Acta Agraria Kaposváriensis (2004) Vol 8 No 3, 219-226
Kaposvári Egyetem, Állattudományi Kar, Kaposvár
University of Kaposvár, Faculty of Animal Science, Kaposvár

The connections of damage by big game, the habitat and game bag in Somogy County

R. Barna
University of Kaposvár, Faculty of Animal Science, Department of Information Technology, Kaposvár, H-7400 Guba Sándor u. 40.

ABSTRACT

Somogy County is the one of the most important habitats and hunting places of the red deer in Hungary. The red deer of Somogy is far away known and recognized. Beside the red deer, the wild boar, the roe deer, the less significant fallow deer and sparsly the moufflon are present. However the game management in Somogy is showing a deficit. Over and above income from hunting, damages by game cause the biggest burden encombrance. In 2003 damages (forestry and agricultural) caused by game were 475 456 000 Ft. In this article the author try to find connections between the damages and the character of the area (forestry/agricultural area) and the size of the hunting bag.
(Keywords: big game, red deer, wild boar, game damage, forest, correlation)

ÖSSZEFOGLALÁS

A vadkár az élőhely és a nagyvad teríték összefüggései Somogy megyében
Barna R.
Kaposvári Egyetem, Állattudományi Kar, Informatika Tanszék, Kaposvár, 7400 Guba Sándor u. 40.

Somogy megye az ország egyik legjelentősebb gímszarvas élőhelye, vadászterülete. A „somogyi szarvas" messzeföldön ismert és elismert. A gímszarvas mellett jelen van még a többi nagyvad is: a vaddisznó, az őz és a kevésbé jelentős dámvad, valamint szórványosan a muflon. A somogyi vadgazdálkodás mégis veszteséges. A vadászatból eredő bevétel legmagasabb az országban, de ez mégsem fedezi a kiadásokat, melyek közül a vadkár a legnagyobb. 2003-ban a vadkár (erdei- és mezőgazdasági-) 475 456 000,00 Ft volt. Jelen cikkben a szerző megpróbál összefüggéseket keresni a vadkár és a terület jellege (erdő/mezőgazdasági terület), továbbá az elejtett nagyvad mérőszámai között.
(Kulcsszavak: nagyvad, gímszarvas, vaddisznó, vadkár, erdő, korreláció)

INTRODUCTION

Somogy County is one of the most important county in Hungary in respect of game management. But looking at the balance of financial management the picture is not so nice. The game management of the county has shown a deficit since 1999. Although it makes the biggest income amoung the counties, cannot counterbalance the measure of damage caused by game.

We do not know exactly the number of the game living in the county, because we cannot count them. The schedules of game management are based upon the esteemed datas wich are established by the game managers and they annually report the data to the authority of hunting. On the basis of the report the authority determines the harvestable

quantity in every species of games. The estimations are usually in accordance with the game managers expectations, such as how many games want to shoot. Our only objective data is the bag, however the extra quantity (the poacher's bag) is not known.

A previous resarch (*Barna and Honfi*, 2002) pointed out, that the damages by game are higher on forestry area and in the Nagyberek than the areas covered by plough-lands and woods. It was unambiguously shown by maps of game damage distribution. The damage by game in the forest – although its sum is important – is just a portion of the agricultural damage by game, and it increases continously. Its reason was searched in relation to the increase of stock of big game. The increased harvest plans did not solved the problem.

In 2003 – at the first time after 5 years – less damage was payed by the game managers, but it is already higher than the sum in 2001. Although the 9% decrease the damage by game is already high – 456 000 Ft. However in 2003 we have to take into consideration, that after the very heavy drought the game could not cause considerable damage in the agriculture.

Present article examines whether the data give reason for these relations.

MATERIALS AND METHODS

The author examined the correlation of the established data and bag data between 1969 and 2003, using data from the Milleniumi Vadászati Almanach publication and Fishery and Hunting Supervision of Somogy County.

I collected and put into table the total area of the game management units in Somogy (the dimension of forests and other – mainly agricultural areas), the amount damage compensation payed for forestry and agricultural, and the bag data of the big game, the red deer, the fallow deer, the roe deer and the wild boar. The data of the 1997-2003 period are given by Fishery and Hunting Supervision of Somogy County. I examined whether the size of forest is in correlation with other data. The correlation between the bag size and damages in forest or the agriculture respectively was also evaluated.

The Excel Program was used for the analysis.

RESULTS AND DISCUSSION

Table 1 contains the bag data and the game population estimations in Somogy County. The stock size of big game species increased from 1969 to 2000. The big game has dispersed overall in Somogy, but the number of small game decreased significantly.

Examining the correlation between the estimation and the bag, it was found that the co-efficent is very high everywhere except the roe deer. Because the connection is close, the opinion is justified that the estimation is depended on the expected bag. The roe deer hunting is not very attractive for the hunters in Somogy, therefore they did not perform the prescribed bag. Because the roe deer do not migrate, the game keepers regard them as their own games and protect them.

The correlation of the damage by game and the number of big game harvested was compared with the total area of the game management units, area of the forest and dimension of other areas (*Table 2*). The dimension of the area (forest-, other and total area) shows a close connection with the game damage. The highest co-efficent was given by the total area. The correlation of the other areas is higher than the correlation of the forests, but the standard deviation of the data is higher too.

Table 1

The summary of annual game management reports in Somogy and the correlation between the estimated stock and the number of the big game harvested

Year (5)	Red deer (1)		Fallow deer (2)		Roe deer (3)		Wild boar (4)	
	Bag (6)	Estimation (7)	Bag	Estimation	Bag	Estimation	Bag	Estimation
1969*	296	1,040	11	65	681	6,064	349	1,080
1970	779	2,890	15	30	1,587	6,669	719	1,284
1971	916	3,374	30	271	1,759	9,417	892	1,308
1972	1,132	3,620	29	296	2,098	9,874	1,120	1,433
1973	1,401	3,761	49	296	2,174	10,214	1,202	1,483
1974	1,670	3,824	33	364	2,621	10,279	1,280	1,279
1975	2,027	4,288	43	363	3,335	10,506	1,583	1,261
1976	2,185	4,369	29	372	3,822	11,584	1,765	1,421
1977	2,513	4,705	49	283	4,479	12,045	1,940	1,477
1978	2,394	4,820	52	361	4,303	12,760	1,671	1,537
1979	2,726	5,056	60	375	4,714	12,940	1,952	1,544
1980	2,298	5,214	66	502	3,552	11,872	1,977	1,687
1981	2,219	5,410	87	597	3,146	12,485	2,409	2,186
1982	2,737	5,571	113	691	3,040	12,376	2,755	2,406
1983	2,797	6,316	162	771	2,812	12,563	3,251	2,679
1984	2,883	6,789	186	1,053	2,828	15,774	3,431	2,962
1985	3,677	7,708	206	1,388	2,721	13,412	3,735	3,215
1986	4,141	7,892	266	1,592	2,199	13,797	3,638	3,379
1987	4,241	7,759	365	1,454	1,898	12,895	3,358	3,205
1988	4,791	6,676	468	1,388	2,088	12,219	4,423	2,968
1989	4,535	6,743	567	1,406	2,396	13,575	4,163	3,152
1990	5,111	8,588	744	1,764	2,994	16,788	4,955	4,338
1991	6,669	10,053	1,207	2,200	3,892	17,552	6,090	5,355
1992	5,812	10,964	1,668	2,298	3,504	18,124	5,520	5,812
1993	4,650	7,948	1,749	2,202	3,043	15,433	5,227	5,087
1994	3,557	7583	1,476	2,339	2,905	17,415	5,081	5,491
1995	2,779	7,037	1,214	2,047	2,603	14,430	5,371	4,911
1996	2,713	7,562	1,138	2,032	2,365	14,725	5,675	5,490
1997	3,084	9,732	1,241	2,470	2,449	14,943	5,823	7,560
1998	3,121	10,335	1,602	3,353	2,639	16,180	7,194	8,315
1999	3,896	10,828	1,513	3,352	2,925	16,414	8,263	9,105
2000	5,056	11,523	2,153	3,998	3,614	16,809	8,239	9,379
2001	5,987	12,314	2,278	4,271	4,180	16,937	10,844	9,693
2002	7,404	12,275	3,398	4,585	4,600	17,855	10,566	11,300
2003	7,404	11,763	3,040	4,610	4,811	18,470	8,821	9,688
Correlation		0.88		0.96		0.56		0.97
P value		P=0.001		P=0.001		P=0.02		P=0.001

*only Hunting Clubs (*csak vadásztársaságok*)

1. táblázat: Somogy megye évi vadgazdálkodási jelentéseinek összesítése és korreláció a becsült vadlétszám, továbbá az elejtett nagyvad mennyisége között

Gímszarvas(1), Dámvad(2), Őz(3), Vaddisznó(4), Év(5), Teríték(6), Becslés(7)

An obvious connection was found: the larger is the absolut dimension of the area is, the bigger is agricultural damage by game. The dimension of the forest shows a close connection with the damage by game year by year and it shows that the game living in the suitable dimension of forest goes out of the forest for feeding on the nearer agricultural land and cause damage. The fences set up in forest just reinforce this behaviour because the closed areas decrease the carrying capacity of the forest. The correlation is varying annually,what is in close connection with the actual yearly amount of the damage.

In the case of forest damage by game the means of the co-efficents are lower, however the correlation is close enough. But in certain years the connection is not so close. It shows that the damage in the forest happened in different life cycle in the different years. The total area, and even more the forest dimension shows closer correlation with the forestry damage by game.

Table 2

Correlation between forest size, total area and agricultural and forestry damages done by game as well as bag of red deer

	Agricultural damage by game (1)									
	1997	1998	1999	2000	2001	2002	2003	min	max	x̄
Other area (ha) (3)	0.76	0.81	0.55	0.83	0.84	0.80	0.78	0.55	0.84	0.77
Forest size (ha) (4)	0.74	0.74	0.73	0.73	0.69	0.64	0.72	0.64	0.74	0.71
Total area (ha) (5)	0.83	0.85	0.68	0.87	0.86	0.81	0.85	0.68	0.87	0.82
	Forestry damage by game (2)									
	1997	1998	1999	2000	2001	2002	2003	min	max	x̄
Other area (ha)	0.62	0.17*	0.68	0.46	0.52	0.68	0.68	0.17	0.68	0.54
Forest size (ha)	0.63	0.38**	0.60	0.38**	0.58	0.88	0.70	0.38	0.88	0.59
Total area (ha)	0.65	0.27*	0.71	0.47	0.60	0.81	0.73	0.27	0.81	0.61

*P<0.02, **P<0.01 every other correlation co-efficent P<0.001 (**P<0,02; **P<0,01; az összes többi P<0,001*)

2. táblázat: Korreláció az erdő nagyság, az összterület és a mezőgazdasági, továbbá az erdei vadkár, valamint az elejtett gímszarvas mennyiség között

Mezőgazdasági vadkár(1), Erdei vadkár(2), Egyéb terület(3), Erdő nagyság(4), Összterület(5)

I examined the correlation between the number of big game harvested – red deer, fallow deer, roe deer and wild boar and the damage by game (*Table 3*). Bag data and correlation co-efficents of area sizes are included too.

I found that the red deer plays important role in causing game damage, greater than the wild boar. It is interesting because the greatest part in causing damage by game is attributed to the wild boar (*Klátyik*, 1995). The possible explanation of this could be that because in Somogy the red deer is the 'game', for this reason doing damage is done the blame on the wild boar. High density of fallow deer is only found on a part of the county. That is why we do not get an exact picture when we examine the data of the county. Because there are a lot of hunting units, where only a few fallow is harvested

annually, we cannot say that this game species continously lives there and does damage. The co-efficent of the roe deer is 0.7 (P<0.001) which in this case shows that finicky game is found in large numbers and in equal dispersion everywhere in the county.

In case of the forestry damage by game the co-efficent of the red deer is the highest (0.61), the second is the wild boar (0.57). According to these findings in regard of the fallow deer the data were probable false because the data is only slightly higher comparing to the roe deer. In case of forestry damage by game deer (*Cervidae*) are ranked among the most important pests. It is justified by the data in the case of the red deer.

The bag of wild boar is in the closest connection with the size of other areas (0.79), the second is the red deer (0.68). The co-efficent of the roe deer is 0.66, while the one of the fallow deer is 0.6.

The bag of the red deer shows the closest correlation with the size of the forest (0.88), the second is the wild boar (0.8), the third is the roe deer (0.74), the last one is the fallow deer with 0.7 correlation co-efficent.

At the total area the order is: the wild boar (0.87), the red deer (0.84), the roe deer (0.76) and the fallow deer (0.69).

Table 3

Correlation between the bag of big game and damages caused by game

	Shots (1)	1997	1998	1999	2000	2001	2002	2003	min	max	$\bar{x}$
Agric. damage (6)	Red deer (2)	0.94	0.92	0.76	0.84	0.79	0.76	0.85	0.76	0.94	0.84
	Fallow deer (3)	0.90	0.84	0.92	0.68	0.59	0.58	0.60	0.58	0.92	0.73
	Roe deer (4)	0.80	0.79	0.60	0.73	0.71	0.64	0.63	0.60	0.80	0.70
	Wild boar (5)	0.77	0.85	0.56	0.86	0.88	0.80	0.86	0.56	0.88	0.80
Forest damage (7)	Red deer	0.60	0.34**	0.70	0.57	0.57	0.72	0.75	0.34	0.75	0.61
	Fallow deer	0.66	0.21*	0.37**	0.19*	0.49	0.89	0.82	0.19	0.89	0.52
	Roe deer	0.49	0.21*	0.58	0.56	0.59	0.59	0.56	0.21	0.59	0.51
	Wild boar	0.64	0.20*	0.67	0.56	0.53	0.74	0.63	0.20	0.74	0.57
Other area ha(8)	Red deer	0.70	0.72	0.67	0.69	0.67	0.64	0.67	0.64	0.72	0.68
	Fallow deer	0.63	0.63	0.58	0.58	0.57	0.59	0.59	0.57	0.63	0.60
	Roe deer	0.74	0.74	0.66	0.67	0.67	0.62	0.50	0.50	0.74	0.66
	Wild boar	0.74	0.82	0.76	0.83	0.81	0.79	0.77	0.74	0.83	0.79
Forest size ha (9)	Red deer	0.89	0.90	0.91	0.89	0.84	0.86	0.89	0.84	0.91	0.88
	Fallow deer	0.72	0.69	0.68	0.69	0.70	0.70	0.71	0.68	0.72	0.70
	Roe deer	0.71	0.70	0.79	0.80	0.75	0.72	0.72	0.70	0.80	0.74
	Wild boar	0.94	0.87	0.89	0.70	0.67	0.73	0.80	0.67	0.94	0.80
Total area ha (10)	Red deer	0.85	0.87	0.84	0.84	0.81	0.80	0.83	0.80	0.87	0.84
	Fallow deer	0.72	0.71	0.68	0.68	0.67	0.69	0.69	0.67	0.72	0.69
	Roe deer	0.80	0.80	0.79	0.80	0.77	0.73	0.64	0.64	0.80	0.76
	Wild boar	0.90	0.93	0.89	0.86	0.83	0.84	0.86	0.83	0.93	0.87

*P<0.02, **P<0.01 every other correlation co-efficent P<0.001 (**P<0,02; **P<0,01; az összes többi P<0;001*)

3. táblázat: Korreláció az elejtett nagyvad mennyisége és a vadkár között

Lelövések(1), Gímszarvas(2), Dámvad(3), Őz(4), Vaddisznó(5), Mezőgazdasági vadkár(6), Erdei vadkár(7), Egyéb terület(7), Erdő nagyság(9), Összterület(10)

It can be stated that in Somogy County the wild boar and the red deer shows the closest correlation taking the total area into consideration. With the size of the forest the bag of red deer, while the size of other areas the bag of the wild boar shows closer connection. This findings justify that the wild boar is the most important pest for the agricultural areas, as the most of them are shot there.

In *Table 4* the correlations of the bag size and damage by game is summarized. The result shows that the wild boar is not in the same connection with the agricultural damage than the other big game species. But at the forest damage its co-efficent is the highest. The conclusion can be drawn that the bag of wild boar is ill-proportioned with the damage. These seven years data are not enough statistically for the well-founded conclusion, but the result is giving food for tought.

Table 4

Correlations between bag size and damages caused by game

	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	Correlation to agr. damage (7)	Correlation to for. damage (8)
Agricultural damage Ft (1)	261,431	238,668	246,367	409,887	394,904	468,791	432,357		
Forest damage Ft (2)	21,119	16,961	28,309	39,439	55,948	52,977	43,099		
Red deer (3)	3,084	3,121	3,896	5,056	5,987	7,404	7,404	0.94	0.88
Fallow deer (4)	1,239	1,602	1,502	2,153	2,278	3,398	3,041	0.92	0.80
Roe deer (5)	2,438	2,639	2,975	3,614	4,180	4,600	4,811	0.93	0.89
Wild boar (6)	5,823	7,194	8,263	8,239	11,213	10,566	8,821	0.72	0.92

4. táblázat: Korreláció az elejtett nagyvad mennyisége és a vadkár között

Mezőgazdasági vadkár(1), Erdei vadkár(2), Gímszarvas(3), Dámvad(4), Őz(5), Vaddisznó(6), Korreláció a mezőgazdasági vadkárral(7), Korreláció az erdei vadkárral(8)

For getting a more precise picture the annual changes of damage and the changes of bag data than their correlations were calculated (*Table 5*). It was proved that the change of the wild boar's bag according to the –0.22 correlation co-efficent is in contrast with the change of the amount of the damage by game, what means that the wild boar is the most important pest, less wild boars are shot than necessary, as its bag has decreased year by year since 2001. Not likely that it was nilfully done by the game managers, because the wild boar is qualified as a beast of prey (it can be shot all year round), it is hunting is possible for every hunter and the boar drives not only give adventure but also means a source of income. The explanation could be that because of the bigger disturbance the wild boar changed its behaviour, so it left the forest and became a more nocturnal game. The hunting law prescribes that the hunting had to be finished one hour after sunset and it could start only one hour before sunrise. The wild boar exploits the time inside the two. Using a rifle-light on wild boar hunting is fixed for permission.

The fallow deer does not show connection with forest damage, and red deer do it hardly too. Surprisinoly the correlation co-efficent of roe deer (0.77) is higher than that of the wild boar. However we should not come to a conclusion of this.

Table 5

Correlations between bag size and damages caused by game

Years (1)	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	Correlation to changes in agr. damage (8)	Correlation to changes in for. damage (9)
Changes in agricultural damage Ft (2)	-22763	7699	163520	-14983	73887	-36434		
Changes in forest damage Ft (3)	-4158	11348	11130	16509	-2971	-9878		
Changes in red deer (4)	37	775	1160	931	1417	0	0.72	0.54
Changes in fallow deer (5)	363	-100	651	125	1120	-357	0.68	0.01
Changes in roe deer (6)	201	336	639	566	420	211	0.72	0.77
Changes in wild boar (7)	1371	1069	-24	2974	-647	-1745	-0.22	0.72

5. táblázat: Korreláció az elejtett nagyvad mennyiségének változása és a vadkár változása között

Évek(1), Mezőgazdasági vadkár változás(2), Erdei vadkár változás(3), Gímszarvas mennyiségének változása(4), Dámvad mennyiségének változása(5), Őz mennyiségének változása(6), Vaddisznó mennyiségének változása(7), Korreláció a mezőgazdasági vadkár változással(8), Korreláció az erdei vadkár változással(9)

CONCLUSIONS

– In this article a GIS hypothesis is justified. According to this on forested areas both the bag sizes and the damages by game are higher.
– The amount of the agricultural damage by game and the bag of red deer and wild boar is proportionate with the dimension of the game management unit's as well as that of the forest. In case of forest damage by game the connection is not so close.
– The number of wild boar harvested shows a closer connection with the dimension of other, mainly agricultural areas, than with forest dimension.
– The bag of the wild boar seems to be not enough high, it should be increase because of the amount of damages.
– The red deer – beside the wild boar – is responsible for the agricultural and forest damages caused by game.

REFERENCES

Barna R., Honfi V. (2002). A térinformatika lehetséges alkalmazása a vadgazdálkodásban. Acta Agraria Kaposváriensis, 3.

Klátyik J. (1995). Vad-, kár-, térítés. Inga-V Bt. Pécs.

Simon P. (2001). A vadászati igazgatás, a nagyvadlétszám alakulása. Milleniumi Vadászati Almanach, Somogy Megye. Pécs, Krónika Kiadó 45-53.

Somogy Megyei FVM Hivatal Vadászati és Halászati Osztály adatbázisa.

Levelezési cím (*corresponding author*):

Barna Róbert
Kaposvári Egyetem, Állattudományi Kar, Informatika Tanszék
7401 Kaposvár, Pf.: 16.
University of Kaposvár, Faculty of Animal Science
Department of Information Technology
Kaposvár, H-7400 P.O.Box. 16.
Tel.: +36-82-314 155/264, +36-82-526 345; fax: +36-82-320 746
E-mail: barna@mail.atk.u-kaposvar.hu