



## Assessment of surface temperature variation under chronic high temperature in four experimental layer chicken lines differing for heat resistance and feed efficiency traits

Tatiana Zerjal, Adeline Tholance, Dzidzo Nyuiadzi, David Gourichon, Nicolas Bruneau, Denis Laloë, Florence Jaffrezic, Anne Collin, Andrea Rau

### ► To cite this version:

Tatiana Zerjal, Adeline Tholance, Dzidzo Nyuiadzi, David Gourichon, Nicolas Bruneau, et al.. Assessment of surface temperature variation under chronic high temperature in four experimental layer chicken lines differing for heat resistance and feed efficiency traits. 10. European Symposium on Poultry Genetics (ESPG), Jun 2017, Saint-Malo, France. 2017. hal-01606588

**HAL Id: hal-01606588**

**<https://hal.science/hal-01606588>**

Submitted on 2 Jun 2020

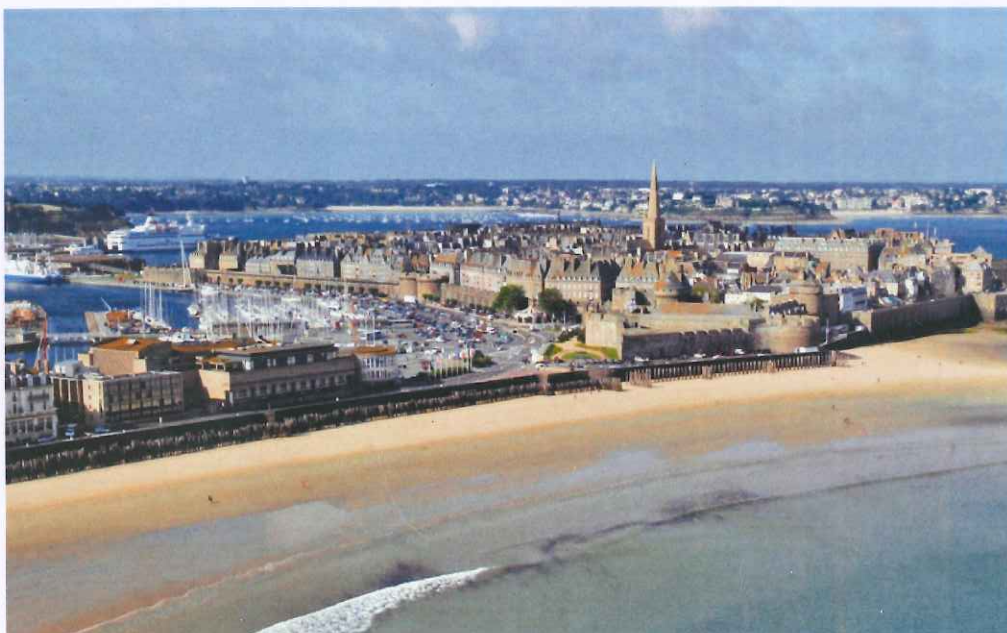
**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - ShareAlike 4.0 International License

Proceedings  
Of the  
Xth European Symposium  
on Poultry Genetics



26 - 28, June 2017  
Saint-Malo, France



WPSA France

**Assessment of surface temperature variation under chronic high ambient temperature in four experimental layer chicken lines differing for heat resistance and feed efficiency traits.**

Tatiana Zerjal, Adélie Tholance, Dzidzo Nyuiadzi, David Gourichon, Nicolas Bruneau, Denis Laloë, Florence Jaffrezic, Collin Collin, Andrea Rau,  
GABI, INRA, AgroParisTech, Université Paris-Saclay, 78350 Jouy-en-Josas  
tatiana.zerjal@inra.fr, France  
GABI, INRA, AgroParisTech, Université Paris-Saclay, 78350 Jouy-en-Josas  
adelie.tholance@gmail.com France  
URA, INRA, 37380 Nouzilly and CERSA, Université de Lomé  
dzidzo.nyuiadzi@tours.inra.fr, France and Togo  
INRA - PEAT - 37380 Nouzilly david.gourichon@inra.fr France  
GABI, INRA, AgroParisTech, Université Paris-Saclay, 78350 Jouy-en-Josas  
nicolas.bruneau@inra.fr France  
GABI, INRA, AgroParisTech, Université Paris-Saclay, 78350 Jouy-en-Josas  
denis.laloe@inra.fr France  
GABI, INRA, AgroParisTech, Université Paris-Saclay, 78350 Jouy-en-Josas  
florence.jaffrezic@inra.fr France  
URA, INRA, 37380 Nouzilly anne.collin-chenot@inra.fr France  
GABI, INRA, AgroParisTech, Université Paris-Saclay, 78350 Jouy-en-Josas  
andrea.rau@inra.fr France

*Corresponding author : tatiana.zerjal@inra.fr*

In this study we used infrared thermography to quantify the effect of ambient temperature (AT) on surface temperature (ST) variations of the comb, the shank and the eye in contrasted chicken genotypes at thermo-neutrality (22°C) and at high AT (32°C). Four INRA experimental chicken lines, representing a unique range of genetic variation for traits known to be important for heat tolerance and feed efficiency, were measured: the Fayoumi breed, known to be resistant to high AT and to parasitic infections; a naked neck dwarf (LS) line of brown-egg layers selected for longer clutch periods; and two lines of Rhode Island Red layers divergently selected for high (R+) and low (R-) residual feed intake. In total 189 hens (50 Fayoumi, 46 LS, 49 R+ and 44 R-) were reared under thermo-neutrality (22°C). At 28 wk of age the AT was increased to 32°C until 33 wk of age. Infrared thermographic pictures were recorded on all animals at 3 time points to estimate ST: at thermal neutrality (T1), 1 week after the increase of the AT (T2) and 4 weeks later (T3). Rectal temperature was also recorded at the same time points. At 22°C a wide variability in body ST was observed, both between and within genotypes, particularly for comb and shank temperatures, while rectal and eye temperatures were more homogeneous. At 32°C, the opposite trend was observed, with differences among lines existing only for rectal and eye temperatures. At 22°C the Fayoumi had the lowest and the R+ the highest rectal and eye temperatures. The same ranking was observed at 32°C. On the contrary, at 22°C the Fayoumi and R+ had the highest comb and shank temperatures, respectively, and no significant differences were observed at 32°C among lines. Significant genotype  $\times$  temperature interactions were observed for the comb and shank ST alone. Although large correlations were observed among ST ( $r$  between 0.75 and 0.84,  $p < 0.0001$ ), correlations between surface and rectal temperatures were generally low, with the eye being slightly more correlated to the rectal temperature ( $r = 0.30$ ) than the comb or the shank ( $r = 0.24$  and  $0.25$ , respectively).

**Keywords :** Heat stress; Surface body temperature, Infrared thermography; chicken