Annals of Warsaw University of Life Sciences – SGGW
Animal Science No 53, 2014: 67–72
(Ann. Warsaw Univ. of Life Sci. – SGGW, Anim. Sci. 53, 2014)

Effect of sex on results of slaughter analysis of grey partridge *Perdix perdix*

AGNIESZKA WNUK[1], MONIKA ŁUKASIEWICZ[1], NATALIA MROCZEK-SOSNOWSKA[1], JAN NIEMIEC[1], BARTŁOMIEJ POPCZYK[2], MAREK BALCERAK[1]
[1] Department of Animal Breeding, [2] Department of Animal Environment Biology
Warsaw University of Life Sciences – SGGW

Abstract: *Effect of sex on results of slaughter analysis of grey partridge Perdix perdix.* The experimental material included grey partridges *Perdix perdix* planned for re-introduction into the natural habitat, reared at the Center of Game Breeding on the area of Mazovia Province. 10 hens and 10 roosters were selected for slaughter. After exsanguination, plucking and evisceration, the birds were cooled for 24 h to a temperature of 4°C. The carcasses were subjected to dissection to enable determination of dressing percentage and calculation in the carcass contents of: breast muscles, leg muscles, adipose fat and giblets. The study showed no effect of sex on results of slaughter analysis of grey partridge.

Key words: grey partridge, dressing percentage, game

INTRODUCTION

It is estimated that ca. 94 species of partridges occur worldwide. They belong to the galliforms order (Galliformes), pheasant family (Phasianide) and partridge subfamily (Perdicinae). Most of these birds inhabit open areas. Likewise pheasants, they are mainly represented by settled, non-migrating species. In Poland, grey partridge *Perdix perdix* occurs on the entire area of the country. This species inhabits open areas and prefers habitats with high biological productivity (clumps of bushes, belts of brushwoods, midfield shrubs, foliage-fields) and with good access to water (Okarma and Tomek 2008). Partridges have been hunted for years but today this tradition is abandoned due to a significant decrease in the population number of these species on hunting grounds. Contemporarily, game birds appear on tables sporadically. However, in some homes and cultures, the hunter's cuisine is still meticulously cultivated and brings the plentitude of ideas, courses and flavors onto our tables. Unfortunately, numerous changes in the natural habitat of birds caused their lower number on hunting grounds (Panek 2012). The tradition of bird hunting is vanishing, however, hunting for pheasants and partridges is still popular in some regions of Poland, especially these where environmental conditions are unfavorable to the big game (Rancew-Sikora 2009).

Game meat has for years been playing the most significant role among meat courses. Partridge game is highly valued by consumers as the most delicate and

the most tasty meat of all game birds (Łebkowska and Łebkowski 1995). Only a few species of birds are still economically significant, therefore bird hunting has lost its commercial character. Nevertheless, in some countries, courses prepared from wild fowl are a local delicacy, are perceived as a luxury course, often claimed a tourist attraction (Wnuk et al. 2013), They are, simultaneously, a valuable dietary complement and variety (Wójcik et al. 2010).

The aim of this study was to determine the effect of sex on results of slaughter analysis of grey partridge.

MATERIAL AND METHODS

The experimental material included grey partridges *Perdix perdix* planned for reintroduction into natural habits, reared at the Game Breeding Center on the area of Mazovia Province.

Complete feed mixtures were applied in the rearing period. In first 4 weeks of birds life, the feed mixtures contained: 29% of total protein, 11.5 MJ of metabolizable energy and 3.6% of crude fiber. Since 6^{th} till 10^{th} week of birds life the mixtures contained: 23% of total protein, 11.5 MJ of metabolizable energy and 4% of crude fiber. From 10^{th} week of birds life till the end of rearing, the birds were fed diets, with a daily feed ration including up to 50 g of wheat and maize grain and *ad libitum* grass which included a mixture of maize, sunflower, alfalfa, grasses and marrows stem kale.

For first 4 weeks, partridges were kept indoors. Since then, they had free access to rearing aviaries that were partly roofed, with the roof covered with an electric cord to protect against predators. The aviaries with gravel-sand bottom were planted with vegetation and possessed natural hideaways in the form of rootstocks and large stones.

10 hens and 10 roosters aged of 14 weeks were selected for slaughter. After exsanguination, plucking and evisceration, the birds were cooled for 24 h to a temperature of 4°C. Cooled carcasses were weighed and subjected to a simplified carcass analysis according to methodology provided by Ziołecki and Doruchowski (1989). Dissection was performed at the laboratory of the Department of Poultry Breeding, Warsaw University of Life Sciences – SGGW. Once the carcasses had been cooled, dissection was performed to enable determining dressing percentage and calculating in the carcass contents of: breast muscles, leg muscles, abdominal fat and giblets.

Results achieved were elaborated statistically with the use of Student's t-test in SPSS 19.0 PL software (SPSS Inc., Chicago, IL, USA). Differences were found significant at $P \leq 0.05$ and $P < 0.01$.

RESULTS AND DISCUSSION

The conducted experiment did not show any differences in results of the slaughter analysis between sexes of grey partridge (Table 1). Body weight of roosters

TABLE 1. Results of slaughter analysis [g] of grey partridge *Perdix perdix*

Group	Body weight		Breast muscles		Leg muscles		Fat	
	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$	SE
♂♂	387.33	12.50	73.68	4.16	40.67	2.08	2.00	0.00
♀♀	380.67	12.22	83.67	4.16	45.33	11.24	1.33	0.57

was higher (387.33 g) than that of hens (380.67 g). A similar tendency was demonstrated by Kokoszyński et. al (2013), however, in their study the final body weight of birds was definitely lower and reached 301.8 g in roosters and 299.5 g in hens. Body weight of grey partridge changes in the annual cycle. Since November till January, they reach the maximum body weight, whereas since June till August, namely in the breeding period, they reach the lowest body weight. significantly higher body weight reaching ca. 460 g is reported for rock partridges *Alectoris graeca*. When reared in closed runs, they reach a significantly ($P \leq 0.01$) higher body weight of ca. 480 g (Ozdemir and Esen 2006).

In the conducted experiment, dressing percentage was similar in both sexes and reached ca. 68% (Table 2). According to Adamski (2012), carcasses of partridges are characterized by high dressing percentage of ca. 71.1%, which is similar to

TABLE 2. Results of slaughter analysis (%) of grey partridge *Perdix perdix*

Group	Dressing percentage		Breast muscles		Leg muscles		Fat	
	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$	SE
♂♂	68.55	3.58	26.78	2.49	15.37	2.08	0.65	0.05
♀♀	68.34	2.05	32.30	2.71	17.47	11.24	0.53	0.23

Males weigh from 340 to 410 g, and females from 350 to 395 g (Krupka 1986). Putaala and Hissa (1995) demonstrated that partridges reared in closed runs had higher ($P < 0.05$) body weight compared to wild birds. A similar tendency may be observed in case of pheasants. Many authors (Hofbauer et al. 2010, Brudnicki et al. 2012) point to differences between birds reared in the hunting ground and birds reared in aviaries. Among partridges being of dietary importance, a dressing percentage of broiler chickens that accounts for 70–71% on average in the EU Member States (Łukaszewicz 2008). Kokoszyński et al. (2013) also showed no effect of sex on dressing percentage, demonstrating a slightly higher value of this parameter at 72.1–72.4%. In turn, Łukasiewicz et al. (2011) demonstrated the effect of sex in pheasants, where dressing percentage was lower in roosters (71.90%) compared to hens (73.50%). The study of Ozdemir and

Esen (2006) shows that dressing percentage of rock partridge ranges from 71.88 to 72.85%. In the group of game birds, a similar dressing percentage as in our study was demonstrated for game pheasants: 70.4–70.8% (Kokoszyński et al. 2011), and slightly lower one for Mallard duck: 64.9–65.9% (Murawska et al. 2013), and for hazel grouses: 65.5% (Dzierżyńska-Cybulko and Fruziński 1997).

In our study, roosters were characterized by a higher percentage content of breast muscles and leg muscles, and a lower content of fat compared to hens. As reported by Adamski (2012), the content of breast muscle in partridge carcass reaches ca. 24.4%, that of leg muscle – 14.8%, and that of fat – 3–4% (skin + fat). In turn, Kokoszyński et al. (2013) demonstrated higher percentage contents of breast muscles at 30.7–31.1%, legs at 17.0–17.4%, and fat with skin at 5.3 – 5.5%. Similar contents of breast and leg muscles are found in game pheasants (27.5 and 19.1%). All cited works and our study showed no effect of sex on the percentage content of muscles.

No differences were demonstrated in the edible giblets between sexes of grey partridge (Table 3). Roosters were characterized by a higher mass of liver (7.67 g) and gizzard weight (6.67 g) compared to hens (5.33 and 6.00 g, respectively). The heart weight was equal in both sexes (3 g). In terms of percentage content in the carcass, a higher content was determined for liver and gizzard in roosters and for heart in hens. According to Adamski (2012), the content of edible giblets (heart, live and gizzard) in carcass of grey partridge reaches 4.6%, whereas in game pheasant 4%. In the conducted experiment, the content of edible giblets was higher in roosters than in hens (4.46 vs. 3.76%). The study by Ozdemir and Esen (2006) demonstrated that in rock partridge it was significantly higher and reached 7.42%. In case of red-legged partridge, it was comparable to that noted in grey partridge, i.e. 4.07% (Millan et al. 2002). According to Putaala and Hissa (1995), wild partridges are characterized by higher heart, live and gizzard weight. Similar conclusions were also reached by Liukkonen-Anttila et al. (1999).

TABLE 3. Content of edible giblets in carcass of grey partridge *Perdix perdix*

Group	Liver				Heart				Gizzard			
	g		%		g		%		g		%	
	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$	SE
♂♂	7.67	1.52	3.09	0.48	3.00	0.00	1.11	0.08	6.67	0.57	2.57	0.17
♀♀	5.33	0.57	2.04	0.55	3.00	0.00	1.16	0.07	6.00	0.00	2.32	0.14

CONCLUSIONS

The conducted study showed no effect of sex on results of slaughter analysis of grey partridge. Noteworthy is the high dressing percentage of these birds.

REFERENCES

ADAMSKI M., 2012: Kuropatwy. [In:] Hodowla i użytkowanie drobiu. Red. J. Jankowski. Powszechne Wydawnictwo Rolnicze i Leśne, Warszawa. 469–476.

BRUDNICKI A., KUŁAKOWSKA A., PIETRUSZYŃSKA D., ŁOŻYCKA-KAPŁON M., WACH J., 2012: Differences in the amino acid composition of the breast muscle of wild and farmer pheasants. Czech J. Anim. Sci. 30(4), 309–313.

DZIERŻYŃSKA-CYBULKO B., FRUZIŃSKI B., 1997: Dziczyzna jako źródło żywności. Wartość żywieniowa i przetwórcza. Państwowe Wydawnictwo Rolnicze i Leśne, Poznań.

HOFBAUER P., SMULDERS F.J.M., VODNANSKY M., PAULSEN P., El-GHAREEB W.R., 2010: A note on meat quality traits of pheasants (*Phasianus colchicus*). Eur. J. Wildl. Res. 56, 809–813.

KOKOSZYŃSKI D., BERNACKI Z., CISOWSKA A., 2011: Growth and development of young game pheasants (*Phasianus colchicus*). Archiv Tierzucht. 54, 83–92.

KOKOSZYŃSKI D., BERNACKI Z., KORYTKOWSKA H., WILKANOWSKA A., FRIESKE A., 2013: Carcass composition and meat quality of Grey Partridge (*Perdix perdix* L.). JCEA. 14(1), 378–387.

KRUPKA J., 1986: Łowiectwo. Wyd. Rolnicze i Leśne, Warszawa.

LIUKKONEN-ANTTILA T., PUTAALA A., HISSA R., 1999: Does shifting from a commercial to a natural diet affect the nutritional status of hand-reared grey partridges Perdix perdix? Wildlife Biol. 5(3), 147–156.

ŁEBKOWSKA D., ŁEBKOWSKI D., 1995: Dziczyzna. Tenten, Warszawa, 1–93.

ŁUKASIEWICZ M., MICHALCZUK M., GŁOGOWSKI R., BALCERAK M., POPCZYK B., 2011: Carcass efficiency and fatty side content of farmer pheasants (*Phasianus colchicus*) meat. Ann. Warsaw Univ. of Life Sci. – SGGW, Anim. Sci. 49, 199–203.

ŁUKASZEWICZ E., 2008: Choroby drobiu oraz ptaków ozdobnych, materiały szkoleniowe. Ed. M. Mazurkiewicz. Wrocław.

MILLAN J., GORTAZAR C., BUENESTRADO F.J., RODRIGUEZ P., TORTOSA F.S., VILLAFUERTE R., 2002: Effect of a fiber-rich diet on physiology and survival of farm-reared red-legged partridges (*Alectoris rufa*). Comp. Biochem. Phys. A. 134, 85–91.

MURAWSKA D., JANISZEWSKI P., MICHALIK D., HANZAL V., ZAWADZKA M, 2013: Carcass and meat characteristics of mallards (*Anas platyrhynchos* L.) hunter-harvested in North-Eastern Poland. XXV International Poultry Symposium PB WPSA. 02–04 September. Zegrze. Poland, 143.

OKARMA H., TOMEK A., 2008: Łowiectwo. Wyd. Edukacyjno-Naukowe H2O, Kraków, 73–77.

OZDEMIR G., ESEN F., 2006: Feed performance and carcass characteristics of Rock Partridges (A. graeca) in intensive conditions. Journal of Animal and Veterinary Advances 5(5), 356–360.

PANEK M., 2012: Demografia kuropatwy w zależności od struktury krajobrazu rolniczego. Wyd. SGGW. Warszawa (rozprawa habilitacyjna).

PUTAALA A., HISSA R., 1995: Effects of hand-rearing on physiology and anatomy in the grey partridge. Wildlife Biol. 1, 27–31.

RANCEW-SIKORA D., 2009: Sens polowania. Wyd. Naukowe Scholar, Warszawa.

WNUK A., MROCZEK-SOSNOWSKA N., ŁUKASIEWICZ M., 2013: Dzikie ptactwo ze staropolskiego stołu. Polskie Drob. 10, 40–43.

WÓJCIK K., SOBCZAK M., ŻOCHOWSKA-KUJAWSKA J., ZIELIŃSKI K., 2010: Porównanie tekstury i struktury oraz podatności na proces masowania mięśni danieli (*Dama dama*). Żywność. Nauka. Technologia. Jakość 1(68), 93–104.

ZIOŁECKI J., DORUCHOWSKI W., 1989: Metoda oceny wartości rzeźnej drobiu. Wyd. COBRD, Poznań.

Streszczenie: *Wpływ płci na wyniki analizy rzeźnej kuropatwy polnej Perdix perdix*. Materiał badawczy stanowiły kuropatwy polne *Perdix perdix* przeznaczone do wsiedlenia do środowiska naturalnego, odchowywane w Ośrodku Hodowli Zwierzyny na terenie województwa mazowieckiego. Do uboju wybrano po 10 kur i 10 kogutów. Ptaki po skrwawieniu, oskubaniu i wypatroszeniu schłodzono w ciągu 24 h do temperatury 4°C, przeprowadzono dysekcję, na podstawie której określono wydajność rzeźną oraz obliczono udział w tuszce: mięśni piersiowych, mięśni nóg, tłuszczu sadełkowego i podrobów. Nie wykazano wpływu płci na wyniki analizy rzeźnej kuropatwy polnej.

MS. received in November 2014

Authors' address:
Agnieszka Wnuk, Monika Łukasiewicz, Natalia Mroczek-Sosnowska, Jan Niemiec, Marek Balcerak
Wydział Nauk o Zwierzętach SGGW
Katedra Szczegółowej Hodowli Zwierząt
Zakład Hodowli Drobiu
Ciszewskiego 8, 02-786 Warszawa
Poland

Bartłomiej Popczyk
Wydział Nauk o Zwierzętach SGGW
Katedra Biologii Środowiska Zwierząt
Ciszewskiego 8, 02-786 Warszawa
Poland