

***Alchemilla straminea* in redetermined herbarium specimens – new to Finland and northern Europe**

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Alchemilla straminea was determined in herbarium material that had been collected from at least four adjacent localities at Kangasjärvi in the municipality of Hyrynsalmi, Kainuu, in eastern central Finland in 1952–1978. The species is new to Finland and northern Europe. Kangasjärvi served as a German military depot during World War II in 1941–1944. Large numbers of horses and mules were housed in the area, and hay for the animals was imported from Central Europe. After the war, Kangasjärvi was known for its rich flora of German polemochores, some of which are still extant in the area. The origin of *A. straminea* is probably from hay cut from natural alpine meadows in the area of the Alps, Jura and the Schwarzwald. Several polemochorous *Alchemilla* species from World War II still have established populations in Finland. *A. straminea* survived at least c. 35 years. Its present status is unknown, as the locality has not been studied thoroughly enough.

Introduction

The Swedish *Alchemilla* expert Stefan Ericsson was preparing an account of the genus for the Flora Nordica project during the 1990s and 2000s. Ericsson borrowed large numbers of specimens from many Nordic herbaria to Umeå (UME) for this purpose. Tragically, the work was never finished because of his sudden death in 2015. Specimens borrowed by Ericsson from the herbaria of Helsinki (H) and Oulu (OULU) universities were returned in 2016. Unfortunately, only a small minority of them had been determined by him. A proportion of the undetermined specimens were put into folders with preliminary determinations or other notes in Ericsson's handwriting. Checking and determining the returned material yielded some surprises, one of which is recounted here.

"The glabrous Kangasjärvi thing"

During his visit to the Botanical Museum in Helsinki in 2001, Ericsson found a few specimens in the herbarium, which were referred to as *Alchemilla glabra* Neygenf. from Hyrynsalmi (Kainuu), Kangasjärvi by L. Heikkinen in 1952–1954 and A. Parnela 1978, and Kuusamo (Kuusamo Region) in 1980 by T. Ahti. Ericsson did not agree with the determinations, however, and he put these disputed specimens in a folder, on which he wrote "the glabrous Kangasjärvi thing". The specimens were sent on loan to Umeå along with several other specimens of the genus in January 2002.

The folder with the specimens was returned to Helsinki together with the rest of the borrowed material but without Ericsson's determinations

or other notes in 2016. I studied the specimens and determined them to be *Alchemilla straminea* Buser. These specimens seemed to fit well both in the keys and descriptions published by Walters & Pawlowski (1968) and Fröhner (1995), in addition to herbarium material preserved in the collections of H. The specimens that had been collected from Kangasjärvi were full-grown summer plants and relatively easy to determine, but one specimen obtained from Kuusamo had been collected in the early season and it lacked well-developed inflorescences. In order to verify the determinations, I sent two herbarium sheets from Kangasjärvi (H 010189, H 541476) and the specimen from Kuusamo (H 564200) to Sigurd Fröhner (Dresden, Germany) in late 2016 as he had kindly promised to have a look at these and some other interesting specimens. Fröhner returned the specimens in March 2017. He concurred with my determination of the Kangasjärvi plants but was of the opinion that the Kuusamo specimen could more likely belong to *A. coriacea* Buser. However, he wrote that the specimen was "not enough for a sure determination".

"*Alchemilla leiophylla*" from Kangasjärvi

Stefan Ericsson also visited the Oulu herbarium in December 2001. He informed me by e-mail correspondence about several specimens of *Alchemilla leiophylla* Juz. that had been collected as *A. glabra* from Kangasjärvi by L. Heikkinen, and *inter alia* wrote: "there is no question that the specimens really are *A. leiophylla*". This was some kind of a mystery to both of us, as *A. leiophylla* is an eastern species that grows in central to eastern European Russia, Siberia and possibly the Caucasus (see the map in Kurtto & al. 2007). It was known as a polemochore that is found in a few localities in Kainuu, all of them in places where Russian troops had been present during the Finnish-Russian Winter War in 1939–1940. However, Kangasjärvi was well known for its rich German polemochorous flora (Heikkinen 1959, Parnela 1985), but with no reported signs of any Russian influence.

Ericsson borrowed a large number of herbarium specimens from Oulu after his visit, including

those he had called *Alchemilla leiophylla*. In later e-mail messages, he told me that he might be wrong with the determination, and that the specimens could belong to another, still unknown species.

After having studied the specimens of *Alchemilla straminea* in Helsinki, I sent a loan request to OULU, to ask for any material collected by L. Heikkinen from Kangasjärvi under the name *A. glabra*. In July 2017, I received 10 specimens placed in a folder in Stefan Ericsson's handwriting and denoted as "non *leiophylla* = *straminea* Buser?" The *leiophylla* mystery was thus resolved. Stefan Ericsson and I had come to the same conclusion about the identity of the "glabrous Kangasjärvi thing".

Alchemilla straminea: characteristics and habitats

Alchemilla straminea is a medium-sized species, 30–45 cm tall. Its stems, petioles, pedicels and hypanthia are glabrous. Leaf blades are pale green, often slightly bluish, 5–10 cm, reniform with a wide sinus to roundish, lobed to $\frac{1}{4}$ – $\frac{1}{3}$ and more or less flat. They are glabrous above except for a few solitary hairs that are sometimes found on the marginal teeth, and glabrous below except for the main veins, which are appressed-hairy in the apical parts. There are (7–)9–11 leaf lobes with straight, relatively narrow acute teeth of equal size. The inflorescence is relatively wide and open with many flowers. *A. straminea* is more glabrous than *A. glabra*, which usually has appressed hairs on petioles (sometimes glabrous in early-season leaves) and one or two lowermost stem internodes. The blade of *A. glabra* is slightly hairy above on the marginal teeth, sometimes also in the marginal parts or along the folds in late-season leaves. Furthermore, *A. glabra* usually has wide, unequal teeth on the leaf lobes, and the teeth often have typically S-curved outer and inner margins.

A. straminea is mainly European and is found in Spain in the west to Greece, Bulgaria and Romania in the east, whereas outside of Europe it can be found in N. Anatolia. The northernmost localities are situated in the border area between Czech Republic and Poland at c. 50.8°N (Kurtto

Fig. 1. A herbarium specimen of *Alchemilla straminea* that was collected from Hyrynsalmi, Kangasjärvi by Lauri Heikkinen in 1953. Photo M. Piirainen.



et al. 2007, Kurtto 2009). The native habitats are in the subalpine to alpine belt along brook sides and surroundings of springs, in tall-herb commu-

nities, moist meadows and alpine pastures, and *A. straminea* is often found with *A. glabra* (Fröhner 1995).

The locality and origin of the species at Kangasjärvi

Kangasjärvi (Kangaskylä) is situated 2–4 km NNW from the main village of Hyrynsalmi municipality, at 64.70°N 28.45–46°E and c. 65 km NW of the town of Kajaani. It is close to Hyrynsalmi railway station along the track that runs from Kontiomäki to Taivalkoski. The rail connection was built shortly before World War II, and traffic commenced in the autumn of 1939. Later the German army had a large maintenance and storage depot at Kangasjärvi in 1941–1944, and between 700–800 horses and mules were housed there. The railway was used for transportation. The German depot covered a wide area that was centered on the isthmus between the small lake of Kangasjärvi and the river of Tuomijoki that lay east of it (Heikkinen 1959). The original vegetation in the area was mainly dry pine forest, and dryish pine bog towards the outer edges.

Hay for the German horses and mules was imported from Central Europe. The amount of dung from the stables was huge, and it was gathered and then deposited in large piles, mainly along the margins of the sandy heath towards the surrounding bog. After the war, part of the dung was carted-off by local inhabitants to manure their gardens and lawns in the surroundings – and part of it was transported by train as far as Kajaani. Seeds and other propagules imported along with the hay from overseas were thus dispersed round the site. The dung fertilized the poor soil in the whole depot area and helped to keep the soil moist (Heikkinen 1959).

Lauri Heikkinen studied the polemochorous flora at Hyrynsalmi and Kangasjärvi after the war. He published the first records as early as in 1948 (Heikkinen 1948), but no species of *Alchemilla* were mentioned. In his second paper (Heikkinen 1959), nine *Alchemilla* species were listed, five of which were reported as being new to the biogeographical province of Kainuu: *A. propinqua* Juz., *A. glabra*, *A. xanthochlora* Rothm., *A. baltica* Juz. [as *A. nebulosa* Sam.] and *A. hirsuticaulis* H.Lindb. However, the specimens of the latter were later determined as *A. glaucescens* Wallr., and *A. hirsuticaulis* is not mentioned from Kangasjärvi in his later study on the *Alchemilla* flora

of Kainuu (Heikkinen 1969). He also added four common species to the Kangasjärvi flora in that paper: *A. pastoralis* Buser [= *A. monticola* Opiz], *A. acutiloba* Opiz, *A. micans* Buser and *A. subcrenata* Buser, none of which he regarded as polemochores.

Heikkinen's records of Kangasjärvi in 1945–1957 (Heikkinen 1959) covered 117 polemochorous taxa, and among them, *Ranunculus montanus* Willd. is of special interest. *Ranunculus montanus* is a species typically found in montane meadows from the Alps, Jura and the Schwarzwald (Tutin et al., 1993), which strongly suggests that a proportion of the imported hay must have directly or indirectly originated from this area and habitat. This is most probably the area of origin of *A. straminea* as well, because these two species show the same distribution in this area in southern Germany, Switzerland and Austria (Jalas & Suominen 1989, Kurtto et al. 2007).

Alchemilla straminea is now known in at least four localities around Kangasjärvi, which fall in three different 10 × 10 km² grid cells in the Finnish uniform grid (YKJ) used in floristic mapping of Finland (Lampinen & Lahti 2017): Heikkinen collected samples from 1) the N. end of Lake Kangasjärvi, 717:56, 2) close to the railway level crossing, 717:57 and 3) S. of Haapala school, 718:56. However, most of his specimens are missing a description of their exact location. Parnela's collection 4) close to S. end of Lake Kangasjärvi falls in the same cell as number two above.

Among Heikkinen's several collections of *Alchemilla glabra* taken from Kangasjärvi at H between 1952 and 1968, there are two sheets that had been originally labelled as "*A. coriacea*?", but were later determined as *A. glabra* by S. Fröhner. Heikkinen probably realized that all the variation among the glabrous plants at Kangasjärvi did not fit *A. glabra*, but he did not succeed in the correct discrimination between the taxa or in naming them correctly.

I visited Kangasjärvi with my wife Pirkko on 30.VI.2017 to look for *Alchemilla straminea*. We searched the area between the outlet of Lake Kangasjärvi and the railway line. The only *Alchemilla* species we could find were *A. micans*, *A. monticola* and *A. subcrenata*, which were mainly growing along the road and railway banks and ditch-

es. These species also grew to a lesser extent in small meadow clearings in the pine forest. In such a meadow clearing we found a small dense stand of *Luzula luzuloides* (Lam.) Dandy & Wilmott, and we also found a few specimens of *Pimpinella major* (L.) Huds. along the railway bank, both species had already been reported as German polemochores in the area by Heikkinen (1959). We also made a short visit to the N. end of Kangasjärvi. The area was dominated by planted coniferous forest that had been partly clear-felled and ploughed, and only the most common species of *Alchemilla* could be found in the small clearings with some meadow vegetation. However, we spent only a limited amount of time at Kangasjärvi and it is therefore not possible to judge, whether *A. straminea* is still extant or not. Several species of *Alchemilla* have survived or even formed established populations in wartime encampment areas in Kainuu (Piirainen & Piirainen 2000). *A. straminea* did so for at least 35 years but its present status cannot be resolved without further study.

Studied herbarium specimens of *Alchemilla straminea* from Finland (label texts translated from Finnish). All specimens originally labelled as *A. glabra*; determinations as *A. straminea* by M. Piirainen 2016, 2017, those on sheets H 010189 and H 541476 are confirmed by S. Fröhner 2017.

FINLAND, prov. Kainuu (Ok/Kn), Hyrynsalmi, Kangasjärvi, YKJ grid 717:56, 6.VII.1952 L. Heikkinen, det. Gunnar Marklund (H 010187); Kangasjärvi, 717:56, 16.VIII.1953 L. Heikkinen, det. Gunnar Marklund (H 010189); Kangasjärvi, German camp area, 717:56, 3.VII.1954 L. Heikkinen (H 010185); Kangasjärvi, 717:56, 5.VII.1954 L. Heikkinen (OULU 105701); Kangasjärvi, 717:56, 17.VII.1955 L. Heikkinen (OULU 037983, OULU 105716, OULU 105718); Main village, dry field close to the Kangasjärvi level crossing, 7178:570, 18.VII.1960 L. Heikkinen (OULU 037984, OULU 105719; the latter a mixed specimen with *A. glabra*); N end of Lake Kangasjärvi, 7179:569, 16.VI.1963 L. Heikkinen (OULU 037985); Kangasjärvi, 717:56, 3.VII.1964 L. Heikkinen (OULU 038988, OULU 037989); Kangasjärvi, along a path S of Haapala school, 7180:569, 22.VII.1968, (OULU 105704); Kangasjärvi, German wartime camp area, close to the S. end of the lake probably at the base of a former stable, by the margin of a nettle thicket in the middle of a sapling forest on sand heath, very sparsely, 7178:570, 5.VII.1978 Ari Parnela (H 541478).

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References

- Fröhner, S. 1995: *Alchemilla*. — In: Scholz, H. (ed.), Gustav Hegi Illustrierte Flora von Mitteleuropa. Band IV, Teil 2B. Spermatophyta: Angiospermae: Dicotyledones 2(3). 2. ed.: 13–242. Blackwell, Berlin, Vienna.
- Heikkinen, L. 1959: Sota-ajan tulokaskasvistosta Hyrynsalmella. — *Memoranda Societatis pro Fauna et Flora Fennica* 34: 57–71.
- Heikkinen, L. 1969: Die *Alchemilla*-Flora der Proviz Kainuu (Ost-Finnland) unter besonderer Berücksichtigung der polemochoren Fernverbreitung der Arten. — *Memoranda Societatis pro Fauna et Flora Fennica* 45: 52–62.
- Jalas, J. & Suominen, J. 1989: *Atlas Florae Europaeae*. Distribution of Vascular Plants in Europe. 8. (Nymphaeaceae to Ranunculaceae). — The Committee for Mapping the Flora of Europe & Societas Biologica Fennica Vanamo, Helsinki.
- Kurtto, A. 2009: Rosaceae (pro parte majore). — In: Euro+Med Plantbase - the information resource for Euro-Mediterranean plant diversity. Published on the Internet: <http://ww2.bgbm.org/EuroPlusMed/> [accessed 1.IX.2017].
- Kurtto, A., Fröhner, S. E. & Lampinen, R. 2007: *Atlas Florae Europaeae*. Distribution of Vascular Plants in Europe. 14. (*Alchemilla* and *Aphanes*). — The Committee for Mapping the Flora of Europe & Societas Biologica Fennica Vanamo, Helsinki.
- Lampinen, R. & Lahti, T. 2017: *Kasviatlas 2016*. — University of Helsinki, Finnish Museum of Natural History, Helsinki. Distribution maps in the internet: <http://www.luomus.fi/kasviatlas>.
- Parnela, A. 1985: Henkiinheränneitä saksalaisia sotatulokkaita Hyrynsalmen Kangasjärvellä. — *Lutukka* 1: 56–58.
- Piirainen, M. & Piirainen, P. 2000: Kasvikuluumisia muutamilta Kuhmon talvisodan aikaisilta taistelupaikoilta. — *Lutukka* 16: 106–117.
- Tutin, T.G., Akeroyd, J.R. & Cook, C.D. 1993: *Ranunculus* L. — In: Tutin, T.G., Burges, N.A., Chater, A.O., Edmondson, J.R., Heywood, D.H., Moore, D.M., Valentine, D.H., Walters, S.M. & Webb, D.A. (eds.), *Flora Europaea* 1. Psilotaceae to Platanaceae. Ed. 2.: 269–286. Cambridge University Press. Cambridge.
- Walters, S.M. & Pawlowski, B. 1968: *Alchemilla* L. — In: Tutin, T.G., Heywood, V.H., Burges, N.A., Moore, D.M., Valentine, D.H., Walters, S.M. & Webb, D.A. (eds.), *Flora Europaea* 2. Rosaceae to Umbelliferae 48–64. Cambridge University Press. Cambridge.