Epidemiology of *Dermanyssus gallinae* infestation in poultry, from three transylvanian localities

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**SUMMARY.** The researches were performed between July-August 2004, in poultry from 73 households, coming from 3 Transylvanian localities. The results have shown a very high extensivity of *Dermanyssus gallinae* infestation: 92% in Dej; 89.28% in Apahida and 90% in Beclean. The mite populational structure, from the three localities was: Dej: egg - 27.12%, larvae - 10.21%, nymphs - 48.32% and adults – 14.35%; Apahida: eggs – 36.19%, larvae – 10.30%, nymphs – 25.55% and adults – 27.96%; Beclean: eggs - 18.89%, larvae – 8.66%, nymphs – 50.39% and adults – 22.04%.

**Key words:** epidemiology, study, *Dermanyssus*, poultry, Transylvania.

**Introduction**

*Dermanyssus gallinae* is an ectoparasite with high extensivity in private households, but attacks with severe consequences can also outbreak in intensive breeding units (Şuteu and Cozma, 2004). Besides poultry, it could attack mammals too, producing pruritus, depilations and otitis (Şuteu and Dulceanu, 2001). The importance of the *D. gallinae* infestation, is known in Europe, especially because of the pathogen effects in layer hens (Chauve, 1998). In some European countries *D. gallinae* is the most important ectoparasite of layer hens (Beugnet et al, 1997). In other regions of the world, *Ornithonyssus sylviarum* and *Ornithonyssus bursa*, have a higher prevalence (Kilpinen, 2000). Generally, the presence of these mites was mentioned in the countries with high egg and poultry meat production (Dernburg et al., 2002).

**Material and method**

The researches performed between July-August 2004, in hens from 73 private households, from 3 Transylvanian localities: Apahida (Cluj county), Dej (Cluj county) and Beclean (Bistriţa Năsăud county). We took in our study young and adult birds. The distribution of the samples by the origin locality was the following:

- Apahida: 28 households;
- Dej: 25 households;
- Beclean: 20 households.

The presence of the ectoparasites was revealed after the collection of suspet material from the bird shelters, on a white sheet of paper and examination after light exposure. If the samples were positive, the material was introduced in plastic recipients, in order to be studied later at with a binocular glass (4x) and microscope (10x) to determine the populational structure.

The determination of populational structure was realised in the laboratory of Parasitology and Parasitic Diseases, Faculty of Veterinary Medicine Cluj-Napoca, Romania, establishing the percentual proportion of *D. gallinae* eggs, larvae, nymphs and adults.

**Results and discussions**

The results regarding the extensivity of *D. gallinae* infestation in poultry, between July and August 2004, in the 3 localities taken in study, are shown in table and figure 1.
Table 1
The intensivity and extensivity of Dermanyssus gallinae infestation, in the three localities

<table>
<thead>
<tr>
<th>Locality</th>
<th>Dej</th>
<th>Apahida</th>
<th>Beclean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of the profs</td>
<td>25</td>
<td>28</td>
<td>20</td>
</tr>
<tr>
<td>Intensivity</td>
<td>23</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>Prevalence (%)</td>
<td>92</td>
<td>89.28</td>
<td>90</td>
</tr>
</tbody>
</table>

Figure 1
The prevalence of Dermanyssus gallinae infestation in the three localities

Following the data from table and figure 1, we could see in all the three localities a high prevalence of Dermanyssus gallinae infestation, around the value 90%: 92% at the poultry from Dej, 89.28% at the poultry from Apahida and 90% at the poultry from Beclean. As a result of traps placed for finding D. gallinae in poultry from alternative system in Sweden, Nordenfors et al. (1999) established a prevalence of the infestation of 67%. In Denmark, Kilpinen (2000) established a prevalence of D. gallinae attack of 68% in „free-range” poultry breeding system. In France, the prevalence of infestation was 74.7%, in the poultry organic range system (Bruneau et al., 2001), and in Poland a prevalence of 100% in poultry breedings (Cencek, 2002). Mitsiadi et al, in 2003, after a study made in turkeys, established a prevalence of D. gallinae infestation of 17.1%. According to Şuteu (1996) the prevalence of D. gallinae infestation in birds could vary between 30-70%, depending on breeding system.

Regarding the populational structure of the mites taken from positive households from Dej, data are presented in figure 2. The identification of the different mite stages was made based on their morphology. Larvae have average dimensions of 390/240 μm, have 3 pairs of legs and they remain in the environment where the females layed the eggs without feeding (Cosoroabă, 2000). The nymphs could measure 427-814/247-541 μm, depending on the feeding stage. The adult females measure 741-1127/474-706 μm and 663/413 μm for the males (Reynaud et al., 1997). The populational structure was the following: eggs represented 27.12%, larvae 10.21%, nymphs 48.32%, and adults 14.35%, with 3% males and 97% females. The difference between males and females was made depending on body size and on the aspect of cheliceras , at the males the cheliceras are more developed than the female. At nymphs and females, the cheliceras are longs and with stiletto or scissors aspect, with the second segment considerable longer (Cosoroabă, 2000). Following the datas from figure 2, we could see the predomination of nymph stage with 48.32%, the larva stage representing the lower percent – 10.21, at the mites from Dej.
The populational structure of the mites found in Apahida, was represented in the figure 3. In this case, the eggs represented 36, 19%, larvae 10,30%, nymphs 25, 55%, and adults 27,96%, with 1% males and 99% females. The egg stage represented in this case the largest percent, having 36,19% from the populational structure, and larvas with 10,30% represented the least percent.

In the case of the mites collected from bird households from Beclean, the populational structure is represented in the figure 4. The eggs represented 18.89%, larvae - 8.66%, nymphs - 50.39%, and the adults - 22.04%. with 3% males and 97% females. We can notice also in this case the lower percentage of larvae (8.66%), while the nymphs percentage was high (50.39).
Figure 4
The populational structure of the mites taken from Beclean

Table 2
The populational structure of the mites taken from the 3 localities, depending on evolutive stage

<table>
<thead>
<tr>
<th>Locality</th>
<th>Dej</th>
<th>Apahida</th>
<th>Beclean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg (%)</td>
<td>27.12</td>
<td>36.19%</td>
<td>18.89%</td>
</tr>
<tr>
<td>Larva (%)</td>
<td>10.21</td>
<td>10.30%</td>
<td>8.66%</td>
</tr>
<tr>
<td>Nymph (%)</td>
<td>48.32</td>
<td>25.55%</td>
<td>50.39%</td>
</tr>
<tr>
<td>Adult (%)</td>
<td>14.35</td>
<td>27.96%</td>
<td>22.04%</td>
</tr>
</tbody>
</table>

Figure 5
The populational structure of the mites taken from the 3 localities, depending on evolutive stage
Following the data from figure 5, the eggs had the higher prevalence in the samples collected from Apahida, representing 36.19%. The percent of larvae was low with values between 8.66 and 10.3%, while nymphs recorded high percentages, with values between 25.55 and 50.39%. Adult mites were represented in a percent of 97-99% by females, and in the case of the whole populations they represented 14.35-27.96 % (figure 5).

The populational structure of adults depending on the sex is shown in table 3. Among adults, 97-99% were females while males represented only 1-3%.

<table>
<thead>
<tr>
<th>Locality</th>
<th>Dej</th>
<th>Apahida</th>
<th>Beclean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males (%)</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Females (%)</td>
<td>97</td>
<td>99</td>
<td>97</td>
</tr>
</tbody>
</table>

**Table 3**

Populational sex structure of mites collected from the three localities

**Conclusions**

The studies performed between July and August 2004 in three localities from Transylvania revealed the following:

1. Extensivity of infestation with *Dermanyssus gallinae* was 92% in Dej, 89.28% in Apahida and 90% in Beclean;

2. Populational structure was:

   - **Dej**: eggs – 27.12%, larvae – 10.21%, nymphs – 48.32%, adults – 14.35% (3% males, 97% females);
   - **Apahida**: eggs – 36.19%, larvae – 10.30%, nymphs – 25.55%, adults – 27.96% (1% males and 99% females);
   - **Beclean**: eggs – 18.89%, larvae – 8.66%, nymphs – 50.39%, adults – 22.04% (3% males and 97% females).

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