

METAPNEUMOVIRUS INFECTION OF BIRDS IN KAZAKHSTAN

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ABSTRACT

In the last 2-3 years birds with clinical signs of infectious *rhinotracheitis* (Avian *Rhino Tracheitis*) - *rhinitis, conjunctivitis*, depression, reduction of egg production are revealed on broiler and egg poultry farms of Kazakhstan. This illness is widely spread in the countries of the Western Europe, Northern Africa, Northern and Latin America. Illness can lead to significant economic losses, especially when it is accompanied by complications. The purpose of the given research was to define presence of antibodies of the bird's metapneumovirus (AMPV) among broilers and hens in the Northern and Western regions of Kazakhstan. Birds were not vaccinated against the bird's metapneumovirus. Tests of blood have been taken from 15 birds by a method of casual sample. Blood samples have been taken irrespective of presence of any signs of respiratory or any other clinical picture of disease. Total 435 samples of blood have been taken from 30 commercial chickens (24 broilers at the age of 6 - 8 weeks, and 6 broilers at the age of 56 - 72 weeks). Presence of antibodies against the bird's metapneumovirus in each serum sample has been tested twice by method of immune-enzyme analysis with use of commercial complete set which was able to define antibodies against A, B and C subtypes of the bird's metapneumovirus. From 347 serum samples received from broilers, 167 (48.1%) had positive antibodies to bird's metapneumovirus, which makes 20 (83.3%) from 24 examined broilers. From 88 samples received from broilers, 82 (93.2 %) had positive antibodies to bird's metapneumovirus, which makes 6 (100%) from the broilers examined. Detection of an anti-antibody of the bird's metapneumovirus among manufacturers of broilers (100%) was above than broilers (83.3%). The higher level of serological positivity (83.3% of tests and 100 % of broilers) is revealed in the northwest.

KEY WORDS: bird's metapneumovirus; prevalence; rhinotracheitis of turkeys, syndrome of swollen head, specific antibodies.

INTRODUCTION

For the first time *rhinotracheitis* was revealed in 1970 in Southern Africa (Buys, Du Preez, 1980) in Europe it was revealed in 1981, in France (turkeys) (Buys et al., 1989). In 1985 after ictus in the Great Britain the scientists concluded, that *rhinotracheitis* of turkeys and infectious *rhinotracheitis* of birds are caused by the same virus. In nineties the virus has been already spread in the Western Europe. In spite of the fact that illness does not cause high degree of death rate of the adult birds, reduction of layers of parental flocks and death of young growth lead to the significant economic losses especially shown at bacterial complications

Agent of disease is metapneumovirus of a bird (Avian Metapneumovirus). It is the RAN-containing virus and concerns to Paramyxoviridae, or rather Metapneumovirus (Pedersen et al., 2000). At present time 4 subtypes of a virus are known: A, B, C and D. All of them are very sensitive to disinfectants and perish quickly under unfavorable conditions. It is important to take into account such condition at processing of rooms and poultry farms.

The hens and turkeys of all age fall ill with it. Virus is typical for sparrows, sea gulls, guinea fowls, wild geese and ducks (Shin et al., 2002). The infection is transferred from a bird to a bird by air drop, spreads quickly and infects at once the big livestock. It penetrates into an organism through epithelium of the top respiratory tracks where it is localized and breeds, destroys it and opens a track for a bacterial infection (Pedersen, Gough, 2009). In a combination to unfavorable environment reducing the general resistance of an organism where in the further the secondary bacterial infection is possible, in overwhelming majority *E.coli* and *Pasteurella* which at favorable conditions lead to syndrome of the swollen head (SHS). Thus besides *rhinitis*, *conjunctivitis*, *hypostasis* of infraorbital sinus, reduction of conversion, reduction of daily average increase and egg productivity, lesions of oviduct, decolouration of a shell, inclination of a neck, accumulation of pus in the field of a ethmoid bone, lesions of a skull and high death rate are observed.

Virus genome is presented by the linear not segmented molecule of not infectious RNA and contains 8 genes. There are four subtypes of a metapneumovirus of birds: A, B, C and D. Viruses of subtypes A and B are spread in Europe, Asia, Africa, Southern and Northern America whereas this virus of a subtype C circulates mainly among turkeys in the USA (Cook, 2000). The metapneumovirus of birds of subtype D has been revealed only once in France (Bäyon-Auboyer et al., 2000).

From pathoanatomical change it is necessary to note serous or purulent *rhinitis* and *tracheitis*. Also it can be purulent or tyroid sinusitis, *conjunctivitis* and *blepharitis*. Such changes as *aerosaculitis*, pneumonia, *perihepatitis*, *pericarditis* can take place in case of complication of secondary micro flora. Also cases of *salpingitis* of turkeys of parental flocks are known.

The problem of antigenic structure of a metapneumovirus besides the big theoretical value represents now essential practical interest in the period of mass vaccination against this illness and also at studying of replication of vaccinal and epizootic strains of a virus in an organism and cell cultures and their spread among birds.

MATERIAL AND METHODS

The work is made out in 2011 - 2012 in laboratory of virology and illnesses of birds of Kazakh National Agrarian University, laboratory on prophylaxis of special dangerous illnesses of animals of RGP "Scientific research institute of problems of biological safety" and serological laboratory of UNIVET LLP.

The following materials are used:

Samples 135 of blood serum of birds have been sampled. For serological testing a set for detection of antibodies to agent of metapneumovirus infection of birds BioCek, manufactures of firm «Avian Rhinotracheitis Antibody Test Kit» (Holland) has been used. Procedure of test and the analysis of results are made according to recommendations of the manufacturer.

The positive and negative control of antiserum has been used in each period. Absorption has been read on length of a wave of 650 nanometers on ELX 800 ® ELISA reader (Bio-Tek, Winoski, VT, USA). The relative level of antibodies has been defined by calculation of the sample to positive (S/P) ratio. Serum samples with S/P ratio are more 0.2 (titers more than 396), in re-testing it is considered positive of AMPV.

RESULTS AND DISCUSSION

IFA definition and the analysis of the results are received strictly in accordance with recommendations of the manufacturer. The results are presented in the Table 1. The serum of

broilers is divided into 2 groups. In the first group it is serum of broiler chickens at the age of 5 - 6 weeks, and the second group consists of serum of hens at the age of 32 - 36 weeks.

Table 1

Serological prevalence of antibodies of the bird's metapneumovirus of hens and broilers

Type	Age (weeks)	Number of poultry farms	Number of samples	Positive tests	%	Positive tests	%
broiler	5 – 6	5	75	12	16	2	80
broiler	5 – 6	6	90	41	46	4	75
broiler	5 – 6	4	60	22	37	5	100
broiler	5 – 6	7	105	52	49.5	3	80
total		22	330	38.25	39	43	83.3
hens	32 – 34	5	75	64	85	4	100
hens	34 - 36	4	60	55	91.6	2	100
total		88	135	88.3	6	100	119

The serum of 38.2% of broilers and 88.3% of hens were serologically positive concerning AMPV. Thus from 330 tests of serum of chickens-broilers 127 were positive (or 38.2%). Testing of serum of adult hens (135 tests) were positive in 119 cases (88.3%). Thus the higher level of serological positivity are typical for the adult hens.

Such high serological activity is confirmed by number of positively reacted poultry. Chickens-broilers from 22 examined poultry farms in 14 cases were positive (63.6%). The adult hens show exactly 100%.

For the first time in the poultry farms of the Northern and Western regions of Kazakhstan at investigation of blood serum tests of birds concerning virus AMPV specific antibodies by means of IFA have been revealed. High serological positivity concerning virus AMPV have adults hens at the age of 32 - 36 weeks. It meets the information of different authors in other countries. Thus (Gharaibeh, Algharaibe, 2007) 100% of cases in Jordan have been confirmed by IFA method that broilers have positive antibodies to AMPV. In Poland according to (Minta et al., 1995) 56.4% of broilers have positive results. Thus it is possible to note that at serological research the increase of a titer of antibodies to virus AMPV depends on latent persistency of infectious agent in an organism of a bird. In most cases revealing of antibodies to a virus of a metapneumoinfection of birds was not accompanied by signs of any clinical disease.

CONCLUSIONS

1. In the Northern and Western regions of Kazakhstan by a method of serological monitoring it is established presence of antibodies concerning virus AMPV.
2. With increase of age of birds the number of serological positive birds increases. That allows to assume on persistence of AMPV- virus in an organism of a bird.
3. Prevalence of metapneumovirus infections of birds should be investigated in other regions of Kazakhstan with use of molecular-genetic methods of indication of a virus.

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