efficiency. Currently, China is the third largest dairy producing country and the third largest beef producing country in the world. The effects of cattle industry on the development of rural economy, increasing farmers’ income and improving the living standards of urban and rural residents have become increasingly prominent.

The Republic of Serbia has 5.1 million ha of agricultural land, 4.2 million ha of arable land and fields and 0.83 million ha grassland, approx. 0.6 ha of agricultural and 0.5 ha of arable land per capita. The quality of soil is best in low lands and moderately good in hilly and mountain regions.

Over 700,000 households are engaged in livestock production, which is over 55% of total number of households, and it is important branch of economy which participates in the gross domestic product with 42%. Livestock production provides necessary products (milk, meat, eggs) for nutrition of domestic population. Also, livestock production provides raw materials for food industry (dairy plants, slaughterhouses, meat industry, conditory industry and leather industry). Livestock production is expected to provide high quality products for export, primarily beef and lamb meat. Chance/opportunity for export exists also for cheeses of high quality (especially sheep and goat cheeses) of defined origin and quality.

Republic of Serbia will in its near future become member of European Union (EU) and World Trade Organization (WTO), which means that livestock production should prepare for competition on unique developed market, without any state trade barriers. Serbia has been preparing for this since 2006 when it signed bilateral agreement on free trade with neighbouring countries - Central European Free Trade Agreement (CEFTA) and in this way became part of the market and accepted the competition rules on the free market. Accession to EU and WTO includes liberalization of trade in livestock products, low possibility for import protection, implementation of quality standards (HACCP; ISO, Global GAP), reduction of the level of domestic support, discontinuing of export subsidies, increase of profitability and ability to be competitive on the international market.

Cattle production is important branch of livestock production in Republic of Serbia. Current situation in cattle production is not satisfactory in regard to the production per head and number of heads which has been constantly decreasing in recent years (Aleksić et al., 1997). Our country, although without developed cattle breeding, has been traditional exporter of beef, meat products and fattening young cattle.
cattle into many countries, even the most developed ones, for instance Italy and Greece. Export of beef was in expansion prior to Italy (1974) and Greece (1980) entering the EEC. For instance, in year 1974, we exported 50,500 t annually on Italian market, i.e. in 1980 51,310 t (Aleksić et al., 2005) and there were 24 registered slaughterhouses with EEC certificate. Today, there are only a few slaughterhouses with EU certificate, and approved export quota of close to 8,000 t of beef we cannot realize. Total production of milk is 1,602,000,000 l. Cattle production is expected to provide high quality products for export, primarily beef and quality cheeses with defined origin and quality.

**Cattle production in Republic of Serbia**

Based on official statistical data, current situation in cattle production is considered as unfavourable (Bureau of Statistics of Republic of Serbia). Number of cattle in 2011 was 936,000 heads and constantly decreasing over the last 11 years. In this period, number of cattle is reduced by 18%, and number of cows and pregnant heifers by 14%. Data on number and categories of cattle also indicate considerable reduction, so category of cattle at the age of 1 to 2 years has been reduced by 24.5%, and number of calves by 29.2%.

Production of cow milk is relatively steadily. In 2011 milk production was 1,434,000 liters. This can be explained by increased production of milk per cow. Genetic progress in milk traits was achieved by utilization of progeny tested bulls on milk and increased scope of artificial insemination of cows and heifers.

Production of meat is in constant decrease which is consequence of reduction of total number of cattle as well as insufficient number of slaughterhouses with EU certificate. Meat production in 2011 was 81,000 t.

**Race composition:**

Cattle breeding: Dominant races are Domestic Spotted and Simmental cattle, participating by about 70% in total number, then crossbreds of Domestic Spotted and Simmental and Busha cattle participating with about 25%, and about 5% goes to Black and Red-White cattle of European White-Black and Holstein races. Breeding of animals of combined production capacities on small farms in a small number corresponds to various and moderately intensive conditions which are dominant on these farms. Production capacities of animals are varied, from weak and moderate to good in smaller number of farms. The cattle quality is improved in farms which use quality bulls and insemination. Production capacities of cattle are not completely used, both for milk and meat, because of a number of limitations and weaknesses either in production or in the placement of final products (Petrović et al., 2003).
Future directions of development of cattle production in Republic of Serbia:

Because of the natural resources, soil, climate and water, cattle production and its development have great potential in total livestock production. Over 700,000 farms are engaged in this production which is 55% of total number of agricultural households/farms in Republic of Serbia. Future development of cattle production should be based on organization of sustainable and efficient cattle production which can be competitive on other markets, and contribute to increase of profitability, providing of food of animal origin, and satisfy the consumer demand in regard to food safety and quality, and is in function of environment protection.

Developed countries are facing the trend of increase of food production, and at the same time population of consumers is decreasing, which is reflected on the market as permanent lowering of prices. Starting from the current situation in cattle production, and on basis of previous practice, domestic and international, and development of cattle breeding, fast and efficient transformation of cattle production is necessary, enlargement of agricultural farms and forming of specialized farmers for production of meat and milk.

Farms (farmers) specializing in milk production:

Specialized farms for milk production have one objective – production of milk complying with standards relating to % of milk fat, % of milk proteins and especially relating to bacterial suitability of milk. Systems of certification and registration which would increase the product value should be introduced on specialized farms (Petrović et al., 2002, 2003). Milk produced in this way can have added value on the market through special dairy products (hard cheeses, semi hard cheeses, white-soft cheeses and milk beverages). The only remaining is the issue of small scale farmers with 15 l or less delivered milk daily, which are over 57% of total delivered milk. These are mainly old households which need to be integrated into system of specialized farms.

Farms (farmers) specializing in meat production:

Specialized farms for production of meat have objective – production of beef for domestic market and export. Future of export of Serbian meat is first of all in production of beef of high quality and complying with standards of specific market. In our country, recently, a need for fast improvement of production of meat from Domestic Spotted cattle is present. In order to improve the quality of calves for fattening beside semen of Simmental bulls for insemination of cows and heifers, also semen of French fattening bulls, Charolais and Limousine should be used (Miščević et al.,1997, 2000). Based on research results, crosses of F1 generation exhibited positive effects in regard to gain (Čobić et al., 1990; Aleksić et al., 1995, 1998; Augustini et al., 1989), carcass quality (Aleksić et al., 1998; Čepin, 2001) and meat quality (Nosal et al., 1992; Aleksić et al., 2001, 2002).
In this sense and based on our previous experiences and practice in production of beef for known buyers and according to their demand, there are three groups:

1. **Export to traditional Italian markets:**
   Italian market demands top quality of beef. Especially the most developed region of Italy – Toscana, where meat of so called "baby beef" quality is demanded. That is meat originating from cattle of age up to one year and average live body mass of 450 kg for males, and 400 kg for heifers. Consumers are especially interested in meat of "baby beef" quality originating from high quality female cattle (Aleksić et al., 2005). In regard to the quality of meat light pink colour is demanded, equal marbling and fat tissue of white to light yellow colour. Also, in regard to processing, so called »Milan cut« is in demand, and cut quarters. Flat cut quarters can be marketed only in limited quantities, which further confirms the choosiness of this market.

2. **Export to traditional markets in Greece:**
   Greek market as traditional importer of our meat demands meat obtained by slaughtering bulls of over 500 kg of live body mass and carcass weight of over 250 kg. In regard to processing, flat cut quarters or carcasses are demanded. In regard to quality, there is demand for carcasses of good conformation and covering with fat tissue (Aleksić et al.,1999, 2005).

3. **Other markets:**
   Other markets include marketing of young beef and beef first of all on markets of former Yugoslav republics and Near and Middle East countries. Demands of these markets relate to necessary traditional-religious slaughtering methods (Aleksić et al., 2005).

   Today, also, there is great interest of our farmers and slaughter industry to return to markets of EU countries, but serious obstacle is still no application of EU Regulations relating to conditions of livestock rearing on farms, transport and depot conditions, as well as slaughtering method.

**Cattle production in PR China**

**Breeds:**
Chinese dairy breed is mainly obtained by grading hybridization from Holstein, Simmental, etc. which were introduced from foreign countries, and local cattle breeds for long time to form the offspring with stable genetic characteristics. Currently, the dairy breeds cultured in China mainly include Chinese Holstein, Chinese Simmental, dairy buffalo, Brown cattle, Sanhe cattle, etc. Chinese Holstein accounts for about 80% of the total dairy cattle (Shengli, 2011).
The well-known local breeds of Chinese yellow cattle include Qinhuandao cattle, Nanyang cattle, Luxi cattle, Yanbian cattle and Jinnan cattle, known as “China’s Five Fine Breeds of Yellow Cattle” and also the major beef cattle breeds in China. Currently, the majority of Chinese yellow cattle breeds are crossbreeds improved by the introduced specialized beef breeds as Charolais, Limousin, Angus, Simmental; the breeds cultivated in China include the dual-purposes breeds of Chinese Simmental, Xinjiang Brown cattle, Red Steppe Cattle, Sanhe cattle, etc., and three specialized beef cattle breeds of Xianan cattle, Yanhuang cattle, Liaoyubai cattle (Yinghan et al., 2002).

Compared with the excellent beef cattle breed in foreign countries, the original cattle breeds in China are with the shortcomings of smaller body, slower growth, stunted hindquarters and lower rate of production of meat, etc. Therefore, people often use crossbreeding specialized strain to produce beef cattle, i.e. use two or more varieties of hybrid to produce commercial beef cattle and raise beef cattle production efficiency and economic benefits through heterosis.

Cattle population and slaughtered amount as well as the output of cow’s milk and beef:

In 2011, the dairy cow population in China was 14.4 million; the output of milk products was 38.1 million RMB. There were a total of 716 dairy processing enterprises in China, reducing by nearly half compared to 2008, and the processing concentration ratio had been improved; there were 13,000 milk stations across the country which run with business license, nearly 8,000 vehicles transported raw milk with permits, agriculture departments had implemented raw milk quality and safety monitoring plan for four consecutive years, which allows the national level of quality and safety of raw milk substantially increased.

From 2000 to 2007, Chinese beef production has always been in a rapid growth phase, with an increase from 5.054 million tons to 6.134 million tons, reached a historical highest level of 6.355 million tons in 2009, but rapidly declined since 2009, and dropped to 5 million tons in 2011. In addition, the amounts of reproduction cow and beef cattle in stock were also declined. In 2011, there were about 32.7 million beef cattle slaughtered, and the beef cattle population was about 80 million at the end of 2011, the beef carcass yield was about 5.5 million tons, the national average carcass weight was 201.5kg/cow, and the production value of beef cattle was about 200.75 billion Yuan. Currently, the amount of reproduction cow in stock declined sharply; the contradiction between the lack of cattle resource and the continued growth of beef consumption is more and more serious (Binghai, 2011, 2012).

Production technology:

In aspects of dairy cattle, the frozen semen breeding technology has been widely used since the first application in the 1960s; the application area of dairy
cow sexed frozen semen technology has also been gradually expanded, in which the female calving rate reached 95% or more; it has begun to implement dairy cow production performance measurement and variety registered work as well as bull joint descendants determination and genetic assessment; dairy cow whole genome technology platform has been built to carry out the genetic assessment of young bulls; the application of corn silage and alfalfa has been extended gradually in dairy farming production.

It has formulated and promulgated a series of industrial feeding and management technology standards, including NY/T 34-2004 Dairy Farming Standard and NY/T 815-2004 Beef Cattle Feeding Standard, etc.

**Industrial layout:**

Chinese dairy farming is mainly concentrated in the North, Northeast and Northwest of China, the dairy cows population in Inner Mongolia, Xinjiang, Heilongjiang and Hebei account for 60% of the total population in China; the beef cattle is mainly concentrated in rural areas as Henan, Shandong and Hebei provinces, accounting for 80% of the national amount of slaughtered beef cattle. In recent years, the superior regions of beef cattle breeding have been gradually shifted towards north and southwest. The beef cattle industry in Heilongjiang Province, Sichuan Province, Yunnan Province and Guizhou Province has been developed rapidly. The beef cattle breeding in pastoral areas are mainly concentrated in Inner Mongolia, Xinjiang and Gansu province (Fanzhen, 2004).

**Product processing:**

According to data released by the National Bureau of Statistics of China, the national milk output was 36.56 million tons in 2011, with an increase of 2.2% compared to 2010. Dairy industry situation was significantly better than the dairy breeding industry, and the rate of increase of liquid milk, dried dairy products and milk powder were greatly higher than the rate of increase of raw milk. The liquid milk production was more than 20 million tons in 2011; the dried dairy production was 3.267 million tons; milk power production was 1.385 tons; the national total output of dairy products was 23.87 million tons.

Currently, beef slaughter and processing aspects mainly consist of two parts. One is the standardized (modern) processing chain of middle and high-end value controlled by the core slaughtering enterprises to produce middle and high-end beef products. The products include chilled meat, frozen meat and meat products, which are packed according to classification to meet the middle and high-end domestic demand. Some products are exported, and the well-known brands include Jilin Haoyue, Inner Mongolia Khorchin, Dalian Xuelong, Shanxi Qinbao, Yu Xiang Yuan and Fucheng companies, etc. Another part is the small-scale slaughter house, assuming about 2/3 of national beef cattle slaughter capacity (Linfeng et al. 2004). These small-scale slaughter houses are with poor equipment, manual
slaughter, backward production technology, poor sanitary conditions. They mainly produce room temperature meat and the subjects of sales were mainly targeted at medium-low income groups, the prices of slaughtered beef were less than 2/3 of the meat from standardized slaughtering and processing enterprises. In 2010, there were 206 beef cattle slaughtering enterprises with over 6000 annual scale of slaughter, the total designed annual slaughter amount was about 8 (7.98) million. The actual slaughtering amount was 2.84 million cattle in 2010 and the operating rate was 35.6%.(Yinghan et al., 2002).

Regardless of dairy industry and beef cattle industry, there is great potential for integration in processing industry.

**Market consumption:**

According to customs statistics, in 2011, the national dairy imports amount was increased to 2.689 billion RMB from 1.995 billion RMB of last year. Of which, the import value was 2.62 billion U.S. dollars; exports amount was 69 million U.S. dollars. The import amount of dairy products, which continued to hold the dominant position, accounted for 97.4% of the total import and export trade volume. From a trade point of view, the import and export volume of dried dairy products was 880,000 tons. The import amount of dried dairy accounted for 98% of the total import and export trade volume. Therefore, China’s dairy trade volume can basically meet the domestic market demand. In recent years, China has also rapidly become a major importer of milk powder. At present, China’s milk powder trade volume has accounted for 1/10 of the global trade volume. China is the largest destination of New Zealand dairy products now.

In 2011, China imported 20,089.7 tons of beef, with value of 94.884 million U.S. dollar and average import price of 4723.0 U.S. dollar/ton. In 2011, the beef production in China was 5.5 million tons, with export volume of 21,979.1 tons, 119.593 million U.S. dollars of export value and 5,441.2 U.S. dollars/ ton of average price. The major export destination was Hong Kong in China, Jordan and Kuwait and other countries and regions. The main export provinces in China include Jilin Province, Henan Province, Inner Mongolia, Shandong Province and Liaoning Province, etc. According to information released by the Certification and Accreditation Administration of the People’s Republic of China, there are 101 registered foreign beef production and processing enterprises in China now. In other words, only the beef of these enterprises can enter the Chinese market. The major importing countries mainly include Australia, New Zealand, Brazil, Argentina and Uruguay. Overall, most of the beef in China is used for domestic consumption and import and export volumes of beef account for a lower proportion of the domestic beef output (Liufang 2002).

At present, Chinese consumption of dairy products and beef is showing a rising trend. National per capita consumption of dairy products is 28 kg, per capita consumption level of urban residents is much higher than that of rural residents.
The major consumption varieties include liquid milk, milk powder and yoghurt, of which the sales of liquid milk show the trend of increasing year by year and brand-name products account for a large proportion. The consumption amount of cheese, butter and condensed milk is still less, per capita consumption of dairy products is equivalent to only 1/4 of the world average level, 1/12 of developed countries, so there is a huge market space in China. Beef is mainly consumed by outdoors and family consumption, but the per capita consumption level is low, about 4.1 kg/a (2011), which is far lower than the level in countries of developed beef cattle industry at last century (such as. the United States 44.1 kg/a, Canada 39.2 kg/a).

**Main development trend of Chinese cattle industry:**

1. **Breeding and production tend to standardization:**
   The proportion of fine breeds is increased; feeding and management technology is further improved, and the level of animal welfare is enhanced, the dung and sewage is utilized scientifically, clean and low-carbon production is achieved, intensification level is enhanced, the breed production is transformed from the growth in the number to the increase in quality and economic returns.

2. **Processing enterprises tend to collectivization:**
   The pace of industry consolidation and alliance is accelerated and the industry concentration ratio is increased. It strides forward to large group and large brand. The products are becoming high-quality, serialization and diversification. It has gradually formed industrial accumulation area and accumulation zone, and the industrial management becomes the industrial development direction.

3. **Industrial organization tends to integration:**
   The cooperation between processing enterprises, industry associations (intermediary organizations), specialized cooperatives and base farms is further strengthened. The distribution of profits of the industry chain is gradually rationalized. The collaboration between government, industry, academia, research and associations is closer and the market information technology applications are further increased.

4. **Market sales tend to expansion:**
   With the increase of population, acceleration of urban and rural construction, improvement of household consumption level, especially the increasing expansion of the vast rural consumer groups, the sales of dairy and beef products are increased continuously, and the proportion of them in the dietary structure is gradually increased Yuejie 2011).
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Govedarska proizvodnja – NR Kina i Republika Srbija


Rezime

Šandong i Hebei, i predstavljaju 80% ukupno zaklanih grla goveda na nacionalnom nivou. Zadnjih godina, regioni koji su nadmoćni sa stanovišta proizvodnje tovnih junadi se postepeno pomeraju ka severu i jugo-zapadu. Proizvodnja tovnih junadi u provincijama Heilongjiang, Sićuan, Junan i Guizhou se razvija velika brzinom. Proizvodnja tovnih junadi u pašnjačkim regionima je koncentrisana u unutrašnjoj Mongoliji, provincijama Xinjiang i Gansu.

Govedarstvo je važna grana stočarstva u Republici Srbiji. Trenutno stanje u govedarstvu nije zadovoljavajuće sa stanovišta proizvodnje po grlu i broju grla koji je u stalnom padu zadnjih godina. Na osnovu zvaničnih statističkih podataka, trenutno stanje u govedarstvu se smatra veoma nepovoljnim (Zavod za Statistiku Republike Srbije). Broj goveda u 2011 je bio 936.000 grla sa trendom kontinuiranog pada zadnjih 11 godina. Tokom ovog perioda, broj grla goveda se smanjio za 18% a broj krava i steonih junica za 14%. Podaci o broju i kategorijama goveda takođe ukazuju na značajno smanjenje, pa je tako kategorija goveda uzrasta od 1 do 2 godine smanjenja za 24.5%, a broj teladi za 29.2%.

Proizvodnja mleka je relativno stabilna. Godine 2011, proizvodnja mleka je bila 1.434.000 litara. To se može objasniti povećanjem proizvodnje mleka po grlu. Genetski progres osobina mlečnosti je postignut korišćenjem progeno testiranih bikova na osobine mlečnosti i povećanjem obima veštačkog osemnjavanja krava i junica.


References


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