

G SUMMARY

The effect of a raised biotin content in female BUT Big 6 turkey breeder diet on reproduction as well as on health status of the foot pads of the progeny

The present investigation was carried out to determine if two different biotin contents in the diet have any beneficial effect on fertility and hatchability of female turkey breeders of the heavy turkey line BUT Big 6. The breeders kept under field conditions were divided in two groups receiving 400 µg biotin/kg diet (standard) and 2000 µg biotin/kg diet (test), respectively. In order to detect any age influence on the reproduction data, examination took place at the beginning (production week 4, date I) and the end (production week 20, date II) of the reproduction period. At both dates the obtained results reveal that the fertility of the test group was higher (0,8 %) than that of the control group. At the end of the laying period (date II) only the older hens of the test group showed a slightly higher hatchability rate than the standard group.

Additionally, a possible influence of the different biotin supplementations of the layer's diet and the layer's age on the progeny's foot pad structure and health status was examined. For this purpose foot pad samples were collected from different prenatal (day 20, 23, and 26 of incubation) and postnatal stages (day of hatch, day 7, 14, and 21 of life). For three weeks one day old male poults from each layer group were reared under experimental conditions. They received a diet with a biotin content of 220 µg per kg. The foot pad specimens were examined macroscopically, morphometrically, light- and electronmicroscopically.

Independent of the female breeders diet and the production stage, no difference in the epidermal fine structure of the foot pads was detectable in the fetuses or the poults. This indicates that the biotin fed to turkey breeder hens and the breeders age seem to have no effect on the epidermal structure of the progeny. The peridermal cells of turkey fetuses do not only display microvilli but also exhibit labyrinthic protuberances similar to those of the human fingertip, which have not been described in poultry previously. Also, the fetuses and newly hatched turkeys displayed no symptoms of a foot pad dermatitis.

By lanthan-tracer-investigation the permeability mechanism of the progeny's metatarsal skin was examined. The barrier-function of the epidermis starts with the increased liberation of the intracellular lipids stored in the cells of the upper stratum intermedium into the intercellular clefts. But complete barrier-capacity seems to be reached just between the mature cornified cells.

However, independent of the layers' diet, some poults already showed first signs of a foot pad alteration at the age of four days, starting with hyperaemia of the foot pads. The redness was due to a primary non-infectious, local and exudative inflammation that leads to a

damage of the skin “from the inside”. As the inflammation progresses, foot pad lesions occur and induce the destruction of the skin “from the outside”. At this stage of the infectious process the fissures can heal without the formation of scar tissue.

An interesting point was the observation, that the progeny of the older hens had a statistically remarkable higher quantity and more severe cases of foot pad alterations than those of the younger hens. After the first week of life there was no statistically evident difference between the progeny's body weight of the two breeder diet groups, in fact, it showed a tendency to become equal. But until the age of 7 days the body weight of the older hens' progeny was significantly higher than that of younger hens. In the first week of life a high body weight gain seems to have an exceptionally negative effect on the foot pad condition of the poults. The adaption and maturing processes of the plantar skin are probably irreversibly disturbed, leading to the poor foot pad condition of the poults originating from the older hens. These results indicate that this process is due to other factors than the biotin content of the layers' diet.