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## THE EFFECT OF BROILER CATCHING METHOD ON QUALITY OF CARCASSES

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### ABSTRACT

Mechanical and hand catching of broilers were performed to determine if differences existed in breast meat quality among catching methods. This monitoring was performed on six farms. Cobb 500 and Ross 308 hybrids were used in this experiment. The qualities of the carcasses were assessed at slaughterhouse in Jevíčko and occurrence of following damages was recorded: contusions, luxation, fractures, bruising and mechanical damage. All carcasses were classified into one of the three quality classes on the base of the damage and weight and shape.

There was considerable difference between carcasses quality of broilers caught mechanically or manually. Statistically significantly higher quality of carcasses ( $P < 0.05$ ) was found in the broilers caught manually.

**Key words:** broiler, catching method, carcasses

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## INTRODUCTION

Over the past 15 years, the European processing industry has gradually increased the availability of poultry meat in a large variety of processed ready-meals, following market trends from North America (Magdeleine et al., 2008). This shift towards further-processed products has underscored the necessity for higher standards in poultry meat quality in order to improve sensory characteristics and functional properties (Fletcher, 2002). Resulting quality of the meat is associated to post-mortem modifications which take place during conversion of muscle to meat. These modifications are strictly related to events occurring during the pre-slaughter period, slaughtering and processing of poultry (Northcutt et al., 2003). An understanding of the major issues contributing to meat quality traits is essential if producers are to generate poultry meat of high quality and uniformity (Petracci et al., 2010).

At the end of grow out phase of broiler production essentially all broilers are caught and loaded into coops or cages (Lacy et Czarick, 1998). Catching and loading of the birds might be the most important process of all, because if birds are injured during this process, it could have a profound effect on their responses to the rest of their journey to the slaughter plant (Whiting et al., 2007). Catching and loading could be performed manually or mechanically (Schwartzkopf-Genswein et al., 2012). Virtually every aspect of broiler production has been automated over the past few decades except for the catching process. Catching broilers is a backbreaking, dirty, and unpleasant job (Lacy et Czarick, 1998).

Broilers are usually caught by hand and carried in an inverted position prior to placement in crates (Nijdam et al., 2005). During the movement of broilers from farm through the slaughtering process, bruising can occur. (Nijdam et al., 2004). Based on histological research of bruised tissue Schilling et al. (2008) concluded that 40 % of bruises recorded at processing plants originate from catching and crating. Besides bruises, catching and crating can lead to broilers that are dead on arrival (DOA) (Nijdam et al., 2004).

Bruising and injury to birds during the catching and crating process are significant concerns to broiler procedures both from an economic and bird welfare viewpoint (Lacy et Czarick, 1998). The concern for welfare of animals and people has led to the production of mechanical catchers that are currently in use in the poultry industry (Schilling et al., 2008). Possible benefits and advantages of mechanical harvesting over hand catching include lower costs, less bird stress, and fewer bruises and injuries to broilers. Mechanical harvesting promises to improve working conditions for live haul personnel as well (Lacy et Czarick, 1998). This method prevents broilers from being carried in an inverted position and from coming into direct contact with people during the catching and crating procedure (Nidjam et al., 2005).

The aim of study was to evaluate the effect of catching process on quality of carcasses.

## MATERIAL AND METHODS

Hybrids Cobb 500 and Ross 308 from 6 flocks were used in this study. Two different catching methods were used; mechanical and manual. Broilers were caught manually on 2 farms and mechanically on 4 farms. Chicken Cat machine (peer system) was used for mechanical catching. The distance from farms to slaughterhouse was from 39km to 93km.

The evaluation of the influence of catching method on carcasses quality was conducted from June to September. In terms of mechanical catching 181 truck were evaluated, it means 1.36 million broilers and 417 truck were loaded manually, which corresponds to the number of 2.15 million broiler.

The observation was carried out at slaughterhouse RABBIT Trhový Štěpánov a. s. commercial premises Jevíčko.

From each farm broilers from one truck were evaluated for carcasses quality. Location of the evaluation was at the platform next to the veterinary supervision. It means that approximately 5000 carcasses were observed from each farm. We observed bruises on the wings, thighs and breast meat, fractures and luxation of wings and thighs, bruising, mechanical damage and classification into quality categories.

Classification of carcasses into quality classes was done by authority (the master) at the slaughterhouse. Steinhauser et al. (2000) noted that quality classes I. and II. are considered as standard meat quality. The difference between these classes is the meatiness, age, size of broilers and processing quality. Broilers which are not very different from standard are included into grade II. Not-standard carcasses are classified into grade III. Data were statistically processed in the Unistat 5.1 program.

## RESULT AND DISCUSSION

A total of 43,414 broilers were evaluated at the slaughterhouse during the experiment. Hand catching was applied to 12,000 broilers. The average age of broilers before slaughter was 40 days and an average body weight was 1.97 kg. Mortality of broilers who were caught hand was zero. The reason for this was that this factor was eliminated by workers. Workers left dead broilers on the farm and the broilers were not transported to the slaughterhouse. Mechanical catching was used by 31,314 broilers. The average age of broilers was 36.5 days and an average body weight was 1.98 kg. Mechanical catcher cannot recognize the difference between a dead and a live broilers and therefore loaded all broilers. The result of this was 49 pieces of dead broilers per loaded truck.

*Tab. 1 Comparison of mechanical and hand catching*

Characteristic parameters	Unit	Mechanical catching	Hand catching
<b>Number</b>	pcs	31,314	12,1
<b>Age</b>	days	36.5	40
<b>Body weight</b>	kg	1.98	1.97
<b>Contusions on wings</b>	%	3.8	3.77
<b>Contusions on thighs</b>	%	0.83	0.69
<b>Contusions on breast</b>	%	0.94	0.56
<b>Luxation of wings</b>	%	2.15	1.38
<b>Luxation of paws</b>	%	0.01	0.02
<b>Broken wings</b>	%	0.15	0.03
<b>Broken paws</b>	%	0	0
<b>Bruises on thighs</b>	%	0.02	0.04
<b>Bruises on breast</b>	%	0.08	0.32
<b>Technological damage*</b>	%	1.32	0.63

\* Damage of carcasses during processing at slaughterhouse

The average occurrence of defects in the carcasses is shown in Tab. 1. A higher incidence of defects in the carcasses with a value of 7.98% was found for mechanical catching. Hand catching caused 6.8% of the observed defects in carcasses. Contusions of wings were observed most frequently in both methods of catching. Higher occurrence of carcasses technological damage (caused during processing at slaughterhouse) was observed in flocks with poor uniformity.

Cachectic chickens were too much steamed in steam baths and on the other hand skin damage and breast meat damage occurred in large broilers in plucking.

A classification carcass into quality grade is an indicator that is influenced by many factors. The important factor is the level of breeding and fattening technology. Furthermore season when broilers are fattened, body weight and method of catching may affect the inclusion carcasses into quality grades. Tab. 2 shows the results of the effect of the catching methods on classification of carcasses into quality grades, regardless of the month, when broilers were fattened.

Tab. 2 Effect of catching methods on classification carcasses into quality grades

Quality grade	Mechanical catching	Hand catching
	Average $\pm$ SE	Average $\pm$ SE
<b>1. category</b>	94.8 $\pm$ 0.11 <sup>a</sup>	94.0 $\pm$ 0.34 <sup>b</sup>
<b>2. category</b>	0.67 $\pm$ 0.094 <sup>a</sup>	1.04 $\pm$ 0.183 <sup>b</sup>
<b>3. category</b>	4.57 $\pm$ 0.033 <sup>a</sup>	4.96 $\pm$ 0.196 <sup>b</sup>

On average, 94.8% of the broilers caught by hand were included into the first quality grade. The standard error was 0.11. For mechanical catching 94% of the broilers were included into the first quality grade. The standard error was 0.34. Statistically significant difference in classification into the first quality grade for hand and mechanical catching was found ( $P < 0.05$ ). Classification of broilers into the second quality grade was lower ( $P < 0.05$ ) for hand catching. Averaged 0.67% broilers (the standard error was 0.094) were included into second quality grade. The result of mechanical catching was 1.04% of broilers in second quality grade with a standard error 0.183. Statistically significant difference ( $P < 0.05$ ) was found in classification of broilers into the third quality grade. This classification was higher (4.96%) for mechanical catching compared with hand catching (4.57%).

The effect of catching methods of broilers on carcass quality is substantial. Statistically significantly higher quality of carcass ( $P < 0.05$ ) was for hand catching. This result may be due to the fact that workers come into direct contact with broilers. Little or bad broilers remain on the farms.

If the hall is unloaded by hand, the hall has a capacity of 60,000 broilers and number of workers is 20, then 6 tons of meat passes through the hands of every workers. Mechanical catching began to develop so that the working conditions and welfare of broilers was improved. Shilling et al. (2008) reported that the first test of the mechanical catching was conducted in the seventies of the 20<sup>th</sup> century.

Results of effect of catching methods on chicken welfare are contradictory. The effect of catching methods to injury of broilers monitored Erkstrand (1998) and he evaluated a higher incidence of injured broilers for mechanical catching. This result is consistent with the results of this work. On the other hand Knierim et Gocke (2003) found a significantly lower incidence of injured chickens for mechanical catching. Nidjam et al. (2005) found no statistically significant effect of catching methods on damage of carcasses. The difference in results may explain the argument that great importance is the driver of catcher (Kettlewell et Turner, 1985). The development of mechanical catcher should eliminate the influence on the minimum value.

## CONCLUSIONS

The experiment evaluated the effect of hand and mechanical catching of broilers on the occurrence of injury of broilers and classification of carcasses into quality grades. Based on the analysis of about 43,000 carcasses from six farms can be summarized that the most frequent contusions and luxation were found on the wings. Broilers which were caught mechanically had a higher

incidence of contusions on breast and thighs. The general incidence of injury carcasses was higher for mechanical catching. Methods of catching had significant effect ( $P < 0.05$ ) on the classification of carcasses into quality grades, especially in the second and third categories. The use of mechanical catching has many advantages. However, this is a new system and farmers have almost no experience with it. The development of mechanical catching should target the technology of catching, in order to remove deficiencies that affect the classification of carcasses into quality grades.

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