Current practices in Greek broiler farms as related to the technical status of the establishments and equipment

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ABSTRACT

The aim of this study was to describe breeding and managerial practices performed in two main categories of broiler farms as related to their technical status i.e. years of functioning, facilities, equipment, etc. One hundred thirty two farms, randomly selected, sited in regions which represent more than 70% of the Greek broiler production were examined. A structured questionnaire was used to collect data by personal interviews with the farm managers including biosecurity measures, harvesting system, feeding and watering method, staff, microclimate in broiler house, antimicrobial therapy and information about the establishment and equipment of the farm as well as the genotype, age and population of the flock. First results indicate that biosecurity measures in farms in good technical status perceive more importance (presence of anteroom and foot bath, P≤0.05) than farms in bad status. Moreover, 93.3% of the farms in bad technical status use straw as bedding material in contrast with the 28.2 % of the farms in good status where rice hulls is used (P≤0.05). Both categories of farms rear Ross genotype while Cobb genotype is only reared in farms in good technical status (P≤0.05). Finally, water equipment differs significantly (P≤0.05) between the two farm categories. Nipple drinkers without a tray is used by 40.4% of the farms in good technical status while 58.3% the farms in low level of hygiene have water equipment with nipple drinkers with tray. This study presents preliminary results of a PhD thesis in progress aiming to investigate the prevalence of resistant strains of Escherichia Coli producing ß-lactamases in poultry farms.

Keywords: broiler; farms; technical; status; biosecurity

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Introduction

In 2014, the EU-28 produced 13 million tonnes of poultry meat, 9 % more than in 2007. Along with the imports (0.8 million tonnes) and exports (1.5 million tonnes) kept the self-sufficiency level in European Union at 103% (EC, 2016, Eurostat, 2015). In Greece, poultry production is one the most dynamic sectors in livestock industry representing the 5% of the total value of agricultural production. The country's self-sufficiency in poultry meat is about 75% while the consumption per person is between 21 to 23 kg / year (Agroepirus, 2015). 90% of poultry meat production comes from poultry industry and 10% of family farming systems, covering local needs in remote areas (Ministry of rural development, 2011). Nowadays, 94.931 broiler farms are operating with 19.376.622 chickens. The main bulk of the meat production is concentrated in the regions of Epirus (39,11%) and Central Macedonia (26,16%) (ELSTAT, 2013).

The establishments, equipment and other facilities in poultry production must meet certain standards and comply with European Regulations (CD, 1998). Several studies have shown that management strategies and hygienic aspects influence the presence of antibiotic resistance bacteria and therefore the health and performance of the birds which also arise a Public Health concern (Dierikx et al, 2012, Hering et al, 2014, Huijbers et al, 2014, Persoons et al, 2010, Vinh et al, 2015,). This study is part of a PhD thesis entitled 'Assessment of the prevalence for the presence of resistant strains *Escherichia coli* producing b-lactamases, in broilers and laying hens' aiming to investigate the prevalence of resistant genes among third generation cephalosporin resistant strains of *Escherichia coli* and to define on farm risk factors associated with this.

More specifically, the study aims to define the differences in managerial practices between two main categories of broiler farms as related to their technical status, i.e. good technical status and bad technical status.

Materials and methods

One hundred thirty two broiler farms were randomly selected in regions which represent more than 70% of the Greek broiler production. The farms were visited between June 2014 and July 2015 and a structured questionnaire was used to collect data by means of personal interview with the farmers. This was consisted of 9 sections.: 1.General information for the farm, 2. Information about the birds, 3.Information about the poultry houses and managerial practices, 4. Information about cleaning and disinfection, 5. Information about biosecurity measures, 6. Information about feeding and watering, 7. Information about the collection system of the birds, 8. Information about the personnel and 9.Information about disease prevention and treatment (Natsos et al, 2015, Xexaki et al, 2016).

The farms were divided in two categories, farms in a good technical status (GTS) and farms in a bad technical status (BTS). Farms in GTS were defined as farms with houses newly constructed (≤10 years) or older but well preserved, in which the construction material was suitable for cleaning and disinfection and the equipment was well preserved without corrosion. On the contrary, farms in BTS were defined as farms with old houses (>10 years), made of concrete or stones that is more difficult to be disinfected and in which the equipment was not well preserved.

A database was set up connecting the data from different sections of the questionnaire and SPSS was used to analyze this data by the chi-square test. The 0,05 level of significance was considered for the acceptance or rejection of the statistical hypothesis.

Results and discussion

In total 132 intensive broiler farms were enrolled in the study. They were randomly selected in order to represent regions that cover more than 70% of the broiler production in Greece. 85 were located in Central Macedonia, 40 in Epirus and 7 in Attiki. The visits were distributed throughout the year and all flocks were originated from four

hatcheries. The 'all-in all-out' management scheme was employed by all farms under study. House sizes ranged from 4.000 to 35.000 animals with a mean number of 20.000 animals per house. The fattening period in the flocks ranged from 1 day to 45 days with a mean number of 18 days while the bird's weight ranged from 100 gr to 1.200gr with a mean weight of 703gr. 70% of the farms reared the Ross breed and only 22% the Cobb breed. As for the

infrastructure, 31.5% of the farms had three poultry houses, 22.6% had seven following by 2, 4, 1, 20, and 5 poultry houses. The age of the buildings ranged from 3 years to 35 years with a mean number of five years. Almost 90% of the farms used drilling as water supply and 10% used water from the mains water supply. Only 15 farms used to treat drinking water and all of them used peroxide.

Table 1 Frequency of occurrence of different factors-managerial practices

FACTOR	CATEGORY	FREQUENCY OF OCCURENCE		P value
		BTS	GTS	
Bedding material	Straw	93.3%	28.2%	P≤0.00
	Rice hulls	0%	58.8%	
	Other	6.7%	12.9%	
Genotype	Ross	87.5%	76.9%	P≤0.025
	Cobb	0%	20.9%	
	Other	12.5%	2.2%	
Water equipment	Nipple drinkers with tray	58.3%	40.4%	P≤0.00
	Nipple drinkers without tray	0%	56.2%	
	Other	41.7%	3.4%	
Presence of anteroom	Yes	20%	90.9%	P≤0.00
	No	80%	9.1%	
Presence of foot bath	Yes	0%	82.8%	P≤0.00
	No	100%	17.2%	

Four managerial factors were found to be associated with the technical status of the farms as following. Bedding material was found to have a strong correlation with the technical status of the farms. More specifically, farms in BTS mostly use straw (93.3%) and no rice hulls whereas farms in GTS use both but prefer rice hulls (58.8%) (P≤0.05). Rice hulls and straw were the most common material used by the farmers. Although rice hulls are more expensive, they are considered to be a better bedding material because they are typically free from excessive dust and provide a better insulation against cold.

Straw can also be used as bedding material although it compacts easily, it is not very absorbent and there is always the possibility of mycotoxins. Furthermore, the water equipment was correlated with the farm category: farmers in farms in BTS tend to use nipple drinkers with tray (58.3%) for the watering of the birds and do not use nipples drinkers without tray while this is the most preferable water equipment (56.2%) in GTS farms (P≤0.05). The main advantage of nipple drinkers with tray is that when the water supply is higher, the tray prevents the spilling water ends up on the bedding. However, they

are more difficult to clean and disinfect and the water, that remains along with the bedding material transferred by the birds, might influence bacterial growth. Regarding the birds breed, both farm categories use to rear the Ross genotype with the only exception in GTS farms where the Cobb genotype is also reared (20.9%) ($P \leq 0.05$). Last but not least, biosecurity measures (presence of anteroom and foot bath) differs a lot in the two categories of farms. Farmers owing farms in GTS give greater importance to the implementation of biosecurity measures as they realize their importance in animals health and well-being. More specifically, anteroom exists in 90.9% of GTS farms and only in the 20% of BTS farms. Foot baths exists in 82.8% of GTS farms and at the same time the total (100%) of BTS farms do not have foot baths at the poultry house's entrance ($P \leq 0.05$). Table 1 presents the frequency and significance of occurrence of different factors-managerial practices in the two categories of farms.

Conclusion

It was concluded that a significant correlation exists between the technical status of farms and the managerial practices farmers commonly use. Further research is needed in order to exploit the relationship between the above parameters and the health and welfare status of the broilers at farm level.

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