**Gender Differences in Opacity of CHICKEN hatching Eggs during incubation**

Khaliduzzaman1, Shinichi Fujitani2, Ayuko Kashimori2, Tateshi Fujiura1, Tetsuhito Suzuki1, Yuichi Ogawa1, Naoshi Kondo1

1Kyoto University; 2Nabel Co., Ltd., Japan

**[**Objective**]**

Culling a huge number of female day-old chicks in layer production are raising a big ethical issue worldwide. Although it is well established that sex differences exist in embryo weight, motility and post-hatch growth, the non-invasive method to study such differences in chick embryos is still a great challenge to the scientist and other stakeholders. Hence, the motivation for the current study was to non-destructively investigate the growth difference in terms of opacity value during incubation.

**[**Experimental Methods**]**

A total of 51 eggs (ROSS 308) sorted from 100 eggs based on size, mass and shell color, were incubated. An Embryonic Vital Scope consists of LEDs (870nm) and a Si-photodiode which receives the light that passes through the egg was used to measure average transimpedance voltage for individual eggs at incubation days 6 to 19. Feather sexing methods was flowed to check the actual gender of the day-old chicks. Student’s t-test was used to see the significant differences between male and female groups and gender classification model were developed using various algorithms.

**[**Results and Discussions**]**

As the embryonic components became larger during incubation, the amount of transmitted light was reduced. Consequently, the opacity, the ratio of input LED current over average output voltage, increased. Therefore, a higher input current (mA) was necessary to get the same output voltage. Male chick embryos showed higher opacity values than female embryos at day 16-18 (p-value<0.05).

**[**Conclusions**]**

Opacity as optical properties of incubated eggs could be used to determine the embryo gender before hatching with an accuracy of 80%.