defects of the genitals. Our results also point at increased lambing rates which are expressed in an increased percentage of ewes giving birth to two or more lambs, i.e., in an increased number of multiple pregnancies (GOODMAN, 1998).
On the basis of the results achieved this method can be recommended for use in sheep herds in order to decrease the numbers of non-pregnant empty animals, to increase the occurrence of multiple pregnancies and to select ewes with lasting functional disturbances of genitals, i.e., to objectivize the culling procedure.

References

ČERVENKA, J.,: Základy štatistiky. Vydavateľstvo Osveta, Martin, 1975, 67-79.
GAMČÍK, P., HARTWIG, W.: In: P. Gamčík, W. Busch, E. Kudláč a kol.: Veterinárno-chova-teľská kontrola reprodukcie úžitkových zvierat. Príroda, Bratislava, 1998, 209-262.
GOODMAN, R.L.: In: The physiology of reproduction. Edited by E. Knobil and J. Neill et al., Raven Press, New York, 1998, 1929-1970.
HAVRILA, A., MARAČEK, I.: In: Proceedings from 9th International Congress in Animal Hygiene. 17-21 August 1997, Helsinki, Filand. Volume 2, 1997, 578-582.
MARAČEK, I.: Riadedená reprodukcia v chove oviec. Zborník prednášok zo szmpózia: Využitie vedeckývh poznatkov pre efektívny chov oviec v trhových podmienkach. Trenčianske Teplice, 19 - 20 septembra 1995, 85 - 89.
MARAČEK, I., BÍREŠ, J. : Slov. vet. čas., 24, 1999, 225 - 228.
MARAČEK, I., HENDRICHOVSKÝ, V.: Slov. vet. čas. 19, 1994, 161-166.
MARAČEK, I., ZITRICKÝ, K., HENDRICHOVSKÝ, V., ELEČKO, J., EŠTOK, M.: Veterinářství, 39, 1989, 72-73.
MARAČEK, I., KUCHÁRSKY, P., HENDRICHOVSKÝ, V.: Veterinářství, 41, 1991, 107-112.
MARAČEK, I., HENDRICHOVSKÝ, V., KRAJNIČÁKOVÁ, M.: Slov. vet. čas., 20, 1995, 60-66.
MARGETÍN, M.: Chov oviec a kôz, 17, 1996, (4), 11-12.
MARGETÍN, M., ČAPISTRÁK, A., KALIŠ, M.: Chov oviec a kôz., 17, 1996, (2-3), 4-7.

THE DEVELOPMENT OF HARE POPULATION (LEPUS EUROPAEUS) IN WEST SLOVAK LOWLAND

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Summary

According to the official Hunting statistics, the actual stock numbers of hares fluctuate about 182956 individuals (minimum 169700 in 1997 and maximum 194616 in 1998)in the Slovak Republic in the past 10 years. If the given data are correct, it can be stated that the population density is stable. However, the actual stock numbers of hares are 60,74 % of standardized stock numbers only. Rapid decline (48.7 % during past 10 years) is registered in the hare production (max 63836 in 1990, min 16639 in 1996). Counted from the official statistics,1 female from the spring stock produced 0.7 young hares in the bag in 1990, but in the period 1997-99 0.3 ones only. Correlation coefficient between spring numbers and the bag is very low (0.0979).Hunting plans for all game species are prepared every year. The plan of hare bag was fulfilled in 1990 only (111%). During monitored period, real number of shot hares represent only 83% of planned amount (in 1996 the real production was only 37 % out of the plan).
According to the bag analysis from selected sites, the increment of hares (expressed in % of young hares in the bag) is 51.07 % (min. 40.77 in 1993, max. 68.76 in 1997), what confirms the theory of stable populations. Reproduction coefficient R (expressing number of young hares per 1 adult in the bag) was 1.13 on average (min 0.76 in 1993, max 2.20 in 1997). Reproduction factor r (expressing number of young hares per 1 female in the bag) was 2.51 on average (min 1.75 in 1998, max 5.7 in 1997). The year 1996 was characterized by extremely bad climate conditions (cold winter with long-term snow cover, cold and wet summer), what caused drastically decline not only of young hares, but adult as well. During hunting season we did not gain any samples and we did not count the parameters of population dynamics. The big reproduction potential is expressed in 1997, when all monitored parameters gained high values, next year after population failure.

Key words: hare, *Lepus europeaus*, Slovakia

Introduction

Stock numbers of the brown hare population (Lepus europaeus) and its recruitments are subject to various influences all the time. The most hares were caught in Slovakia during the years 1933-36 (on average 243 726 animals annually), and then during the years 1973-74, i.e. in the conditions of intensive large-scale "socialistic" agriculture (on average 342 866 animals per year). We noticed deep decrease in stock numbers and in recruitment in 1975, however, in 1976-77 shot the hunters

again more than 250 000 hares, which was certainly a great mistake after the great decline in the population in the preceding year because since 1978 began even deeper decline in the stock numbers of this game and the bag stagnates on a very low level nearly two decennia. In the spring stock number (SSN) of hare population in Slovakia there are two decreases in the years 1994 and 1997 since 1990. The second one was unambiguously caused by unfavourable climatic factors in 1996, during which the number of the whole population decreased markedly. In this year somewhat more than 16 ths. individuals were hunted, which is the historical minimum in Slovakia. The whole year 1996 was very adverse to small game. The climatic conditions were unfavourable during the great part of the reproduction season, the youngs of hares were exposed to rain and cold all the time. The autumn was also cold and rainy, it created suitable conditions for development of illnesses and so a part of the youngs which survived the summer deceased during this autumn. The spring populations regenerated quite well after that period, and they achieved the highest number for the last decade in 1998-2000, but he bags did not achieve even the values from the period 1987-95. If the data about the spring populations are reliable then it is a promising fact for the development in the hare population in spite of the average value of SSN being only 61 % of the standardised stock numbers. However, to fill them should the numbers of hares increase approximately by one hundred thousand individuals, which is not possible at present.

PRODUCTION OF HARES

While in 1990 one female from the SSN produced in bags or at catching 0.7 hare, which is a very low value itself, this number decreased during the following years and recently must three females bear the whole year long to realise one young in the bag. The bag of hares after decrease in 1996 was able to regenerate from this critical year (production 0.2 hare per one female out of SSN) only to 0.3 hare per female from the spring stock. This value, being only for the sake of orientation, demonstrates the decrease of production during the last decennium. The production per one female is approximate only as the hares are not hunted in many placed at all and many caught are not mentioned in the statistics (they are not mentioned by hunters or they are poached). Planned and real bag of hares In the period since 1987 was the plan of hare hunting performed to 88.6 % only. It was performed in the years 1988, 89 and 90 only (it was performed to 112.9 %). Since 1991 is was performed not even in one year (it is performed to 79.8 % only for this period). The greatest discrepancy between the plan and the reality was in 1996, when only 37.1 % out of the planned hares were caught. The presented results demonstrate the mistakes in planning. It was influenced also by very early term of submission of these plans in previous years. If the plans are submitted too early they cannot take into account the mortality of individuals to the period of catching. However, it was changed in the decree already and we hope it will diminish the disproportions between the plan and hunt. From the presented follows further that planning is not done on the basis of the game census before hunting but presumably merely by estimate. Recruitment of hares and bag of hares and foxes There is apparent discrepancy between the increment of hares and proportion of their hunting which proves that the hunting is not planned correctly. The disproportions began to appear in 1989 when the increments started to decline and hunting increased steadily. It is the most marked during the years 1990 and 1991 when the proportion of hunting was too high and the increments low. The increase in number of hunted foxes meant decrease in increment of hares in hunting grounds and vice versa, in years when less foxes were hunted the increment of hares rose. In 1996 was the decrease in number of hunted foxes caused by adverse conditions. We studied the bag of hares and foxes on the whole territory of Slovakia during the last 25 years and we found out the highly significant negative correlation between these values (0.7583^{++}). It proves the marked effect of this predator on the hare population. Parameters of population dynamics We participated in hunts organised in 25 hunting grounds of south-western Slovakia. We analysed the age and sex in more than 4 thousand individuals. The age was assessed on the basis of dried eye lens weight which we consider to be the most reliable method although it time and labour demanding (Slamečka et al., 1997). The analysis of parameters of population dynamics in hares is given in table 1. The proportion of young hares in bag (PYB) varied from 40.8-54.5 % to 1995. The low value of PYB in 1993 manifested itself in the decrease of spring stocks in 1994, however, with regard to good increment in 1994 was PYB stabilised again. We gained no data about the development in population from 1996, as most associations did not hunt the hares and therefore is this column in table 1 empty. After that year is evident a high value of increment again. It is expressed by the proportion of youngs in bag (almost 69 %). Since that year fluctuates PYB around 50 % which means that in the population is about one half of young individuals and their number changes neither upwards nor downwards. It is confirmed also by the value of the reproduction coefficient which gives the proportion of young and adult hares in bag and which is for the whole period only slightly higher than 1.0 (the proportion of young and adult individuals in the population is equal). The value of reproduction factor is interesting. It gives the number of young hares per one adult female in bag and it shows that in the localities, in which the population was studied, was the increment per one female much higher (2.23 youngs) than in the whole Slovakia. The entry from 1997 is worth noticing again, when the rate of increment was high after 1996 and in the bag came up to 5.7 that year's hares to one female. The sexual index, which expresses the proportion of males and females, fluctuates permanently around 0.50. It means that the proportion of sex 1:1 is kept, with very slight superiority of females (0.51) which is confirmed also by literary data.

References

SLAMEČKA, J., HELL, P., JURČÍK, R. (1997): Brown hare in the West Slovak Lowland, Acta Sc. Nat Brno, 31, (3-4)

Table 1 Parameters of population dynamics in hares from selected localities of south-western Slovakia localities totally

	1987	1988	1989	1990	1991	1992	1993	1994
Localities	14	15	19	8	5	8	5	4
n	1451	1563	1593	977	491	686	474	394
PYB	49,2	57,73	55,2	44,52	48,27	51,31	40,77	54,48
R	0,97	1,37	1,23	0,85	0,95	1,25	0,76	1,2
r	1,86	2,48	2,37	1,99	2,03	2,65	1,82	2,51
SI	0,52	0,51	0,52	0,481	0,497	0,519	0,515	0,5

continuation of table 1

	1995	1996	1997	1998	1999	2000	Total (1987-2000)
Localities	5	-	2	2	3	3	37
n	391	-	141	193	177	237	8768
PYB	52,42	-	68,79	47,64	52,54	49,37	51,68
R	1,13	-	2,204	0,911	1,107	0,975	1,07
r	2,46	-	5,7	1,75	2,21	1,983	2,23
SI	0,502	-	0,52	0,52	0,51	0,498	0,51

PYB - proportion of young hares in bag, R - reproduction coefficient, r - reproduction factor, SI - sexual index.

EFFECTIVITY OF PREVENTION AND CONTROL IN MASTITIS CAUSED BY ENVIRONMENTAL PATHOGENS ON A DAIRY FARM WITH STANDARD ANIMAL CONCENTRATIONS

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Summary

In this work the effectivity of methods of mastitis prevention and control in reducing the occurrence of mastitis casued by environmental pathogens is described in a herd counting a mean of 220 dairy cows. At the start of the experiment 3 complete examinations were carried out. They revealed 38 dairy cows to have clinical mastitis, 84 to have a positive NK-test and 123 to have an infected mammary gland (S. agalactiae, S. aureus, betahaemolytical Streptococci and environmental pathogens in 31, 3, 1 and 88 cases, respectively). Intramammary cephalosporine treatment of 123 animals with udder infections was unsuccessful in 23 cases; these animals were aliminated and treated repeatedly. After treatment, the quality of the milk produced increased substantially (BT SCC under 400,000 per ml). This favourable condition could be maintained for 5 months after treatment. Afterwards, in consequence of omitting the antimastitis methods or the undue application of the latter (mainly in the field of hygiene) the number of cows with udder infections increased and reached about 78 – 88 animals towards the end of the observation period. However, this had no effect on the quality of the milk produced which still fulfilled the quality parameters required by the standard.

Key words: mastitis, dairy farm

Introduction

Increasing economic effectivity of milk production urges producers to constantly eliminate unreasonable costs. From this point of view mastitis is an important factor decreasing production profitability. Most cases of mastitis are due to an infectious agent. The basic principle of effective mastitis control is to reduce infection sources and transmission ways of the main mammary gland pathogens.

Due to the basic classification of mastitis agents two sources of infection are recognised:

- the milk gland infected with mastitis-causing agents, and
- the infected environment.

The so-called environmental pathogenic bacteria, designed as such because their source is