Deficiencies in livestock holdings with respect to animal welfare identified as part of cross-compliance checks completed in 2016–2020 in the Czech Republic

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Abstract

Cross-compliance checks are a tool of the Common Agricultural Policy to promote agri-environmental objectives relating to the environment, animal welfare, and food safety. This mechanism consists of paying direct subsidies to farmers who comply with prescribed requirements. Compliance with animal welfare requirements in the Czech Republic is supervised by the State Veterinary Administration. This study aimed to find the main deficiencies identified as part of cross-compliance checks and to assess the trends of the most frequent defects during the period under review, i.e. 2016–2020. The data for the analysis were received from the Central Veterinary Administration of the State Veterinary Administration and included the results of 2,031 checks carried out. Shortcomings were found in 14.52% of cases. Detailed analysis showed that significantly ($P < 0.05$) the highest frequency of violations was found in the areas of 'nutrition and watering' (294; 29.85%) and 'spatial requirements' (274; 27.82%). Based on the evaluation of trends, a significant ($P < 0.05$) decrease in the frequency of violations in the field of compliance with holder duties and animal hygiene standards of animals was detected. The results of this work show that animal welfare is continuously improving on farms. However, the aim should be to reduce deficiencies to a minimum for all indicators. In view of the results of this study, it is necessary to focus primarily on improving the quality of nutrition, providing better housing standards with emphasis on space and equipment used, and intensifying daily checks of animals.

Animal welfare, farm animal, nutrition, veterinary inspection

Cross-compliance (CC) was introduced in the European Union (EU) in 2003 to increase farm sustainability and to define standards relating to the environment, food safety, plant and animal health/welfare and to set requirements for maintaining land in good agricultural and environmental condition (European Council 2003). Cross-compliance represents the attachment of these regulations to the direct payments under the Common Agricultural Policy (Meyer et al. 2014). Kristensen and Primdahl (2004) report that EU Member States use CC to promote agri-environmental objectives under the Common Agricultural Policy, thereby reducing the negative environmental impacts of agricultural production. Cross-compliance is further defined as "the provision of public payments to farmers subject to compliance with prescribed environmental norms" (Mann 2005; Schmidt et al. 2019).

Since January 1, 2009, the payment of direct aid and other selected subsidies in the Czech Republic has been conditional on the fulfilment of standards for maintaining land in a good agricultural and environmental condition, i.e. compliance with mandatory farming requirements classified into three areas: (1) Environment, Climate Change, Good Agricultural and Environmental Condition of the Soil; (2) Public Health, Animal Health and Plant Health; and (3) Animal Welfare (Ministry of Agriculture 2023). Animal welfare can be defined as the ability of an animal to successfully adapt to environmental conditions without

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harm being caused to its mental and physical health (Broom 1986; Gračner et al. 2018; Popelková et al. 2022). Recently, emphasis has increased on reducing environmental stress in animals. In cattle, for example, it has been found that environmental stress is reduced by improved welfare (Němečková et al. 2022).

In the event that an applicant for the aid fails to comply with the CC requirements as specified, payment of the selected funding used may be reduced or, in the most extreme case, withheld. Compliance with the standards and requirements is audited by checking compliance with the monitored requirements (Ministry of Agriculture 2023). In the Czech Republic, compliance checks are carried out by the State Veterinary Administration (SVA) through site checks by inspectors of regional veterinary administrations (RVA) (State Veterinary Administration 2021).

This study aimed to identify the main deficiencies that occur in livestock holdings in the area of compliance checks based on the analysis of the results of official site visits carried out by the SVA in 2016–2020. Another aim was to assess the trend in the occurrence of the main deficiencies during the period under review.

Materials and Methods

For this study, data from the Central Veterinary Administration of the State Veterinary Administration containing the results of non-administrative cross-compliance sub-checks carried out on ‘holder’s farm’ type establishments with livestock (administrative checks, animal welfare subsidy checks, checks on farms without animals and checks of other than farm animals are not included) in the years 2016–2020 were obtained and analysed. Each site check was carried out on the holding in the presence of the farmer and the RVA inspector, during which the specific control points (CPs) were checked (43 in total) (Table 1). The wording of the individual CPs is based on the requirements of the European Directives: (1) Council Directive 2008/119/EC laying down minimum requirements for the protection of calves; (2) Council Directive 2008/120/EC laying down minimum requirements for the protection of pigs; (3) Council Directive 98/58/EC on the protection of animals kept for farming purposes. Each of the site checks included an assessment of environmental standards, housing quality, nutrition, care and husbandry practices, plus prevention of the emergence and spread of diseases was reviewed.

The checks were planned based on a centrally conducted risk analysis and were carried out on livestock holders applying for subsidies. The aim was to survey 1% of subsidy applicants annually. Specific risk level criteria were established for each field, taking into account, in particular, the number and types of livestock kept, findings of deficiencies during animal welfare site checks in previous years, results of site checks at slaughterhouses, number of animals moved to rendering plants and slaughterhouses, etc. In addition to scheduled cross-compliance checks, non-scheduled cross-compliance checks were also carried out based on detected violations as part of the ‘national animal welfare check’ scheme (State Veterinary Administration 2021).

A total of 2,031 site check records were analysed, containing data on the year, type of animal, list and number of CP violations and the results of those site checks, i.e. whether or not any defects were found. Microsoft Excel 2019 was used to process the data.

Due to the type of data and the purpose of data processing, the methodology used in this study was similar to the previous study by Švestková et al. (2024). To provide an overview of the number of CC site sub-checks carried out, a list of these site checks was compiled for each of the years of the 2016–2020 period, including the number of site checks with identified defects (incl. the percentage). Furthermore, the numbers of site checks with detected defects were specified according to the CPs violated (in %) within the range of these values determined by us (0.1%–5.0%; 5.1%–10.0%; 10.1%–15.0%; 15.1%–20.0%; 20.1%–30.0%; 30.1%–40.0%; 40.1%–50.0%; as were total numbers of CPs violated in each year of the 2016–2020 period. Subsequently, the frequencies of violations were specified for each CP and also by livestock species (cattle, sheep, goats, horses, pigs, poultry, ratites, farmed game, fish and unknown = not specified) for the whole period under review.

To analyse the main weaknesses identified during the CC site checks, the individual CPs were divided into two main groups and eight sub-groups according to their focus (Table 1). The number of defects found throughout the period under review was subsequently specified within the groups we formed. Trends were then compiled for the main groups and for the four most significant sub-groups of violated control points detected, where the highest number of violations were recorded, for the years 2016–2020. The number of defects by livestock type was also specified for these four most significant sub-groups of control points.

Chi-square test in Microsoft Excel 2019 and Spearman’s correlation coefficient in RStudio were used for statistical data analysis. Chi-square test was used in this study to compare frequencies for site checks with defects in 2016–2020, site checks with defects by number of CPs violated, number of CPs violated in 2016–2020, and animal species, individual CPs, sub-groups and main groups, at a significance level of $P < 0.05$. Using Spearman’s correlation coefficient at a significance level of $P < 0.05$, the trend in the frequency of CP violations was evaluated for all sub-groups to determine whether there was an increase or decrease in the incidence during the period under review.

Table 1. List and classification of control points assessed as part of livestock cross-compliance checks.

Main group	Sub-group	Numerical designation	Control point name
Husbandry standards	Nutrition and watering	1	A diet containing fibre and iron; access to feed
		2	Colostrum intake after the birth of calves
		3	Access to drinking water for calves 2+ weeks old
		4	Feedstuffs and access to drinking water, sufficient fibre for dry sows and gilts
		5	Feedstuffs and drinking water
		6	Limiting water and feed contamination
	Spatial requirements	7	Animal structures and housing
		8	Restricting the freedom of movement of animals
		9	Keeping calves older than 8 weeks in an individual pen and a designated area available for each calf
		10	Individual pens for calves and walls with holes
		11	Prohibition of tying and muzzling calves
		12	Floors and calf housing space
		13	Group housing of sows and gilts
		14	Pig housing
		15	Stalls and harnesses for tethering sows and gilts
		16	Usable free floor area and slatted floors in pigs
		17	Floors in pig farming
		18	Protection of animals from adverse conditions
	Equipment standards	19	Material used for animal housing, edges and protrusions
		20	Access to material that enables ethological activities
		21	Inspection of all layout, technological and operational designs of stalls
	Animal hygiene standards	22	Noise level and light intensity
		23	Natural/artificial lighting in animal housing
	Prohibited husbandry methods	24	Prohibition of the administration of specified prohibited substances
		25	Illegal husbandry practices and administration of substances
Holder duties	Checks	26	Livestock inspection
		27	Daily checks, calves
	Provision of medical treatment	28	Breeding practices and modifications of the appearance of animals
		29	Treatment of animals and record keeping
		30	Number of employees
	Preventing the emergence and spread of diseases	31	Interventions and procedures carried out for purposes other than therapeutic and diagnostic purposes or for the identification of pigs
		32	Housing sick and injured pigs in separate pens
		33	Handling of animal body parts
		34	Handling of suspect animals
		35	Reporting of suspected TSE
		36	Relocation of parts of a body intended for harmless disposal
		37	Relocation of risk animals and parts of bodies of animals found to be infection-positive
		38	Relocation of animals from the suspected holding
		39	Relocation of susceptible animals and products
		40	Milk without tuberculosis status
		41	Milk without brucellosis status
		42	Sheep – animals with a satisfactory genotype are marketed
		43	Cattle – live animals placed on the market, excluding positive animals/cohorts

Results

A total of 2,031 CC checks were carried out during the 2016–2020 monitoring period (Table 2). The number of site checks in which a defect was found was 295 (14.52%). During the period under review, this proportion ranged between 12.43% (in 2020) and 16.86% (in 2018), but no significant difference was found between years ($P > 0.05$).

Table 2. Number of cross-compliance checks carried out and number of site visits with detected deficiencies in 2016–2020.

Reference period (year)	Number of site visits	Number of site visits with a deficiency	Proportion of site visits with a deficiency (%)
2016	452	73	16.15[a]
2017	411	54	13.14[a]
2018	421	71	16.86[a]
2019	409	55	13.45[a]
2020	338	42	12.43[a]
Total	2 031	295	14.52

[a] Values in the column with the same superscript are not significantly different ($P > 0.05$)

In the case of defects identified during the site check, the most frequent number of CP violations found was significant ($P < 0.05$), ranging from 5.1% to 10% (105 site checks) (Fig. 1). The second most numerous group were the site checks with identified defects in the range of 15.1%–20% of the violated CP (74 site checks). The other groups of the number of violated CPs showed a lower number than 37 site checks.

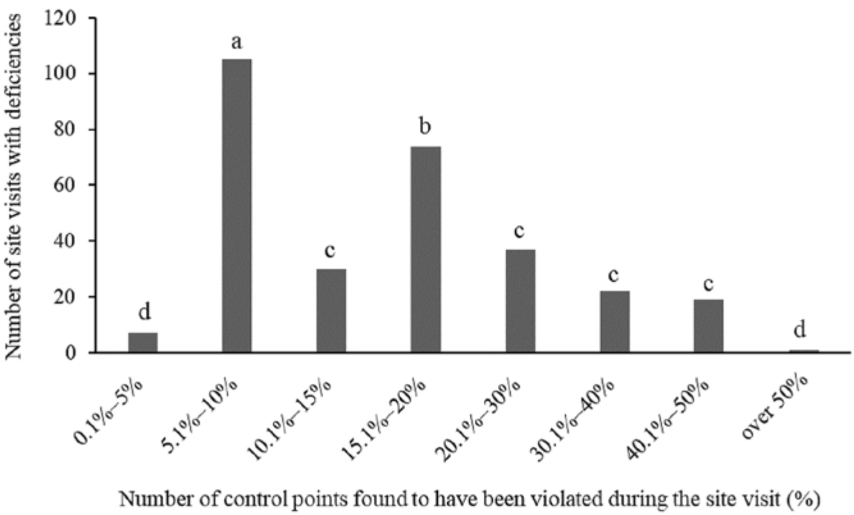

Fig. 1. Number of cross-compliance checks with a deficiency by number of control points found to have been violated (%) in 2016–2020.

[a-d] Values with different superscripts are significantly different ($P < 0.05$)

During the period under review, we found a significantly ($P < 0.05$) lower number of CP violations in 2020 (145) compared to previous years (Fig. 2). Between 2016 and 2019, the numbers of violated CPs ranged between 202 and 214.

Significantly ($P < 0.05$) the highest frequency of violated CPs by livestock species was detected for cattle (491) (Fig. 3). This was followed by pigs (152) and sheep (140), between which no significant difference was found ($P > 0.05$). For the other species, less than 100 violated CPs were found.

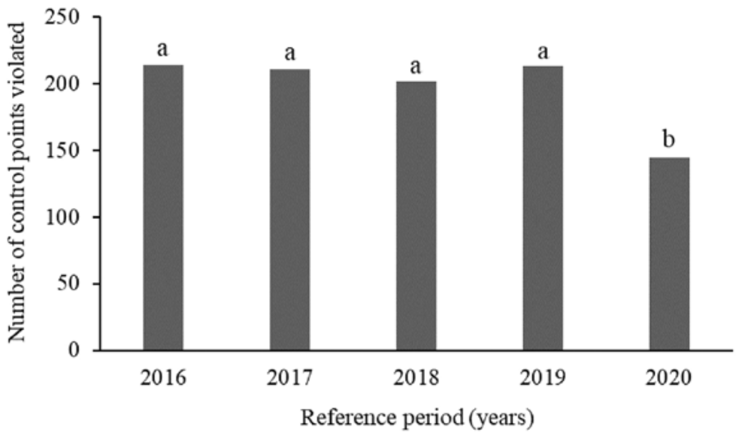

Fig. 2. Number of control points violated between 2016 and 2020.

[a-b] Values with different superscripts are significantly different ($P < 0.05$)

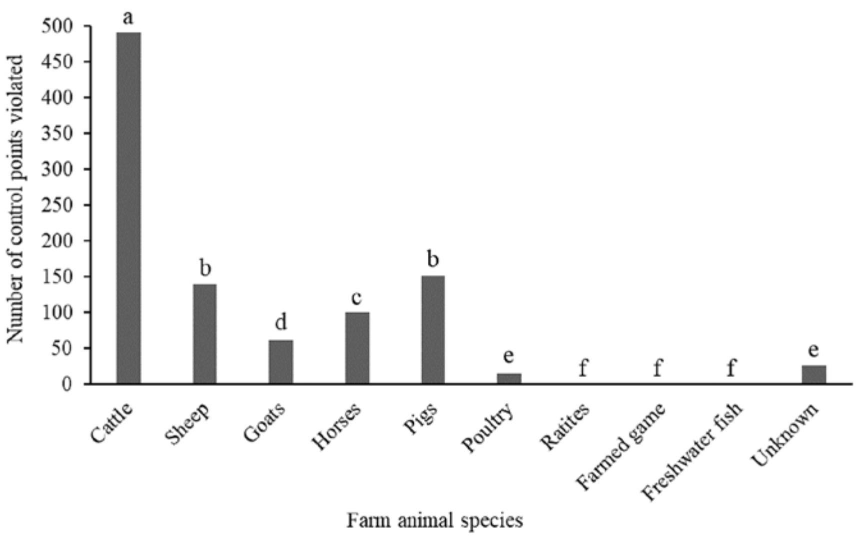

Fig. 3. Number of violated control points by livestock species in 2016–2020.

[a-f] Values with different superscripts are significantly different ($P < 0.05$)

Significantly ($P < 0.05$) the highest number of violations in the evaluation of individual CPs (Fig. 4) was found for three CPs, namely ‘material used for animal housing, edges and protrusions’ (149), ‘feedstuffs and drinking water’ (145) and ‘livestock inspection’ (116). There was no significant difference between these CPs ($P > 0.05$). This was followed by the CPs of ‘limiting water and feed contamination’ (97), ‘protecting animals from adverse conditions’ (96), ‘animal treatment and record keeping’ (86) and ‘restricting the freedom of movement of animals’ (75). For the other CPs, the number of violations was lower than 36.

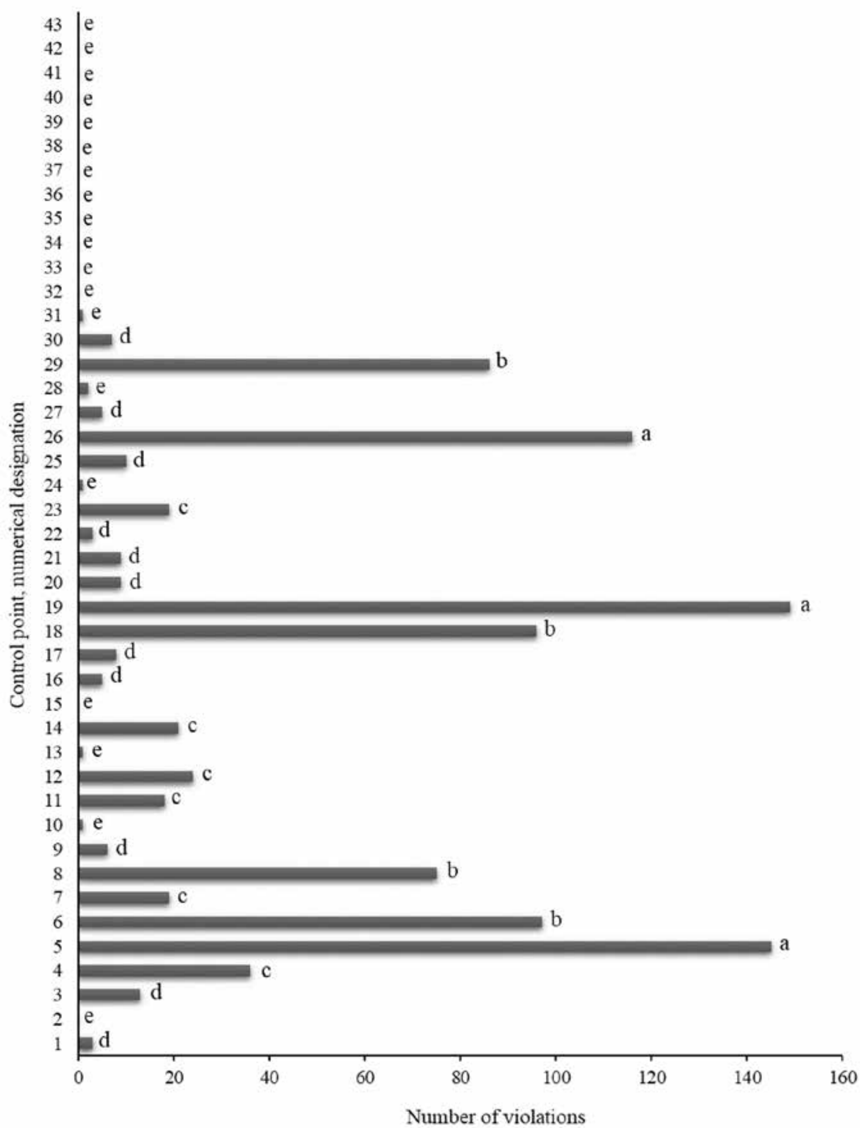

Fig. 4. Number of violations of individual control points in 2016–2020 (numerical designation of control points as per Table 1).

[a-e] Values with different superscripts are significantly different ($P < 0.05$)

When evaluating the frequency of violated CPs for the CP sub-groups (Fig. 5), the highest number of failures was found to be significant ($P < 0.05$) for the sub-groups ‘nutrition and watering’ (294) and ‘spatial requirements’ (274), with no significant difference between them ($P > 0.05$). This is followed by the ‘equipment requirements’ (167) and ‘inspection’ (121) sub-groups. For the other sub-groups, the number of defects was found to be less than 95.

When comparing the frequencies of violations of the CPs for the main groups, significantly ($P < 0.05$) more violations were found for the group ‘husbandry standards’ (768) compared to the group ‘holder duties’ (217).

For the four most frequently violated CP sub-groups, the frequency of violations by animal species was evaluated (Table 3), and it was found that significantly ($P < 0.05$) the highest number of violations was detected in cattle for the sub-groups ‘nutrition and watering’ and ‘spatial requirements’. In the other sub-groups, the numbers of violated CPs were significantly ($P < 0.05$) lower.

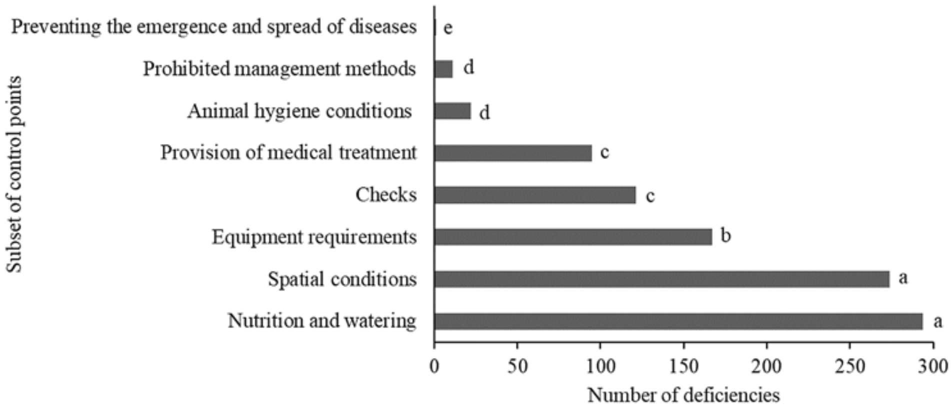

Fig. 5. Number of violations by control point subsets in 2016–2020.

[a-e] Values with different superscripts are significantly different ($P < 0.05$)

Table 3. Number of violations for the four most significant subsets of control points by livestock species in 2016–2020.

Farm animal species	Subset of control points			
	Nutrition and watering	Spatial conditions	Equipment requirements	Checks
Cattle	$148^{a,w}$	$149^{a,w}$	$82^{b,w}$	$53^{c,w}$
Sheep	$37^{a,y}$	$32^{a,x}$	$25^{a,x}$	$27^{a,x}$
Goats	$21^{a,y}$	$15^{a,y}$	$11^{a,x}$	$8^{a,y}$
Horses	$25^{a,y}$	$19^{a,y}$	$18^{a,x}$	$20^{a,x}$
Pigs	$57^{a,x}$	$48^{a,x}$	$25^{b,x}$	$7^{c,y}$
Poultry	$2^{a,z}$	$1^{a,z}$	$3^{a,y}$	$2^{a,y}$
Ratites	$0^{a,z}$	$0^{a,z}$	$0^{a,y}$	$0^{a,z}$
Farmed game	$0^{a,z}$	$0^{a,z}$	$0^{a,y}$	$0^{a,z}$
Freshwater fish	$0^{a,z}$	$0^{a,z}$	$0^{a,y}$	$0^{a,z}$
Unknown	$4^{a,z}$	$10^{a,y}$	$3^{a,y}$	$4^{a,y}$

[a-c] Values with different superscripts in rows within the same species are significantly different ($P < 0.05$)

[w-z] Values with different superscripts in columns within the same checkpoint subgroup are significantly different ($P < 0.05$)

Figure 6 shows a downward trend in the number of detected defects for the main groups of breached CPs over the period 2016–2020. This result was confirmed as significant for the 'holder duties' group (rSp = −1.000; $P = 0.017$). There was no decreasing or increasing trend in the 'husbandry standards' group (rSp = −0.100; $P = 0.950$).

Table 4. Evaluation of the trend in violation frequencies for each subset of control points between 2016 and 2020 using Spearman's correlation coefficient (rSp).

Subset of control points	rSp	*P*
Nutrition and watering	0.4000	0.5167
Spatial conditions	−0.7000	0.2333
Equipment requirements	−0.5000	0.4500
Animal hygiene conditions	−0.9747	0.0048
Prohibited management methods	−0.2237	0.7177
Checks	−0.9000	0.0833
Provision of medical treatment	−0.8721	0.0539
Preventing the emergence and spread of diseases	−0.7071	0.1817

In the assessment of the development trends for the CP sub-groups, a significant ($P < 0.05$) decreasing trend was found for the sub-group 'animal hygiene standards' during the period under review (Table 4). No decreasing or increasing trend was detected for any of the other sub-groups.

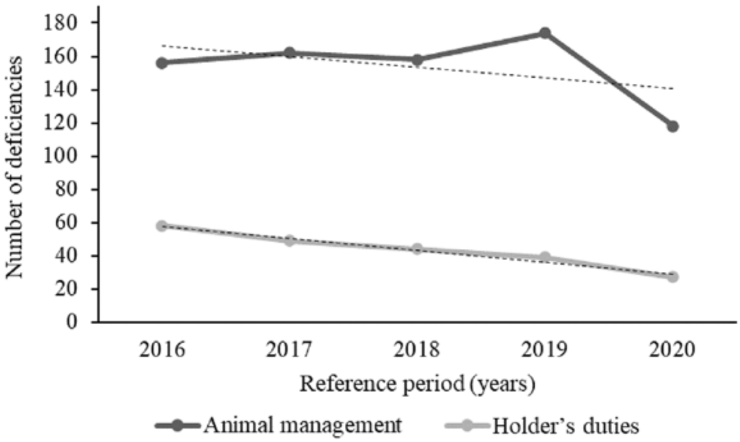

Fig. 6. Trends in the frequency of violations of the main groups of control points over 2016–2020.

Discussion

Based on the evaluation of the CP sub-groups we formed, the main deficiencies identified during the CC site checks during the 2016–2020 monitoring period were detected in the field of 'nutrition and watering', specifically related to feed, drinking water and access to it, and in the case of gilts and dry sows, sufficient fibre and ways of preventing water and feed contamination. The same results were also obtained in the research of Gottardo et al. (2002) in Italy, who found inadequate nutrition to be the main problem on large-scale beef cattle farms. The energy and protein concentrations were often above the target levels required by the animals. This presents a stress factor, as large amounts of easily fermentable organic matter reduce rumen pH and can lead to sub-clinical or clinical acidosis (Fiems et al. 1999; Cozzi et al. 2009). Humer et al. (2017) add that dairy cows affected by sub-acute ruminal acidosis show a fluctuating feed intake pattern. Poor feed quality can result in lower growth rates and poor feed conversion (Madsen and Kristensen 2005). Based on the results of veterinary welfare checks in Norway, it has been found that a common problem on dairy cattle farms is the lack of free access to drinking water for calves up to 3 weeks old. At the same time, 60% of farmers have been observed to be feeding less dairy nutrition, which means a limited fluid intake that can cause serious health complications leading to death in the case of sick calves (Johnsen et al. 2021).

Orihuela (2021) states that there may be problems in nutrition even when new feed ingredients are included in the diet. In such cases, livestock suddenly prefer a particular feed ingredient or even stop taking it altogether. This is called food neophobia. Research done by Lecuelle et al. (2011) on the effects of feed colour on behaviour and feed intake in female turkeys showed that prior visual experience did not reduce subsequent feed neophobia, but that continuity of colour facilitated diet change from one food to another.

According to Leiber et al. (2020), the availability of different feed types and ingredients should be part of the criteria to ensure ruminant welfare, as should the variability of feed texture and taste. The choice of a variety of plants and herbs is an important element for ruminants to meet their physiological needs.

The second sub-group of the most frequently violated CPs was ‘spatial requirements’. Here, most violations were found in the restriction of the freedom of movement of animals and the protection of animals from adverse conditions. These results are consistent with the findings of the study by Averós et al. (2013), which reported problems related to space quality among the most common defects found in large-scale livestock systems. Fregonesi and Leaver (2002) add that lack of space has a direct effect on dairy cow fouling and the incidence of sub-clinical mastitis. Sub-clinical mastitis is a serious economic problem for farms. One of the factors that significantly influence its presence is bedding cleanliness. To increase the level of hygiene and thus improve the welfare of dairy cows, the use of sand as bedding with its regular replacement and sanitation is advisable (Singh 2022).

Many studies have described the importance of securing space requirements in livestock holdings. In group-housed sows, lack of space increases the incidence of aggressive behaviour (Spoolder et al. 2009). Inadequate housing standards in pregnant sows further cause chronic stress. It is subsequently transmitted to the foetuses and can cause a number of health complications in piglets. This is called prenatal stress (Lagoda et al. 2022). According to Averós et al. (2010), the lack of extra space in conjunction with slatted floors has a negative effect on the daily gain of fattened pigs. In broiler chickens, high stocking rates have a negative effect on heat dissipation, growth rate, and the incidence of dermatitis when bedding standards are inadequate (Bessei 2006; Averós et al. 2013). Providing more space has the effect of reducing the incidence of agonistic behaviour and increasing the resting time of cows in individual pens (Fregonesi and Leaver 2002).

Based on their research, Brscic et al. (2011) reported that housing quality and farm management have a significant effect on the incidence of gastrointestinal disorders in calves. Specifically, it has been found that improved housing standards represent a reduction in stress for calves, improved welfare and also have beneficial effects on rumen health. A study by Johnsen et al. (2021) showed that calf morbidity is a serious problem that carries an increased risk of mortality. Averós et al. (2013) add that improving housing standards is perceived as an effective way to improve livestock welfare globally.

The third sub-group with a high number of violated CPs was detected in ‘equipment standards’, specifically the material used for animal facilities, edges and protrusions. Averós et al. (2013) point out that another important aspect of welfare is the quality of housing, i.e. the materials or equipment used. For example, when designing chutes, pens and aisles, the orientation as well as the material of the walls and roof must be considered to avoid shadows alternating strips of light and dark. These can be perceived negatively by animals due to their similarity to zebra patterns (Orihuela 2021). In pig production, the use of solid concrete and/or slatted floors that cause hoof lesions is a serious problem (Heinonen et al. 2006). The surfaces used are also highly important in dairy farming. Research done by Flower et al. (2007) shows that the surfaces on which dairy cows move have a direct effect on the quality of gait and the development of lesions. Specifically, composite rubber floors have been found to be safer compared to concrete floors, promoting better walking and reducing healing time in the event of limb injuries.

Stall ventilation systems are also often inadequate, causing respiratory disease in animals (Gorden and Plummer 2010), as is the quality of lighting, which, for example in broilers, has a major impact on growth rate and flock uniformity (Mels et al. 2023).

Environmental conditions are also highly important when weaning pigs. The difficulties in coping with the new setting are compounded by the lack of enrichment materials. It has been shown that pigs reared in unsuitable and poorly enriched areas are more aggressive than those held in settings that suit them (Beattie et al. 1996; De Jonge et al. 1996; Orihuela 2021). Lay et al. (2011) add that enriched environments in caged poultry farms allow laying hens to exhibit natural behaviours, thereby reducing frustration and stress levels. However, increased behavioural freedom can also give rise to cannibalism and predation.

The fourth largest sub-group of violated CPs was inspection, primarily related to regular daily checks of livestock. Weary et al. (2009) state that the implementation of regular and proper animal checks can ensure early detection of potential diseases through changes in animal behaviour, even before the appearance of corresponding clinical signs. According to Huzzey et al. (2007), health disorders have a major impact on the profitability of dairy herds. Diseases (e.g. diarrhoea) often spread rapidly in a group of pigs, and if not detected and treated immediately, they can result in losses such as reduced growth rate and increased mortality (Madsen and Kristensen 2005).

Flower et al. (2005) reported in their study on dairy cows that kinetic gait analysis could detect foot injuries and associated hoof disease when ongoing inflammation/fully-developed lameness was still not present. Furthermore, research by Svensson and Jensen (2007) demonstrates that by observing calf appetite using automatic milk feeders, gastrointestinal infections can be predicted before clinical signs appear. The same conclusions were reached by Huzzey et al. (2007), who showed that by observing feed intake in high-calving dairy cows one week before calving, it was possible to identify cows at risk of developing metritis after calving. Furthermore, Madsen and Kristensen (2005) found that changes in feeding and drinking regimes were usually the first visual signs of pigs experiencing environmental stress. Finally, the importance of microclimate control needs to be mentioned, especially in the case of extreme climatic conditions (Averós et al. 2013).

Comparison of the frequency of CP violations by animal species clearly showed the highest numbers in cattle. This result may have been influenced by the high numbers of registered animals during the 2016–2020 monitoring period (Czech Statistical Office 2023), which may also affect the number of inspected holdings with ‘cattle’ as registered species included in the selected CC site checks. However, Ninčáková et al. (2022) who compared the health status of slaughtered animals as indicated by postmortem inspection at slaughterhouses found the worst level of health in cattle likely resulting from inadequate farming methods. In our study, most defects in cattle were detected in the fields of ‘housing standards’ and ‘nutrition and watering’. The importance of these defects identified across livestock species is confirmed by the results of an analysis of official site checks carried out on horse farms in Sweden (Hitchens et al. 2017), where the most common problems were found in nutrition, housing standards, and inadequate care.

Based on the evaluation of trends, a decrease in the number of defects was found during the period under review in the area of compliance with the 'breeder duties' and 'animal hygiene standards'. This result supports a claim by Meyer et al. (2014) on the positive effect of the CC control system in encouraging farmers to comply with given agri-environmental standards through government aid payments. Veissier et al. (2021) add that holders value the opportunity to receive public subsidies through compliance with legislation, which they see as motivating them to do so.

In conclusion, CC checks are having a positive impact on raising the level of livestock welfare. Nevertheless, based on the results of this study, it is necessary to focus on improving the quality of nutrition in livestock holdings, providing better housing standards with regard to space and equipment used and intensifying daily checks of animals. The aim should be to continuously reduce the number of violations identified during site checks in all indicators.

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