



Original Contribution

SLAUGHTER ANALYSIS PROTOCOL IN EXPERIMENTS USING JAPANESE QUAILS (*COTURNIX JAPONICA*)

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SUMMARY

Frequently, the slaughter analysis manipulations reported in scientific literature are not presented in detail due to restrictions of publication lengths. Therefore, the readers often fail to understand what exactly the processing of carcasses includes and they are not able to compare data from different sources. This motivated our aim to present in a most detailed manner and to illustrate the consecutive steps of manipulations related to slaughter analysis in experiments with Japanese quails. The exact sequence of manipulations related to slaughter analysis in experiments using Japanese quails is presented and is illustrated in the best possible way. The methods of euthanasia in line with the latest normative requirements, the cleaning, evisceration and dressing of carcasses are explained accordingly. Detailed information about the consequent steps of carcass deboning is also provided. All steps are illustrated by three **Figures** consisting of 24 photographs.

Key words: Japanese quails, slaughter analysis

INTRODUCTION

Recently, public opinion throughout the world showed a serious concern with regard to humane treatment of animals. All that is reflected in a number of normative documents (EC regulations, laws and decrees). The protection and humane attitude to animals and birds in particular, are covered by the Law on Animal Protection from 2008 (1) and the Order No 25/2005 (2) about the minimum requirements with regard to the humane approach of layer hens rearing, in the EC regulation 1/2005 for animal protection during transportation (3). The requirements about the density and the microclimate in animal rearing facilities largely reflect the new concepts of animal comfort and welfare (4). When handling experimental animals, researchers should conform to the requirements of art. 152, p. 2 of the Law on Veterinary Medical Activities from 2005 (5) and Order No 15/2006 (6) that guarantee the protection and humane attitude to experimental animals.

From many years, Japanese quails (*Coturnix Japonica*) have been widely used in

experimentation. Apart from being utilised as models, most commonly in feeding (7, 8) and selection trials (9), during the past two decades, Japanese quails turned out to be a species with a serious potential in human economic activity. The egg production is more popular in Eastern Asia while in Brazil, the USA and Europe, more serious attention is paid on meat production, thus requiring investigations in the field (10, 11). The production of meat from Japanese quails, limited at present, is one of the main reasons for the inadequate and often almost not available literature on meat production technologies and cut charts in birds from this species.

Frequently, the slaughter analysis manipulations reported in scientific literature are not presented in detail due to restrictions of publication lengths. Therefore, the readers often fail to understand what exactly the processing of carcasses includes and they are not able to compare data from different sources. These flaws motivated our purpose to present in a most detailed manner and to illustrate the consecutive steps of manipulations related to slaughter analysis in experiments with Japanese quails.

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MATERIAL

In the present study, Manchurian Golden Japanese quails were used. This breed has been reared for four years in the Poultry breeding section at the Trakia University. Our quail population could be characterized as belonging to the general purpose type with live body weight of sexually mature birds of 240-270 g (females) and 200-230 g (males). The birds of this breed have good fattening performance and excellent meat quality.

The illustrations in this study were made with digital photo camera *Canon Power Shop A 450* and then organized by means of *Photoshop CS 3* software.

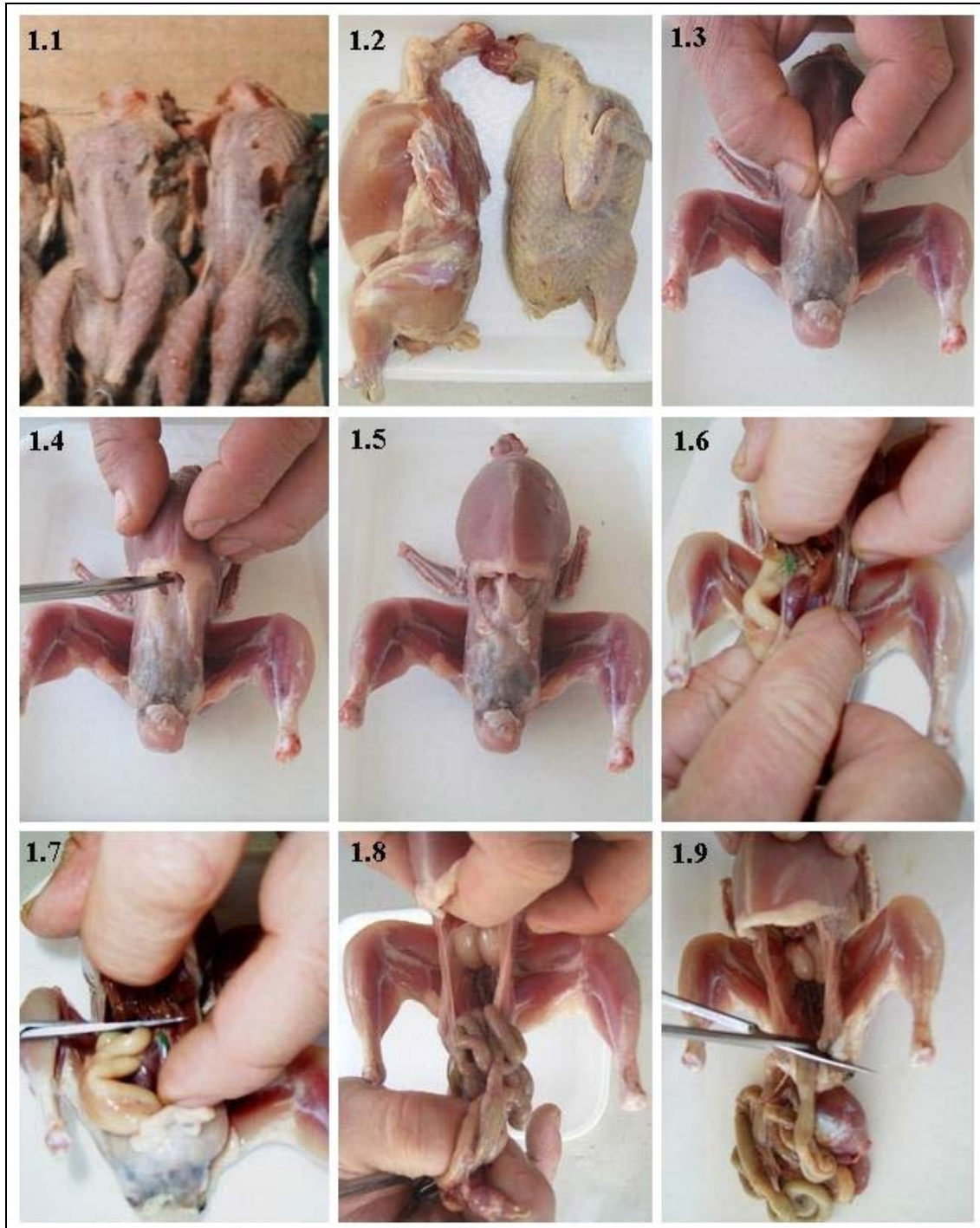
SLAUGHTER ANALYSIS METHOD

According to Article 152, paragraph 2 of the Law on Veterinary Medical Activities from 2005 (5), animal experimentation is allowed for the purpose of developing and producing safe foods and food additives for animals and humans. The slaughter analysis performed to evaluate the quality of meat should be necessarily preceded by pre-slaughter withdrawal of food from the animals. Its duration depends on the avian species and is a function of the rate of feed masses' passage through the gut. Pre-slaughter food withdrawal should last enough to ensure the absence in the alimentary tract of food matters, but also should not last too much and to result in weight loss. In Japanese quails, the alimentary tract is emptied in about 3.5-4 h after the last food intake (12). When performing experiments with birds, they should be euthanised in accordance with normative requirements of Order 15/2006 (6) for humane attitude and protection of animals, i.e. by disruption of the spinal cord (cervical dislocation). Three variants of this manipulation are possible – by fixation of bird's body with one hand and its head with the other, followed by abrupt twisting of hands in opposite directions until the spinal cord is separated from the brain. The second way requires grasping of bird's head with one hand and with a sharp whip-like movement and spinal cord interruption under the influence of the bird's own weight. A third way could use decapitation by means of a pair of scissors. When using the first two approaches, depending on the momentary condition of the operator, there is a risk of not applying of the exact amount of force and of not achieving the desired result; further, the failure would prolong the suffering of the bird in contradiction to the principles of the Law

on Animal Protection from 2008 (1). Our experience has shown that the third variant is the most appropriate because it occurs instantly without excessive stress on the bird. The cut in this manipulation passes on the boundary between the head and the first cervical vertebra. After the exsanguinations, the metatarsal part of the legs is separated on the level of the tarsal joint and the body is cleaned from feathers. The last procedure is determined by the bird's age and the related skin strength and elasticity on one part and the intensity of feather fall off. The most intensive feather fall off in Japanese quails occurs between the age of 30 and 40 days, i.e. when slaughter maturity is achieved. By that time, the skin is not sufficiently elastic. All that highly impedes the proper removal of feathers from the carcass without damage of the skin. Such carcasses have a poor commercial appearance and are not attractive for consumers (**Photo 1.1**). The lack of subcutaneous connective tissue in birds facilitates the removal of the skin together with feathers. For this purpose, the wing ends should be cut through the carpal joint. Regardless of the mode of carcass processing (with or without skin – **Photo 1.2**), the consecutive steps of evisceration are as follows: the carcass is placed in dorsal recumbence and after applying a gentle pressure on the soft abdominal wall just behind the sternum, a skin fold free of viscera is formed (**Photo 1.3**). Then, by means of thin sharp scissors, a short (0.5 cm) transverse incision is made (**Photo 1.4**), that is then bilaterally extended in the direction of the vertebral column (**Photo 1.5**). Through the abdominal incision, the liver is fixed with the fingers of one hand and the other alimentary organs that are to be removed are gently shifted caudally (oesophagus with crop, proventriculus and gizzard, small and large intestines, pancreas). Thus, the gallbladder is exposed and could be well noticed (**photo 1.6**). It is attached to the liver and connected to the duodenum through *Ductus hepatoentericus communis* and *Ductus cysticoentericus*. With the scissor tip, the *Ductus hepatocysticus* and above-mentioned ducts are cut (**Photo 1.7**) and with a pulling movement of the hand the oesophagus and the crop could be taken out. This is followed by the removal of the remaining part of the alimentary tract (without the liver) from the caudal region (**Photo 1.8**) and through a body incision just in front of the coccygeal vertebra (*pygostyl*) (**Photo 1.9**). The next procedures include removal of edible viscera from the

body cavity – heart, liver, spleen, testes or ovary. The viscera are weighed and their proportion to the total body weight of the quail is determined. After the evisceration, the neck is separated by means of scissors, the cut passing on the boundary between the last cervical and the first thoracic vertebrae. The

cleaned carcass devoid of neck and giblets makes the so-called “grill cut”, that is fundamental in the slaughter analysis in poultry breeding and in industrial poultry meat production (**Photo 2.1**). The relative proportion of the grill cut vs. the live body weight is the slaughter yield



A catalogue of photographs showing: 1.1 Poor commercial appearance; 1.2 Carcass with (right) or without (left) skin; 1.3 Pressure on the soft abdominal wall just behind the sternum; 1.4 Transverse incision; 1.5 Bilaterally extend; 1.6 A gallbladder; 1.7 Cut of liver ducts; 1.8 Eviscerate; 1.9 Cut of the viscera.

Then, the carcass without giblets could be further parcelled into “bone-in breast”, “leg” (thigh and drumstick), “wings” and “ribcage”

(hip, fused lumbar and sacral vertebrae, thoracic vertebra with ribs and scapulas). The separation of breast from the carcass is

performed with scissors from the caudal end of the *Carina sterni*. With the carcass in lateral recumbence, the cut is directed in a cranio-lateral direction along the lateral border of pectoral muscles (**Photo 2.2**). Then the incision continues horizontally through the cartilage joining both rib parts (sternal and vertebral) and is directed to the shoulder joint (**Photo 2.3**). These cuts are made on both body sides, together with removal of breast meat from the carcass. The “bone-in breast” cut includes the pectoral muscles, the sternum, the sternal rib part, the clavicle and coracoid

bones (**Photo 2.4**).

The thighs are separated by means of an incision on the ventral side of the hip joint, passing over the femoral head (**Photo 2.5**). The wings are separated through the shoulder joint cut. The other part of the carcass, including hip bones, the fused lumbar and sacral vertebrae, the thoracic vertebra with the vertebral part of ribs and the scapula form the so-called “ribcage” market cut. The obtained cuts (**Photo 2.6**) are weighed and the proportion of each one vs. the live body weight or vs. the grill weight is determined.



A catalogue of photographs showing: 2.1 Cleaned carcass; 2.2 and 2.3 Cut of the breast; 2.4 Breast; 2.5 Cut of the legs; 2.6 Separated parts of body.

The deboning of breast is done by cutting the pectoral muscles with a sharp blade on both sides of the sternum (**Photo 3.1**). Then the clavicle is liberated by incision of muscles around its ends. After dissecting the bond between the sternum and the narrowed part of the V-shaped clavicle, the latter is removed by hand in a direction opposite to its normal position (**Photo 3.2**). The separated breast muscles are then freed from the sternal part of ribs and coracoid bones (**Photo 3.3**).

The deboning of thighs is performed

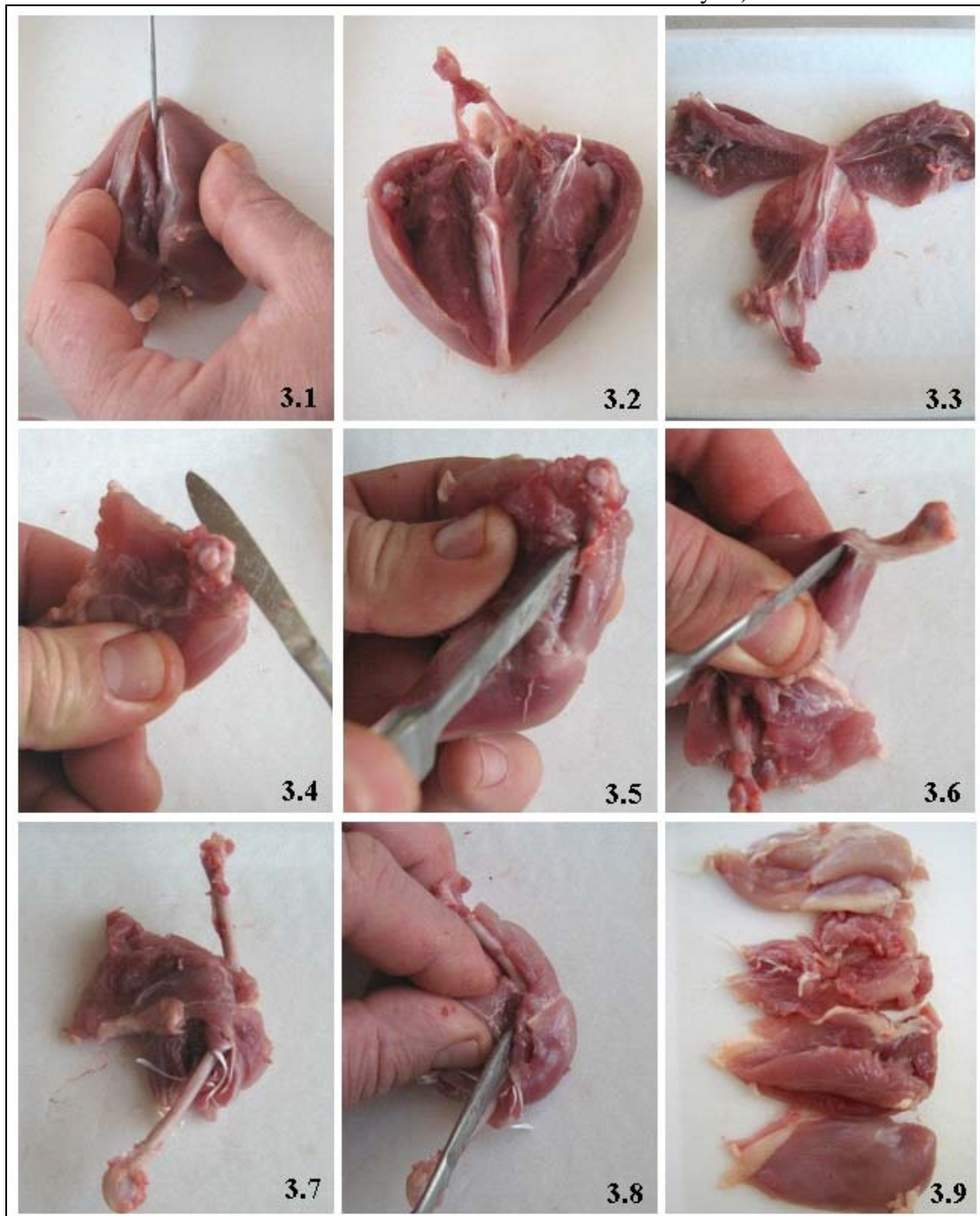
with a circular dissection in the region of the femoral neck (**Photo 3.4**). After that, the musculature is dissected medially to the femur in the direction of the knee joint (**Photo 3.5**). After fixation of femoral head and trochanter with one hand, a blunt dissection of thigh muscles on the lateral side to the knee joint region is made with the other.

The deboning of the drumstick begins with dissecting the fascia of crural muscles with two cuts of the plantar and cranial tibial surfaces (**Photo 3.6**). After fixation of the distal end of the tibia with one hand, the crural

musculature is bluntly dissected in the direction of the knee joint (**Photo 3.7**). The muscles are separated from the joint on the side of the medial surface (**Photo 3.8**). After the dissection, the patella remains linked to the joint.

The boneless meat from the breast and

the legs (**Photo 3.9**) is weighed and the proportion vs. the grill weight is determined. Boneless breast and leg meat could be used for further analyses of meat quality (pH, water retention capacity, colour) or for chemical analysis (total chemical analysis, amino acid, fat acid or mineral analysis).



A catalogue of photographs showing: 3.1 - 3.3 Debone of the breast; 3.4 – 3.8 Debone of the legs; 3.9 Boneless meat from breast and legs.

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