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Comparison of the embryo development of the Pekin duck and the Mulard duck

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Knowledge of the stages of avian embryo development is essential for the supervision of the incubation process in a hatchery. Therefore, it seems interesting and necessary for poultry practice and science to describe the embryo development of the Pekin and Mulard ducks and indicate the stages with an increased probability of embryo mortality during artificial incubation.

The hatching eggs of Pekin (Cherry Valley) and Mulard ducks (1,800 eggs/breed) were incubated (setter/hatcher IGLOTECH, Poland) at a gradually decreased temperature (from 37.8 to 36.2°C) and RH 65-60%. Embryological sampling (3 eggs/breed/collection) was on: 0-4, 5-12 and 3- 28/32 days of incubation (d.i) every 6, 12, and 24 hours, respectively.

The incubation of the remaining eggs (2 × 1,600 eggs) continued until the ducklings hatched. All discarded during candling and unhatched eggs were breakout analysed.

The faster embryo development of Pekin duck in comparison to Mulard was already detected on 1 d.i. Two clear peaks of embryo mortality were observed for both breeds of ducks. However, the first peak occurred for Pekin duck between 2 and 6 d.i. (with a critical period in 2-3 d.i., HH 11-17) and was very sharp (74.3% of all deaths), while for Mulard between 2 and 7 d.i. (with a critical period in 4 d.i., HH 16-17) and was milder (28.6% of all deaths).

The second peak was found for Pekin duck (17.7% of all deaths) between 22 and 26 d.i. (with a critical period during the internal and external pipping), while for Mulard (57.3% of all deaths) between 24 and 30 d.i. with the sharp mortality during the external pipping (29 d.i.).

From the beginning of incubation, the subsequent stages of embryonic development of the Mulard are observed later than in the Peking duck.

Moreover, both breeds of ducks are characterised by the different patterns of the timeline of embryo mortality. For this reason, the incubation programme needs to be targeted individually for each with these breeds. ■

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Dietary energy-to-protein ratio in the breeder diet affects chick quality

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This study aims to investigate the impact of breeder dietary energy-to-protein ratio on fertility, hatchability, embryonic mortality and chick quality. At day 0, 1,200 broiler breeder pullets (Ross 308) were randomly assigned to four treatments in 20 pens in a 2 x 2 experimental design.

The pullets were subjected to two rearing diets (0-21 weeks of age) and two production diets (21-60 weeks of age) with a different energy content (96% and 104% AMEn relative to breeder recommendations), which were fed on a pair-gain principle. At 32, 36, 40, 45, 50 and 55 weeks of age, 150 settable hatching eggs per age were selected per pen for incubation at a commercial hatchery.

At E18 and at pull, clear eggs and unhatched eggs were opened to determine infertility or stage of embryonic mortality. At pull, chicks were classified as first or second grade and a subsample of chicks (n=24 to 46 chicks per pen per age) were weighed.

Data were analysed by linear mixed models including rearing and production diet and their interaction and breeder age in the model. Not normal distributed data were arc sin transformed to obtain normal data. No interactions were observed. Breeder rearing and production diet did not affect fertility, hatchability, embryonic mortality or chick weight.

Feeding a 104% AMEn production diet reduced the percentage of second grade chicks, compared to feeding a 96% AMEn production diet (2.2 vs. 3.5%, respectively, P = 0.003). Breeder age affected reproductive parameters, where older breeders (>40 weeks of age) had a 12.8% lower fertility, 2.0% lower hatchability of fertile eggs, 2.0% higher embryonic mortality, 2.5% higher percentage of second grade chicks, and 7.2g heavier day-old chicks compared to younger breeders (≤40 weeks of age; P<0.001).

It can be concluded that a higher energy diet of breeder hens during production has beneficial effects on chick quality. ■

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Preliminary study on SPIDES effect of freshly laid goose eggs on hatchability rate

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Our earlier experiments on stages of embryo development at oviposition in the freshly laid goose eggs indicated great varieties in distribution of the developmental stages from stage VI of EGK to stage two of HH (Lukaszewicz et al., 2017, 2019).

These stages depended on genotype, flock age and period of the reproductive season. Fasenko et al. (1992) described that older broiler breeder hens tended to produce more developmentally advanced embryos, that were also more resistant to storage.

Knowledge about the significance of embryo stage at oviposition on resistance to length of storage and further hatchability inspired us to determine if SPIDES (Short Periods of Incubation During Egg Storage) of goose eggs prior to storage will improve their hatchability.

Hatching eggs were collected from Bilgoraj goose kept in Wroclaw University of Environmental and Life Science, and at the day of oviposition divided into two groups: – control (not heated, stored for 10 days) and SPIDES (heated four hours at temperature at 37.5°C, then stored for 10 days).

All eggs were placed horizontally on trays, stored at 17°C and air humidity 55-60%, and turned once a day along the long axis. After 10 days eggs were set into incubator and incubated according to guidelines for goose egg, candled on day 10 and 27 of incubation and the unfertilised eggs and eggs with dead embryo were removed. Hatching indexes were determined after 30 days of incubation. Results obtained indicate the positive effect of SPIDES on goose egg hatchability. ■

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