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Comparison of carcass traits between mallard ducks (*Anas platyrhynchos*) and domestic ducks (*Anas platyrhynchos domesticus*)

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Abstract: The aim of this study was to evaluate the effects of domestication and the associated rearing system and rearing conditions on the carcass traits of ducks, assessed on the basis of weight and yield parameters, including skinless carcass weight, skinless breast muscle weight, skinless thigh weight, skinless thigh muscle weight, and the corresponding yield parameters. The study included 20 wild mallard ducks (*Anas platyrhynchos*) living under natural conditions and 20 domesticated Cherry Valley ducks (*Anas platyrhynchos domesticus*) reared under intensive indoor production conditions with controlled lighting, temperature, and feeding regimes. Wild duck group comprised females (DWF; $n = 10$) and males (DWM; $n = 10$), whereas Cherry Valley duck group comprised females (DDF; $n = 10$) and males (DDM; $n = 10$). Wild ducks were harvested during the hunting season in September. The age of the birds was determined according to standard hunting and ornithological criteria based on the evaluation of morphological characteristics, and all individuals were classified as one-year-old, whereas domesticated ducks were reared to 42 days of age. The results demonstrated that body weight, skinless carcass weight, skinless breast muscle weight, skinless thigh weight, and skinless thigh muscle weight were significantly higher ($P \leq 0.05$) in Cherry Valley ducks. This pattern was confirmed in females, males, and in the analysis irrespective of sex. Among the evaluated yield parameters, Cherry Valley ducks exhibited significantly higher skinless thigh yield and skinless thigh muscle yield ($P \leq 0.05$). In contrast, wild ducks showed significantly higher carcass yield and skinless breast muscle yield, both in females and males analysed separately and irrespective of sex ($P \leq 0.05$). These findings confirm that domestication and intensive rearing have a significant influence on growth performance and carcass traits in ducks.

Keywords: living conditions; meat production; waterfowl

Hunting activities targeting free-ranging wildlife constitute an integral part of European culture and are closely associated with cultural heritage, human nutrition, and the regulation of wild animal population abundance (Needham et al. 2023). In many developing countries, game meat represents an important source of animal protein and contributes to food security (Taylor et al. 2020). Among the most frequently hunted and consumed species of game birds in Europe is the mallard duck (*Anas platyrhynchos*), a cosmopolitan species with a worldwide distribution (Needham et al. 2023). The

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domestic duck (*Anas platyrhynchos domesticus*) is considered a domesticated form of the mallard. The domestication of the mallard duck occurred independently in several regions of the world, which is reflected in the genetic and phenotypic variability of contemporary domestic breeds (Li et al. 2010; Zhang et al. 2023). Despite centuries of artificial selection in domestic ducks, genetic studies have confirmed that most contemporary breeds retain a high degree of genetic relatedness to the mallard duck (*Anas platyrhynchos*). Current breeding programmes primarily focus on increasing growth rate, improving feed efficiency, enhancing disease resistance, and optimising reproductive performance (Pingel 2006).

A characteristic feature of the mallard duck (*Anas platyrhynchos*) is its distinct sexual dimorphism (Baldassarre 2014). Growth and metabolism are closely associated with the conditions of the natural environment, particularly seasonal food availability, climatic conditions, and migratory behaviour. Growth of mallards is relatively slow, allowing the maintenance of an optimal balance between body weight, muscular performance, and flight capability. Domestic ducks (*Anas platyrhynchos domesticus*) attain considerably greater body weights, with meat-type lines frequently exceeding three or four kilograms. They are characterised by a more robust body, well-developed breast muscles, and a higher proportion of both subcutaneous and visceral fat. Flight ability is strongly reduced or completely lost in most breeds. Compared with the mallard duck, sexual dimorphism is generally less pronounced, while growth rate is substantially higher and accompanied by improved feed efficiency (Pingel 2006). The morphological and physiological differences between mallards and domestic ducks reflect a long-term domestication process during which traits associated with enhanced growth potential, meat production, and production efficiency were selected.

Duck production systems differ primarily in production intensity, housing conditions, nutritional management, and the degree of contact with the natural environment. These factors substantially influence production performance, behaviour, health status, and welfare of both domesticated and free-ranging individuals. The mallard duck (*Anas platyrhynchos*) is a highly adaptable waterfowl species inhabiting a wide range of aquatic and wetland habitats (Baldassarre 2014). Its diet is highly diverse and reflects its omnivorous feeding strategy. Seasonal changes in diet composition have a significant impact on body condition, energy reserve deposition, and metabolic processes (Baldassarre 2014). Hunting of mallard duck represents a traditional form of human utilisation of this species. In European countries, hunting activities are regulated by legislation aimed at the conservation of wild bird populations and are restricted to clearly defined hunting seasons occurring during the autumn and winter months (Baldassarre 2014). Wild populations exhibit greater variability in body condition, growth performance, and other biological characteristics. In contrast, these factors are intentionally controlled in domestic ducks to maximise productive performance (FAO 2013; Baldassarre 2014). Intensive production systems for domestic ducks (*Anas platyrhynchos domesticus*) are characterised by high stocking densities, standardised management practices, and strict control of microclimatic, hygienic, and zootechnical conditions.

The evaluation of carcass traits is an important tool for the economic assessment of poultry production and for the optimisation of breeding and slaughtering practices. The most frequently assessed parameters include live body weight, eviscerated carcass weight, the proportion of valuable meat cuts, particularly breast and thigh muscles, and selected technological indicators of meat quality (Baeza et al. 2022). One of the most important factors affecting the carcass traits of poultry is the genetic background. In addition to genotype and nutrition, carcass traits are influenced by rearing conditions, health status, sex, age at slaughter, and the level of physical activity. Carcass yield provides an objective measure of production efficiency and enables comparisons among different species, breeds, genotypes, and duck production systems in both commercial and non-commercial contexts (Baeza et al. 2022). With respect to carcass composition, the mallard duck (*Anas platyrhynchos*) has been reported to exhibit a relatively higher proportion of breast muscle tissue (Hascik et al. 2025). In domestic ducks (*Anas platyrhynchos domesticus*), carcass yield is the result of long-term selection aimed at intensive growth, efficient feed utilisation, and enhanced muscle deposition. Modern meat-type lines, particularly those derived from Pekin ducks, achieve relatively high and consistent carcass yields, most commonly ranging from 60% to 74% (Petracci and Cavani 2012).

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The aim of the study was to evaluate the effects of domestication and the influence of environmental conditions, particularly the rearing conditions, on carcass traits. Carcass traits were assessed on the basis of the weight and yield of the skinless carcass, skinless breast muscles, skinless thigh muscles, and skinless thighs, in mallard ducks (*Anas platyrhynchos*) living under natural conditions and domestic ducks (*Anas platyrhynchos domesticus*) reared under intensive production system.

MATERIAL AND METHODS

A total of 40 ducks of the genus *Anas* were included in the study. The experimental groups consisted of 20 mallard ducks (*Anas platyrhynchos*) and 20 domesticated Cherry Valley ducks (*Anas platyrhynchos domesticus*). Data were evaluated both by sex (males and females) and irrespective of sex. The Cherry Valley duck is a commercial hybrid line derived from the Pekin duck and developed in England with the aim of achieving rapid growth, efficient feed conversion, and high meat production. At present, it represents one of the most important meat-type duck lines used in intensive production systems worldwide. As a result of its favourable production characteristics, the Cherry Valley duck is frequently used as a reference genetic line in studies evaluating growth performance and carcass traits of waterfowl.

Wild ducks (*Anas platyrhynchos*) were harvested during the legal hunting season in September in the surrounding areas of the town Havlíčkův Brod, specifically in the area of Suchá, located in the Vysočina Region of the Czech Republic. According to Decree No. 64/2025 Coll. (Czech Republic 2025), the hunting season for wild ducks (*Anas platyrhynchos*) extends from 1 September to 30 November. Therefore, harvesting in September was conducted in accordance with the legally established hunting season. The age of the birds was determined according to standard hunting and ornithological criteria based on the evaluation of morphological characteristics, and all individuals were classified as one-year-old birds. The locality is situated in the Bohemian–Moravian Highlands at an altitude of 420–600 m above sea level. The landscape is characterised by a mosaic of agricultural land, forests, watercourses, and ponds, providing suitable habitats for waterfowl populations. The area contains numerous ponds, small water reservoirs, and streams that serve as important breeding, feeding, and migratory sites for the mallard. The mallard is one of the most common waterfowl species in the region and utilises both natural and anthropogenically created aquatic habitats. The region is characterised by a moderately warm to cool climate with sufficient precipitation throughout the year. Together with the high density of water bodies and the availability of food resources, these environmental conditions provide a suitable habitat for the permanent presence and successful reproduction of mallard populations. The natural diet of wild ducks (*Anas platyrhynchos*) is diverse and includes both plant and animal components. The plant component consists primarily of aquatic vegetation, seeds, cereals, and other plant material, whereas the animal component includes aquatic invertebrates, insects, molluscs, crustaceans, and other small aquatic organisms. The relative proportions of these dietary components vary depending on the season, age of the birds, and food availability. Carcass traits and biological material were obtained from wild ducks (*Anas platyrhynchos*) harvested during routine hunting activities conducted in accordance with the applicable legislation. The birds included in the study were not killed specifically for research purposes; therefore, ethical approval was not required. Wild ducks were randomly selected from individuals harvested during the legally established hunting season.

Cherry Valley ducks were obtained from PERENA, s.r.o. (Chlumec nad Cidlinou, Czech Republic), which imports Cherry Valley duck breeding stock from England. The domesticated Cherry Valley ducks were reared in the accredited experimental poultry facility of the University of Veterinary Sciences Brno (Czech Republic). During the fattening period, ducks were raised on deep litter of wood shavings from one day of age until 42 days of age under controlled lighting, temperature, and feeding conditions in accordance with the management recommendations for the Cherry Valley hybrid line. Lighting regimes were adjusted according to the age of the ducks.

During the initial phase of rearing, ducks were provided with 23 h of light and 1 h of darkness per day, while during the growth period the lighting regime was modified to 18 h of light and 6 h of darkness. Temperature of the environment was gradually reduced from 31 °C to 21 °C according to the

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age and physiological requirements of the birds. Throughout the fattening period, ducks had *ad libitum* access to commercially produced complete feed mixtures (ZZN Pelhřimov a.s., Pelhřimov, Czech Republic) and water. Feed was provided using tube feeders, while water was supplied via nipple drinkers.

Commercial complete feed mixtures were formulated using conventional feed ingredients, primarily wheat, maize, soybean meal, vegetable oil, and a premix of feed additives. The diets were offered according to the recommended feeding programme for the respective age categories. Ducks were fed the $VKCH_{Start}$ (Prestarter) diet in mash form from 1 to 10 days of age. From 11 to 20 days of age, they received the $VKCH_1$ (Starter) diet in pelleted form, followed by the $VKCH_2$ (Grower) and $VKCH_3$ (Finisher) diets from 21 to 35 and 36 to 42 days of age, both in pelleted form. The nutritional composition and nutritional value of the experimental diets corresponded to those reported for the control group of ducks by Strakova et al. (2025a, 2025b). The experiment was conducted in accordance with the applicable legislation governing animal welfare and was approved by the Ethics Committee of the Central Commission for Animal Welfare of the Ministry of Agriculture of the Czech Republic.

For the purposes of the study, four experimental groups were established according to origin and sex of the ducks. The wild duck groups consisted of females (DWF; $n = 10$) and males (DWM; $n = 10$), whereas the domesticated Cherry Valley groups consisted of females (DDF; $n = 10$) and males (DDM; $n = 10$). In addition, data were analysed irrespective of sex using groups with equal representation of females and males: wild ducks (DW; $n = 20$) and domesticated Cherry Valley ducks (DD; $n = 20$).

Evaluated parameters. Individual body weight was determined in wild ducks immediately after harvesting during September and in domesticated Cherry Valley ducks by individual weighing at 42 days of age. Following stunning, slaughter, and exsanguination, all birds were eviscerated by removing the internal organs from the body cavity. Subsequently, the weight of the skinless eviscerated carcass was determined. Skinless breast muscles and skinless thighs were dissected from each carcass. Dissection involved the separation of the evaluated tissues from the skeletal system and the removal of adjacent tissues. Their weights were subsequently determined. In addition, the weight of skinless thigh muscles was evaluated after deboning the thighs and removing the skin and excess adipose tissue. All measurements were performed using a KERN PCB 6000-1 electronic laboratory balance (KERN & Sohn GmbH, Balingen, Germany) with a maximum capacity of 6 000 g and an accuracy of 0.1 g. Recorded weight parameters were expressed in grams. Based on the measured weights, carcass yield, skinless breast muscle yield, skinless thigh yield, and skinless thigh muscle yield were calculated. To minimise methodological variation, all procedures related to carcass processing and muscle dissection in both wild and domesticated ducks were performed by the same person.

The evaluated yield parameters included carcass yield (%), expressed as the proportion of carcass weight to body weight, skinless breast muscle yield (%), skinless thigh yield (%), and skinless thigh muscle yield (%), expressed as the proportion of the weight of the meat cut to body weight. These parameters were used to assess carcass traits and the proportion of the main meat cuts.

Statistical analysis. Statistical analysis focused on descriptive statistics, including the number of observations (n), arithmetic mean ($\bar{x}$), standard deviation (SD), and coefficient of variation (CV). Data normality was evaluated using the Shapiro–Wilk test in Unistat v6.5 (Unistat Ltd., London, UK), where all variables fulfilled the condition of normal distribution ($P > 0.05$). Homogeneity of variances was assessed using the F-test. The F-test was followed by Student's t-test to evaluate differences between mean values between the study groups. Statistical significance was set at $P \leq 0.05$, and statistically significant differences were indicated by the symbol (*).

RESULTS

Table 1 presents the mean values of the evaluated parameters and the statistical significance of differences between female wild ducks (DWF) and male wild ducks (DWM). Analysis of the coefficients of variation showed that, for most weight and carcass parameters, greater variability was observed in DWM. The only exceptions were skinless thigh yield and skinless thigh muscle yield. In general, DWF exhibited a higher degree of homogeneity across the assessed parameters, with coefficients of variation ranging from 1.94% to 7.08%. In DWM,

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Table 1. Comparison of mean values of weight and carcass parameters between female wild ducks (DWF; n = 10) and male wild ducks (DWM; n = 10)

Parameter (g)	Group	$\bar{x}$	SD	CV (%)	P-value
Body weight	DWF	1 262	±50.8	4.02	*
	DWM	1 402	±114	8.16	
Weight of skinless carcass	DWF	781	±35.6	4.56	ns
	DWM	829	±79.9	9.64	
Weight of skinless breast muscles	DWF	199	±13.4	6.76	*
	DWM	221	±22.5	10.1	
Weight of skinless thighs	DWF	154	±9.04	5.85	ns
	DWM	156	±17.3	11.1	
Weight of skinless thigh muscles	DWF	90.9	±6.43	7.08	*
	DWM	101	±9.28	9.17	
Parameter (%)	**Group**	$\bar{x}$	**SD**	**CV (%)**	P-value
Carcass yield	DWF	61.9	±1.20	1.94	*
	DWM	59.1	±1.62	2.74	
Yield of skinless breast muscles	DWF	15.8	±0.78	4.99	ns
	DWM	15.7	±1.05	6.75	
Yield of skinless thighs	DWF	12.3	±0.82	6.69	*
	DWM	11.2	±0.63	5.64	
Yield of skinless thigh muscles	DWF	7.20	±0.42	5.85	ns
	DWM	7.10	±0.31	4.45	

*$P \leq 0.05$

CV = coefficient of variation; ns = not significant; SD = standard deviation; $\bar{x}$ = mean

Table 2. Comparison of mean values of weight and carcass parameters between female Cherry Valley ducks (DDF; n = 10) and male Cherry Valley ducks (DDM; n = 10)

Parameter (g)	Group	$\bar{x}$	SD	CV (%)	P-value
Body weight	DDF	3 495	±200	5.72	ns
	DDM	3 306	±204	6.17	
Weight of skinless carcass	DDF	2 066	±113	5.47	*
	DDM	1 870	±114	6.11	
Weight of skinless breast muscles	DDF	472	±35.2	7.46	*
	DDM	376	±33.3	8.85	
Weight of skinless thighs	DDF	540	±29.5	5.47	ns
	DDM	517	±37.3	7.23	
Weight of skinless thigh muscles	DDF	406	±19.6	4.85	ns
	DDM	401	±21.2	5.29	
Parameter (%)	**Group**	$\bar{x}$	**SD**	**CV (%)**	P-value
Carcass yield	DDF	59.2	±1.31	2.22	*
	DDM	56.6	±1.57	2.79	
Yield of skinless breast muscles	DDF	13.5	±0.70	5.24	*
	DDM	11.4	±0.84	7.39	
Yield of skinless thighs	DDF	15.4	±0.51	3.35	ns
	DDM	15.6	±0.84	5.40	
Yield of skinless thigh muscles	DDF	11.5	±0.52	4.58	ns
	DDM	12.1	±0.73	6.09	

*$P \leq 0.05$

CV = coefficient of variation; ns = not significant; SD = standard deviation; $\bar{x}$ = mean

the coefficients of variation were higher, ranging from 2.74% to 11.1%.

Table 2 shows the mean values of the evaluated parameters and the statistical significance of differences between female Cherry Valley ducks (DDF) and male Cherry Valley ducks (DDM). The analysis of the coefficients of variation revealed greater variability in DDM for all assessed parameters, whereas DDF exhibited a higher degree of homogeneity. The coefficients of variation ranged from 2.22% to 7.46% in DDF and from 2.79% to 8.85% in DDM.

Table 3 compares the mean values of the evaluated parameters and presents the statistical significance of differences between female wild ducks (DWF) and female Cherry Valley ducks (DDF). All measured weight parameters were significantly higher in DDF than in DWF ($P \leq 0.05$). However, notable differences were observed in the yield parameters between the groups. DWF exhibited a significantly higher carcass yield, reaching 61.9%, compared with 59.2% in DDF ($P \leq 0.05$). A similar trend was observed for skinless breast muscle yield, which reached 15.8% in DWF compared with 13.5% in DDF ($P \leq 0.05$). In contrast, skinless thigh yield and skinless thigh muscle yield were significantly higher in DDF. Skinless thigh yield reached 15.4% in DDF compared with 12.3% in DWF, while skinless thigh muscle yield was 11.5% in DDF and 7.20% in DWF ($P \leq 0.05$). Evaluation of the coefficients of variation indicated that DWF were more homogeneous than DDF for most of the assessed parameters. The only exceptions were skinless thigh muscles weight, skinless thigh yield and skinless thigh muscle yield, for which greater homogeneity was observed in DDF.

Table 4 compares the mean values of the evaluated parameters and presents the statistical sig-

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Table 3. Comparison of mean values of weight and carcass parameters between female wild ducks (DWF; n = 10) and female Cherry Valley ducks (DDF; n = 10)

Parameter (g)	Group	$\bar{x}$	SD	CV (%)	P-value
Body weight	DWF	1 262	±50.8	4.02	*
	DDF	3 495	±200	5.72	
Weight of skinless carcass	DWF	781	±35.6	4.56	*
	DDF	2 066	±113	5.47	
Weight of skinless breast muscles	DWF	199	±13.4	6.76	*
	DDF	472	±35.2	7.46	
Weight of skinless thighs	DWF	154	±9.04	5.85	*
	DDF	540	±29.5	5.47	
Weight of skinless thigh muscles	DWF	90.9	±6.43	7.08	*
	DDF	406	±19.6	4.85	
Parameter (%)	Group	$\bar{x}$	SD	CV (%)	P-value
Carcass yield	DWF	61.9	±1.20	1.94	*
	DDF	59.2	±1.31	2.22	
Yield of skinless breast muscles	DWF	15.8	±0.78	4.99	*
	DDF	13.5	±0.70	5.24	
Yield of skinless thighs	DWF	12.3	±0.82	6.69	*
	DDF	15.4	±0.51	3.35	
Yield of skinless thigh muscles	DWF	7.20	±0.42	5.85	*
	DDF	11.5	±0.52	4.58	

*$P \leq 0.05$

CV = coefficient of variation; SD = standard deviation; $\bar{x}$ = mean

Table 4. Comparison of mean values of weight and carcass parameters between male wild ducks (DWM; n = 10) and male Cherry Valley ducks (DDM; n = 10)

Parameter (g)	Group	$\bar{x}$	SD	CV (%)	P-value
Body weight	DWM	1 402	±114	8.16	*
	DDM	3 306	±204	6.17	
Weight of skinless carcass	DWM	829	±79.9	9.64	*
	DDM	1 870	±114	6.11	
Weight of skinless breast muscles	DWM	221	±22.5	10.1	*
	DDM	376	±33.3	8.85	
Weight of skinless thighs	DWM	156	±17.3	11.1	*
	DDM	517	±37.3	7.23	
Weight of skinless thigh muscles	DWM	101	±9.28	9.17	*
	DDM	401	±21.2	5.29	
Parameter (%)	Group	$\bar{x}$	SD	CV (%)	P-value
Carcass yield	DWM	59.1	±1.62	2.74	*
	DDM	56.6	±1.57	2.79	
Yield of skinless breast muscles	DWM	15.7	±1.05	6.75	*
	DDM	11.4	±0.84	7.39	
Yield of skinless thighs	DWM	11.2	±0.63	5.64	*
	DDM	15.6	±0.84	5.40	
Yield of skinless thigh muscles	DWM	7.10	±0.31	4.45	*
	DDM	12.1	±0.73	6.09	

*$P \leq 0.05$

CV = coefficient of variation; SD = standard deviation; $\bar{x}$ = mean

nificance of differences between male wild ducks (DWM) and male Cherry Valley ducks (DDM). As in females, all measured weight parameters were significantly higher in DDM than in DWM ($P \leq 0.05$). In contrast, carcass yield was significantly higher in DWM, reaching 59.1%, whereas a value of 56.6% was recorded in DDM ($P \leq 0.05$). A similar trend was observed for skinless breast muscle yield, which was higher in DWM (15.7%) than in DDM (11.4%) ($P \leq 0.05$). Skinless thigh yield and skinless thigh muscle yield were significantly higher in DDM. Skinless thigh yield reached 15.6% in DDM compared with 11.2% in DWM, while skinless thigh muscle yield was 12.1% in DDM and 7.10% in DWM ($P \leq 0.05$).

Analysis of the coefficients of variation revealed greater variability for weight parameters in DWM than in DDM. In contrast, higher coefficients of variation for yield parameters were generally observed in DDM, with the exception of skinless thigh yield.

Table 5 shows the mean values of the evaluated parameters and presents the statistical significance of differences between wild ducks (DW) and Cherry Valley ducks (DD) irrespective of sex, with equal representation of females and males (50 : 50). The results confirmed that DD exhibited significantly higher mean values for all measured weight parameters than DW ($P \leq 0.05$). In contrast, carcass yield was significantly higher in DW (60.5%) than in DD (57.9%) ($P \leq 0.05$). Similarly, skinless breast muscle yield was higher in DW (15.7%) than in DD (12.4%) ($P \leq 0.05$). Significantly higher values of skinless thigh yield and skinless thigh muscle yield were recorded in DD. Skinless thigh yield reached 15.5% in DD compared with 11.7% in DW, while skinless thigh muscle yield was 11.8% in DD and 7.15% in DW ($P \leq 0.05$). The coefficients of varia-

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Table 5. Comparison of mean values of weight and carcass parameters between wild ducks (DW; n = 20) and Cherry Valley ducks (DD; n = 20) irrespective of sex

Parameter (g)	Group	$\bar{x}$	SD	CV (%)	P-value
Body weight	DW	1 332	±112	8.41	*
	DD	3 400	±219	6.45	
Weight of skinless carcass	DW	805	±64.9	8.07	*
	DD	1 968	±149	7.60	
Weight of skinless breast muscles	DW	210	±21.4	10.1	*
	DD	424	±59.2	13.9	
Weight of skinless thighs	DW	155	±13.5	8.68	*
	DD	528	±34.8	6.59	
Weight of skinless thigh muscles	DW	96.0	±9.40	9.79	*
	DD	403	±20.0	4.96	
Parameter (%)	**Group**	$\bar{x}$	**SD**	**CV (%)**	P-value
Carcass yield	DW	60.5	±2.00	3.32	*
	DD	57.9	±1.94	3.36	
Yield of skinless breast muscles	DW	15.7	±0.91	5.78	*
	DD	12.4	±1.31	10.5	
Yield of skinless thighs	DW	11.7	±0.94	8.00	*
	DD	15.5	±0.68	4.44	
Yield of skinless thigh muscles	DW	7.15	±0.36	5.12	*
	DD	11.8	±0.69	5.89	

*$P \leq 0.05$

CV = coefficient of variation; SD = standard deviation; $\bar{x}$ = mean

tion indicated that weight parameters generally exhibited higher coefficients of variation in DW than in DD. In contrast, higher coefficients of variation for yield parameters were generally observed in DD.

DISCUSSION

The comparison of weight and carcass parameters between wild and domesticated ducks showed that domestication and the rearing system had a substantial effect on the evaluated parameters. Intensive breeding programmes and controlled production conditions have a significant impact on body weight in domesticated ducks. The body weight values obtained in the present study are consistent with those reported by Strakova et al. (2025a) for domesticated ducks and by Petracci and Cavani (2012), who observed higher body weights in domesticated ducks compared with free-ranging individuals. The lower body weight reported for wild ducks compared with domesticated Pekin-type ducks is most likely a consequence of genetic differences and the long-term artificial selection in domestic ducks for meat production. Kelava Ugarkovic et al. (2024) reported a carcass yield of approximately 51.0% in wild ducks, and higher values of the carcass yield are commonly achieved in commercial Pekin-type duck lines. These differences are associated with greater growth potential, enhanced muscling, and more intensive tissue deposition in domesticated ducks. Our results demonstrated that Cherry Valley ducks achieved significantly higher ($P \leq 0.05$) values for all measured weight parameters than wild ducks. This difference was evident in both females and males and was also confirmed when the data were evaluated irrespective of sex. Farhat and Chavez (2000) compared the live body weight of Pekin ducks reared either in mixed-sex groups or separately according to sex and reported significantly higher body weights in males than in females (M 3 196 g, F 2 973 g) ($P \leq 0.05$). In contrast, the domesticated ducks evaluated in the present study exhibited the opposite trend, with females attaining higher body weight than males (M 3 306 g, F 3 495 g), although the difference was not statistically significant ($P > 0.05$). Sexual dimorphism is generally recognised as an important factor affecting growth performance and meat quality in poultry. Edrova et al. (2026) and Kokoszynski et al. (2022) reported that sex is widely recognised as one of the most influential biological factors affecting growth performance and product quality in ducks. Kelava Ugarkovic et al. (2024), who observed the effects of sex and hunting location on carcass traits and meat quality of mallards (*Anas platyrhynchos*) in Croatia, reached conclusions comparable to those included in the present study. The authors reported a significant interaction between sex and hunting location (environmental conditions) for most of the evaluated carcass traits, which is consistent with our findings. Hascik et al. (2025) addressed the issue of mallards (*Anas platyrhynchos*) reared in captivity. The authors reported live body weights of 1 271 g in females and 1 393 g in males, which closely correspond to those observed in the present study (F 1 262 g, M 1 402 g). Higher carcass yield values were reported by Hascik et al. (2025), who observed an average carcass yield of 74% in mallards (*Anas platyrhynchos*) reared in captivity; these results can be attributed to differences in living conditions, nutrition, and the lower

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level of physical activity of birds under human care. The results obtained in the present study are consistent with those reported by Abdullah et al. (2026), who observed significantly higher live body weight (3 300 g and 3 208 g), carcass weight (2 303 g and 2 312 g), and carcass yield (69% and 72%) in conventionally reared and organically reared ducks in comparison with wild ducks (1 302 g, 626 g, and 48.0%) ($P \leq 0.05$). The carcass weight values obtained in the present study were also very similar to those reported by Hascik et al. (2025) when evaluated according to sex. The authors reported an average carcass weight of 760 g in female mallards, compared with 781 g observed in the present study. Hascik et al. (2025) reported a carcass weight of 830 g in male mallards, which was very similar to the value of 829 g recorded in the present study. In both studies, females exhibited higher carcass yield values than males. In the present study, carcass yield reached 61.9% in females and 59.1% in males, whereas Hascik et al. (2025) reported values of 74.2% in females and 73.8% in males.

According to published studies, the proportion of breast muscle in wild ducks ranges from approximately 19% of live body weight (Janiszewski et al. 2018) to 27% (Hascik et al. 2025). These differences may be associated with variation in environmental conditions, age of the birds, and the methodology used for carcass evaluation. The values obtained in the present study were lower, reaching 15.8% in females and 15.7% in males. In comparison to breast muscle, information on the proportion of thigh muscle in wild ducks is limited. Janiszewski et al. (2018) reported that thigh muscles accounted for approximately 15% of total lean muscle mass; however, the proportion relative to live body weight was not reported. In domesticated Cherry Valley ducks, thigh muscle proportion has been reported to range from 12.7% to 14.4% of carcass weight (Wlazlak et al. 2024). The greater proportion of thighs and thigh muscles observed in domesticated ducks suggests changes in muscle distribution that may be linked to long-term artificial selection and intensive production systems. In contrast, wild ducks exhibited higher carcass yield and a greater proportion of breast muscle than domesticated ducks. Hascik et al. (2025) reported a carcass yield of 74% and a breast muscle proportion of 36.4% of carcass weight in wild ducks. Similarly, Janiszewski et al. (2018) found that more than 53% of total lean muscle mass was concentrated in the breast muscles, whereas approximately 15% was concentrated in the thigh muscles. Differences among studies may be related to differences in methodology, as well as to the age of the birds and the season during which the evaluations were conducted. Published data indicate distinct patterns of muscle distribution between wild and domesticated ducks. A greater proportion of muscle tissue in wild ducks is concentrated in the breast region (Hascik et al. 2025), whereas domesticated ducks have a higher proportion of thigh muscle tissue due to long-term selection. Compared with domesticated ducks, particularly Pekin-type lines, wild ducks achieve lower live body weights, carcass weights and lower proportion of body fat. On the other hand, they are characterised by a higher relative proportion of breast muscle and very lean meat (Janiszewski et al. 2018; Kelava Ugarkovic et al. 2024), which may be associated with higher physical activity and different way of life.

Analysis of the coefficients of variation revealed that the wild population generally exhibited greater variability in weight parameters, whereas domesticated ducks showed higher variability for some yield parameters. These differences may be attributed to the genetic structure of the populations as well as to differences in environmental conditions and the rearing system. Based on the present findings, it can be concluded that domestication had a substantial effect on both growth performance and carcass traits in ducks. While the domesticated Cherry Valley line was characterised by higher body weight and greater thigh muscle development, mallard ducks were defined by higher carcass yield and more developed breast muscle. Long-term selection for production traits has resulted in a significant improvement in growth rate and carcass value in meat-type duck lines reared in intensive production system. Compared with wild ducks, domesticated ducks achieve higher live body weight, greater muscle deposition, and higher meat production within a shorter period of time. These changes are the result of genetic improvement, optimised nutrition, and controlled rearing conditions (Makagon and Riber 2022).

CONCLUSION

The results demonstrated that Cherry Valley ducks exhibited significantly higher values for all evaluated weight parameters than mallard ducks ($P \leq 0.05$). Domestication and rearing in intensive production system resulted in an increase in body weight and

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carcass weight. Wild ducks showed higher carcass yield and a greater proportion of breast muscle. Cherry Valley ducks exhibited higher skinless thigh yield and skinless thigh muscle yield, most likely as a consequence of the lower level of physical activity under controlled rearing conditions. These findings indicate that domestication and rearing conditions have affected the distribution of muscle tissue in ducks. Wild ducks exhibited higher variation in weight parameters, and domesticated ducks showed higher variation in some yield parameters. The results confirm that selection and intensive rearing have a significant influence on growth performance and carcass traits in ducks.

Conflict of interest

The authors declare no conflict of interest.

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