

**A two-year (2010-2011) survey on productive performances and mortality rates of farmed game hares (*Lepus europeus*)**

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**ABSTRACT:** The present survey measured the performance and the mortality rates of the biggest game hare farm in Veneto Region (318 hare pairs) during two years (2010-2011). The performances were similar during the two years: the yearly number of alive kits was 10.5 per reproductive present pairs and 11.4 per reproductive fertile pair; the fertile reproductive pairs kindled on average 4.9 times per year, weaned 8.4 kits at 25 d, and produced 7.0 growing hares (60 d of age). Sterility, *i.e.* the proportion of hare does which never kindled averaged 8.5% of the total number of present does. The culling rate of hare does significantly decreased from 81.1% in 2010 to 69.2% in 2011. The mortality rates of kits varied from 22.9%, during lactation (3-25 d of age) to 9.7% during growth (26-60 d of age). Despite the total mortality of the born hares was not significantly different (38.7% on average), losses were significantly higher in newborn and lactating kits and lower in growing and sub-adult hares during 2010 compared to 2011.

Key words: Game hares, Productive performance, Mortality.

**INTRODUCTION** – Since after war, the game hare (*Lepus europaeus* Pallas, 1778) population over Italian territory decreased because of hunting, agriculture, urbanization and introduction of new pathogens, besides natural predation (Spagnesi and Trocchi, 1992). Included within minor farmed species, game hares started to be farmed by 1964 thanks to the activity of the National Institute for wildlife (now ISPRA; Institute for Environmental Protection and Research, Rome). At the beginning of '80s, hare farms were scored at 600, mainly distributed in Piemonte, Lombardia and Veneto Regions, accounting for a production of about 12,000 animals/year (Trocchi, 1983). Last available data estimated an Italian annual production of 100.000 animals (Toso and Trocchi, 1998). With few exceptions, hare farms rears a low number of animals (10-50 pairs) and are characterized by a low technical degree. As a consequence, few data are available on the performance of game hares farms. The present survey measured the performance and the mortality rates in the biggest game hare farm in Veneto Region (Venice Province).

**MATERIALS AND METHODS** – The farm housed a total of 720 cages, of which 320 for reproducing animals and the remaining for the other categories, over an area of 4.500 m<sup>2</sup>. A total of 318 pairs (first, second and third year of reproductive activity) were

controlled during two years (2010-2011). The pairs were kept outside in roofed cages (4 m long, 1.60 m wide and 70-80 cm high) with wooden side and back walls and wire net front side. Animals were fed with commercial diets. Further, fresh alfalfa (*Medicago sativa*), during April-October, and savoy cabbage (*Brassica oleracea*), during the other months, were administered *ad libitum* to all animals. Litters were weaned at 24-25 days of age and moved in collective cages until selling or the following reproductive cycle. Data of mortality and performance were collected on five hare categories: newborn kits (0-2 d of age), suckling kits (3-25 d), growing hares (26-60 d), sub-adult hares (61 d until selling), and reproducing hares (animals kept for reproduction, including sub-adults kept for culling). The data were analysed by a one-way ANOVA and using the GLM procedure (SAS Institute Inc., Cary, NC, USA). Differences in mortality were analysed by the  $\chi^2$  test and the CATMOD procedure of SAS.

**RESULTS AND CONCLUSIONS** – The performances of the reproductive pairs in the farm during the two-year survey were very similar (Table 1). Sterility was measured as the ratio between the number of hare does which never kindled during the year and the total number of present hare does: it ranged from 8.2% in 2010 to 8.8% in 2011. The fertile pairs kindled on average 4.9 times per year and the average yearly number of alive kits was 10.5 per reproductive pairs present in the farm and 11.4 per fertile pair. Further, the fertile pairs weaned 8.4 kits at 25 d per year, without significant differences between 2010 and 2011. The number of growing hares (60 d of age) was 7.0. The culling rate of reproducing females significantly decreased from 81.1% during 2010 to 69.2% during 2011. The above results were comparable with available literature: a range from 4.0 to 7.8 born per present pair was measured in five farms (Mantovani, 1993), whereas values from 7.2 and 11.1 were recorded within the same farm during five years of observations (Tocchini, 2000). Spagnesi and Trocchi (1992) pointed out at 5.3 the average value of hares produced per fertile reproducing pairs, which is somewhat worse than what found in the present survey. Also the sterility we observed was better than available data: 11-24% according to Tocchini (2000) and even 12-50% according to Mantovani (1993). On the other hand, the culling rate was high compared to previous findings: 50-55% according to Spagnesi and Trocchi (1992) and 40% according to Mantovani (1993).

**Table 1** – Reproductive performances of game hares per year during 2010 and 2011

	Year		P-value
	2010	2011	
Kits born alive per present reproductive pair, n	10.49	10.41	n.s.
Kits born alive per fertile reproductive pair, n	11.42	11.41	n.s.
Kindling per fertile reproductive pair, n	4.76	4.85	n.s.
Weaned kits (25 d) per fertile reproductive pair, n	8.02	8.76	n.s.
Sub-adult game hares per fertile reproductive pair	6.97	7.02	n.s.
Sterility%	8.2	8.8	n.s.
Culling rate of hare does%	81.1	69.2	<0.001

In the surveyed farm, total mortality of born hares reached 38.9% and 38.5% in the two years (Table 2). This high mortality is consistent with data reported by Tocchini (2000), who recorded a mortality rate from 29% to 39% in a farm with about 150 reproducing pairs, and by Miragoli (2007), who found 48% of losses in a big farm (243 hare does).

The high stocking density of hares in the farm of the present survey could have accounted for the high mortality rate, since the distance between cages of the same line (few cm) and between different lines (1.5 m) was far below the recommended limits (2-4 m between cages of the same line; 5-8 m between different lines of cages) (Spagnesi and Trocchi, 1992). When looking at the distribution of mortality among the different categories present in the farm, the highest percentage of animals died during the suckling period (from 3 to 25 d of age) with an average value of 22.9% (Table 2), *i.e.* 60% of the total mortality. In most cases, mortality was due to enteric diseases. Mortality around kindling also seemed high (3.6% on average) if taking into account the very short period in which it occurred (*i.e.* 2 days). Further, a rather important amount of mortality (9.7%) occurred in growing hares (within 26 and 60 d of age). Finally, sub-adult hares resulted the healthiest animals (average mortality 2.5%). Despite the total mortality of born hares was similar, losses were significantly higher for newborn and lactating kits and lower for growing and sub-adult hares during 2010 compared to 2011. Causes of mortality are described and discussed by Rigo *et al.* (2013). In conclusion, reproductive performances of the farm were rather satisfying when compared to findings present in literature.

**Table 2** – Mortality rate of game hares during 2010 and 2011

	Year		P-value
	2010	2011	
Mortality of young and growing hares	38.9	38.5	n.s.
Newborn kits	5.1	2.1	<0.001
Suckling kits	24.7	21.1	<0.001
Growing hares	7.1	12.2	<0.001
Sub-adult hares	2.0	3.0	0.02

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