

# Peripheral complete blood cell count results in pigs are impacted by gender, sow parity, and farrowing season

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## Sex effect

Figure 1.

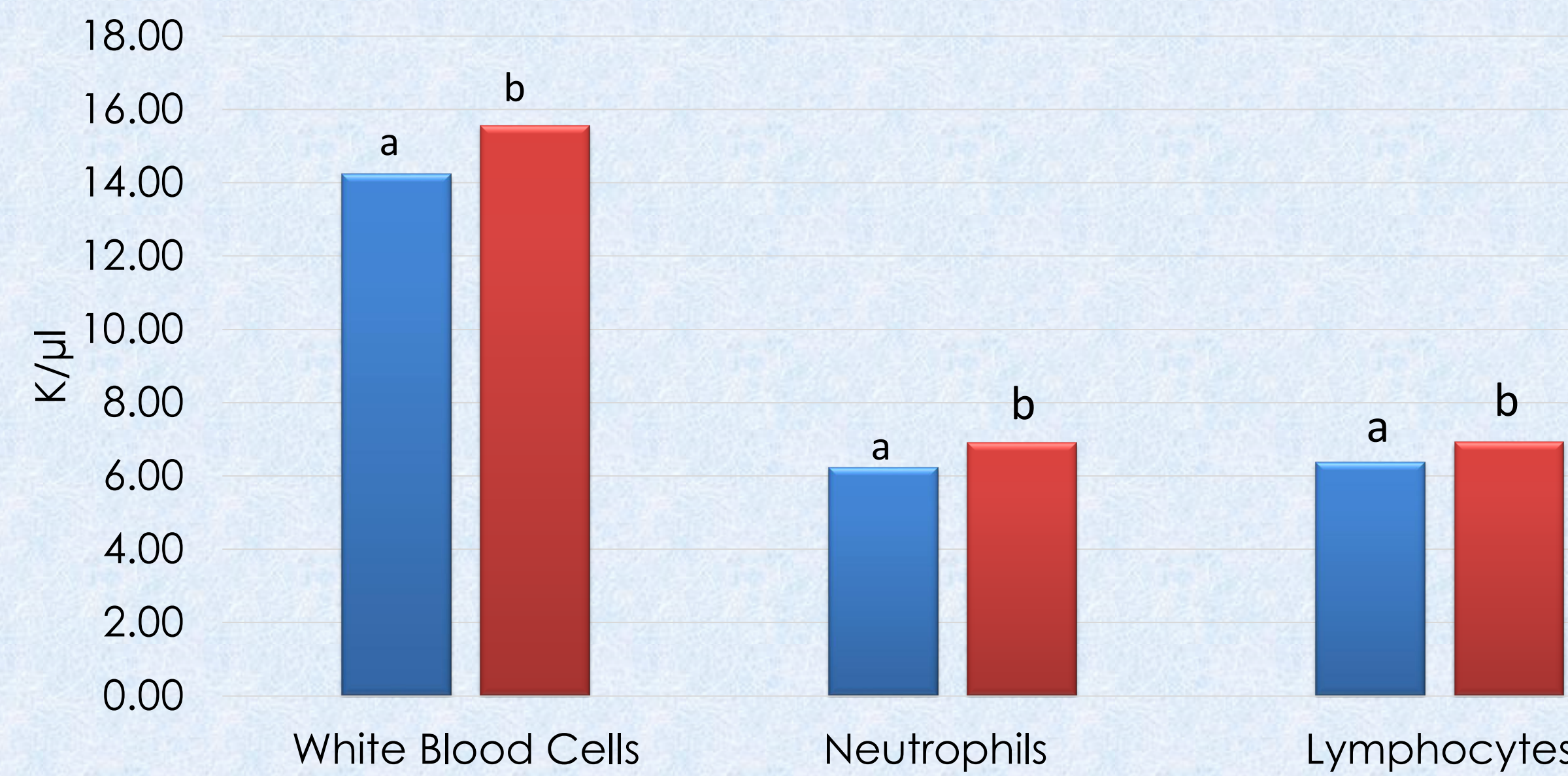
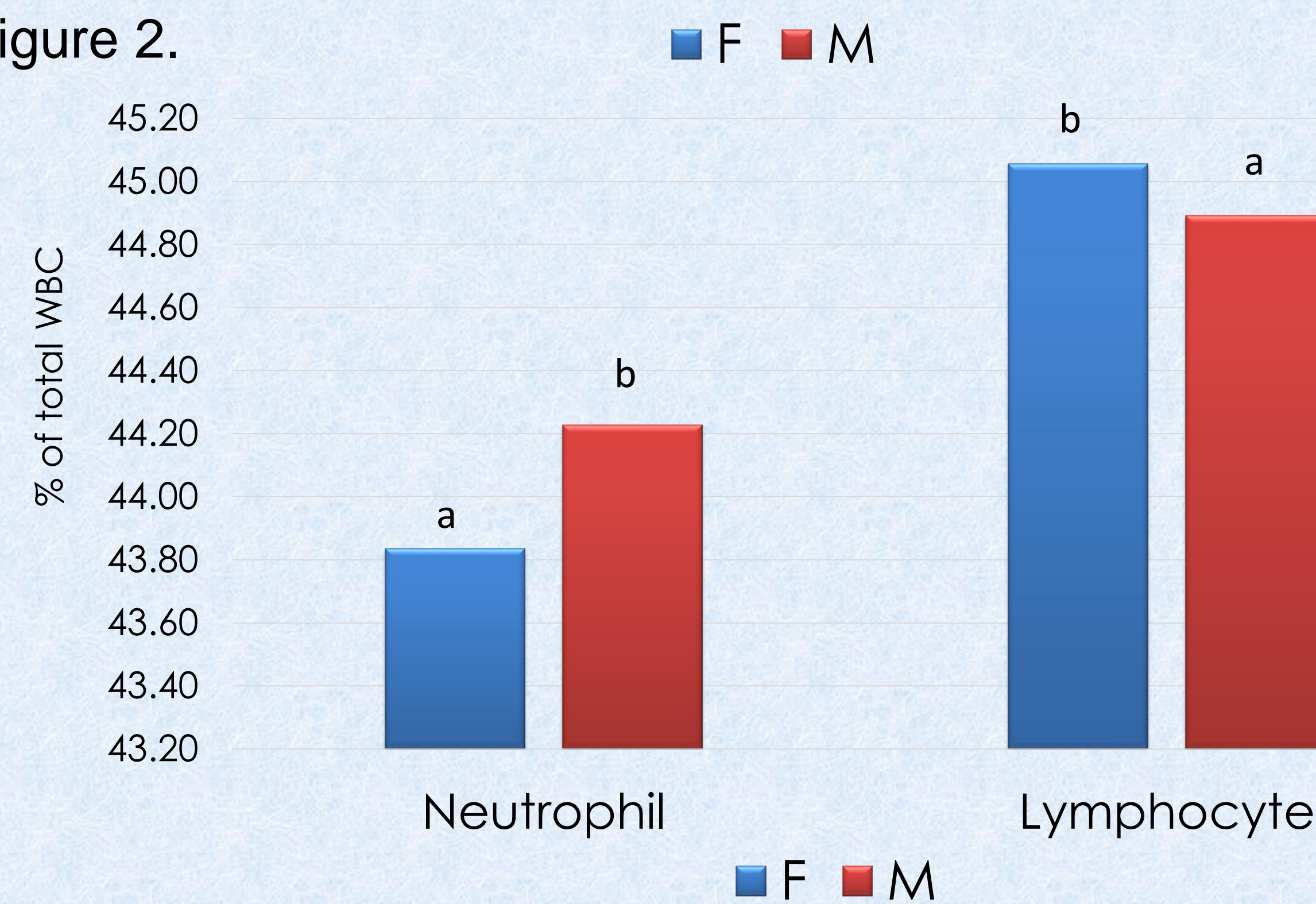


Figure 2.



a,b,c. Means without a common superscript differ;  $P \leq 0.05$   
 x,y,z. Means without a common superscript tend to differ;  $0.05 < P \leq 0.10$

## Abstract

Complete blood cell counts have been used as a diagnostic tool across many animal species including swine. To investigate the factors that cause variation in complete blood cell count results, a total of 2,284 whole blood samples were collected from 2012 to 2019 in preweaning piglets ( $n = 518$ ), nursery pigs ( $n = 1,704$ ), and grower pigs ( $n = 60$ ). Whole blood was collected into K<sub>2</sub>EDTA blood collection tubes and assayed using an automatic hematologic analyzer within 6 hours of collection. Data were analyzed by Mixed procedure of SAS with gender, parity group, and farrowing season as fixed effects. Body weight and age of pigs served as covariances. Farrowing season was grouped into summer (born during May to October) or winter (or November to April). Pigs that were born from first, second, and third parity, and four and above parity sows were sorted again into parity group 1, 2 to 3, and 4+, respectively. Barrows had a greater concentration of total white blood cells ( $P < 0.01$ ), lymphocytes ( $P < 0.01$ ), and neutrophils ( $P < 0.01$ ) compared to gilts. Barrows had lower mean corpuscular volume ( $P = 0.03$ ), mean corpuscular hemoglobin ( $P < 0.01$ ), and mean corpuscular hemoglobin concentration ( $P = 0.02$ ) compared to gilts. Pigs that were farrowed in the winter season had a greater concentration of white blood cells ( $P = 0.01$ ), neutrophils ( $P = 0.01$ ), and the percentage of neutrophils ( $P = 0.03$ ) but were lower in the percentage of lymphocytes ( $P = 0.03$ ) .....continued

## Sow parity group\*

Figure 3.

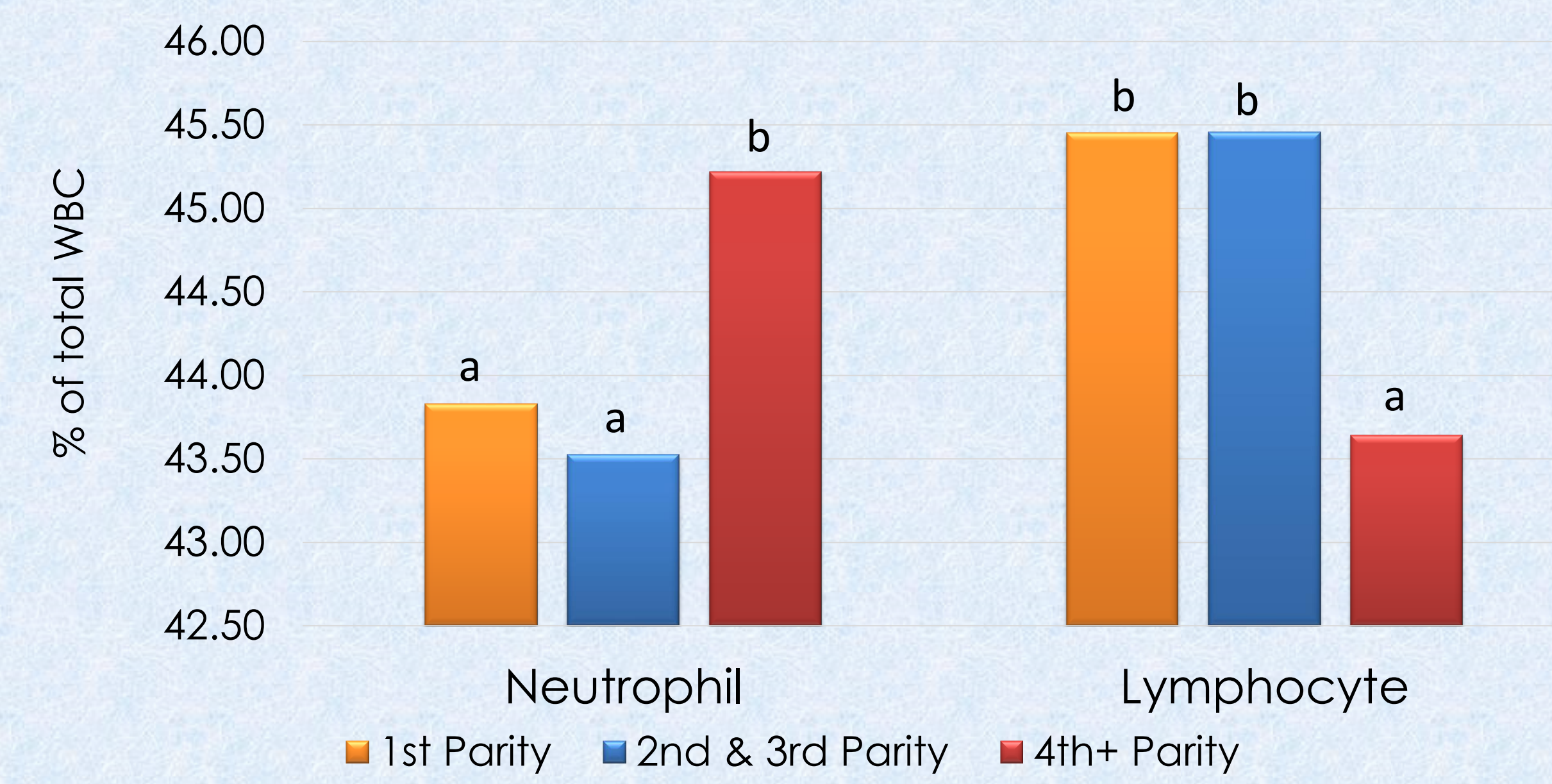
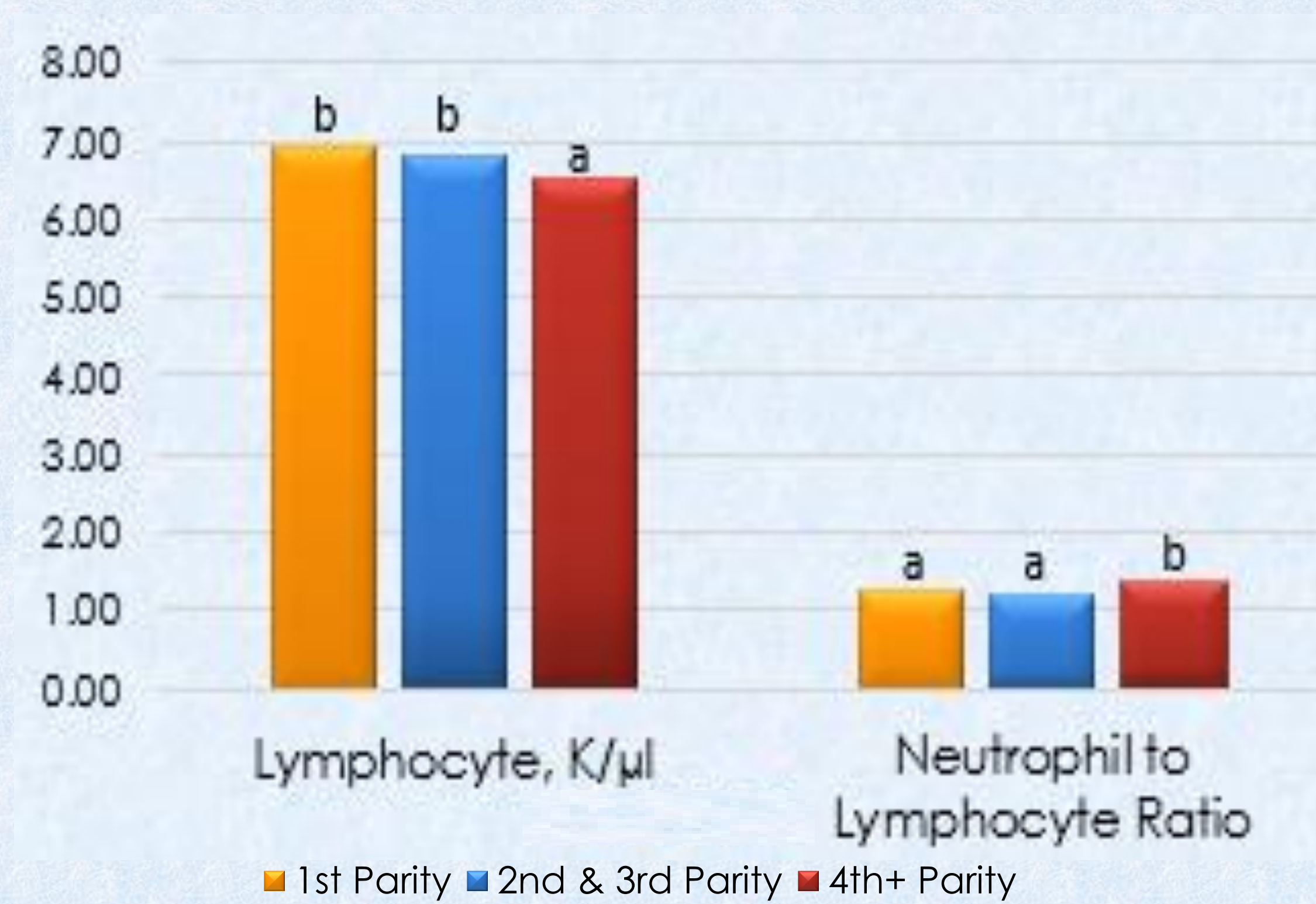


Figure 4.



a,b,c. Means without a common superscript differ;  $P \leq 0.05$

## Introduction

A complete blood count (CBC) test is often used as a diagnostic tool across a variety of animal species and can be used to assess an animal's immune function. Individual pigs have shown a large variation in immune response parameters<sup>1</sup>. These parameters can be affected by a variety of factors including sow parity, farrowing season, age, and gender. The sows' parity has shown to have a significant effect on its offspring. Previous studies have found that that growth performance and humoral immune response was improved in pigs suckled by multiparous sows than primiparous sows<sup>2</sup>. In addition to parity, farrowing season affects offspring's growth and development. Sows that were heat stressed during gestation have produced offspring with higher body temperatures, greater fat deposition, and impaired reproductive development<sup>3</sup>. Age and gender cause variations in cytokine levels, which affects the immune response. While cytokine production increased with age, boars and gilts showed differences in their interleukin-2/interleukin-4 ratio<sup>1</sup>. These factors can influence growth and immune function; therefore, we have chosen to evaluate their effect on CBC results in swine.

## Materials & Methods

- A total of 2,284 whole blood samples were collected from 2012 to 2019 in 518 preweaning piglets, 1,705 nursery pigs, and 60 grower pigs.
- Whole blood was collected into K<sub>2</sub>EDTA blood collection tubes and assayed within 6 hours of collection using an automatic hematologic analyzer.
- Data were analyzed using Mixed procedure of SAS with gender, parity group, and farrowing season as fixed effects.
- Body weight and age of pigs served as covariances. Farrowing season was grouped into summer (May to October) or winter (November to April).
- Pigs that were born from first, second, and third parity, and four and above parity sows were assorted 1, 2 to 3, and 4+, respectively.

## Farrowing season\*

Figure 5.

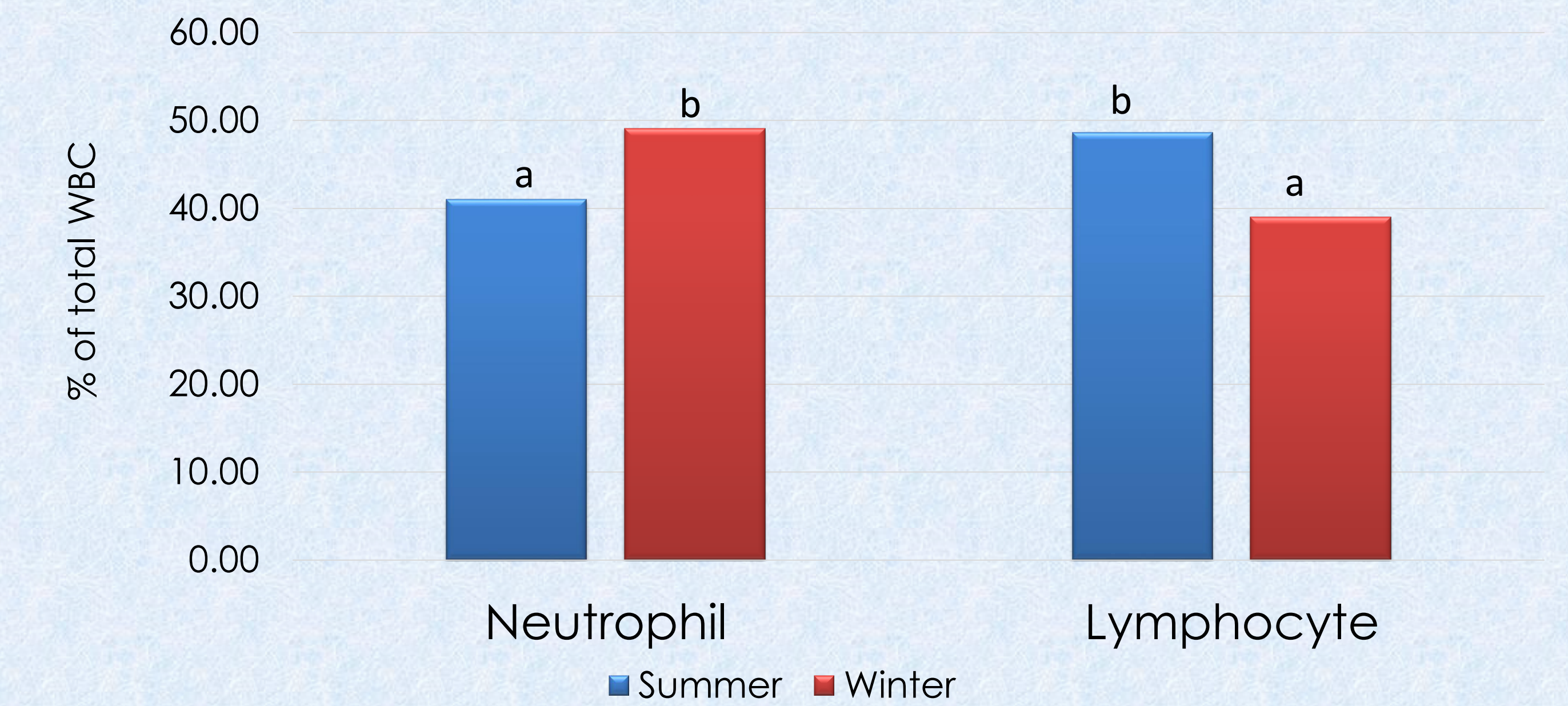
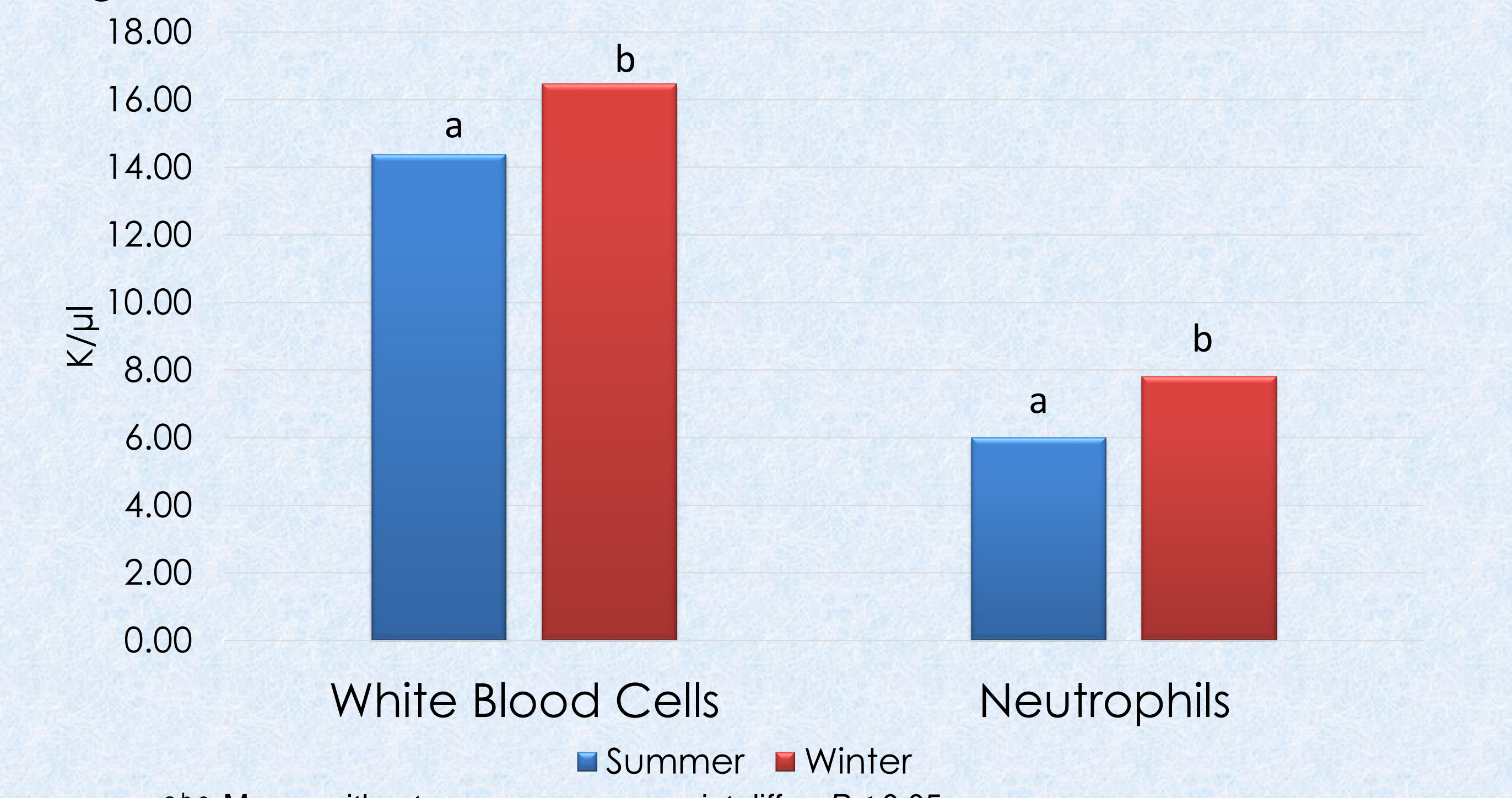


Figure 6.



a,b,c. Means without a common superscript differ;  $P \leq 0.05$   
 \*Farrowing season was grouped into summer (May to October) or winter (November to April).

## Conclusions

- Barrows had a greater concentration of total white blood cells ( $P < 0.01$ ), lymphocytes ( $P < 0.01$ ), and neutrophils ( $P < 0.01$ ) and a lower mean corpuscular volume ( $P = 0.03$ ), mean corpuscular hemoglobin ( $P < 0.01$ ), and mean corpuscular hemoglobin concentration ( $P = 0.02$ ).
- Pigs farrowed in winter had a greater concentration of white blood cells ( $P = 0.01$ ), neutrophils ( $P = 0.01$ ), and percentage of neutrophils ( $P = 0.03$ ) and had a lower percentage of lymphocytes ( $P = 0.03$ ) when compared to those farrowed in the summer.
- Offspring of parity 4 and above sows had a greater lymphocyte count ( $P = 0.01$ ), percentage of neutrophils ( $P = 0.02$ ), and percentage of lymphocytes ( $P = 0.01$ ).

## Implications

- Gender, sow parity, and farrowing season can affect peripheral complete blood cells count results.

## References

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