Annika Michelson

COME SHEEPY, SHEEPY! CUTE SHEEPY, SHEEPY!

Experiences of Traditional Sheep Keeping

A publication by the KnowSheep-project
Tallinn 2013

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Frontpage and backpage: Sheep on their way to the summer pasture. Photo: Sonja Tobiasson.

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Sheep – a Gift to the People in the North!

A hundred years ago, it was typical to see a common village meadow or a common forest grazed by sheep, cows and horses together. This is something we seldom experience nowadays. The beneficial co-existence by different domestic animals in the old days was based on the long and dark winter when the animals shared a common stable. They became one flock. In summertime large animals protected the smaller ones from predators, though humans were always present - living closely together with their domestic animals and also guarding them. A shepherd was there to assist when domestic animals needed help. A close connection was, and still is, the basic foundation for building a trustful relationship between man and domestic animals. Women were closely related to sheep as all caring and work was done by hand in direct contact with the animals. Today we limit to a great extent what, where and how sheep eat and live. In the old days sheep could independently decide many things by themselves. Nowadays machinery has in many cases re-

Sheep follow people they trust. Karl-Erik Jäetma has been taking care of sheep since the age of 15 and he is a member of the flock. Photo: Taavi Jäetma

placed humans for different kinds of work. Today domestic animals are more afraid of humans than trusting them.

Sheep were very important animals supplying families with mainly wool for warm clothes but also meat and fur. Bones and horns supplied raw material for a wide range of different tools. Our native sheep are easy to teach and easy to communicate with. You can teach them their names and how to behave in different situations. Sheep were also important animals for children. From sheep, children learnt how ewes took care of their lambs and how rams protected the flock. Small lambs are funny and do funny things, which amuse farmers in everyday life. Sheep are animals full of affection. Native sheep are small in size and suitable for both women and children.

Traditional sheep keeping differs from modern industrialised sheep keeping in many ways. This book contains some basic information about traditional sheep keeping, both practical advice and also folklore. Information about traditional sheep keeping is useful for all new sheep keepers but especially for small farmers who want to keep sheep in a traditional way. Every farm is unique and advice given in the book may work on one farm but not on another. Still, it is possible to keep sheep in a traditional way. Native sheep need care but most of all they need kindness and love!

Annika Michelson
March 2013

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1. I want to keep sheep!

Many people may feel like they would like to keep sheep. Before you get sheep you should think about how you live and if you can offer your sheep the environment they need. There are many things you should think about before you decide to start sheep keeping. Here are ten central questions and by answering them you will know how easy or difficult it would be for you to start keeping sheep.

1. Do you have pasture areas large enough? If the pasture is too small you will have future problems with sheep parasites. A year old sheep counts for 0.15 animal units and this is good to know if you plan to apply for EU agricultural support schemes. In order to get basic animal support you need at least 0.4 animal units per ha. For ewe support you need at least 10 one year old ewes. On coastal meadows it is recommended to keep 1.5–2 animal units per ha and on alvar it is recommended 1 animal unit on 5–10 ha or 0.2–0.5 animal units per ha. If there is a thicker soil cover on the alvar, it can be 1 animal unit per ha; i.e. up to 6 sheep / ha.
2. Do you have cultivated pastures or semi-natural meadows? Semi-natural pastures are to be preferred in traditional sheep keeping. When taking care of semi-natural pastures you can keep up a high biodiversity in the landscape.
3. Do you live in a remote place with no neighbours or do you live close to other households? Sheep have a tendency to run outside their pasture areas, especially if the pastures are too small.
4. Is there a risk of predators in your area? If there is a risk, you must consider extra costs either for guard dogs or a shepherd. Some problems can be prevented by keeping sheep inside at nighttime. Fences, even fences designed to be predator safe, are usually not 100 % safe.
5. Are there any cereal or vegetable fields close to your farm? Sooner or later the sheep will discover them resulting in damage and a possible fight with the field owners.
6. Do you have your garden fenced? Your garden has different interesting plants and sheep would love to visit your garden.
7. Do you already have a fenced pasture or do you need to build a fence?

The cost of the fence is usually the highest cost in sheep keeping and it takes time to build it.

8. Do you have the required buildings or do you have to build some new ones? Old buildings can be used for sheep keeping. You may also need a summer shelter on the pasture if the pasture is located far from the main shed.
9. Do you have hay for the sheep? Do you have your own machinery and can you produce the hay yourself or do you need to buy it? Sheep also need straw or hay for bedding.
10. Do you have access to a forest to collect leaves and branches for winter fodder? Sheep like to eat leaves, branches and bark also in summer time.

Sheep are not rare in our countries**,** but nevertheless there is little knowledge about sheep both in the agricultural sector as well as in the veterinarian and educational sector. You will get better treatment and advice for your dog than you will get for your sheep! That is why sheep keepers in many countries have built up their own strong networks. If you want to start sheep keeping then start by building up your own network of contacts with experienced sheep keepers, farmers' organisations and people in the educational and advisory sectors. You will find a lot of information on the Internet on the homepages of farmers' organizations, networks and forums. You will get the best and timeliest asisstance from sheep farmers who live nearby. You need your network regularly for getting new rams, sheep care, transport issues, purchasing goods as well as marketing and selling products. Together it is easier!

2. What kind of sheep and how many should I get?

There are many sheep breeds you can choose among. Meat sheep are suitable for industrial sheep keeping on cultivated fields whereas native sheep are suitable for traditional sheep keeping on semi-natural pastures. Traditionally, sheep keeping was not a one-source-of-income production like industrial sheep keeping is today. Traditional sheep keeping was and still is an additional source of income giving a large range of products such as wool, meat, fur, horns and bones. Traditional sheep keeping is suitable if you want

to graze semi-natural meadows. Do not base your decision on what breed to keep upon the size of the sheep (i.e. larger sheep = more meat = more money). Base your decision on the type of pastures that you have! Native sheep, especially those that have been bred little, are not easy sheep to start with. Less bred sheep are more free in their souls and they think as well as decide a lot themselves. Native sheep may be very difficult to keep if you place them in an unsuitable environment with too little space to walk. Native sheep love to walk and look for their own food in a diverse landscape. If you choose to raise endangered native sheep, join the preservation programmes and help to protect them. You will not only be getting sheep, but the whole cultural heritage surrounding them.

There are many attractive sheep breeds, especially in the United Kingdom, but also in the Nordic countries. If you would like to import native sheep from another country, think twice, especially if they are endangered in their own country. Can you preserve them in your country? Will you get a suitable ram for them in your country? Are they lost to their genetic population when you take them away from their home country? Many native sheep have very specific characteristics that are not always fit for another country. Icelandic sheep are used to grazing on open mountains, Norwegian Villsau are used to stony and rocky hills close to the sea, Ålandsheep are used to grazing on small islands in the archipelago, whereas Finnsheep are used to walking in forests. If the sheep do stay alive in a foreign environment, then even a small change in environment and climate conditions may cause problems in the fleece. Icelandic sheep have a long slippery overcoat suitable for a climate with a lot of rain and wind and a less fine undercoat than, for example, the Finnsheep. Thus Icelandic sheep are less suitable for a climate with long cold winters like in Finland or Estonia. As native sheep are endangered in most of their native countries you should select native sheep of your own country. This way you help preserve a valuable local genetic population. Keeping sheep only in summer may be suitable for families with children that stay the whole summer in their summer cottage. If you have suitable areas to graze, make an agreement with the closest sheep keeper to either purchase or borrow some sheep for summer. Also ask the farm if they could help you with advice during the summer concerning sheep keeping as well as with slaughter in the autumn.

Sheep are flock animals and a flock consists of at least 3 sheep. Having a

flock ensures safety. Two ewes and one ram are a good start for a small sheep farm. Sometimes one sheep is replaced by a goat or a cow. If you have one goat and 2 sheep, the goat will be the boss. If you have one cow and two sheep, the cow will protect the sheep from predators. If you keep one sheep alone, it will be very unhappy and could die of stress. If you have one ewe and one ram, the newborn lambs will not necessarily get the social skills they need to be able to function in a larger sheep flock. When you buy sheep you should check if they are healthy. The fleece should look normal and it should have been regularly sheared. If the wool is felted and dirty, the sheep may not have been correctly cared for. There should be animals of different age in the flock. If there is Mæde-Visna disease in the heard, there are usually no old animals as they die before they get old. The eyes should look clear (not infected) and the sheep should walk normally. It is a good start to buy one ewe with two lambs or two ewes with one lamb each. The ewes should preferably be of different mothers. It is good to buy one ewe that has lambed at least once as you can be sure that she lambs without ptroblems. Contact native sheep organisations in order to get contacts of reliable sheep keepers, if you want to buy genetically valuable native sheep.

Native sheep can grow very old. A ram of the Swedish sheep Svärdsjö, grew to nearly 20 years old. A ewe was 28 years old. Ewes may become older if they do not lamb every year. A general recommendation is that native sheep should be allowed to grow as old as possible and continue to reproduce as long as they are fertile and have no problems with lambing.

3. How should I keep native sheep if I want to conserve genetic diversity?

In most countries native sheep are already "found" and under conservation. Still, we have countries and regions in the far north of Europe where you can find undiscovered flocks of native sheep. The keepers are often old and sheep are kept in traditional ways. Native sheep in Northern Europe belong to the short-tailed sheep family of breeds and they are very similar to each other. They have short tapered tails and no wool on their heads or legs. Many of

them have little wool under their stomach too. You find many different colors, marks and wool types among them. By examining a sheep's fleece structure a handicrafter can tell what the prevailing climate is like in the region where the sheep comes from. Usually native sheep are smaller in size compared to modern breeds. However, you will also find difference in size among native sheep – some are larger, others smaller. North European native sheep's most valuable characteristics are not all visible – they are good mothers, fertile, healthy, curious and social animals.

Usually all countries have their own organisation or an appointed responsible organisation that takes care of the conservation of native animals. There is an essential difference between conservation and breeding. If you protect genetic biodiversity you would want to keep the characteristics of your sheep the same over time. Your sheep should look the same after 20 years of preservation as they looked when you started with the conservation work. In conservation you also want to raise them in a traditional way. Native sheep are no longer native sheep when you start to raise them in an industrial way or when you benefit only from the meat and leave all the rest of their products unused. Breeding means you want to change their characteristics into qualities that for the present time are economically useful. Many countries have conservation agreements with farms for them to get support for taking care of native sheep. In other countries, conservation is totally based on voluntary work and you need to make a conservation "agreement" only with yourself!

All sheep within the European Union, by law, must be marked by numbers attached to their ears according to the law. Traditionally sheep have been marked with cuttings in their ears with owner marks. Many conservation organisations also collect information about rare breeds in their own databases in order to give advice in finding suitable mating partners. Written breeding recommendations are good to make for each gene bank population annually. These recommendations should be written by people who know the most about the origin of the native sheep population. Often it is a native sheep non-governmental organisation, research institute or private individuals who have been involved in looking for the prime native sheep populations or those who have kept native sheep themselves for a long time. It is also common that older sheep keepers advise new sheep keepers in choosing a ram. Farms that have been keeping and selling native sheep for a long time have their own network

To the left you can see how preservation as a living gene bank looks. In the middle you can see how preservation looks when only certain animals with a certain look and certain production qualities are accepted. To the right you can see how the flock looks when you keep up a strong selection or follow only one special pattern in preservation.

and many farm owners exchange information and advice in their own network on a regular basis. The following discussion about breeding is based on advice given by Louise Lindquist at the Swedish Native Sheep Organisation.

What kind of ram should I choose for breeding? It is important that the ram develops normally, that he has had a good mother that has taken good care of her lambs and that he is not angry. It is better to use a ram from the same breed than to start breeding with sheep from other breeds. It is important that all ewes have both ram and ewe lambs. The aim should be for all ram lambs to have descendants. If you get a chance to buy prime ewes (first line discovered native sheep ewes) then it is important to preserve their descendants and use them in breeding. It may be good to use a 3–4 generations younger ram on an old prime ewe.

How long can I use the same ram? It is most important that one ram should not have too many lambs, i.e. matador breeding. There have been situations among native sheep populations where one ram was the father to more than 70 lambs. This ram was sold two times and among the small population it resulted in a situation of animals related to each other on both the mother's and father's side. It is not good for the population to be as small as for example 200 ewes in wintertime. If an ewe does not get pregnant the first year you should try with another ram and at least let her live 2 years before you take her away from the flock. It is recommended that one ram

should not be used for more than one year (depending on how small or big the herd is and how many lambs the ram has got in the whole population). A good amount may be 10 lambs / ram that will continue breeding within the population. A ram that has been used should not be sold but one of his sons should be sold instead. This way you will get more diverse genetic combinations in the native sheep population.

How closely can the animals be related for breeding in a small population? Regarding family relationship, it depends a lot on how many sheep you start out with. Usually there is a low number of sheep in all recently preserved native sheep populations. This means that many have the same father in the first generation. At the beginning it is impossible not to mate related sheep with each other. For this reason it is important that all rams get a chance to mate at least some of the ewes. After 10–15 years of preservation work it is not that difficult anymore to find a suitable ram but some lines may still be small, so all rams that are born need to be used. It is good to keep two different rams in breeding. This way it is possible to use your own born rams for mating in the autumn of the second year.

It is not recommended to mate half-sisters, mother-son nor father-daughter related animals. However, there can be exceptions to this rule. For example, if the flock is small and you have got only one lamb from the ram one year and there are only 4 ewes in the flock, in this case it is acceptable to use the same ram for one more year. If you use this method, it is important to follow how the newborn lambs develop. It may be long distances between owners of different gene banks and in these cases it is acceptable to use a ram for two years in a line. The lambs will be accepted in the gene bank if they are normal and develop normally. In these cases it is important to get an unrelated ram for the third year, that produces one unrelated offspring per 3 generations.

Inbreeding – are all small population lines the same hardy? Some lines are very hardy against inbreeding while other lines are not that hardy. At Ruhnu Island in Estonia, native sheep have been kept for a long time and rams have seldom been brought to the island from other locations. The same situation has been ongoing at Kihnu Island in Estonia. If some lines get rams with only one ball or sterile ewes then one should be more careful in breeding within these lines. If you do not get a new ram, it is better to use this ram's son or several sons instead of using the same father ram again. In this case, if possible, one can divide the flock into two parts and use one ram in one

and the other in the other half in order to avoid half-sisters and mother-son / father-daughter mating. It is important to do the best that can be done under the circumstances. Do not use the same ram anymore when the lambs born are weak, deformed or if the lambs do not develop normally. Some old women have used only their own rams for many years. They have a way to choose rams from different ewe lines in their own herd and after a certain interval cross-breed the lines again. Among Estonian native sheep we have noticed that mother ewes may protect their young daughters from getting mated. In 2011 a ram tried to mate a young ewe at Kiltsi Meadow for several times but the mother ewe attacked and hit the ram each time until he stopped. There may be an inner regulation kept up by older ewes if the age structure in the flock is diverse. There may also be strong inner regulations in native populations concerning the mating of son-mother and father-daughter. No investigations have been carried out on these issues.

When is it possible to cross in the same line again in the flock? The same line can be used again after about 2–3 generations, depending on many factors. It is important to get as many ewes from the old mother lines as possible. It is good to write down all old ewe-lines and see which one has got the most rams. In this case an ewe lamb to such an old mother ewe is very interesting. It is important that all old prime ewes get an even amount of descendants. If there are a lot of ram lambs and you do not know which one to use for mating and which one you should sell, check which ewe line they belong to and see how many descendants there are of that line. In theory it should work like this but in practice there may be reasons to make a different decision.

4. What kind of buildings do sheep like?

Before you get sheep you need to prepare the building where you will keep the sheep. A traditional wooden shed is good for a small flock of traditionally kept sheep. Many areas in Northern Europe have traditionally had animals located in the same building where people live, for example in Estonia and in Karelia. This is very practical, especially in winter, as people can care for animals without leaving the main building. Native sheep do not need a warm shed but a shed with well functioning ventilation. They do not mind

The traditional Estonian farm house has two doors opposite each other in the barn, which along with other purposes were used for making draught.

cold as long as they are kept in a dry place without draught in wintertime. The wool protects them from the cold and under their skin they have a layer of fat. Healthy and well fed animals can stand very cold minus degrees. Humidity is too high when the walls have condensation = frost on walls inside in winter or when the wool feels wet when you touch it.

In summertime black or dark colored sheep can become too hot. You can cool them with water, which is not so easy to arrange in practice, nor are the animals willing to stay under a water shower! An easier way to cool them is to offer indoor space in the shadow with a floor of cold soil. Sheep enjoy this very much on a hot summer day. By opening and closing the doors in the shed you can also regulate the temperature inside. Find out on a warm summer day how long your building is colder inside than outside. Open doors first when the temperature is as warm inside as outside. Traditional Estonian farm buildings are very practical with two doors, one on each side of the building. In this way one can choose which door to open or close to give animals a good place to stay. Wooden details inside can be treated with tar which may help to keep the amount of insects low in the stable. Swallows eat a lot of insects, too.

Sheep should have dry bedding material. Lambing ewes need extra bedding material in order to make a nest for lambing and also to protect lambs from cold if needed. Provide your ewe with enough space when lambing. It needs some distance from the other ewes. Sheep should be able to see, hear

A traditional fixed wooden feed trough at Setu farm museum, Estonia.

and smell the other sheep even if they are separated from the flock. Rams may be difficult to keep in wintertime. If you put a ram in a separate area, give along at least one ewe and he will feel happier.

Present regulations require normal periods of light and dark over a 24-hour period to reflect natural light rhythms. However, native sheep in Northern Europe are used to long periods of darkness in wintertime. Sheep fear sharp lighting contrasts and are reluctant to move from bright to dark areas and vice versa. Consequently, a light source that produces uniform illumination without dramatic shadows is to be preferred.

Ecological sheep keeping requires that sheep can walk outside in winter when the weather is fine. Far up in the north, sheep have traditionally not been kept outside in wintertime, mainly due to predator risk. Traditionally stables were small with low doors and small windows, if there were windows at all. Instead of windows there was usually a hole for removing manure. It can also be used as a window.

Sheep need a summer shelter at the pasture area if they cannot use the winter stable in summer. Sheep need shadow in summertime and places to escape if there are too many insects outdoors. You may also need bedding material in summer. Regular daily cleaning keeps the amount of insects down. A large tree in the meadow can provide the needed shadow during warm summer days. A big wooden trunk can offer wind shelter, even if it does not give shadow from the sun.

In the European Union there are minimal requirements for space for sheep that vary depending on their age, sex and size. However, it is good to provide

sheep with much additional space as they are used to free movement. They need also to settle their indoor hierarchy, which often requires more space as some individuals are more dominant than the others. A ram takes more space than an ewe. Younger ewes take less space than an old leader ewe. If you have several mature sheep lambing, the space needed is also larger.

Wood is a good material to use for indoor stable furnishing. Sheep eat traditionally from wooden feed troughs as wood is durable and cheap in Northern Europe. The size of it was about 1.2 m long and 30 cm wide. You have to make as many feed troughs as the sheep need to eat simultaneously. Put the trough a little higher up so that it is not directly on the floor in order to avoid manure getting in it.

Juniper and spruce are strong materials which can be used for building different feed troughs. Aspen is soft and from its trunk you can make a nice traditional one-stem trough. Wooden troughs are easiest cleaned with hot water. Add juniper berries or branches and the water will also have a disinfective effect.

Feed troughs should not have any sharp edges or corners. They should be shallow enough to allow the animals to maintain visual contact with each other while eating. Sheep, especially lambs, like to climb. Provide a place to climb on also indoors. They will enjoy a heavy wooden box, wooden blocks or straw bales to climb on. Lambs like a protected and separated place to sleep in. Be sure to provide them with such a space. You can build a separate area with a small entrance so that only lambs can go into this space. Make the entrance regulated so that you can make it larger as they grow.

5. What kind of fences should I build?

Traditionally sheep were kept free-ranging and cereal fields were fenced. As the number of humans grew and more areas were occupied by annual cereal cultivation, the old agricultural system was abandoned. In the new agricultural system with cereal cultivation as the main activity, domestic animals had to be fenced. Still there are areas in many countries where sheep are walking free. In Estonia it is mostly small flocks of maximum 10 sheep walking free and often guarded by an (old) woman. In North-West Russia sheep are

A nearly forgotten type of fence is the twig-fence, to the left on the photo. It is suitable in connection with grazed forests and was traditionally built in connection with clearing a forest area to become a pasture.

still walking free in the villages whereas cultivated fields are fenced. This is much cheaper in areas with low cultivation levels compared to fencing large (often semi-natural) pasture areas.

Free-ranging is still a good way of pasturing semi-natural meadows if you have no neighbours or cereal cultivation nearby. You need only to close off nearby gardens with a good fence. Sheep love to roam free! A small flock does not walk that far away from its home shed. Experience at Kiltsi Meadow in Estonia shows that a flock of 6–15 sheep walk about 2–4 km daily in a radius of 200 m around its home shed. Sheep have traditionally, if possible, been taken to pastures on little islands or islets for summer. They are pretty safe places for sheep. Some farmers check the sheep every second-third day, others only once a week, whereas in the old times somebody was usually shepherding them on the islands. It is a good idea to cooperate with summer cottage owners of an island in keeping an eye on your sheep if you do not live there yourself. The huge amount of islands in the archipelago of the Baltic Sea is well suited for sheep pastures. If there is a predator risk from eagles on the islands then keep some guard dogs staying with the sheep.

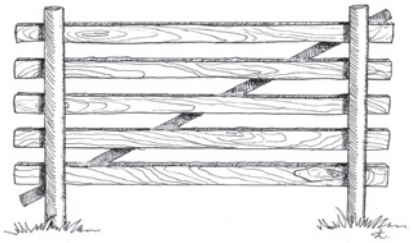
Native sheep are not so easy to keep in a fenced area, especially if they have been used to free-ranging and then are moved to a fenced area. They can stay in a fenced area as long as they like it and as long as there is enough food to graze. If they think there is something better in another place then they will go there. Native sheep are very good jumpers so they can nearly always find a way to escape from a fenced area. Native sheep walk a lot daily and if the fenced area is too small, they cannot walk enough. Sheep like linear fences

In the old days there were fences along the village road. Every morning and evening the shepherd took the sheep to the pastures outside the village and back again. Photo of Ruhnu main road. Unknown photographer

and are likely to walk along them. There are many different types of fences to choose among depending on your farm's geographical location and on the shape of your fields. Wooden and stone fences were widely used traditionally.

All old types of fences have a good impact on biodiversity as they are permanent. Old types of fences are used by sheep in a diverse way. They give the sheep the feeling of safety as sheep can hide themselves behind them, sheep can scrub themselves against them, they give shadow on a warm summer day and lambs enjoy to run on stone fences. A permanent fence forms an ecological corridor in the landscape that many small mammals and insects can use for migration. Birds can also use old type of fences to sit on and smaller animals find themselves a nice place to live in. Modern fences do not usually have this multi-purpose usage possibility as old fences do. Electric fences are light, easy to remove but sheep may have difficulties in seeing them. Fences of net do not give sheep the feeling of safety at the pasture and if not carefully done, sheep escape from these areas as well.

The most simple type of wooden fence is a ca. 2 meter long plain fence with a diagonal bar to keep it stable. You can make several fences and fix them together. This type of fence is easy to relocate.

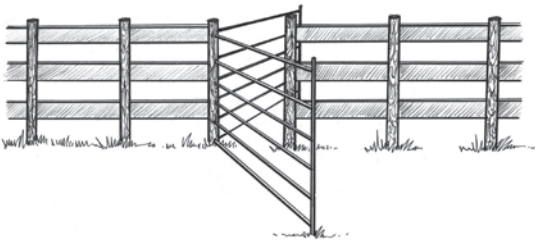


Wooden fences are suitable in connection to all pastures. If you build a wooden fence out of board then place the first board about 20 cm from the ground. A common problem is that sheep press their head between the boards in order to scratch their neck. If the board has not been cut with even edges, sheep may get stuck with their heads between the boards, panic and even kill themselves in this way. If an area has a good access to stones then they have also been used in building fences. Stone fences can be combined with both, wood and modern electric fences. Modern metal net fences can also be combined with wooden fences. Today metal sheep nets are widely used as fences as well as wired electric fences. Providers have guidelines on how to build them. If you keep electric fences, you need to cut the grass under and outside the fence regularly. Sheep net should be put very close to the ground as sheep have a tendency to put their heads under the net.

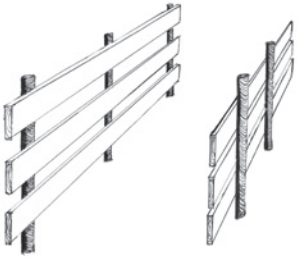
Spruce and juniper are good raw materials for poles. Wood for poles was traditionally cut down in new moon wintertime. You get the best materials in a thick grown forest as the spruce there has less branches which makes the poles more durable. Poles of deciduous trees do not last long. A cheap and ecological way to extend the life of poles is to burn the end of the poles. It is important that the part that will be put in the soil is burned in order to prevent it from rotting.

When you build fences you need gates as well. You may need both a gate for sheep to use and a gate that visitors can use. If people should have free access to the pasture then it is a good idea to build a stair across the fence.

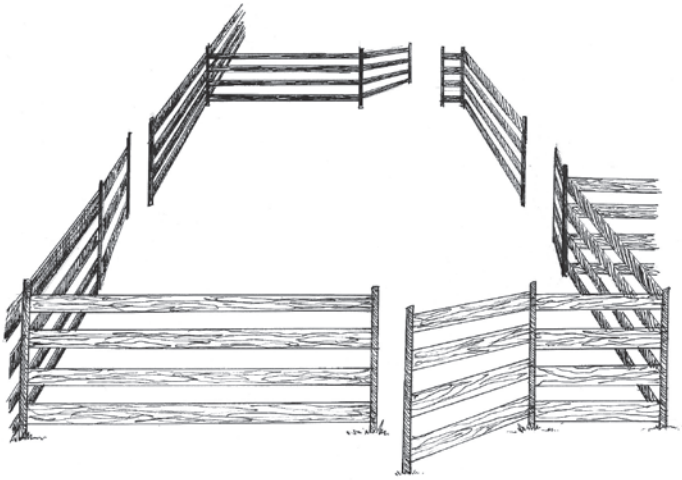
In connection to the pasture it is practical to have a gathering space in connection with the gate. A space that looks like a corridor is practical in many ways. You can reach the animals from both sides, they are easy to catch



Native sheep learn fast how to open gates, so a double gate is usually very good to use.



A corridor is a practical gathering area for sheep as it reminds of the old village road with fences on both side.



A square formed area is a practical gathering area for sheep.

and treat if needed. If you have guests the sheep can be put in the gathering area so that people can see them close up – especially children enjoy this. Sheep are easy to train to gather up in the area if you reward them on the arrival to the gathering area. A corridor is easy to close up in both ends if needed or you can press the animals by a gate into an even smaller area at the end of the corridor. Different types of V-shape can also be used inside the stable for gathering up.

6. What kind of administrative work does sheep keeping require?

In EU you need to register yourself as an animal owner and the sheep shed must also be registered as an animal keeping shed. Each animal should be marked with earmarks and registered in the official animal register. You can choose to register them on paper or by using an electronic service on the internet.

Finland

Elintarviketurvallisuusvirasto EVIRA

The sheep and goat register. Registration of animal owners, sheds and animals.

ProAgria Advisory Centres

WebLammas. ProAgria keeps up a sheep monitoring system, the Web-Lammas-service.

Estonia

Estonian Agricultural Registers and Information Board PRIA

Registration of animal owners, sheds and animals, online use by e-PRIA.

Estonian Animal Recording Center

Ordering ear numbers and nippers for animals.

Estonian Sheep Breeding Association

PÄSSU - a program which you can monitor information about your animals.

You need to learn how to fasten an earmark and this may take some time to learn. Invite an old sheep keeper to show you how to fasten them. It is usually not enough to read the written guidelines that you get from the authorities or find on the internet. Be aware that there are different types of earmarks and each type of earmark has its own nippers. Earmarking is a never ending problem for animal owners. Marking sheep is the easiest to do if you put them to sit on their rump. Then they will not be able to do any fast movements from the pain that they feel when you put on the earmark. Pain is individual, some say nothing whereas others tend to jump of fear. This work must be done quickly in order to avoid any accidents. Before the fastening you can disinfect the earmarking place. Avoid putting on earmarks when the weather is very warm, when there are a lot of insects or if the lamb is small. According to

the law the ear mark must be put on before a lamb gets 6 months old. If you have a lot of lambs you can choose to put colored bands around their necks in order to know who is who. Lambs tend to keep close to their mothers and in a small traditional flock there is normally no problem in recognizing who is whose. Earmarks tend to come off and due to this there is a regulation saying that sheep should have earmarks in both ears. If one number is lost you can order a new number. Native sheep grazing on semi-natural pasture tend to get caught in bushes, roots or trees with a broken ear and a missing earmark as a result. Many sheep keepers choose not to put a new mark in a broken ear due to animal welfare but it is against the regulations.

Many animal related issues are regulated by authorities. You should be aware of how to take care of sheep and know about their welfare. The Animal Protection Law has rules for animal keeping. You should know what kind of buildings, gates and fences are safe. Wounded and sick animals need special care and there are rules for how to take care of them. Transportation of sheep have their own regulations. Hoof cutting and wool shearing are regular care that all sheep need. Sheep should never have to suffer from pain. Prior to slaughtering they should get anesthetized which is easily and safely done with a captive bolt gun. You should be able to use your pastures in a way that they stay a good and healthy environment for your sheep.

The following information can be gathered into your own sheep farm database: number of shed, birth date, registration number, name, breed, color & marks, information about the mother and father (birth date, registration number, name, breed, color, sex), birth weight, other weight (for example slaughter weight), mating, lambing, wool type, wool weight, sheep temperament, information about selling and buying (name of owners, contact information and dates of movement), date of shearing, body measurements, illness & medicines (accidents), slaughter date, fodder, other. It is also useful to mark the dates your animals have been taken to the pasture in spring and permanently inside for winter. Any movement between pastures is also useful to note.

You are obligated to keep a database on the farm with information about your sheep – it is not much information that has to be gathered upon the requirement from the authorities. Usually the minimal requirement is to keep the sheep registration number, when it was born and who is the mother as well as information about the movement of animals (bought-sold) and

slaughtered animals. Many breeding organisations also want to know the registration number of the father. If you have applied for any agricultural support scheme or you stick to ecological farming there is usually additional information you must collect and keep books on. It is important to follow what happens in your sheep keeping. It does not take much time to write down the information of a traditional small flock of sheep.

7. How can I easily handle my sheep?

There are several regular treatments that you need to do in close interaction with sheep for example transportation, shearing, hoof cutting and ear-marking. Humans can be seen as predators by sheep and this can elicit strong fear responses that may be expressed by a range of behaviours including running, jumping and foot stamping. Sheep have an excellent memory and do not readily overcome their fears if they are reinforced by any procedure that causes pain or distress. Fear can only be overcome by regular contact with knowledgeable and patient personnel, who provide compassionate safe conditioning. Native sheep in Northern Europe have traditionally relied a lot on human. The long dark winter period indoors together with a human regularly feeding them gives close ties between sheep and human. Traditionally sheep were fed several times a day and not only one time. This also builds up close relations between humans and sheep. The more time you spend with your sheep the more you become one of the flock and the more they rely on you = the easier it is to handle them. Sheep in Kenozero National Park in North-West Russia do not run away from a human but run towards him when they meet a man in the village. This is a clear sign of the close connection and how much sheep rely on humans in the area.

You can use the animals' natural behaviour to help you with routine tasks. Sheep naturally 'follow the leader' and stress can be reduced by handling them in their own preferred social order. Handling pens and fences should be properly designed and located to encourage animals to move through the system without force. By putting the leader ewe first on a car the others may even follow her. Native sheep are also easy to train by offering food in reward for a required behaviour. For example, you can reduce potential stress by giving them

Sheep are easily caught with the help of a shepherd stick. The plastic parts on this model tend to come off. You can also make one yourself of wood.

grain or bread as a reward. The easiest way to start this training is to call them and when they come you give them food in reward. This way you can always call them home from the pasture if needed. If you want to put a sheep to lie down, then press the animal towards a wall or a fence, grab the front and hind leg that is further away from you and fell it down pulling the legs towards you.

It is not good animal welfare to separate lambing ewes in small boxes alone nor should you fix their heads for several days in order to force them to give milk to lambs other than their own. When rams are newly introduced to each other they tend to start fighting for the place in the hierarchy. You can let them fight or you can put them into an area small enough to prevent head-to-head combat. This you can do only for a short time, for example one day and one night. Ewes also settle the hierarchy when a new ewe is brought into the flock.

Transportation of sheep should be done by persons that have the required education. You may transport sheep less than 50 km by a non-certificated vehicle. If you transport them a longer distance, you will need certificated transportation. Sheep are best transported in a vehicle where they can stand up, the floor should not be slippery and they need protection against wind and rain. Sheep are usually easy to transport, even if it can be tricky to get them on the car wagon. Be careful with transporting too many animals in too small vehicle if you have small lambs in the transportation. Consider taking the lambs inside the car in a packing box. You can easily make a hole so that their head is above the box and the box can also be fixed with a seat belt. Do not transport lambs separated from their mothers for a long distance. It is better to put two lambs in a box so that they won't feel so lonely, nor afraid. Sheep are very individual, some may cry for their mother all the way whereas others stay silent. Do not tie sheep's legs up and put them at the back of the

car space. If you need to transport one single animal, it can be put in a bag with its head outside. Tie up the bag on the side of the head. Do not put a rope around its neck.

Larger farms keep rams also in wintertime whereas smaller farms tend to keep rams for shorter periods, only for the mating period. Bringing a ram to the farm may cause problems. Sheep do not like changes and new things. They get stressed and fearful of any significant change in their surroundings. If you want to make some changes, make them gradually. This is why every change of animals from one farm to another may cause problems. It usually helps to keep the sheep together inside for some days before letting them out on the pasture. They need to sort out the new hierarchy in the flock. This is especially important if you bring an old animal to the flock. Young animals are quickly put in the last end of the hierarchy and they accept the fact without bigger fights. This is the period where they get to know you and you get to know them.

8. What kind of fodder do sheep like?

Sheep need to ruminate, which requires a diet of sufficiently bulky food. Too little fibre, or fibre of an inappropriate form, for example chopped too short, may result in digestive problems. Sheep sample new food items cautiously and may refuse to eat unfamiliar food in any quantity. Dietary changes should therefore be introduced gradually. Traditionally North-European sheep have got hay and dried leaves in winter. Native sheep are smaller than modern meat breeds and need about 500 kg hay / winter / animal or 2 kg hay per day / animal. Hay should be of good quality. Dusty hay can be thrown up in the air to get the dust out before you give it to the animals. Usually it is said that sheep are good at wasting food, tearing it under themselves and then leaving it uneaten. The more varied diet you give the sheep the less they waste. Sheep should be given little food at a time but several times per day, as they were fed traditionally. If you serve them coarse cultivated hay meant for cows they will waste more. Sheep prefer hay made of finer grasses and broad leaved plants. Suckling ewes need more protein and it is suitable to give them hay with clover. Make sure that there is sufficient space to allow all the animals to be fed at the same time without competition.

Sheep like to eat leaves. Young Estonian native sheep at Kiltsi Meadow fancied leaves of Alder Buckthorn (*Frangula alnus*) the bark of which is most poisonous for horses. Alder Buckthorn is a native bush of Europe.

Traditionally, in Finland 100–150 brooms of leaves / sheep were made for winter. It was calculated that one third of winter fodder could be leaves. Inkovaara (1946) writes that leaves contain more protein than oat flour. Leaves should not be collected too early in summer, as then they have a high content of resin which sheep don't like. You can start to collect leaves after Midsummer and continue as long as they are green in color. Usually young shrubbery was cut but also trees could be pollarded. You can collect ash, birch, aspen, willow rowan and even alder. In Saaremaa island (Estonia) mostly ash brooms were made. Sheep like willow especially, aspen and rowan but at least in Saaremaa it is known that sheep also like some slightly poisonous bushes like Alder Buckthorn (*Frangula alnus*) and Dogwood (*Cornus sanguinea)*. As few of these grow there, they were usually saved for the lambs in spring. The brooms used to be tied together with young rowan or willow branches. The size of the brooms varies according to location, storage facility and feeding system. In Finland and mainland of Estonia they had a size of a sauna broom but at Saaremaa they were often larger, ca. 1–1.5 m high. Sheep ate the small brooms totally whereas in Saaremaa the leftovers were taken inside to be used as firewood in the stove. The small branches gave a fast and hot fire.

In some places it was important to make brooms at old moon, but in others, when there was time to make them, often in August. The brooms were put to dry, preferably in the shade at a windy place. When dry, they were stored in barns or attics. Traditionally in Finland several 1–1.5 meter poles were put in the shed on the floor upon which the brooms were put. In autumn you can give leftovers from the kitchen garden, for example leaves of cabbage and red beat but be sure not to give too much. Additional minerals may be needed for the animals in wintertime. Many sheep like apples and most sheep like dried bread. Besides brooms also leaves were collected and dried in Finland. You can pour hot water on the leaves in wintertime and they taste like fresh.

Native sheep naturally spend a lot of their time foraging in a varied environment, eating a range of different foods. It is important to provide environmental enrichment that allows expression of this natural behaviour. Sheep in North Europe spend a lot of time housed indoors and this is why natural feeding behaviours should be used also in wintertime. You can place root vegetables in straw litter which they have to look for. By hanging dried brooms with leaves in the ceiling (use hooks to fasten the brooms) they have to bend their heads back in order to eat them like from a tree. In wintertime you can bring aspen stems indoor, branches of pine or spruce that they can pick on. They eat also pine bark as it contains vitamins and minerals. Inkovaara (1946) writes that conifers and pine bark prevent the development of worms.

Sheep should be provided with fresh water daily. When you let sheep out in winter you can see them eating snow but snow does not compensate water. Sheep drink more water during the indoor period than during the outdoor period. In summertime they get much water from fresh grass. However, sheep should get fresh drinking water daily in summer as well. If you give water in a kit, place it a little higher up as lambs may drown themselves in a kit. Take care that the ground under the water place is dry and not slippery. Flour and dishwater (no use of dishwashing detergents in the old days) could be mixed and given to drink for the sheep. Native sheep that have traditionally been kept on biotopes related to the sea eat seaweed and drink seawater.

All sheep need salt. In the old days coarse salt was put on a stone or in a food trough for them. Salt could also be kept in a birch bark box and given by hand to each sheep to lick. In winter, salt was put in hay. Many different

Do you have something good for me to eat? North-European short-tailed sheep and Alexandra Shatkovskaya in Ust-Pocha village, Kenozero National Park, Arkhangelsk oblast, North-West Russia, 20.8.2012. Photo: Kairi Orav

types of salt are sold. You can give them coarse salt like in the old days, pure salt stones which are quite soft or harder salt stones mixed with minerals. Sheep do not get enough minerals from a salt stone with minerals. Sheep need more salt if it is a rainy summer. You can buy minerals as granular or mixed with molasses in barrels. Sheep tend to eat the minerals very fast when mixed with molasses as they are sweet. Granular minerals can be mixed with flour. Salt and minerals is needed all the year round. Selenium (Se) is an important microelement that sheep need and this is often included in salt-mineral stones. Selenium can also be given as injections. Sheep like oat. It can be given as it is, crossed or as flour. Some sheep prefer flour, others whole grain. If you want to make a switch in the used form of diet, then do it gradually. Food is very individual – something that works in one flock may not work in another. Do not be surprised if your sheep fancy ashes. They need it especially if the pasture is on lowland with low content of phosphor.

Climate change may result in warm summers and sheep seek shelter for longer time inside. On warm days sheep often go to windy places where there is both less heat and insects. In places with predator risk sheep often stay inside on a warm day and then you can consider letting them out during the night on pasture instead. If sheep prefer to stay indoors on a warm day you can give them leaves to eat. There may also be a threat from more insects and insect born diseases as a result of a warmer climate. Sheep on islands are nowadays vulnerable for a new risk, namely alga flowering in shallow bays where sheep are used to drinking water. During the pasture period slow growing toxic poisoning may lead to death among sheep by the end of July – start of August when the algae flower at their most. In the future we may have to ensure that sheep on pastures can withstand more severe weather conditions.

Traditional daily feeding schedule in the 1920s (winter)

Time	Food
Morning	Leftovers from horses, brooms of leaves, hay.
Evening	Brooms of leaves, hay. The water vessel is washed with hot water and new water is given.
Daily	Warm food was made of oat husks (1/2 kg per sheep) mixed with hot salted water. A weight was put on the mixture until the following day. Washing and rinse water was mixed with some oat flour or some milk. Also other leftovers in the household were given to sheep. In summer and autumn sheep were given salt to lick. In winter, the salt was mixed into the warm fodder.
Occasionally	Boiled potatoes, turnip, bread, pine or spruce branches.

9. How should I use my semi-natural pasture?

Sheep are very flexible and adaptable animals that manage on different types of pastures. Traditionally sheep have pastured a wide range of marginal and semi-natural pastures. Ancient grazed areas make up a wide range of different types of meadows that were in extensive agricultural use. Such areas are coastal meadows, lake and river shores, dry or stony areas, mountains and

forests. In the area of the Baltic Sea there is also a special type of meadow, the alvar. An alvar is a biological environment based on a limestone plain with thin or no soil and, as a result it has only sparse grassland vegetation. You find alvar landscapes and limestone meadows in several regions around the Baltic Sea, for example on Estonian islands, in north Estonia, on the Swedish islands Öland and Gotland as well as in areas at Åland island and South-West Finnish archipelago. Managed alvar grasslands have a rich and unique biodiversity. Forest grazing is an old tradition in the North and it is still practiced among farmers. Sheep did usually not walk alone in the forest but together with a shepherd or together with goats, cows, horses or dogs. When new agr-environmental schemes are developed, these areas are very often forgotten in the European Union. Due to this an important cultural heritage of the North is about to die as no rules include these areas. Semi-natural areas used to be grazed by sheep traditionally.

Bang mentions an important fact in his book (1870) about the benefit of sheep keeping that we often forget: "*It is said that one cow eats as much as 5 ewes with lambs up to 5 months old. However, people tend to forget that sheep can graze areas that are of very poor quality and eat grasses that cows do not. In this way sheep can satisfy their hunger on a smaller area and faster whereas cows must walk on a much larger area to satisfy their hunger. Sheep get in this way more time to rest and digest whereas cows must spend more time on walking. Due to this it is difficult to compare cows with sheep concerning fodder needs*".

Sheep can very well graze together with the other domestic animals such as cows, goats and horses as they all prefer different plants. Sheep feel safe on a pasture with such domestic animals that they also spent winter together with indoors. Some dogs are very friendly with sheep, even taking care of lambs. This goes mostly for dogs that live together with sheep in the shed. Sheep also like cats and cats like sheep. Lambs fancy cats on the pasture – they like to chase the cat or just follow it. When different domestic animals graze a pasture together it will result in a well grazed pasture. Different animals have different parasites and by co-grazing you can keep the level of parasites lower.

Sheep are selective grazers – we can even call them gourmet feeders! Native sheep have a narrow muzzle that makes it possible for them to graze

Alvar in Estonia, Toila limestone clint. Unknown photographer.

much more selectively than modern meat sheep breeds with a larger muzzle. Native sheep can select a small rose leaf to eat or choose only one of two grass blades. Semi-natural pastures usually have many different plants (large biodiversity) and sheep love it, as they can choose what kind of plant to eat. They always prefer fresh shoots. They eat different plants in different periods during the pasture season. Sheep of different age graze in different ways. One year you may have one sheep that eats a lot of spruce bark, whereas another eats a lot of Lily-of-the-valley (*Convallaria majalis*) flowers. An old ewe may fancy apples whereas small lambs fancy leaves of wild roses. There are also plants that sheep do not fancy, for example Wild Marjoram (*Origanum vulgare*), Meadow Buttercop (*Ranunculus acris*), Drug Eyebright (*Euphrasia stricta*) and Oxeye Daisy *(Leucanthemum vulgare*). Sheep eat some plants early in the season, others late. They prefer some plants when the seeds are ready, such are Cowslip (*Primula veris*) and Dandelion (*Taraxacum*). There are also plants that they graze the whole grazing season, for example Black Medick (*Medicago lupulina*) and Fodder Vetch (*Vicia villosa*). Sheep enjoy eating different kinds of leaves and needles. Aspen and willow bark are also chosen. In spring, especially lambs, like to eat new shoots of pine.

Sheep make paths on the pasture very quickly which they use on a regular basis. They use them when walking out from the shed and when they transfer from one area of the meadow to another. The path is often put close to a linear object. It may for example follow a fence. They may choose to use a landscape element, for example crossing a hill, walking on the top of a ridge, walking down in the bottom of a valley or following a river. Sheep have fixed routines in grazing that depend on the size of the flock and on the age of the sheep. This grazing routine depends also on the weather and the season. In the beginning of summer they graze more often in short periods if there are small lambs in the flock. Late autumn they graze for longer periods as the lambs are already bigger. Sheep tend to get restless at pastures in the autumn.

In the old days people needed to spread out the cow manure by hitting it with a stick on the pasture whereas sheep manure was spread out in suitable portions by the sheep themselves. So there was less work with sheep manure than with cow manure. In connection with daily cleaning in the shed and outside the shed sheep manure was collected and turned into fine compost – this is worthwhile doing still today. You get less insects both inside the stable and outside if you use some time daily for cleaning away the manure in those places where sheep rest during the day. Studies at Kiltsi Meadow show that they drop manure about 50 m radius from their normal daily resting place.

You will find that sheep choose certain safe places to rest in. They may also have some places where they graze more often. It may be because there are plants growing that they like or the plants may taste better in general at that spot. Sheep are good in getting rid of many difficult plants from overgrown pastures, for example Meadowsweet (*Filipendula ulmaria*) and Raspberry (*Rubus idaeus*). When sheep graze a semi-natural pasture you will soon start to see new plants on the meadow. It is a good idea to take photos of your meadow regularly in order to follow its development. Trials on Kiltsi Meadow (limestone soil) in Estonia have showed that 10–15 sheep use 8 ha semi-natural pastures (2011) whereas 5–6 sheep used 5 ha in free-ranging (2012). Sheep regulate grazing on the pasture by themselves. In the summer of 2012, sheep grazed the same area one week before they entered a new area. It is of most importance not to separate lambs from their mothers too early as they have

Black Medick (*Medicago lupulina*) with its small yellow flowers is often overlooked as it is such a small plant. Sheep know where it grows as it is one of their favorite plants to eat on a semi-natural meadow!

to learn how to graze. As sheep eat different plants throughout the grazing period lambs will not learn to use the pasture fully if they cannot stay with their mother during the whole grazing period. Sheep can be kept outside on a pasture longer in autumn than cows. How do I know that my pasture is grazed in a good way providing a high degree of biodiversity? You get high biodiversity by using the pasture in a diverse way. There has been an old custom in Häme region in Finland to divide the pastures in two parts. One year they used one for grazing and cut the other plot, the second year vice versa. There are many plants and animals that benefit from grazing. Plants have developed their own strategies in order to survive grazing for example, their leaves grow close to the ground.

The following plants benefit from grazing and tramp damages:
Cowslip (*Primula veris*)
Drug Eyebright (*Euphrasia stricta*)
Dropwort *(Filipendula vulgaris)*
Oxeye Daisy *(Leucanthemum vulgare*)
Nottingham catchfly *(Silene nutans*)
Quaking-grass (*Briza media)*
Bluebell *(Campanula rotundifolia L.)*
Catsfoot *(Antennaria dioica*)
Mat-grass *(Nardus stricta L.*)
Smooth Meadow-gras *(Poa pratensis L.*)
Meadow Saxifrage *(Saxifraga granulata L.*)
Stonecrops (*Sedum*)
Lady's Bedstraw *(Galium verum*)
Burnet-saxifrage (*Pimpinella saxifraga*).
Many seeds get stuck in the wool and are transported to other places, for example:
Agrimony (*Agrimonia eupatoria*)
Cock's-foot *(Dactylis glomerata L.*)
Timothy (*Phleum pratense*).

Ants can develop large populations at semi-natural meadows as they are not plowed. One grass cutting annually does not disturb ants to a larger extent. If you have ants on the meadow you will perhaps also see the Eurasian Wryneck (*Jynx torquilla*) looking for food at the pasture. Some plants, butterflies and ants make up a mutual benefit system. At alvar pastures where there are also junipers growing you may see Whinchat (*Saxicola rubetra*). Where sheep graze you will most likely also see birds like Larks (*Alaudidae*), Thrushes *(Turdidae*), Flycatchers (*Muscicapidae*), Swallows (*Hirundinidae*) and White Stork (*Ciconia ciconia)*.

Sheep often graze in areas where rare orchids grow. Do sheep destroy orchids or do they create an area where orchids and other species can mutually co-exist better? Orchids grow, like many other plants, in a close cooperation and symbiosis with insects and fungi. Not much is known about this. We know that some insects prefer to pollinate certain type of orchids,

The number of many butterflies has decreased as there are few semi-natural meadows with suitable plants left as habitats for them. Some butterflies need special plants that only grow on well grazed pastures. Purple-edged Copper (*Lycaena hippothoe*) on Field Scabious (*Knautia arvensis*).

for example night butterfly Gold Spangle (*Autographa bractea*) pollinates often the Fragrant Orchid (*Gymnadenia conopsea*). There are also some other rare plants, butterflies and ants that cooperate on our semi-natural meadows. Ants can maintain their poplulation on your semi-natural pasture only if you do not plow the soil. Many of the plants need a grazed pasture with a lot of sun to get on well. One example of such a fruitful cooperation is the butterfly Alcon Blue (*Maculinea alcon*) which larva feed on Cross Gentian leaves (*Gentiana cruciata*), and stay the winter with red ants (*Myrmica ruginodis*) or European fire ant (*Myrmica rubra*).

Sheep tramp the soil and make it possible for plant seeds to grow. Sheep manure feeds many insects. Studies on Kiltsi Meadow have showed that sheep like blue and red colored flowers, especially lambs fancy them. They can let them grow until the day they start to blossom – then they eat them. Field work at Kiltsi Meadow in Estonia showed that lambs in 2010 ate most of the orchids but in the summer of 2012 there were few lambs and less orchids were eaten. In both years the number of adult ewes was similar. What we know is that sheep and orchids have been using the same areas through centuries and orchids have survived sheep grazing. Perhaps you will get fewer blooms of orchids one year as they are eaten by sheep, but perhaps this will result in the growth of their root system that year instead?

Especially lambs likes to eat the colorful flowers of Fragrant Orchid (*Gymnadenia conopsea*).

How often do people realize that our beautiful landscapes around the Baltic Sea are created by human together with our native sheep? Many of the beautiful juniper alvars of Saaremaa or the colorful meadows of the islands of Åbo Archipelago would not have a rich flora with Oxey Daisies *(Leucanthemum vulgare*) or Peach-leaved Bellflowers (*Campanula persicifolia*) if there wouldn't be sheep grazing on meadows. It is important that farmers are aware of the biodiversity services their sheep provide the society by grazing our traditional cultural landscapes.

10. Flock hierarchy and roles

In traditional breeding when all sheep in one village grazed together there were several rams in the flock. In traditional breeding the ewe decided herself what ram could mate with her. The traditional method functions if the village herd is large enough (estimation 50–100 animals). If the flock is small there may be a risk for inbreeding. Traditionally rams were exchanged between villages in order to bring in "new blood". In modern breeding humans decide what kind of ram will have the right to give lambs. Modern breeding system requires also the name of the ram which cannot be told if you have several

Åland sheep ram.
Photo. Sonja Tobiasson

rams in the flock. Breeding associations calculate which ram is the best to use. The evaluation is based on different kind of information such as population size and degree of inbreeding.

The role of the ram besides mating is to attack strangers entering the pasture area or coming too close to the flock. They may make a fake attack towards intruders on the pasture area. The ram usually grazes at the edge or at some distance from the main flock. He gives clearly a signal that he needs some more space around himself. It is said that the ram is half of your sheep flock. Buying a ram is not an easy task and you need to examine it before buying it. Examine only sexually mature rams. Look at the animal from the distance to judge the movements and its carriage. Take a closer look at its teeth, eyes, hooves, legs and joints. The ram should be healthy, fit but not fat. In this judgement it is important to examine the balls. The testicles should be regular in form, similar in size and both down in the pouch. You should be able to move the testicles in the pouch. It is easier to examine the testicles if you press up one while you examine the other. A healthy testicle is like a tense muscle. If it is too "mushroom like" then it may be a sign of degeneration, if it is too hard it may be a sign of an old injury. Make sure that there is no soft or hard spots in the testicle. There is a clear connection between the size of the pouch and sperm production – the larger the better! In practice you need the owner to keep the ram in place or tie it up when you examine it. In practice transport and logistical questions often determine what ram to use. Use your

The leader ewe leading the sheep to rest.

sheep network in getting a new ram. Many farms consider it difficult to keep a ram in winter and slaughter it after the mating period. Larger farms may keep a separate group of rams. It is quite difficult to judge what ram would be good to save for breeding when they are small. You have to see how they grow and develop. An older ram is always to be preferred to a young ram. In some geographical locations young rams are always preferred to older rams.

Ram lambs start early to train themselves in fighting for a place in the flock hierarchy. Do not play a fighting game with the lambs as they may develop an angry behaviour as adults. Wave with a broom or a bag in front of its nose in order to get it to concentrate on something else. You can also bend his head to the opposite direction if he approaches you for a fight quickly. It is not seldom that a ram becomes angry. It happens often when a ram is changing environment (moving from one farm to another). It is not fun with an angry ram and in practice it may be best to keep this ram only as long as he has mated the ewes and then slaughter the ram. Some farmers keep the ram going with ewes about 2–3 months while others keep it in the flock from early summer to late autumn (6 months). Some keep a ram in the flock all year round and do not have any problems with that. Rams may get aggressive and protective just after they have been mating the ewes in the autumn and guard them in a very aggressive way for about a week. Do not turn your back towards a ram, especially in mating period. It is also not rare that a ram starts to hit small

ram lambs, even kill them. It is for that reason often better to separate the ram from highly pregnant ewes, if possible. There are also rams that are very friendly with all small lambs. Rams can be placed separately with young ewes or ewes that will not start to lamb soon. Rams tend to need more space and too little space wintertime indoors may create aggressive behaviour.

It is important that you know who is the leader ewe in your flock. It is often the oldest ewe. The leadership may be inherited in the same ewe line. According to observations at Kiltsi Meadow (2005–2012) the following jobs are carried out by the leader ewe:

- She walks as the first of the sheep out in the morning. She stops at the door opening of the stable to check if it is safe for the flock to walk out. She stops the second time when she stands in front of the pasture, she turns her head, watches and listens in all directions if it is safe.
- She decides where and when to start and stop grazing for resting.
- She leads the flock on the pasture from one area to another. She decides when it is time to move forward.
- During the grazing time she guards the flock. Other adult ewes may assist her if some danger approaches. She keeps an eye on the forest and on the roads. She may stop to listen while the rest of the flock continues to graze. If any predator, dog or stranger is moving nearby she signals the rest of the flock to be alert. She gives the direction where to run if they have to flee. (If you keep guarding dogs, they will assist the leader ewe in guarding).
- She may stand guarding on the door opening of the shed when the rest of the flock eats inside the shed.
- She guards and gives worried voice signals when it is too hot to stay out in the sun during a hot summer day.
- When the leader gets old she gradually transfers the leader role to the second ewe in the hierarchy.

A leader ewe trains young ewes in doing the leader job. At Kiltsi Meadow it can annually be seen how young ewes are given the right to lead out the flock on the pasture some mornings. The young ewes carry out their job with pride and show the signals extra clearly – turning their heads several times in all directions, listening and stopping several times! When a young ewe starts to walk the rest of the flock follows her.

Some jobs in the flock are taken care of by all members. When the sheep rest outside during the day often one or a few of them are guarding. The guarding sheep may stand up or if lying down it keeps its head up. They switch doing this job and they are more alert towards the autumn than in the beginning of the grazing season. Lambs may be interested in storks and want to go close to them. All sheep warn lambs against approaching a stork by making a loud warning sound. All ewes may stamp with their foot on the ground as a warning, usually 1 to 3 times. If you want to warn them you can use the same way of warning. Sheep sleep inside the shed according to their hierarchy. The leader ewe and the ram take the best places in the shed. Young sheep get the least attractive places. Lambs sleep next to their mothers. Rams choose who may sleep next to them – they do not tolerate all sheep to stay close to them. If you want to move your animals or treat them in any way then you should always start to do it with the leader as the rest will accept it and maybe even follow her. A large sheep flock may have several leaders. You can notice it if the flock grazes in several different flocks. Weak, old and sick animals give clear signals by grazing at some distance from the main flock. In a predator attack they move, if possible, down in the terrain whereas stronger animals move up in the terrain.

11. How can I live together with predators?

Attacks on sheep flocks are emotionally, as well as financially, draining for sheep owners. Surviving animals usually do not produce as well and ewes may abort unborn lambs. Injured animals feel pain and must be treated. The largest risk for sheep is to be attacked by a dog. Dog owners tend to believe the best about their dogs and do not see the risk there might be with having a dog running free close to domestic animals. Sheep are very likely to run if a stranger or a dog is approaching them on the pasture. The dog considers sheep as prey to catch, especially native dogs have often a strong hunting instinct.

Fox, crow, raven, eagle, lynx, bear and wolf may also attack sheep. Usually they attack young, old or weak sheep. If you have only animals of the same age then hierarchy in the flock does not work and this may give wrong signals to predators.

Trained guard dogs provide you with effective protection. Photo: Imbi Jäetma.

During the last ten years the conflict between sheep owners and wolves as well as other predators has grown in the North of Europe. There is no easy way in protecting domestic animals, not against dogs nor wolves. You will get the best results by combining several methods. Guarding is an effective way of protecting. Traditionally guarding was done by shepherds, nowadays this job is done by guard dogs. You get better protection with several dogs guarding your sheep. Buy only a dog the parents of which have been working and living together with sheep. A guard dog needs to be trained for its work and training takes time. Ask for specific advice on raising a guard dog from the seller of the puppy.

Another common traditional methods is to take sheep inside for the night also in summertime. This is still practiced by many small sheep keepers. In the following list you can see methods that have been used in protecting sheep against wolves. The methods have been divided into first choice methods, second choice methods and uncertain methods. The more methods you combine the safer your sheep will be.

First choice methods

- Shepherd and guard dogs
- Guard dogs
- Shepherd and shepherd dog
- Shepherd
- Keeping sheep inside at night also in summer

- Drinking water and additional food inside
- Drinking water and additional food outside but placed so that an attack cannot be made while drinking or eating
- Animals of different age at the pasture
- Pasturing sheep together with cows, bulls or horses
- Not very young, sick or very old and weak animals on the pasture
- Take animals away from forest pastures and pastures close to forest in autumn
- In autumn pasturing on areas close to human, buildings or a road with lively traffic
- Keeping sheep on islands
- Keep animals inside if it is wolf-weather (misty, rainy)
- Wolf hunting (requires permission)

Second choice methods

- Choose a pasture with a terrain that does not enable wolf attack easily
- Music at the pasture (NB! Wolf can get used to music)
- Sheep with horns
- Building permanent line objects (fences) and lead the wolf attack to a certain known spot
- All animals free ranging so that they can run for help if needed
- All animals sheared twice a year so that they can run fast.
- Wolf attacks against the wind, place animals so that it is impossible to do.

Red cloths fastened on a rope was, and still is, put up at some distance from the pasture in order to frighten away wolf from the pasture area. The Russian Museum of Ethnography, St.Petersburg.

- Use native or local breeds
- Use open fire on pastures
- Closed farm areas, bring animals close to farm buildings at night
- A system of informing animal owners by mobiles when wolf is observed in the area.
- Clear up forest areas close to pastures of bushes so that wolf cannot sneak too close.
- Shepherd dogs

Uncertain methods

- Screaming, hard noise, different tools and instruments making noise
- Waving with hands
- A good stick to hit with
- „Wolf fence"
- Dense wooden fence or stone and wooden fence combined
- Net fence for sheep
- Red cloths fixed on a rope and placed on the fence or in the forest close to the pasture
- Keep black sheep (old saying that the wolf takes only white sheep)
- Searchlights irregularly on the pasture night time
- Bells making sound around the neck of the sheep
- Rubbing gunpowder or tar on the legs of the sheep (traditional)
- Tie up a small bag with smelling plants around the neck of the sheep (traditional)
- Spells and rituals (traditional, very common in the old days)

12. When and how should I shear the wool?

Sheep have traditionally been sheared as much as needed, but at least once a year. The right time of shearing depends on the length of the wool. This should also be the rule nowadays. Wool growth is very individual, some animals may have to be sheared earlier than others. Usually sheep are sheared before they are taken in for the winter and before they are let out on the pastures in spring. Vohlonen (1927) mentions in her book *Nykyaikainen lammas-*

talous that sheep in Finland have been sheared 3–4 times per year, in Estonia even 5 times.

In Finland it is also noticed that sheep were fetched home from the forest on a Sunday at the end of August. If sheep were sheared three times in Finland then it was done at the end of February, June and October. It was said that fine wool sheep should not be shared more than twice a year whereas sheep with long and straight wool could be sheared 3–4 times per year.

The tradition to wash sheep or wool varies a lot in North Europe. There are also locations where wool never was washed before spinning. At Saaremaa, and many other locations in Estonia, sheep have traditionally been washed before shearing. This tradition was kept up even till the 1960s at some locations in Estonia. Also in Finland and Sweden there is information that sheep have been washed before they were sheared. It is much easier to wash sheep than to wash wool after shearing. Sheep were washed in the sea, lakes, rivers and ponds. No washing detergent was used. During the last 10 years there have been many field trials of washing sheep again in Estonia as it is a part of our cultural heritage. Today it is preferable to wash sheep on land in order to avoid nutrients getting into the sea. Sheep do not dislike washing as long as you keep their head dry. Washing sheep may also remove outer parasites from the fleece. In Finland some spinning mills have a wool washing unit, whereas others send the wool to be washed abroad. Estonian farmers usually have to wash the wool before they can take it to a spinning mill.

Little bred native sheep may have an old wool shedding rhythm, just like wild animals shed their wool. If you have such sheep you must collect the wool from your pastures. Birds may get stuck with their feet in the wool and starve to death. This is especially important if your sheep graze coastal meadows with migrating water birds.

Many native sheep change color by age. Some start to change color before they become one year old, others first when they are 3–4 years old. A very common color change is from dark brown or black to grey. In most cases the color changes gradually but there are also cases where color change starts from the root and turns to another color very suddenly

Wool scissors are old tools that look similar all over the world. Old blacksmith scissors are the best shearing scissors. There are also shearing scissors made of plating steel but usually blacksmith scissors are better. New good

On the photo you can see how a North European native sheep in Gorõ village in Kenozero National Park, North-West Russia has started to shed the overcoat. The old sun bleached wool is light brown and the new wool is dark brown.

(small enough for a woman's hand) shearing scissors are difficult to get. If you have a small flock of sheep you can use Fiskars scissors for shearing. Old sheep shearing scissors do not cut as close to the skin as the modern electric shearing tools do. If there are a lot of insects outside then it is better if the wool is not cut too short. When you cut by hand then you can easily sort the wool at the same time.

Traditionally women sat on the ground and kept sheep on their lap when shearing. This established a close relation of trust between the women and the sheep. Young sheep are often difficult to shear, as it is their first time. Different sheep have different shearing temperaments, some lie calm and even „help" you in shearing whereas others are very nervous. Some sheep may start to hyperventilate. Stop shearing if a sheep starts to hyperventilate and calm it down before you continue. Talking softly to the sheep or singing during shearing may keep the sheep calm. Some like to chew bread while being sheared. Something extra good to eat afterwards may teach the sheep to enjoy being sheared. Old ewes enjoy wool shearing – you can feel how they

Sun may change the color of wool. Some animals' wool has a stronger ability to change color compared to others. A usual change in the sun is when dark brown wool is bleached into chocolate brown.

enjoy getting rid of the wool especially if you shear them on a warm spring day. The best way to learn shearing is to ask a person in your sheep network to join you at your farm when you learn to shear. Learning is a process and it is good to have a skilled person shearing together with you for the first 2–3 years. Make sure that the shearing environment is silent and that no outside persons or machinery is operating close by.

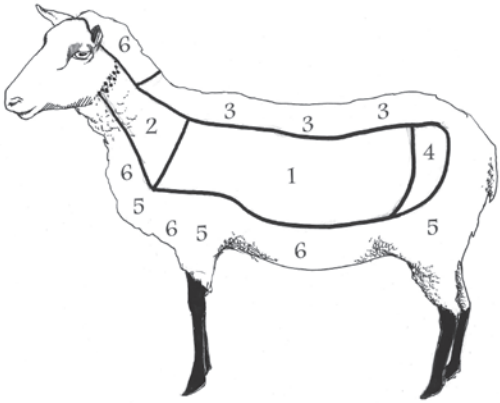
Beginners start easily by shearing the tail first. Also the back is a good place for beginners to start shearing. Ask the master to cut the first area open and then you can continue from the opened space. Sheep are most afraid when you shear their neck and head. Rams do not like it when you touch their pouch**,** so avoid touching it more than necessary. A ewe's udder should be covered with one hand when shearing close to it. Make sure that both tits are covered by your hand. In this way you will avoid any accidents if the ewe by some reason moves suddenly. When you are a skilled shearer you can shear the head and the neck first. The skin is very loose and soft on the front side of the neck. It is better to cut a little too long than short in this place. Sheep do not like the noise of the scissors when shearing the head. You can cover the ear with one hand so that it cannot hear so well when you cut around its ear.

Nowadays sheep are put to sit on their rump when they are sheared with electric machinery. In this way they cannot move. It is important that the sheep are dry. Take them inside early enough if the weather is bad. Some use a shearing bench and there are many different types of benches. You can make one yourself out of wood or buy ready-made metal benches. In large meat producing farms the time of shearing is most important – each sheep should be sheared as fast as possible. In smaller sheep farms, where wool is important, each sheep should be sheared slowly in order not to need any

Lihula women in Estonia shearing in 1913. The sheep's head is placed in a basket in order to keep the sheep calm.
Photo owner: Eesti Vabaõhumuuseum, photographer Johannes Pääsuke.

corrections in shearing movement. Every time the shearer makes a correction the result will be long wool mixed with 1–2 cm short wool. All the short wool has to be removed afterwards by hand which is time consuming and often also impossible. The short wool will leap out of the finished yarn which makes the knitted item ugly. If you have a lot of sheep to shear then the machinery may get hot and this may burn the end of the wool so that the sheep feels coarse when touching it afterwards. The sheep shearers have usually several types of bites – some are suitable for coarse wool types and others for fine and dense wool. If you have one person shearing then 1–2 persons can sort the wool at the same time. Use a table for comfortable sorting.

It is said that summer wool is the best and winter wool the worst but the difference does not have to be so big. If you keep the animal shed clean and see that no hay comes into the wool in connection with feeding then winter wool may be of good quality as well. Lamb wool is usually soft, but not all lambs have soft wool. Some are coarse from the start. The wide range of different wool types among native sheep is best processed by hand. The North-European short-tailed sheep wool is usually built up of under wool and cover



You get the best wool from the sides (1), neck (2) and from the back (3, 4). Wool is of lower quality on the underside of the neck, on feet and around the tail (5–6). Sort the wool according to color, type and length. You may also sort according to luster and curl. The wool under the stomach is usually short and fine, well suitable for felting.

hair. The hard industrial treatment often destroys the overcoat, and makes it itchy. Native sheep wool can be divided in three main types and several transition types:

1. Wool with coarser cover wool and finer under wool
2. Wool with even transition of under wool and cover wool
3. Even wool

All types can be found in different softness, curl and glace. Bang (1870) writes in his book that native sheep are smaller but give more wool as their wool is thicker than larger meat breeds' wool.

13. When and how should I cut the hooves?

Your sheep need their hooves cut regularly, even if they spend a lot of time outside. Many think that hooves are worn out during the summer but this is not always the case. Hoof growth is individual, some need to be cut more, others less. You can cut the hooves when shearing wool or do it separately. Check the hooves two times per year. You can cut hooves in many different ways. You can put the sheep to sit on its back, as it is usually done when wool is sheared. This way one person manages the job alone. You can also lie the sheep down with all its legs on one side. You can even let it stand and turn one leg up at a time and cut the hoof. You need good light, a wooden stick or some other stick to remove the manure from the hoof and hoof trimmers.

Fiskars fish scissors on the left and a hoof trimmers on the right.

On the photo you can see a hoof that is neither cleaned nor cut. First, clean the hoof from all manure with a stick. The hoof has a soft pad (*torus*), in the middle. Be careful not to injure it. Start cutting from the back part of the hoof. First, cut one side, then the other and in the end you cut the front part of the hoof. You can make a horizontal cut in the front so that the hoof will not be too sharp. In the front there is soft horn substance between the hoof and the pad.

There are special hoof trimmers on the market but a normal pruning shear or Fiskars fish scissors are good hoof cutters as well.

14. Mating and lambing

Different sheep may have different times when the rutting is the strongest. Many sheep have a strong rutting period in autumn and others at the beginning of the summer. Native sheep may mate any time during the year. Many farms want to regulate lambing and therefore regulate mating. Traditionally it was practical to keep rams separated from ewes during wintertime, while indoors. In North-West Russia rams are kept separated from ewes in the winter and let out in the spring together with the ewes. This results in autumn lambing. There are two benefits from this: as native sheep grow slower they will be large enough in the autumn (10–12 months) for slaughtering and in

spring 6–8 months old lambs can manage better on the pasture than newborn lambs. Traditionally the wool production was the most important reason for keeping sheep. Ewes were kept alive as long as possible, often as long as they produced wool and kept on giving lambs (often to the age of 14–17 years old). An old ewe is usually very valuable for the flock. She is experienced in grazing and a good mother. She may even take responsibility for her grandchildren by letting them suckle if needed. When meat production became more important than wool**,** the expected lifetime of sheep went down.

It is important to keep a pregnant ewe safe and calm during her pregnancy. Any change or strangers in the stable may result in accidents as the sheep try to run and escape from what they are afraid of. Ewes in small flocks do not usually need to be separated from the flock before lambing. A ewe can lamb in the flock perfectly well but there should be enough space for her. The ewe needs some privacy when lambing and she normally takes some distance from the others when lambing. Ewes prefer to lamb close to a wall or in the corner. If they lamb in the middle of a space then there is most likely not enough room in the building for her to choose a safer lambing place (she is most likely also ranking lowest in the hierarchy). A native sheep ewe often makes preparations for lambing by making a shallow nest in the straw. Some ewes carry out more work in doing this, others less. Modern breeds may lack this ability totally. Native breeds may also cover their newborn lambs with straw if it is cold inside the stable. If you keep too many sheep together in one space a pregnant ewe may become stressed when lambing and not nurse the lambs correctly. After lambing the ewe licks her lamb and in this way they establish a good contact. The newborn lamb and the mother will also have to learn to know each others' voice. Check that the ewe does not have too much wool for the lamb to find the tits in the udder. Native breeds have naturally shorter wool growth under the stomach compared to modern breeds. Native sheep ewes usually lamb independently and seldom need help.

International welfare standards mention that lambs must not be weaned before 5 weeks of age. There are no national standards for weaning. Many native sheep ewes give milk to their lambs up till 6 months of age or even longer. Old women also say that native sheep lambs should not be weaned before the age of 6 months. They have to learn how to graze the whole grazing season beside their mothers in order to become good grazers. It may hap-

pen that an ewe has not enough milk or that she does not want to give milk to her lamb. If there was some complications connected to lambing she may decide not to nurse the lamb (for example if she feels too weak). As an animal owner you should decide how to take care of the newborn lamb. Feeding a lamb with a bottle is hard work that will last for 3–4 months. The lamb will also learn that you are the "mother" and this will result in a close connection between you and the lamb. Sometimes a grandmother or a sister to the mother may be willing to take care of the lamb or even to let it suckle. You can try to keep the mother still while you let the lamb suckle. It may be that some of them start to nurse the lamb after you have been helping a little. Sometimes the ewe has too little milk or the tits may be so filled with milk that the lamb cannot get anything from them. The lamb gets weak very quickly and chills out. You should check on newborn lambs more frequently at the beginning to make sure that they can suck enough milk. It is important that a newborn lamb gets the colostrum from her mother within 2–4 hours. Do not separate a lamb from the flock even if her mother does not feed it. Keep it with the rest of the flock. There are many different milk substitutes that can be used. Goat milk is the closest milk to lamb milk. You can also buy a special sheep lamb milk replacement powder which is easy to use but expensive.

Milk replacement recipe 1

1 l cow's milk

1 dl sour milk

Mix them and let it stay at room temperature day-and-night

Milk replacement recipe 2

1 l cow's milk

1 egg yolk

a little sugar or honey

a little salt

1 tablespoon oil

½ dl cream

½ dl milk powder

Mix all together and store in the refrigerator. Warm one portion at a time. (Maaseutukeskusken liitto, 2000)

It is good to give milk replacement to lambs in small portions and often. Here is one suggestion for a feeding schedule.

Lamb age (in days)	One feed portion (in dl)	Times / day-and-night
1	0.5–1.0	5–6
2–7	1.0–2.0	4–5
8–14	3.0–4.0	3–4
15–28	4.0–6.0	3
29–42	5.0–6.0	2

The weight of a newborn native lamb is usually 2.5–4 kg. A lamb of a modern breed drinks in free feeding as follows:

- a 5 kg lamb drinks ca. 1.3 kg milk /day;
- a 10 kg lamb drinks ca. 2.3 kg / day;
- a 15 kg lamb drinks ca. 3 kg / day.

Calculate smaller amounts for a native breed lamb.

15. How can I help when my sheep is ill?

If a sheep is sick then you may need to separate her from the flock. In traditional sheep sheds there were usually several boxes. Keep ready fences that you can use to build a separation box when needed. If you permanently want to keep an animal separated then do not separate one animal alone. It is always better to keep at least two in the same box. All sheep must be able to have at least eye contact with each other. Never put a sheep alone in a separate building. Do not tie a sheep up for more time than needed for treatment. If the sheep has a disease that it can pass on to others you should always put it in a separate box according to guidelines of your veterinarian.

Usually you find the quickest help in your own sheep network when you need advice concerning a sick animal. Especially in the beginning you will need more support when you first learn to judge and act in different situations. If a sheep lies down and does not stand up then it is a good idea to call the veterinarian. However, there is much that you can do yourself to prevent illness. By keeping an eye on your sheep more than one time per day you will quickly see if there is something wrong with your sheep. Some diseases develop very quickly and you have little time to act. The larger the flock is the larger is also the possibility not to notice in time that somebody is sick

or missing. In small traditional sheep flocks it is much easier to care for your animals. A sick individual often walks outside the main flock on the pasture. In Estonia there has been an old habit to tie up the leader ewe on the pasture letting the rest of the sheep range free. The flock won't leave the leader ewe under such circumstances. This is not a good thing to do as the leader ewe cannot show the flock where to graze, nor can she give a clear signal for rest. If she is attacked by a dog or by insects she cannot run away from them.

You should keep some basic things at home like a fever thermometer, disinfection medicine, selenium (Se), germicide salve, worm medicine and syringes. When you call the veterinarian you should make sure that the sick animal is either separated or that you can catch it easily. The veterinarian needs to know the sheep weight in order to prescribe medicine. Sometimes more than one person is needed to assist him. Sheep may spit out pills. Pills are easiest given if you crush them and place them in powder form between two bread slices. Medicine in fluid form to be swallowed is best given by using a syringe (no needle). Sick sheep do not often open their mouth but press their teeth hard together. Bring in the syringe between the teeth and cheek. Press it as far in as possible and empty the syringe of the medicine while you keep her head slightly up.

In the following**,** some common illnesses are described according to their main symptoms:

COUGHING, WEAKNESS. All sheep normally have parasites but they should not get too many of them. There are many different kinds of parasites. General symptoms of too many worms may be coughing, loss of weight, diarrhoea or general weakness. It is recommended to treat sheep for worms automatically twice a year. Chemical worm medicine has a negative effect on many insects in your meadow and that is why it should be given at least one week before you let them out on the pasture. Part of the chemicals will come out with their droppings. The second time to give worm medicine is best in the autumn when you have taken your sheep inside for winter. It is good to use different types of worm medicine but this is not always possible in practice. Avoid keeping sheep on low lying pastures where they may get common liver fluke (*Fasciola hepatica*).

By keeping sheep on a large enough pasture or using co-pasturing you may have to give less medicine to them. There are many traditional methods in preventing the worms to grow too much. Aspen and Alder leaves, bark of pine and spruce needles may keep the level of worms down. Sheep eat many

slightly poisonous plants like Lily-of-the-valley (*Convallaria majalis*), plants with clear medicine effects like salix bark, Herb-Paris (*Paris quadrifolia*), Alder Buckthorn (*Frangula alnus*) and oak acorns. These plants may keep the amount of worms down naturally. Natural plants are good to use in preventing the number of worms to grow but if a sheep is already sick then give it chemical worm medicine as it will quickly reduce the amount of worms. There is no need to treat the whole flock with worm medicine on a regular basis. If you have a small traditional sheep flock on large semi-natural areas then it is enough to treat animals that have some symptom. In general you should avoid moist pastures where there is a larger risk for different types of parasites.

Sheep can have sheep liver fluke (*Fasciola hepatica*) that needs a small snail (*Limnaea truncatula / Galba truncatula)* in its lifecycle. There may also be Lancet liver fluke (*Dicrocoelium dendriticum*) in the liver. It needs both snails and ants in order to propagate. In the intestines there are coccidiosis (*Cryptosporidium parvum, Eimeria spp*) and *Giardia duodenalis*. Coccidiosis for lambs starts with bad smelling diarrhoea that later will be mixed with blood. Roundworms (*Strongyloides papillosus, Trichuris ovis*) and tapeworms (*Moniezia Expansa,* mites as hosts) are also in the intestines. Tapeworms can be seen as small white parts in the manure. A beetle carries on the tapeworms' lifecycle. In the lungs there may be lungworms that also use snails to carry on their lifecycle (*Dictyocaulus filaria, Protostrongylidae*).

DIARRHOEA. Diarrhoea is often related to digestion problems. Sheep can also get diarrhoea because of too many parasites or bad drinking water. Some sheep have a more sensitive stomach than others, and they may easily get ill if it is a rainy summer. If the sheep feels normal but has diarrhoea you can try to give it baking yeast. Start with 10 gr (for a sheep about 30 kg weight) put on bread and give it twice a day and later slightly more. You can do this for one week. Sheep can also get diarrhoea if they have eaten poisoned plants or if they have been eating mould in the hay. You can try to give them medical coal (the same that you give to humans but a larger dose) or oak bark tea / pills. Always call a veterinarian if the sheep develops a fever or is too weak to stand up. Water is easily given to sheep by using a PET bottle. Make a hole into the bottle cap with a nail. Press the bottle between the teeth and the cheek. Press the water towards the cheek but take care not to press it directly into the throat.

WEAK LAMBS. It is very important that newborn lambs get colostrum

(within 2–4 hours). A lamb needs 0.5–1 l colostrum during the first day-and-night (at an interval of 2–4 hours) Lambs get chilled very fast and lose energy. In an emergency situation you can wrap the animal in a blanket or take it indoors for some time to warm it up. A lamb should not stay too long without its mother. You can make an energy drink for weak lambs of one egg yolk mixed with a similar amount of cream. It is also good to give vitamin and selenium to a weak lamb (injection). You can milk colostrum from an ewe that lost her lamb and put it in the freezer to use later when needed (for long time storage in deep freezer). You may not warm colostrum in a micro wave owen. 1 dl is enough for one portion.

ABSCESSES. Sheep often get abscesses. Normally they heal by themselves. Do not start to remove them as they will most likely get infected. An infected abscess should be treated with antibiotics.

A SMALL SKIN WOUND, INSECT PROTECTION. If your sheep get a small skin wound in summer, insects may start to suck blood from the wound. Tar is an effective help. Tar has an effect for about 1–1.5 weeks. After this you may have to put new tar on. Do not put tar on large wounds. Use tar that has as little chemical additives as possible. A sick animal can be covered with broadleaf branches on a hot summer day in order to prevent insects from attacking it.

ILEUS. It may happen that animals eat too much clover, apples or flour and get too much air in the stomach resulting in ileus. It is important to start to treat the animal immediately. You can give it ordinary kitchen oil (1 tablespoon for adults, 1 teaspoon for lambs) and then start to massage in order to get the gases out. The sheep should start to burp and fart if it works. Stand behind an adult sheep with your face in the same direction as the sheep's face. Move your hands on both sides of the sheep clockwise. You can take a small lamb on your lap and place it with its back towards your stomach when giving the massage. Do not press too hard and do not massage for too long at a time for a small lamb. You can give vodka mixed with water (1/2 glass vodka and 1/2 glass water) to an adult sheep.This makes the sheep relax quickly and helps on possible ileus.

HALTING. A halting sheep should immediately be caught and checked. Most likely it has a small stone or piece of wood between the hoof. A sheep can also halt if you have not cut the hooves regularly. A too long hoof bends under the foot and results in halting. If the hoof is damaged you should judge if you can cure it yourself or call a veterinarian. If there is a white mould or

bloody wound between the hooves then call the veterinarian as it may be infective hoof rot that can be carried on to other sheep. In this case the whole flock will be treated for hoof rot.

SHEEP ITCHING ITSELF, INSECTS. Sheep can itch themselves when they have needles from the forest in the wool or when hay itches the skin. If there are a lot of mosquitos then sheep start to stamp and itch their legs. They may start running in order to get away from them. Tar odor may keep insects away. Sheep, especially fine wool sheep, can also get wool parasites which make them itch themselves. You prevent wool parasites by shearing the sheep at least twice a year. There are several chemicals that can be used in the treatment for wool parasites and for keeping insects away, all with different active ingredient, for example Deltamethrin (FlyTix, Coopersect) and Cypermethrin (Ecofleece). Some are in oil form to be spread on the back of the animal, others are injected and spread with the blood. Some outer parasites suck blood (Sheep ked, *Melophagus ovinus*), whereas others only eat dead skin and wool. Call your veterinarian for advice if you have blood sucking parasites. Blowflies can attack sheep on warm and humid summers, especially if they have not been sheared regularly, are dirty or have a wound. Blowflies larvae eat a hole into the skin and start to eat meat on living sheep. Blowflies develop very quickly. Call a veterinarian if you notice blowflies larvae on your sheep. Start picking away the larvae as you wait for the veterinarian. The wound should be cleaned and larger wounds treated with antibiotics. The following outer parasites may make sheep itch themselves and need treatment:

Ticks (*Ixodidae*), Sheep biting louse (*Damalinia ovis / Bovicola ovis*), Sheep ked (*Melophagus ovinus*), Sheep Bot Fly (*Oestrus ovis*), Leg Mange (*Chorioptes bovis*), Sheep scab (*Psoroptes ovis*), Itch mite (*Sarcoptes scabiei var ovis*), Sheep face louse (*Linognathus ovillus*) and Blowflies (*Calliphoridae).*

WOOL FALLING OFF. The wool may fall off sheep on areas as large as a hand. If the wool peals off from the neck it may be as a result of the fodder in winter when they are indoors. Sometimes wool just drops off on the back of the sheep or at some other part of its body. There may be several reasons: there can be a parasite in the wool; perhaps the stable has too high humidity and it is too warm (check the ventilation); sheep may become allergic to ammonia. Keep their laying place dry and clean. There may be lack of some mineral. Give them a mineral barrel so that they can lick what they need. There

may also be something wrong with the metabolism. Usually the wool starts to grow out again in spring. Some native sheep normally change wool but never so that the skin is bare in between.

EYE OR EAR INFECTION. Sheep may get eye or ear infections. Call your veterinarian to get help.

HAIR FALLING OFF THE FACE AND EARS, CRACKS. (Photosensitivity) If your sheep loose hair on the ears and the face and there become cracks in the skin then it has most likely eaten some poisoned plants on the pasture. Take it inside and keep it in a dark place until the wounds are healed. Give it only dry hay to eat. Do not give any green colored fodder at all. Scab may also same symptom. Contact your veterinarian if you suspect scab.

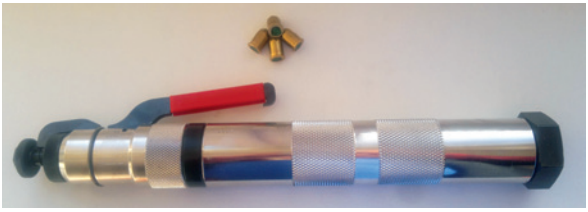
LYING DOWN WITH SPASMS. If the sheep has fever then it may be some soil bacteria that has resulted in an infection. If the sheep has no fever but spasms it can be CCN (*Cerebrocortical necrosis*) which is treated with a large dose of B-vitamin. In all cases of spasms you should call your veterinarian for help.

SORE MOUTH INFECTION, ORF. *(Contagious pustular dermatitis, contagious echtyma*). Separate the sheep from the rest of the flock so that they cannot be in contact with each other if your sheep get blisters around the mouth and nose. Especially lambs may get this but also adults. It is very infectious. Sheep may have such a pain in their mouth that they have difficulties in eating. The lambs can also carry on the virus to the udder. Orf virus is a zoonosis that can carry over to humans. You can put on some disinfective salve or some oil to make the skin soft (*Calendula*). Use gloves to protect yourself. You need antibiotics if there is an infection.

16. How do I slaughter a sheep?

In Estonia there is a saying *"Every ram has his Michaelmas"*, and in Finland "*Everything in its own time said the ram when his head was cut off*" meaning that the day of slaughtering comes for all (rams) in the autumn.

Slaughtering has traditionally been done from October to December in Northern Europe. Cold autumn weather was important in order to have less insects when slaughtering. Native sheep grow slowly and were slaughtered at the age of 10–12 months. Modern meat breeds grow faster and are ready



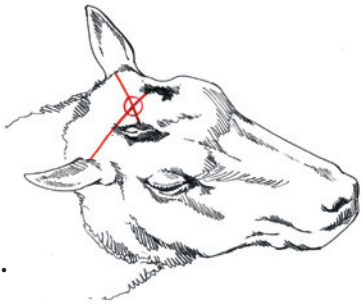
A captive bolt pistol.

to be slaughtered at the age of 6 months. Slaughtering on the farm used to be a common job in the old days but has become very rare nowadays in many countries. Slaughtering skills have mainly been preserved at sheep farms and among hunters in Finland. In Estonia it is still quite common that there are people in every village who know how to slaughter an animal. One to two sheep are quickly slaughtered for one's own use at the farm. Farm slaughtering should be preferred to transporting sheep to large slaughterhouses. Sheep feel when the transport ends up with slaughtering as they are very sensitive in interpreting feelings and body language of humans. Usually sheep are silent when getting slaughtered but this is not always the case. Sheep may also scream of fear.

Sheep slaughtering is, like shearing, best learnt by asking a person in your sheep network to show you and help you learn to do it. Animals being slaughtered should be treated with kindness and respect. Choose a safe environment for slaughtering. It should be far enough from the flock that they cannot hear what is being done. Do not keep any animals watching the process, not even if it is some other animals that also will be slaughtered the same day. The process is best done by a person who knows the sheep as any stranger will make the sheep nervous. A chilly day is the best time to do home slaughtering, preferably when it is below freezing outside. You can also do it early in the morning. Place yourself with one leg on each side of the sheep, with your face in the same direction as the sheep has its head. Talking to the sheep will keep it calm.

There is an old tradition in Estonia to tell an animal before you slaughter it that you need its meat, you beg for apologies for what you must do and say thank you for what it has given to you.

Use a captive bolt pistol in order to stun the sheep before letting the blood out. There are different colors of cartridges. The larger animal you kill the faster the bolt must move. There are green, blue and red colored cartridges, each



The intersection cross to place the bolt pistol.

with a different amount of gunpowder. Usually green colored ones are used for sheep. If you have to slaughter a large ram or sheep with horns you may need blue or red colored cartridges. The bolt pistol should be placed where the lines intersect when you draw one line from each of the horn pits to the earhold that is furthest from the horn pit. Place the bolt pistol in a slightly forward direction towards the jaw in order to hit the small brain. If the animal has horns place the bolt pistol just behind them slightly angled towards the jaw.

After stunning the animal you should immediately open the main artery on both sides of the neck. Use a sharp knife. Lift the body higher up in order to let the blood out. You can use a few pallets for this purpose. It takes at least 5 minutes before the blood is let out. During this time the animal will have spasms due to contracting muscles. All spasms must end before you can start skinning the animal. If there are no spasms then check that you have opened the arteries well enough. If necessary, do an additional cutting. The animal is hung up by its hind legs with its head down. You start taking off the skin from the hind legs and continue down. There are many different methods in skinning. The skin is best taken off with bare hands. A knife can be used to help if needed.

The skin is placed horizontally on a flat space and salt is put on the skin (depending on the size of the skin from 3–6 kg). Keep the skin salted for one week before you take it to the skin-tanning company or ask your company for guidelines. It is best if the meat can hang some time in a cold room before you cut it up. If you do not have this possibility then you can cut the meat into smaller parts immediately after the slaughtering and place them in a refrigerator for 4–7 days before you put them into the freezer. Most parts of the sheep can be used. The heart lasts the longest of the organs, whereas the liver and kidneys need to be eaten the soonest. If you want to use the blood then you should whip it until it is cold. Add salt while whipping then it will not become

lumpy. It is important not to let any liquid from the mouth / throat to come into the blood. You can cool it faster by putting the blood in the snow while whipping it. Traditional slaughtering dishes are blood bread or blood sausages. Fat around the heart and inner organs can be used for making candles and soap. Examine the liver and lungs as you may see traces of parasites or any other illness. If the liver has small or large white hard spots on the outside then it is a sign of liver fluke. Sometimes the attack is smaller and can only be seen inside the liver. If the liver feels like a mushroom (feels like jam) you should not eat it. Animals (usually old) may also have signs of parasites on the lungs.

You will have some residual parts when you slaughter. Animal residuals and dead animals must be delivered to a residual disposal plant both in Finland and Estonia. Farms in remote places of Finland can apply for permission from the veterinarian to bury residuals and animals at the farm. Also in some parts of Estonia you may bury residuals after informing the veterinarian first about it. Contact your veterinarian in order to get information about the rules in your area A farmer must report to the official animal register of dead and slaughtered animals for personal use. All slaughterhouses perform an industrialised slaughter process which during any circumstances is stressful for the animals. All sheep owners must be able to carry out emergency slaughtering if needed on the farm. Slaughtering on the farm for one's own use of meat gives better animal welfare and treatment as well as less transport of animals which results in less stress, lower costs and greater use of the different parts of the body.

17. How can I supply high quality raw materials for handicraftsmen?

Sheep supply a wide range of diverse raw materials for the handcraft and artisan food industries. In order to produce high quality raw materials**,** you need to know the different requirements that processors of the raw materials have as well as the different stages in processing.

Producing a high quality wool depends on many factors. The following are some common problems:

- Animals do not have enough bedding material which gives lower quality wool (white wool turns yellow from urine)

- Wrong bedding material, for example wood chips or peat get stuck in the fleece
- Pastures may have plants that get stuck in the fleece
- Wrong feeding methods (resulting hay in the fleece)
- Wool shearing is done too late which results in wool that is too long to be carded or it is felted
- The shearer has not cut wool in one cut but has made corrections which gives short wool mixed with long wool. Short wool is impossible to separate from long wool later during processing. If you mix both long and short wool it will be noticeable in a knitted sweater after some time of use. The short wool will flare on the sweater surface and form a small tuft that must be removed by hand.
- Wool is not sorted according to color, wool type and length.
- Wrong feeding can give a brittle wool quality or wool with no luster.

Traditionally wool was carded and spun at home by hand. Nowadays there are good modern hand cards, card mills as well as traditional new spinning wheels sold on the market. Ashford from New Zealand is one of the largest carding and spinning wheel producers, but you can also find companies producing tools for wool processing in the Netherlands, Poland, USA and Canada. Handicraftsmen buy wool in different pre-processed forms. The most common are:

Yarn can be made in a wide range of types by hand spinning.

- Carded wool
- Rovings
- Woollen yarn
- Worsted yarn
- Carpet yarn

Yarn can be spun of different thickness, of which the most common are 1-thread yarn, double yarn or 3-thread yarn. Yarn is spun and twisted in different directions, Z-twisted (clockwise) and S-twisted (anti-clockwise). Cooperation between spinning mills and farmers is of high importance. In the Baltic Sea Region we have few small spinning mills that can offer suitable industrial processes for processing native sheep yarns and even fewer different kinds of yarns.

There are many North-European short tailed sheep with a beautiful crimp and lustre, all well suitable for fur. Fur used to be very valuable in the old days and gave a valuable cash income for sheep keepers. Life in the cold northern climate was impossible in the old days without fur. There are few skin-tanning companies today and most of them do not have fixed delivery times. This makes it difficult to offer leather and fur as raw materials for handicraftsmen. The quality may also be uneven. In both spinning mills and skin-tanning industries there is a need for development of both professional skills as well as developing the processing technologies.

Traditionally horns and bones were turned into different kind of tools and other items. Many of these tools have been replaced by plastic tools today.

Native sheep that have grazed on semi-natural pastures feed on a wide range of wild plants including wild flowers and medical herbs.

All sub-products from sheep can be valuable raw materials for many different types of handicraft work and enterprises. Bone and horn work can be carried out by using similar tools as in wood processing.

High quality meat needs high quality production and processing on all levels. There are many different meat production and processing methods ranging from industrial to small scale processing. Artisan food (gourmet food) are foods that are hand-crafted, typically in small batches. Artisan foods are usually processed by using old traditional methods. Few studies are made on the quality of the meat of native sheep grazing semi-natural meadows.

Each sheep keeper has to find his or her own way in producing and processing sheep products. Traditional sheep keeping is a skill that you learn best by practice!

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