

## MORTALITY OF POULTS UP TO 40 DAYS OF LIFE DEPENDING ON BREEDING SYSTEM AND CONDITIONS

Zoran Popović<sup>1</sup>, Ivana Stanković<sup>2</sup>, Vladimir Maletić<sup>3</sup>, Nenad Đorđević<sup>1</sup>

<sup>1</sup>Faculty of Agriculture, Nemanjina 6, Zemun, Serbia

<sup>2</sup>Public Enterprise „Srbijašume”, Mihajla Pupina 113, Belgrade, Serbia

<sup>3</sup>Faculty of Forestry, Skopje, Republic of Macedonia

zpopovic@agrif.bg.ac.rs

Three year long research of production losses (2002–2004) was conducted in pheasantries „Vinik“ (Pheasantry I) and „Rit“ (Pheasantry II). In both pheasantries, chicks would spend first nine days of life in batteries. From there they would be transferred in the pheasantry „Vinik“ into barns with outlets, where they would remain until twenty days of age, and in the pheasantry „Rit“ in stalls with outlets, where they would remain until twenty-five days of age. After that the pheasant chicks were released into rewilding pens. Monitored parameters were mortality in the breeding flock, percent of hatched eggs with respect to the amount of set eggs and mortality of chicks. Larger mortality of adult individuals from the breeding flock and lesser percent of hatched poults were established in the „Vinik“ pheasantry. Unfavorable conditions in the „Rit“ pheasantry resulted in net losses of chicks up to 40 days of age to be, depending on the year, 8.33% – 13.39%, whereas losses in the „Vinik“ pheasantry were significantly smaller and were 3.60%–4.74%. Additional improvement in production results in both „Vinik“ and „Rit“ pheasantries through application of certain modifications and improvements would be obtained.

**Key words:** poult; breeding; mortality

## МОРТАЛИТЕТ НА ФАЗАНСКИ ПИЛИЊА ВО ПРВИТЕ 40 ДЕНА ОД ЖИВОТОТ ВО ЗАВИСНОСТ ОД СИСТЕМОТ И УСЛОВИТЕ НА ОДГЛЕДУВАЊЕТО

Тригодишните испитувања на загубите во производството (2002–2004) се вршени во фазанериите „Виник“ (фазанерија I) и „Рит“ (фазанерија II). Во двете фазанерии фазанчињата првите 9 дена од животот ги поминаа во кафези (батерии). Потоа во фазанеријата „Виник“ беа префрлени во хали со испусти, каде останаа до 20 дена од животот, а во фазанеријата „Рит“ во боксови со испусти, каде останаа до возраста од 25 дена. Потоа беа пуштани во волиери за подивување. Следени се следниве елементи: морталитетот во матичното јато, процентот на испилување од насадените јајца и морталитетот на фазанските пилиња. Во фазанеријата „Виник“ е утврден поголем морталитет на возрасните единки во матичното јато и помал процент на изведени пилиња. Поради непоповолните услови во фазанеријата „Рит“ вкупните загуби на фазанчињата до возраста од 40 дена изнесуваа 8,33 % – 13,39 %, додека во фазанеријата „Виник“ беа значително помали, односно се движеа помеѓу 3,60 % и 4,74 %. Со примена на одредени модификации и подобрувања, во фазанериите „Виник“ и „Рит“ би можеле дополнително да се поправат производните резултати.

**Клучни зборови:** фазанчиња; одгледување; морталитет

### INTRODUCTION

Natural production of pheasants in Serbian hunting grounds is insufficient with regards to decreased habitat area, ever-deteriorating natural conditions primarily related to nutrition and constantly increasing number of hunters. Pheasants

are therefore reared on pheasant farms, in controlled conditions, similar to domestic fowl, and released into the hunting grounds in a certain phase of growth and after required adaptation (Caroll et al., 1997). Pheasant farming technology comprises of several segments such as raising of

the breeding flock, production of eggs for incubation, rearing of poults in controlled conditions up to the 6<sup>th</sup> week of age. It is necessary to provide a variety of important factors, such as adequate objects, controlled conditions and precise feeding in specific phases of production and categories of age to ensure obtaining maximal results (Pekeč, 2004). Feeding on farms is very intensive and is conducted exclusively through concentrates in the beginning of poult rearing (Popović and Đorđević, 2009). Later, in order to emulate natural nutrition, grain and green food is added to the meals (Kokoszynski et al., 2008). Nutrition of breeding flock may vary depending on whether it is hatching season or not. Certain losses are present in all mentioned phases of production and are presented in form of decreased bearing capacity, poor quality and fertility of eggs, as well as poult mortality. Perfection of breeding technology results in constant increase in percent of hatched and reared poults, percent of reared poults in relation to the number of set eggs increased from 50% to 70% and in some cases up to 75% (Mantovani et al., 1993). Current capacity of pheasantries in Serbia is 900,500 day-old poults. Several tens of millions of industrially reared birds were released in Serbian hunting grounds in the past four decades (Popović and Stanković, 2009). However, both production conditions and production results vary among pheasantries. In accordance with this fact, object of this paper is to study the degree of loss in various production phases in two pheasantries in Serbia.

## MATERIAL AND METHODS

Three-year long research (2002–2004) was conducted in pheasantries „Vinik“ (Pheasantry I) and „Rit“ (Pheasantry II). There are several differences between these pheasantries, in regards to construction and layout of objects and additional facilities. For example, batteries in „Vinik“ pheasantry are contained among incubation station, while the battery in the „Rit“ pheasantry is a separate object, removed some 20 meters from the incubation station and transportation of piped poults from the incubator to the battery is required. Area and capacity of the batteries is identical in both cases. In both observed pheasantries, poults spend the first nine days of life in batteries, where microclimate is controlled. From there they are transferred, to the pheasantry „Vinik“ into barns with

outlets, where they would remain until the 20<sup>th</sup> day of life, and in the pheasantry „Rit“ in stalls with outlets, where they would remain until the 25 days of life. After that period, pheasant chicks were released into rewilding pens.

Rooms with artificial hens in the „Vinik“ pheasantry are built in two rows with six rooms in each row. Rooms have walls with wood cladding and floors covered with sand and are connected by passages that can be closed shut. Concreted outlets with overhangs, also divided in six parts, are attached to the rooms. Rewilding pens are adjoining to the outlets, and at the age of 20 days the wire-fence between the pen and the outlet is removed and uninterrupted passage of pheasant chicks is allowed.

Rooms with artificial hens in the „Rit“ pheasantry are divided into stalls (wire stalls with laminated wood plate in front with height of up to 75 cm and height between stalls of 40 cm) set in two rows with a corridor between them. There are 12 stalls on each side to which grassed outlets without overhangs are attached. Floor in stalls is made of concrete and covered with a layer of sand and straw. Poults remain in this phase for fifteen days. At twenty-five days of age, they are transferred into rewilding pens (located on the opposite end of the pheasantry). In both pheasantries, pheasant chicks remain in rewilding pens until 6 – 8 weeks of age when they are either sold or transferred into the winter pen.

The breeding flock of the „Vinik“ pheasantry is fed with concentrate mix with 21% of raw protein (RP) during the hatching season, poults up to three weeks of age with 28% RP mix, poults up to eight weeks of age with 24% RP mix, and poults over eight weeks of age with 20% RP mix. The breeding flock of the „Rit“ pheasantry is fed with 23% RP mix and pheasant chicks up to six weeks of age with 28% RP mix.

In order to estimate losses in the entire process of poult production, dying of cocks and hens in the breeding flock during the reproductive season, percent of piped poults with regard to number of set eggs and percent of died poults in relation to piped poults were observed.

## RESULTS AND DISCUSSION

Increased percentage of adult mortality in the „Vinik“ pheasantry may be observed from the Table 1, with the year 2003 being particularly promi-

ment. Causes for mortality of adults may vary greatly, and include available space per bird and nutrition. In large density of population as well as in case of inadequate nutrition, cannibalism may be a frequent occurring problem. Common practice in past years was to keep the breeding stock divided into families with sex ratio 1:8 in favor of

hens. Group keeping, which has been proven to be more practical, is utilized nowadays. According to Ristić (2005) egg bearing in this system of farming is 5–10% less, but fertility percentage is 80% – 95%. As it can be seen from Table 1, mortality in adults may be decreased when a larger group of hens is kept in a group with a single cock.

Table 1

*Mortality in the breeding flock*

Pheasantry Year	Number of birds in the breeding flock at the beginning of the reproductive season	Ratio of sexes in the reproductive flock at the beginning of the reproductive season	Percent of hen deaths during the reproductive season (%)	Percent of cock deaths during the reproductive season (%)
I 2002	777	7.01:1	3.67	7.21
I 2003	629	5.42:1	9.22	13.26
I 2004	632	7.00:1	8.86	5.06
II 2002	1,125	8:1	4.20	5.1
II 2003	1,135	7.4:1	4.30	4.7
II 2004	1,354	7.8:1	5.83	6.3

Incubation success depends on the biological quality of eggs, the regime of incubator operation and the engagement of human labor. The biological quality is referred to as a quality of eggs, the means and the length of egg storage and the adequate choice of eggs for setting. Fertility may be influenced by the structure of the breeding flock, the method of the flock farming and the sex ratio. Spells of cold and rainy weather, presence of strange persons and similar disturbances of the breeding flock may also produce a negative impact on the egg fertility.

The lowest percent of hatching, which was 50.90% (Table 2) was recorded on the „Vinik“ pheasantry in 2002. Better results were achieved in 2003 and 2004. The percent of hatched poults on the „Rit“ pheasantry in observed years varied between 68.85% – 70.85% and was significantly more leveled. Based on the analysis of variance, the significance of the pheasantry factor and the year × pheasantry interaction was determined. The pheasantry „Rit“ obtained statistically better production results with regard to the percent of poult hatching, with maximally leveled results in all observed years. Unlike that, the „Vinik“ pheasantry had significant variations through the observed

years. Similar results were obtained in other studies. For example, Jakovljević (1996), while studying the poult production in the „Karkuša“ hunting ground for the 1986–1996 period, determined the percentage of poult hatching to be 59.26% – 70.90%. Makević (1984) cited the percent of hatching for the „Ristovača“ pheasantry to be 55.68% – 70.91%.

Largest differences between observed pheasentries are related to dying of poults. Reasons for increased mortality may be too high temperature combined with inadequate humidity, appearance of diseases, too large number of poults in a certain area, nutrition deficit, or other factors. Dying in battery stations and stalls with outlets may be ascribed to technical inadequacies of the objects themselves. Duly detection and removal of causes of increased mortality is of the greatest significance.

The total percentage of deaths at the age of up to 40 days on the „Vinik“ pheasantry varied between 3.60% – 4.47%. Unlike that, the total percentage of deaths at the age of up to 40 days on the „Rit“ pheasantry varied between 8.33% – 13.39% (Graph 1).

Table 2

*Percent of hatched eggs in relation to the number of set eggs*

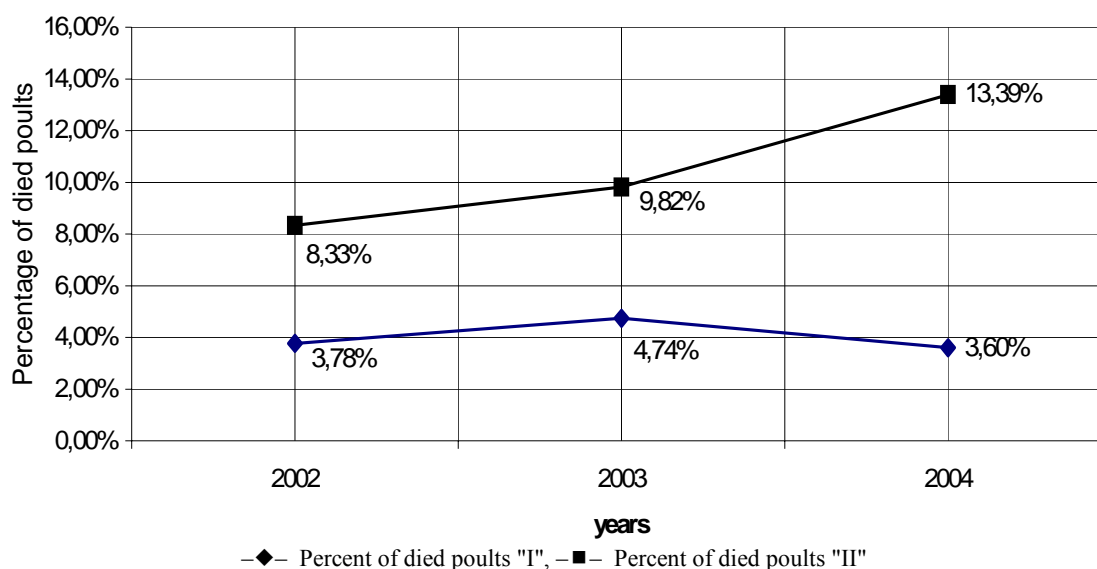
Pheasantry	Year	Number of set eggs	Percent of set in relation to the total number of laid eggs	Sum of piped poult in season	Percent of hatched poult in relation to the total number of set eggs in season	Average of hatched poult per hen yearly
I	2002	27,720	91.14	14,109	50.90 <sup>b</sup>	21.12
	2003	20,135	94.69	14,027	69.66 <sup>a</sup>	27.67
	2004	24,172	99.30	14,800	61.23 <sup>ab</sup>	26.76
II	2002	25,000	55.87	17,700	70.80 <sup>ns</sup>	18.04
	2003	34,000	77.16	23,410	68.85 <sup>ns</sup>	23.89
	2004	40,000	76.00	28,210	70.53 <sup>ns</sup>	24.24

*Impact relevance of the studied factor*

Year	–	–	–	P>0.05	–
Pheasantry	–	–	–	P<0.05	–
Year × Pheasantry	–	–	–	P<0.05	–

Significantly smaller percentage of losses with regard to the „Rit“ pheasantry was determined in other papers. For example, Pekač (2004) cites that mortality during the first period of the poult rearing (0 – 15 days) varied between 0.73% – 3.33%. In the later period, from 15 – 42 days of age, mortality levels fell to 0.00% to 1.56%. Net mortality in the entire 6 week period ranged from 1.09% to 3.7% and decrease in mortality was ob-

served with development of birds. Unlike that, older references note significantly greater losses. For example, Jović (1964) cited mortality of 7.29% at the age of 20 days, with variations from 35.70% to 1.5% per party of hatched poult. He also stated that mortality of poult was related to many factors: from heat conditions, nutrition, space, ventilation and hygiene to dampness of breeding space.



**Graph 1.** Percent of sum of died poult up to 40 days of age –

## CONCLUSION

There are large and significant differences between observed pheasantries related to production parameters and losses per a certain phase of production. The pheasantry „Vinik“ is characterized by greater mortality of adults and a lesser degree of piping, but also with far lesser mortality of poults. These differences cannot be inscribed to a single factor, but to the entire set of factors. In each case, all present oversights in breeding technology of both pheasantries should be corrected in order to improve results and bring them en par with results mentioned by other sources.

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