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Stinging Nettles
An Indigenous Source of Fibres
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Abstract

The object of this study is to investigate the feasibility of preparing and spinning indigenous nettle fibres, *Urtica gracilis*, into a practical yarn.
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Description of Plant and Fibre.

*Urtica gracilis* is an indigenous, herbaceous perennial which grows in moist places throughout the prairie provinces (Cormack, 1977, 67). It grows two to six feet in height. Its leaves are opposite, simple, narrowly lance-shaped, and coarsely toothed. The outside of the leaf bears stinging hairs (Figure 1).

Similar to *Urtica gracilis* is *Urtica dioica*, which is indigenous to Europe. It was introduced to the Great Lakes region and the west coast of Canada (Woodland, 1982, 203). It, too, has stinging hairs on the leaves, but hairs also appear in abundance on the stem (Figure 2). The leaves are more heart-shaped and the flowers of *U. dioica* are dioecious, whereas most flowers of the *U. gracilis* are monocious (Woodland, 1982, 283).

The stinging hairs on a green plant of *Urtica gracilis* break of like fine slivers of formic acid, and acetyl chlorine (Carr et al, 1987, 471). This penetrates the skin and causes an irritating rash. When the plant is dried, the hairs are harmless.

*Urtica gracilis* has tall straight stems which usually are square in cross section (Agriculture Canada, 1981, 304). The strength of the stem comes from a fibre found between the
Figure 1. *Urtica gracilis*. 
Figure 2. Urtica dioica.
outer bark and the woody core (Figure 3). These fibres are associated with the phloem system of the plant.

According to Strasburger (1976, 12,117), the cells of the fibre have a very small diameter, 50-75 mm. These cells become elongated as a result of tip growth, up to 7.5 cm in length. This compares to 4-6.5 cm in flax, and 30-55 cm in ramie. Cook (1968) describes the surface of the cell as being marked and distorted in many places. The end of the cells are rounded and the cells are often broken into filaments. In cross-section the cells are oval with thick walls (25).

Rita Buchanan (1987) mentions all plant fibres have an inherent twist as observed when the fibres are moistened. "Flax, ramie, milkweed and Indian hemp fibres always show a natural S twist; and hemp, jute, sisal and yucca fibres always turn in a natural Z twist" (1987, 10). Nettle fibres turn in an S direction (Figure 4).

**Historical Production**

Several North American Indian tribes have spun nettle fibres into various sizes of yarns.

Franz Boas (1909) described in detail the processing and spinning of nettle fibres by the Kwakiutl Indians of Vancouver Island at the turn of the century:

Nettles are cut in October ... close to the ground.

Fifty stems ... are tied together ... and taken home
Figure 3. Stinging nettle stem.

Figure 4. Natural S twist in nettle fibre.
... The stems are split with the nail of the thumb. Then they are ... coiled up ... and hung on a drying frame ... exposed to the sun and the wind for four to six days ... Next the nettles are broken, and the inner part is pulled off from the cortical fibres. As soon as the fibres are clean, they are put down on a mat ... bent over in the middle and the two parts are loosely twisted together. They are placed on a board and beaten with the butt end of a wedge until all the fragments adhering to the fibres drop off, and the fibres themselves are entirely separated. Then the nettle is placed in a basket, untwisted, and rubbed thoroughly. Then it is combed over the rib-bone of a bear ... (370).

Kwakiutl spinning was done by the women. A metre long distaff was constructed and the nettle fibre was tied by the root end to the top of the distaff. A woman sat on the floor and wound the loose fibre around the distaff spirally. Boas continues with his description:

Then she takes a number of fibres out of the bunch, pulling them out from below, and coils them in a box on her left. While she is holding the end of the fibres in her left hand, she takes out another small bunch of fibres, according to the thickness of the
thread she intends to make, and twist the ends of
the first and the second bunch together ... After
about one fathom of string has been coiled up, she
sprinkles some sand over it ... The fibre which is
thus prepared is then spun by means of a spindle.
The shank of the spindle is two spans and four
fingers long ... The spindle whorl is made of bone
of whale. The size of the spindle whorl differs
somewhat according to the size of the thread to be
made (372, 373).

The spindle was rubbed down the leg of the woman. This put
an S twist into the drafted fibres.

In spinning nettle fibres, four different sizes of thread
were prepared and incorporated into Kwakiutl fishing nets.
The yarns were plied by attaching two threads to the top of the
spindle. The spindle then was twirled up the leg rather than
downward, producing a Z twist ply (Boas, 1909, 374). The fine
threads were used at the narrow end of the nets, with coarser
threads used as the net got wider and longer.

Homer Barnett (1955) describes how the Salish Indians
spun nettle fibres by rolling two small bundles of fibres forward
between the palm and the thigh to tighten together the fibres.
These fibres were then plied in a quick backward motion (88).
The Salish Indians processed and used nettle fibre much the way as the Kwakiutl, as described by Oliver Wells:

Twine made from the bark of nettle stems was used extensively in the weaving of items requiring strength and refinement and firmness in the warp used. Nettles were gathered in October and dried for future use. Various nettles were damped once again sufficiently to make the bark tough and flexible, while the pith of the stem remained dry and brittle. By splitting the stalk and running it over a blunt edge, the bark would separate itself from the pith. This bark was then beaten and combed, or carded into a soft tissue which could be spun with the use of a spindle in a manner similar to the spinning of wool. Twine produced from nettle fibres was of great strength and utilized in the making of nets and fishing line, as well as for a warp in weaving (32).

Cheryl Samuel, who studied the Chilkat blankets of the West Coast Indians, found some of the warp yarns in the blankets were mountain goat hair spun onto a nettle fibre yarn core (1982, 62).

Europeans have been using nettle fibres for centuries. Archaeologists have found nettle fabric wrapped around a
body in a Bronze Age (3500-1000 BC) burial site in Denmark (Carr et al, 1987, 472). Rita Buchanan (1987) notes the poet Thomas Campbell wrote in the early 1800's:

I have slept in Nettle-sheets, and I have dined off a Nettle-table-cloth ... The stalks of the old nettle are as good as flax for making cloth. I have heard my mother say that she thought nettle cloth more durable than any other linen (41).

Before the advent of cotton, nettle cloth was the finest weave made (Hoppe, 1975, 26). Later, the term "nettle-cloth" came to mean a very fine cotton fabric.

Hans Christian Anderson (1970), a Dane who began writing in 1835, wrote "The Wild Swans", a story of a girl whose eleven brothers had been turned into swans. A fairy tells the girl how she may "deliver" her brothers:

Do you see this stinging nettle I hold in my hand?
... Crush the nettles with your feet and you will have flax, and of this you must weave eleven coats of mail with long sleeves. Throw these over the eleven swans and the charm is broken (712).

Scandinavians have a long history of using nettle cloth for making sails (Cook, 1968, 25).

In recent times, only during World War I in Germany were nettles used on a large scale. Nearly six million pounds of
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nettles were collected from the country side to weave into nettle cloth, as cotton was in short supply (Carr et al, 1987, 472).

Stinging nettle is still grown for its fibre in France and Germany, but total output is quite small (Cook, 1968, 26). It is made into twine, rope, and is woven into canvas and sailcloth. Some parts of Europe still use nettles for clothing and upholstery (Cook, 1968, 26).

Procedures and Results

Europeans traditionally processed their *Urtica dioica* like flax. Elisabeth Hoppe (1975) detailed the procedure for flax production. The retted stalks were dried until brittle. The stalks were then broken with a mallet and worked through a flax brake. This broke the woody part of the stem from the fibre. Scutching removed the woody segments which remained after braking, leaving the bast fibre. This could be spun into a coarse thread or hackled. Hackling removed the short fibres and helped separate the longer fibres into finer filaments (16-25). Hoppe also suggested that although nettles are prepared in the same way as flax, they are both harder to work and more sensitive (26).

To research the nettles as a viable fibre source, the stems were treated like flax. Nettle stalks were collected in the fall
when the seeds had ripened off. The stalks were stripped of leaves and left to dry in a shed.

Next, the stalks were retted. At the end of September, the stalks were left to soak outside in an old bath tub for two weeks. Then it froze. The stalks had to remain in the tub until spring, as the ice was too big to thaw in the house and too thick to chip into smaller pieces without damaging the fibres.

In the spring, the stalks were dried and then broken with a mallet. Scutching was done by hand while wearing leather gloves. After the scutching was completed, the fibres were hackled through hand carders of various sizes. Too much or too vigorous hackling broke the strands of fibres into short pieces, but it also broke most of the bark free (Figure 5).

During the winter, experiments were done on stalks of nettles that were collected at four different times of the year. One group was picked in July, at the peak of its growth, and dried. The second group was picked in February, after four months of natural winter retting. The third group was picked in June, when the orioles strip the old nettle stalks for fibres to weave into their nests. The fourth group were old stalks from the year before, which had been naturally retting for about sixteen months.

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Figure 5. September picked stalks, retted and hackled.

Figure 6. Split stalks.

Figure 7. Decorticated stalks.

Figure 8. Commercially prepared flax.
fibres were hackled through a fine hand carder, then a steel brush. Most of the bark came off, but the fibres were still not as clean as commercially prepared flax (Figure 8).

There was a difference in the colour and the strength of the fibres. The stalks which were cut in July (Figure 9) produced the strongest fibres. They were green, but bleached white when soaked overnight in a solution of four parts water and one part chlorine bleach. They also retained more bark than the other samples (Figure 10). The stalks which had been naturally retted for two years (Figure 11) were the whitest. They were also the most fragile to work with. The June picked stalks (Figure 12) were naturally bleached, and the fibres were strong enough to retrieve. The February picked stalks (Figure 13) had the green bleached out by the weather and had ample strength for experimentation.

Some of the February stalks were broken with a mallet and scutched with gloves. This wasted fibres and not all of the woody core came off. The fibres, however, were aligned (Figure 14). One hackling removed the bulk of the woody parts (Figure 15). Several hacklings removed most of the bark and separated the fibres (Figure 16).

Another bundle of February picked stalks were retted in a heated garage for two weeks. The stalks were broke, scutched
Figure 9. July picked stalks, split and decorticated.

Figure 10. July picked stalks, decorticated and bleached.

Figure 11. Two-year-old stalks, split and decorticated.

Figure 12. June picked stalks, split and decorticated.
Figure 13. February picked stalks, split and decorticated.

Figure 14. February picked stalks, broke with mallet and scutched.

Figure 15. February stalks, one hackling.

Figure 16. February stalks, several hacklings.
and lightly hackled (Figure 17). The fibres were cleaner than the non-retted February stalks.

Stinging nettles are in the same family as ramie, but unlike their Chinese counterpart, they do not contain gummy resins (Buchanan, 1986, 31). The fibres are held together with a pectin-like substance similar to flax (Linder, 1986, 11). Retting breaks down the pectin, freeing the fibres. The next experiment was to extract the pectin as in making preserves. A sample of decorticated fibres was boiled in one part lemon juice and ten parts water for one hour. The dried fibres were slightly weaker and the pectin was not removed (Figure 18). Celia Quinn (1985) notes that acids are harmful to cellulose fibres. Even mild organic acids can be damaging (N. pag.). The acid in the lemon juice may have weakened the fibres, Quinn also states that alkali solutions do not damage the fibres. To test this, a sample of decorticated fibres was boiled for one hour in one part baking soda and six parts water. The water turned a light brown, the fibres retained their original strength, but the pectin had not been separated from the fibres.

Another method for removing the pectin was tried using a recipe compiled by Janet Dodgers from Canmore for paper making. Plant parts are boiled in lye to extract the fibre which is then used for paper making. Decorticated February picked stalks were boiled in one part lye and sixty-five parts water
Figure 17. February stalks, retted, broke, scutched, and lightly hackled.

Figure 18. Decorticated fibres boiled in lemon juice.

Figure 19. Decorticated fibres boiled in lemon juice.
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(one tablespoon lye per litre of water). The water turned dark brown. When the fibres were removed they fragile, but became stronger as they dried. When thoroughly dried, it was possible to hackle the fibres through a hand carder and a steel brush. Most of the bark combed out and the end fibre was relatively clean (Figure 20). It spun into a fine flax-like single which would be suitable for weaving into cloth or transparencies (Figure 21). The tow was usable when hand carded (Figure 22). These fibres spun easily and would be suitable in a tapestry or fishing net (Figure 23).

Some of the fall retted stalks were decorticated and hackled. These fibres were stronger than those boiled in lye, probably because they were stronger to start with. However, not as much bark came off (Figure 24). These fibres produced a strong, somewhat hairy, two-ply yarn (Figure 25). It would be suitable for fishing nets or as texture in a weaving. Hand carding the tow produced a fine soft mat (Figure 26) which spun easily into a smooth medium weight yarn, suitable for fish nets and tapestries (Figure 27).

As another experiment, some February stalks were decorticated and the bundle of fibres were hand rubbed several times (Figure 28). Most of the bark chaffed off, and the fibres were left parallel enough to attempt spinning. Even though it
Figure 20. Decorticated fibres, boiled in lye then hackled.

Figure 21. Fibres from figure 20, wet spun, s.

Figure 22. Hand carded tow from fibres boiled in lye.

Figure 23. Fibres from figure 22, wet spun, ssZ.
Figure 24. Fall retted stalks, decorticated and hackled.

Figure 25. Fibres from figure 24, wet spun, ssZ.

Figure 26. Hand carded tow from fall retted stems.

Figure 27. Fibres from figure 26, wet spun, ssZ.
Figure 28. February picked fibres, decorticated and rubbed between palms of hands.

Figure 29. Fibres from figure 28, wet spun, ssZ.
was wet spun, the yarn was rough and twine-like, but very strong (Figure 29). It would be suitable for cordage.

The cleanest and finest fibres were obtained by scraping the decorticated stalks with a finger nail. This worked well with both February gathered stalks (Figure 30) and the fall retted stalks (Figure 31). It was a very time consuming job, but the fibres broke down to very short fine filaments that could be wet spun into a fine yarn. These yarns would be suitable for fine crochet work (Figures 32, 33).

Conclusion

The fibres in *Urtica gracilis*, the stinging nettle, can be successfully retrieved by either water retting whole stems or by boiling decorticated stems in lye. Neither is a quick, simple method.

The United States patent office has information describing a method for degumming decorticated bast fibres. To date, I have not received the information. This could prove to be a more efficient method of preparing nettle fibres.

Acquiring the modern European method of nettle fibre preparation may also provide an effective way of working with this plant on a larger scale.

With a few more years of experimenting and researching, nettles could become a viable spinning fibre.
Figure 30. February picked stalks, scraped with a finger nail.

Figure 31. Fall retted stalks, scraped with a finger nail.

Figure 32. Scraped February stalks, wet spun, s.

Figure 33. Scraped fall retted stalks, wet spun, s.
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Works Cited


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