Field Horsetail *(Equisetum arvense)* as a Food Plant

Kannubjølluvísa til matna

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Úrtak

Í 1700-talinum skrivaði sveisiski plantufrøðingurin von Haller at rómverjarnir brúktu myribjølluvísu (*Equisetum fluviatile*) til matna. Høvundin metir at hetta er ein mistulking, tí tað eru eingi etnobotanisk prógv um at hesin vøkstur hevur verið brúktur til matna. Hinvegin hava kannubjøllur og várleggir av kannubjølluvísu (*E. arvense*) verið brúktir til matna fleiristaðni. Í Føroyum eru prógv um at tey undir 1800-talinum ótu vøksturin tá tey um vári arbeiddu í bønum. Aðrastaðni í Evropa eru tað mest børn, sum hava eti vøksturin. Í Norðuramerika og Eysturasia brúktu tey eisini *E. arvense* til matna.

Abstract

According to the 18th century Swiss botanist von Haller, the Romans used water horsetail (*Equisetum fluviatile*) as a food plant. The author argues that this is a misinterpretation. There is no ethnobotanical evidence that water horsetail has been used for human consumption. However, the bulbs and shoots of the field horsetail (*E. arvense*) have been widely used as human nutriment. Faroese 19th century records show that it was eaten by people working the fields during the spring. From other parts of Europe it is reported that it has been eaten mainly by children. *E. arvense* was used as a food plant also in North America and East Asia.

According to the Swiss botanist Albrecht von Haller (1768: 1) the Romans consumed a plant called *Equisetum*. He identifies the actual species as the water horsetail, *Equisetum fluviatile*. Especially the poorer strata of the Roman Empire is said to have utilized the tubers but also the fresh stems as food. This information is also repeated by von Paula Schrank (1789: 415) in a Bavarian flora, by the English botanist Lindley (1849: 22) in his book on medical plants, by Sturtevant (1919: 255) in his *magnum opus* on edible plants, by Grieve (1931: 420) in her herbal book, and in Abbe's (1981: 92) book on ferns as herbs. Most published handbooks in economic botany are actually compilations with the same data repeated uncritically. The original sources are very seldom given in these books and especially 19th and 20th century publications mix freely domestic and foreign information.

In this case, I think Haller identified the wrong species. More recent ethnobotanical facts from Europe or Asia never mention the use of *E. fluviatile* as a food plant. In Scandinavia it is rather a well-known plant for fodder which have been harvested until

the 1950s (Svanberg, 1987a; Isaksson and Lindström, 1988). Instead, other species of *Equisetum*, especially *E. arvense* and sometimes the shady horsetail, *E. pratense*, have been utilised as food plants for human beings.

Looking at the recorded folk knowledge from pre-industrial Europe we find several examples of the use of *E. arvense* as a food plant. Our first example is one of the most detailed descriptions of the literature and originates from the western periphery of the Eurasian region. In 1800 reverend Landt writes in his monograph of the Faroe Islands that *Equisetum arvense* is »... very common, particularly in the cultivated fields. The root which is called *kannubjølla*, is often found when the ground is dug up in the spring; in loose earth it throws out its red filaments, to which are suspended the *kannubjølla* properly so called; that is *tuberi*, which are almost as large as cherries. They are covered with a black skin, but in the inside they are white. They have a sweet taste, and therefore, they are eaten by the inhabitants, wherever they are found« (Landt, 1800: 215). This interesting ethnobotanical note of *E. arvense* as a food plant is corroborated by other sources as well, both from the Faroe Islands and from other parts of Europe and Asia (Svanberg, 1997a, c). We will return to these later.

The field horsetail (*Equisetum arvense*) is a wide-spread species known from Eurasia south to Turkey, Iran, the Himalayas, and across China, Korea and Japan, and from North America where it is found throughout Canada and the USA, except for the southeast. It was introduced by man in Mexico, South America, South Africa and New Zealand (Hultén and Fries, 1986: 971). In this article I will discuss ethnobotanical aspects of the field horsetail, i.e. its relation to people, especially in the Eurasian region (for definitions on ethnobotany, see Svanberg, 1987b; 1997a; b; c; Wickens, 1990: 16-18; Given and Harris, 1994: 1-8; Alcorn, 1995; Martin, 1995; Balée and Brown, 1996; Balick and Cox, 1996; Cotton, 1996: 9-13). It is unavoidable not to give some details about the ethnobotany of other *Equisetum* species as well.

Medicinal uses

Equisetum arvense is a well-known traditional and modern medicinal plant in Europe, Asia and North America, recommended already by Dioscorides and Plinius (Hewe, 1939: 142; Abbe, 1981: 91). According to the ethnobotanical Phytochemeco Database at the US Department, Agricultural Research Service, National Germplasm Resources Laboratory, available on Internet and compiled by Stephen M. Beckstrom-Sternberg and James A. Duke, its ethnomedicinal uses are countless: albuminuria, anodyne, antiseptic, astringent, bladder, calculus, cancer, carminative, diabetes, diarrhoea, diuretic, dropsy, dyspepsia, gout, gravel, hematuria, hemopoietic, hemoptysis, hemostat, kidney, lung, piles, sore, tuberculosis, tumour, and wound.

It has been officinal (*Herba Equiseta*) in Scandinavian pharmacies until rather recently (Bergmark, 1981: 138) and it was still available, and popular, in health stores providing alternative medicine in Sweden

in 1997. Tea of the field horsetail is recommended for giving energy and strength, as well as a diuretic. It is also said to stimulate sexual lust, which might contribute to its popularity (Nilsson, 1975: 96; Ingmansson, 1996: 248). According to the Scottish botanist Lightfoot (1789: 647) it was moreover once »... esteem'd serviceable in the [...] *Gonorrhœa*, but is out of the present practice.« Curiously enough, people of northern India still use crushed plants of the related *E. debile* with a little quantity of water until a thick paste is formed. The paste is then orally applied for the treatment of gonorrhoea (Rai *et al.*, 1993: 194).

The medicinal uses of field horsetail are known in the folk tradition from its whole distribution area, including Europe, North America and Malaysia (Høeg, 1974; Brøndegaard, 1978; May, 1978: 513). If we just take the Indians of North America as example, they used various parts of the plant in their healing systems. Iroquois made tea from the roots when infants were teething; Ojibwa ordinated tea from the whole plant for dropsy and a stem decoction was used against painful urination. Among the Indians in California ashes from the roots were used on sore mouth (May, 1978: 513; Arnason *et al.*, 1981: 2267).

Other species have been used as medicinal plants as well. Costanoan Indians in California used a decoction of *E. laevigatum* as contraceptive, for bladder ailments, for delayed menstruation, and as hair wash (Bocek, 1984: 247). The Washington Indians used the rough horsetail (*Equisetum hymenale*) for eye wash. Blackfoot Indians used it in horse medicine and Cree included it in a medicine to correct menstrual regulations (Johnston, 1970: 304). In California the Indians made a hot infusion drink of *E. kansanum* for backache and in South Africa Suto women drank a decoction of the rhizome from the branched horsetail (*Equisetum ramosissimum*) to facilitate fertilization. The powdered stem in water could be used for an upset stomach. Peruvians treated acne and ulcers with *E. xylochaetum* and used it as a diuretic (May, 1978: 513). Bergvall (1972) has recorded from Edsele in Ångermanland, northern Sweden, how *E. scirpoides* was gathered during the late summer and used for various veterinary medicine for cattle and horses.

Used as fodder

E. arvense seems to have been regarded as bad fodder for sheep and cattle in some places. It has even been regarded as harmful to the animals, while it is said not to affect the animals in other areas. E.g. Montin (1749: 62) asserts that *E. arvense* is harmful for the foetus of sheep and leads to premature delivery. Linnæus (1755) reports the same about *E. hyemale*. Furthermore he says that the cattle usually do not eat *E. arvense*, although he mentions the case of the cattle in Friesland who, due to hunger, actually grazed on it. *E. hyemale* is regarded as excellent fodder for horses by Linnæus, and *E. fluviatile* is eaten by cattle, who produce more milk after eating it, and also eaten by reindeer. His younger colleague Liljeblad (1798: 383-384), with references to various local traditions, is sceptical also of most species of *Equisetum* as fodder and according to him they all seem to be harm-

ful to cattle and sheep, with the exception of *E. fluviatile*. Lightfoot (1789: 646) views *E. arvense* as disagreeable to cows, but it »... does not seem to affect horses or sheep«. In a study of the ecology of *E. palustre* in Finland, where it is sometimes, but not always, regarded as noxious to the cattle, Borg (1971) has pointed out that the toxic effect should be referred to an alkaloid called palustrin, which is developed, not by the plant itself, but by a parasitic fungus living in the plant in some areas.

According to Høeg (1974: 343) Norwegian sheep and goats ate the spikes of *E. arvense* during spring and both *E. arvense* and the wood horsetail (*Equisetum sylvaticum*) were harvested as food for swine. Bergvall, who has recorded the probably best collection of ethnobotanical knowledge from a specific area (Edsele, Ångermanland) in Sweden, tells that when the cattle population increased in the villages the supply of pasturage became insufficient. Children therefore had to gather especially *E. sylvaticum* as fodder for the animals. *E. palustre* was a popular pasturage for horses and it was also gathered for winter supply. *E. fluviatile* was of course harvested as winter fodder for the cattle (Bergvall 1972).

From India it is reported that the cattle sometimes used *E. arvense*. Also *E. debile* was used as cattle fodder (Islam, 1983: 863). North American Indians regarded *E. arvense* as an excellent fodder, as the Blackfoot Indians who utilized it as an autumn and winter forage for their horses (Johnston, 1970: 304).

Curiously enough, Rothof (1762: 116) does not mention the tubers as useful for human food – usually he does not have any prejudices and gladly suggests almost anything as edible (cf. Nelson and Svanberg, 1987) – he only mentions unspecified *Equisetum* roots as winter fodder for hogs. Another Swede, Wallner (1742), suggests the use of roots from *E. fluviatilis* as swine fodder. The German ethnobotanist Treichel (1894: 319) has recorded that the *E. arvense* tubers were eaten by swine in Prussia.

E. fluviatilis has been extensively used as a hay-grass for fodder in northern Sweden and in Norway. It is well-documented from Värmland, Dalecarlia, Gästrikland, Hälsingland, Härjedalen, Medelpad, Ångermanland, and Lappland (Levander, 1914; Campbell, 1948; Moberg, 1952; Svanberg, 1987a; Isaksson and Lindström, 1988) and from the greater part of Norway (Høeg, 1974: 346-347).

Dye plant

In Norway, the stems of *Equisetum sylvaticum* have been used as a dye. It produced a greyish yellow colour. It can also be stored without changing colour (May, 1978: 496). Also *E. arvense* and *E. pratense* have been used as dye plants according to 20th century Swedish experts on vegetable dyeing. They are still recommended in modern handbooks in plant dyeing. Depending on the mordant, they give various yellow, greypink and yellowgreen colours (Larsson, 1913: 49; Hansson and Ryd, 1973: 37-38). Neither from Norway nor from Sweden, have I so far found any evidence in the folk-life records about a tra-

ditional use of horsetail for producing dyes.

Miscellaneous uses

Some older sources mention the use of *E. arvense* as a vegetable tan (von Paula Schrank 1789: 414; Retzius 1806: 230). *E. arvense* and other species of *Equisetum* have also been utilized as raw material for producing various kind of small crafts. *E. arvense* has been used for manufacturing baskets in North America. The Costanoan Indians used the roots of both *E. arvense* and *E. hyemale* in basketry, while the stems of the great horsetail (*Equisetum telmateia*) were used among the Coast Salish for black imbrication in basketmaking (Turner and Bell, 1971: 68; Bocek, 1984: 247). Children used stems of *E. arvense* and other *Equisetum* species to make a kind of whistles both in Scandinavia and in North America (Høeg, 1974: 324, 347; Gilmore, 1991: 11). In northern Sweden the peasants made brushes of *E. hyemale* (Lindberg, 1975).

According to Øllgard and Tind (1993: 55-56) it is still customary for clarinet and oboe players to have along a few stems of *E. hyemale* in their instrument case in order to make the final trimming of the sensitive reed mouthpieces, rubbing them with the stems.

Equisetum arvense is said to be extremely receptive to heavy metals, a feature which has been used in the search for gold in Alaska (Benedict, 1941).

Various *Equisetum* species have also been used for hair wash and cosmetics. It is recommended for washing tired, ageing and problem skins. Horsetail baths should be taken each night for at least a week, according to Czech authors (Hlava, *et al.* 1995: 100).

Especially the *E. hiemale*, but also *E. sylvaticum* and sometimes *E. arvense*, has been used for polishing woods and metals, a practice known not only in Scandinavia but also from the British Isles, Continental Europe and among both North American Indians as well as settlers from Europe (Høeg, 1974: 348; Lightfoot, 1789: 659; Böhringer, 1913: 35; Schullerus, 1916: 389; Turner and Bell, 1971: 68; Johnston, 1970: 304; Bergvall, 1972; May, 1978: 520; Gilmore, 1991: 11). Olvier de Serres wrote in 1600 about its use as for polishing (Lieutaghi, 1996: 368). Southern Kwakiutl Indians of British Columbia used the rough leaves and stems of *E. arvense* and *E. telmateia* for polishing canoes and other wooden articles (Turner and Bell, 1973: 264). Salish Indians in the Cowichan reserves near Duncan, Vancouver Island, were sandpapering the wooden knitting needles smooth with *E. arvense* (Lane, 1951: 22). In the cities gold- and silversmiths used it to polish their craft (Linnæus 1755). The rough silicious surface made them very useful for this purpose. *E. hiemale* was actually gathered by poor farmers from Härjedalen who sold it on their winter migration for labour to Hälsingland (Modin, 1911: 731). Its use for polishing and cleaning wooden dairy vessels is well-known from northern Sweden (Fridner, 1926: 274; Berglund, 1935: 53). Cottagers in Oxfordshire used *E. telmateia* for scouring saucepans (Vickery, 1995: 162). From northeastern India ethnobotanist Islam reports that joints of stem from *E. de-*

bile are used for cleansing the surface of the nails and for cleansing the utensils (Islam, 1983: 863).

Within biodynamic vegetable gardening in Sweden *E. arvense* is used as a kind of biocide. Field horsetail are put in a bucket of water, where it yields silica. Vegetables sprayed with this siliceous water are said to get stronger resistance against fungus (Nilsson, 1975: 96). Also *E. sylvaticum* is recommended as a biodynamic biocide (Ingmanson 1996: 249).

In Norway *E. arvense* was used as a calender sign. When the stem had five segments the sheep could be fleeced and when it had seven segments it was time to take out the cattle (Høeg, 1974: 343).

Horsetails as food

In a newly published popular book by a Swedish ethnobotanist, the use of field horsetail as a food plant among North American Indians is mentioned (Källman, 1997: 70). Both the tubers and the spring shoots were regarded as edible. Ethnobotanical descriptions from the northern Western Hemisphere affirm its use among Indians, Inuits, and settlers in Alaska, Canada and U.S. We can demonstrate this with some evidence from the literature.

That the spikes can be prepared like asparagus is mentioned in many handbooks (e.g. Hutchens, 1991: 157). In the Rocky Montains the stems of *E. arvense* were dried, ground and used as mush or thickening powder (May, 1978: 502). From the Alaskan Inuit, Oswalt (1957: 22) reports that the tubers were »... ground up while green and mixed into *agu'tuk*. They may also be mixed with fish eggs and made into a soup«. Coast Salish used the young shoots during spring both raw and boiled (Turner and Bell, 1971: 68). We have evidence as far south as from the Kiowa Apaches in New Mexico who boiled the base of *E. arvense* as food (Uphof, 1968: 201).

Other species of *Equisetum* have been utilized as food plants as well in North America. The Bois Fort Ojibwa, for example, used the tubers of common horsetail (*E. pratense*), a food that was available throughout the summer months (Black, 1980: 71). The Hopi Indians dried and ground the stem of *E. laevigatum* and mixed it with maize meal and made a mush used in food and ceremonial bread (Fewkes, 1896: 17). The pollen cones of *E. telmateia* was regarded juicy and sweet by Indians in Washington. Also the cooked rhizomes were consumed by e.g. Cowlitz Indians (Turner and Bell, 1971; May, 1978: 502).

Källman (1997) is obviously not aware of its traditional use in Scandinavia and other parts of Eurasia. The quoted use of the tubers of the horsetail as food on the Faroe Islands above, is attested by other sources with first-hand knowledge about the life and habits of the Faroe Islanders as well. Svabo (1959: 153) writes in his description from the 1780s of local plants that the tubers were called *kannubjølla* and were consumed by the islanders. The Danish botanist Rostrup (1870: 72), who conducted botanical field work on the islands in 1867, recorded its use as an esteemed food plant. The Faroese botanist Ras-

mussen (1946: 14) mentioned the tubers among the edible native plants. He tells us how in older times, when Faroese men where spade cultivating, they often unearthed tubers. The tubers were as big as peas, sweet and always eaten on the spot. Skylv Hansen (1967: 95) made the interesting observation that the tubers were eaten mainly by children. The older sources never mentions that. Landt specifically talks about the »inhabitants« and Rasmussen about the »men« who where working the fields.

E. arvense as a food plant is also described from other Scandinavian countries. The Faroese-born botanist Nicolai Mohr (1786), writes from Iceland that the tubers were called *surtar-eple* (apples) by the Icelanders, and according to him they tasted very good. Finsterwalder (1865: 348) has also recorded *goubitill, gvondarber, sultarepli* from Iceland, and he is obviously referring to the tubers. According to Olafsen (1772: 434) the roots had a sweet taste.

The Norwegian author Wille (1786: 111) mentions in his description of Sillefjord that the stems of *E. arvense* were eaten during the spring and the tubers were dried and ground into flour. He appears to refer to *E. arvense* as a food plant consumed by the whole population. According to more recent information recorded in Norway, *E. arvense* has been eaten mainly by children and the practice seem to have been restricted to Trøndelag and Setesdal. Evidences of its use are few from outside these regions (Høeg, 1974: 342-343). As in the Faroe Islands, the Norwegian children ate the tubers, called *jordnøtter* (ground nuts) or *steinbær* (stone berries), which were found while tilling the soil during springtime. According to Norwegian informants they tasted like hazelnuts. Also the spikes were eaten, sometimes fried in butter.

Our ethnobotanical information from Denmark and Sweden are scarce on reports of using field horsetail as food. Brøndegaard (1978: 50) does not give any evidence from Denmark though, other than the Faroese case. However, the fresh green shots of both *E. arvense* and *E. pratense* have been eaten in Sweden during springtime. As in Norway, it seems to have been the children who ate them. The records originate from the descendants of the Finnish-speaking people in Värmland, central Sweden (Keyland, 1919: 55, 61, 121). I have not been able to trace any further evidence in the recorded material of folk traditions from the middle and northern Sweden. However, in a modern handbook of native edible plants, Ingmansson (1996: 248-249) recommend fresh shots of *E. arvense* in salads and the yellow spikes boiled as asparagus.

In northern Central Europe we have evidence from 19th century Prussia that peasant children use to eat the tubers, called *Erdnüsse* (ground nuts) by the locals (Treichel, 1894: 318-319). In the days of Pietro Andrea Matthioli, i e. mid-16th century, the fresh spring shoots were eaten in northern Italy fried in oil (Lieutaghi, 1996: 369).

Equisetum arvense has been utilized as a food plant also further eastwards. The entire straws were eaten raw or boiled during the spring season by poor people in Russia

in the 19th century. The tubers were eaten in northern Russia, as well as in Belarus, and regarded as a delicacy by the population (Maurizio, 1927: 69; Zelenin, 1927: 119; Moszynski, 1967: 32). The Nenets of northern Russia prepared a soup of the early spikes and also used it as stuffing in pirogues (Manninen, 1931: 35). According to a 19th century report from Solvychegodsk, Vologda government, many Russian families were able to survive the spring by eating horsetails, the only food stuff available for them. From Vjatka it is reported that only the children ate horsetails. In Poland it has been used as a famine food (Maurizio, 1927: 108-109).

In Japan the spikes are eaten after being boiled as a dish called *tsukushi*. The Japanese also consume them salted and when kept in vinegar mixed with soy, after being boiled in water (Loew, 1907: 109; Uphof, 1968: 201; Iwatsuki, 1995: 19).

Our references show that *E. arvense* has been used as a food plant in Eurasia and North America. Not only the tubers were used as food, as on the Faroe Islands, but also the spikes. Recent folk tradition from northern Europe indicates that the horsetails were eaten mostly by children. This was actually the case with many other edible plants as well. Children were also in much more need of fresh vegetables as vitamin sources than adults (cf Høeg, 1974; Svanberg, 1997c). However, older sources from the 18th century and from some marginal areas, show that the tubers and spikes were eaten by all inhabitants. The changing food habits with the access to more food through the development of national and international trade in the 19th century most probably made it obsolete as a spring food plant. However, it survived as a kind of treat for children in Europe. It is of course difficult to identify the plant once eaten by the Romans. However, it is more likely that they ate *E. arvense* rather than any other species of the genus. The knowledge of an ancient food plant actually survived on the Faroe Islands and in various parts of Continental Europe, in East Asia and North America until recently.

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