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The Influence of *Galium aparine* L. Seeds on the Health Status of Broiler Chickens

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Abstract: The bursa cloacalis (bursa of Fabricius) and thymus are the central lymphoid organs of fowl and their presence is essential for the development of their adaptive immune function.The bursa and thymus control different immune responses (humoral or antibody-mediated and cell mediated Cr transplanted immunity) against a wide range of pathogens. Itrununosuppression is a serious problem in commercial poultry flocks and estimation of economic impact is complicated and depends on the type of challenge, susceptibility of the flocks and local environmental factors. In our experiment three groups of broiler chicken were fed on a complete diet for three weeks. Standard diet: control group-(C), contaminated diet: group A supplemented with 10% and group B supplemented with 5% of the *Galium aparine* L. seeds. We observed clinical symptoms, body weight gain, haematological and biochemical values, pathological changes, humoral immunity, serology and histological changes of Bursa of Fabricii. We compared results of control group C with results of both experimental groups A and B. According to our results we comfirmed the vasotoxic, hepatotoxic, nephrotoxic effects of *Galium aparine* L.seeds in diets for broiler chickens.

Key words: Chickens, immunosuppression, B. of Fabricius, Bursa cloacalis, *Galium aparine* L. seeds

Introduction

Poultry in intensive rearing is often affected by many infectious and non-infectious pathogenic noxae. Vaccination failure, bad nutrition, higher mortality and bad economic failures are the results of immunosuppression (Wagner,1987; Muneer *et al*., 1988).The early detection of immunosuppression can be used for diagnosis and differential diagnosis. The four types of the cell activities: mitosis, proliferation, apoptosis and necrosis can explain the damage of the organism and its detection could be used for diagnosis. Apoptosis is an important indicator of immunosupression in poultry (Skardova *et al.,* 1999). Both bursal B and thymic T avian lymphocytes are very sensitive to immunosuppression caused by different pathogenic and non-pathogenic agents during commercial poultry farming (Sebekova, 1999).

In our research we have studied the influence of weed seed (*Galium aparine* L.) on the health status of broiler chickens and its possible immunosuppressive effect. In recent years poultry farmers warned of a large concentration of *Galium aparine* L. seeds in complete diets for poultry, together with clinical findings ressembling IBD symptoms (Pospisilova, 1998). In some cases were found more than 2% of weedseeds although regulations do not allow higher concentration than 1% of the *Galium aparine* L. in complete diets for broiler chicken (Sebekova,1999).

Materials and methods

In our experiment three groups of one day old broiler chickens were fed with the following diet for three weeks: complete diet-standard (control group-C) and contaminated diet (group A,B). The diet of group A was supplemented by 10% *Galium aparine* L. seeds and the diet of the group B was supplemented by 5% of the *Galium aparine* L. seed, Group C was fed with a standard diet without *Galium aparine* L. seeds. Broilers were kept in one room in the three separate compartments under electric heatersin a deep litter. Chickens were vaccinated with modified dryed vaccine against IBD at the age of 8 days.

The following parameters were observed:I.Clinical signs, 2. Body-weight gain at age 1, 7, 14 and 21 days, 3. Haematological values: total red blood count, total white blood count, differential blood count, haematocrit, haemoglobin values, 4. Necropsy, 5. Biochemical values: ALT, AST, ALP, total proteins, urea, cholesterol, 6. Serological values:level of antibodies against IBD by ELISA, 7. Histological examination of the bursa of Fabricius (Table 1).

Results and Discusion

In some cases in group A and B, in our experiment we observed diarhoea, growth depression, somnolence, apathy and anaemia. The smallest weight gain was observed in the group A between days 7 and 14 day of experiment. The difference in weight gain compared with controls was 63.67 g. The weight gain in the group B was also lower and difference compared with controls was 51.47 g Haematological values in both experimental groups showed erythropaenia, haernoglobinaemia, slight leucopenia, lymphopenia, heterophilia and lower haematocrit values. We observed anaemia of wattles, bleeding in the skeletal muscles, stomach and B. of Fabricius. Necropsy showed a muscular stomach filled with *Galium aparine* L. seeds (Fig. 1). The seeds were also present in the intestine and were in different stages of digestion. We did not find any case of obstruction of the gastrointestinal tract (GIT). Pathological examination of the liver and kidneys showed fatty degeneration and milliar necrosis. These changes were comfirmed by screening of laboratory enzymes AST, ALT, ALP, urea and cholesterol which showed increased level and a decrease in total protein. Serological examination showed lower antibody level against IBD in groups A and B (1:212, 1:419).

The immunosupressive effects of *Galium aparine* seeds in our experiment is also proved by our histological examination of the bursa of Fabricius. We found miliary degenerative changes in some of the follicles and necrosis of lymphocytes in the centre of the follicles (Sebekova, 1999).

In the early stages we found monocelular necrosis in the centre and cortex of the follicle. In late stages of the immunosuppression we observed depletion of the centre lymphocyte and a thiner cortex. We did not find any apoptotic changes (programmed cell death) in the bursa of Fabricius, which represents physiological changes in many immunocompetent organs.

The immunosuppressive effect of *GallUm aparine* L. seeds was observed by Wagner (1987). During the rearing period he gave 200 broiler chickens a diet contaminated with 10% *Galium aparine* L. seeds. He observed haemorhagic diathesis with ecchymosis in the sceletal muscles and in some cases small petechiae in the muscular stomach and small intestine. Degenerative changes to the liver were also observed. Pospisilova (1998) warned of a high concentration of *Galium aparine* L. seeds in broiler diets and the possible immunosuppressive effect of this weedseed.

Table 1: Body-weight gain in broilers affected by *Galium aparine* seeds in diet

Days of experiment	Weight gain/group A	Weight gain/group B	Weight gain/group C
1-7	73.67	69.08	92.66
7-14	99.50	111 70	163.17
1-21	176.37	189.90	195.74

A = 10% Galium apar ne seeds B=5% *Galium aparine* seeds C = Control

Fig. 1: Necropsy finding. The presence of *Galium aparine* seeds in the gizzard

The results presented here are similar to the results of Wagner (1987) and Cermakova (1988).These results prove the hepatotoxic and nephrotoxic influence of *Galium aparine* L. seeds on the broiler chicken.

According to Halouzka and Jurajda (1991) atrophy of the bursa of Fabricius is a macroscopic demonstration of immunosuppression. In our our study we can confirm that *Galium aparine* L. seeds cause lower weight gain, clinical signs immitating IBD and have vasotnxic, hepatotoxic, nephrotoxic, and immunosuppressive effects on broilers. Thus our present study supports the hypothesis that *Galium aparine* L. seeds induce immunosuppression similar to 1BDV, as described by Pospisilova (1998), Wagner (1987) and Cermakova (1988).

From this point of view it is essential to control the amount of *Callum aparine* L. seeds in commercial diets for broilers. Concenration can not be higher than 1% in the diets (Genekova and Skardova, 1999). This could help to prevent immunosuppression in commercial poultry.

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