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Reducing sheep losses to large predators by use of livestock guarding dogs

Key words: wolf, bear, damage to livestock, livestock protection, livestock guarding dog, Slovakia

Preface

Slovakia is an important stronghold of native large carnivores in Europe. Bear, wolf and lynx populations are most numerous in the Western Carpathian Mountains and serve as a reservoir for re-colonisation of former ranges and for strengthening of small populations in neighbouring countries.

However long-term survival of large predators primarily depends on public attitude to them. After 1990 widespread poaching resulted in a marked decline of the prey species of large predators, especially in eastern Slovakia. Due to this wolves retreated from some parts of the range. In addition, all three large carnivores were heavily persecuted by hunters and poachers. This negatively affected wolf and lynx populations. As a new phenomenon, bear poaching became more common.

Generally people living in towns and cities are only partially involved in wildlife issues. On the other hand local people, especially hunters and farmers, usually favour regulation of large predator numbers over total protection. It is a commonly held opinion among rural people that wolves should be wiped out in the wild and only some specimens kept in zoos.

Flock-guarding dogs (LGD) have been used on the continent of Europe since ancient times

to protect flocks from depredations by bears, wolves, lynx, and human thieves. Shepherds have developed big, placid dogs (35-40 kg on average, 65-70 cm in height) whose behaviour is different from the smaller, more active herding dogs. Guarding dogs live with the flocks 24 hours a day, bonded to their livestock (sheep, goats and sometimes horses or cattle). They protect the animals by barking to alert the shepherd, and by imposing themselves between predator and flock. Actual fights between dogs and predators are rare, because a predator's primary instinct, even before feeding, is to avoid hazards. Thus, shepherds have developed a defensive system of protection that also preserves the predator.

However, the broad picture for European flock-guardinas shows several breeds threatened with extinction or adoption off the farms for use as pets or show dogs. Some breeds may have already become extinct, for example the Alentejõ of central Portugal. Others have been bought out of the farmland by breeders for commercial and/or nationalistic reasons, resulting in a severe negative impact on endemic pastoral working dogs. These dogs, which have been for centuries an integral part of the livestock business, are being eliminated or genetically impoverished or genetically swamped by an influx of free-ranging non-working dogs.

In Slovakia, we found different problems. Dogs are staked out in open pastures, on chains, and thus not develop their full potential as guardians. In fact, the system here is full of liabilities. Because of the extreme heat in summer, the system also is cruel to dogs with no shade and often, no water. Sheep, too, exhibit signs of stress due to disease, making them even more vulnerable to predators which their chained guardians cannot intercept.

It is important now that the traditional guarding dog system not be lost. Beyond the basic protection of the flocks, it is highly beneficial to those predators that are also endangered species, keeping them away from domestic livestock without the need to kill or move them from their natural habitats. Guarding dogs are extremely appropriate for use among the rare species of the Carpathian Mountains (Fig. 1).



Fig. 1 Traditional Slovakian livestock guarding dog Slovenský čuvač

This paper refers to preliminary results of the project „Livestock guarding dogs and carnivore conservation in Slovakia“ supported by the Born Free Foundation (UK) and the Carpathian Wildlife Society (Slovakia).

Material and method

Published data was used for evaluation of current situation of large carnivores and livestock in Slovakia (HELL & SLAMEČKA 1999; HELL, SLAMEČKA & GAŠPARIK 2001; LEHOCKÝ et al. 2002; SALVATORI et al. 2002).

The data on large carnivores and livestock interactions during the grazing season 2002 was gathered by field research and questionnaire

surveys in October - November 2002. 23 farms were visited and another 188 farmers were mailed questionnaires and requested to provide basic information on predation to their livestock. In total we contacted 211 farmers.

In 2000-2002 three strains of guard dogs were used for livestock protection; Slovenský čuvač, Caucasian shepherd dog and crossbred Podhalský shepherd x Slovenský čuvač. Of 36 dogs included in the project during 3 years, 30 dogs were used for guarding flocks in 2002. In total 6 dogs were lost due to human caused mortality (FINDO 2002).

Six weeks old pups were placed and reared with sheep at the farms situated within the range of large carnivores. These dogs were tested for working abilities from puppy-hood to maturity and used for guarding sheep at 12 summer sheep camps. During the third year of the use of appropriately reared dogs it was possible to judge their effectiveness against predators' attacks to sheep. The effectiveness of the methods of livestock protection was evaluated based on the total number of the sheep attacked per sheep camp/farm during the grazing season 2002.

Results

Current situation of large carnivores and livestock in Slovakia

Wolf

The wolf primarily occupies mountainous areas in central and eastern parts of the country. Occasionally some individuals attempt to recolonise the former range and disperse outside the core area into SW Slovakia, the Czech Republic and Hungary. Recent telemetry and snow-tracking studies on both sides of the Slovak/Polish border confirmed that the same individuals of wolf commonly cross the border and use the habitat in both countries (FINDO & CHOYANCOVÁ 2004). In 2001, hunters estimated the wolf numbers as up to 1,113 individuals. The hunters overestimate wolf numbers by about 3 times. More realistic figures regarding large predators were gathered by snow tracking in Poľana Mountains conducted in December 2001. These results document how a high population density of large predators can also be expected in other

parts of their range in Slovakia. An 80,500 hectares large area harbored some 90 bears, two packs of wolves (4 and 3 individuals respectively), 13 lynx and 7 wild cats. This means that the population density of wolf was very low, only 0.87 individual per 100 km².

Hunters officially killed 93 wolves in 2001. The open season currently accepted is 2.5 months from 1st November until mid January. In 2001 wolves killed 170 sheep/goats (LEHOČKÝ et al. 2002). This loss was definitely heavily underestimated. As shown by our own survey conducted in 2001, where wolves killed 90 sheep at only 54 sheep camps out of the approximately 350 existing in Slovakia.

The conservation status of the wolf has changed slightly. In two areas declared as corridors to Hungary and the Czech Republic, the wolf was granted year round protection (The Slovak Karst National Park and area around the town of Čadca). In addition a new Nature Protection Law n. 543/2002, valid from January 2003, introduced a ban on hunts within the core area of all national parks. This is quite an important step towards wolf protection in the national parks, as many were shot alongside wild boar during these hunts. The new Nature Protection Law also prescribes compensation for damage to livestock caused by wolf and lynx. Up to now only damage caused by bear has been compensated. This new law includes an unusual rule, that in areas where the wolf is totally protected (the two areas mentioned above in this paragraph) damage they cause to wild ungulates must be compensated by the government to the local hunting club. In spite of many protests and appeals, this anti-ecological rule was implemented in a law by a strong hunting lobby represented by the Ministry of Agriculture.

Brown bear

The species is common in mountainous areas. It is distributed more widely in the central part of the country, while in the eastern part it inhabits a narrow stretch along the Polish border. In 2001 an official hunters' estimate of the population of brown bear was about 1,350 individuals. It was probably over-estimated as experts estimate bear numbers at around 700 individuals. A population census, conducted in Poľana

Mountains in December 2001, confirmed a density of about 11 individuals per 100 km². This means about 1 bear per 900 hectares. In general the population density of 1 bear per 1,000 hectares is very high (PAJETNOV, pers. comm.). High bear numbers are reported from most of the mountainous areas of central Slovakia.

Brown bear is protected all year round and hunted only in exceptional circumstances. In 2001 a license for killing 68 bears was issued. Hunters killed only 25 bears officially and 10 carcasses were reported (natural and human caused mortality mostly due to road/railway kills).

Bear causes considerable damage. In 2001 bears destroyed 220 beehives and killed 263 sheep, 9 goats and 9 cattle. In addition damage was caused to wooden lodges, poultry etc. The damage was estimated up to 25,700 Euro. The total compensation paid was 14,870 Euro. This compensation does not include damage to fruit trees (orchards) and agricultural crop (LEHOČKÝ et al. 2002).

According to the new Nature Protection Law the government will also compensate humans for health treatment needed as a result of attacks by bears. There are about 8-10 bear – human encounters every year that result in injuries.

Lynx

Lynx is protected and most hunters respect this status. In 2001 the official numbers were estimated up to 968 individuals. As in the case of all other large carnivores this number is heavily over-estimated. In general we can conclude that the current state of the lynx population is much better than that of the wolf. Lynx occupy a larger range than wolf and total numbers can be estimated at around 400 individuals. Recently shepherds reported more cases of damage to sheep that were not officially included in the Hunting Statistics.

Livestock

There are about 800 thousand hectares of meadows and pastures suitable for grazing of livestock in Slovakia. Sheep rearing is concentrated within the region occupied by large carnivores. After a heavy recession within the sheep industry, the number of sheep has slightly increased since 1998 (Table 1). Despite three different

subsidies for sheep rearing (per hectare of pasture, per head of sheep and per 1 kg of sheep cheese) provided to farmers by the government via the Slovak Ministry of Agriculture, the sheep industry is not profitable.

However, from the environmental point of view, sheep grazing plays an important role in maintaining mountain pastures which are not suitable for other agricultural production. From 2004, the future of the Slovakian sheep industry within the EU is uncertain due to the very low subsidies planned for farming.

The number of cattle has rapidly dropped over the last 13 years from 1.6 million in 1989 to 656 thousand in 2001. A further decrease in the number of cattle can be expected as a result of the incidence of BSE, the subsequent decline of beef consumption and low subsidies from the EU (from 2004).

The survey of predation on livestock and effectiveness of protection methods in 2002

We gathered information about depredation to livestock from 80 farms (23 were visited by researchers and 57 farmers responded to questionnaires) comprising 34,973 sheep/goats and 350 cattle. 44 farms (54.3 %) reported positive predation.

In total the predators attacked 459 sheep/goats of which 404 were killed and 55 wounded (Table 2). In addition 7 young cattle were killed (5 by bears, 2 by wolves). The total estimated loss was more than 27,800 Euro. In total wolves attacked 327 sheep/goats (279 killed, 48

wounded) and bears attacked 121 (114 killed, 7 wounded). Lynx killed two sheep and two goats.

The farmers at 26 of the sheep camps used chained LGDs and shepherds for protection of flocks comprising of 14,855 sheep/goats. These farms recorded 3.0 % loss of livestock due to predation. The flocks at 9 other farms comprising of 4,700 sheep/goats which were protected by shepherds and free ranging LGDs lost only 0.15 % of the stock (20 times less). At all 9 farms activity of large predators was observed during grazing season 2002.

In 2002 it was possible to evaluate the various methods of flock protection at 52 of the farms/sheep camps (Table 3). Permanently chained dogs (flock protection „A“) were used for guarding sheep at 33 farms and free ranging dogs (flock protection „B“) mostly in combination with chained ones (flock protection A + B) protected 13 flocks. Staked dogs were sometimes released during the night. Electric fences (flock protection „E“) and free ranging dogs were not always properly used. At two sheep camps, electric fences in combination with staked dogs failed as a result of bad fence construction and maintenance (Tvrdošín, Dlhá nad Oravou). Not all dogs included in the group B (free moving) were properly trained. Some of these dogs showed appropriate behavior while others were insufficiently bonded to the livestock. Not all the dogs were attentive enough or were unwilling to go on the pasture with all of the shepherds. In such cases the sheep were guarded on the pasture during the day only by the shepherd (s). Despite the mentioned drawbacks in flock protection, there was an apparent

Table 1 The number of livestock in Slovakia (Thousand)

Year	Total No Sheep	Ewes	Goats	Cattle
1995	427,8	295,9	?	928,7
1996	418,8	283,6	?	892,0
1997	417,3	279,8	?	803,4
1998	326,2	192,5	50,9	704,8
1999	340,3	208,1	51,1	665,1
2000	348,0	211,6	50,0	646,1
2001	359,4	212,6	51,5	655,8

difference in guarding effectiveness between chained and free ranging dogs. As mentioned above chained dogs were used at 33 farms. Of these farms 76 % reported damage caused by wolf and 33 % by bear. On average the wolves attacked 8.91 individuals of livestock per farm and the bears 1.45 respectively. In addition some of the flocks guarded by chained dogs during the night-penning recorded extremely high losses. There were recorded heavy damage to more places which resulted in annoyance of farmers and other locals (see also FINĐO & HOOD 2001).

In the Nizke Tatro wolves caused heavy losses at three farms/sheep camps (Table 3). Near Dol-

ná Lehota locality Kejda the sheep camp was inconsistently affected by wolf predation during the whole grazing season. In total the wolves killed and wounded 63 animals; 62 sheep and 1 young calf. From April 25th until the end of the grazing season increasing attacks on the sheep were reported on the pasture during the day, as well as at night. Due to insufficient flock protection the wolves dared to approach the sheep even when shepherds were present. Different adult wolves were observed from a close distance of about 30 metres. An observation in late July confirmed that the sheep camp is situated within an active wolf pack territory. This pack raised 5 puppies. In November 2002 near

Table 2 Damage caused by large predators on livestock in 2002

Predator	Sheep		Goat	Cattle	Livestock		
	Ewes & Lambs	Rams			Killed	Wounded	Total
Damage surveyed by researchers on 14 farms protected by chained LGDs and shepherds							
Wolf	169	6	4	1	172	8	180
Bear	5	2	0	1	8	0	8
Lynx	2	0	2	0	4	0	4
Total	176	8	6	2	184	8	192
Damage surveyed by researchers on 9 farms protected by free LGDs and shepherds							
Wolf	8	0	0	0	4	4	8
Bear	0	0	0	0	0	0	0
Lynx	0	0	0	0	0	0	0
Total	8	0	0	0	4	4	8
Damage reported from 57 farms via questionnaires							
Wolf	140	0	0	1	105	36	141
Bear	114	0	0	4	111	7	118
Lynx	0	0	0	0	0	0	0
Total	254	0	0	5	216	43	259
Total damage on 80 (14 + 9 + 57) farms surveyed in 2002							
Wolf	317	6	4	2	281	48	329
Bear	119	2	0	5	119	7	126
Lynx	2	0	2	0	4	0	4
Total	438	8	6	7	404	55	459

this locality one adult wolf was shot by a hunter. The pack members visited other neighbouring sheep camps around Dolná Lehota. Two of these sheep camps were protected by the Čuvačs appropriately raised during this project. However the damage on these two farms was not too serious. There were 4 sheep wounded at one farm and one sheep was killed on the pasture at the other farm during the daytime when our Čuvač was temporarily chained. The third flock visited by 2-3 pack-members belonged to

a farm in Horná Lehota where 10 sheep/goats were killed.

Completely different patterns of damage caused by wolves were recorded near Závadka nad Hronom in the Nízke Tatry Mountains. During the night of 8/9th May the private farm Poľspol Plus lost 35 ewes and lambs. The sheep were protected by chained LGDs.

This attack can be considered as surplus killing that is typical, but unexplained and occasional, wolf behaviour. Later on wolves killed another

Table 3 Damage on livestock in 2002 by farms/sheep camps ($N = 52$) depending on kind of flock protection. Killed and wounded animals were pooled.

Farm – Sheep camp	Flock Protection	Damage		
		Wolf	Bear	Lynx
SHR Medveď, Kejda, Nízke Tatry Mts	A	63	0	0
PD Klenovec, Veporské Mts	A	38	2	2
PoľnoPlus, Závadka, Nízke Tatry Mts	A	37	0	0
PD Liptovská Teplička, Nízke Tatry Mts	A	19	0	0
SHR J.Šuchtár, Liptovský Ondrej	A	13	0	0
SHR Budovec, Čierny Balog	A	12	3	0
PD Hranovnica	A	10	0	0
PD Víkartovce	A	10	0	0
SHR F. Hunčík, Ochodnica	A	10	0	0
PD Rejdová	A	10	1	0
PD Goral, Franková	A	8	0	0
Agroubár s.r.o., Hrabušice	A	7	0	0
PD Ošadnica	A	7	0	0
PD Kobeliarovo	A	7	0	0
Agročiré a.s., Čiré	A	6	0	0
Poľnoblh s.r.o., Hnúšťa	A	5	5	0
Agro Slavošovce s.r.o.	A	5	0	0
SHR Bartošová, Štítnik	A	5	0	0
PD Heľmanovce	A	5	0	0
PD Oľšavica	A	5	0	0
PD Veľký Liptník	A	4	0	0
PD Roštár	A	4	0	0
PD Východná	A	1	4	0
SHR M. Šaloň, Šarišský štíavnik	A	2	0	0
PD Párnica	A	0	15	0
PD Vyšná Slaná	A	1	0	2

2 sheep during two separate attacks. Heavy damage was also reported from the northern part of the Nízke Tatry, near the village Lip-tovská Teplička, where wolves killed 19 sheep (Table 3).

Every year serious wolf depredation on live-stock has been recorded around the village Klenovec in Veporské Mountains (Table 3). The farm PD Klenovec owned more than 2,500 pedigree sheep that are grazed on 4 different summer camps. At three sheep camps where

they used chained LGDs the wolf predation resulted in the loss of 38 sheep. An unusual event happened one October 2002 afternoon, when wolves attacked an unprotected flock and killed 15 sheep on the pasture. At the forth camp, our two Caucasian shepherd dogs properly reared and used guarded the sheep. There was no damage recorded to this flock in 2002, although previous year in August the wolves killed 18 lambs there over 10 days. This damage occurred before we introduced trained free

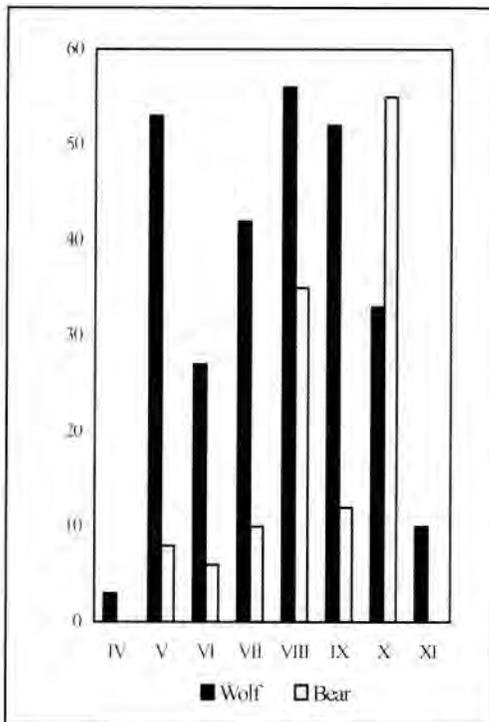
Table 3 continuation

SHR Lupták, Dolný Kubín	A	0	8	0
PD Kvačany	A	0	7	0
PD Krnáč, Selec	A	0	1	0
Cajdes, Hrochov	A	0	0	0
PD Silica	A	0	0	0
SHR Hric, Brdárka	A	0	1	0
PD Ráztoka	A	0	1	0
SHR Lipá, Hiadel'	A + B	1	0	0
OS Dolná Lehota	A + B	1	0	0
RD Javorina, Valča	A + B	0	5	0
PD Belá Dušice	A + B	0	4	0
SHR Mazuch, Ostrá Lúka	A + B	0	1	0
PD Rožňavské Bystré	A + B	0	1	0
SHR Vraštiak, Dlhá nad Oravou	A + E	0	66	0
PD Žiarec, Tvrdošín	A + E	8	0	0
SHR Dianiška, Tisovec	B	2	0	0
SHR Roško, Tisovec	B	1	0	0
PD Klenovec, Paulinka	B	0	0	0
PD Revúca	B	0	0	0
SHR Roštárová, Sopotnica	B	0	1	0
SHR Zvara, Detva	B	0	0	0
SHR Ďurica, Heľpa	B	0	0	0
SHR M. Stieranka, Dolná Lehota	B + C	4*	0	0
Múzeum, Príbilina	C	0	1	0
SHR Žilka, Dolná Lehota	C	0	0	0
PD Horná Lehota	Non	10	0	0

Note: A – chained LGDs; B – free ranging LGDs; C – night penning (sheep closed in the barn during the night); E – electric fence; * wounded animals

ranging LGDs. Another case of heavy damage caused by bear was recorded near the village Dlhá nad Oravou. During 10 attacks bear killed 66 sheep. The most serious attack happened on 7th October 2002 when 41 sheep died as a result of predation and panic when most of the sheep were suffocated and drowned in a small narrow river (Table 3).

As discussed above properly trained LGDs (flock protection B) and in combination with chained dogs (flock protection A + B) guarded 13 flocks. The wolves attacked 31 % and the bear 38 % of these flocks. Average damage per flock caused by wolves and bears was only 0.38 and 0.92 sheep respectively. These figures were higher for the flocks protected only by chained dogs (wolf - 8.91 and bear - 1.45). In comparison with chained dogs properly trained dogs successfully prevented surplus killing or escalating heavy damage during grazing season. These results demonstrate that properly trained guarding dogs are acceptable preventative measure for reducing wolf and bear damage on livestock. The seasonal pattern of damage in 2002 is shown in Fig. 2.



Conclusions

Our experience up to now showed that improvement of livestock protection against predators by use of appropriately trained livestock guarding dogs or by other methods is primarily a matter of public awareness among local people. The prosperity of the sheep industry is another key factor. Currently breeding of livestock is not very profitable and people employed in this sector belong to the poorest group of inhabitants. To convince farmers/shepherds to adopt better methods of livestock protection or to change their attitude towards large predators requires extraordinary effort, while success is most uncertain (FINDO 2002).

Based on our previous experience of co-operation it is preferable to select prosperous farms where predation has been recorded over the last two years. Our co-operators had to consider the introduction of better livestock protection methods as important.

Based on our advice and instructions over last few years the shepherds, on an increasing number of farms across Slovakia, properly raise livestock guarding dogs and currently use them for livestock protection. So far 11 farms have been discovered with 17 properly trained LGDs that have been reared by the shepherds themselves. These findings are encouraging.

In addition we outlined and have started to establish working breeds of Slovenský čuvač and Caucasian shepherd dog so that sustainable puppies produced from tested working parents will be ensured for future use in Slovakia or elsewhere. Co-operation within this project, among LGD breeders and farmers has been successfully started. Dog breeders are keen to disseminate the idea of appropriately trained LGDs. Preliminary results were publicised as a mutual effort between the Born Free Foundation (UK) and the Carpathian Wildlife Society (Slovakia).

Fig. 2 Number of livestock (mostly sheep) attacked during the grazing season 2002

Summary

Reducing sheep losses to large predators by use of livestock guarding dogs

In Slovakia after 2nd World War traditional system of livestock protection against large carnivores by free ranging guard dogs has been forgotten. From the unknown reasons dogs are staked out in open pastures, on chains, and thus not develop their full potential as flock guardians. The paper refers to the preliminary results of the project „Livestock guarding dogs and carnivore conservation in Slovakia“ primarily focused on revival of traditional use of flock guarding dogs. The Slovenský čuvač is still important and traditional part of pastoral life in Slovakia. Thus the ultimate goal is to test the working abilities of this native breed and re-establish its proper use as a flock guardian. Current situation of wolf and brown bear is briefly described. From 80 farms a large carnivores and livestock interactions during the grazing season 2002 was gathered by field research and questionnaire surveys. It was also possible to evaluate the various methods of flock protection at 52 of the farms – sheep camps. There was an apparent difference in guarding effectiveness between chained dogs and free ranging dogs. In comparison with chained dogs properly trained dogs successfully prevented surplus killing or escalating heavy damage during grazing season.

Zusammenfassung

Nach dem 2. Weltkriege erlosch in der Slowakei der traditionelle Schutz der landwirtschaftlichen Tiere gegen die grossen Raubtiere mit dem Einsatz der entsprechend erzogenen und sich frei bewegenden Hirten-Wachhunden. Die Hunde wurden aus unbekanntem Gründen immer angekettet und haben ihre Schutzfunktion nicht entwickeln können. Die Arbeit beschäftigt sich mit den vorläufigen Resultaten des Projektes „Hirten-Wachhunde und Schutz der Raubtiere in der Slowakei“, dessen Ziel die Erneuerung des traditionellen Einsatzes der Wachhunde für den Schutz der Herden in der Slowakei ist. Der Slowakische Hirtenhund (Tschuwatsch) ist immer ein wichtiger Bestandteil der traditionellen Viehweide in der Slowakei gewesen.

Es wird die derzeitige Lage des Wolfs und des Bären in der Slowakei analysiert. Von 80 privaten landwirtschaftlichen Unternehmen wurden durch eigene Forschung und mit Hilfe einer Fragebogenaktion in der Weidesaison 2002 die Angaben über die Interaktionen zwischen den grossen Raubtieren und dem Vieh gewonnen. Ebenso war es möglich, die verschiedenen Methoden des Schutzes der Herden auf 52 landwirtschaftlichen Sommerhütten zu testen. Es wurde ein deutlicher Unterschied der Effektivität des Schutzes zwischen den angeketteten und sich frei bewegenden Hunden festgestellt. Die entsprechend erzogenen, sich frei bewegenden Hunde haben das übermässige Töten ebenso wie das Anwachsen der Schäden während der Weidesaison verhindert.

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