

2 Summary

Background: Over the last ten years, the Zoo Basel has encountered numerous cases of alopecia in the Gouldian finch flock. The birds suffer from difficulties with their molt, seasonally losing all of their feathers around the eyes, on the back of the head as well as on the neck. The finches are mostly in good general condition and the juveniles before onset of their first molt are not affected. Alopecia in captive held Gouldian finches is a condition which has been described in keeper's forums and books¹. These sources suggest the alopecia is caused by a deficiency in iodine. According to them, Gouldian finches are known to have higher needs in essential iodine and captive held finches are very often deficient. Unfortunately, no scientific study has ever been conducted on this subject and it has never been scientifically proven, that iodine deficiency causes alopecia and supplementation could remedy the condition.

Objectives: To investigate the cause of the alopecia in the flock of Gouldian finches at the Basel Zoo and, mostly, to evaluate if the feather loss could be a result of chronic iodine deficiency and therefore a decreased function of the thyroid gland.

Material and methods: In a first retrospective study, the clinical records of the zoo were reviewed and, if existent, compared with the pathological and histological findings of the necropsied birds at the Institute for Animal Pathology at the University of Bern. Secondly, in a prospective study, the entire Gouldian finch flock at the Zoo Basel, consisting of 16 birds, was randomly divided in two equal groups: the control group was provided with normal drinking water, the treatment group was supplemented with a 5% Lugol's iodine solution into the drinking water. The condition of the birds, their behavior, the apparition of alopecia and the progression of the lesions were watched, photographed and scored every two weeks. A sample of food was sent to a specialized laboratory to measure the content of iodine. Every two weeks, pooled fecal samples were collected for each group in order to measure the content of the thyroid hormone T3 in the droppings at a specialized laboratory. Once in the middle of the study, the finches were all caught for closer observation. During that operation, feathers were plucked and approximately 0.1 ml blood was drawn from every finch. The T3-hormone concentrations were measured in the serum and compared to the concentrations in the feces. Skin biopsies were taken from finches with alopecia. Each biopsy was cut into two pieces: one half was routinely cultivated for bacteriology, the other half was formalin-fixed and paraffin-embedded for histology, mycology using special stains on the cuts and virology using PCR analyses. Virological investigations were also conducted on the plucked feathers as well as the archived formalin-fixed and paraffin-embedded skin tissues of the previous cases of the retrospective study.

Results: Twenty-four cases of Gouldian finches with alopecia on the head and the neck have been archived over the last ten years at the Zoo Basel, thirteen of which died or were euthanized and sent for evaluation at the Institute of Animal Pathology at the University of Bern. In three of the thirteen cases, a dermatomycosis was believed to have contributed to the alopecia. In the prospective study, only one bird was diagnosed with dermatomycosis. Histologic review of affected finches revealed two major patterns: the cases with dermatomycosis had a severe orthokeratotic hyperkeratosis and a marked to severe diffuse lymphocytic dermatitis. The feather bulbs were inactive and the follicles were filled with lamellated keratin instead of feathers. All of the keratinized layers were invaded by large numbers of fungal organisms. In the other cases, there was a second pattern of mild orthokeratotic hyperkeratosis and a mild lymphocytic and plasmacellular perivascular dermatitis. The feather follicles were also filled with lamellated keratin, no feathers were visible. In exception of the four cases of dermatomycosis, no other underlying infection was found. The observation of the birds revealed that every finch had gone through molt. The assessment of the lesions exposed statistically significant differences of the scores between the dates, with values increasing in a first time and decreasing to the end. This indicated that every finch was affected at some time by the alopecia. The duration of this period, however, was very variable. The finches in the treatment group seemed to have shorter molting periods than the birds in the control group. This could not be proven statistically. The measurements of T3-hormone in the

feces and the serum and the comparison between the two groups were also not statistically significant. Nevertheless, the feed analysis revealed that there was an actual deficiency in iodine and a supplementation was welcome.

Conclusion: This study could not prove that the alopecia was caused by an iodine deficiency. Supplementation in iodine could remedy the clinical condition of the affected birds. Psittacine circovirus (psittacine beak and feather disease virus) or avian polyomavirus (budgerigar fledgling disease virus) infection as well as bacterial colonization could be ruled out as sole cause. The origin of the alopecia remains thus unclear and must be viewed as most likely multifactorial in nature.