

## THE MOST IMPORTANT DILEMMAS REGARDING THE WELFARE OF FARM ANIMALS

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**Abstract:** In this review paper, contradictions in modern livestock production as dilemmas of farm animal welfare are considered. The main dilemma concerns the question of whether extensive production in small farms is generally better than intensive production in large farms. The next dilemma relates to an intensive selection of animals and its impact on the emergence of welfare problems. Another dilemma is related to the two main interconnected problems of pig welfare in individual farrowing pens: the piglet death by crushing and the sows' movement restriction. Similarly, welfare dilemma is the paradox of parent flocks of broiler line breeding that could not be solved until the pressure for genetic advancement in production is required due to the economic efficiency. The next example of the dilemma is the widespread practice of tail docking in piglets in order to reduce the risk of tail biting. Although the tail docking is painful and may cause death, anaesthesia is usually not applied on farms. A similar example of the dilemma is debeaking in the laying hens and the occurrence of feather pecking in free rearing systems. It is important to notice the difference between the described dilemmas, where one premise opposes the other, which is essentially a conflict between the animal welfare goals and other values, such as economic, ethical and moral issues. Finally, there are also some dilemmas about the consumers' willingness to pay a higher price of products that originate from welfare friendly rearing conditions.

**Key words:** dilemma, welfare protection, farm animals.

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## Introduction

There are numerous contradictions in contemporary livestock production, which are now considered in the literature as dilemmas in terms of ensuring the welfare of farm animals (Appleby et al., 2014). These dilemmas concern equally all important participants in the technological process of farm production, consumers of animal products and the public as a whole (Hristov et al., 2007a). The important participants in the technological process of production related to this issue are farm owners, employees, stockmen, veterinarians, animal husbandry engineers and advisers, animal feed suppliers, technical and other persons who participate directly or indirectly in any stage of farm production (EFSA, 2012c). In addition, the dilemmas are also important for the activists of NGOs as well as governmental institutions that define and adopt appropriate regulations for ensuring good welfare of farm animals (Kjarnes et al., 2007; Hristov et al., 2007b).

The issue of animal welfare on farms was initiated 65 years ago because of public concern about the problems that arose as a result of increasing the capacity of the farm, mass keeping of animals in one place and industrialization of farm production. Use of the term factory animal production (Harrison, 1964) symbolically represents a refusal of the public to accept industrial intensive system due to the perception that this farm production system is not able to provide the appropriate environmental conditions for the animals (Brambell, 1965; Miele et al., 2011). Many people today perceive that animal welfare is significantly better in small capacity production units and open farm systems with a natural diet. They reject husbandry practices that are associated with industrial production systems as poorer regarding animal welfare, human health and protection of the environment (Cornish et al., 2016).

On the contrary, poor evidence of any clear relationship, negative or positive, between farm capacity and animal welfare was found (Robbins et al., 2016), indicating that larger farms can achieve more in animal welfare improvement, but may create welfare risks as well. Today, the need to update thoughts on animal welfare in the sense that it moves away from the “Five Freedom” to “Life worth living” is often pointed out (Mellor, 2016). In the papers published by von Keyserlingk et al. (2009) and Nawroth et al. (2019), it has been noted that general knowledge about farm animals’ relations with the environment is necessary, and it has significant importance for a range of stakeholders (citizens, politicians, cognitive ethologists and philosophers).

In addition to those resulting from inadequacy in housing conditions, many other factors can also affect the welfare of animals, particularly of farm animals reared in industrial production systems, such as: selection for high productivity, restricted nutrition, high-density population, poor zootechnical procedures and veterinary treatments which often inflict stress, pain and occasionally suffering to

animals (Vučinić, 2006; Broom and Fraser, 2007). Also, management, disease preventive measures, handling of animals, animal and space hygiene, rearing conditions such as floor and the manure system influence significantly disease outbreaks and provide a good welfare level for farm animals (OIE, 2018a). Many of the proposed methods for addressing these issues of animal welfare ensured in industrial production systems include compromise, but in some cases solving one problem can lead to other problems, which can be even much more pronounced. These issues, in general, are considered as welfare dilemmas in recent literature (Appleby et al., 2014; Hötzel, 2014).

In making professional decisions, veterinarians, animal husbandry engineers and stockmen have to be guided by their conscience, adherence to ethical behaviour, professional guidelines, cultural norms and legal framework. Therefore, it is crucial to define and establish good farming practices through professional ethical guidelines. Since farm animal welfare dilemmas are very important for professional ethical guidelines, the aim of this paper is to identify and discuss the most important ones.

#### The most important animal welfare dilemmas

A large number of citizens in developed countries estimate current conditions in livestock production operations as insufficient in respect of farm animal welfare. There are certain controversies that contribute to maintaining a poor state of farm animal welfare. Consumer behaviour is often contradictory; they verbally support the improvement of farm animal welfare but are not ready to pay higher price for animal products derived from animal welfare friendly livestock production (e.g. Boulstridge and Carrigan, 2000; Tawse, 2010), which is often referred as citizen-consumer duality (Vanhonacker et al., 2007).

All the most important criticisms of intensive farming systems are the result of the events and changes that these systems have undergone in the last two decades of the 20th century. In intensive rearing systems, the mortality of animals caused by parasites and by the pathogens, as well as by predation and bad weather conditions, has been reduced. However, mortality from respiratory, gastrointestinal organs and locomotor system, as well as behavioural disorders, has increased (Vučinić, 2006; Broom and Fraser, 2007; Hristov et al., 2007b, OIE, 2018a). Also, intensive rearing systems brought with them very important problems related to direct pollution of the environment (McGlone, 2001; Vučinić, 2006).

It is very important to point out that there is no animal rearing system that can provide or replace living conditions in autochthonous habitats. Intensive systems of animal rearing regularly deprive them of sunlight, fresh air, physical activity and expression of normal forms of behaviour. In confined rearing systems, there is the possibility of better control over animals, early detection of disease and

maintenance of better hygienic conditions as a whole, but animals are predisposed to the more frequent occurrence of infectious diseases, which requires either immune prophylaxis or antibiotic treatment. Contrary to confined systems, open free systems of rearing theoretically allow animals to express physiological forms of behaviour, but in these systems, animals are constantly exposed to parasitic diseases, bad weather conditions and predators. Regardless of all open animal rearing system shortcomings, greater immune competence and the ability to express physiological forms of behaviour give them an advantage over confined systems of rearing (Figure 1). Therefore, in many countries, the reorientation of breeders from intensive confined to open free systems of animal rearing followed (Hristov et al., 2006c; Vučinić, 2006; Broom and Fraser, 2007; Hristov et al., 2007a).

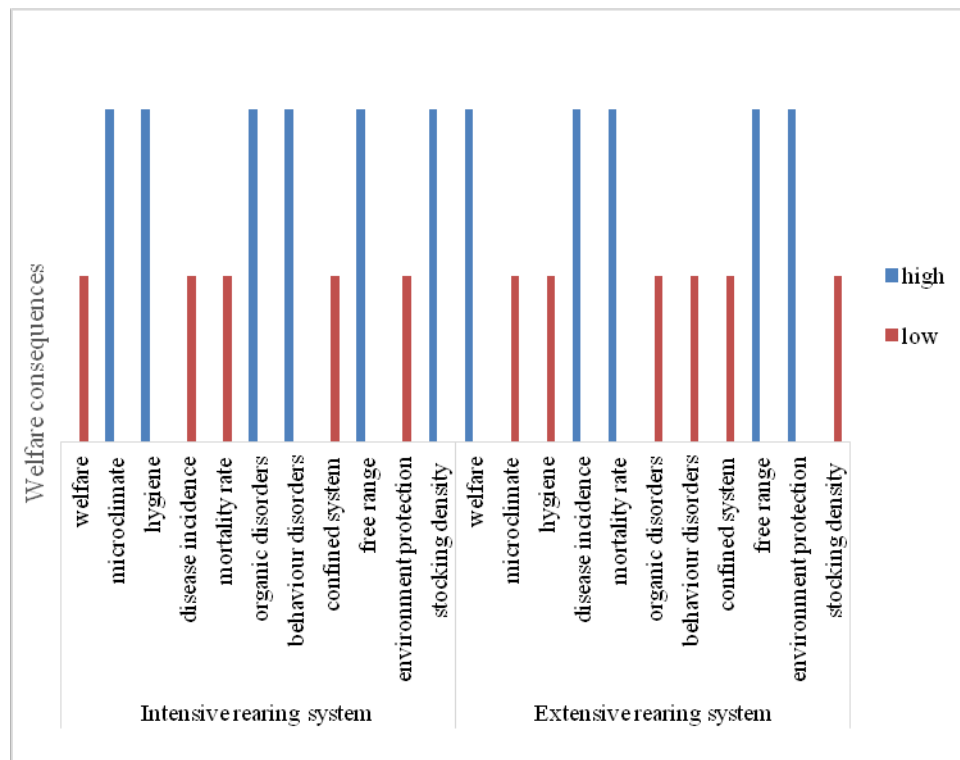


Figure 1. Welfare consequences in different rearing systems.

The knowledge of physiological aspects of behaviour and welfare (Todorović-Joksimović et al., 2007), emotions and cognition (Fratrić et al., 2007) and stress and welfare of farm animals (Hristov et al., 2007c) contributed to the definition of

minimum standards for ensuring the welfare of farm animals (Hristov et al., 2007d, e; Pandurović et al., 2007; Petrović et al., 2007). The Office International Epizootique (OIE) has so far adopted several chapters related to the welfare aspects of farm animal production systems, including pig (OIE, 2018b), dairy cattle (OIE, 2018c), beef cattle (OIE, 2018d) and broiler chickens (OIE, 2018e), which continue to contribute to the adoption of welfare standards for farm animals in many countries, especially developing ones.

In the last 65 years, understanding of higher cognitive processes in animals advanced dramatically (Nawroth et al., 2019), as well as in the development and validation of farm animal welfare assessment methods (EFSA, 2012a, b, c, d, e, f; EFSA, 2015a, b, c). Perhaps the most significant improvement of the welfare of farm animals was achieved in the conditions of housing with the adoption of the five freedoms proposed by the Brambell Committee: to be able to get up, lie down, turn around, do self-care and stretch their limbs. The conditions of housing preventing animals from the abovementioned freedoms are gradually abandoned in certain parts of the world, by legislation or guidelines, implementation of welfare programs or farm assurance schemes (Main et al., 2014). Further visible progress has been made with the implementation of research on welfare indicators, i.e. resource-based, management-based, and especially, animal-based indicators (Bartussek et al., 2000; Botreau et al., 2007; Blokhuis, 2008; Welfare Quality, 2009a, b, c; Hristov et al., 2009; Mellor, 2016).

Genetic selection is one of the main drivers of the increased production of farm animals. This raises profits but also amplifies direct and indirect losses in animals. Therefore, some authors point out that the selection for high production imposes many animal welfare problems (Figure 2), especially in industrial livestock production (Rodenburg and Turner, 2012; Grandin and Deesing, 2014). Intensive selection towards high production has led to the frequent occurrence of numerous diseases in farm animals. For example, high-milk dairy cows are prone to mastitis, lameness, milk fever, placental retention, ketosis, endometritis and occurrence of cysts on the ovaries (EFSA, 2009a, b; Oltenacu and Broom, 2010). In addition, the selection of growing production may cause morphological and physiological imbalances in pigs, resulting in the occurrence of locomotor disorders and the reduction of the adaptive ability of animals to environmental challenges. Increasing the average size of the litter by selection resulted in higher mortality of the piglets. A general consent was achieved that these can reduce animal welfare towards starvation, pain or discomfort, and in some cases impede the reproduction and longevity of pigs (EFSA, 2005a, 2007a, b). Egg production, for example, affects the cardiovascular and musculoskeletal system in the laying hens (EFSA, 2005b). Although it was possible to expect, otherwise, initiatives and attempts to reconsider the objectives of productivity selection in terms of incorporating features that could favour animal welfare benefits in selection

programs were generally limited (Rodenburg and Turner, 2012; Grandin and Deesing, 2014).

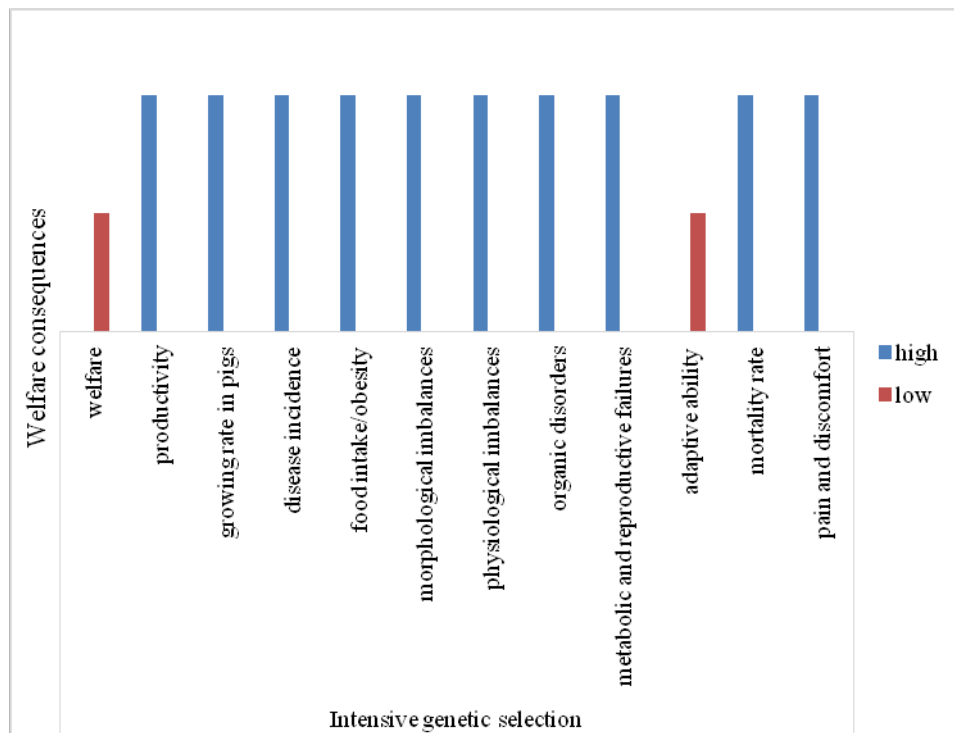


Figure 2. Welfare consequences regarding intensive genetic selection.

Genetic selection for high productivity is often associated with high food intake, which leads to the need for food restriction and high levels of starvation at certain stages of production. For example, pregnant sows (EFSA, 2007a) and parent broilers (de Jong et al., 2012) are no longer in the age when high rates of a weight gain are desired, so these animals are usually fed only about 50% *ad libitum* intake. If *ad libitum* is allowed to access the same concentrated feeds that are usually given, these animals will face an increased risk of metabolic and reproductive disorders (EFSA, 2009a, b). Therefore, the dilemma of choosing between hunger and obesity-related diseases clearly appears here, and both variants are unfavourable in terms of animal welfare (EFSA, 2007a; EFSA, 2009a, b; de Jong et al., 2012; Hötzel, 2014).

There are two other very important dilemmas of the animal welfare in pig production (Figure 3), related to the use of farrowing crates and tail docking. The first dilemma is related to the two main interrelated problems of pig welfare: the

death of the pig related to crushing and limiting the movement of sows in farrowing crates. These crates are implemented to reduce the crushing of the piglets but have a disadvantage of depriving of most normal behavioural forms and strategies, including turning around and building nests. Keeping pigs in free-range systems solves this problem, but often increases the mortality of the piglets due to mother’s crushing. The piglets that spend more time in contact with sows are probably more exposed to crushing, but changes in freehold systems designed to encourage the piglets to spend more time out of the reach of sows (for example, by providing a warm, soft and non-slippery space for piglets) have not brought significant success. This problem is further complicated by the selection of larger litters, which has the effect of increasing the proportion of light piglets that are more prone to crushing (EFSA, 2007a).

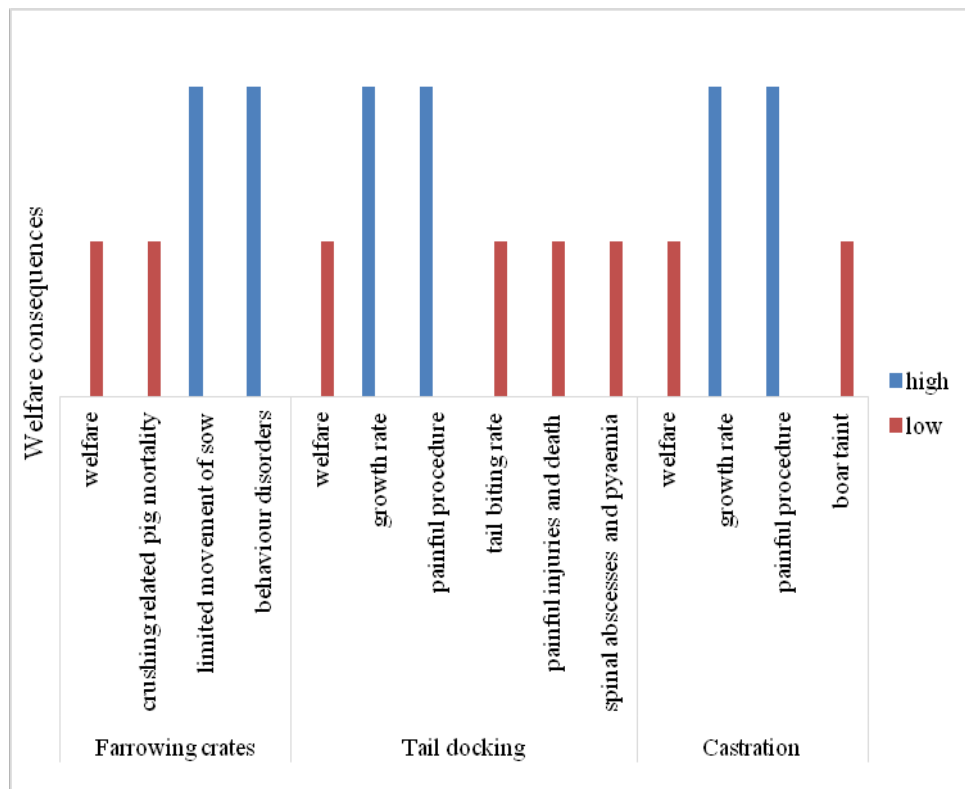


Figure 3. Welfare consequences in pigs.

The second well-known example of the animal welfare dilemma in pig breeding is the widespread practice of docking the tail in piglets in order to reduce

the risk of tail biting occurrence. Tail biting is common in confined systems and can cause painful injuries and deaths in growing piglets. Also, tail biting is accompanied by different pathological changes, varying from spinal abscesses to pyaemia in different body regions. These changes are often followed by a reduced growth rate or in more severe cases, total carcass condemnation (D'Eath et al., 2014, 2016; Valros et al., 2016; EFSA, 2007b, c). Although the tail docking is painful, anaesthesia is usually not applied. In addition to the immediate pain associated with this zootechnical procedure, at the point of amputation of the tail, neuromas and therefore chronic pain may occur frequently. Docking of the tail would not be necessary if the basic causes of tail biting were removed (EFSA, 2005a, 2007b, c). Risk factors associated with the occurrence of tail biting relate to large groups of piglets and high density of population, non-stimulating environment and genotype, even though the relative contribution of each of these factors has so far been little considered and explained in the research (EFSA, 2007a). Although European legislation (EC, 2001) requires the use of adequate stall space enrichment and the restriction of the use of tail docking with only exceptionally applicable cases, this zootechnical procedure is still common practice in many countries, which points out the difficulty of controlling this abnormal behaviour, especially in intensive rearing systems. For now, it is concluded that the docking of the tail has a tendency to reduce the appearance of tail bites and will be applied until this behaviour is explained and effective preventive measures are suggested; probably, it will continue to be practiced regardless of legal restrictions (Sonoda et al., 2013; Hötzel, 2014).

Castration in piglets, another major welfare problem, exists to this day, although many studies have been conducted. Namely, castration of male piglets is performed primarily in order to avoid the development of the unpleasant smell and taste of boar meat. Although Welfare Law says that castration could be performed without analgesia in the first seven days of life, it is painful at any age (EFSA, 2004).

In broiler production, one of the well-known dilemmas (Figure 4) is related to the paradox of parent broiler breeding: obviously, genetic progress in broiler growth efficiency will not slow until economics warrant slows improved efficiency and yield (de Jong, 2012; OIE, 2018e). EFSA (2010) scientific opinion explained the impact of genetic parameters which may affect the commercial broiler welfare. According to this, the major welfare issue based on genotype and influence of management factors may lead to inadequate welfare and occurrence of skeletal disorders, contact dermatitis, ascites and sudden death syndrome. Most of these are related to high growth rates of broilers. In addition, this points out that there are various interactions between the environment and the genotype, with a serious adverse effect on welfare regarding lighting regimes, litter management, dietary deficiencies and contamination, air quality and temperature. When the welfare risks



are assessed, the odds of a hazard and the level of the poor welfare effects and consequences of that exposure have to be estimated (EFSA, 2010; 2012a).

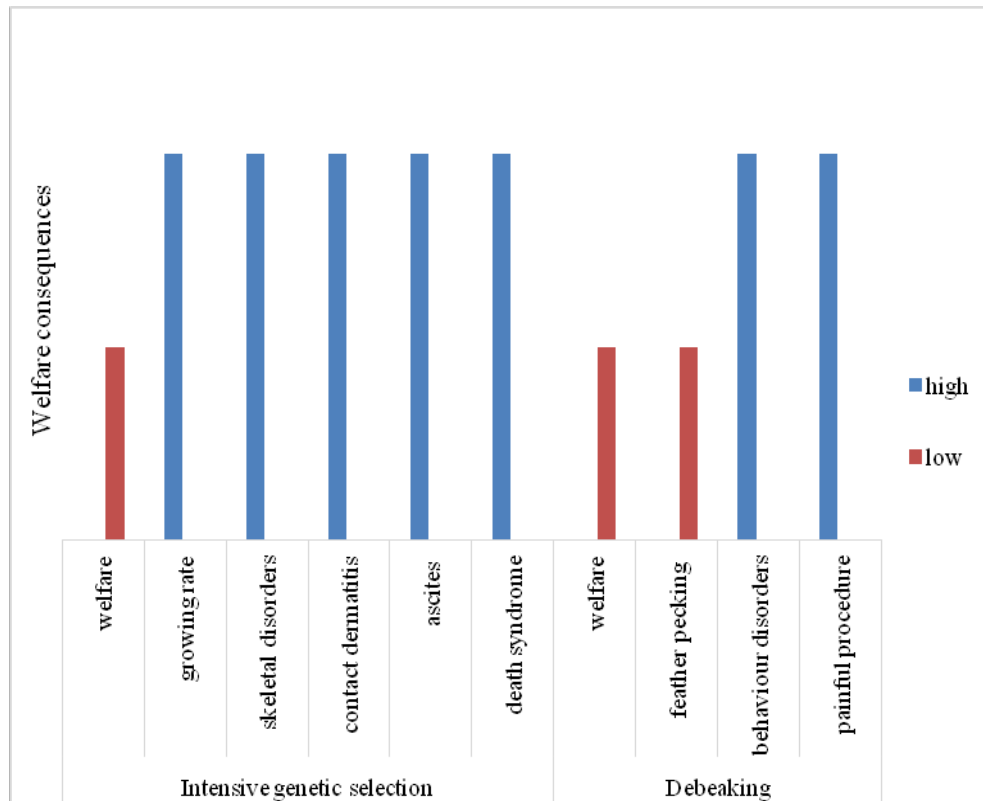


Figure 4. Welfare consequences in poultry.

Another important example of the dilemma regarding animal welfare is well-known debeaking in laying hens and the occurrence of feather pecking. In the prevention of feather pecking, debeaking is considered effective because the feather condition is deteriorated in laying hens with intact beaks, compared to the birds with trimmed beaks, although the feather pecking occurs also in debeaked flocks. It should be kept in mind that chickens with a shortened beak are less prone to ground peck and preening. The debeaking process itself is painful, and the creation of neuromas at the top of the shortened beak causes long-lasting pain. The cutting of the beak, therefore, does not solve the basic problem, but only deals with the consequences. Therefore, the breeding of chickens with intact beaks should be an integral part of sustainable laying hen production (Lambdon et al., 2010; Kaukonen and Valros, 2019).

On behalf of the European Commission, EFSA published scientific opinions on animal health and welfare of different categories of pigs in relation to housing and husbandry (EFSA, 2007a, b), risks accompanied with tail biting in pigs and suggested solutions to reduce the need for tail docking considering the different rearing systems (EFSA, 2007c), welfare aspects of the castration of piglets (EFSA, 2004) and effects of different floor types and space allowances on welfare of weaning and rearing pigs (EFSA, 2005a). The detailed scientific report on the effects of farming systems on dairy cow welfare and disease (EFSA, 2009a) was published, as well as the contemporary achievements regarding the risk assessment in respect to different solutions in housing, nutrition and feeding, management and genetic selection concerning dairy cow metabolic and reproductive problems (EFSA, 2009b). In the poultry production, the scientific report has been reviewed and updated on the welfare of broilers and broiler breeder (de Jong et al., 2012), as well as the scientific opinion on the welfare aspects of the use of perches for laying hens (EFSA, 2015c). The latest scientific knowledge on these topics was presented in all of these scientific opinions and reports, providing conclusions and recommendations in accordance with the previously defined requirements of the European Commission.

Botreau et al. (2007) presented the general criteria for animal welfare assessment. Having in mind the importance of animal-based indicators, since they define welfare from animal point of view, EFSA has considered their use in farm animals (EFSA, 2012c), pigs (EFSA, 2012d), dairy cows (EFSA, 2012d), broilers (EFSA, 2012e) and in small-scale farming systems (EFSA, 2015c). Besides this, an analysis of the gaps in the use of animal-based measures in the EU was realised (EFSA, 2015b). In addition, EFSA presented the outcome of the public attitude on the guidance on the risk assessment (EFSA, 2012f), guidance on animal welfare risk assessment (EFSA, 2012a) and scientific opinion on the welfare risks related to the sheep production (EFSA, 2014). In the above-cited publications, a crucial dilemma of farm animal welfare was considered, taking into account specific issues.

Many review papers are aimed to highlight the importance of the welfare friendly housing system planning, emphasising the necessity not only to explore the field of animal welfare, suggesting new and modified housing systems but to perform a survey of current but contentious systems as well, paying special attention to the design contributions to these systems in respect of farm animal welfare.

Also, areas for future research on ensuring farm animal welfare are highlighted in the literature. Von Keyserlingk et al. (2009) emphasised key concepts and the need to explore the welfare of dairy cattle, while Hemsworth (2018) presented key facts regarding management and housing design implications on pig welfare. According to von Keyserlingk et al. (2009), three major concerns of

animal welfare are: is the animal functioning well, is the animal feeling well, and is the animal able to live according to its nature? Issues in pig production include the following aspects: effectiveness of environmental enrichment for gestating sows in intensive, indoor and non-bedded systems, prospects to prolong foraging and feeding periods in feed-restricted gestating sows, propose accommodation options that allow both access to feed, water, comfortable lying area, and escape opportunities in order to reduce aggression, minimising risks to the welfare of group-housed sows, and less confined farrowing and lactation systems (Hemsworth, 2018). These papers point out that those animal welfare problems may be less a consequence of the type of housing system than of how well it operates. In addition, Lay et al. (2011) have concluded that the right combination of housing design, breed, rearing conditions, and management is essential to optimise hen welfare and productivity in different housing systems.

Dawkinis et al. (2004) analysed the influence of housing conditions and stocking density on chicken welfare. Their results show that differences among environment features for chickens that are provided by producers more affect welfare than stocking density itself. The skills, knowledge and motivation of stockmen to effectively care for and deal with their animals are essential for the welfare level. Stockmen attitude influences not only how they handle animals but also their motivation. Even though public concerns and policy debates are often focused on intensive housing systems, available data indicate that the design and management of both indoor and outdoor housing systems are probably more important for animal welfare than it is expected. Therefore, upgrading of technical skills and knowledge and the attitudes and behaviours of stockmen must be a primary goal of the human resource management practices at a farm (Vučinić, 2006; Hristov et al., 2007b; Broom and Fraser, 2007).

Regardless of the production system, it is necessary to provide minimum standards of welfare for all species and categories of farm animals. In this sense, the authors in our country described various aspects of animal welfare, such as farm animal welfare concept: from beginnings to integration in modern production systems (Ostojić-Andrić et al., 2018), the conditions of rearing, welfare and behaviour of farm animals (Hristov et al., 2006c), basic principles of dairy cattle welfare plan creation and implementation (Hristov et al., 2015a), welfare and behaviour in relation to disease of dairy cows (Hristov et al., 2015b), rearing conditions, health and welfare of dairy cows (Hristov et al., 2008), welfare of dairy cattle – current status and perspectives (Hristov et al., 2012b) and the welfare of dairy cattle on farms (Hristov and Stanković, 2016). All analysed papers basically encompass some aspects that clarify the dilemmas of the welfare of farm animals in intensive production.

In our country, in a number of papers, minimum standards of farm animal welfare were also reviewed, e.g. related to hygienic conditions for housing and

ensuring of poultry welfare in the European Union (Hristov, 2005), housing conditions and health care of goats (Hristov and Relić, 2005), conditions of housing and welfare of sheep and goats (Hristov et al., 2007c), housing conditions and welfare of cattle (Hristov et al., 2007e), housing conditions and welfare of laying hens (Pandurević et al., 2007), housing conditions and welfare of pigs (Petrović et al., 2007), welfare and biosecurity standards on farms focusing on housing conditions of cattle and pigs (Hristov et al., 2009) and hygienic standards in rearing of piglets (Hristov et al., 2006b). In general, stockmen in Serbia for years have had information about new technological trends in the production and farm animal welfare achievement, but they are often unable, for various reasons, to completely apply them. Because of this, farm animals often suffer from the deprivation of space, qualitatively and quantitatively inadequate nutrition, inability to express species-specific behaviour, infectious and non-infectious diseases that are frequent due to professional failures, as well as poor farm procedures, often implemented by less competent, unmotivated and usually underpaid employees. Housing conditions for animals are mainly determined by the financial possibilities of a particular breeder, who often uses inadequate materials such as concrete for the construction or renovation of buildings, without taking into account the needs of animals, their health, production results and the productivity life length (Vučinić et al., 2007; Hristov and Stanković, 2009a; Stanković et al., 2014; Ostojić Andrić et al., 2015; Ostojić Andrić et al., 2016b).

There is a need to identify the dilemmas of veterinarians during their surveys of the welfare incidents that involve stockmen facing numerous social, health and psychological problems. Three related dilemmas for veterinarians were revealed: defining professional parameters, determining the appropriate response and involvement versus detachment. It is a well-known fact that EU regulations on farm animal welfare are guided primarily by zoocentric approach and professional ability to recognise relevant animal-based indicators (Hristov et al., 2018). Study evidence shows that veterinarians are willing to assist the stockmen in order to ease animal suffering (Devitt et al., 2014).

#### Serbia: a state of the art

Up to now, several methods have been developed to assess the welfare of farm animals. Some of these methods became part of the legislation in many countries; to be more effective, they are being actively applied, supplemented and re-examined. That is the case with the following methods: Animal Needs Index (Bartussek et al., 2000), EFSA methods for the assessment of animal welfare risk (EFSA, 2012b, c, d, e, f, EFSA, 2014, EFSA, 2015a) and protocols on the quality welfare assessment of cattle, pigs and laying hens (Welfare Quality®, 2009a, b, c). In the last 15 years, different aspects of methodology for assessing the welfare of

farm animals in our country have been considered: methodologies for assessing the welfare of dairy cows and pigs that have been developed within the project TR 20110, the most important indicators of dairy cow welfare evaluation (Hristov et al., 2012a), different approaches to assess the welfare of dairy cows with some results in Serbia (Hristov et al., 2014), assessment of conditions of housing and welfare of dairy cows (Maksimović et al., 2007), assessment of the welfare of cows in free housing (Hristov et al., 2011), welfare indicators of dairy cow focusing on selection and implementation in assessment (Ostojić Andrić et al., 2013), key health issues affecting dairy cow welfare (Ostojić Andrić et al., 2016a), behaviour of cattle as an indicator of their health and welfare (Relić et al., 2012), dairy cow health parameters in different seasons – a welfare approach (Ostojić Andrić et al., 2017), welfare and biosecurity indicator evaluation in dairy production (Hristov and Stanković, 2009b) and assessment of some welfare parameters in lactating sows (Relić et al., 2016). These papers provided very useful data for ensuring and improvement of farm animal welfare in Serbia.

In addition, the current problems related to the welfare of animals in Serbia (Vučinić et al., 2007), the most significant failures in ensuring the welfare of animals on farms of cattle and pigs (Hristov and Stanković, 2009c), the most common health disorders and welfare of dairy cows and calves (Stanković et al., 2014), welfare and behaviour in relation to disease of dairy cows (Hristov et al., 2015b), dairy cow welfare quality in loose vs. tie housing system (Ostojić-Andrić et al., 2011), housing conditions and welfare of dairy cows in Serbia (Ostojić Andrić et al., 2015), the state of welfare on Serbian dairy farms (Ostojić Andrić et al., 2016b), health and welfare of dairy cows in Serbia (Ostojić Andrić et al., 2016c), colostrum management in calves' welfare risk assessment (Relić et al., 2014), frequency of behavioural disorders of calves in the first month of life (Samolovac et al., 2018), influence of rearing conditions and birth season on calf welfare in the first month of life (Samolovac et al., 2019), as well as the appearance of feather loss in the laying hens as a welfare problem were considered (Hristov et al., 2006a). Although there are a number of problems directly related to the welfare of animals in Serbia, one of the basic is insufficient knowledge and skills of professionals and poor awareness of the citizens about this problem. The best solutions that can change the existing status of the welfare of animals and the awareness of citizens are training and education through the inclusion of all subjects competent to transfer knowledge and skills (Vučinić et al., 2007, Hristov and Stanković, 2009c; Stanković et al., 2014; Ostojić Andrić et al., 2015; Ostojić Andrić et al., 2016b).

#### Approaches to solving problems and dilemmas of the welfare of farm animals

In order to solve the farm animal welfare dilemmas, it is important to provide all the direct and indirect participants in the technological process of production

with professional ethical principles. Knowledge of the technological process of production, economic, legislative and scientific principles has great importance in improving the welfare of farm animals in all kinds of rearing systems. The easiest ways to improve stockmanship are to select employees carefully, and even better – to train them to improve their technical knowledge, working organisation and attitudes towards both animals and husbandry practices (Boivin et al., 2003; Hristov et al., 2007b).

To date, two approaches to addressing problems endangering farm animals welfare in all farming systems have been proposed (Vučinić, 2006). The first approach is based on manipulations in the living environment and its improvement (free system of rearing, increasing of space, enrichment of the environment), so animals can satisfy their basic behavioural needs. This method is based on the use of alternative housing systems that allow the expression of all forms of normal behaviour without altering the productivity of animals. The second approach is based on the use of behavioural principles of restraint, zootechnical procedures, veterinary interventions and the placement of farm animals in order to preserve well-being and prevent pain, distress and suffering (Dawkins et al., 2004; von Keyserlingk et al., 2009; Lay et al., 2011; Hemsworth, 2018). In addition, the application of genetic selection is required in scientific research in order to examine all aspects of animal adaptation to intensive rearing systems (Grandin and Deesing, 2014). Also, there are attempts to carefully apply some therapeutic procedures in order to influence the physical condition or psychological status of the animal and thus preserve their well-being (Vučinić, 2006).

It should be kept in mind that contradictions that accompany animal welfare include not only economic factors, but other factors as well. A multidisciplinary approach in animal welfare assurance context must be used, complementary to the food safety, environmental protection, worker health and safety, economics, international trade, domestic protection, public perception and consumer economics (McGlone, 2001; Anon., 2015; Anon., 2017; Anon., 2018). Demand for the production of more food in an environmentally sustainable way can affect the efficiency of production in relation to other goals, among which are the objectives of ensuring the welfare of animals. Prior to the higher scientist engagement in future animal welfare research, enabling larger quantities of cheaper food production in further sustainable system intensification, it should be considered whether this option corresponds to real improvements in the animal welfare and whether it is the best or at least a satisfactory option that can cope with current and future challenges in livestock production (Broom and Fraser, 2007).

## Conclusion

Based on the considerations of the most important dilemmas regarding the ensuring of the welfare of farm animals, it could be concluded that the main dilemma concerns the question of whether extensive production is generally better compared to the intensive, and whether on the farms of a smaller capacity, better welfare of the animals in relation to larger farms is ensured. In addition, the next dilemma relates to the application of an intensive selection of farm animals and its impact on the emergence of problems in ensuring their welfare. The following dilemma is related to the two main interrelated problems of pig welfare and individual farrowing pens: the piglet death by crushing and the sows' movement restriction. One of the well-known welfare dilemmas is the paradox of parent flocks of broiler line breeding that could not be solved until the pressure for genetic advancement in production is required due to the economic efficiency; the next examples of animal welfare dilemmas are the widespread practice of tail docking in piglets in order to reduce the risk of tail biting and debeaking in the laying hens and the occurrence of feather pecking in free rearing systems. Finally, there are also dilemmas about the consumers' willingness to pay a higher price for the products that originate from animal welfare friendly conditions.

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## NAJZNAČAJNIJE DILEME KOJE SE ODOSE NA DOBROBIT FARMSKIH ŽIVOTINJA

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### R e z i m e

U ovom preglednom radu razmatraju se kontradikcije u modernoj stočarskoj proizvodnji kao dileme koje se odnose na dobrobit farmskih životinja. Glavna dilema odnosi se na pitanje da li je ekstenzivna proizvodnja na malim farmama generalno bolja od intenzivne proizvodnje na velikim farmama. Sledeća dilema odnosi se na primenu intenzivne selekcije životinja i njen uticaj na nastanak problema dobrobiti. Naredna dilema se odnosi na dva glavna međusobno povezana problema dobrobiti svinja u pojedinačnim boksovima za prašenje: uginuća prasadi gnječenjem i ograničenje kretanja krmača. Takođe, dilema u vezi sa dobrobiti je paradoks roditeljskih jata tovnih pilića koja se ne može rešiti dok postoji pritisak za genetski napredak u proizvodnji zbog ekonomske efikasnosti. Sledeći primer dileme je široko rasprostranjena praksa sečenja repa kod prasadi kako bi se smanjio rizik od griže repova. Iako je sečenje repa bolno i može prouzrokovati uginuće, anestezija se obično ne primjenjuje na farmama. Sličan primer dileme je i skraćivanje kljuna kod kokoši nosilja i pojava kljucanja perja u sistemima slobodnog uzgoja. Važno je uočiti razliku između opisanih dilema, gde je jedna premisa suprotstavljena drugoj, što je u suštini konflikt između ciljeva dobrobiti životinja i drugih aspekata, kao što su ekonomska, etička i moralna pitanja. Konačno, postoje i neke dileme koje se odnose na spremnost potrošača da plate višu cenu za proizvode koji su dobijeni u uslovima gajenja koji pospešuju dobrobit farmskih životinja.

**Ključne reči:** dileme, zaštita dobrobiti, farmske životinje.

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