

G SUMMARY

Physiological and pathological findings of hind limbs of genetic different turkey lines and with different feeding composition with especial attention to tibial dyschondroplasia and to pododermatitis

In today's intensive turkey production, leg disorders are still a major cause of economic loss. These disorders are also important under animal welfare aspects. Most diseased poults are unable to walk. Diseases come along with acute and chronic pain of the affected birds, followed by cannibalism. Many etiological different diseases were combined under the terminus "leg weakness syndrome". As causes for the occurrence of leg disorders, different factors such as genetic disposition, rapid growth, food composition, mismanagement and environmental stress are to be assumed. In addition bacterial or viral infections can also lead to leg weakness. Numerous experiments were conducted to investigate influences on the cause of leg weakness. The experiments were structured into 3 trials:

Trial 1: Canadian wild-type turkeys, rearing period 24 weeks

Trial 2: 5 commercial meat-type turkey lines, light line Kelly Bronze, two middle weight lines Nicholas (N) 300 + BUT 9 and two heavy lines N 700 + BUT Big 6, rearing period 22 weeks

Trial 3: BUT Big 6, rearing period 20 weeks

Trial 1 and 2 carried out to investigate the genetic influence on the occurrence of leg weakness. Trial 3 was conducted to research the effect of dietary influences on the frequency and severity of leg disorders. Therefore the dietary was cut into two different energy levels and two different biotin concentrations.

In all trials mortality, morbidity and the causes and the occurrence of leg weakness syndrome were investigated. In various intervals of two to four weeks a randomly selected sample of 56 birds (trial 1), 175 birds (trial 2) and 132 birds (trial 3) were examined. The following data was collected: body weight, autopsy findings and leg healthy as well as bone parameters length, weight from femur (Fe) and tibiotarsus (TT), breaking strength of TT and histometric measurements of the growth plate of TT. The proximal ends of TT were investigated with pathological-anatomical and pathohistological techniques.

During the whole rearing period clinical signs of leg weakness syndrome were detected only sporadically. In contrast a representative number of the examined birds showed subclinical indications of tibial dyschondroplasia (TD) and pododermatitis (PD). Seeing that the advanced investigations were made to characterize these both disease.

During the whole rearing period of 24 weeks, the Canadian wild turkeys (trial 1) showed under the applied test conditions no clinical signs of leg weakness, no pathological changes or posture abnormalities of the extremities, no pathological findings of the growth plate of the tibiotarsus, especially no TD lesions. The footpads showed physiological hyperkeratosis of the reticulate scales and no signs of pododermatitis.

Only 0.7% of the commercial meat-type turkey lines (trial 2) showed leg disorders. The observation of TD showed that all five different meat-type turkey lines had a high prevalence of subclinical TD lesions. The observation didn't show significant differences between the lines and there was no correlation between body weight, turkey line and frequency of TD lesions.

In regard to frequency and severity of TD it was observed that the light weight lines had less severe grades of TD than did the heavier weight lines. The occurrence of TD lesions showed an age-related development. First sporadic TD lesions appeared between 4 and 8 weeks of age and their frequency peaked at 16 weeks. At this age 88% of all turkeys showed subclinical TD lesions. This peak was followed by a noticeable decline in number and size of the lesions until 22 weeks of age. Only 32% of poults at this age still had TD lesions, an evidence that this condition is partially self-limiting and reparable. The results of the investigations on footpad dermatitis showed: poults from heavy turkey lines had significant more pododermatitis and with severe grade than light-weight turkey lines.

The BUT Big 6 (trial 3) showed leg weakness in 0.3% of the cases. On one hand differences were noticed by body weight. At the end of investigations poults with restricted energy level

had more than 50% less body weight than poults with commercial or high energy level. On the other hand the restrictive fed birds showed in contrast to the other feeding groups a more constant bone development in association to the body weight development. The occurrence of TD revealed that a decrease in energy level of the feeding rations led to a decrease in frequency and severity of TD in meat-type turkeys. Poults from heavy poults with commercial or high energy level showed more subclinical TD lesions and with significant severe grades of TD as lighter poults with a low energy level. The results of the observations to PD represented that a higher biotin and energy concentration in the food could reduce the frequency and the severity of PD significantly in spite of the higher body weight of these poults.

Based on the trials it can be concluded that several factors like genetic selection as well as energy and biotin in the food can take an influence on the occurrence and severity of tibial dyschondroplasia and pododermatitis. There is evidence that the development of TD lesions depends on high growth rates and high genetic body weights. Against the appearance of PD showed a high correlation to the biotin concentration in the food composition. Furthermore it appears that other factors like stable conditions, season and mismanagement like stocking density and litter material have an influence on the leg healthy too.