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Project #F002

Evaluating the Response of Broilers in Incubation Systems of a Commercial Hatchery

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"Comparison of Single and Multi-stage Incubation for Broilers"

The available incubational management practices are changing and an examination of these practices are needed to evaluate how they perform in a commercial broiler setting. The practices to be examined include a comparison of single stage incubation versus multistage incubation and their impact on viability of the embryos, chick quality and broiler performance. A second objective was to evaluate the injection of carbon dioxide into single stage machines during the initial incubation period and measure its impact using the same criteria. The third objective was to evaluate the effects of reduced ventilation in multi-staged incubators by controlling ventilation based on humidity or carbon dioxide levels as opposed to the normal damper control based on temperature.

All trials were conducted in a commercial broiler hatchery which used both Chick Master multi-stage incubators and Chick Master single stage incubators. Comparisons were made in all three of the above objectives by equally dividing eggs from breeder flocks at time of set between both treatments of a particular objective. At hatch, chicks from the same breeder flocks were evaluated for weight of chick, weight of residual yolk sac and moisture content of both. Breakout of residue was evaluated for each of three breeder flocks in each incubation treatment. Each farm in the test was comprised of 4 houses where 2 houses each housed the chicks of each incubation treatment except for the reduced ventilation tests in multi-stage incubation where only one house per treatment could be used because of hatch numbers available. Broiler weights were obtained at 1 and 8 weeks of age. Additionally at the 8 week weighing the broilers were evaluated for leg health parameters. Processing plant data were collected when available,

Results: Single stage incubation, when compared to multi-stage incubation, gave the most

significant and consistent positive results in improved broiler performance. Hatchability improvements were not consistently observed but there were improvements in hatchling quality parameters, market body weight, feed conversion and leg health issues. The other two objectives comparing ventilation rates in multi-stage incubation and the injection of CO₂ into single stage incubation during the early period resulted in inconsistent results that were regarded to be non significant differences between the two systems regarding the broiler performance parameters evaluated.

Expected Impact: The benefits of single stage incubation included improved feed conversion, body weight gain in most of the trials and consistent improvement with regards to leg health issues. The use of carbon dioxide injection during the first 6-8 days of single stage incubation did not prove to be beneficial in our experiments. The use of reduced ventilation in multi-staged machines did not yield benefits in increased performance although energy savings could be realized because of reduced ventilation requirements in the setters.