

Session (1) : Keynotes

Anatomical and Physiological Characteristics of the One-humped Camel (*Camelus dromedarius*)

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Past and present experiences proved that the dromedary camels have very special anatomical characteristics, and many varied physiological mechanisms, which enable the animal to live, reproduce and produce milk and meat, and to work under extreme conditions of heat and aridness - even during periods of drought when cattle, sheep and goats barely survive. These anatomical and varied physiological characteristics can be summarized in the following: The skin, head, scent glands, ears, eyes, nostrils, mouth, neck, hump, udder, male genitalia, fore and hind legs, horny modifications of the skin, foot pads and tail are anatomically different from other farm animals as an adaptation for the extreme conditions of heat and aridness where camels are raised. The physiological mechanisms for the adaptation of the one-humped camel to the hot arid environment of the desert are: Camels store heat during the day and cool off by conduction and convection in the evening. Water-deprived camels reduce their metabolism, which also conserves water. The smallest possible surface area of the body of camels is exposed to the rays of the sun and camels are less active in the heat of the day. The coat covering of the skin of camels change from wool in the winter to a sleek shiny reflecting hair in the summer. The hump does not serve as a water reservoir, nor solely as an energy reserve, but its greatest use is that on being a concentration of body fat it leaves the subcutaneous tissues little subcutaneous fat allowing for an efficient cooling and preventing the fast loss of stored heat from the body surface (during the night). The large size and height of the camel are advantageous in heat regulation because a large body mass heats up much more slowly than a smaller mass exposed to the sun. The long legs and the large humps give the camel a large skin surface in relation to the large body mass, which is another advantageous feature regarding heat regulation. The height above the ground (long legs) allows the desert winds free access to the body thus in some circumstances cooling it effectively. Camels can withstand a very considerable degree of dehydration more than other animals. In hot climates camels can tolerate a water loss of at least 25 % of its body weight without causing any physiological disturbances. Camels don't sweat until their body temperature reaches 42 °C, and only limited sweating that will only reduce the body temperature occurs. They sweat directly on the skin surface and not on the wool tips and this is a physiological characteristic of camels because sweat evaporates from the skin and not from the tips of wool which helps in economizing water loss. The skin and wool provide so much insulation, that even when the outside temperature is 50 °C, the body temperature does not exceed 41 °C. The respiratory rate of the camel is one of the lowest among other farm animals (economizing water losses from the buccal cavity and upper respiratory tract). Thirst causes a decrease in saliva secretion by about 20 liters/day in hydrated camels to about 0.5 liter in thirsty camels. In spite of this camels do not lose their appetite but continue eating, swallowing and digesting their food easily maintaining a good condition because they always keep their mouth moist through continuous rumination and increasing the secretion of urea in saliva. In camels exposed to