

Project

ARCTUROS GREEK SHEEPDOG BREEDING PROGRAMME

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1. Introduction

The Greek Sheepdog, also known as the Hellenic Shepherd Dog or Ellinikos Poimenikos, has its origins in classical antiquity. Writing in the 4th century BC, Aristotle described two distinct forms of dogs, one for hunting and the other for guarding livestock and property (Hancock, 2000). They were kept by the Molossi, an ancient Greek tribe who lived in the mountainous region of Epirus, now shared between north-western Greece and southern Albania.

Today, the Kennel Club of Greece recognises three indigenous breeds of flock guardians: the Molossus of Epirus¹, the Greek White Shepherd² and the Greek Sheepdog³ (Fig. 1). However, the traits that are favoured by modern dog breeders, with an emphasis on appearance, are not always the same as those needed for good working dogs (see Giannakopoulos et al., 2017 in *CDPnews* issue 16). Characteristics inherited from Molossian dogs and preserved due to the region's isolation and inaccessibility are in danger of being lost. At the same time, there is a renewed need for effective methods of protecting livestock as numbers of wolves (*Canis lupus*) and bears (*Ursus arctos*) increase. In the case of wolves, the problem is compounded by a scarcity of wild prey which compels



Fig. 1 A Greek Shepherd Dog. (Photo: Arcturos archive)

them to predate on livestock (Iliopoulos et al., 2009; Petridou et al., 2019).

This article describes the Greek Sheepdog breeding programme run by Arcturos, which aims to revitalise the breed and provide shepherds with good quality flock guardians. It summarises key milestones and presents the main achievements and results so far. It also includes the findings of a recent follow-up study assessing the performance of dogs given to shepherds and their role in facilitating the coexistence of livestock and wild predators in Greece.

¹ <http://www.koe.gr/index.php/el/greekbreeds/molosos-tis-hpeirou>

² <http://www.koe.gr/index.php/el/greekbreeds/leyko-elliniko-tsopanoskylo>

³ <http://www.koe.gr/index.php/el/greekbreeds/ellinikos-poimenikos>

2. The Greek Sheepdog

The characteristics of the Greek Sheepdog have been shaped by the natural environment in which it lives and the task it performs. For centuries, pastoralism in mountainous areas was based on transhumance: exploiting pastures at higher elevations in summer and spending the winter in lower-lying areas. Guarding dogs accompanied flocks and herders on these seasonal migrations, often travelling great distances with a meagre diet and little time to rest. This required a combination of endurance, adaptability and bravery in confronting predators (OFEP, 2012).

Husbandry practices gradually changed to more permanent locations and housing livestock in barns. Some shepherds turned to breeds from elsewhere, such as the Caucasian Shepherd Dog, or crossbred flock guardians with other types of dogs in the belief that bigger dogs would be more capable of winning fights with bears and wolves. These factors contributed to a decline of the Greek Sheepdog, which for several years appeared to be threatened with extinction. Nowadays, dogs with many different morphologies can be found in the countryside of Greece, but not all are suitable for the protection of livestock. Larger, heavier dogs become tired more easily and those with thick coats, in particular, may struggle to cope with hot summers. The characteristics espoused by the breed standard for the Greek Sheepdog (Box 1) are therefore ideally suited to conditions in Greece.

3. Arcturos breeding programme

Arcturos is a Greek non-profit, non-governmental organisation founded in 1992 and dedicated to the protection of wildlife and natural habitats. It maintains sanctuaries for bears and wolves that cannot be returned to the wild. It also runs various carnivore conservation projects, mainly on bears in the Pindos and Rodopi Mountains in the north of the country and on wolves throughout the mainland.

Arcturos first became involved in breeding Greek Sheepdogs in the late 1990s as part of the LIFE Lycos project Conservation of *Canis lupus* and its habitats in Central Greece⁴ (LIFE97NAT-GR-04249). Arcturos co-operated with shepherds to establish a livestock guarding dog breeding programme (Arcturos, 1999). In these early stages, no genetic research was conducted and dogs were selected for the programme on the basis of the following criteria:

- Excellent working dogs;
- No hereditary disease or unwanted behaviours (e.g. aggressiveness);
- Conform to the breed's morphological characteristics.

⁴ <https://cordis.europa.eu/project/id/LIFE97NAT-GR-004249>

Box 1 Characteristics of the Greek Shepherd Dog

According to the breed standard approved by the Kennel Club of Greece, the Greek Sheepdog is a courageous dog with good body structure, characterised by a strong skeleton with good muscle coverage, able to move all day under adverse weather conditions, in difficult terrain and in need of little nutrition.

Character: The Greek Sheepdog is independent, decisive, loyal, a good worker with a strong sense of duty and strong protective instinct for the animals it accompanies and for its environment.

Important proportions: The ratio of the length of muzzle to skull is 2:3; the body length is larger than the height by 7–10%; the width of the skull is almost equal to its length.

Coat: Dense and abundant, with two layers. The undercoat has soft and dense wool while the topcoat is longer with straight or slightly curly hair (of harsh texture). Various colours, uniform or with markings. Short hair and long hair variations.

Height at the withers: males 68–73 cm, females 63–68 cm.

Weight: males 40–55 kg, females 32–42 kg.



Fig. 2 Female Greek Sheepdog Hanna guarding a flock of sheep in Nevrokopi, Drama prefecture, Greece.

(Photo: Arcturos archive)

The founding group of dogs thus collected was used for breeding and their pups were given to shepherds working in areas with wolves or bears (Fig. 2).

As the years passed, the breeding programme became more refined, with the addition of genetic testing. A standard was established but, unfortunately, the breed is still not recognised by the World Canine Organisation (FCI) because there is not a sufficient number of bloodlines officially registered with the Kennel Club of Greece.

In 2008, Arcturos established the Greek Sheepdog Breeding Centre which today is home to 16 female and three male breeding dogs (Fig. 3). They were either bred and raised by Arcturos or provided by the breed club, the Group of Friends of the Greek Shepherd⁵. More than 50 additional dogs given to shepherds or private owners are also used as breeding dogs within the programme. Breeding dogs are screened to reduce the risk of hereditary conditions appearing in pups.



Fig. 4 Volunteers help to feed, groom, walk, train and socialise dogs.

(Photo: Giorgos Moutafis, Arcturos archive)



Fig. 3 Arcturos Greek Sheepdog Breeding Centre in Agrapidia, Florina.

(Photo: Nikos Grammenopoulos)

The youngest dog currently at the Centre has a five-generation pedigree of breeding by Arcturos. Dog breeding is conducted following the advice of the Arcturos veterinary team and in consultation with the Veterinary School of the Aristotelian University of Thessaloniki. The programme is funded by Arcturos and volunteers from all over the world assist with the everyday care of the dogs (Fig. 4).

Pups remain at the Centre until they are at least nine weeks old (Figs. 5–6). They are vaccinated, microchipped (from 2003 onwards), dewormed and socialised with other dogs and humans before being distributed to shepherds (Fig. 7). There is great demand for pups, but priority is given to shepherds who live and work in areas with predators. A contract is signed specifying that Arcturos remains the owner of the dog but the shepherd has the use of it. Arcturos supports and advises the shepherd throughout the life of the dog. The shepherd is responsible for covering any subsequent veterinary costs and must inform Arcturos if the dog is injured, stolen, dies or needs to be rehomed, for example if the livestock are sold. Arcturos staff can confiscate a dog if it is not kept in appropriate conditions or the terms of the contract are broken. This has happened less than ten times during the programme; dogs were rehomed successfully in all cases. According to the contract, shepherds should not breed the dogs without approval. If breeding is agreed, shepherds can keep any pups they want and the rest are given to the programme to be distributed to other shepherds.

⁵ <http://www.ofep.gr/>



Figs. 5–7 Clockwise from top-left: Greek Sheepdog Fiona with her pups at the Arcturos breeding facilities; one week old pups; a shepherd receiving a new pup from the programme. *(Photos: Melina Avgerinou, Arcturos archive)*

When a shepherd receives a pup, it is put in a barn in direct contact with the animals it is meant to protect so that it learns to recognise them as its own social group. Pups are usually placed with sheep and/or goats, mostly of local breeds or crosses, but some are placed with cattle or other livestock (Fig. 8). Since the programme began, more than 1,500 pups have been distributed to shepherds all over Greece. From 2003 until today, Arcturos has bred and distributed 758 pups (405 males and 353 females). Most shepherds take two pups (from different litters and bloodlines), although some want only one (usually a male, in order to avoid having litters of their own).

4. Study of outcomes

Arcturos closely monitors pups and working dogs throughout their lives. In order to evaluate their effectiveness as livestock guarding dogs (LGDs), as well as to identify any new problems that shepherds might be facing in regard to coexistence with wildlife, in

early 2020 Arcturos conducted additional follow-up research with shepherds who had received pups from the programme.

4.1 Methods

A questionnaire survey was administered by telephone or during site visits to a total of 171 shepherds who had received LGD pups from the programme between 2008 and 2019. This included questions on the following aspects:

- Livestock and landscapes where the dogs work;
- Levels of damage to livestock;
- Shepherds' perceptions of LGDs, attitudes towards coexistence with large carnivores and opinions of existing management measures;
- Dog behaviour;
- Dog health, welfare and causes of mortality.

Some questions were evaluated on a per-flock basis (i.e. if a shepherd had more than one dog, answers for all dogs were pooled), whereas responses to other



Figs. 8 Greek Sheepdogs with livestock.

(Photos: Web archive, www.arcturos.gr)

questions were evaluated for each individual dog. Reported losses were grouped into categories as follows: 0–1, 2–4, 5–9, ≥10 head of livestock per year.

4.2 Results

4.2.1 Livestock and landscapes

The shepherds included in the survey had received a total of 274 dogs (131 males, 143 females) from the programme. Most of them worked in areas with large carnivores, although there were some elsewhere who faced damage by packs of stray dogs. Most surveyed shepherds, as is typical in Greece, kept sheep (75 respondents), goats (26) or both (31). Some bred cattle (32) and the rest (7) had pigs, horses, etc. (Fig. 9). Almost all of them were based permanently in one location; only two utilised different pastures in summer and winter. Most flocks were 100–450 head, fewer up to 1,000, and usually grazed on rangelands or in fences pastures.



Fig. 10 Sheep killed by wolves in Emporio village, Kozani, Greece. (Photo: Arcturos archive)

dogs to 80% afterwards. All other categories of losses decreased, most notably the proportion of shepherds reporting the highest levels of loss (≥10 head of livestock per year), which declined from 28% to 10% following the acquisition of LGDs (Fig. 11).

4.2.3 Shepherds' opinions and attitudes

The vast majority of shepherds agreed that the use of Greek Sheepdogs is a good measure for preventing predation by wild animals: 90% responded that it is the best solution for their problems and 91% indicated that they would recommend them to others. Almost all of them (97%) considered the Greek Sheepdog a relatively 'cheap' damage prevention measure.

Paradoxically in light of the above, when they were asked if the frequency of damage by wild predators dropped after receiving Greek Sheepdogs, only 32% of shepherds answered yes while 62% said no. Of

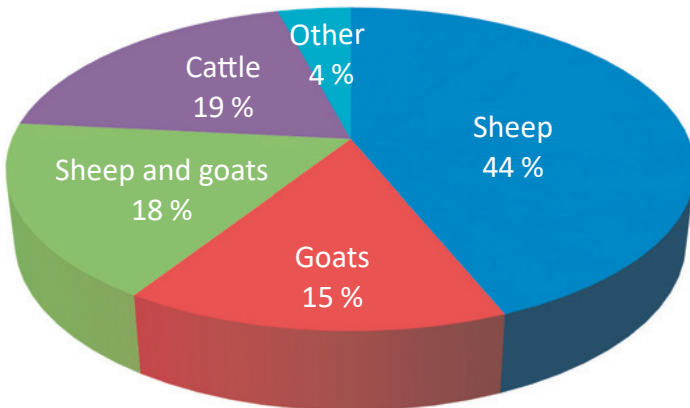


Fig. 9 Types of livestock kept by shepherds included in the survey.

Shepherds with programme dogs worked in landscapes with forest (41%), low vegetation (27%), grass meadows (26%) and in mixed or more complex terrain with fields, lakes, etc. (6%). Most (60%) reported having lost livestock to predators before they received Greek Sheepdogs, while those who had not nevertheless wanted to use LGDs to prevent such damage occurring. Shepherds were usually most concerned about wolves (Fig. 10), to a lesser extent bears, and some mentioned problems with wild boar (*Sus scrofa*), jackals (*Canis aureus*) or stray dogs.

4.2.2 Damage levels

The proportion of shepherds who reported having negligible or no losses (0–1 animal lost annually) increased from 49% before acquisition of Greek Sheep-

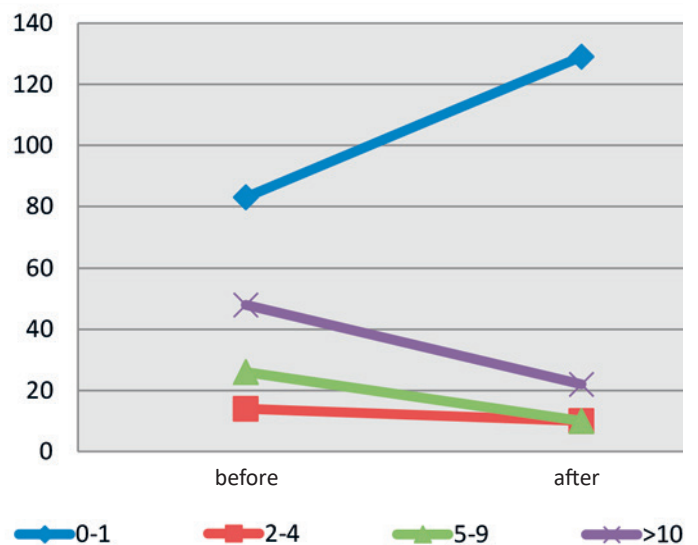


Fig. 11 Reported numbers of livestock lost to predators annually (in four categories) before and after acquisition of Greek Sheepdogs.

those who stated that they saw no change in damage frequency, 51% reported having had damage before acquiring dogs. However, when they were asked about the number of animals lost in all wild predator attacks, most agreed that the use of Greek Sheepdogs had significantly reduced the total number of animals lost.

All participating shepherds, without exception, considered the existing damage compensation system in Greece to be insufficient. All of them found the procedure extremely difficult and some stated that they do not apply for compensation because they thought they would not get it anyway. Of 136 who mentioned having claimed for damage in the past, almost half (46%) had not received compensation. Shepherds were evenly divided in their opinions of coexistence with large carnivores: 39% viewed it as normal, 37% considered it problematic and the remaining 24% were indifferent. In most cases, shepherds reported that their opinions had not changed since receiving LGDs to help protect their livestock.

4.2.4 Behavioural analysis

A large majority (85%) of the 274 dogs provided by the programme exhibited no behavioural problems. The remainder showed some deficiencies: 12 dogs (4%) did not follow the herd; nine (3%) were aggressive towards people; six (2%) killed and ate chickens; three (1%) were aggressive towards other

dogs; three (1%) were fearful; three (1%) were disobedient; two (1%) were aggressive to sheep and lambs; and <1% ate their puppies, chased cars or became aggressive after a bear attack. Fourteen of the shepherds (8%) with a total of 23 dogs indicated that they spent time on the proper training of their dogs, while the remaining 92% stated that this was not necessary. Only 13 (5%) of all dogs were neutered, even after behavioural problems appeared.

4.2.5 Health, welfare and mortality

At the time of the survey, 9% of all dogs included in the research had had some health-related issues. The most common problems were various parasitic diseases and skin or ear infections (Fig. 12). A minority of dogs (23%) were fed exclusively with specialised dogfood; the rest were fed pasta, rice, bread, meat, milk, dead animals, leftover corn flour, bran, etc.

At the time of the survey, 133 dogs placed with 81 different owners had already died. Of these, 46 (35%) were less than one year old when they died and another 45 (34%) died at the age of 1–5 years. Seventeen dogs (13%) died when 5–10 years old and seven (5%) were older than ten when they died. In the remaining 18 cases, the owners did not remember the exact age of death. However, these percentages are distorted by the fact that 141 dogs placed with 90 different shepherds were still alive at the time of the survey. When all 274 dogs are considered, mortality at ≤1 year of age was up to 17%.

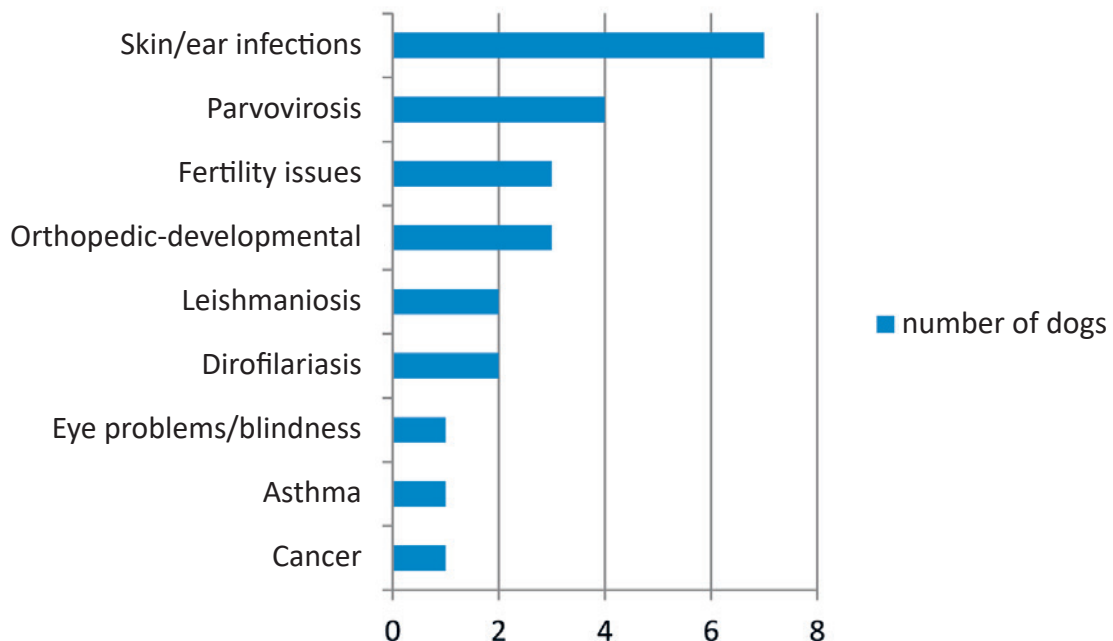


Fig. 12 Health problems of pups and adult dogs in the breeding programme.



Fig. 13 Poisoned Greek Shepherd Dog rescued by the vet team. (Photo: Melina Avgerinou, Arcturos archive)

Shepherds reported that most dogs for which cause of death could be determined died due to disease (20 dogs), encounters with snakes, bears, wolves or wild boar (20) or natural causes i.e. old age (16). Additionally, 19 dogs were poisoned (Fig. 13), 15 were killed in fights with other dogs and 13 died due to collisions with motor vehicles. The remaining 30 dogs died of unknown causes (Fig. 14).

5. Conclusions and recommendations

This long-running breeding programme, started by Arcturos more than 30 years ago, shows that Greek Sheepdogs retain their original working characteristics. Our results show that the use of these dogs as flock guardians is an excellent preventive measure against predation on livestock by wild predators and stray dogs.

The vast majority of shepherds participating in our research agreed that LGDs were the best solution for them and recommend them to others. Greek Sheepdogs are a very efficient tool, since they can reduce losses substantially and are also relatively easy to implement by shepherds, who consider them inexpensive to maintain. When combined with other measures (continual shepherd presence, electric fencing, etc.), they probably represent the optimal approach to protecting livestock from predators in Greece.

While our findings are encouraging in terms of the effectiveness and efficiency of Greek Sheepdogs as a working tool, concerns arise about whether shepherds are able to raise and care for them appropriately and

secure their health and wellbeing. We found considerable interest among shepherds in acquiring pups but an apparent lack of information about modern animal husbandry. Many shepherds still adhere to more traditional practices of raising dogs with minimal intervention. Besides continuing to breed and distribute quality dogs, efforts should therefore be focused on better education of shepherds regarding animal welfare.

Dogs living and working in outdoor environments are exposed to various dangers and therefore do not have the same life expectancy as dogs that live in more protected environments such as a house, yard or fenced area. However, a significant percentage of early deaths might be avoidable with better care, including vaccination followed by regular booster shots against canine parvovirus, anti-parasite collars for *Leishmania* and *Dirofilaria*, limiting the number of dogs with each flock to avoid fights, providing a safe fenced environment during the night and taking measures against poisoning (see Infante and Beatriz, 2017 in *CDPnews* issue 16).

Illegal poisoning is rapidly becoming one of the biggest dangers faced by working dogs and wildlife in Greece (Ntemiri et al., 2018). It occurs mainly in late August to early September, before the hunting season, but can happen during several different periods throughout the year. The intended targets are usually

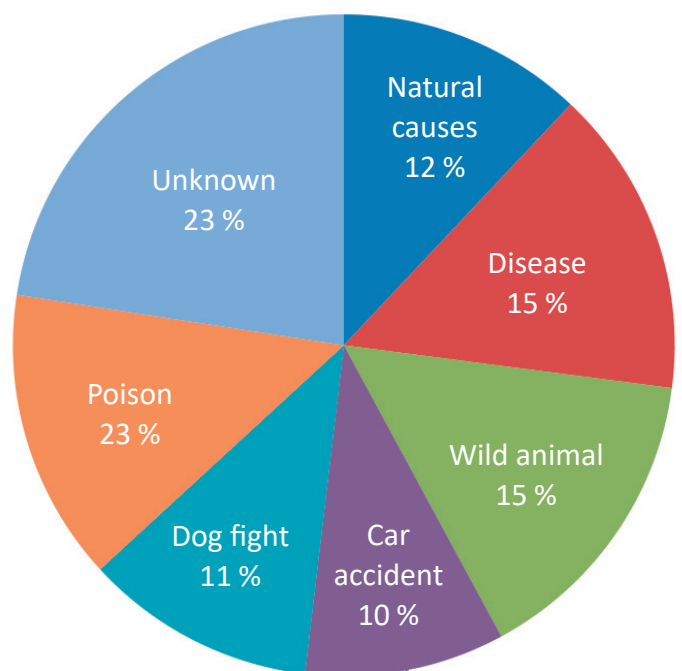


Fig. 14 Cause of death of working Greek Sheepdogs.

predators including wolves and stray dogs, but some people accuse hunters or even authorities of deliberately spreading poisoned baits to kill sheepdogs.

It is to be expected that people negatively impacted by wildlife may not support its conservation unless measures are also taken to protect their livelihoods and property. The rather ambivalent responses of the shepherding community to the question of coexistence with large carnivores may be influenced by widespread dissatisfaction with the damage compensation system. Arcturos has striven for years to achieve a fairer and more efficient system of compensation, which could provide an additional motivation for shepherds to support, or at least to tolerate, the pres-

ence of large carnivores. Informing shepherds about the value of wildlife in their area may also help to foster better coexistence.

Finally, for the Greek Sheepdog to be officially recognised by the FCI requires years of work to collect information and pedigrees of at least 1,000 dogs from eight different bloodlines with at least three generations of unrelated dogs and many other requirements that shepherds cannot meet. Although this is not a priority for Arcturos at the moment, most programme dogs and litters are registered with the Kennel Club of Greece in order to keep official records. Genetic testing from time to time may also provide useful information.

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