

STUDIES ON THE EUROPEAN HARE. XXVI.

Zygmunt PIEŁOWSKI

Length of Life of the Hare

[With 2 Tables]

Long-term and large-scale individual marking of European hares caught in nets during the winter and annual inspection of about 35% of the individuals of a given population supplied data on maximum length of life of the hare. A total of 326 repeat reports were obtained, 19 of which referred to hares at least 5.5 years old. The oldest marked hare was 12.5 years old. It was found that in addition to external factors senile mortality begins to contribute to reduction in the older age classes. The physiological length of life of the hare is considered to be from 12—13 years. Females exhibited a greater capacity for survival. There were no males at all amongst captured hares over 4 years old.

I. INTRODUCTION

Different authors consider the maximum physiological age of the hare to come within limits of 8 to 12 years (Koenen, 1956; Müller-Using, 1962; Rieck, 1963; Caboń-Raczyńska, 1964; Piełowski, 1966; Petruszewicz, 1970), but as yet there are no fully documented data available.

The Research Station of the Polish Hunting Association at Czempin has carried out individual marking of the European hares, *Lepus europaeus* Pallas, 1778, on a large scale since 1958. The present study summarizes data on length of life of these animals.

II. STUDY AREA, MATERIAL AND METHODS

The marking of hares is carried out on the experimental area consisting of 15,000 ha of fields. Habitat conditions are considered to be optimum for the rearing of hares in Poland. (A more detailed description of the area is given by Piełowski, 1968). Hence the relatively high density of the hare population, varying over the last few years around a level of 50 animals per 100 ha during the autumn-winter period. Density was assessed by means of the belt assessment method

(Pielowski, 1969). The state of game protection and care of the animals is very good. Hares are obtained solely by the net capture method. The average yearly catches for the last 12 years forms 30% of the total number of hares estimated.

The hares are marked during the yearly winter captures in December and January. A metal ear-tag with a consecutive number is attached to the lower half of the hare's ear. Ear-tags of various kinds were used up to 1963/64. Since the 1964/65 season ear-tags of the type used for sheep were exclusively used for this purpose (*inter alia* also for hares reared in captivity) since they proved to be the most suitable.

Up to the winter season of 1968/69 inclusive a total of 1.740 hares were marked, this figure including 804 »old« (over one year old) and 936 »young« hares (under one year old). Improved Stroh's method (Pielowski, 1968), was used for determining the age. The principle of releasing all repeatedly caught marked hares on the same shoot as they were caught was observed.

III. RESULTS

The captures of live hares carried out each year made regular inspection of a large part of the hare population in the study area possible. On average 35% of the individuals reached the researchers' hands every

Table 1

Repeat reports on marked hares in successive years from time of their first capture.
Y — young hares, A — adult overwintered hares, F — females, M — males.

Year of marking	No. of years from first capture :															
	1 yr				2 yrs				3 yrs				≥ 4 yrs			
	F		M		F		M		F		M		F		M	
	Y	A	Y	A	Y	A	Y	A	Y	A	Y	A	Y	A	Y	A
1958/59	?	?	?	?	?	?	?	?	?	?	?	?	—	1	—	—
1959/60	?	?	?	?	?	?	?	?	?	?	?	?	2	5	—	—
1961/62	?	?	?	?	?	?	?	?	?	?	?	?	1	3	—	—
1963/64	?	?	?	?	1	1	—	—	1	3	—	—	2	2	—	—
1964/65	—	—	2	—	2	3	2	2	1	2	2	—	1	3	—	—
1965/66	4	1	1	1	—	3	—	—	—	—	—	—	1	1	—	—
1966/67	31	11	25	16	11	9	4	10	8	3	2	2	—	—	—	—
1967/68	7	21	8	7	5	19	7	8	—	—	—	—	—	—	—	—
1968/69	31	5	21	1	—	—	—	—	—	—	—	—	—	—	—	—
Total	73	38	57	25	19	35	13	20	10	8	4	2	7	15	—	—

year. Of this 30% formed the game yield already referred to, and 5% were hares marked in previous years, or recently marked, and released. The percentage of marked individuals in the study population naturally increased from year, as did the chance of constantly obtaining new repeat reports of hares marked several years previously. Table 1 gives data for

various study years. Hares were not marked at all for the seasons of 1960/61 and 1962/63, and these years are consequently omitted from the table. There are no data on repeat reports for the seasons from 1959/60 to 1964/65. It is, however, known that during these years 744 hares were marked and released again on the catching area.

In addition part of the repeat reports on marked hares refer to dead hares found. There are 112 of such additional reports for all the years

Table 2
Reports on marked female hares over 5 years old.

First capture			Recovery		Age, yrs
Ear tag no.	Date	Age	Date	Ref.	
81/116	18.I.62	A	28.I.66	*	5.5
81/771	10.II.62	A	28.I.66	*	5.5
4438	12.II.62	A	28.I.66	*	5.5
12147	8.I.64	A	4.I.67	*	
			2.I.68	*	
			1.VI.68	**	5.5
12167	25.I.64	Y	24.I.69	*	5.5
12176	25.I.64	Y	15.I.66	*	
			19.XII.66	*	
			30.VI.69	**	5.5
A-9	10.I.65	Y	11.I.67	*	
			20.XII.69	*	5.5
A-27	15.I.65	A	24.IV.69	***	5.5
A-49	7.I.66	A	22.I.70	*	5.5
8351/59	3.I.60	Y	20.I.66	*	6.5
8818/59	20.I.60	Y	19.I.66	*	6.5
12137	25.I.64	A	26.I.67	*	
			2.I.69	*	6.5
A-19	12.I.65	A	3.I.67	*	
			18.II.70	***	6.5
9291/59	30.I.60	A	19.I.66	*	7.5
8144	16.XII.59	A	16.I.67	*	8.5
8731/59	15.I.60	A	3.I.67	*	8.5
8287	17.XII.59	A	24.I.68	*	9.5
			5.I.70	*	11.5
6551/58	12.XII.58	A	20.XII.69	*	12.5

A — adult, Y — young, * — caught in net, ** — run over on railway track or on road, *** — found dead.

taken jointly. A sum total of 326 repeat reports was obtained for the years 1965/66 to 1968/69, counting as one only reports on individual hares in each year.

The oldest marked hare found so far in the study area was at least 12.5 years old. It was caught for the first time as an overwintered adult, that is, at least 18 months old. It was caught for the second time 11 years later, was in very good condition and weighed 4.500 g, thus exceeding the average weight for hares in this region. A hare was also caught which

was at least 11.5 years old, and this individual also weighed 4.500 g. It was previously inspected once before when 9.5 years old. There are also reports on two hares 8.5 years old, one 7.5 years old, four 6.5 years old and nine 5.5 years old (Table 2). There is of course a proportionately larger number of hares 4.5 years old and under.

IV. DISCUSSION

The hare's length of life can be determined on the basis of representative material only when there is minimum elimination of individuals from the study population. In addition to efforts made to keep natural reduction to a minimum, it is possible to achieve the above aim by cutting out game shooting. This in practice is difficult to average, but it is possible, as was done in the case of these studies, to release all the live marked individuals caught on the same capture site. In this way their chances of surviving to a maximum age are greatly enhanced. Hence after a study period of 11 years a fairly large number of documented reports on hares aged 5.5 years and over were obtained. As collection of such material from the study population has not yet been completed there are possibilities of obtaining further data. The absolute upper age limit of hares has thus not yet been established.

Out of the 546 marked hares in the season of 1958/59 and 1959/60 only two reports were obtained of individuals more than 10 years old. If we accept the average natural yearly reduction calculated by Petrusiewicz (1970) for this same hare population, and for approximately the same period, as 30% of the total number of hares, it is possible to establish how many of these marked hares had chances of surviving to that age. Calculations show that as many as 16 individuals should be able to survive for so long. Taking into consideration that only 35% of the population is inspected yearly and consequently not all of them might have been caught during the tenth and eleventh year of the studies, the number of repeat reports theoretically obtainable may be lower. It is, however, undoubtedly higher than the number of 2 reports actually obtained. This means that in the higher age classes senile mortality, in addition to reduction by external factors, also begins to exert its effect. It may therefore be considered that the physiological length of life of the hare is 12—13 years.

Decrease in the number of repeat reports of males with their increasing age merits consideration (Table 1). It must of course be remembered here that the number of marked females slightly exceeds the number of males the ratio in percentages being 54:46. This by no means explains this question. Correct proportions are maintained only after the first

year, when 58% of the repeat reports obtained referred to females and 42% to males. After two years only 38% of males were caught and after three years 25%. After four and more years only females were caught.

This would mean that females' capacity for survival is far greater than that of males. Many authors have given, with sufficient grounds for doing so, the natural sex ratio in hare populations as 1:1. It was shown on the basis of abundant material originating, *inter alia*, also from the present study area, that the sex ratio obtained by examining distribution from shoots and captures (regardless of the system used) indicated that there is a slight preponderance of females in the autumn-winter populations of hares (Pielowski, 1969). On this ground one may suggest that the natural reduction of males must be greater than that of females. The question of the cause of the earlier elimination of males remains open. It is probably ecological factors which account for this. The males may be less cautious or more active and therefore are most often run over and killed by vehicles or agricultural machinery and form easier prey. A more detailed analysis of this problem will appear in one of the successive publications on the cycle of studies on the hare carried out by the Research Station of the Polish Hunting Association at Czempień.

REFERENCES

1. Caboń-Raczyńska K., 1964: Lagomorpha. [In Kowalski K., Ed., Klucze do oznaczania kręgowców Polski, V. Ssaki, Mammalia]. 1—280. Państw. Wyd. Nauk. Warszawa.
2. Koenen F., 1956: Der Feldhase. Die Neue Brehm Bücherei 169: 1—80. Ziemsen Verlag. Wittenberg—Lutherstadt.
3. Müller-Using D., 1962: Diezels Niederjagd: 1—367. Verlag Paul Parey, Hamburg u. Berlin.
4. Petruszewicz K., 1970: Dynamics and production of the hare population in Poland. Acta theriol., 15, 26: 413—444.
5. Pielowski Z., 1966: Zając. Monografia przyrodniczo-łowiecka: 1—96. Państw. Wyd. Rol. i Leśne. Warszawa.
6. Pielowski Z., 1968: Die Jahresbilanz einer Hasenpopulation in Polen. Beitr. Jagd- und Wildforsch., 6, 104: 129—137. Berlin.
7. Pielowski Z., 1969: Sex ratio and weight of hares in Poland. Acta theriol., 14, 8: 119—131.
8. Pielowski Z., 1969: Belt assessment as reliable method of determining the numbers of hares. Acta theriol., 14, 9: 133—140.
9. Rieck W., 1963: Der Feldhase. Merkblätter des Niederwildausschusses des DJV, 4: 1—56. F. C. Mayer Verlag, München.

Accepted, October 10, 1970.

Polish Hunting Association,
Research Station,
Czempień n/Poznań.

Zygmunt PIELOWSKI

DŁUGOŚĆ ŻYCIA ZAJĄCA

Streszczenie

W latach 1958/59 do 1968/69 przeprowadzono na większą skalę znakowanie indywidualne zajęcy złowionych w okresie zimowym za pomocą sieci. W sumie oznaczono 1740 osobników. Dzięki silnej eksploatacji łowieckiej badanej populacji drogą odłowów sieciowych, każdego roku istniała możliwość skontrolowania około 35% osobników całego pogłowia. Zajęce już znakowane w latach ubiegłych oraz pewna liczba świeżo zakolczykowanych, łącznie w ilości ca 5% stanu liczebnego pogłowia, powróciły każdorazowo z powrotem do łowiska. Tym sposobem znacznie zwiększyła się szansa przeżycia. Wzrosła też szansa uzyskania coraz to nowych wiadomości powtórnych o tych zajęcach. 112 wiadomości otrzymano ponadto przez znalezienie padłych znakowanych zajęcy. Łącznie w latach 1965/66 do 1968/69 uzyskano 326 wiadomości. W tym 19 wiadomości dotyczyło zajęcy w wieku co najmniej 5,5 lat. Najstarszy znakowany zajęc miał 12,5 lat. Następny był w wieku 11,5 lat. Wobec wyliczonej teoretycznie szansy złowienia się aż 16 znakowanych osobników w wieku powyżej 10 lat, wysuwa się twierdzenie, że w starszych klasach wiekowych obok redukcji przez czynniki zewnętrzne zaczyna działać śmiertelność starcza. Fizjologiczną długość życia zajęcia określa się na 12—13 lat.

Zebrany materiał wskazuje ponadto na znacznie większą eliminację z populacji osobników męskich. Brak w niej w zasadzie samców w wieku powyżej 4 lat. Już w trzecim i czwartym roku życia stosunek ilościowy płci znacznie się zmienia na korzyść samic. Sugeruje się, że u podstaw tego zjawiska tkwią przyczyny ekologiczne.