

BLACK SPOT AND LATE DEATH IN SHELL IN BORDER CANARIES.

The Border canary is a type canary differing from the wild canary as being heavily feathered and having an adult weight of 40 grams as to the regular canary weighing around 25 grams. Black spot and late dead in shell (just before hatching) are the two most common problems met worldwide, from Europe to the UK, as well as in the US and South Africa (personal communication) in different settings and different approaches as to feeding, housing and caring for these birds. These modern fanciers worldwide do take good care of their birds, and do follow instructions as being told by some well known avian vets. In spite of this losses are huge making some fanciers desperate making them leave the hobby.

As to late dead in shell most frequently being associated with problematic humidity in the breeding room and eggshell abnormalities, as well as to nutritional deficiencies and latent infections. Nevertheless cultures being done on death in shell eggs never have shown any infectious origin, apart from some E. Coli infections, which can be considered as a normal inhabitant of the intestinal flora. (Border Convention UK).

Black spot, as being called, is just a congested gall bladder in which electronic microscopic investigations have shown circo virus, but cultivation and infection trials remain negative. This infection causes an immunosuppression caused by lymphoid necrosis and cellular depletion in the bursa of Fabricius and to a lesser extent in the spleen (Avian Medicine, second edition, Tully, Dorrestein, Jones). Mortality in newborn chicks is high due to secondary infections and as the possible viral origin no cure is known.

Other causes of black spot are Coccidiosis (Atoxoplasmosis). Ornithosis, bacterial septicaemias and other blood parasites (Avian Malaria (Plasmodium), Haemoproteus and Trypanosoma) . German researchers believe Mycoplasma to be the main cause of Black Spot in Europe. Red mites, biting flies, mosquitos and house sparrows spread these blood parasites. (Dr Marshall, DVM, Australia)

In this communication I am proposing another possible cause as to both problems, not being scientifically proven, but a hypothesis to be investigated. The main cause of both of these disorders being a possible "energy deficiency" related problem.

As being shown the avian egg does not contain much carbohydrates, in a chicken egg of 50 grams, only 0.6 grams of carbohydrates are present. We know this glucose, stored in the form of glycogen in the glycogen body is, only supplies the embryo for the first 6 days of incubation. After this period glucose is supplied by gluconeogenesis, in which proteins and fats are being converted to glucose for energy supply. In order to do this proteins and fats are being used from the yolk and albumen, starting after organogenesis. For gluconeogenesis biotin is needed, but if the embryo starts ingesting albumen, the avidin present can bind the biotin in the gastrointestinal tract, inactivating its action.

What we are proposing is the idea of some artificially bred type canaries outweighing their natural ancestors might need more energy as the embryo develops in a way the embryo comes in a situation in which it becomes energy deficient too soon during incubation, for example already after 5 days of incubation. In order to survive the embryo starts using fats and proteins from the yolk sac, in order to produce glucose by gluconeogenesis, but when this yolk is all being used, before hatching, the embryo dies because of energy deficiency. Latent biotin deficiency or biotin being bound to the avidin in the egg might be another factor blocking gluconeogenesis. This could be a reason for the increased incidence of death in shell problems in birds requiring more energy. Even more, if the chick is born with a relative biotin deficiency, gluconeogenesis is impaired resulting in stunting in the first week of life and this could be a cause for dying chicks in the first weeks of life.

A possible solution could be to supplement hens before laying with enough glucose which can be stored as glycogen needed for the first period of incubation, for example by adding some royal jelly, rich in biotin, to the softfood and increasing biotin in the hens regime in order to attain better gluconeogenesis in the second part of incubation. Levels up to 0.5 mg per kilo of biotin in the total food regimen would be proposed. Also remember fanciers do supply their breeding birds with softfood, but as this only makes up a part of the total food regime, subclinical levels are met frequently. Even more, there has been a tendency to give birds high protein foods, having less carbohydrates worsening it all. Interesting too is this breed of birds easily suffers from fatty liver syndrome (FLHS), which also has been related to biotin deficiency. While low dietary protein predisposes chicks to develop FLHS, high dietary protein can cause classical signs of biotin deficiency. Feeding pelleted food could be of assistance but canary breeders do not seem having enthusiasm doing this.

Oxygen is the only nutrient not derived from the egg for proper incubation. According to Phil Warne, UK, the most respected canary breeder in the world, lack of oxygen is the main cause of death in shell. Ventilation does affect carbohydrate metabolism. Thus hypoxia (low oxygen levels reaching body tissues) can negatively affect glucose production. This could be an explanation for the observations made by this fancier.

As to black spot, it could be possible the congested gall bladder as seen in newborn chicks might just be a reflection of the above written as the black spot could be oxidised fats in the gall bladder, as the yolk is being used too soon in the incubation process. Research has to be done to show the presence of yolk in the intestines in black spot chicks, as digestion of yolk in the intestinal tract only starts at hatching (before hatching through blood vessels). The presence of yolk in the intestines before hatching would demonstrate early use of yolk. Beside this, the physiological fatty liver in newborn chicks, because of the absorption of the yolk sac, should be impaired in this situation, so it could be investigated if these chicks show what is called a "retarded fatty liver", because no yolk is present just before hatching to be absorbed.

Typical in chicks with black spot is these almost do not beg for food from their parents, a sign of energy deficiency, weakening them and making them vulnerable for secondary infections like E. Coli. Case reports have shown chicks born with black spot being given a glucose solution, just a few drops for the first day, may shift these chicks to survival (personal communication).

The canary, when the Spanish invaded the Canary Isles in 1478, was called the Sugar Bird because of its fondness of the sugar cane and the likes to eat sugar.

If this hypothesis is true remains to be proven, if so, first of all by breeding for type we managed to breed a bird needing more energy during incubation as to his ancestors, or did we change our feed regime in a way we went for high protein foods in a way we lost sight of the carbohydrate needs for our birds.

Dr. Jan Vanderborght