INTRODUCTION

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Flight is the characteristic adaptation of birds, bats and most insects. Because of the physical problem of moving in air, flight is one of the most demanding adaptations found in nature. Bird flight is of particular physical and physiological importance because of its high power requirements, which are met by oxidative metabolism (Viscor *et al.,* 1985). Respiration and respiratory functions of blood must therefore provide sufficient gaseous exchange during this activity. The levels of flight metabolism indicates a 7 to 15 fold increase over standard metabolic levels (Lasiewski, 1972; Tucker, 1972a and Bernstein *et al.,* 1973). Therefore specific physiological adaptations are expected to be found in birds in order to meet the oxygen demands of the higher metabolism.

Flight involves, besides the physical aspects of contractions of participating muscles, interactions of mechanisms consisting of cardiovascular, respiratory, neural, endocrine, metabolic, osmoregulatory and thermoregulatory processes (George and John, 1993).

The present work aimed to study three different kinds of birds. The first kind was chosen to be characterized by powerful flight the pigeon *(Columba livia domestica),* while the second one is characterized by strong flight, namely the common buzzard *(Buteo buteo vulpinus)* but the third one was flightless namely the moorhen *(Galtinula chloropus).*

The present work comprises three essential parts. The first part is concerned with cardiovascular and organs weights adaptations as related to flight activity in the three studied birds and the second one deals with hematological parameters and respiratory functions of the blood. The third part includes studies on some metabolites, enzymes and hormones in order to give evidence if there is any relationship between these parameters and flight activity of the birds.

The aim of this study is to reveal to what extent the process of flight exerts its effect on cardiovascular, organs weight, hematological parameters and respiratory functions of blood and on some metabolites, enzymes and hormones of the studied birds.