

**Georgian Carnivore Conservation Project Component:
Mitigating human-carnivore conflict in East Georgia**

**Improving the effectiveness of Livestock Guarding Dogs
as used by the Tusheti sheep farmers of Eastern Georgia**



Field report on provision of training

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EXECUTIVE SUMMARY

The Georgia Carnivore Conservation Project (GCCP) was established to conserve the unique and globally important biodiversity of the semi-arid landscape in Georgia. This biodiversity may come under threat and conservation measures may be compromised in areas where human-carnivore conflict is prevalent. For this reason, the GCCP decided to undertake a study in partnership with the Tushetian community, to identify conflict issues surrounding grey wolves, brown bears and ethnic Tushetian livestock herders and owners in areas where they share a landscape, and to suggest possible measures to mitigate the conflict. During Phase 1, a comprehensive baseline survey was conducted in March–April 2010 to gain an overall understanding of HCC in East Georgia (Rigg and Sillero 2010a). Phase 2 included the elaboration of a toolbox of mitigation methods for reducing HCC (Rigg and Sillero 2010b).

Livestock guarding dogs are an integral part of the Tushetian herding tradition in Georgia. All livestock farms surveyed during the baseline survey had at least one LGD, with an average of eight dogs per farm. However, because flocks were sometimes split up, it is possible that not all livestock was accompanied by LGDs at all times. Dogs were frequently encountered away from flocks. Insufficient daytime attentiveness may explain why most attacks were reported to occur during daylight hours, when flocks were in pastures, rather than at night. In addition, some dog breeders and researchers in Georgia hold the view that the quality of LGDs at working farms is insufficient due to crossbreeding and the export of the best dogs during Soviet times.

In light of the above findings, the GCCP initiated a pilot study aimed at improving methods used within the Tusheti community for rearing LGDs while supporting the work of a newly established Human-Carnivore Conflict Response Team (HCCRT) in Vashlovani NP. The consultant was contracted to prepare a manual of 'best practices' in working with LGDs to be distributed to Georgian sheep breeders; to provide training in basic socialisation and husbandry techniques; to design a monitoring programme for a trial of LGDs in Vashlovani; and to provide other technical support including contributions to other manuals and data analysis.

This report describes training provided by the consultant to livestock owners and herders at three livestock farms in Vashlovani National Park on 10th – 12th December 2011 in advance of the delivery of six LGD pups, which are to be provided by the GCCP and raised during the 2011/2012 winter grazing season according to guidelines on best practice included in this report. A companion report (Rigg 2012) describes the monitoring programme developed specifically for the Vashlovani trial as well as associated training provided to the HCCRT.

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1. INTRODUCTION

The Georgian Carnivore Conservation Project (GCCP) has been actively working in the Vashlovani and Tusheti Protected Areas of eastern Georgia since early 2009. The overall goal of the project is “*To conserve the unique and globally important biodiversity of the semi-arid landscape in Georgia by drawing on indigenous and international expertise*”. Specifically, it is intended to develop effective mechanisms, capacity and enhanced advocacy to improve the conservation status of keystone large carnivores.

One important issue that has been identified in the project landscape is human-carnivore conflict (HCC). Results of a baseline survey (Rigg and Sillero 2010a) confirmed that the strongest negative feelings towards carnivores were held by those most affected: livestock owners and herders, for many of whom losses to predation were reported to be an economic burden. This creates a conflict between people’s livelihoods and protected areas and their wildlife.

The Tushetian livestock owners and herders are one of the key human groups within this landscape and they have a unique culture with prevailing traditional attitudes and customs closely linked to sheep farming (Anthem 2009). Hailing from the highlands of Tusheti, part of their pastoralist lifestyle involves an annual migration towards the end of each year, from the mountains and into the lowlands and to winter pastures. Traditionally, this migration involved a relatively wide-ranging dispersal, with many livestock owners and herders crossing the historically porous border with neighbouring Dagestan. However, decades of Soviet manipulation, followed by the dissolution of the USSR and the subsequent tightening of borders, have concentrated the availability of winter pastures and the majority now take their flocks to the semi-arid pastures in and around Vashlovani National Park (VNP) in the southeast of the country.

As well as affecting physical migration routes, it is also widely believed that Georgia’s recent history has impacted the Tushetian community in deeper ways. As a result, it is generally believed that current shepherding practises are less than ideal and poor livestock management is resulting in high livestock mortality and increased predation of sheep by feral dogs and wild predators. Of particular note is the relatively recent decrease in the once widespread use of traditional sheepdog socialisation and training methods that once helped produce the trustworthy, attentive and protective dogs that are crucial in this predator-rich environment. It is the intention, therefore, of the GCCP to facilitate the reintroduction of these methods into the daily working practices of the Tushetian community operating in and around the project sites.

The use of livestock guarding dogs (LGDs) has proven to be one of the best methods to limit losses of livestock to a variety of predators in many different situations worldwide (e.g. Linhart *et al.* 1979, Green *et al.* 1984, Coppinger *et al.* 1988, Andelt 1992, 1999, Andelt and Hopper 2000, Rigg 2001, 2004, Rigg *et al.* 2003, 2011, Bangs *et al.* 2005, Coppinger and Coppinger 2005, Landry *et al.* 2005, Marker *et al.* 2005a,b, Mertens and Schneider 2005, Ribeiro and Petrucci-Fonseca 2005, Sedefchev 2005, Śmietana 2005, Stone *et al.* 2008, Gehring *et al.* 2010). To make effective guardians, dogs must possess three key traits: they should be trustworthy (become part of the flock without causing a disturbance, exhibiting submissive behaviour towards livestock and not harming them); attentive (stay with the flock as much as possible, both day and night, following when it moves and resting among or

near the livestock); and protective (bark at new or strange activities and situations, taking up a position between the flock and any potential threats) (e.g. McGrew and Blakesley 1982, Coppinger *et al.* 1983, Lorenz 1985).

Livestock guarding dogs are an integral part of the Tushetian herding tradition in Georgia. All livestock farms surveyed during the baseline survey had at least one LGD, with an average of eight dogs per farm (Rigg and Sillero 2010a). However, because flocks were sometimes split up, it is possible that not all livestock was accompanied by LGDs at all times. Dogs were frequently encountered away from flocks. Insufficient attentiveness (cf. Mertens and Schneider 2005) may explain why most attacks were reported to occur during daylight hours, when flocks were in pastures, rather than at night.

Additionally, some dog breeders and researchers in Georgia think that the quality of LGDs at working farms is insufficient due to crossbreeding and the export of the best dogs to the Soviet Union. During the baseline survey, livestock owners with 'pure-bred' dogs were more satisfied with their performance than those who said they had mixed breed dogs, although during informal pilot interviews prior to the survey several livestock owners and herders had rated mixed dogs as superior because they were faster. No significant relationship was detected between the percentage of all livestock lost and either how owners rated their dogs or if they described them as pure versus mixed breed. However, some evidence was found that mixed breed dogs might be better with cattle while 'pure-bred' dogs could be more effective with sheep.

The GCCP contracted the consultant to work closely with the recently established HCC Response Team (HCCRT) and three pre-selected Tushetian sheep owners in order to socialise six LGD pups with associated sheep flocks for the purpose of becoming effective livestock guarding dogs. It was stipulated that the process shall include the training of farmers in socialisation and husbandry techniques, the training of HCCRT members in the monitoring of the implementation of these techniques and the provision of a 'best practice' manual for the long-term use of Georgian sheep breeders. In addition, GCCP is to provide the participating farmers with both husbandry and veterinarian support for the life of the project.

2. SUMMARY OF BASELINE SURVEY FINDINGS

A study was undertaken in March–April 2010 by the GCCP, in partnership with the Tushetian community, to identify the issues surrounding human-carnivore conflict in East Georgia (Rigg and Sillero 2010a) with a view to suggesting possible mitigation measures for this conflict in order to improve conservation management efforts in the area.

The study focused on the Dedoplistskaro District, particularly around and within Vashlovani National Park, and involved a comprehensive baseline survey in two parts. The first part, which used a semi-structured interview protocol, was a description or classification of livestock farming in the VNP area, recording various husbandry parameters such as livestock type, herd/flock size, guarding techniques and losses to predation, disease and other mortality. The second component used a self-administered written questionnaire to gauge the perceptions and attitudes of several target groups towards large carnivores.

In the first part of the survey, livestock owners and herders at 69 farms within VNP or up to 2km from its boundary were interviewed. Ten target groups were identified for inclusion in the second part of the study, the quantitative survey: Tusheti and other livestock owners; herders; cereal farmers; enforcement officers; hunters; rural residents; urban residents; school pupils; and school teachers. The vast majority of the 765 respondents who took part in the written questionnaire lived in the Kakheti Region of East Georgia.

Results on livestock farming in the VNP area:

- Sheep were the most common livestock in the study area, providing wool and lambs, while cows were less common and were used for their milk and cheese. Sixty percent of farms had more than one livestock owner and on average each hired three herders during the winter period (October to April). Most respondents said they moved their livestock elsewhere for the summer, typically to Tusheti but some of them to Tianeti, Back Pshavi, Pankisi, Javakheti or Gombori.
- Predation emerged as the biggest cause of economic loss, followed by disease. Fifty-two percent of respondents felt their economic losses to predation were large, while 28% considered predation a partial problem. According to 88% of respondents, most predation occurred in winter pastures, with a peak in February corresponding with the lambing season. Eighty-eight percent of killed animals and 67% of those injured by predators were sheep (or in a few cases goats). Eighty-seven percent of 46 farms with sheep had allegedly lost an average of 11 sheep each to predators since arriving in Vashlovani for the winter. Cattle and horses were more likely to be left injured after attacks than were sheep. Donkeys seemed to be selected by wolves, which might be explained by the fact that donkeys were tied up by their owners.
- Predation was considered a big problem at 52% of the livestock farms surveyed. One third (32%) of livestock owners rated the loss to their income from predation as significant. Grey wolves were mentioned by 87% of respondents when asked to rank predators responsible for livestock losses, and were always the most problematic species. Golden jackals and brown bears followed in second place most of the time.
- Seventy-six percent of livestock attacks were reported as happening in the afternoon or at dusk, normally when the flocks were in the pasture. Few attacks occurred at night. Most respondents acknowledged the use of protective measures to deter predators (every farm had at least one dog and all but one farm had a night-time corral) and considered their efforts effective. Ninety-three percent of owners also

had barns for young animals. However, patrolling and the conscious avoidance of potentially risky areas were generally not practiced. Respondents also admitted that perhaps their dogs were not trained properly or were not suitable for guarding against wolves.

- While all respondents stated that they did not have permission to shoot predators (an incorrect statement as wolves, unlike bears, can be shot legally), the majority brought up lethal control methods as one way to reduce conflict episodes. Very few listed non-lethal methods. Eighty-eight percent indicated they did not want help protecting their animals.

Results on perceptions and attitudes towards large carnivores and management:

- Feelings were consistently more negative towards wolves than towards bears across all target groups, with livestock owners and hired herders holding the most negative views, particularly towards wolves. Unexpectedly, cereal farmers (many of whom also owned livestock) had a fairly positive attitude when it came to bears but held more negative views of wolves. Seventy-four percent of respondents, especially livestock owners, thought that the wolf population was increasing in Georgia, while 79% of all respondents thought that there were too many of them. In every group, bar the enforcement officers (national park rangers and border guards), the majority of respondents were afraid of wolves, more so than of bears.
- More than three quarters of urban residents, teachers and pupils seldom or never went to places with wild animals. Livestock owners tended to spend the most time in places with wild animals such as wolves, followed by enforcement officers and hired herders. For all the other target groups the respective figure was less than 20%. Unsurprisingly, livestock owners were the group most directly affected by the presence of wolves. Bears had been seen less, shot less and caused less damage within every target group.
- All target groups tended to acknowledge that wolves belong in the wild in Georgia, but only in restricted parts of the country. The majority agreed that it is important to have protected areas such as VNP in Georgia (from 61% of livestock owners to 96% of teachers). Whereas most target groups agreed with a year-round ban on hunting any wild animals within protected areas, 77% of livestock owners and 67% of cereal farmers thought otherwise. Owners and herders also thought that grazing should be allowed in protected areas. The vast majority (89–99%) of respondents in all groups agreed that people should be allowed to kill wolves if their livestock is attacked. Over 90% agreed that compensation should be paid to owners who have lost livestock to predators, while 61% of owners and 86% of herders supported the idea of money being paid only to those that had employed some sort of protection method.
- Generally, the respondents were keen for more information on wolves and bears and wanted to see more research taking place. They differed in their choice of media in which to receive new information. For example, television, newspapers and magazines seemed to be the best media to reach livestock owners, while excursions would be appreciated more by urban residents, pupils, cereal farmers, hunters and teachers.

3. SUMMARY OF FINDINGS RELATING TO LIVESTOCK GUARDING DOGS

All 69 farms within VNP or up to 2km from its boundary surveyed in March–April 2010 had at least one dog (average 8, maximum 27). The number of adult dogs at sheep farms correlated with numbers of sheep. Respondents most often reported their dogs to be of mixed descent (66%), with a minority claiming to have Caucasian (10%) or Georgian (25%) shepherd dogs or a combination of pure and mixed breed (4%). Dogs were said to have originated from on-farm reproductions (82%), were exchanged (9%) or given as gifts (9%).

Dogs were reported to have been present during 62% of 105 predatory attacks on livestock for which detailed data were obtained. Their reaction was usually described as barking (90%) and chasing the predators (91%). In two cases dogs allegedly killed a marauding wolf.

Higher dog:sheep ratios appeared to limit losses. Livestock owners at farms with more livestock (sheep, cattle or both) reported losing higher numbers of animals, but not a higher percentage. The higher numbers of dogs observed at larger farms may have helped prevent wolves successfully targeting larger flocks. However, larger farms tended to be further from tree cover, had more herders and less overgrown pastures, all of which would be expected to make them less vulnerable to predators.

A large majority of respondents thought they had good (61%) or partially good (22%) dogs. Good dogs were defined as being attentive to livestock (51%), aggressive to predators (12%) and not afraid of wolves (7%). A total of 21 respondents who said their dogs were partially good or that they could not rate them most often explained that they were not attentive enough (38%), were attentive but afraid of predators (19%) or were insufficiently protective (33%). At five farms, respondents stated that their dogs (some or all of which were mongrels that had bred on the farm) were not good, citing lack of attentiveness (2), the dogs' fear of wolves (1) or poor breeding (1) or a failure to train them as pups (1).

Owners describing their dogs as pure-bred were more likely to be satisfied with them: whereas all but one owner of Georgian ($n=19$) or Caucasian ($n=3$) dogs rated them as good, 38% of owners of mixed breed dogs ($n=39$) stated that their dogs were only partly good and 10% that they were not good. However, a significant relationship was not detected between percentage of livestock lost and either owners' ratings of dogs or if they described them as pure versus mixed breed. There was some evidence, not statistically significant, that mixed breed dogs did better with cattle and 'pure-bred' dogs were more effective with sheep.

During farm visits it was observed that large flocks were sometimes split up for management purposes. It is possible that not all livestock was always accompanied by dogs. Indeed, owners reported that dogs were not present during a third of attacks by predators. Insufficient daytime attentiveness to livestock of some LGDs may partly explain the temporal pattern of predation: two thirds of attacks happened during daylight hours when flocks were in pastures, while only 15% of attacks were said to have occurred under cover of darkness, when livestock was gathered in corrals close to farm buildings and presumably where dogs were most likely to spend the night.

No special regime for training dogs was reported in most cases. Dogs were said to learn what to do by themselves (40%), from being brought up with the flock (31%) or from older dogs (25%). Only two respondents mentioned specific actions to train dogs: encouraging dogs to accompany the flock and feeding them near livestock.

4. SUMMARY OF HCC MITIGATION TOOLBOX

Following on from the baseline survey of HCC in East Georgia (Rigg and Sillero 2010a), a toolbox of mitigation methods was elaborated (Rigg and Sillero 2010b). The remit was to develop a strategy for the project area in and around Vashlovani National Park (VNP), considering approaches proven successful in comparable situations worldwide and designed so as to be transferable to a wider geographic area, while making suggestions for developing a national policy for dealing with HCC in Georgia as a whole.

The strategy proposed to mitigate the conflict begins with first partitioning the conflict into three elements: the reducible, the irreducible but bearable and the neither reducible nor bearable. A range of direct and indirect interventions is then described which address those portions of the conflict that either could potentially be reduced or which, at the present time, cannot be reduced but may nevertheless be tolerated by those affected.

Indirect actions seek to make more of the conflict bearable. The apparent reluctance of livestock owners and herders to accept support to deal with HCC, and the prevalence of negative attitudes towards carnivores and conservation in general, calls for a communication strategy of outreach and education to change people's attitudes and incorporate them in decision-making processes. Support to improve the health of herds can help reduce HCC by reducing livestock vulnerability and total mortality. A system of ongoing monitoring would allow a better understanding of factors predisposing farms to predation so that mitigation can be targeted most effectively as well as facilitating prompt responses to attacks. This calls for the establishment of an HCC 'Rapid Response Team'.

Several well-tested tools exist for non-lethal damage prevention, some traditional and some contemporary, that can be applied in VNP. Especially when used in combination, these methods can significantly reduce losses to predation. Preventive measures should be applied most intensively during the lambing season, when livestock is in pastures, and incorporate more effective use of guarding dogs, human vigilance, *fladry* or other portable barriers. If non-lethal methods do not reduce losses to a bearable level, other approaches may also be needed. Two options appear relevant for VNP: a) to remove problematic wolves and/or to develop an insurance scheme to compensate aggrieved livestock owners, with payments made contingent on improved animal husbandry.

In relation to livestock guarding dogs, it was noted that more prolonged and intensive observations of dogs and flocks would be necessary in order to determine whether insufficient daytime attentiveness of LGDs is a key factor leading to losses. It was suggested that data could be gathered either by direct observations (e.g. from a vehicle or on horseback) using a focal observation protocol (e.g. Rigg 2004) or by fitting a sample of dogs and livestock with GPS-GIS collars to record their relative positions.

Improving the attentiveness of grown dogs can be problematic and requires a patient and consistent approach. Success is more likely to be achieved if starting with young pups. It was suggested that the GCCP consider purchasing e.g. 20 pups (pure-bred for placement with sheep, ideally from working parents) to distribute across farms and then work with livestock owners and herders to raise them according to recommended guidelines, with regular monitoring and outcome evaluation. An information brochure on best practice in working with LGDs could be compiled and targeted specifically at livestock owners and herders.

5. LGD TRIAL

5.1. Aims, objectives and scope

The overall aim of this component of the GCCP is to improve the interface between local communities and large carnivores in the project landscape, leading to the enhanced conservation of the latter and improved livelihoods of the former.

The key objectives of this contract are to:

- i. Introduce effective methods for rearing effective LGD into the Tusheti community;
- ii. Support the work of the HCCRT in Vashlovani.

This consultancy is viewed by the project as a pilot study which, depending on outcomes, may be replicated by the HCCRT with other livestock owners in Vashlovani.

There are three distinct components of this consultancy:

1) Development of best practices manual

This will provide the participating farmers with detailed but understandable guidelines on LGD socialisation and husbandry methods. Initially used as a training tool, the manual should then be available as a reference for sheep farmers throughout the lives of their LGDs. The consultant will also provide technical input into other HCC related documents, including an HCC Technical Manual and a Livestock Husbandry Technical Manual.

2) Delivering of training & monitoring programme

The primary beneficiary of this consultancy is the Tushetian community and it is vital that the consultant engages fully with this group. Recipients of LGD pups will be selected by GCCP according to the location of their winter farm, the number and quality of their existing dogs and their willingness and ability to take on the responsibility of maintaining up to three pups. To this end the consultant will ensure that each individual is trained in basic socialisation and husbandry techniques. As this is a long-term commitment on the part of the livestock owners and herders, the consultant will also ensure that the recently formed HCCRT is adequately trained in methods and protocols for monitoring the participating farmers and ensuring their continued commitment to the trial.

3) Technical support for data analysis

Surveys originally implemented during the 2009/2010 winter season will be repeated during the lifetime of this consultancy (but not as part of this contract) and data, specific to HCC in Vashlovani, will be collected by the HCCRT during the 2011/2012 winter season. The consultant will also provide technical support in analysing and reporting on these data.

5.2. Study area

Pups are to be raised at livestock farms in Vashlovani National Park, East Georgia. VNP forms part of the Vashlovani Protected Areas (VPA), which are located in the Dedoplistskaro District of East Georgia, between the Iori and Alazani Rivers (Fig. 1). In addition to VNP, the VPA also include Eagle Gorge, Takhti-Tepa Mud Volcanoes, Juma Bay and Alazani Floodplains Natural Monuments. The core of VNP consists of Vashlovani Strict Nature Reserve, which was established in 1935 to preserve its unique light forests. The Reserve was expanded to 101 km² in April 2003, when Vashlovani National Park (251 km²) was established along with the VPA (Kikodze 2007).



Fig. 1. Locations of Vashlovani (VNP) and Tusheti National Parks in the Kakheti Region of East Georgia

The highest point in VNP is at 708m a.s.l. and the lowest point in the area is at 90m a.s.l., where the River Iori enters the Mingachauri Reservoir. Vashlovani has a dry climate and is typified by wild pistachio trees (*Pistacea mutica*), arid light forests and bluestem-feather grass steppes. Other forest types present include mixed deciduous (Georgian oak *Quercus iberica* and ash *Fraxinus excelsior* with some maple *Acer campestre* L., *A. ibericum* and elm *Ulmus carpinifolia*) and flood-plain forests (poplar *Populus canescens*, *P. nigra* and oak *Q. pedunculiflora*). The Strict Reserve contains badlands-like areas of dry ravines and steep cliffs, known as 'Alesilebi', with semi-desert steppe as well as arid and deciduous forests.

The territories of VNP (except the Strict Reserve) and the neighbouring Eldari Lowland, Patara Shiraki and Iori Steppe are used by Tushetians as winter grazing lands. They graze their sheep, goats and cattle in the natural pastures of the VNP from autumn to spring, after which most flocks are moved to summer pastures, typically in the Greater Caucasus, including Tusheti NP (Fig. 1).

The locations of farms included in the LGD trial are shown in Figure 2. One of them (#26) was in Vashlovani NP itself while the other two (#64, #74) were within 2 km of its boundary.

These farms were all self-selected: they were the only livestock owners in Vashlovani who expressed a wish to take part in the trial. During the 2010 baseline survey (Rigg and Sillero 2010a), livestock owners/herders interviewed at farms #26 and #74 reported relatively high levels of predation on livestock (Table 1), which they considered a big loss to their income, whereas no problems with predators were reported at farm #64 during the 2009/2010 winter grazing season up to 17th March 2010, when it was surveyed.

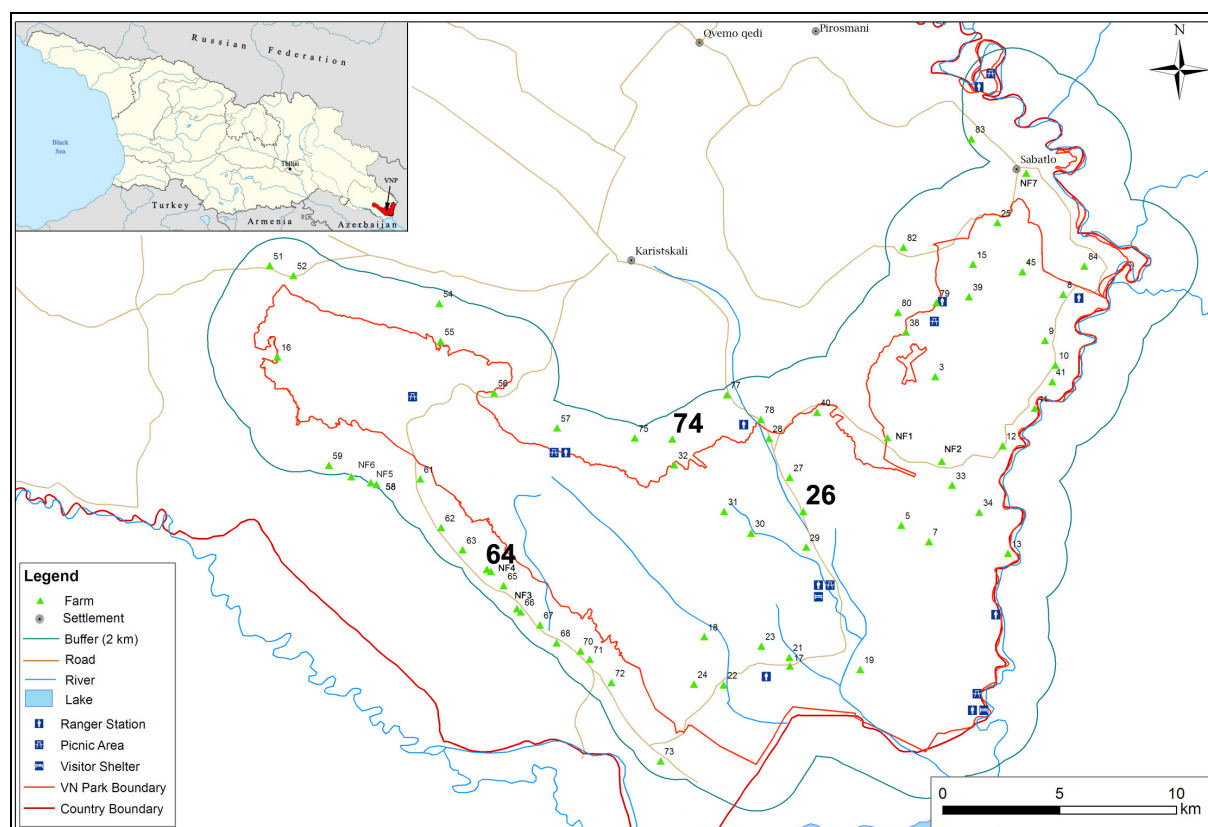


Fig. 2. Livestock farms in Vashlovani NP and within 2 km of its boundary, highlighting the locations of the three farms (#26, 64 and 74) where LGD pups are to be raised as part of the pilot study

Table 1. Details of farms where training was delivered as part of the pilot project. Data are from the baseline survey conducted during the 2009/2010 winter grazing season (Rigg and Sillero 2010a)

Farm #	Owner's name	Sheep ¹		Cattle		Total ³ loss (%)	Impact of predation ⁴
		Total	Loss ²	Total	Loss ²		
26	Beso Gatsiridze	1,250	16	30	0	1.80	High
64	Zura Tilidze	715	0	0	-	0	Low
74	Levan Ichirauli	760	20	0	-	2.63	High

¹ Also includes a minority of goats. ² Up to 15–18th March 2010 as reported by livestock owners/herders, not necessarily verified. ³ Expressed as a percentage of all livestock at the farm and may include other species e.g. horses, donkeys. ⁴ Based on a combination of the survey respondent's rating of economic impact and the percentage of the farm's livestock reported as killed by predators.

5.3. Provision of training

Content for a programme of training in basic socialisation and husbandry techniques was prepared based on the consultant's experience of working with LGDs in Slovakia (Rigg 2004, Rigg *et al.* 2011), information gathered during previous visits to Georgia in 2009 and 2010 (Rigg and Sillero 2010a,b) as well as recommendations in the published literature (Lorenz 1985, Lorenz and Coppinger 1986, Green and Woodruff 1990, Giffin and Carlson 2000, Rigg 2001, Dawydiak and Sims 2004, Yilmaz 2007). Heavy emphasis was placed on the importance of maximising pups' contact with livestock during the critical period for socialisation, from the second to the fourth months of life, when the development of strong social bonds with livestock should form the basis for an effective adult dog that stays with its flock.

Training was administered at all three farms included in the trial, one per day. Approximately 2–3 hours were spent at each farm with around 4–5 owners and herders as well as two HCCRT members and the GCCP coordinator present. Sessions began fairly informally with introductions made around the kitchen table in the farm house. The consultant outlined his previous experience and set out the main principles of working with LGDs. The discussion then moved to the farmyard and barns in order to agree details of where and how pups would be raised with sheep. Brief notes relating to individual farms are provided below.



Fig. 3. The main barn at farm #26 showing portable sections of wooden fencing that can be used to construct pens of various sizes

At each farm, members of the HCCRT helped with the assembly of one of two pens provided by the GCCP for containing young pups (Fig. 4). Livestock owners and herders agreed to

assemble the second pen themselves prior to the delivery of pups, which was expected to occur in late December. All the farms had barns where lambing takes place. Portable sections of wooden fencing used to make pens for ewes and lambs could also be set up to keep sheep in close contact with pups (Fig. 3).

During the training visit a collaboration agreement (see Appendix I) was signed by the livestock owners and the GCCP coordinator, witnessed by the consultant. This agreement sets out the roles and responsibilities of both parties in relation to the LGD trial.

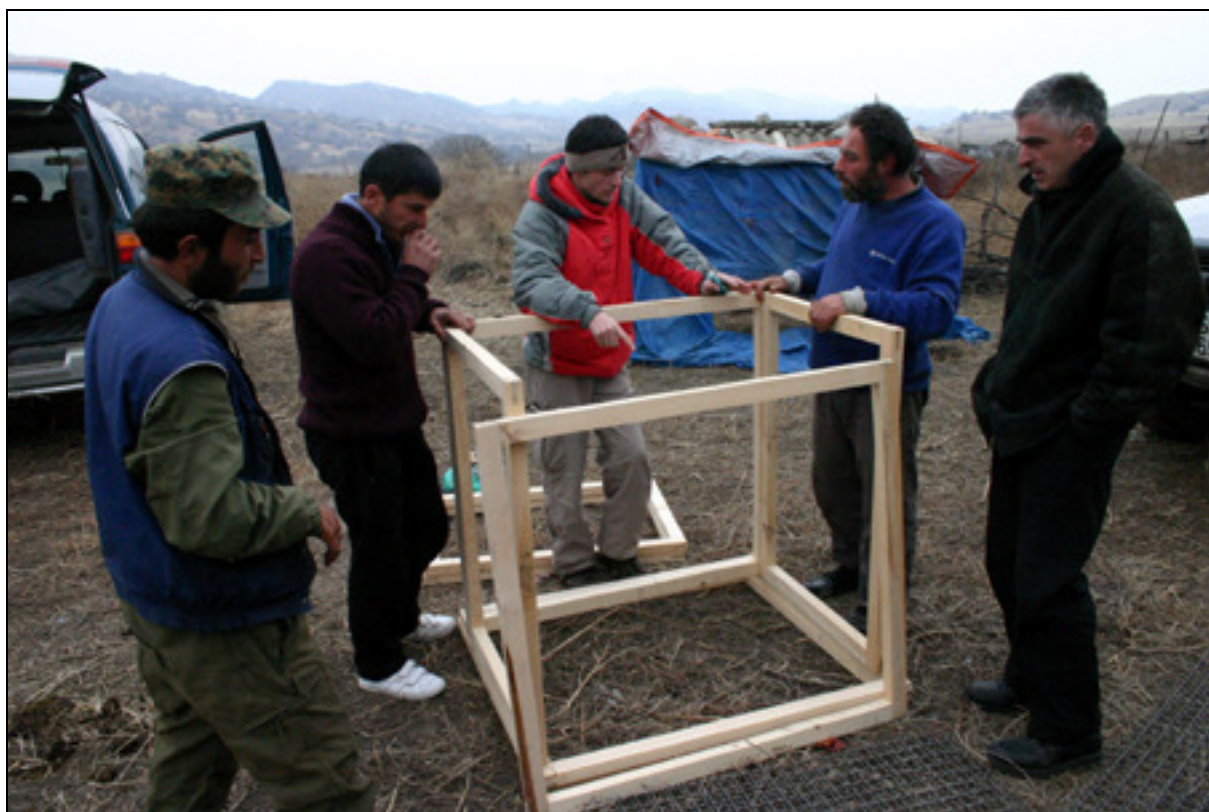


Fig. 4. Members of the Human-Carnivore Conflict Response Team helping livestock owners and herders at farm #26 with the construction of a training pen for young livestock guarding dog pups

A draft manual of ‘best practices’ in working with LGDs was prepared by the consultant in advance based on his experience of working with LGDs in Slovakia (Rigg 2004, Rigg *et al.* 2011) as well as the published literature (Lorenz 1985, Lorenz and Coppinger 1986, Green and Woodruff 1990, Giffin and Carlson 2000, Rigg 2001, Dawydiak and Sims 2004, Yilmaz 2007), modified according to feedback from the GCCP. The final text of the manual (see Appendix II), to be distributed to livestock owners and herders, was completed in light of further experience and insight gained during the farm visits described below.

5.3.1. Farm #26

The first farm at which the consultant provided training was farm #26, which was visited for this purpose on 10th December 2011. Farm personnel gave the impression of having relatively little previous experience of structured work with LGDs but were open to cooperation and readily agreed to suggestions made. An area of the main barn was

identified where an enclosure is to be constructed around the pup's training pen. In relation to existing LGDs, herders mentioned that their dogs sometimes left the flock in the pasture in late afternoon and returned to the farm looking for food. This is undesirable as it leaves livestock vulnerable to attack at a time of day identified by the baseline survey (Rigg and Sillero 2010a) as a high risk period. Providing better quality food, introducing an additional morning feed or feeding dogs in the pasture may help to alleviate this problem (Fig. 5).



Fig. 5. Gruel prepared for adult dogs at farm #26, where farm personnel mentioned that dogs sometimes left the flock in search of food

5.3.2. Farm #64

Training at farm #64 was carried out on 11th December. Here, farm personnel clearly had substantial experience of LGDs and already had a good grasp of the principles. This farm had the best facilities, with the main barn, in particular, being in a good state of repair (Fig. 6).

5.3.3. Farm #74

The third and final farm where livestock owners and herders were trained in best practices with LGDs was farm #74. When we arrived at the farm on the morning of 12th December the flock was still in the night corral. There were several dogs present, some of which had apparently spent the night in close proximity to the flock whereas others were closer to the farm house and seemed to be more attentive to humans than to sheep (Fig. 7). While we were at the farm, 2–3 LGDs ran several hundred metres towards an unidentified canid and disappeared from sight behind a rise, apparently pursuing it for a considerable distance. They had yet to return when we left the farm c.15–20 minutes later.



Fig. 6. The main barn at farm #64



Fig. 7. Some of the dogs seen in use at farm #74 on 12th December 2011 appeared to be more attentive to herders than to sheep

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Robin Rigg
December 2011



GLOSSARY

To ensure their clear, consistent use and to avoid potential confusion and misinterpretation, the following glossary of terms was established in English and nearest Georgian equivalent.

- Cereal farmer (ფერმერები, რომელთაც მარცვლეული მოქყავთ):** A person growing crops – but not substantial numbers of livestock (as defined under livestock owner) – around VNP.
- Enforcement officers (კანონის აღმსრულებლები):** National Park rangers, border police, etc, working in and around VNP.
- Farm (მეურნეობა/ფერმა)** Buildings (pens, barn, farmhouse) used by herders/owners to contain their flocks/herds while in or around VNP.
- Flock (ფარა):** A number of sheep/goats kept and grazed together.
- Herd (ჯოგი, ნახირი):** A number of cattle/horses kept and grazed together.
- Herder (მწყემსი, მენახირე):** A worker who tends livestock on a daily basis but is not the owner of a significant proportion (>10%) of the herd/flock.
- Hunter (მონადირე):** A person that legally hunts wild animals in East Georgia, whether commercially or as a hobby.
- Livestock (პირუტყვი):** For the purposes of this survey, livestock is considered to include sheep, goats, cattle, horses, donkeys and pigs.
- Livestock owner (პირუტყვის მეპატრონე):** The owner of at least 100 sheep/goats or at least 15 cattle/horses, who may or may not tend them daily. This group could be subdivided into Tushetian (present in East Georgia during the winter but going to the Caucasus for the summer grazing season), local (present throughout the year) and other.
- Rural residents (სოფლის მაცხოვრებლები):** People living in villages near VNP and not belonging to one of the other target groups.
- Sheep dog (ნაგაზი, მეცხვარე ძაღლი):** A large breed of dog used to guard livestock, living close to the flock. Livestock guarding dogs kept in VNP may be listed as Georgian, Caucasian, mixed breed or other.
- Urban residents (ქალაქის მოსახლეობა):** People living in Dedoplistskaro and not belonging to one of the other target groups.

ABBREVIATIONS USED

GCCP	Georgian Carnivore Conservation Project	PA	Protected area
HCC	Human-carnivore conflict	USSR	Union of Soviet Socialist Republics
HCCRT	Human-Carnivore Conflict Response Team	VNP	Vashlovani National Park
LGD	Livestock guarding dog	VPA	Vashlovani Protected Areas
NP	National Park		

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Appendix I

Agreement of collaboration with farmers

I _____
with the Identity Card number, dated ____/____/____, issued in _____
and resident in _____

accept to collaborate with (FFI and NACRES for) the Georgian Carnivore Conservation Project, in the scope of the actions developed to reduce human-carnivore conflict in Vashlovani and not to impede in any way its good development and act in agreement with the rules established by the GCCP and HCC expert and of the present protocol, namely:

DUTIES OF THE LIVESTOCK OWNER

I – DOG POSSESSION/OWNERSHIP

1. Accept the selected dogs as identified by the microchip numbers:

_____ & _____

2. Not to deliver the dog to others.

3. Deliver the dog to GCCP if the flock with which dogs were integrated is sold or given away.

II – DOG EDUCATION AND TRAINING

1. Maintain the dog according the instructions given by GCCP, in order to maximize its behavioural development and eventual efficacy as a livestock protector.

2. Facilitate the integration of the dog into the flock according to the instructions given by GCCP.

3. Maintain the dog permanently with the livestock it should protect.

4. Never to chain the dog, except when specifically instructed by GCCP.

5. Contact GCCP with any problems regarding the dogs.

III – DOG MAINTENANCE

1. Feed the dog adequately with the food that is recommended by GCCP.

2. Keep the dog in good sanitary and welfare conditions by following instructions given by GCCP.

3. Contact the HCCRT immediately whenever the dog is injured, sick or behaving strangely.

4. Contact the response team immediately in case the dog dies, and recover the corpse for posterior necropsy.

IV – DOG REPRODUCTION

1. Breed the dog only after two years of age.

2. Breed the dog with other dogs from the same breed in order to maintain the integrity of the breed and contribute to its preservation.

3. Accept the instructions of GCCP regarding the procedures to be followed during reproduction.

V – DOG MONITORING

1. Allow the monitoring of the dog and its progress by GCCP on a regular basis.

VI – RESPONSIBILITIES OF THE LIVESTOCK OWNER

1. The livestock owner is responsible for the control and safekeeping of the dogs detailed above and is legally responsible for all its actions, including any damages it may cause.

2. The livestock owner must communicate to GCCP all attacks and losses of livestock attributed to predator.

3. The livestock owner must use food provided by GCCP only for the dogs detailed above.

DUTIES OF GCCP

1. Deliver to the livestock owner, when possible, the food necessary for the development and maintenance of the dog until it reaches 6 months of age.

2. Provide standard vaccinations to the dog.

3. Provide the necessary veterinary care to the dog, when possible, when requested by the livestock owner, until the dog reaches 6 months of age.

4. Provide support to the livestock owner in every aspect related to the good physical and behavioural development of the dog, until it reaches 6 months of age.

6. Register and license the dog at the Municipality responsible for the registry and license the dogs in the region, in the first year of the dog’s life.

7. Deliver dog enclosures, food and water bowls.

CESSATION DUE TO UNFULFILMENT

Failure by the livestock owner to meet the above terms is sufficient grounds for rescinding the agreement and returning the donated dogs and associated materials to GCCP.

AGREEMENT CEASING OR MODIFICATION

The present agreement can be terminated or modified by a written agreement, signed by both parties, in addition to the present one, from which it will become an integrant part.

Signed on behalf of the livestock owner by:

_____ Date ____/____/____

Signed on behalf of GCCP by:

_____ Gareth Goldthorpe, GCCP Coordinator Date ____/____/____

Witnessed by:

_____ Robin Rigg, Consultant Date ____/____/____

Appendix II

Text of livestock guarding dog 'best practices' manual

Introduction

About this manual

This guide is intended first and foremost for livestock owners and herders. It outlines the basics of using dogs to protect livestock from predators and goes on to give advice on acquiring and raising good dogs. It also describes some of the breeds of dogs used for this work and provides details of who can be contacted for further help and advice.

Human-carnivore conflict

There have been conflicts between livestock farmers and wild predators for as long as animals have been domesticated. Over the years, people have employed many ways of protecting their flocks. One of the most successful has been the use of livestock guarding dogs (LGDs).

Sheep tend to be the most vulnerable type of livestock, particularly near forested areas or in scrubby pastures. Differences in guarding techniques have been found to be the most important factor affecting how many livestock predators kill. Although no method of protecting livestock is perfect, livestock guarding dogs are one of the most effective options.

Physical characteristics of LGDs

LGDs are usually large (often 70 cm tall and weighing over 40 kg), particularly the breeds from cold mountain climates. Most breeds have a large head and pendant, rather than pricked, ears. Many LGDs are various shades of brown and grey or have patches of colour, but there are also several breeds of white dogs. Traditionally, the colour of many LGDs has been similar to the livestock they protect. Non-white dogs such as the Caucasian Shepherd Dog and the Kangal Dog in Turkey might have pre-dated the ability to wash and dye white wool. White wool was favoured in Roman times and white dogs were selected, leading to Maremma-type dogs, which have been protecting sheep from bears and wolves in present-day Italy for more than 2,000 years. Lighter coloured dogs were probably also easier for herders to distinguish from wolves in the dark.

Herders often dock the tails and crop the ears shortly after birth, possibly to prevent biting by wolves or other dogs. Some people believe that cropping pendant ears helps the dog hear better. Sometimes herders also put spiked metal collars on their dogs to protect their throats from the wolf's bite.

Key behavioural traits of LGDs

The typical temperament of adult livestock guarding dogs is independent, courageous, domineering and territorial. They tend to be calm and steady but wary of strangers and quick to react to perceived threats. Although the presence and behaviour (patrolling, barking, scent-marking) of dogs near livestock may deter predators, sometimes LGDs have to actively defend the flock. In this case, the dog stands between the flock and the threat, chases the predator away or even, occasionally, fights with it.

Like other dogs, LGDs are social animals with a great need to stay in a group, especially with individuals that they have known since their early years. This feature has been inherited from the wolf, which is the ancestor of all domestic dogs. LGDs seem to retain juvenile

characteristics throughout their lives, allowing them to bond with livestock such as sheep, which they follow and protect as if they were part of the flock.

Experts have identified the following three characteristics as being the most important for livestock guarding dogs:

Attentive – In order for a dog to be able to defend livestock, it must stay with it as much as possible, both day and night. LGDs should follow the flock when it moves and rest among or near the livestock. Sniffing around the face or anus of livestock is investigatory behaviour, which is also a good sign that the dog has the right instincts.

Trustworthy – LGDs must become part of the flock without disturbing or harming it. They should be submissive to livestock: approaching with their ears back and squinting or averting their eyes, rolling over to expose their belly.

Protective – LGDs should bark at new or strange activities and situations. Pups typically rush out barking with tail raised, but if challenged may retreat to the flock with tail between legs. This is called approach-withdrawal behaviour. As dogs mature they should become more confident, advancing further towards potential threats and showing dominance behaviour.

Benefits of LGDs

If they are properly raised, are given appropriate environments to work in and are well taken care of, livestock guarding dogs, can:

- reduce losses to predators;
- reduce the need for human supervision of livestock;
- reduce the need to keep livestock in barns at night;
- provide opportunities to use pastures previously too vulnerable to predation;
- increase the owner's self-reliance in managing problems with predators;
- reduce the need for other forms of predator control;
- alert owners to disturbances in the flock;
- provide protection for the owner's property and family;
- give peace of mind.

The main job of LGDs is to stay with the livestock and drive away intruders. Therefore their most important benefit is in reducing losses to predators, potentially representing a substantial financial saving. During trials in Slovakia, farms with livestock guarding dogs lost 70% fewer sheep to bears and wolves than those without. There is evidence from Slovakia and Romania that LGDs prevent surplus killing (when predators, particularly wolves, kill more prey than needed to satisfy their immediate hunger).

In Spain, flocks guarded by herders and LGDs had 83% fewer losses than unguarded flocks, despite being in areas with higher wolf densities. In Portugal, where wolf attacks on livestock are common, 75% of farmers reported a decrease in predation after introducing LGDs: the reduction in losses ranged from 33 to 100%. More than 90% of American farmers with LGDs recommend them to others.

LGDs can potentially provide 24 hour protection, 7 days a week. Dogs are likely to become more effective the longer they are used, and good dogs will provide the most benefit.

Livestock can also learn to modify their behaviour: spending more time near LGDs and standing with or running to them when predators approach.

LGDs also warn farmers about other problems, such as if livestock becomes trapped, pregnant ewes cast on their backs or lambs are born unnoticed. Some dogs are particularly attentive and careful in guarding new-born lambs.

Basics

Livestock guarding dogs require both instincts and learned behaviour, so achieving good LGDs is a combination of choosing the right pups and raising them in the correct way. Pups which do not have the right genes will not succeed regardless of how they are raised, but also dogs not reared properly cannot be retrained later. To make a good livestock guardian, a dog must be attentive, trustworthy and protective. The aim of the LGD breeder and trainer is to achieve an acceptable level in all three of these characteristics.

To ensure that a LGD stays with the flock as much as possible, it should become part of the flock from an early age. *“The dog should be kept with, brought up with, socialised with and bonded with the stock it is going to protect.”* Domestic dogs have a so-called ‘critical period’, between about 4 and 14 weeks of age, during which they can form strong social bonds not only with other dogs but also with other species, including livestock. This process is facilitated by LGDs having only weakly developed predatory instincts, which helps livestock accept the dogs among them.

Preparation

Raising and training a livestock guarding dog requires an investment of time and money. A small percentage of dogs will fail despite their owner’s best efforts, but if you choose a pup from a recognised LGD breed/type then it will most likely have the right instincts, so the outcome will depend mostly on your attitude and expectations. To maximise the chance of achieving a good dog, before you begin ensure that you are as well prepared as possible. Read through the main steps carefully and plan how you will implement each stage. Initially, you will need a pen or other secure area to keep the young pup in contact with livestock, away from human distraction and other dogs, and from which it cannot escape.

The time needed to raise LGDs well is often overlooked. Ranchers in America reported spending around 1.5 hours per day supervising, training and feeding pups during their first year. Older dogs required less than 0.5 hours per day and often saved their owners time in reduced livestock management, but some dogs might need occasional corrective training until they are 18–30 months old.

When to start

Although older dogs have sometimes been successfully incorporated into flocks, the process of socialising them with livestock can fail if begun later than 16 weeks of age. Training should therefore begin with young pups. This will also give the livestock more of a chance to get used to having a dog living with them. Pups should not be separated from their mother and siblings too early or they may later be afraid of other dogs. Taking all these factors into account, the ideal age to begin training LGDs is 6–8 weeks old.

Time, effort and money must be invested to raise good LGDs. It normally takes one to two years to begin to see the results of dogs’ guarding abilities. Some may become ill, get injured or die prematurely. It is critical that the initial steps of training are done correctly, as early mistakes can be very difficult to correct, so make sure you have enough time to work with

young dogs. Avoid starting during periods when you will be too busy or a young dog could be too disruptive. Winter is often a good time to get a new dog.

How many dogs is enough?

It is usually recommended to have at least two dogs, because together they will be more confident and courageous in confronting threats. For larger flocks, more dogs are needed, with a good rule of thumb being one dog per 100 sheep. However, LGDs should not usually be raised together, as they may bond more to each other than to the livestock or owner and can form a pack when playing with sheep. It is often easier to start with one pup and add additional dogs later.

What type of dog

A study undertaken in Vashlovani in 2010 as part of the Georgia Carnivore Conservation Project found that most livestock owners were more satisfied with Georgian or Caucasian Shepherd Dogs than mixed dogs. Although some mongrels or crossbreeds of LGDs are good livestock guardians and they are usually cheaper and easier to find than pedigree dogs, crossing with non-guardian breeds can reduce effectiveness. In Bulgaria for example hybrids between the native Karakatchan and the St. Bernard, Newfoundland or even the Caucasian Shepherd Dog were not able to guard livestock. Another advantage of having breeds is predictability: if two 'pure-bred' dogs mate, we expect their pups to look and behave similarly to their parents. However, formalised dog breeding has often emphasised physical traits whereas herders have traditionally selected dogs on the basis of their working abilities.

Which sex works best?

Several studies have found no difference in the effectiveness of males versus females or of intact versus neutered dogs. However, if several dogs are to be used together, then their sex should be considered to avoid future problems. Usually a male and a female is the best combination whereas two females that do not accept each other upon maturation may fight, even if they have been neutered. On the other hand, males may take longer than females to mature and settle into being trustworthy guardians.

Intact males have more of a tendency to wander away from the flock, whereas females will attract males when in heat and, if allowed to breed, will not be able to accompany the flock at all times while nursing pups. **Neutering (at 6 months for females, 9 months for males) is often beneficial in avoiding such problems and should not affect the ability of dogs to protect livestock.** If a female is kept intact, she will become sexually mature at around 10–12 months of age. However, **females should not be allowed to mate before 2 years old** because LGDs continue growing until then. If a female breeds earlier, she and her pups will have lower weights.

Choosing a puppy

Select a pup of a recognised LGD breed, 6–8 weeks old, or an older dog that was raised with the type of livestock that you want it to protect. Separating a puppy from its mother and littermates before six weeks of age can have negative effects on its weight and physical condition.

Ideally, the pup should come from good working parents rather than relying on the reputation of a particular breed, because differences in temperament within a breed can be greater than those between different breeds.

When acquiring a pup, do so from a reputable breeder after seeing at least the mother, if not both parents. The surroundings should be clean. The parents should have sound shoulders, legs and feet and be free of hip dysplasia. Be sure that neither parent exhibits excessive aggressiveness or shyness, because these traits could appear later in their offspring.

Look for a confident, outgoing and friendly pup that appears rounded and firm, standing on strong straight legs and feet, with a smooth gait. Avoid a pup that seems either very shy or that dominates its litter mates. Look for sound muscle and bone structure, including a well-shaped head, jaws and teeth, which should meet, or preferably overlap in a scissors bite (upper incisors slightly overlap the lower ones). Gums should be pink and healthy looking, not pale. The pup should breathe in and out without effort.

The pup’s nose should be cool and moist and there should be no discharge from the nose, eyes or ears. The eyes should be clear and bright with dark pupils that have no lines or white spots. Ears should have well furred tips, not crusty which could indicate a skin disease such as sarcoptic mange. A healthy coat is bright and shiny.

Health care

Water – Pups need a lot of water and dehydrate quickly if they do not get enough fluids. They should have a **bowl of fresh water available at all times**. Bowls for water and food should be unbreakable, ideally stainless steel or plastic, and weighted to prevent tipping over. Clean them daily with soap and water.

Food – Puppies should be fed 3–4 times a day until 6 months of age with good quality food providing a balanced diet. This should be particularly rich in protein to supply the essential amino acids that ensure good growth but also containing sufficient carbohydrates, fat, vitamins and minerals. Pups up to 6 months of age need twice as many calories per kilogram per day as adult dogs.

The table gives a guide to the food requirements of growing puppies based on an average dog. Larger breeds should be fed less than smaller ones to maintain a slower rate of growth, allowing muscles and tendons to develop at the same rate as bones.

Raw meat, such as sheep carcasses including organs, should not be fed: there is a high risk of the dog picking up internal parasites or infectious diseases. However, it is not a problem if dogs eat afterbirth from lambing.

Body weight (kg)	Daily kcals required	
	Weaning to 3 months	3 to 6 months
1	268	214
3	649	520
5	915	732
7	1,167	934
9	1,394	1,115
11	1,670	1,331
13	1,929	1,543
15	2,179	1,743
17	2,415	1,932

19	2,640	2,112
21	2,856	2,285
23	3,062	2,450
25		2,618
27		2,785
29		2,945
33		3,250
37		3,551

From 6 months of age, feeding twice per day is sufficient. From 1 year of age, the diet should be changed to that of an adult dog: less protein, fewer calories and 1–2 feedings per day. Working dogs need a highly digestible diet with increased fat content to maintain stamina and body condition.

Vaccinations – Young puppies should be vaccinated to build their immunity against infectious diseases, particularly distemper, hepatitis, parvovirus, parainfluenza and rabies. A suggested schedule is given in the table below. Other diseases may occur in some areas which should also be vaccinated against.

Age	Vaccine
5–6 weeks	Distemper-measles-parainfluenza
8–12 weeks	DHPP (distemper-hepatitis-parainfluenza-parvovirus)
12 weeks	Rabies
16 weeks	DHPP
15–16 months	Rabies, DHPP
Annual booster (12 months after first)	DHPP
Booster every 1–3 years	Rabies

Health checks – If a dog is not healthy, it will not work well. It is recommended that puppies are dewormed at 2, 4, 6 and 8 weeks of age and then monthly for 6 months. Deworm a newly acquired dog immediately and then again after 2 weeks. All dogs should be treated for roundworms and tapeworms every 3–6 months. Check for and control external parasites (fleas, ticks, mites). Regularly examine your dog’s ears, eyes, mouth and feet. Keep its nails clipped and trim the hair on its feet and under the tail if needed. Look for cuts and scratches that can become infected and treat them. During hot weather, you may need to shear or brush the dog’s coat.

How to raise a good livestock guarding dog

The main elements to raising good livestock guarding dogs are: choosing the right type of dog; socialising it with livestock so that it stays with them; and correcting unwanted behaviour appropriately to ensure the dog is trustworthy as well as attentive. Protectiveness will take care of itself as this is an instinctive behaviour that does not need to be taught, although some dogs are more protective than others.

The following system has been used successfully in many countries to incorporate LGDs into livestock operations, even where they have not been used before and there are no adult working dogs to act as teachers. The text refers to sheep but the same principles apply to raising dogs with other types of livestock.

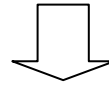
The emphasis in the first year of the dog's life is on socialising it with sheep to form social bonds. For this to happen, the dog must be kept with the sheep and away from the house, people and other dogs. Until it is 16 weeks old, the pup should be kept in a pen close to the sheep. This could be in a lambing barn, night corral, pasture or other place where sheep gather. The pup should be let out to exercise several times a week but always returned to the pen afterwards.

'Golden rules'

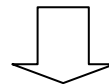
- Select a suitable breed and reputable breeder.
- Raise pups singly from 6–8 weeks of age with sheep.
- Minimise contact with humans and other dogs.
- Ensure the dog's health and safety.
- Monitor the dog and correct undesirable behaviour in an appropriate way.
- Encourage the dog to remain with or near the livestock.
- Remember, *"If the dog isn't with the sheep it isn't where it's supposed to be."*
- Manage the livestock according to the dog's age and experience.
- Be patient and allow enough time for training.

0–6 weeks

Choose a healthy pup of a recognised LGD breed/type from a reputable source. The pup should stay with its mother for the first 6 weeks.

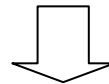


Before the puppy arrives, prepare a pen that is large enough for the dog to move freely and allows regular contact between pup and livestock but is secure enough to prevent the pup getting out. This could be a fenced off area of the farmyard or barn. It should be out of sight and hearing of the farmhouse.

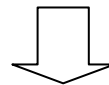


6–8 weeks

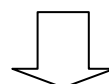
Take the pup from its mother and siblings and immediately put it in the pen close to the livestock you want it to protect. Give the pup some toys to play with and provide high-quality dog food regularly.



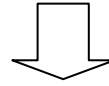
Ensure that the pup is kept with several sheep or lambs, not only 1 or 2, and ideally animals that are going to stay as part of the flock rather than be sold. Once one group of sheep accepts the dog, other sheep unaccustomed to guard dogs will tend to accept it more quickly. Change the sheep for others every few days.



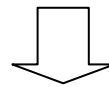
Some farmers leave their pups together with livestock from an early age. If you do this, consider the dog's personality when selecting which sheep to put with it. A few weak lambs may be suitable for small or shy dogs but they might be injured by a larger, more energetic dog, which would be better off with male yearlings. Do not leave a pup unattended with livestock for long periods of time until both are clearly adjusted to the situation.



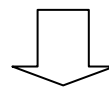
Do not allow the pup to escape from the pen, wander around or hang about near people. It is important that you do not reward such behaviour by giving it food or attention if it leaves the livestock.



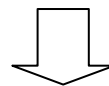
Minimise contact with humans and other dogs. Remember, the pup is going to be a working dog, not a pet. Do not let it play for long periods with people (including children) or other dogs. Apart from short visits, the pup should be kept isolated and in contact with the livestock until 16 weeks of age.



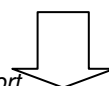
Whenever you are doing chores near the pen, let the pup out among the livestock. Supervise early contacts with sheep carefully. Reprimand the pup immediately if it chases sheep, chews their ears or pulls tails and wool.



Spend time with the pup so it is not afraid of you and will allow you to handle it later. Routine worming, vaccination and veterinary checks are essential for good health and performance. Begin the dog in obedience training (“come”, “no”, “stop”) during its early exposure to sheep. However, always return it to the pen after a short time and praise it when it greets livestock and stays with them.

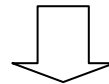


As the pup gets older, introduce it (on a leash) to the rest of the farm including equipment, other livestock (horses, cattle) and dogs. Supervise the dog closely when it is first introduced to new-born lambs. Build its confidence by praising good behaviour.

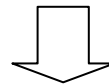


4–5 months

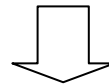
Start to leave the dog with the flock for longer periods of time. As the dog matures and becomes accustomed to being with sheep, move it to situations which provide progressively more freedoms and opportunities for independent action. Move it from a small pen to a larger pen to a pasture and from a few lambs to the whole flock that it will eventually guard. Monitor it carefully, encouraging good behaviour and reprimanding it for bad behaviour.



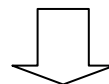
Observe the dog carefully after each move or change in routine. Make sure it adjusts properly and react quickly to correct any mistakes.



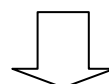
Continue to be consistent in making sure the dog stays with the sheep. Return it to the flock any time it tries to leave and praise it when it stays.



Even when the pup is older it is a good idea to provide a place where it can rest and eat that the sheep cannot get to.

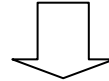


LGDs should receive at least basic obedience training. Having control over the dog is not only important for the safety of sheep and humans but it also allows it to be examined and treated when necessary and provides an opportunity for development of an affectionate dog-human bond. Work with the dog on a regular basis in the pasture with the sheep so that training becomes associated with the pleasure of the owner's company and with sheep.

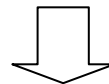


6–12 months

By now the dog will probably begin to mark its territory, exhibit more serious concern for the sheep, and bark with deliberate intent. However, it is important to continue to supervise young dogs as they are vulnerable when not yet physically and mentally mature. Young dogs can suffer mental traumas while guarding stock that may prevent them from developing the confidence necessary to become successful adult guardians.



If left alone with livestock, the dog should be checked daily and provided with sufficient food, water and shelter. You may need to train it to watch your livestock rather than those of a neighbour.



Be patient and allow plenty of time for your dog to mature. LGDs may show ideal behaviour within the first six months, but it will most likely take longer for them to develop enough confidence to attack predators. LGDs can usually be expected to begin working effectively **between one and three years old**.

Solving common problems

Some dogs repeatedly roam away from livestock, causing problems with neighbours or hunters; others may injure livestock, chase vehicles or be too aggressive in confronting people. LGDs may also interfere when livestock are moved. However, given careful selection of appropriate dogs, patient training and removal of undesirable individuals, many such problems can be avoided or resolved.

Some dogs may not be aggressive to predators, although they may still help to detect them and raise the alarm. On the other hand, very aggressive dogs are not appropriate in areas frequented by unfamiliar people such as tourists and mushroom pickers. Even the best dogs might not stop all losses. Predators often watch livestock from a safe distance and wait for opportunities to attack. Dogs that wander away from the flock leave it vulnerable to attack. Wolves sometimes learn to distract LGDs or approach sheep without being detected. Rarely, LGDs have been badly injured or even killed by bears and wolves.

In a long-term study of more than 1,000 dogs of various Old World breeds and crossbreeds used on livestock farms in over 30 different states of the USA, it has been found that 65–75% of dogs turn out to be good or excellent. Nevertheless there are a variety of problems that can occur during the process of raising and training. Some of the commonest concerns are described below, with suggestions on how to alleviate them.

Not trustworthy: harassing livestock

Most pups and young dogs will act playfully towards livestock at some point. This typically includes chasing, biting, mounting and wool-pulling. Occasionally it can result in injury or even, in extreme cases, death. Such behaviour can usually be corrected with patient training: less than 5% of LGDs become habitual sheep killers. However, if stalking-type behaviour is observed, the dog should be replaced.

Most young dogs grow out of disruptive play behaviour by the age of 12–18 months. You may be able to achieve a trustworthy dog at an earlier age by careful supervision and correction. Whenever a young dog is seen harassing stock during the training period it should be reprimanded immediately: grab it by the scruff and jerk it once or throw a stick or other object near (but not at) the dog and tell it firmly “No!”. You must be consistent, firm and fair in making these corrections. Praise the dog when it stops the unwanted behaviour and backs off.

Sick, old or odd sheep may be attacked by otherwise trustworthy LGDs, so if possible replace them with healthy individuals. Likewise if fearful lambs are inadvertently encouraging the dog to chase them by running away, replace them with yearlings or older (but not aggressive) animals. The unwanted behaviour may be due to boredom: give the pup some toys to play with. Chasing can be reduced by lowering the dog’s calorie intake (but not quantity of food), such as with a 2-week diet of cooked oats or other food low in fat and carbohydrates.

If the problem persists, a chicken wire fence can be used to temporarily separate dog and sheep while still keeping them in contact with each other within the barn or farmyard. For older dogs, a ‘dangle stick’ attached to a chain on the dog’s collar and hanging 8–10 cm above the ground should slow it down. This can be used for 3–4 weeks but should then be removed: first the stick, later the chain. Another measure would be to put a basket muzzle on the dog to stop it biting or to tie the dog up for a short time so that sheep can approach without getting chased. These are temporary measures, however, and do not teach the dog not to chase. Perhaps the dog is not ready to be left alone with livestock.

Normally it is desirable for LGDs to bark at and otherwise threaten anything new and unexpected. Sometimes, however, this behaviour can cause problems. They may be unsettled by changes in the flock if some animals are sold or others brought in. Some dogs will act aggressively to new or unusual flock members, for example if they are differently coloured or move abnormally due to illness or injury. New livestock will probably also need time to get used to the dog. Moving to a new location can also upset them so extra time may be needed to familiarise them with the new area, which can be done by walking the dog on a leash around its boundaries.

Not attentive: wandering away from livestock

Not all dogs will stay with the flock and be attentive all the time. Most sleep during the day, although they tend to be more attentive at night. During hot and humid weather dogs may leave to seek shade or water. Brushing out the under-fur, shearing long-haired dogs and giving plenty of water can reduce this. Dogs may also go looking for shelter from bad weather or for extra food. **Make sure that you provide LGDs with their basic needs, including sufficient food, to allow them to do their job.** Leaving the flock can also be associated with sexual activity, so neutering at 6–12 months of age may decrease roaming. Neutered dogs also tend to eat less food and remain healthier while remaining effective guardians.

Escaping (as well as chasing) can be impeded by attaching a weight to the dog's collar using a chain. The weight should be a piece of wood, tyre or other material not likely to cause injury, about 30 cm long, 8–35 cm in diameter and up to a quarter of the weight of the dog. The chain should be a metre or more in length.

The most common attentiveness problem is dogs returning to areas of human activity. Seriously inattentive dogs tend to be those treated as pets or allowed to develop social relations with pet dogs. If all corrective measures have failed, even dogs more attentive to people than livestock can be useful in some situations, such as where a shepherd is always present, within a fence or where pastures surround a house or barn.

Although most LGDs do not have well-developed predatory instincts, some do chase wild animals. Besides leaving livestock vulnerable to predators this can also lead to conflicts with human hunters, who may shoot LGDs. To reduce the risk of this happening, follow procedures for socialising pups with livestock diligently, reprimand them whenever they try to leave the flock and be sure to provide them with sufficient food. As with tackling harassing of livestock, a 'dangle stick' can be used to restrict the dog's movements. Try to talk to local hunters about your efforts to protect your livestock and consider marking your dogs with a coloured collar so they can be clearly identified.

Not protective

LGDs do not need to be ferocious at all times in order to deter predators. The dog that appears to be lazing around all day doing very little might in fact be performing its role very well, particularly at night, when predators tend to be more active. Be patient in allowing a young dog sufficient time to develop the confidence to confront large predators. Having the company of other dogs tends to give LGDs more courage. They will also be less anxious in novel surroundings. More than one dog may be needed to protect a larger or widely scattered flock and this will also reduce the impact of a deficient animal. Some dogs might not be aggressive towards predators but are very vigilant and so can still be useful in barking to alert other LGDs and herders, which also distracts the attention of predators. Most protectiveness problems are associated with poor attentiveness.

Aggression towards people

Whilst serious injury is thankfully rare, sufficient consideration should be given to the issue of human safety. A certain degree of aggression is to be expected from dogs whose job is to guard and protect. However, **LGDs do not need to be overly aggressive towards people** in order to successfully defend livestock from predators.

If your dog is going to be working in areas frequented by unfamiliar people, such as tourists, make sure it gets used to meeting a variety of people from an early age. LGDs are likely to react more negatively to strangers when the owner is not present. Intact males can become more aggressive as they mature; bitches when in heat or lactating. Dogs are often especially protective of their food or a territory boundary such as a fence. Those which remain excessively aggressive after neutering, even without provocation, should be replaced unless they can be contained in a secure area and very carefully managed.

Other methods of reducing losses to predators

Many non-lethal methods have been developed worldwide to reduce losses of livestock to predators. These include predator-proof fencing, confining livestock at night or during bad weather, electric fences, proper carcass disposal, replacing vulnerable stock, adjusting calving/lambing seasons and location, leaving horns on cattle.

Improved husbandry and vigilance

Changes to the way livestock is managed can often help to prevent damage. Particular care should be taken to ensure that lambing and calving occur under close supervision in secure areas, ideally indoors, and not in open pastures near woodland or shrub cover. Cattle will be better able to defend themselves from predators if some of them are left with horns and heifers are put with older cows. Vigilance should be increased particularly in the afternoon and at dusk, when the flocks are in the pasture, and during the lambing season (February). Ideally, flocks should not be divided during these periods. Do not leave small groups of sheep without dogs, avoid scrubby overgrown pastures and always return livestock to corrals at night.

Fladry

This was originally a technique for hunting wolves in Eastern Europe and Russia, which uses lines made of thin but strong string with pieces of coloured (usually red) material 40–60cm long and 10cm wide sewn on at 30–50cm intervals. For unknown reasons, wolves avoid crossing these lines. Trials at Rome Zoo found that captive wolves never crossed such a barrier, even to reach their daily food ration. The method has been used successfully to protect livestock from wolves in Poland and Canada. Although wolves may eventually overcome their wariness, in Canada they avoided it for up to 60 days, which could be long enough to keep them away from calves and lambs.

When using fladry to protect livestock, the lines should be strung around the pasture (rather than around the fold), ideally attached to posts hammered into the ground so that the bottom edges of the material are 15–20 cm above the ground and can move in the wind. More recently, an electrified version called ‘turbo-fladry’ has been developed, which is simply *fladry* hung on an electrified fence-line powered by solar-charged batteries. Regular maintenance is essential, including the replacement of aged, torn or faded material, as a broken, tangled, pinned down or otherwise compromised *fladry* barrier is likely to fail. *Fladry* tends to sag if soaked by heavy rain, flags will wrap around the line when blowing in the wind and livestock may chew or pull on them.

Improved livestock health

Healthy livestock is less vulnerable to predation. Some losses thought to be caused by predators may in fact be due to disease. Help is available from [*Add contact details*].

Electric fencing

If designed, installed and maintained correctly, electric fences can be extremely effective at excluding carnivores from a wide variety of situations including farms. There are a variety of fence types available. Key features of design include the number, height and spacing of wires, type of energiser and the effectiveness of grounding. To deter wolves, bears and lynx, fences should have four or more galvanised and high tensile wires of 1.5–2.5 mm diameter and 20–30 cm apart. The bottom wire should be no more than 20 cm above the ground and the top wire between 1.2 and 1.5 metres high. Plastic insulators are used to mount wires to wooden, plastic or fibreglass posts at 4–5 m intervals, with sturdier posts at corners. The energiser releases high voltage (5,000–8,000V) electric impulses at intervals of around one per second. Power can be supplied from a car battery or solar panel. Livestock quickly learn to avoid the electrified wires, but should be watched initially after installation to prevent damage to the fence.

Contacts for help and advice

HCCRT

[*Add contact details*]

NACRES

[*Add contact details*]

APA

[*Add contact details*]

Descriptions of some breeds used in central and eastern Europe

Georgian Shepherd Dog

The Kartuli Nagazi originated in the Caucasus Mountains in the northeast of Georgia, but nowadays can also be found in many other parts of the country. It is a large, robust and confident dog, distrustful and aggressive toward strangers. Males are not less than 65 cm at the withers and females not less than 60 cm. It has a powerful body, short neck and large head. The muzzle is shorter than the length of the skull and is fairly broad and deep. The coat is short and coarse, often slightly longer on the neck and withers, with a strongly developed undercoat. There is wide variation in colouring.

Caucasian Ovcharka

The Caucasian Shepherd Dog is a large, strong-minded and aggressive dog which originates in the Caucasus Mountains and adjacent plains, although there has been extensive crossbreeding in Europe and the former USSR. Males are 65–75 cm tall and weigh over 55 kg, with the largest reaching 70–90 kg. They can be various colours, from dark to light grey, reddish to fawn, often with white markings and usually a distinctive dark facial mask. A massive head and deep, wedge-shaped muzzle are also distinctive. The Kavkazkaya

Ovcharka is slow to mature and needs disciplined training. It tends to be vigorously healthy, but should be screened for hip and elbow dysplasia.

Central Asian Ovcharka

This is probably one of the oldest types of LGDs and is a relative of the larger Caucasian Shepherd Dog and possibly the Tibetan mastiff. Similar dogs may have accompanied the Mongols when they invaded eastern and central Europe. There are a wide range of coat colours and patterns among Central Asian Shepherd Dogs, as well as long-haired and short-haired varieties. There are also several different types of head (e.g. 'bear-head') set on a short, strong neck with a large dewlap.

Due to the relative isolation of its region of origin, east of the Ural Mountains, it has been largely unaffected by modern breeding practices. Instead, regional variations with different names (Alabay, Dahmarda etc.) can be found over a wide area in the present-day republics of Afghanistan, Kazakhstan, Kyrgyzstan, Iran, Turkmenistan, Tajikistan, Uzbekistan, Mongolia and Russia.

South Russian Ovcharka

Also known as the Ukrainian Ovcharka or Youzhak and originating in the Crimea, this is a robust dog with massive bone structure and strongly developed musculature. Males are at least 65 cm and females 62 cm or more in height. A white or pale coat of coarse hair 10–30 cm long and tending to become matted covers a thick furry undercoat. The thick coat, said to be 'self-cleaning', protects the dog from both cold and heat.

Kars (Caucasian) Shepherd Dog

Resembling the Caucasian Ovcharka, this is a regional sheep dog of Turkey, found in Kars as well as in southern mountainous and lowland areas and the north-east. Its coat has many colour variations, including mixtures of black, reddish brown, grey, white, piebald and white. It is often long-haired (suitable for severe winter conditions), particularly the mane around the neck and the hindquarters, but there are also short-coated Kars Dogs.

Kangal (Karabash)

This is regarded as the national breed of Turkey. It can be found throughout Anatolia but probably came to the area with the Turks from central Asia. It is characterised by a black muzzle (Karabash means black head in Turkish), black-rimmed eyes and a lioness-like body shape. The tail hangs low with a slight upward and forward curl. Its dense, short double-layered coat varies from fawn and cream to tawny coloured. Fully grown Kangal (Karabash) dogs weigh 45–80 kg and are powerful, fast runners. It is not unusual for them to use their shoulders and chest to knock a wolf to the ground and even kill it with a bite to the throat.

Akbash

The word Akbash in Turkish means white head. Akbash Dogs are native to the plains and mountains of western Turkey. They are milk white, with purebred dogs being free of pinto, skewbald and brindle markings. The Akbash is leaner than the Karabash and Kars, long legged and a fast runner. It may have originated from a mix of two types of dogs: mastiff (used for guarding and in war) and coursing hounds (fast hunting dogs). Males may not reach full size until 3 or more years of age.