

METHOD FOR EARLY DETECTION OF POULTRY RED MITE *DERMANYSSUS* *GALLINAE* (DE GEER, 1778)**

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Abstract: *Dermanyssus gallinae* (De Geer, 1778), poultry red mite or chicken mite, is haematophagous poultry ectoparasite. In poultry flocks small populations of chicken mite usually remain undetected. In order to supplement existing diagnostics we have investigated the method for its early detection. Investigation was carried out on 13 flocks, during two-year period, throughout Serbia and Montenegro. We have established that method for early detection of chicken mite can: improve the efficiency of existing diagnostic methods, that it is simple and reduces the period when parasites are hidden since it enables detection of small number of parasites before the population becomes visible. We recommend it to poultry farmers for regular control of the flock and control of the new flock, to veterinarians in poultry production as supplement to diagnostic methods: when suspecting the presence of *Dermanyssosis* in order to achieve early differential diagnostics, sampling of small number of chicken mite, monitoring the movement of the population and effect of the treatment, coming to conclusion regarding the effect of the disease control and as element of the forensic evaluation method.

Key words: *Dermanyssus gallinae*, method for early detection, poultry

Introduction

Dermanyssus gallinae (De Geer, 1778), poultry red mite or chicken mite, is most important haematophagous poultry ectoparasite in Europe (Chauve, 1998). Parasitism of this mite is demonstrated through disturbance of poultry, irritation, anemia, transfer of diseases, reduced laying ability, and

sometimes even death (*Evans and Till, 1966; Pavlović et al. 1988 a; Axtel and Aruds, 1990*). Chicken mite stay on the host only during night when they feed, in day time they are hidden somewhere in the chicken house, on cages, wall cracks where they digest blood and multiply (*Kirkwood, 1974; Svedberg, 1991; Mauer and Baumgathner, 1992; Pavlović et al. 1988 b, 1997; Nordenfors, 2000*). Human infestation or avian mite dermatitis, has been reported after exposure to a variety of birds. Clinical manifestations are itching, papules, vesicles and dermatitis. Usually is a professional disease (*Duncan, 1957; Pavlović, 2004*).

Because of their way of life small populations of chicken mite usually remains undetected. Their ability to hide demands adequate and efficient methods of detection and sample taking. Certain authors recommend putting of white bags on places where chicken mite stay. It is also recommended to cover cages with white cloth over night and examine it early in the morning. If chicken mite is present parasites will be registered on the cloth. If chicken mite isn't registered the procedure should be repeated several consecutive times (*Pavličević et al. 2002*). It is proven that chicken mite usually hide in perch cavities. Therefore, places, which offer adequate area for hiding, can also be used for detection of infection by chicken mite (*Kelly, 1995; McGarry and Trees, 1991*). Based on above-mentioned conclusions, Nordenfors (2000) recommend solution in form of traps. Traps similar to hiding places used by satiated mite are used for detection of chicken mite presence and monitoring of movement in the population. For this purpose traps made of uneven cardboard were used. By investigations the following was determined: adequate shape, dimensions, period and scope of sampling, as well as number of traps needed to obtain reliable data.

Considering methods for detection of chicken mite, their efficiency and application, we have come to conclusion that they can be simplified and still achieve even better results in detection of mite.

Objective of this paper was to develop simple and at the same time efficient method for detection of chicken mite acceptable to every poultry producer as a routine control, and for experts as a supplement to existing diagnostic methods. Approach is basic and objective was to provide answers to main issues.

1. Timely diagnostic of disease.

Timely diagnostic of disease enables timely treatment, provides spreading of chicken mite and avoids causing of damage.

2. Diagnostic in case of flock housing.

Diagnostic in case of flock housing is necessary due to the evaluation of

responsibility of the provider of new flock.

3. Monitoring of movement, extensity and intensity of population.

4. Treatment efficiency

In order to achieve final effect – total elimination of chicken mite population, it is necessary to realize the effect of each treatment in order to make certain corrections and achieve full effect in subsequent treatments.

5. Effects of the control of chicken red mite.

Determination of the effect of control is important because of the responsibility of the executor and taking of isolation measures.

Material And Methods

The investigation was carried out during year 2000 and 2001 in chicken houses throughout Serbia and Montenegro, on the field. The investigation included 13 flocks – 83695 layers and 4 chicken houses for 60 000 chickens. Method for early detection of chicken mite was investigated in breeding and exploitation of layers of table eggs, in battery and floor system. Following hybrids in different ages were investigated: Isabrown, Tetra-SL and Shaver. In order to realize early and effective detection of *D. gallinae* dust and feathers taken from the chicken house floor were examined, as well as chicken excrement depending on the type of chicken house. Layer of approximately 10 centimeters of dust, feathers and other impurities taken from the chicken house floor were placed in a bucket, bucket was covered with white paper because of easier detection of chicken mite. After 24 hours, inside of the paper and bucket were examined on light. Method for early detection of chicken mite was repeated in frequent intervals. Dust was gathered systematically so that no battery or section of chicken house would be left out. The importance of the systematical approach increases with the size of chicken house. In case when new flock was introduced on farms excrements and feathers from transporting cages was used. Preliminary results were obtained after 15 to 30 minutes, and final results in morning hours the next day. The efficiency and speed of detection of chicken mite depended on the gathered material and their number. If in short time great number of chicken mite is detected, such populations are already clinically visible.

Method for early detection of chicken mite was carried out by farmers, that is veterinary service in case of large farms, in controlled conditions.

Results And Discussion

Results of the investigation are presented in table 1.

Example 1. In chicken houses for breeding of layers no chicken mite was detected by clinical examination. By method for early detection of chicken mite we have established the presence of chicken mite. Clinical invisibility of mite was caused by their small number. Development of the population of chicken mite in breeding is hindered by the duration of breeding and radical methods: cleaning, cleansing and disinfections.

Table 1. Results of the investigation of chicken mite on different farms.
Tabela 1. Rezultati istraživanja kokošije grinje na različitim farmama

	Before treatment		After treatment			Farm capacity and purpose	Note	
	Method for early detection	Clinical examination, inspection	Method for early detection	Clinical examination, inspection				
1.	+	-	-	-	-	4 chicken houses, capacity of 60.000 chickens – breeding farm	Results conclude 6 weeks subsequent to moving out of chickens	
2.	29.9.- 10.10.01	+	-	From 18.10.01.	-	Layers in exploitation – 25.000	Introduction of the new flock	
3.	9.7.01.	+	-	/	-	Layers in exploitation – 4.380	Introduction of the new flock 24 days after settling of new flock + finding From 3 rd day of treatment until 3rd month, finding -	
	20.7.01.	-	-	/				
	2.8.01.	+(1)	-	/				
	3.8.01.	+(15)	-	/				
	4.8.01.	+(1)	-	/				
	5.8.01.	+(17)	-	/				
	Until 10.8.01	+	-	10.8.01.	-			
4.	13.7.01.	+++	+++	14.7.01.	X	+	Layers in exploitation – 5.000	From 3 rd day of treatment until 3rd month, finding -
				15.7.01.	X	+		
				16.7.01.	-	-		
5.	3.8.01.	+++	+++ cl.	7.8.01.	-	-	Layers in exploitation – 4.000	From 3 rd day of treatment until 3rd month, finding -

6.	20.8.01.	++++	++++ cl.	24.8.01.	-	-	Layers in exploitation – 915	From 3 rd day of treatment until 3rd month, finding -
7.	Empty chicken house	-	+ insp.	28.7.01.	-	-	Layers in exploitation – 6.000	From 3 rd day of treatment until 3rd month, finding -
8.	27.4.01.	+++	+++	1.5.01.	-	-	Layers in exploitation – 5.000	From 3 rd day of treatment until 3rd month, finding -
9.	26.7.01.	++	++	30.7.01.	-	-	Layers in exploitation – 5.700	From 3 rd day of treatment until 3rd month, finding -
10.	21.8.01.	++	++	24.8.01.	-	-	Layers in exploitation – 2.700	From 3 rd day of treatment until 3rd month, finding -
11.		+	-	Since 2.10.01.	-	-	Layers in exploitation – 25.000	From 3 rd day of treatment until 3rd month, finding -
	31.8.01.	++	++	Since 3.9.01. until 2 nd treatment	-	+ insp.		
12.				Since 28.9.01.	-	-	Layers in exploitation – 25.000	From 3 rd day of treatment until 3rd month, finding -
				Since 25.12.01.	+	-		Until 53 rd day of treatment - ; then method wasn't positive each day
	30.8.01.	++++	++++	Since 1 st treatment	-	+ insp.	Layers in exploitation – 25.000	
13.				Since 20.10.01., 3 rd treatment	-	-		From 3 rd day of treatment until 3rd month, finding -

Explanation: categorization of the extensity and intensity of the infestation

a) Method for early detection of chicken mite

- negative finding
+ 1-5
++ 5-20
+++ 20-100
++++ over 100

b) clinical examination, inspection of cages

- negative finding
+ individual parasites found
++ smaller groups found on cages
+++ larger groups found on cages
++++ huge groups found on cages and

Example 2 and 3. In case of new flock being housed, chicken mite could not be detected by clinical inspection, however method for early detection of mite was positive. In this example potentials of this method of chicken mite detection when new flock is being introduced and presence of mite can be controlled, are demonstrated.

In example 3, subsequent to housing of new flock, chicken mite could not be diagnosed. It took 24 days to detect the population by method of early detection of mite. However, other methods registered no presence of chicken mite. Therefore, if the moment when new flock is being housed is not used for examination of material from transporting cages, subsequently the period when disease is hidden occurs and it can no longer be detected by clinical examination nor by method of early detection of chicken mite. This is a period when disease is concealed.

Example 4. One day subsequent to administration of drug chicken mite population was no longer easy detectable, however, presence of small number of live parasites was determined during following three days. In this case chicken mite was detected by inspection of the cages. However, method for early detection of chicken mite wasn't carried out at the time, because it is used only in case of detection of clinically invisible populations. The small number of present chicken mite was not exposed to lethal dose of drug. In following days chicken mite disappeared under the influence of residual action of ectoantiparasitics. Therefore it is recommended to begin with the method of early mite detection three days after application of ectoantiparasitics.

Examples 5, 6, 7, 8, 9, 10 and 11. Effects of the treatment of houses were complete. Carried out methods for early detection of chicken mite, clinical examination of the flock and inspection of cages were negative. Regular controls provided reliability of applied measures, controlled treatment and responsibility of the treatment executor.

Example 7 demonstrates adequately prepared chicken house for exploitation of layers which was cleaned, cleansed and disinfected. By inspection of the object we have registered several individual white chicken mites. In such situations one should rely on inspection of the farm since there is no material to conduct the early method of detection of chicken mite, and populations are concealed waiting for new flock.

Examples 12 and 13. In these examples method for early detection of chicken mite wasn't conducted in detail. However, examples indicate the possibility that small number of chicken mite, subsequent to chemical treatment, could be found by inspection of the cage on hidden places, which

further points out the importance of comparative conducting of methods for early chicken mite detection, inspection and clinical examination.

In example 12, chicken mite appeared 45 days after last drug application. Population of red chicken mite could not be detected by clinical examination of the flock or inspection of cages. Only the method for early detection of chicken mite was positive. At the beginning the positive result was not regular each day, but eventually it stabilized.

Veterinarians and farmers have confirmed the simplicity of this method. Based on results of the investigation it can be concluded that the method for early detection of chicken mite:

1. Contributes to the efficiency of existing diagnostic methods,
2. Is simple,
3. Reduces the period when parasite is hidden since it enables its detection even when small number is present, before the population becomes visible,
4. Because of achieved results we recommend it:
 - a) To each poultry farmer:
 - For regular control of the flock,
 - For control of the new flock,
 - b) To veterinarians in poultry production as supplement to diagnostic methods:
 - when suspecting the presence of *Dermanyssosis* in order to achieve early differential diagnostics,
 - sampling of small number of chicken mite,
 - monitoring the movement of the population,
 - effect of the treatment,
 - conclusion regarding the effect of the disease control,
 - as element of the forensic evaluation method.

Accordingly, the role of the method for early detection of chicken mite is to complete and supplement the clinical examination and inspection findings in order to detect small number of chicken mite in cases when no clinically visible population is registered.

METOD ZA RANO OTKRIVANJE CRVENE KOKOŠIJE GRINJE *DERMANYSSUS* *GALLINAE* (DE GEER, 1778)

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Rezime

Dermanyssus gallinae (De Geer, 1778), crvena kokošija grinja je hematofaga artropoda koji nanosi znatne gubitke živinarskoj proizvodnji. Pri malim infestacijama obično odtaje neotkriven u jatima. U cilju njenog ranog otkrivanja razvijena je metoda za njihovu ranu detekciju. Ogled je sproveden na 13 živinarskih farmi u dvogodišnjem periodu na teritoriji Srbije i Crne Gore. Na osnovu rezultata smo zaključili da je metod: efikasniji od postojećih metoda, jednostavan za rad i smanjuje period sakrivenosti parazita u objektu – pomaže u otkrivanju malog broja parazita. Stoga je preporučujemo farmerima za kontrolu ove grinje u objektima farmi, kod kontrole novonabavljenih jata i veterinarima za rutinsku kontrolu jata. Rano otkrivanje crvene kokošije grinje dok je populaciono malobrojna, u mnogome olakšava i poboljšava efekte tretmana i kontrole ove parazitoze.

Ključne reči: *Dermanyssus gallinae*, metod rane detekcije, živina

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