№ 35 July 2013

JOURNAL

of the International Society for Preservation of Primitive Aboriginal Dogs

From the Publisher…

Dear members of PADS and readers of our Journal,

In this issue of our Journal we introduce you to successful attempt of John Deppe to use aboriginal South African dogs in a new capacity and also to a very dramatic history of Norvegian Lundehund described by Ingvild Espelien.

Sincerely yours, Tatiana Desyatova

Secretary of PADS, International

In This Issue…

The challenge of finding new roles in changing environments

John Deppe

The aboriginal dogs of Southern Africa are collectively known as AfriCanis. This Southern African dog is the product of a unique relationship of specifics. African homesteaders have always bred livestock and companion animals within a working context. Generally this has followed the process of placing the animal in the climatic and socio-cultural environment in which it is expected to function and keep what works. Practices of selection and controlled breeding are significantly absent from the local model. The challenge of subsistence living in an abundant but unforgiving landscape has led to the indigenous livestock and companion animals from this part of the world showing remarkable endurance and compatibility. Yet although there is significant homogeneity, there are also significant regional variations which show in identifiable physical traits from different geographical regions. Placing the working animal in different social, cultural and environmental situations has led to specific physiological and mental conformations.

Photos by Johan Gallant

Photos by Johan Gallant

This natural model of animal husbandry has emerged from a particular way of living with these animals. It is influenced by the local cultural and social practices of the indigenous communities. Ray Coppinger suggests the way a dog's brain is wired (the shape of the mind) should be understood in the same

way we consider the shape of a dog's physique to be appropriate for the physical context in which it functions. We then can talk of a dog having a compatible shape of mind and a compatible shape of body for a specific context. In Southern African indigenous communities a dog is not given a privileged status. A dog must bark and defend its territory. It is favoured if it is a good hunter. However, if it decimates the homesteader's domestic livestock it more than likely ends up in the pot itself. It must recognize and protect the extended family, including livestock. It must be consistently healthy and robust as there is little veterinary support in distant rural areas. It must survive the variations of climate. It must not be costly to maintain. It must be smart enough to traverse these concepts and still maintain its subservience and loyalty to its owner in an open free-range environment. These are the primary actors defining the physical and mental shapes required of a good AfriCanis. They are the actors that, in this region, have been shaping the land race for the past 2000 years.

Photos by Johan Gallant

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From the earliest times European settlers on the sub-continent commented on the favourable physical and mental conformation of these animals. In 1719 Kolben wrote of the aboriginal Khoisan dogs: “they are particularly very faithful when their masters are in danger from lions, tigers, wolves, etc., and for this reason they are well sought after by the Europeans as well as by the Hottentots” (Hawley, T.C. 1957:11). Other local writers have over the years paid reference to the remarkable steadfastness of character and undivided loyalty exhibited by these dogs. In later years the status of these fine canines would be subverted by colonial ideas of racial superiority. Yet

more recently in this country animal husbandry, across a broad spectrum of livestock, has been revisiting the very principles of natural development that the indigenous communities have been following for centuries, to great success. The world of cynology, however, has been reluctant to move from its traditions of racial exclusivity. Local literature has not forgotten the values that the AfriCanis has always embodied. In Herman Charles Bosman's story Unto Dust it is the loyalty of the AfriCanis that leads men to understand equality (Bosman, H.C. 1987:37).

Photos by Johan Gallant

A personal account by a farmer living in Mozambique on the border with South Africa told of his AfriCanis dog “Bones”who was named because he

was literally just skin and bones when he acquired him. The farmer was having problems with a lion killing off his cattle and phoned a friend across the border who was at the time a game ranger in the Kruger National Park. The friend suggested he go to the nearest village, barter an indigenous dog and set him off after the lion. It was here that "Bones" was collected, taken to the latest lion kill and released. The farmers followed as best they could while "Bones" set off after the lion. After some time the dog cornered the lion in a thicket and kept him there on his own endeavour. If the lion charged, "Bones" would run away and the moment the lion felt exposed he would head back to the thicket and the dog would return to his vigil. The farmers came upon the scene and dispatched the lion. "Bones" was exhibiting good AfriCanis mental conformation.

That the AfriCanis has now developed into a remarkably healthy, robust and intelligent animal is without doubt. The mental shape of the dog makes it ideal as a hardy, steadfast, biddable animal. Intellectually it displays exceptionally high allelomimetic ability. In rural areas, little or no formal training is given. Dogs are simply expected to slot into their roles within the homestead. The AfriCanis naturally interprets what is expected of it and performs within that framework. The result is that these dogs consistently score very well in canine intelligence testing.

AfriCanis dog Muhle. Photo by author

Additional to the role the dog must perform within the homestead, it is also expected to cope within a physically challenging environment. The climate of the Southern African region varies between the arid coastal and interior regions to the north and west of the range, the temperate coast and interior to the centre and south of the range and the sub-tropical to the east of the range. Temperature extremes can vary between -15°C in winter to 40°C in summer. Parasites proliferate with a plethora of tick borne illnesses that plague the animals in the grasslands. Water is scarce and there is little abundance of good food. In all these conditions the dog is expected to survive with very little attention and nurturing. In short, the AfriCanis survives in conditions both

mentally and physically that few modern breeds could manage.

In the development of this hardy land race the AfriCanis has proven its value as a tracker, a courser, a herder, a guardian and a loyal companion. It exhibits a good working dog conformation. It does not exhibit hypertrophied motor patterns but appears to follow a full natural canine motor pattern. This might make it a little less predictable as a herder; however the very strong imprinting that occurs with these animals means that once it is introduced to livestock, particularly guarding, and to some extent herding, it follows quite naturally. In spite of this it maintains a strong chase response and in the hunt will orient, eye, chase, grab-bite, kill-bite, dissect and devour in a complete sequence. In rural Southern Africa it has proven a most ideal companion animal.

However, the rural landscape in this country is changing. Increased urbanisation and loss of traditional values and lifestyles is placing pressure on the role and the environment of this land race. The fact that the AfriCanis is such a robust product of its situation leaves one wondering what might happen to this dog as its situation changes. If the canine has been shaped by its environment to arrive at a very suitable animal up to this point, what will happen, in a natural husbandry model, as that environment changes in the future?

Pastoral culture, from which the AfriCanis has emerged, is being threatened by the lure of western urban culture. Historically, farming in South Africa has been dominated by western practices and values. In the process of development of this country this has followed, for the most part, racial delineation. From this history, there is a prejudice against indigenous knowledge systems. They are seen as backwards. However, recent studies in indigenous livestock rearing practices have been instrumental in highlighting values within these local knowledge systems. One such value is the use of the "working model" as a measure of contextual appropriation. In many cases these values are being reintroduced (often "dressed" as new thinking) into the commercial system to great effect. In this sense pastoral culture is changing the face of local models of animal husbandry in many respects. But as a model itself it does not seem to be able to withstand the lure of modernism. Rural South Africa is leaching manpower to the industrialized centres of the region. As people move away from the land the knowledge of that land and the way to live in it is lost. We are therefore at risk of losing many of the values entrenched within such indigenous knowledge systems. The AfriCanis is a product of such an indigenous knowledge system. It marks the way in which man and dog has forged a common identity within such a culture and context. In many respects the AfriCanis is a mark of that culture

itself. As pastoral culture dwindles, so do the knowledge systems within that culture. In the same way, as the natural environment for the AfriCanis dwindles, so too will the "reasons" for the existence of this landrace.

Инжасути ест кустарникового зайца, которого она только что поймала. Фото автора

Local knowledge would suggest that in an unrestricted system of natural husbandry, change will always prevail upon the individual to deliver the most appropriate responses to the stress. If this process has successfully led to the current product there is no reason to suggest that the model of natural husbandry

should be modified; and yet while the AfriCanis dog has lived in a free-ranging context all the values of the animal have been extolled as positive. It is a robust and generally healthy animal. It imprints extremely easily and therefore forms significant bonds with extended packs and livestock which it defends with great success. It is a prolific hunter with a high chase response. The body shape is medium built that reduces overheating and allows the AfriCanis a good turn of speed. It shows uncanny ability in the hunt, sometimes even plotting intriguing strategies to enhance success. If the environment has been so instrumental in shaping this land race then part of any maintenance program would in some way concern itself with maintaining the environment. This is a conservative approach that would seek to identify and support cultural values towards the maintenance of the relationship between the communities and their dogs.

But conservative intervention is not the only future course. In this sense it is important that the indigenous role is respected and yet one must also acknowledge that change is inevitable. It becomes important to search for alternative roles that such a canine product might undertake. Placing these animals, the product of centuries of free-ranging subservience to their human masters, in modern situations has not presented any particular concerns. They have shown themselves to be highly adaptable.

They generally interact very well with other dogs and humans. They show strong territorial defensiveness and are therefore intimidating guardians. If they are properly introduced to other pets they are generally very accepting. They excel at obedience and seem to anticipate their owners' desires. While they are not a hyperactive dog at all, when the AfriCanis moves from passive relaxation to active interaction it does so with great enthusiasm. They are, after all, a working dog. As such they have a great need to be socially, intellectually and physically stimulated.

Maru and Dube in the front yard in Pretoria
Photo by the author

As part of a conscious effort to explore the potential of this aboriginal race in modern contexts we

have been actively measuring the adaptability of the AfriCanis to modern working and recreational environments. In formal training environments they have done extremely well even taking to working with six dogs and a single handler simultaneously. More recently we decided to introduce them to canine sport and in particular have become active in the sport of dryland sledding in South Africa. Dryland sledding involves Siberian Huskies, Husky crosses and other working breeds pulling a wheeled conveyance such as a cart, scooter or mountain bike. By far the most common breed of dog used for this sport in South Africa is the Siberian Husky in the proportion of more than 10:1. In our first year in the sport in 2011 we entered the South African Dryland Sledding Association (SADSA) national championships, held in the town of Colesberg in central South Africa, with a two dog bike joring team. The dogs had been well exposed to working with bicycles in our obedience demonstrations, something they took to immediately with no training whatsoever. We then spent one sledding season preparing them to not run alongside the bicycle any longer but to pull from out in front. We were hoping for the best but expecting the worst.

SADSA National Dryland Sledding Championships

The dryland sledding national event consisted of a timed 24km run split over two days. Amongst a group of Siberian and Alaskan Husky teams, the performance of the AfriCanis was uncertain. They were entered into the advanced two dog bike joring category and finished both days in first place. In the same season they followed up with winning the Fastest Mile event in Gauteng with an average speed of 24.8km/h. At the national event we shared extensive discussions with professional musher (dog driver) and owner of Nature's Kennel, Ed Stielstra of the USA, who was the event marshal. Comparing the AfriCanis with dogs typical of the racing athletes in snow sledding in the United States, the AfriCanis is slightly longer than taller and stands with a slightly

higher croup than withers whereas the long distance sledding athletes in the USA, according to Ed Stielstra, possess a flatter back. He appreciated the rounder barrel chest of the AfriCanis, suggesting greater lung capacity. The AfriCanis is also a fair bit bigger than the Alaskan Huskies that are most common in the sport overseas. However, in dryland sledding one works with much smaller teams than the large racing teams of the Iditarod and the Yukon Quest. In a smaller team the individual dog carries a greater share of the workload.

In sledding the gait of the individual animals in the team is important. The AfriCanis possesses a full range of gaits, from the walk, through a mile eating trot and ending in the double suspension gallop. Moving from a walk to a trot they single track to conserve energy. The AfriCanis shows remarkable agility and acrobatics leaping 2m in the air while still in a fast run, a product of a high strength to weight ratio, and can turn from a sprint in an instant, due to robust carpal joints. In studying their gait over time we have noted that the AfriCanis has indicated a remarkable quality in that in a gallop they can extend the carpal joint through 90 degrees in the opposing direction, giving the forearm almost 180 degrees of movement. Perfection of the gallop depends upon the power of extending the shoulders and forelegs as far as possible, as well as bringing the hind legs rapidly forward to give the propulsive stroke. The AfriCanis

has well developed shoulders, good thighs, a good back, and, lastly, for containing the lungs and heart, whose actions are essential for the maintenance of speed, a well-formed and capacious chest. In discussions with local mushers after the success at the national event, where few participants had heard of the AfriCanis, they were not surprised that its conformation made for a good sprint dog.

In 2012 we decided to test the dogs in a different context. We entered the two dog AfriCanis team in the 150km Wartrail event. The Wartrail is a dryland touring event run over three days in the rugged mountain country of the southern Drakensberg. The trails are gruelling, the pitch and altitude extreme. As far as we are aware it is the longest and toughest dryland sledding event in the world.

We decided to set up a comparative study measuring the performance of an AfriCanis and Siberian Husky team during the event. We had a veterinarian from Canada, with many years' experience with racing sled dogs, perform an in-situ veterinary check at the start, finish and every 20km throughout the Wartrail on both teams of dogs. Essentially we wanted to measure the effect of the event on any dog but the data is also useful in measuring the comparative performance of the AfriCanis.

Facing the terrain in which the Wartrail is run. Photo by Marnus Malan

Pre-event vet checks with Dr. Long
Photo by author

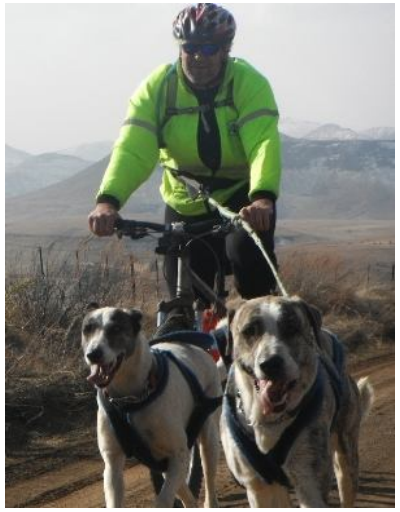
The course ran over three days in the Wartrail Valley of the Eastern Cape in South Africa. The first day was a 60km loop on the New England trail. The trail conditions on day one ranged from snow to deep mud dirt tracks with the majority of the running on hard packed red earth. The air was crisp amongst the snow drifts and the sky was clear. On the second day the trail was similar with less snow. There were more river crossings and the elevations were dramatic, especially up Lundean's Neck with an altitude of 2162masl. From the Neck it was a downhill run along the beautiful Blue River to Mosheshesford to complete the 50km for the day. The trail was predominantly hard packed gravel. The day started hot but on the way up Lundean's Neck the wind picked up and battered us mercilessly. As in all mountain country the weather is precocious. The Wartrail is rugged farming country and the many streams we crossed provides for ample watering.

The third day once more started hot and clear but within an hour the wind was battering us so badly we were driven off the trail on a few occasions. The weather became a severe challenge with blinding dust off the hard packed earth. We suffered broken spokes to the bicycle wheel and soldiered on. The passes we crossed, Donkerhoek and Aartappelhoogte, were so steep new disk brake pads were worn through. The last 40km was challenging.

Dube enjoying a run in the snow before we set out on day one. Photo by Marnus Malan

Lundean's Neck pass along the Wartrail. Photo Richard Long

The relative fitness of the two teams can be seen from the standing heart rate at the beginning of each stage, during the 20km vet checks and data collection and the final heart rates in the following tables. While the AfriCanis team appears marginally fitter from the data, they are pulling a weight 20kg heavier along the trail. The assumption from the data seems to be supported by the physical performance of the dogs on the trail. Between the two teams, the AfriCanis team set off first every day and were caught up by each 20km checkpoint. It was always the performance in the kilometres after this that made the difference. The Siberian Husky team struggled on the back part of the day's trail whereas the AfriCanis team improved their performance as the day wore on. Coupled with this the Siberian team started struggling with pad abrasions on the last day, caused by the wear from the hard packed trail. Their feet were wrapped in linen booties for support. The AfriCanis team showed no worn pads. On day three the AfriCanis finished the event with a fast run into the last 10km. Battered by howling winds they were doing 30km/h along some stretches and generally not dropping much below that.



Dube and Dunga, battered by the wind, cresting at Aaartappelhoogte

The AfriCanis team during our vet check and a stop for snacks.
Photos by Richard Long

Wartrail Tour 2012 – two teams – four dogs				
Veterinarian: Dr. Richard Long	Dunga (1) AfriCanis m (neutered) 5yr	Dube (1) AfriCanis m 5yr	Luna (2) Siberian Husky f 4yr	Sharo (2) Siberian Husky m 4yr
Day 1 Pre-event				
Heart Rate	84 beats / min	80	94	90
Rectal temp	38.4°C	38.2°C	38.1°C	38.3°C
Respiration	12 breaths / min	14	18	16
Hydration	Good	Good	Good	Good
20km				
Heart Rate	100	104	144	138
Rectal temp	38.4°C	39.1°C	39.0°C	38.7°C
Respiration	14	14	18	16
Hydration	Good	Good	Good	Good
40km				
Heart Rate	84	98	120	124
Rectal temp	38.9°C	38.5°C	38.8°C	38.4°C
Respiration	Panting	Panting	18	14
Hydration	Good	Good	Good	Fair (-8%)
Finish day 1				
Heart Rate	92	104	120	100
Rectal temp	38.8°C	38.7°C	38.4°C	38.0°C
Respiration	18	12	14	10
Hydration	Fair	Fair	Fair	Fair
Day 2 Pre-event				

Heart Rate	116	120	108	88
Rectal temp	38.5°C	38.1°C	38.7°C	38.4°C
Respiration	12	18	14	10
Hydration	Good	Good	Good	Good
20km				
Heart Rate	100	112	140	120
Rectal temp	38.0°C	38.6°C	38.7°C	38.5°C
Respiration	20	22	Panting	24
Hydration	Fair	Fair	Good	Good
Day 3 Pre-event				
Heart Rate	84	80	96	92
Rectal temp	38.2°C	38.0°C	38.1°C	38.7°C
Respiration	14	Panting	14	Panting
Hydration	Good	Good	Good	Good
20km				
Heart Rate	120	98	134	120
Rectal temp	39.0°C	39.0°C	38.9°C	38.3°C
Respiration	Panting	Panting	Panting	Panting
Hydration	Good	Good	Good	Good
Finish day 3				
Heart Rate	104	116	108	124
Rectal temp	39.7°C	39.6°C	38.7°C	38.8°C
Respiration	Panting	Panting	Panting	Panting
Hydration	Fair	Fair	Good	Good
Mushers: 1. John Deppe - Dunga + Dube 2. Marnus Malan - Luna + Sharo				

The weather was unpredictable and it was important for us that we collate the data within the context of trail temperatures. The general consideration for maximum temperatures for dryland sledding is an ambient temperature of 15°C. We measured incident temperatures on the trail with a digital thermometer mounted on the bicycle handlebars. The table below illustrates the temperature range in which the dogs performed.

Incident temperatures recorded during the event measured on the trail in direct sunlight at 1m off the ground			
	start	hottest	finish
Day 1	4°C	10,4°C	2°C
Day 2	11,2°C	17,1°C	8°C
Day 3	13,6°C	19,2°C	12°C

The dogs were fed snacks throughout the tour. Each musher followed his own recipe. We had frozen packs of pork fat for each day and generally snacked at the vet checks. We found the dogs soon got bored with the fat or were simply getting more than they needed because they turned off the fat before the end of the event. Fat supports slow twitch fibres and will aid long term energy use. Fast twitch fibres are best supported by complex carbohydrates like maltodextrin which is rapidly absorbed without an insulin release or

fluid imbalance. We didn't have maltodextrin and so made use of bread snacks for the dogs, fed within 30 minutes of the exercise. The complex carbohydrate allows the muscle to replenish as much as 80% of the glycogen lost during performance, as opposed to a mere 40% through the use of other carbohydrates.

Although the data for hydration was collated by Dr. Long at each vet check, along the trail each musher checks his dogs' hydration throughout the day. The first issue is just making sure that they have access to clean water regularly. Each musher has to carry supplies, mandatory first aid and safety equipment and at least 1l of drinking water per dog in the team. In terms of access to drinking water, the Wartrail was well located with many clear and accessible streams along the route. The hydration tests we perform on our dogs along the trail include lifting a pinch of skin at the back of the neck and releasing. Depending on how quickly the skin recovers will be an indicator of how well the dog is hydrated. Typically a pinch should recover immediately. The skin on the neck of a dog that is dehydrated will take seconds to recover. Our second test is to press on the gum of the dog with the thumb and release. The gum will be white where the thumb was pressing and turn pink again as the blood returns to the spot. The more hydrated a dog the quicker will the gum return to pink. Again an interval of a second should prevail. If the recovery of the gum is longer than a second then the

dog needs water. Finally we also take note when the dog urinates. The darker the urine the more dehydrated the dog.

Each musher checks his dogs' hydration throughout the day. On the trail there were numerous water crossings and each one provided opportunities for access to clean mountain drinking water. There were also constant rivulets along the entire trail due to melting snow. We took to rubbing the dogs down with snow over hotter sections of the trail.

At the end of day three the dogs were tired but in superb condition. We used ice coolers to cool down sore ligaments while we waited for the other competitors to arrive at the finish line. The AfriCanis pair had worked consistently throughout the event and were the first team across the finish line. They showed a rugged determination and seemed to grasp intuitively how best to manage their own reserves on the trail. We generally let them run the way they wanted to run. Some mountains they ran up, pulling all the way and some they walked. In the end they got through with the best time.

Photo by Richard Long

There is much literature and research into genetic lines in high performance working dogs. Dr Heather Huson in her intriguing research on Genetic Profiling and Identification of Performance Associated Genes within Sprint and Distance Alaskan Sled Dogs (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3320045/ and also at NIH Public Access http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2920855/) identifies Alaskan Malamute and Siberian Husky as the major purebred breed components in top performing sled dogs. They are well considered to be the extreme athletes in the canine world. The best

sledding dogs are usually Husky crosses which have led to the supreme sporting animal – the Alaskan Husky. . In dryland sledding events in South Africa, the AfriCanis team is constantly performing against these breeds with consistently good results. In every event in dryland sledding that we enter, the opposing teams are almost exclusively Siberian Huskies. Yet we have had to argue with some in the local sledding fraternity to allow an AfriCanis team to compete. According to this group, it is unfair to expect a Siberian Husky to compete against an AfriCanis, to the point that they insist on establishing a pure breed class for pure breed dogs, ostensibly to keep the AfriCanis team out of the competition.

Huson suggests from her research that in sprint dogs racing performance enhancement seems to be linked to musculature development and recovery controlling genes while in distance athletes the top performers indicate higher tolerance to heat and other forms of stress. Certainly from the data above the AfriCanis team held their own on the trail. However, we might explore the evolutionary genesis of the AfriCanis land race and attempt to match the natural qualities of the animal with a different activity (as we have done with dryland sledding) then the working model will have been extended into new avenues that will allow for the natural qualities of the animal to come to the fore. Ultimately, the AfriCanis is also a running dog, like the Siberian Husky. If it is true that

there are so called "running genes" it begs the question, how did they get there? What causes a "running gene" to come into existence in a specific breeding sample? We would suggest that it is a similar process that has brought all the natural land races into being, placing the animal in a context and using what works. Sled pulling dogs were not developed by breeding for coat colour. They were developed within a working model. There are many similar contexts that have led to working dogs around the world. Ray Coppinger records one of his best sledding dogs was a Border Collie.

While we do not have the luxury of a veterinary report, as we established along the Wartrail, from every event we have partaken in, we do have the results from many more than one event where the AfriCanis team finished ahead of the Siberian Husky competition. This not to say that the AfriCanis is in any way superior but that "running genes" emerge in a certain context and that there is enough evidence to suggest that that context might be explored broader than just around Siberian or Malamute founding stock. As a dog that has evolved in a "natural" way in this climatic and socio-cultural context we are left wondering how these genetic markers might be manifest in the AfriCanis land race. To what extent does the evolution of a specific land race within its climatic and social context with humans lead to enhanced performance in the working of those dogs?

Tough evolutionary conditions obviously breed tough dogs. To find new roles for ancient land races, is it simply a case of finding new working environments in which one might fit an existing working model?

AfriCanis dog Dunga having some fun with local farm kids before the start of day 3 of the Wartrail. Apparently we have created enormous difficulties for the local farmers whose children now insist on turning the house Labrador into a Balto. Curiously, in spite of the performance of the AfriCanis team and the Huskies unwillingness to pull the farm kids around, the Huskies still won out on the cute factor. Photo by Richard Long

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Visit the AfriCanis at http://www.africanis.co.za/

The History and the future of the Norwegian Lundehund – the Puffin dog

Ingvild S. Espelien

Introduction

The Norwegian puffin dog is one of the world's rarest breeds. The breed survived at Værøy (Vaeroy) and all dogs of the breed living today originate from this remote Island at the South west end of the Lofoten Archipelago, Northern Norway. A small subpopulation of dogs used and bred for hunting puffins survived in the fisherman's village Måstad (Maastad). Måstad was almost isolated from the rest of Værøy until the village was abandoned in 1974. In this article, the history of the small dogs' life together with the fishermen's families is discussed. This includes the dramatic period of genetic bottlenecks which is also a parallel history of the fisherman's villages and the problems they faced during the same period.

The Norwegian Lundehund Club has the responsibility of the breed. In 2013 the Club works on a breeding strategy to preserve the breed for the future as a healthy and genetically sustainable dog.

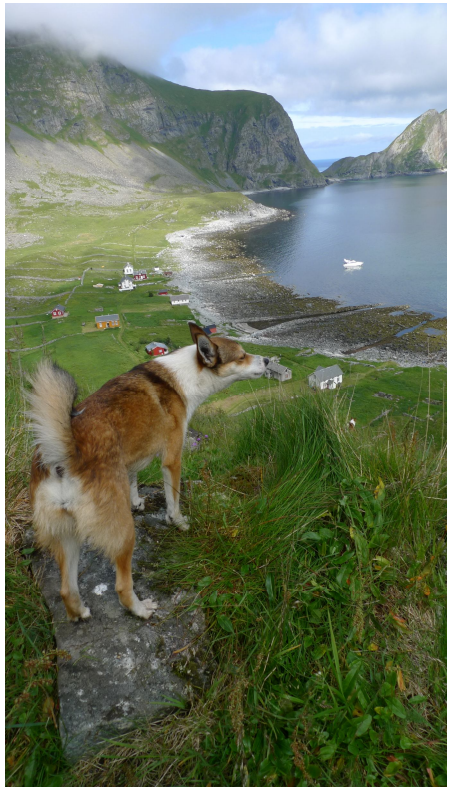

Figure 1.
A Lundehund looks down at Måstad, picture taken during the traditional Lundehund meeting every 4th year at Værøy.
Photo: I .Espelien

History

An important dog for the people along the North Norwegian Coast

The Norwegian Lundehund is an ancient breed. Its anatomy probably makes it the most exceptional breed in the world. The official English name is Norwegian Lundehund, but it is also known as the Norwegian Puffin dog, named after the little seabird it

used to hunt. The Norwegian word for puffin is "Lunde" or "lundefugl" ("fugl" means bird in Norwegian).

Today's Lundehunds all descend from a small number of dogs from the tiny hamlet Måstad on Værøy in the Lofoten Archipelago. The breed is very old, - the legends say that as long as there have been people on the islands of Northern Norway, there have also been Lundehunds. The first reliable written source of description dates from 1591. The Bailiff Erik Hansen Schønnebøl's account of his voyage to Northern Norway told among other things about the Lundehund and puffin hunting. He says the puffin nests in screes and burrows so that "one cannot easily retrieve the birds from the depth without having a small dog accustomed to crawl into the hole and pull the birds out".

In the 16th and 17th century there are many reports of Lundehunds along the coast from Helgeland to Finnmark. The most famous one is from the poem "Nordlands Trompet" (The Trumpet of Nordland") by the poet-priest Petter Dass, who described the puffin hunting on the island of Lovund around 1700. The verse in the poem, directly translated:

"But peasants, having a plan,
Knowing well how to rob the puffins,
By using particular dogs
Which are of built flexible and small,
Able to crawl into the narrowest corner

And pull out the puffin alive."

The puffin hunting was of economic importance

The importance of the Lundehund as a working/hunting dog is described several times in the 17th and 18th century. A good puffin hunting dog was highly appreciated. From Fugløy in Gildeskål it is said that the value of a good Lundehund equals that of a cow. Earlier, Lundehunds could be found wherever there were puffins. As it became more common to hunt with nets, the importance of the dogs for hunting diminished and the breed disappeared from most of its distribution range. The only dogs left in our times were at Værøy and Røst, where they were used to secure winter supplies of puffin meat.

The puffin is a seabird of the family Auks (Alcidae) in the order Charadriiformes. It was hunted both for the meat and for the down. The down of the puffin was known to be of almost the same quality as the down from eiders (Somateria mollissima). The down was an important source of income for many families along the coast of Northern Norway. The meat of the birds were conserved in salt for storage and eaten during the winter, or it was consumed fresh after frying in a pan. It was a favorite meal and considered a delicacy among the people in the fisherman's villages situated near seabird colonies, not only along the North Norwegian coast, but also on Iceland, the Faroe Islands and the other North Atlantic

islands. It is still eaten as an exclusive delicacy on the Faroe Islands and on Iceland, while the hunt is banned in Norway.

Figure 2. Before the Second World War, the Lundehunds were often white with markings, as well as tricolor and red with white markings. today, only the latter color exists. This picture from 1928 reveals that the dog was about the size of a cat, and it has not changed significantly

All Lundehunds of today descends from Måstad, Værøy

At the outbreak of the Second World War, Måstad had a population of 50 Lundehunds. These dogs came to the knowledge of the family of Eleanor and Johan Christie. They had a kennel named Luxor and bred English setters. They understood the importance of preserving the small Norwegian breed. Six dogs, among them the two named Urd and Ask, were sent to them from Måstad, and they started a breeding program in the south of Norway. Soon it was more than 60 dogs there. In 1943, canine distemper struck at Måstad, this was a disaster for the breed. Only one dog survived, and it never recovered fully form the disease.

The Christie's however, could send dogs back to Måstad. This was during war times, and the transport of the dogs up to the North along the Norwegian coast in small cargo ships was a risky travel, both for the dogs and for the men on the ships, as is was forbidden to do this. Three dogs, the two littermates Otter and Lunda of Luxor, and a female named Mari who was mated before she left, were sent to Måstad and arrived safely there after a journey of six weeks. Otter and Lunda were puppies after Urd and Ask, while Mari in fact came home – she was one of the dogs sent to the south in 1938. Mari, unfortunately, lost her first litter, but bred later a litter at Måstad, but her descendants seems to have been lost during the next decade. Otter

and Lunda had several litters, and the population at Måstad grew rapidly during the period of 1944-1955. In 1944, shortly after the three dogs arrived at Måstad, the canine distemper struck again. This time it and wiped out all the Lundehunds in Southern Norway, except Urd, who died I 1947, nine years old.

The kennel Luxor was closed after the canine distemper in 1944. Eleanor became a widow in 1956 after her husband had been ill for a longer period. They still kept some Lundehunds during this period, but they did not breed.

Kathrine and Monrad Mikalsen worked together with Eleanor Christie to save the Lundehund

In 1960 Eleanor Christie took up her mission to save the breed. By that time Måstad was practically depopulated, except for one couple, Kathrine and Monrad Mikalsen and their two dogs, Lady and Morsk. They were full siblings and their parents were Otter and Lunda. These two dogs provided Eleanor Christie with 3 littermates, the male Rune and the dams Eir and Rind. Later, a male named Piljo was sent to Oslo as well. Piljo was a half- brother of the three. He descended from the same mother, Lady, and his father was a male named Pan who lived at Værøy. His littermate Bobb 2 remained on Værøy. The last dog who was used in the initial breeding program in the early 1960ties was Buster. He was sent from Overhalla, but he was born at Værøy in 1960, and his

parents are not known. These five dogs are the ancestors of all Norwegian Lundehunds living today.

The Norwegian Lundehund club was founded in 1962 by a group of enthusiasts, and much effort was put into saving the breed. Eleanor Christie was the first leader of the club, and she was the prime initiator during the early breeding work.

Two genetic bottlenecks

The breed survived two genetic bottlenecks. The first was due to canine distemper in 1943-44, and the second due to the abandonment of Måstad during the 1950ties. The first bottleneck was probably very serious indeed. There is no documentation of other surviving dogs that bred except for the littermates Otter and Lunda. Still it is possible that some unregistered dogs bred during the period 1945-1955 and by this contributed genetically to the breed.

The dam Lady is the ancestor of all Lundehunds living today. She is the mother of the three littermates Rune, Eir and Rind, that she had with her full brother Morsk. She was also mated with Pan, and they got two sons, Piljo and Bobb 2. Together with Buster, these dogs are the ancestors of all later Lundehunds.

The two bottlenecks meant a great loss of genetic variation. An example is seen is the color genes of the Lundehund. Before WWII, there were also black (tricolors) and White Lundehunds (with colored spots), but these colors are extinct.

Early breeding strategies

In historic time, the breeding of the Lundehund was a semi-natural process. There was a dominant male at Måstad which mated the dams – unless the owners kept the dams behind closed doors to prevent mating. When he got old, some younger male would fight him, and take his place. Most of the litters were born in the family houses, according to interviews of old people who lived at Måstad.

Some litters were accidentally born in small caves dug out by the females under the houses in the village. The females took good care of the puppies. The families chose a puppy or two from each litter to keep for hunting, and they gave away others. Still, the excess puppies probably were culled while they were quite small. All dogs of Måstad belonged to the families there, there were no stray dogs.

The breeding in Southern Norway was quite different. The Christie family bred the dogs in a kennel and planned their litters primarily to increase the number of dogs rapidly. The same strategy was dominating through the 1960ties, as the number of dogs was low and it was necessary to breed as many puppies as possible.

An increasing population

In 1971, the number of Lundehunds passed 200 individuals, and this made it easier plan the breeding. Export of dogs to other countries was allowed. During

the 1970ties, the breed was established in Sweden and Denmark. Today there are Lundehunds in 21 countries in Europe, America and even Asia.

Today, there are approximately 1400 Lundehunds. Of these, 520 are in Norway, about 200 in USA and most of the rest are in the European countries. The Nordic countries are the breed's stronghold – and there is an extensive genetic exchange between the subpopulations in these countries.

Figure 3 A Lundehund retrieving a live puffin. Photo: Roar Torsteinsen

Anatomy and function

The Lundehunds task was to hunt and retrieve puffins

The work of the Lundehunds was to retrieve puffins from burrows in screes and cliffs. Their anatomy is particularly well adapted to moving on rugged grounds and crawling into the narrow passages to the birds nest. The anatomy of the paws with their large surface gives a very good grip, not only for climbing but also when going down steep and stony screes. The outer ears may fold tightly to prevent dirt to penetrate. Hyper flexibility of the shoulder and neck joints helps the dog to crawl into the narrow crevices and also to turn in the narrow space when retrieving the birds.

As a bird retrieving dog, the lundehund was highly specialized. It caught the Puffin alive and retrieved it undamaged to the hunter. The dog's owner could thus let the bird free if it was not suitable for food, and if the hunter chose to keep the puffin he - or she (many of the hunters were youngsters of both sexes) could cull it by a quick turn of the birds' neck and collect it in a belt around the waist. This way, the skin of the bird was undamaged and it would be easy to pluck the down. It was important that there was no blood in the down, as this would make it unsuitable for sale. This meant that the dog should have a soft, but firm and controlled bite and no urge to kill its prey.

Outlines of the breed standard with some important comments

The Lundehund is a primitive Spits and a hunting dog which worked independently and by instinct with little training. Even today, an untrained Lundehund will easily retrieve live puffins if it is allowed. This has been tested on several occasions during the production of films about the breed. As a primitive breed, it is specialized on the puffin hunt. It is a dog which survives during the harsh natural conditions and climate typical for the Lofoten Archipelago. This area is situated north of the Arctic Circle. Even if the Gulf Stream provides better climate along the Norwegian coast than anywhere else north of the Arctic Circle, it is still harsh conditions for a small dog. They were adapted to this life and thrived.

The breed standard of the Lundehund has always been based on the dogs' origin and function. In the following, some outlines from the standard are discussed with emphasis on this.

The first Norwegian breed standard was accepted by the Norwegian Kennel Club in 1943. The latest standard revision was approved by the Norwegian Kennel Club 04.06.2009 and in FCI the 22.02.2012. The Norwegian lundehund is also recognized as a breed by the AKC in USA from 2012. The revision of the standard in 2009-2012 was conducted by the breeding council of the Norwegian

Lundehund club, were the author of this article is a member.

For the complete standard in English, refer to FCIs website at: http://www.fci.be/

An outline is given below with comments from the English version of the Norwegian breed compendium. This may be purchased from the Norwegian Lundehund Club at their website: www.lundehund.no

A few extra comments are also given from the author.

The Norwegian lundehund, outlines from the breed standard with comments

Classification FCI:

Group 5 Spitz and primitive types. Section 2 Nordic Hunting Dogs.

General appearance

Spitz type dog, small, rectangular, supple, rather lightly made; morphological characteristics different according to sex.

Behavior/character:

Alert, energetic, lively.

Comment:

It should be very flexible and have a friendly disposition. It is never low to the ground or squarely built. The lundehund is the smallest of the Nordic spits hunting dogs.

Jaws / Teeth:

Scissor bite preferred, but a pincer bite or a moderate prognathism of the mandibles is permitted. The absence of premolars on both sides, jaw and mandible, is accepted.

Comment:

The jaws should be well developed to facilitate the retrieval of birds. A level bite, reverse scissor bite or moderate undershot is tolerated, as is an uneven bite and lack of premolars. The lack of genetic variations in the breed makes it difficult to select against these problems, but a severely undershot dog should be downgraded. The bite should always be functional. This means that the dog should be able to control its bite. Refer to the task of retrieving live puffins. It should also be able to eat its natural food, which includes dried cod and fish bones.

Comments on the hyper flexibility

The joints of the Lundehund have more flexibility than in any other dog breed. The flexibility does not, in any way, harm the dog. The dog is very functional both for its original purpose, but also as a companion dog. It is a dog with great stamina and will easily follow much larger dogs for a full day in the mountains. It will not be tired when it walks for several days together with its owner.

Hyper flexibility of the neck

The head is carried relatively low. The neck vertebrae are shaped so that the dog can virtually turn its head over its back. Photos of this can be found in Beregovoj and Porter, 2001. To do so is vital when turning in the narrow burrows.

Very flexible and elastic shoulder muscles

The Lundehunds shoulder joints allow the forelimbs to extend at nearly 90 degrees from the body.

Note that Dog show judges are instructed NOT to check the hyper flexibility of the neck and shoulders in the show ring. This because all of the lundehunds has this feature and there is no variation between the dogs. Also, the dog's owner may easily demonstrate the flexible movements, as the dog will normally trust its owner. It would not necessarily trust a stranger to do this. The dogs often demonstrate this ability in its daily life by moving or even sleeping in "unnatural" positions but we will stress that must NEVER be demonstrated in the show ring because it could scare the dog!

A polydactyl breed

The Norwegian Lundehund is a polydactyl. Instead of the normal four toes on the front paws and five behind, the Lundehund normally has six toes, all fully developed joints and muscles and tendons going

up the inside of the leg, partly responsible for its wide front gait. Some individuals may have more, others less than six toes per foot, but less than six on the front paws should lead to downgrading. The extra toes help the dog when it climbs crevices in screes and cliffs. In countries where a written critique is given for each dog, the judge should comment on the development and function of the extra toes. Six toes on each paw is specific for the breed and one of the most distinguishing traits. The extra toes on the hind paws are normally less developed than those on the forepaws. Deviation from the ideal, both regarding number and placement, should not be penalized.

The paws of the Lundehund should always be functional, both for its original purpose –to climb in the cliffs, but also during normal activities. This means that a correct paw has six strong toes with functional skeletal and muscular construction. The paws are larger than normal for such a small dog, and this makes it very suitable for moving in i.e. deep snow, in soft sand and in marshes. While the lundehund is not constructed for trotting all day, it will still be able to move unceasingly for a full day.

It is important to remember that the polydactylia is a genetic stable trait and it would not be wise to breed for "improved quality" of the toes, but rather conserve the good quality it has today. Seven toes on one paw is not a fault, and it accidentally happens that a dog has seven toes - but it

is not desirable to increase the number of extra toes by selective breeding.

Figure 4. A Lundehund with high quality paws, showing functional polydactyli. Photo: Arild Espelien

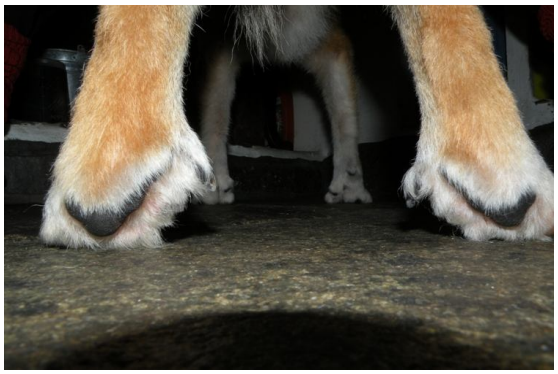

Figure 5 Hind paws of a Lundehund. The pads do not touch the ground when the dog stands. In the terrain, the pads will follow the cliffs and give good grip. Photo: Ingvild Espelien.

Figure 6. Front paw of a high quality polydactyl Lundehund with 6 functional toes. Photo: Arild Espelien

Figure 7. Hind paw of a high quality polydactyl Lundehund with 6 functional toes. Photo: Arild Espelien

Gait/Movement:
Light and elastic. An external rotary action of the forelegs and somewhat close action behind is characteristic of the breed.

Comment from the breed compendium:
When judging the movements of the Lundehund, one must consider that this dog is built to climb efficiently up and down steep cliffs and screes. The extra pads on both fore- and hind paws will touch the surface to aid the dog in climbing. The extra toes help getting a grip when ascending and descending. The wide hyper flexible front enables safe climbing, as the forelegs can grip at a 90 degrees angle to the body. On flat surfaces, the Lundehund will show typical rotating front leg movements, due the extra toes on the inside of the legs. Hind leg movements are narrow. This helps the dog do place the big paws in an effective pattern.

Color:
Always combined with white; from red to fawn, coat more or less sprinkled with hairs with black tips; white with dark patches. The adult usually has more marked black tips in the coat than the younger dog.

Comments from the breed compendium:
White dogs with tan patches (i.e. tan with black hair tips) around the eyes and on ears may appear and are

fully acceptable. White markings on the body should preferably be symmetrical. A dog which has got half or more of its head white, and no pigmentation around the eyes, is not acceptable and should be downgraded. Before the genetic bottlenecks, the colors of the dogs varied more; it could be black or tricolor as well as white with markings.

Height and weight:
Height at withers: Male: 35 - 38 cm.
Female: 32 - 35 cm.
Weight: Male: about 7 kg.
Female: about 6 kg.

Comments from the breed compendium
A small, flexible, lithe, rectangular dog is to be preferred. For the dog to be able to get into the burrows, it cannot be coarse.

Health
The Lundehund is a healthy dog, due to its functional construction. Since it is a primitive dog, it is easy to keep and to breed, a healthy behavior and well developed instincts. Still there is one health issue that will be discussed below.

Consequences of genetic bottlenecks – Intestinal Lymphangiectasia

In the 1960ties, the breeders discovered that quite a few of the dogs became ill and died from intestinal problems. The illness was named the Lundehund syndrome, and it took some years to discover that it was intestinal lymphangiectasia (IL). IL is caused by congenital malformations of the lymph system of the small intestines. This leads to malabsorption of fat and by this, a blocking of the lymph system and a significant reduction of the protein uptake. This may lead to osmotic failure in the dog. Intracellular water leaks out between the organs and the dog may starve due to damage of the intestines. It may also develop emphysema in the belly, the heart sack of other cavities. This may be life threatening.

The owners and the veterinarians in Norway has, during the 50 years since the disease was discovered, developed good methods for treating the sick dogs. Unfortunately, the breeding program has failed to reduce the rather high frequency of the disease.

Figure 8. Two of the authors' daughters with the Lundehunds living at their kennel in 2006. Photo: Ingvild Espelien

Breeding strategies and conservation breeding

A new breeding strategy in the 1980ties

In 1983, the breeding council of the Norwegian Lundehund club made its first strategy to avoid inbreeding and to prevent further loss of genetic diversity in the breed. The Swedish geneticist, Per Erik Sundkvist, advised the club to breed as many dogs as possible, both males and females. He also suggested putting restrictions on the number of offspring from each male to avoid matador breeding. This strategy has been loyally followed by the

breeders thereafter, and it has been refined during the following years.

The future breeding strategy – the future of the Lundehund

It is unlikely that the lundehund will be used for its original purpose in the future. The puffin is now a red listed species in Norway. The cultural traditions for hunting puffins with dogs is virtually extinct.

The Lundehund is a nice companion dog, and it might be used for new purposes. It is well suited for retrieving birds, and it is also a suitable dog for searching for wounded game after hunting or traffic accidents. Its small size makes it easy to use for tracking on leash. For people who like outdoor life, will find this to be a perfect, small dog, as it will thrive in any climate.

The breed's only problem is the IL. Today, the Norwegian Lundehund club is developing a new breeding strategy to solve this. The aim is to reduce the number of affected dogs through a larger national strategic breeding program. During the process, the club will cooperate with the Norwegian Genetic Resource Centre, the Nordic Council of ministers' institution NordGen, the Norwegian Kennel Club, The Norwegian University of Science and Technology and The Norwegian School of Veterinary Science. The details of this new breeding program are still not clear.

It will be necessary to increase the genetic variation of the breed to accomplish the desired effects.

Figure 9. Today, the Lundehund is a perfect companion dog for families who like to be outdoors. It is social and suits well together with larger dogs like the Samoyed. Picture taken in the mountains of Central Norway. Photo: Ingvild Espelien

Figure 10. The lundehund is still a hunter and may easily learn to kill pest rodents. Photo: Arild Espelien

Thank you:

This article is based on the book "Lundehundboka" which was published in 2012 as part of the Norwegian Lundehund Club's 50 years anniversary. The article is also based on the breed compendium. It is produced by The Breeding Council of the Norwegian Lundehund Club in cooperation with members of the Club.

Hanna Gautun has been a key coworker on issues concerning the breed for the later years. Arild Espelien is the main photographer and has helped with the text.

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For more information about the Lundehund, confer www.lundehund.no and linked sites.

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