

Editorial

Climate Change-Induced Extreme Environmental Temperatures Affect Poultry Production: Challenges and Perspectives

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By 2050 the world's population is projected to grow by one-third, reaching between 9 and 10 billion people. With trade globalization and expected growth in global affluence, the Food and Agriculture Organization (FAO) of the United Nations estimates that by 2050 there will be increased demand for meat and egg protein by 73% and dairy products by 58% over 2011 levels. Thus, sustainably meeting the expected growth in global demand for high quality animal protein and nutritional needs will be very challenging especially under extreme environmental temperature constraints due to climate change, and require intense applied and basic research efforts. Among the most significant challenges compound this rapid growth are the increasing pressure on the availability of water, land, and energy to sustainably increase animal agricultural productivity in one hand, and the strong negative impact of global climate changes on agricultural productivity on the other hand. An additional challenge is the overuse of medically important antibiotics leading to an increased risk of resistance to antibiotics and infectious disease in both humans and animals. In the present editorial, I will focus on the strong adverse effects of extreme environmental temperatures on poultry productivity and stress the need of significant fundamental and applied research efforts to identify effective strategies and improve feed efficiency and food security.

Global warming can lead to extreme weather in various portions of the globe so that some regions have extreme snowfall and others have increased intense and frequent heat waves [1] and these temperature anomalies are predicted to continue to rise [2]. Environmental stress (heat and cold stress) impacts every aspect of bird lives and their very existence [3]. It can result in heat-related discomfort, illness, multiple organ damage, and in extreme cases can lead to death. In broiler (meat-type) chickens, which play a key role in worldwide meat production without religious taboos, the strong negative effects of heat and cold stresses on growth, feed efficiency, meat yield and mortality leading to considerable economic losses

are well documented [4-10]. The challenges to be met go beyond traditional ways to enhance growth performances. Fundamental research using new techniques involving genomics, proteomics, transcriptomics, metabolomics, and microbiomics, in combination with applied research will solve the intervening puzzle between nutrient, genes, environment and performances. By knowing the potential genetic of the bird and its limitation under sub-optimal conditions and by identifying key molecular signatures in feed efficiency and their regulation under different systems (nutrition, environment, etc.), these approaches have the potential to change the future by selecting thermo/cold-tolerant birds and optimizing nutrients fine-tuned with animal genetic profile to sufficiently meet the global demand and assure food security.

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