Chapter 15
Local Practice of Cattle Farming and Ethnoveterinary Medicine in Estonia: Case Study of Saaremaa and Muhumaa

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15.1 Introduction

Cattle have been raised in Estonia since the Stone Age (which lasted in the territory of present-day Estonia until the beginning of the second millennium B.C.), when tribes of the Corded Ware culture arrived in this area together with the first domesticated cattle. The general transition to cattle raising took place in Estonia during the Bronze Age (1800–500 B.C.) (Mägi 2003); and thus both cattle raising and dairy farming have long traditions in Estonia. However, to date there have been no summary articles specifically dealing with the traditional or local rearing and treatment of cattle. Potential is seen in implementing experiences gained in the traditional treatment of animals, especially those with herbs, in modern organic cattle farming, but as yet no veterinary phytotherapy products have reached the market. Although knowledge about the effects of herbs can be obtained from ethnoveterinary medicine,

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Fig. 15.1 Location of the Estonian islands of Saaremaa and Muhumaa

ethnoveterinary practices have been investigated mainly in Southern Europe (Mayer et al. 2014). In Estonia different plant products have been successfully tested in the control of pig parasites (Mägi and Sahk 2003; Mägi et al. 2006), and therefore there is the potential to replace synthetic medications in organic farming. This article is the first to explore in depth the topic of Estonian ethnic veterinary medicine and provide a more thorough overview of one Estonian region – the islands of Saaremaa and Muhumaa (Fig. 15.1).

Saaremaa, which is located in the Baltic Sea, is the largest island in Estonia, at 2673 km^2. Due to its maritime climate and the versatility of the soil, Saaremaa has the greatest number of plant species in all of Estonia. The landforms are relatively low and flat, and approximately half of the island is currently covered by forest. The soil is nutrient poor, and therefore people have been more involved in cattle farming than growing crops. Presently, the island has approximately 33,000 residents (https://et.wikipedia.org/wiki/Saaremaa). Muhumaa is a smaller island, at 198 km^2, located next to Saaremaa, and it shares a similar natural environment. Currently there are more than 1600 residents on the island (https://et.wikipedia.org/wiki/Muhu).

15.1.1 General Collection of Local Ethnoveterinary Data in Estonia

The first data regarding traditional ethnoveterinary medicine was collected along with general trends in folklore. Pastor Jakob Hurt (1839–1907), who published his public calls in local newspapers, initiated this trend in 1888. The active village residents welcomed his idea across Estonia, and many became his collaborators in collecting folklore. Hurt provided the focus for the following era – to collect and study mainly lyrical folklore – and he also set the general classification of folklore, where ethnoveterinary medicine was categorized under religion and customs.

Institutions of historical memory such as the Estonian National Museum (ENM) and the Estonian Folklore Archives (EFA), which were created at the beginning of the twentieth century, also began collecting folklore with the help of professional folklorists, and also by publishing general calls to the public, as was done by Jakob Hurt. The ENM began paying more attention to ethnographic materials, and they have therefore published and distributed numerous questionnaires regarding the life of domestic animals (e.g. Linnus 1981; Jaagosild 1963, 1964; Ridala 1946, etc.). But these collection campaigns have been more for just gathering data for the collection, and more thorough analyses have been left for future researchers. Therefore, as museum employees traditionally have not been researchers in the field themselves, often the interview plans have been deficient. Only short articles in encyclopaedias (e.g. Pärdi 2008) have been published from this material, and no in-depth studies have been carried out. Inadequacies of the thematic material include the extremely uneven quality of both the answers and the extent of regional contributions, and also the one-sidedness and inclination of the material (as qualitative in-depth additional questions asked during interviews were not implemented in the case of written correspondence). Following Hurt's example, the EFA continued collecting oral folklore with an emphasis on lyric materials, and thus ethnoveterinary medicine was not emphasized as a topic. If on rare occasions it was collected, it was left untouched as material for future research. This topic was not studied directly, but only sometimes indirectly, for example, in association with holiday traditions or religious rituals. The practical value of the material (e.g. how an animal was treated specifically) was not considered important, but rather only the presentation or writing of the story. Also thematic collections of folkloric texts aimed at the public have been issued, collecting the most beautiful stories by the best correspondents (e.g. Loorits 2001).

The largest collection of folkloric plant usage in Estonia was collected by the teacher and botanist Gustav Vilbaste (1885–1967). His work therefore remains the most important early source pertaining to plant usage. Although he planned to issue a five-volume collection about the use of plants, only the first two volumes were ultimately published (Vilberg 1934, 1935). He also selectively noted the uses of plants employed in ethnoveterinary medicine in his monograph of plant names (Vilbaste 1993). In this work, the Vilbaste monograph has been used to identify the folk plant names and folk animal diseases names.

15.1.2 Folklore Collection of the Academic Veterinary Association

The most thorough interview plan on ethnoveterinary medicine in the early days of research was prepared in 1912 by veterinarian Johannes Kool (Kool 1912), who also initiated a general call for people to participate. World War I interrupted the collecting work. It is known that by the year 1920, he had received responses from 21 persons (Kool 1920), but no traces of the data have been discovered up to today. Still, his lasting contribution is that his interview plan was later taken as a basis for the collection activities of the Academic Veterinary Association (AVA) (in Estonian *Akadeemiline Loomaarstiteaduslik Selts*, ALS (1928–1934)). However, the collection method of the AVA differed greatly from that of memory institutions and also Kool. Firstly, the interview plan was very professional; secondly, correspondents were not used, but rather fieldwork was carried out in villages by veterinary students knowledgeable on the topic; and thirdly, the collection was systematic, i.e. it attempted to cover the entire territory of Estonia uniformly (although more emphasis was given to bordering counties), which also allows studies to be conducted according to region. Over the course of 6 years (1928–1934), the fieldwork projects of eight grantees were funded which resulted in the collection of more than 4000 pages (about A5 format), making this the largest thematic collection. Today, the collection is stored in the Estonian Folklore Archives of the Estonian Literary Museum (Tartu). Unfortunately, so far the material has not been thoroughly analysed (for more on the history of ethnoveterinary research, see Ernits 2001).

The region for the case study of this article was limited to the islands of Saaremaa and Muhumaa. In this region, fieldwork was conducted by the Vassili Grünthal (as of 1930 named Ridala; 1906–1985) who became later veterinary professor at the University of Tartu. Grünthal himself was also born and raised in Muhu Island. During the summer of 1928, he interviewed a total of 23 people from Muhumaa and 16 people from Saaremaa. The answers have been gathered into volume 1 of the AVA collection, totaling 735 pages. In 2014 and 2015, ethnobotanists Raivo Kalle and Renata Sõukand carried out ethnobotanical fieldwork in Saaremaa, during which 61 and 58 people were interviewed, respectively. The gathered material is stored in the Folklore Archives of the Estonian Literary Museum in the authors' collection (RR, Saaremaa (2014–2016)). The interviews also covered plants used in ethnoveterinary medicine, and these plants have been presented in comparison with the AVA plants (see more about the fieldwork in Sõukand and Kalle 2016; Kalle and Sõukand 2016).

15.2 Historic Ethnoveterinary Medicine in Saaremaa and Muhumaa

15.2.1 Cattle Farming and the Traditional Calendar

In addition to questions regarding the (medical) treatment of animals, Vassil Grünthal also asked questions about maintaining the animals' wellbeing on a daily basis as well as according to the traditional calendar. Here wellbeing signifies what had to be done to prevent animals from falling ill. The answers show that the most important day for cattle farmers used to be the day cattle were let out of their barn for the first time in the spring (called *karjalaskepäev*). Generally in Estonia that day has been 1 April. But considering that until January 1918, Estonia used the Julian calendar, this indicates a date of 15 April according to the current Gregorian calendar. Yet, this day was more symbolic as the natural conditions were not suitable for letting cattle outdoors (too little grass in the pasture, fickle weather, etc.). In reality, the day of letting the cattle outdoors was celebrated along with St. George's Day (called *jüripäev*) on 23 April. The reason was that St. George's Day was important as the beginning of all springtime farm work. St. George, in whose honour the day is celebrated, was considered to be the patron saint of fields and cattle and was supposed to particularly protect cattle from wolves (Hiiemäe and Järv 2016). The answers in the questionnaire did not reveal whether "the day of letting the cattle out" referred to the calendar holiday or the day when cattle were actually let out of the barn for the first time. The latter is favoured by the fact that the AVA has a note from Muhumaa island that when letting the cattle outdoors for the first time, it was observed that it would not be on either Monday or Friday, which were considered unlucky days. It is specified that this tradition was followed more in manor barns. Hence, by 1928 the calendar tradition was replaced by a more logical option that was based on the weather.

As during the winter the animals were hidden from strangers' looks, they had to be protected from these people when being let out in the spring – there was a particular fear of "the evil eye" (called *kuri silm* or *kaetus* in Estonian). The charms and objects used against "the evil eye" were similar in both Saaremaa and Muhumaa. The most important of these was common salt, which was thrown behind the animals when they were walking to the pasture for the first time. Sprinkling salt into the tracks of the animals was also thought to keep the animals safe from wolf attacks during the summer. A second protective object was bread, which was fed to the animals with salt. It was believed that bread kept from Christmas or a special loaf baked on Shrove Tuesday had special powers.

On rare occasions, words usually spoken at christenings (Christian ceremony at which a baby is baptized) were read on that day to animals to ward off "the evil eye" and wolf attacks. But it was more common to ward off wolves by placing a soot-covered kettle log (a log on which the kettle is hung over a fire) on the doorstep of the barn so that the animals would step over it.

Fig. 15.2 Historical photograph of barn with cattle, Lümanda village, early twentieth century (https://arhiiv.saartehaal.ee/2009/03/17/lumanda-muuseum-sai-naituse-tegemiseks-toetust/)

To keep snakes from biting animals during the summer, the chest, nose or head (between the horns) of cows was rubbed with tar, or wood tar was put into their mouths with a wooden stick. It was thought that the smell of wood tar would keep snakes away. In order to prevent different foot ailments in animals during the summer, different iron tools such as an axe and a bar were put on the doorstep of the barn in the belief that if an animal steps over them, they would not get ill.

Another important period in the calendar began with Christmas (6 January in the Gregorian calendar) and ended with the Epiphany (called *kolmekuningapäev*). On Christmas Eve and New Year's Eve, there was the tradition to draw crosses with chalk above the windows and doors of the barn to protect animals. In the Sõrve Peninsula, on New Year's morning, crosses were circled, but in Muhumaa the crosses were made using soot on New Year's Day. There is a single mention of crosses also made on the Epiphany.

The archival texts did not include notes about traditions during the third most important period – Midsummer (called *jaanipäev*) – however, contemporary fieldwork revealed that flower wreaths were used to adorn the animals coming home from the pasture during that time. Whether this was done with the intention to ward off danger or illness is no longer known. A historical photograph of a traditional village barn with cattle is shown in Fig. 15.2.

15.2.2 Activities to Help Animals to Adjust to the Pasture and Stay There

For a new animal to adjust, there were several customs to observe on the day of purchase. According to custom, after the money was paid, the former owner was no longer allowed to pet the animal, whether it is a cow or a horse. It was traditional for

the new master to take a handful of hay from the former owner's cart and to feed it to the animal upon arrival home. When the new owner got to their home gate with the animal, they placed their leather belt in front of the gate, and the animal had to step over it. This was thought to bind the animal to the new place.

Now and then a wooden stick or cattle whip was taken from the former home of the animal and put into the eaves of their new home upon arrival. Conversely, it was very common in Saaremaa and Muhumaa to take one, three or nine rocks from the former home of the animal and throw them into the well on arrival to their new home (barn). Sometimes the stones were passed around the animal's head three times before throwing them into the well. At the same time, there is a note that mentions three rocks taken from the place of purchase were tapped on the animal and then left behind at the same place. The well was an important place in the home yard, and thus three turns around the well, preferable in a counterclockwise direction, were taken with the animal upon arrival home. A similar action was taken when an animal fell ill at home, after which it was given a bucket of water to drink. If possible, the water was brought from a health-giving spring. When a new animal was let out the pasture with the other animals, they were all given pieces of bread from the same loaf, which were sometimes covered with the saliva of the new animal.

To keep animals in the pasture during the summer and to keep them from running away, the first cattle whip used on the day when the animals were let out for the first time was attached to the house or the eaves in the evening. Similarly, during birth of an animal, the keys of the barn or house were put into the first hot drink water so that the animal would keep to their home.

15.2.3 Changes in the Quality of the Raw Milk and How to Improve It

Up to the end of the nineteenth century, raw milk was mainly kept in wooden containers. Starting from the beginning of the twentieth century, metal milk cans were also used. Accordingly, the older people interviewed in 1928 still remembered the time when wooden milk containers were used: the archival texts mention boiling the milk containers in hot water in such instances. Sometimes dried grass was also put into the hot water. It was also believed to help if the milk containers were washed with ash lye and dried in the sun. In earlier times, when the cows were in the barn during the winter, they did not provide milk as this was the time of pregnancy. The milking period was during the summer. As raw milk quickly spoils, it needs good conditions for preservation, which were often not available in the countryside. Raw milk was kept either in the well or in a cool cellar. Sour milk, unlike fresh milk, was drinkable for many days.

It was thought that any changes in milk when storing it, such as the milk becoming sticky, spoiled, hardened, etc., were the result of witchcraft. Both Saaremaa and Muhumaa had similar activities to prevent this from happening. It was widely common to smoke the milk containers with scraps from the yard (grass, leaves, twigs,

etc.) or old rags. The best things to use for this were the trash from the yard of the person or the clothes of the person who was considered to be responsible for spoiling the milk. But if these were not available, the trash from the home yard and even hay from the pigsty or old sails were considered suitable. In some parts, the milk equipment was later washed with ash water, or the water was given to the animal to drink. Washing milk containers with ashes was also recommended in the early literature (Ollino 1897), and the best to use were ashes from leafy trees, particularly birches (*Betula* spp.) (Ottenson 1932). If it was thought that the milk had spoilt after a woman had stepped over the milking bucket, the containers were smoked with the threads of the woman's apron.

If the taste of the raw milk changed and it tasted, for example, like a grinding stone or grinder, it was thought that this occurred because the milk containers had been used to take water to the water container under the grinding stone. In order to prevent such a change in the taste of milk or to remove it, a grinding stone was put at the bottom of the animal's drinking dish, and the animal was given this water to drink right after giving birth. Also a grinding stone or chips from the stone were put into the water when washing milk containers for the same purpose.

15.2.4 Supernatural Illnesses and Their Treatment

It was previously thought that supernatural illnesses were caused by *lendva* – a witching arrow sent by an evil person either with words or the wind, with which a sudden illness or attack was directed towards the animal. In the medical literature, "attack", "witching arrow" and "sudden illness" have been identified as anthrax, a severe infection caused by the bacteria *Bacillus anthracis.* Its spores are particularly resilient to external impacts, and grass-eating animals ingest it with fresh grass or feed (Sumberg et al. 1941).

As the illness comes on suddenly, in Saaremaa and Muhumaa, it was cured with gunpowder, which also causes a sudden reaction. Gunpowder was either fed to the sick animal with water or given dry with salt. Infrequently, a gun loaded with only gunpowder was shot once to the left and another time to the right of the animal. It was also common to smoke the animal by different means. For example, the gunpowder was lit and the animal's head covered with cloth so that it would inhale the smoke; three matches were lit in a row under the animal's nose; or dust was gathered from room corners, crossroads, the door or the gate and then smoked. Also, the traditional medicines asafoetida (*Ferula assa-foetida*) and frankincense (*Boswellia* spp.) were brought from the pharmacy and smoked under the animal's nose. Another method involved drawing blood from the tail or ear of the animal and then feeding it to that animal, if necessary with bread.

Lice and other parasites on animals were also considered to be of supernatural origin or due to the "the evil eye". It used to be common in both Saaremaa and Muhumaa to take nine lice from an animal, to put them into a gun and then to shoot them into a northern wind, the forest or a body of water. There are also notes in the

archival texts that mention the practice of putting nine lice into a hole in a log, which was then closed, and the log thrown into the furnace. There were other ritual activities such as swiping the animal three times with an old broom.

15.3 Herbs, Mushrooms and Mosses Used Against Cattle Illnesses and in Wellbeing Rituals in Saaremaa and Muhumaa

15.3.1 List of Herbs of the AVA

Certainly, the folklore texts do not cover the totality of the situation and knowledge, as they constitute the results of only one expedition. As there are no earlier lists of herbs used in Estonian ethnoveterinary medicine, the list of the AVA can now be compared with recently gathered data, and these differences are outlined in Table 15.1 and discussed below.

The use of nettle (*Urtica dioica*) to feed cows has been recommended for more than a century (Jannau 1857, Wöhrmann 1930s, and others), and this practice was also mentioned by informants during the recent fieldwork. Therefore, it can be said for certain that although the archival texts do not specify this, the herb was also used as feed during those periods. The literature recommended the use of nettle as it increases milk production and improves the animal's overall health. The use of clover (*Trifolium* spp.) in order to increase milk production was also well-known, today as well as in the past (e.g. Jannau 1857 and others). This plant was mainly sown on pastures and given as fodder. A typical scene of Saaremaa pasture is presented in Fig. 15.3.

It has always been a tradition to make leaf brooms for feeding animals in the wintertime in both Saaremaa and Muhumaa. These were mainly made for sheep, but they were also given to cows if there were excess brooms or if there was a lack of hay. The branches for the brooms were gathered by cutting off branches from a large tree or by chopping off brushwood. The branches bunched up were about 1.5 m tall, and these were kept in the hayloft of the barn. The interviewees told me that the animals liked to eat the leaves of ash (*Fraxinus excelsior*) and alder buckthorn (*Frangula alnus*) the most. The brooms were dried in a sheltered place under the eaves of buildings, and the dried brooms were kept in a hayloft or barn. The branches of coniferous trees such as spruce (*Picea abies*), pine (*Pinus sylvestris*) and more rarely juniper (*Juniperus communis*) were given mainly during late winter or early spring when there was a lack of hay or in the spring for vitamins. As these trees are evergreens, the branches were brought from the woods when necessary and not stored beforehand (see more from Kalle 2015). Although these species and usages were not recorded by the AVA, it can still be said that these trees or bushes were also fed to animals before.

Table 15.1 Plants used for ethnoveterinary medicine and animal wellbeing in Saaremaa and Muhumaa

Latin name (family)	Folk name	Purpose of use	Application
Achillea millefolium L. (Compositae)	Raudriiarohi, rauareierohi, rauareia, rauareia rohud, raudrohi[a]	(Fresh) wounds	Crushed leaves applied on wounds
		Diarrhoea in cows, stroke (apoplexia), blood enhancer[a]	Decoction given to drink
		Babesiosis	The herb is soaked in vodka or water and then the water or vodka is given to drink
		Bleeding from a wound	Plants soaked in spirits applied gently on a wound
Alchemilla xanthochlora Rothm. (Rosaceae)	Kõuerohi	Milk spoiling after cow terrified by thunder	Water infusion given to drink
Alnus spp. (Betulaceae)	Lepp	Put in colostrum	Bark put in milk so that the milk would stay fresh
		Babesiosis	An alder stick thrust into the ground where the cow urinated blood for the first time
		Spoiled milk	Cream from the milk put in a hole in an alder log and thrown into the furnace
Aloe arborescens Mill. (Xanthorrhoeaceae)	Aknauhakas	Burn wounds	Topical application of the juice
Artemisia absinthium L. (Compositae)	Koirohi	Abdominal diseases[a], constipation, diarrhoea in cows, cough	Decoction given to drink
		Stroke (apoplexia)	The herb is smoked under the animal's nose
	Suhkrupeet	Fresh wounds	The plant put on wounds
Beta vulgaris subsp. *vulgaris* var. *altissima* Döll (Amaranthaceae)		Postnatal period[a]	Beet syrup was given to strengthen cows
Betula spp. (Betulaceae)	Kask	Diarrhoea in cows	Water enriched with charcoal and ash was given to drink
		Ritual in the spring	The first whip was put into the eaves so that cattle do not stray from the pasture
Calendula officinalis L (Compositae)	Saialill	Diarrhoea in cows[a], inflammation[a]	Decoction given to drink

Carlina vulgaris L. s.l. (Compositae)	Keelikurohi	Ceases to ruminate	Decoction given to drink
Carum carvi L. (Apiaceae)	Köömned	Increase milk productivity	Decoction of seeds given to drink
Chelidonium majus L. (Papaveraceae)	Vereurmarohi	Babesiosis, tick diseases[a], milk fever[a], post-parturient hypocalcaemia[a], or parturient paresis[a]	Decoction, water or alcohol infusion is given to drink
Cirsium heterophyllum (L.) Hill (Compositae)	Keeliku rohi[a], haavaleht, kuue haava leht, valgepoolega leht	Babesiosis[a] Wounds, erysipelas	Aerial parts given to eat[a] Topical application of the leaf
Coffea spp. (Rubiaceae)	Must kohv, kohv	Urinary retention (ischuria) Postnatal period	Strong black coffee given to drink with a bottle Coffee with grounds are given to drink
Crataegus oxyacantha L. (Rosaceae)	Kontmaripuu	Arthritis, polyarthritis, foot disorders	Decoction of twigs given to drink
Cucumis sativus L. (Cucurbitaceae)	Kurk	Fodder[a]	In spring, lacto-fermented cucumbers were fed to animals
Cypripedium calceolus L. (Orchidaceae)	Külmkinga rohi	Eye diseases (runny eyes)	Water infusion of aerial parts and 9 burning coals, used to wash the cow's eyes
Dryopteris spp. (Dryopteridaceae)	Sõnajalg	Against all diseases	The roots of the fern picked on Midsummer's night to treat all diseases
Frangula alnus Mill. (Rhamnaceae)	Paaspuu, paakspuu	Fodder[a]	"Cows eat very well from this bush"
Fraxinus excelsior L. (Oleaceae)	Saar	Fodder[a]	Branches with leaves as winter food
Glechoma hederacea L. (Lamiaceae)	Maaaljarohi	Urticaria	Washing with decoction was followed by magical ritual involving a therapeutic stone

(continued)

Table 15.1 (continued)

Latin name (family)	Folk name	Purpose of use	Application
Hordeum vulgare L. (Poaceae)	Oder; linnased [malt]	Diarrhoea in cows	Roasted seeds were given to eat
		Verrucae	A number of grains equal to verrucae were rubbed on them and thrown into furnace
		Postnatal period	Roots remaining after cultivation of malt were given with a drink
		Retention of afterbirth	Germs and roots remaining after the cultivation of malt were given with a drink
Hypericum spp. (Hypericaceae)	Harilik naistepuna	Diarrhoea in calves[a], poisoning with plants[a]	Decoction given to drink
Inula helenium L. (Compositae)	Ollandilehed	Foot diseases	The leaves fed to animals
Juniperus communis L. (Cupressaceae)	Kadakas	For the health of calves[a], for health (vitamins)[a], arthritis, polyarthritis (prevention), diarrhoea in cows	Branches boiled and given to drink
		Witch eye[a]	The smoke from juniper was made[a]
		Fodder[a]	Boughs given to eat[a]
Levisticum officinale W.D.J.Koch (Apiaceae)	Liistok, liistük	Snake bite[a]	Juice applied on the wound, a leaf of the plant kept in fish brine put on the wound[a]
		Babesiosis	Decoction of greater plantain (*Plantago major*), lovage (*Levisticum officinale*) and radix of common sorrel (*Rumex* spp.) given to drink with flaxseed oil

Linum usitatissimum L. (Linaceae)	Lina	Diarrhoea in calves[a], healthy (vitamins)[a], ceased rumination[a]	Boiled seeds and given to drink[a]
		Ceased rumination	The tows boiled and given to drink
		Constipation	The seeds were boiled until they became flattened and were given to drink
		Tympany[a]	Flaxseed oil given to drink[a]
		Babesiosis	Oil was given with decoction made of greater plantain (*Plantago major*), lovage (*Levisticum officinale*) and radix of common sorrel (*Rumex* spp.) (*Levisticum officinale*) and radix of common sorrel (Rumex spp)
		Erysipelas	Topical application of flaxseed oil
		For wound closure	Linen cloth strips topically applied
		Babesiosis	The tows boiled for as long as the water lasts and then consumed
		Retention of afterbirth	The tows boiled and given to drink
		For the health of calves[a]	The seeds were put in calf food[a]
Matricaria chamomilla L. (Compositae)	Kummel	Postnatal period	Flowers put into drinking water
Matricaria discoidea DC. (Compositae)	Koerakusekummel	General sickness in animals[a]	Decoction given to drink
Nicotiana rustica L. (Solanaceae)	Tubakas	Cattle lice	Wash the animal with decoction, several times, if necessary
		Tympany	The stem of a long pipe full of tobacco was put into the cow's rectum and tobacco burned; when the tobacco has burned off, the animal was believed to be cured
Petroselinum crispum (Mill.) Fuss (Apiaceae)	Petersell	Urinary retention (ischuria)	Decoction of roots (and occasionally fish air bladder) was given to drink
Picea abies (L.) H.Karst. (Pinaceae)	Kuusk	Old wounds	Topical application of ointment made with resin, pork fat, wax and alum stone in spring; decoction of shoots given to drink
		Cough	
		Fodder in spring[a]	Twigs given to eat[a]

(continued)

Table 15.1 (continued)

Latin name (family)	Folk name	Purpose of use	Application
Pinus sylvestris L. (Pinaceae)	Mänd	Fodder in spring[a] Fresh wounds	Twigs given to eat[a] The bottom white side of bark was placed on a wound
Plantago major L. (Plantaginaceae)	Teeleht	Babesiosis Old wounds	Decoction made of leaves and lovage (*Levisticum officinale*) and common sorrel radix (*Rumex* spp) and given with flaxseed oil Leaf put on wounds
Potentilla erecta (L.) Raeusch (Rosaceae)	Tedremaran	Stomach-ache	Roots given to eat
Primula veris L. (Primulaceae)	Käekuatsa	Postnatal period	Decoction of flowers was given to drink ["which would give yellow milk"]
Prunus padus L. (Rosaceae)	Toomingas	Diarrhoea in calves[a] Ritual[a]	Decoction of twigs was given to drink It was not allowed to use it for making cattle whip made; would make animals ill
Quercus robur L. (Fagaceae)	Tamm	Diarrhoea in calves and cows[a] Diarrhoea in cows, postnatal period	Decoction of bark or acorn and was given to drink[a] Decoction of bark was given to drink
Rumex spp. (Polygonaceae)	Oblikas	Babesiosis	Decoction of roots with leaves of greater plantain (*Plantago major*), lovage (*Levisticum officinale*) and given with flaxseed oil
Salix repens L. (Salicaceae)	Kõuepaju	Spoiled milk (due to fright from thunder)	Branches boiled and given to drink
Sambucus nigra L. (Adoxaceae)	Leederpuu, leedripuu	Babesiosis; cough	Flowers given to eat; tea from the flowers given to drink
Secale cereale L (Poaceae)	Rukis	To strengthen health[a] Retention of afterbirth Cattle lice	Grains stewed and given to eat[a] A hot flour soup was given with a meal Ointment made with gunpowder, sulphur, quicksilver, fat, butter, twitch grass, beeswax and copper sulphate [copper vitriol]

Solanum tuberosum L. (Solanaceae)	Tuhlis	Burn wounds Urticaria	Cut potato topically applied Potato cut, one half thrown into the forest, the other was rubbed on the animal three times and then placed under a stone
Sorbus aucuparia L. (Rosaceae)	Pihelgas, pihlakas, pihla	Cattle lice Wounds Old wounds Ritual Ritual[a]	9 lice placed under bark or 9 lice shot from a gun into a tree Decoction of bark used to wash a wound, then greased with seal fat Topical application of bark infusion The first whip was put into the eaves so that cattle do not stray from the pasture "Do not hit animals with a rowan branch, it becomes ill"[a]
Tanacetum vulgare L. (Compositae)	Soolikarohi	Diarrhoea in calves	Decoction given to drink
Taraxacum sect. *Taraxacum* F. H. Wigg. (Compositae)	Võilill	Ritual[a]	Wreaths plaited and put on the cow and shepherd on Midsummer's day
Thuja occidentalis L. (Cupressaceae)	Elupuu	Retention of afterbirth	Decoction given to drink
Thymus serpyllum L. (Lamiaceae)	Liivatee, liivarohi, liivanõmme tee, timmerjaan	To improve health[a] Urinary retention (ischuria) Cough	Decoction given to drink[a] Tea was allowed to pass through a natural hole (tree, stone, table) and given to drink Decoction given to drink
Tilia cordata Mill. (Malvaceae)	Lõhmuspuu	Burn wounds Old wound Erysipelas	Bark infusion applied on the wound Wash with inner bark infusion The bottom white side of bark was placed on the skin
Trifolium montanum L. (Leguminosae)	Jaanirohud	Postnatal period	Decoction given to drink
Trifolium sativum L. (Leguminosae)	Härjapea	Postnatal period	Decoction of flowers given to drink

(continued)

Table 15.1 (continued)

Latin name (family)	Folk name	Purpose of use	Application
Trifolium spp. (Leguminosae)	Ristik, ristikhein	Fodder[a]	Was sown in pasture
Tussilago farfara L. (Compositae)	Vaeselapseleht	Cough	Decoction of leaves given to drink
Urtica dioica L. (Urticaceae)	Nõges	Metritis[a] Fodder[a]	Decoction given to drink ("if animal does not drink, put flour in") Dried and given to eat in winter
Valeriana officinalis L. (Caprifoliaceae)	Vallerjaan	Stomach-ache	Decoction of roots given to drink
Verbascum thapsus L. (Scrophulariaceae)	Üheksajuur	Diarrhoea in cows	Roots boiled in beer and given with water
(?) *Lamium purpureum* L. (Lamiaceae)	Punaste lehtedega nõgesed	Babesiosis	Fed to cows

[a]Use recorded in 2014, but refer to the time when animals were still kept or even to the childhood of the respondent (for which limited details were given). If not marked, the record dates to 1928 (?) Identification based on plant description

Fig. 15.3 Traditional Saaremaa wood pasture near Kuressaare. (Photo Renata Sõukand, 2015)

15.3.2 Modern List of Herbs

The modern list of herbs seems short at first glance, but if we take into consideration that the same herbs have been used for similar illnesses in animals and humans (e.g. different wounds, coughs, skin ailments, etc.), the list is much longer. Therefore, although fewer herbs are used today for specifically treating animals, as animals are no longer raised, these treatments are still being used in humans. This is also reinforced by many popular medicine books published recently.

If we compare the two lists, it becomes apparent that many of the historical herbs are still being used today. For example, recent fieldwork recorded the use of the water from linden (*Tilia cordata*) bark and the juice of aloe (*Aloe arborescens*) leaves for burn wounds; the use of spruce (*Picea abies*) resin ointment and broadleaf plantain (*Plantago major*) for wounds; the use of tormentil (*Potentilla erecta*) roots for stomach ailments; and the use of coltsfoot (*Tussilago farfara*) leaves and Breckland thyme (*Thymus serpyllum*) herbal tea for coughs, all of which were classified as treatments for animals in the archival texts.

In the nineteenth century, the literature recommended giving animals caraway seeds (*Carum carvi*) for increasing milk production (Ollino 1897, third print was issued in 1909). Although this use has not been noted in folklore texts, during fieldwork it was still known that caraway seeds improve milk production, but it was specified that the respondent had read about this use and had never used the seeds in such a way. As a result this information is not shown in Table 15.1.

15.3.3 Recommendations in Literature as Influencers of Herb Use

Use of medicinal plants in ethnoveterinary medicine is generally considered to be "rational", and it is recommended in both veterinary books and popular books on medicinal plants. The first Estonian medicinal plant book *Ma-rahwa Koddo-Arst* (Jannau 1857) even included a number of recommendations for improving the well-being and treatment of cows. Published handbooks and the popular science literature gained a lot of momentum in the beginning of the twentieth century.

Here analysis can be carried out only with regard to those usages for which there is reference to the archive or notes from fieldwork. The total list of various herbs and their usages noted in the literature is not the subject matter of this article. However, one exception needs to be mentioned: juniper (*Juniperus communis*) berries, according to the AVA materials and recent interviews, have not been used to treat animals at all. Nevertheless, Saaremaa is the most juniper-rich Estonian county, and the ethnoveterinary literature highly recommends juniper berries for the treatment of lung diseases, peritonitis, agalactia, oedema and poor milk consistency (Tõnisson 1890, Ollino 1897, Wöhrmann 1930s). Likewise, people have not used berries to treat themselves; however, in recent years (Kalle and Sõukand 2016) it has become accepted that these berries are beneficial and therefore they are eaten for prevention, but not for treatment. They have been used only for urinary incontinence of a single child, but it was specified that this was recommended by the local healer. The literature (Tõnisson 1890) has also recommended boiling wooden milk containers in hot water with juniper branches to prevent an unpleasant taste in milk and to prevent milk from spoiling. In addition, recent fieldwork has demonstrated that hot juniper water is used for boiling wooden containers, but these barrels were no longer used for storing milk but rather for meat, fish, lacto-fermented cucumbers and sauerkraut.

Many earlier Estonian veterinary books noted that they were prepared on the basis of a translation of the work by V. Metterlingk (e.g. Wöhrmann 1930s, Vinkler 1938; Vaiksaar 1939 [third print was published in 1940]), who was a professor at the veterinary clinic of the University of Tartu and presumably a Baltic German who published in German. Often the translators did not note the Estonian names along with the Latin names of herbs, and this may have impeded understanding and thus the use of the herbs. For example, in the case of constipation, the literature recommended giving an animal a little bit of *Napellus* and *Cannabis* (Wöhrmann 1930s), for which there is no information that people actually used them.

15.3.4 Using Foreign Species to Treat Animals

The use of foreign species closely reflects the impact of the literature as this is the first source of knowledge on the medicinal properties of a certain species. Yet, people have sometimes changed these recommendations according to their knowledge.

For example, several veterinary brochures (Tõnisson 1890 [4 prints published, last in 1903] Wöhrmann 1930s) instruct that in the case of bovine flatulence, a solution of tobacco (*Nicotiana rustica*) and salt should be inserted anally into the animal. From the archival text, we learn that tobacco is put inside a long pipe, which is inserted into the rectum of the animal and then lit. When the pipe burns down, the animal is cured. However, another recommendation for using tobacco, namely, washing animals with tobacco water to treat bovine lice, has been adopted without changes.

Parsley (*Petroselinum crispum*) has been one of the most recommended herbs in the literature for the treatment of kidney and bladder issues in both people and animals. In earlier times, people also adapted the use of this herb with their own knowledge. For example, in Saaremaa, fish air bladders were added to a parsley decoction to treat ischuria. It is thought that this was done because like [bladder] could cure like [bladder diseases]. Although parsley has not been recorded as a treatment for cattle in Saaremaa, people still use it widely for their own urination problems.

One of the foreign species most widely promoted in the literature for the treatment of people and animals has been elder (*Sambucus nigra*). For example, it is recommended to give elder flowers to cows to alleviate coughing (Jannau 1857, Wöhrmann 1930s, and others). Yet its implementation is limited by the fact that the Estonian climate is not suitable for this bush, and it can be grown only in Western Estonia and Saaremaa, which have a milder climate. It very rarely grows in the wild, and thus this herb has not been adapted to the folk medicine of continental Estonia. According to the AVA, water boiled with elder flowers has been used in Saaremaa for bovine coughing and babesiosis. Today, people in Saaremaa eat the black elder berries to improve their overall health, but the plant is not used to treat animals.

The literature has also widely promoted the medicinal properties of chamomile (*Matricaria chamomilla*). The information provided in the AVA which states that cows are given water with chamomile flowers after giving birth derives from the literature where this decoction was recommended for reducing birthing pains (Tõnisson 1890). Another species of chamomile (*M. discoidea*) has become so wild in nature that people no longer consider it to be a foreign species, and it is deemed unsuitable for treating people.

With regard to modern cultivated species, one of the most popular medicinal herbs in Saaremaa is marigold (*Calendula officinalis*), which is used for dozens of different human ailments, as well as for treating animals, mainly infections. The increase in popularity of this herb in the last few decades has again been caused by popular medical books (e.g. Treben 1991, the fifth printing which was issued in 2017) and its forceful promotion by the former local pharmacist and in his published books (Mandre 1994, third printing published in 1999; Mandre 1999, third printing published in 2001).

In the early literature, if there was no Estonian name for foreign species, they were presented in German, as the books were mainly translated from the latter. For example, horse-heal (*Inula helenium*) is called *Alant* in the medical books. However, people adapted these foreign works to suit their needs. In Saaremaa it has been noted that in the case of cow foot illnesses, horse-heal leaves should be given to an

animal, without specifying the application method. But if we also study the folklore collected from Western Estonia at the same time (Sõukand and Kalle 2008), it is revealed that these were boiled and given to the cow to drink in the case of bone illnesses. Today, horse-heal is practically unknown in Estonian folk medicine, as it is no longer grown as a medicinal herb and has escaped into nature from gardens.

15.3.5 Herbs Used for Ritual Purposes

In Saaremaa, two species of *Alnus*, either black alder (*A. glutinosa*) or grey alder (*A. incana*) which cannot be identified by the name in the archival texts, have been used for ritual purposes. Alder wood was considered special and magical because breaking or cutting a raw tree results in the wood turning red, thus creating the illusion that blood is seeping from the tree. This is the reason why when cows had babesiosis, an alder stick was stuck into the ground where it occurred the first time so that the alder would trap the illness inside the ground. In a similar manner, alder was used in the case of milk spoiling: spoilt milk was put inside a log and then thrown into a burning furnace – the wood would take away the bad, and it would be destroyed in the fire.

Rowan (*Sorbus aucuparia*) also used to be an important holy tree in folklore. Folklore texts say that the first springtime cattle whip had to be made of rowan, and at the end of the day, the whip was placed in the eaves – this way the cattle would not stray from the pasture. During the recent fieldwork, it was repeatedly said that an animal may not be struck with a rowan stick as then it would fall ill, the milk would go bad or the bulls would begin to hit that particular cow. Similar qualities were also attributed to hackberry (*Prunus padus*). It was believed that animal lice were due to "the evil eye", and rowan was used for exterminating them. Nine lice from the animal's back were put under tree bark or loaded into a gun and then shot towards a tree. Apparently, the tree was to take in the lice and save the animal from this pest.

Juniper (*Juniperus communis*) has also been a culturally important tree. Nowadays its medical properties are primarily known, but it is still also important as a magical tree. For example, the fieldwork recorded that juniper branches were used to smoke rooms during funerals, in case of infectious disease, and also to repel flies. On the one hand, it was explained that juniper smoke is used as a disinfectant, but on the other hand, it was said that the smoke cleans rooms of witchcraft. Smoking was also used to treat animals. When the animals had diarrhoea at the collective farm and all medical approaches had been unsuccessful, it was thought that the ailment was the result of witchcraft, which can be fought only by witchcraft. For this reason, the ritual of smoking with juniper branches was carried out at night, in secret, without telling anyone.

In earlier times, the roots of ferns (*Dryopteris* spp.) gathered on Midsummer's night were also considered to have magical medicinal properties. This belief arises from the fact that, although ferns reproduce by spores, the peoples of many Slavic

nations, Finno-Ugric nations and Baltic nations believe that ferns bloom during that period. The person who finds the blossom will have good luck and health, and roots gathered during that time were believed to cure all diseases.

In Estonian folk mythology, lady's-slipper orchid (*Cypripedium calceolus*) was considered to be an important wonder cure endemically in Saaremaa. This plant is more common in nature in Saaremaa and Muhumaa than in continental Estonia. The earlier folk name of the plant, *külmkinga rohi* or cold-foot herb, in Saaremaa, means that this is an herb to ward off an evil spirit. All supernatural and sudden illnesses in both animals and people were thought to have come from either stepping on the footprints of a vengeful spirit or the "bad wind" created by the spirit. The only help against this deadly illness was considered to be the lady's-slipper orchid. In case of animals having runny eyes, it was thought to be caused by "bad wind". The herb was soaked in water, nine burning pieces of coal were added to the water, and then the water was used to wash the runny eyes of an animal.

15.3.6 Mosses, Algae, and Fungi for the Treatment of Animals

In this paper, uses of mosses, algae and fungi have also been analysed (Table 15.2). In Saaremaa, but not in continental Estonia, spore dust of the common puffball (*Lycoperdon perlatum*) was used for closing bleeding wounds, but this remedy is no longer used today. Also characteristic of the folk medicine of Saaremaa is the use of birch besom (*Taphrina betulina*) for treating both people and animals. This practice, although still used in Saaremaa today, is practically unknown as a medicine in continental Estonia. Birch besoms (Witch's broom) were mainly used to smoke children during contagious illnesses as it was thought that the branch tangles created by the fungus cure supernatural illnesses, which were thought to come from "bad wind", but this is no longer believed today. Earlier it was also thought that a "bad wind" sent by a witch causes eye ailments in animals and makes their eyes runny. For treatment, animals were massaged with the Witch's broom.

The historical popular medicine in Saaremaa differs from that of continental Estonia by the fact that bladderwrack (*Fucus vesiculosus*) is used for all kinds of skin diseases, especially those which are thought to have been caused by sea water. During the recent fieldwork, no one spoke of using bladderwrack for the treatment of animals, but people still treat their own painful joints with a bladderwrack infusion.

As it is possible to get a skin disease from the sea (called *merikid*), the treatment has to be obtained from the same place. Other algae have also been used for the same purpose, but their species or families could not be specified afterwards. The archival texts mention that "sea blossoms with a red cross" (probably a blooming and floating algae) have to be collected from the northern part of the sea and then put on infected skin.

One identification has been made only at phylum level, *Bryophyta*, as the folk name *katusesammal* cannot be assigned to a specific species or family. As the folk

Table 15.2 Mosses, algae, and fungi used for the treatment and wellbeing of animals in Saaremaa and Muhumaa

Latin name	Folk name	What it was used for	How it was used
Bryophyta	Katusesammal	Udder swelling	Warm moss put on the udder
Fucus vesiculosus L. (Fucaceae)	Karpmuda, Muda	Eczema madidans, eczema squamosum	Algae from stones were mixed with honey and then rubbed on infected skin. The algae were burned, and then the ashes were mixed with water and used for washing
Inonotus obliquus (Ach. ex Pers.) Pilát (1942) (Hymenochaetaceae)	Kasekäsn	General sickness[a]	Decoction given to drink
Lycoperdon perlatum Pers. (1796) (Agaricaceae)	Tuhkja	Bleeding from a wound	Spore dust topically applied
Saccharomyces cerevisiae Meyen ex E.C. Hansen 1883 (Saccharomycetaceae)	Pärm, õllepärm, koduõlle pärm, töömiis, leivapärm	Retention of afterbirth udder swelling	Given to drink with water or home-made beer
			Rubbed on the udder
			Given as fodder
		Constipation	About 1.2 l of beer yeast given to drink in a bottle; topical application of yeast or mixture of bread and yeast
		Tympany	
		Psoriasis, eczema	
Taphrina betulina Rostr. (Taphrinaceae)	Tuulepesa	Eye diseases	Witch's broom used for massaging

[a]Use recorded in 2014, but refer to the time when animals were still kept or even to the childhood of the respondent (for which limited details were given). If not marked, the record dates to 1928

name *katusesammal* or roof moss implies, it grows on the roofs of houses; and straw or thatched roofs used to be common in Saaremaa. It is specified that for the treatment of a swollen cow udder, moss has to be taken from the northern side of the roof. A suitable species could be whitish feather moss (*Brachythecium albicans* (Hedw.) Schimp.) or one belonging to the *Ceratodon* spp. family. Different species of moss have also been widely used as compresses for various illnesses, aches and swellings in humans. During the recent fieldwork, we also learned that heated moss has been used as a compress on aching joints (in human ethnomedicine).

Home-made beer was often recommended to treat various ailments by historical veterinary handbooks, and people have accepted these recommendations, for example, in the case of a retained placenta (Wöhrmann 1930s). However, people have also supplemented these recommendations, and have given, for example, liquid beer yeast (*Saccharomyces cerevisiae*), to animals in addition to the suggested beer. The AVA texts specify that beer and yeast cannot be given to a pregnant animal as this causes premature labour. The literature recommends giving half a mug of yeast to animals suffering from severe diarrhoea (Tõnisson 1890), but folklore texts

recommend the opposite, that is, using yeast when an animal is constipated. The recent fieldwork revealed that the beer yeast was kept in a bottle or metal container in a cool place such as the cellar or well.

According to the fieldwork data, the chaga mushroom (*Inonotus obliquus*) has been widely used for the treatment of lung illnesses in people living in Saaremaa. It was also stated that the chaga mushroom was boiled and given to animals as well, but the intended use was no longer remembered.

15.4 Non-herbal Treatments

The most widely used mineral treatment used to be, in both people and animals, common salt. This was given to treat different diseases both separately and with various herbs. Salt was also known to have great medicinal properties, which are illustrated by a text written at the end of the nineteenth century: "The Saaremaa people never go out early in the morning without adding some salt to their boots, because they believe that salt protects against all witchcraft" (Sõukand and Kalle 2008).

Previously, when describing the customs of letting cattle out of the barn for the first time, it was revealed that common salt was thrown behind the animals when they went to the pasture and it was also given with bread to every animal so that it would protect them from disease. In addition, it was also mentioned that sprinkling salt into the tracks of the animals also was thought to keep the animals safe from wolf attacks during the summer. Giving salt was supposed to improve the animal's health, which is why it has also been given, dry or mixed into warm water, during the postnatal period. The practice of giving salt was also believed to help when the animal fell ill suddenly.

When being used as medicine, salt was put on wounds, or infected wounds were washed with salted water. Skin diseases were rubbed with salt, which was then put into three fireplaces on a Thursday evening. In the treatment of bone diseases, the animal's tail was cut and salt applied to the incision. If the animals had cataracts or other eye diseases, they were treated by putting salt in their ears with a feather or by blowing through a straw. Yet in case of human cataracts, it was more common to blow sugar, chalk dust and indigo dye into the eyes.

With regard to metals, iron and quicksilver were used for treatment or wellbeing. Iron tools were used in rituals when letting cattle out of the barn for the first time in spring (in front of the doorstep so that animals would step over it). At other times, an iron horseshoe was used as a talisman and put into the washing-up water of milk containers or the animals' drinking water. Quicksilver was recognized for its magical protective qualities, which is why it was tied in a small cloth bag around the necks of animals in a barn if it was thought that an evil spirit was haunting the animals. Quicksilver was also added to ointments to combat lice. Feeding quicksilver mixed into lard was supposed to help if the animal did not ruminate. In addition, quicksilver was recommended as medication for different illnesses by informants

during recent fieldwork as well as by earlier veterinary handbooks (Ollino 1897, Wöhrmann 1930s).

In the case of broken bones, animals were given copper or silver dust (scratched from a silver coin). Silver coins and jewellery (rings, brooches) and copper coins were also put into colostrum when boiling it, and sometimes these items were taken to the church afterwards. These items were believed to help the cow produce a lot of milk in the future and for the milk not to spoil. Skin diseases were treated by rubbing the affected area with silver, copper or iron horseshoe nails.

With regard to minerals, blue clay was used to treat foot diseases in animals, but it was not specified how, apart from the animals standing in the clay. Blue clay was also rubbed on animals when they had lice. The method recommended in the literature is that in order to prevent bone diseases in animals, bones should be burned to ash and then fed to the animal (Ollino 1897). The ashes were either fed with flour or mixed with water and given in a bottle. The water mixed with wood ash was also given to animals in the case of retained placenta.

Different oils and liquids were also used for treatment. Wood oil, which was presumably made of pine resin, was rubbed on the udder if it was swollen after giving birth or on the injured leg of an animal. Likewise, petroleum was rubbed on different wounds and stiff legs of animals. Gasoline was given to animals in the case of constipation. In earlier times, pharmacies used to colour wood oil red and sell it as an expensive miracle drug which was to be rubbed on split teats (Rohtsepp 1884), but people in Saaremaa have used fat from the abdominal cavity of pigs to treat split teats. This fat was and continues to be one of the most popular medicines in folk medicine. It was used as a component in all kinds of home-made ointments and also rubbed on swellings from snake bites. Seal fat was also used – given to an animal in case of coughing or rubbed on different wounds. Butter and sour cream have also been used for rubbing on wounds, while fresh cream has been used to treat split teats or swollen udders.

15.5 Viability of Traditional Knowledge in Cattle Farming in Modern Estonia

Dairy cattle farming is one of the most advanced and most competitive livestock sectors in Estonia. Although the number of dairy animals has decreased in recent decades, milk yield per cow has continued to increase (Estonian Livestock Performance Recording 2018). At the same time, the structure of the herds has changed due to the construction of new livestock buildings (loose housed free stall barns) and the introduction of modern farm technologies. Nearly 3/4 of the cows are kept in a herd with 100 or more cows, which requires the introduction of control mechanisms to ensure that consumers expect safe food production and animal welfare and health. The number of organic dairy cows is also declining in recent years, after a ban on tie-stall housing regulation came into force. In 2012 there were 2937

organic dairy cows in Estonia (about 3% of total dairy cattle), but in 2015 there were only 1966 cows (Leming et al. 2016).

In 2014 the Minister of Agriculture passed the development plan of organic production, which states that "Organic farming is maintaining traditional agricultural methods in cooperation with the development of science" (EMA 2014: 2). Organic livestock farming has greatly increased in the recent years: only from 2006 to 2013, the number of beef animals increased 2.5 times. However, the number of organic dairy animals decreased significantly during that period. Organic dairy farms are significantly smaller than conventional farms, and only 3 of the former farms had more than 100 cows. Approximately 16% of agricultural land is cultivated as organic (Statistics Estonia www.stat.ee). In 2012, only 1.7% of milk in Estonia was produced organically (EMA 2014). According to Statistics Estonia, in ordinary cattle farming, the minimum optimal herd size for beef animals is 50 individuals, and in the case of dairy animals, it is 300 individuals (Valdvee and Klaus 2012), and thus organic farmers can keep their cattle herds small only due to additional funding (governmental subsidies). But even the smallest conventional cattle herds today are larger than the historic village herds, which included animals from many farms.

The period of time following the collapse of the collective farming system is characterized by a reduction in the number of cows and herds, leading to increases in herd sizes and changes in breeds' proportions in the cattle population. Estonian Holstein and Estonian Red breed are the main dairy breeds in Estonia. If the proportion of these breeds was about 1:1 in 1990, then by 2011, three fourth of dairy cows were Estonian Holstein. However, Estonian Red breed is more favoured in Western Estonia and islands. But the inevitability and desirability of these changes have been under continuous social dispute. On the other hand, in spite of a reduction at the beginning of the 1990s, since 1990 average milk production per cow has increased significantly. That brings the dairy farmers to the same challenges as other countries with intensive dairy farming (Jaakson 2012). Figures 15.4 and 15.5 show pictures of the modern cow breeds on pastures.

The general long-term negative trend in the number of cattle farmers has now become irreversible. For example, only from 2001 to 2010, the number of bovine farmers in Estonia decreased fourfold (Valdvee and Klaus 2012), and small farmers in particular were those who terminated production. The decrease of small cattle farms began in the 1990s, when the economy changed from a planned economy to a market economy. In Soviet times, the size of dairy cattle herds kept at home was limited by the fact that people raised cattle in addition to their main jobs, and there was a national norm on how many fields and pastures a private animal owner could use. Then, as a result of land reform, there was a momentary abundance of small farmers, who began raising dairy cows. However, the market economy did not favour small farmers as the new owners (following privatization) of dairy plants ceased purchasing milk from unprofitable small-scale dairy farms.

The irreversible decrease began in the 2000s (Olmaru 2014). Therefore, it can be said that nowadays small farmers and private animal owners (who raise animals apart from their main job) have given up raising dairy cows and have switched to

Fig. 15.4 Modern cow breeds (Estonian Holstein and Estonian Red cows) on seminatural meadow near Lümanda. (Photo Renata Sõukand, 2015)

Fig. 15.5 Modern cow breeds in traditional Saaremaa wood pasture near Pöide. (Photo Renata Sõukand, 2015)

beef farming animals or, more commonly, have rented out their lands. Consequently, traditional cattle raising has died out in Estonia today.

In addition to supporting organic animal farming, the state also sponsors, from its nature conservation resources, the farming of smaller cattle, which would not otherwise be economically sustainable. Natural conservation funds are primarily

given to managers of protected areas, with traditional landscapes or seminatural communities. These are areas where moderate human activities have helped to develop diverse communities, and when human activities end, the landscapes are dominated by reeds, bushes and forests. These areas were kept open by mowing and herding, but began to disappear after switching from extensive to intensive agriculture, primarily with the establishment of the Soviet system, which forced small farmers to join into large collective farms. Still, the largest change in land use has been caused by the drastic decrease in the number of animals since the turn of the new millennium, and thus today there are thousands of times less of these seminatural communities than there were during their peak time in the 1920s to 1930s. However, governmental subsidies have aided the farming of nontraditional animals such as Scottish Highland cattle (Fig. 15.6). These animals can stay outside throughout the year and need less care than other beef cattle. Therefore, although these cattle are few and traditional methods could be used, considering the lack of historical experience in raising new breeds, all knowledge now comes from school education. In addition, the legislation and norms regarding animal farming and environmental protection do not favour flexibility, and cattle farmers have been left with very little discretion for the creation of local knowledge arising from personal experience.

Today silage is one of the cheapest feeds in the cattle diet and is fed year-round in Estonia. Silage comprises an average 50% of milk production costs but is more nutritious forage than hay. In Estonia, silage is produced mainly from grasses and legumes (over 90%) and less from maize cultivars (Kaldmäe et al. 2014). However, in organic farms and smaller dairy farms (in many cases family farms), cattle grazing is often preferred, and silage is fed during the winter period. A few farms are

Fig. 15.6 Traditional landscape (alvar) is now habituated by Scottish mountain cows, new to Estonia and bred for meat. Near Kuressaare (Abruka island). (Photo Renata Sõukand, 2015)

feeding dairy cows only with hay in order to get better raw milk for cheesemaking. Although, dairy farming based on feeding the total mixed ration is more and more dominating in dairy cattle farming. Implementing such a feeding system, where the forage and grains are mixed together before being delivered to the animal, was first introduced in the early 2000s in Põlula experimental farm (Kärt 2006).

Modern dairy farming has changed in recent years in Estonia due to the implementation of a variety of precision technology and knowledge-based decision-making (Viira et al. 2015). With the help of science, diagnostic tools and software systems have been introduced, which is a significant help for the stockmen. New technology allows cattle breeders to discover more quickly and prevent the occurrence of diseases, therefore improving the health and welfare status of cattle. The latter shows that Estonian cattle farms are relying on the decisions of research outcomes. The beginning of research on animal husbandry in Estonia dates back to the year 1921, when the Animal Breeding Experiment Station was established just outside of Tartu. A total of 170 long-term projects were conducted there during the next 18 years, carried out under the supervision of Professor Jaan Mägi. The first feeding trials were carried out already in 1914, but there are no reports available of those studies (Tölp 2012). Nowadays, cattle trials are conducted either in the Eerika experimental farm (owned by the Estonian University of Life Science) or on commercial dairy farms all over Estonia.

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