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EFFICIENCY OF DERGALL DRUG ADMINISTRATION IN TREATING SCALY LEGS OF BACKYARD FLOCK

Ye. L. MIKULICH, I. B. IZMAYLOVICH, V. I. BORODULINA

Belarusian State Agricultural Academy, Gorki, Mogilev region, Republic of Belarus, 213407

M. W. LIS

University of Agriculture in Krakow,
30-059 Krakow, Poland

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Резюме. *Приведены методика и результаты применения польского препарата Dergall для лечения кнемидокоптоза ног у домашних кур. Препарат применяли по нестандартной методике методом индивидуальной обработки ног кур путем окунания в раствор препарата. В результате проведенных исследований установлено, что трехкратное применение препарата Dergall по предложенной авторами схеме полностью излечивает даже самую тяжелую крупозную форму кнемидокоптоза ног у домашних кур (отпадают известковые наросты на ногах, эпителий кожи полностью регенерирует, кожа становится желтого цвета).*

Ключевые слова: кнемидокоптоз, клещи, известковые наросты, куры, лечение, Dergall.

Summary*. The paper describes the procedure and results of using the Polish "Dergall" drug for treatment of scaly legs in domestic chickens. The treatment was provided by the non-standard procedure of dipping each bird's legs into a solution of the drug. The tests have shown that three applications of the Dergall drug according to the schedule proposed by the authors can cure even the most nasty forms of scaly legs in backyard poultry (raised encrusted scales on the legs come away, epithelium tissue regrows, skin becomes yellow).*

Key words: scaly legs, mites, raised encrusted scales, chickens, treatment, Dergall.

Introduction. Knemidokoptosis of chickens, otherwise known as the scaly legs or knemidokoptic mange, is a fairly common disease that, if detected in a timely manner, can easily be treated. The disease belongs to the category of infectious ones, since it is caused by the Knemidocoptes mite. For the first time in the literature, the scaly legs in chickens was described in 1778 in India. Then the causative agent of the knemidokoptosis of chickens was described in detail by Robin in 1860. And in Russia, the knemidocoptic mange of chickens was reported for the first time by Brandt in 1873. The scaly leg disease in poultry was most completely described by V.B. Dubinin [8]. In the 70-80s of the XX century, the disease was often observed in poultry farms, where up to 75% of the livestock exposed to Knemidocoptes mites may have been infested. Currently, the scaly legs of chickens and other birds is found mainly in small household plots or farms. The scaly legs is an extremely serious disease for poultry, because it can quickly spread and affect all the livestock. In most cases, unless timely assistance is provided, the birds will die [1, 2, 9, 10, 14].

Analysis of sources. The kemidokoptosis or the scaly legs is a disease caused by Knemidocoptes mites 0.2 – 0.5 mm in size. Their body is oblong-oval or round, gray with a yellowish shade of color, and they have four pairs of short, well developed legs. The mites feed on lymph, inflammatory exudate and skin epithelium. The peak of their invasion is observed in the spring and summer period [7, 11]. On the skin of affected birds, this mite multiplies quite rapidly, causing knemidokoptic mange in those parts of the body where it settles. The most visible damage is done to the bird's legs, because the mites dig tiny tunnels underneath the skin where they live and lay eggs and where their larvae develop. At the same time, the horny scales covering the bird's legs rise and protrude, and the skin in this area becomes tuberous. The legs become covered with cracks and scales of gray color, which the bird pecks until blood appears ("scaly leg"). Pathogenicity of the mites consists not only in their toxic effect on the bird's body, but also in the mechanical destruction of skin elements. If the disease is neglected, necrosis of the distal phalanges or inflammation of the joints can

develop. Due to a long incubation period of up to 3-4 months, it is rather difficult to determine the onset of the disease, as the raising of horny scales on the legs occurs when the mites have already considerably multiplied and severely irritate the bird, which often tries to scrape off the itchy area with its beak [13, 14] .

The scaly legs is easy to treat. The birds are usually given acaricidal drugs, which effectively destroy both the mites themselves and their larvae. You can immerse the bird' legs in a warm solution consisting of 0.1% permethrin or 0.5% cyodrinum. The bath duration should be 1-2 minutes, the head and wings of the bird being held immobile in the process. A good medicine is Front Line spray. It can be easily applied to the lesions with cotton buds. The skin should be treated for 1-2 days until the external signs of the disease disappear. The combination of ASD-3 and boric petrolatum has proved to be very promising. This tandem prevents the reproduction of mites by blocking them access to oxygen and food. At the same time, it reduces itching and regenerates skin cells. To control the mites, you can also use the aversectin ointment, which should be applied externally 2 or 3 times at 7-10 days intervals.

The scaly legs can also be cured using folk medicine: the lesions should be treated with birch tar or its mixture with kerosene. You must dip the chicken legs into the bath containing this mixture for a few minutes. Such treatment should be carried out 2 or 3 times once every 10 days. Heated birch tar can also be applied to the affected areas with a brush. In the absence of tar, a mixture of iodine and glycerin in equal proportions can be used. The treatment must be carried out every 5-6 days. When the knemidokoptosis is at its initial stage, warm baths with a 72% strong solution of laundry soap will be helpful. At home conditions, malicious mites on the legs of the poultry can also be exterminated by a simple and very affordable means. To do this, you must coat the chicken's legs in the late evening with slightly warmed sunflower oil, repeating the operation for twenty days. And to achieve even better effect of this oil procedure, you can add one spoon of solid oil to 150 grams of oil when it is heated, and stir up the mixture until smooth. In this case, the mites will die from the inability to breathe [10, 11, 12]. Also, you can prepare for the birds mixtures for bathing consisting from sulfur, tobacco and sand or sulfur, lime and sand (1: 1: 8), and pour them into wide and shallow boxes [7].

Regular inspection of the flock and timely detection of diseased individuals will help prevent the spread of mites on your farmstead or backyard. These mites are not dangerous for people and die in a few days, because they do not find suitable food on the human body. Nevertheless, during this period they can be passed on to other birds, and therefore one should thoroughly wash their hands after contact with the sick individual [14].

Purpose. Study of the effectiveness of the Polish "Dergall" drug for treating scaly legs of chickens in the conditions of private farms of the Republic of Belarus.

Material and methods of testing. The material for testing was 30 domestic chickens from a private farmstead, affected to a different degree by 100% knemidokoptosis infection. All the individuals had the following clinical signs: peeling of the horny layer of the epidermis on the legs, rising and loosening scales, getting covered with white limelike coating, then falling off completely. The stratum corneum thickens and massive gray 1-1.5 cm thick crusts are formed. The keratoid layers are covered with cracks, from which ichor exudes and dries up on the surface (Figures 1, 2). It should be noted that the most severe leg lesions were observed in young individuals aged 1-1.5 years. If we compare between hens and roosters, then judging by the clinical manifestations, the disease course was more severe in roosters (Figures 1, 2). Figures 1 and 2 show the affected legs of a 1-year old hen and a 1-year old rooster. Of the 30 heads in the experiment, there were 23 hens and 7 roosters, their age ranging from 1 year to 5 years.

It must be noted that some authors [3, 5] also point out that the roosters suffer from mites much more severely than the hens, the cases of death among roosters being more frequently recorded. According to Svetlov [6] and V.B. Dubinin [4], this difference in sensitivity to parasites in roosters and hens can be explained by the fact that the sexual differential sensitivity to the influence of adverse factors in females is much higher than in males [14].

Fig. 1. Knemidokoptosis-affected legs of a hen

Fig. 2. Knemidokoptosis-affected legs of a rooster

The material for laboratory tests was scrapings of the deep layers of the skin on the legs of the chickens, taken with a scalpel on the tarsometatarsus and at the fingers, in places both slightly and severely affected by knemidokoptosis (Fig. 3). Particles of the scrap were placed on the object plate, thoroughly crushed with a scalpel until large particles were softened, then kerosene in the amount of twice the scrap volume was added, the crusts were crushed again and specimens were prepared, covered with cover slip and examined under a microscope. The Knemidocoptes mites were found in the field of view of the microscope (Fig. 4).

Fig. 3. Taking scrapings from deep layers of the leg skin

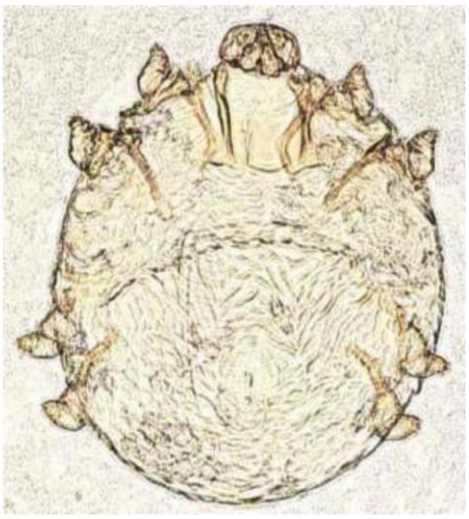

Fig. 4. Knemidocoptes mutans mite

For the treatment of sick chickens, the innovative DERGALL drug was used to immobilize the poultry mite (Fig. 5). The product is manufactured in Poland and is a registered trademark of ICB Pharma. The effect of the drug is based on the unique 3D-IPNS technology (three-dimensional polymer network system). When applied to the surface, it forms an air permeable three-dimensional molecular mesh. It causes mechanical immobilization of the mites, thus leading to a significant reduction in their numbers within 70 hours after application. The drug has no adverse effect on the physiological processes of arthropods against which action of the reagent is directed. The drug has been provided for the tests by Polish colleagues from the University of Agriculture in Krakow.

Fig. 5. DERGALL drug

According to the instructions for use, the drug is recommended to be used in all types of poultry farms by spraying in the presence of poultry. However, given the small number of birds in our experiment, we decided to apply it somewhat differently.

Treatment of each chicken was carried out according to the following procedure: at first the legs of the sick bird up to the ankle joint were placed for several minutes in a warm solution of laundry soap to soften the raised encrusted scales. Then, a toothbrush was used with gentle circular movements to remove the softened gray crusty buildups until skin with a pink or yellowish tinge appeared on the chickens' legs.

Then the chickens' legs were dipped up to the feathering (ankle joint) into a 0.6% solution of DERGALL for 2 - 3 minutes. For this purpose a bottle of the drug (18 ml) (Fig. 5) was dissolved in 3 liters of lukewarm water. After treatment of the chickens and mechanical cleaning of the poultry house where they were kept, the room, including nests, cracks and crevices, was thoroughly sprayed with 0.6% solution of the drug at a flow rate of 50-70 ml/m2. The treatment of the birds and the room was carried out three times at 5-7 day intervals.

Test results and discussion. The croupous stage of knemidokoptosis, the last and most severe form, which is difficult to treat, was found in the majority of the chickens. Already after the initial treatment, the crusty buildups on the legs of the chickens became dark gray, soft to the touch and started falling off but only partially. After re-treatment of the legs in the soap solution (on the seventh day after the first treatment), we noticed that the crusts became very soft and almost ready to fall off completely, with many of the affected scales on their legs actually coming off. Therefore, we decided to accelerate this process and removed the crusts from the legs of the chickens by making circular, accurate movements with a toothbrush (mechanical cleaning) (Fig. 6). After the second treatment, the crusty buildups fell off almost completely from the chicken legs and the skin on the legs, instead of the dirty gray color (Fig. 6, right leg), acquired a practically healthy yellowish shade. The legs, also at the joints, became much thinner (Fig. 7). In addition, the chickens became much more active, stopped pecking on the skin on their legs and readily entered the hen house in the evening. 7 days after the second treatment, we carried out the third and final treatment of the sick chickens according to the same procedure (at first the legs were soaked in a warm solution of laundry soap, then mechanically cleaned and treated with DERGALL for 2-3 min).

On the seventh day after the third treatment, scrapings were also taken from the skin of the legs in the chickens after treatment. During microscopic examination of the scrapings, no mites were found in the microscope field of view. The drug was applied 3 times as prescribed. Practically complete recovery of the birds (regeneration of the epidermis of the skin, restoration of skin color) occurred 2 to 2.5 months after the start of treatment. After finishing the treatment of chickens, we found in one of the supermarkets a tar soap with the addition of natural birch tar, which, by the way, is produced in Belarus. Therefore, we would recommend to replace, if possible, the household soap with the tar soap to prepare a soap solution.

Fig. 6. Rooster legs (Fig. 2) after primary treatment (left) and mechanical cleaning (right)

Fig. 7. Two legs of a rooster after primary treatment and mechanical removal of crusty buildups

Conclusion. As a result of the conducted testing, it was established that the DERGALL acaricidal drug, intended for a group treatment of chickens to get rid of mites and other pests in poultry farming by indoor spraying is an effective therapeutic tool for the individual treatment of scaly legs in domestic chickens. The treatment of the birds had to be carried out three times at intervals of 5-7 days according to the following procedure: first, the legs of the sick bird were dipped up to the ankle joint for 4-5 minutes in a warm solution of laundry soap to soften the raised encrusted scales. Then, with gentle circular movements of the toothbrush, the softened gray crusty buildups were removed until the skin with a pink or yellowish tinge appeared on the legs of the chickens. Then the legs of the chickens were immersed up to their feathering for 2-3 minutes in a 0.6% warm solution of the DERGALL drug. After the treatment of the chickens and mechanical cleaning of the poultry house where they were kept, the room was treated with a 0.6% solution of the drug by spraying.

Complete recovery of the birds (absence of mites in scrapings examined under microscope, regeneration of the epidermis of the skin, restoration of skin color) occurred 2 to 2.5 months after the start of treatment.

This product is intended for use in poultry farming for group treatment of poultry to get rid from mites. We have been the first to apply the drug successfully for individual treatment of scaly legs in chickens in backyard flock conditions.

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