

Growing and Dyeing with Japanese Indigo

Isabella Whitworth and Christina Chisholm, Online Guild

Japanese indigo (*Persicaria tinctoria*) is a valuable plant for natural dyers living in temperate climates. It is also known as Chinese indigo or dyer's knotweed and the botanical name *Polygonum tinctorium* has been current until recently. It is not the same plant as the invasive Japanese knotweed.

It is ideal for those who wish to use their own plants rather than import dyestuffs, gives an identical blue dye to

the *Indigofera* species and yields a much stronger colour than the same weight of woad leaves (*Isatis tinctoria*). It grows fast and can be harvested more frequently than woad, which is hardy in the northern hemisphere. Japanese indigo is a more demanding plant to grow in temperate climates because it is native to Vietnam and Southern China and is frost sensitive. It is technically an annual,¹ 30 - 80 cm high, with alternate bright green to

blue-green leaves. The flowers are small, white to pink in colour and readily produce numerous small seeds.

Christina Chisholm lives in the far north of Scotland and Isabella Whitworth in the more gentle climate of Devon. Both grow Japanese indigo successfully to dye wool fibre and yarn (Christina) and silk, wool and some cotton (Isabella). In the first part of the article, they describe their individual experiences of cultivating the crop.

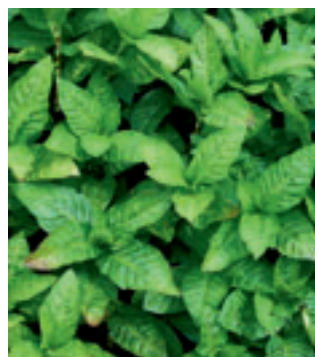
Photos: Christina Chisholme and Isabella Whitworth



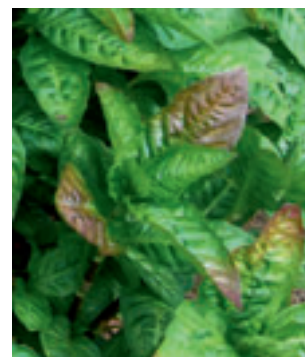
Plants grown in polytunnel in north of Scotland



Plants grown outdoors in north of Scotland



Plants grown outdoors in Devon



The leaves are ready to dye when they show this redd/blue tinge

Growing Japanese indigo in the north of Scotland: Christina's experience

'I live in the north of Scotland and start my Japanese indigo seeds in cellular seed trays under gentle heat in March. Seed is collected from the previous year's flowering, from plants usually in the second year of growth. It germinates readily. The young plants are ready for transplanting into the beds of the polytunnel in April or early May. In my experience bought seed, or that stored for at least a year, germinates significantly less well. About one square metre is sufficient to grow enough plants to dye useable quantities of fibre or fabric. I space the plants about 20cm apart. In the polytunnel, the plants are kept moist and warm, grow rapidly and profusely and can be harvested up to three times in their growing cycle (July, September and late October/November). I can tell when the leaves are likely to yield useable dye because the leaves readily turn blue when bruised. They are unlikely to flower and produce seed in the first year so after the final harvesting I pot up a few plants and bring them indoors for winter protection. In the spring they can be returned to the polytunnel to be replanted in the beds. Because the plants become weak and leggy over winter they require care – and I have to be prepared for a few losses. Once they start growing again in the spring they quickly flower and set seed. The plants can be grown outside where I live provided there are no night frosts, but they produce a far better harvest in the polytunnel. Leaves can only be harvested from first year plants – and growers should note that once they have started to flower no colour is obtained at all.'

Growing Japanese indigo in Devon: Isabella's experience

'Unlike Christina, I have neither greenhouse nor polytunnel. My Japanese indigo is grown as an annual. I save seeds from year to year by identifying one or two of the more advanced plants and not taking any of their leaves for dye. I can then protect just these plants from early frosts if necessary, rather than the entire crop.

I sow in late April. I scatter seed onto trays of compost that I put in the airing cupboard, and keep them damp and dark. When they germinate I take them into the light. I have found that a few seeds germinate very fast, but others take considerably longer, so I always wait a little before pricking out the seedlings. When they are a few weeks old I separate seedlings into separate, small pots and plant them outside in late May or June.

I usually plant about 50 plants over about 4 square metres and fortunately they do not seem to attract slugs, snails, pigeons or sparrows. Each year I grow them in a different area of the veg patch. In very dry periods I keep them watered.

At the end of the season I cut the selected flower heads with their stalks, bind them together and place them head down in a plastic bag. I hang this upside down in a warm place to allow everything to dry out, allowing air to circulate in the bag or the heads might go soggy. The seeds can eventually be shaken free of the heads and are saved and labelled carefully for use the next spring.'

Harvesting leaves

Once the stalks bearing leaves have grown to around 50 cm tall they can be cut down to about 10 cm just above a leaf node, whereupon they will readily form new shoots. Alternatively, leaves can be harvested directly from the stalk without cutting the plant at all.

Organic vats

There are many excellent recipes for making organic vats with Japanese indigo but neither Christina nor Isabella has yet experimented with these methods.

Vat method using fresh leaves and commercial chemical assistants

NB: Ensure that you have read and understood all safety guidelines for the chemicals used in preparing an indigo vat.

Strip leaves from stalks and place just the leaves in a large bowl or bucket which can be heated. Add enough *cold* water (this is very important) to cover the leaves and then, very gradually over a period of two hours, raise the temperature of the dyebath to 60°C/160°F. After two hours the leaves will have turned a dull brown, the water a dark sherry colour (although a bluish tint in the water may be evident as the leaves are slowly heated) and the vat can be removed from the heat source. This dyebath contains a precursor of indigo named indoxyl.²

In order to extract the blue indigo, strain the dyebath through a sieve to remove the leaves and, once the dyebath has cooled sufficiently, squeeze the remaining liquid from the leaves, wearing rubber gloves. (The leaves can be composted.) Add this liquid to the dyebath. Once the dyebath has cooled to 50°C/120°F add enough washing soda (or another suitable alkali) to turn the dyebath from brown to green. Do this slowly, a teaspoon at a time. Whisk the dyebath vigorously to introduce oxygen and enable the formation of indigo. The foam which forms on the surface of the dyebath should turn blue – if this has not happened within a minute or two, add further washing soda. If you continue to whisk, the foam should start to turn green.

Reheat the dyebath to 50°C/120°F and hold it at this temperature. Then carefully sprinkle a tablespoon of a reducing agent (Spectralite or equivalent) over the surface of the dyebath. This removes the oxygen from the dyebath (known as ‘reducing’) and allows the indigo to become soluble. In its soluble form it is known as ‘indigo white’ although in reality the dyebath turns a yellowy-green shade, with a thin layer of blue on the surface, which represents the oxidised and insoluble indigo. The dyebath can be used once it has become yellow.

Dyeing wool and silk

NB: Indigo does not require a mordant.

Wool and silk can be dyed in either spun hanks or as scoured fleece, which may have been prepared for spinning by combing or carding. If scoured fleece is dyed this can be blended with other colours/fibres prior to spinning. Fabric and fibre should be well soaked in a bucket of water before introduction into the vat: add a small squirt of pH neutral detergent to assist wetting out. Squeeze out as much water as possible before dyeing.



Leaves at start of extraction process



Leaves at end of extraction process



Formation of blue froth



‘Indigo white’ dyebath



Above: Results on wool (Falkland tops)

Below: Colours obtained from dyeing handspun hanks of Tussah silk (45g), Wensleydale wool (141g) and Falkland wool (50g) successively in a vat made from 530g of Japanese indigo leaves cut in late July from four plants in Christina's polytunnel.



Above: Wool and silk skeins dyed with Japanese indigo (note purplish shades in top right hand corner)

Below: Aqualeaf



Check the pH of the vat and maintain it at around 8 - 9 for wool and silk. Use pH indicator papers or a pH meter. Don't allow the temperature to exceed 50°C. For cellulose fibres, the pH can be higher (9 - 10.5).

Method:

Carefully introduce the fibres/yarns to the dyebath. Whatever you are dyeing, it is important to keep fibres/yarns below the surface of the dyebath to prevent patchiness. Using a stirrer, keep them moving gently, disturbing the surface of the dyebath as little as possible to avoid re-introducing oxygen.

When the fibres/yarns are carefully lifted from the dyebath their colour will turn from yellow to blue as indigo pigment is formed when exposed to oxygen. As with all indigo dyeing, deeper blues build up through a succession of dips rather than by longer immersion in the dyebath. The strength of the dyebath will also affect the depth of colour.

With silk, the first immersion is about 5 minutes and subsequent dips are shorter – perhaps 2 or 3 minutes. Wool can be immersed for 5 – 10 minutes or slightly longer, but care should be taken as successive dips may cause felting and too much exposure to alkalinity weakens wool fibres.

As the dyebath exhausts the colour obtained becomes weaker/lighter. When the dyebath is nearing exhaustion some quite different colours can be obtained – pale pinks, lavenders and beiges.

Yarns and fibres should be hung up to dry in an airy place and then rinsed in cool water after an hour or so. Blue is by far the most usual shade obtained from this method of dyeing with Japanese indigo, however more purplish/reddish shades may occasionally occur.

Dominique Cardon refers to these as 'Indirubin, the red shade of indigo', suggesting that they may arise from certain temperature and acidity parameters.³

Freeze-dried leaves

At the end of the summer it is possible to pick and store leaves. Collect a bucketful of leaves on a dry day and place them loosely in several sealable plastic bags. These should be put in the deep-freeze overnight. The next morning, remove bags and scatter the leaves onto a plastic sheet, separating them out as much as possible so that they soon dry to a crisp state. Then re-bag and store the leaves in a dark, dry place. To use them, make up the vat as before, crushing the dried leaves into water before gradually raising the heat. The blue from dried leaves is unlikely to be as strong as from fresh ones.

Aqualeaf blue on silk using Japanese indigo

Isabella learned this special recipe from Jenny Balfour-Paul and Lucy Goffin, who invite her to their annual summer indigo dyeing sessions. They call the method 'Aqualeaf Indigo'. It produces superb bright turquoise colours on silk and softer shades on fine wool. Though not commercially practical, it is worth it for the novelty, the smell and the colour, and the delight of dyeing with no added chemicals. Since items dyed by this method must be stored away from light and washed with care it is ideally used to dye special fabrics for occasional wear. The best plant source is Japanese indigo although other indigo plants (woad) can be used.

Aqualeaf indigo for silk or fine wools

Prepare everything before you pick the leaves as the whole process must be completed as quickly as possible. Have silk or wool ready and wetted out.

You will need:

- Food blender – not used for food
- Bucket and containers
- Ice cubes

1. Pick a bucketful of plant material, preferably early in the morning. Strip leaves from the stems and keep them soaking in iced water.
2. Place batches of leaves in the blender, cover with cold water and whisk until a mushy green, which takes about a minute.
3. Strain the liquid into a container. Depending on how much you dye, you may need more than one blender's worth. Add the silk or wool and dye by moving the material constantly for 3 – 5 minutes.
4. Remove silk or wool from the container, wring it lightly, open to the air and then immediately submerge it in cold, (ideally) running, water. Hang the dyed material in the sun and remove from the line as soon as it is dry.

You can obtain a darker colour by repeating from step 2.

Save the liquid and leaf pulp, add water and turn it into a conventional indigo vat using a standard recipe.

Source of seeds in the UK

Saith Ffynnon Wildlife Plants, Saith Ffynnon Farm, Whitford, Holywell, Flintshire CH8 9EQ. www.7wells.co.uk

Bibliography

- Buchanan, Rita: *A Dyer's Garden*, Interweave Press 1995
Dean, Jenny: *Colours from Nature: A Dyer's Handbook*, Search Press 2010
Dean, Jenny: *Wild Colour*, Mitchell Beazley 2010
Goodwin, Jill: *A Dyer's Manual*, Ashmans Publications 2003

Acknowledgements

With thanks to Jenny Balfour-Paul and Lucy Goffin
See also: Journal 202 June 2002 (p 9) *Indigo Growing in Essex*, Pamela Smith; Journal 212 December 2004 (p 32) *Indigo Dyeing Online*, Helen Melvin & others. (Back copies available on the website www.thejournalforwsd.org.uk or by contacting the Guild Subscriptions Secretary – see details on contents page.)

Footnotes

¹ Although the plant is technically an annual, in colder climates it is often difficult for it to flower and set seed within the same year as it is grown from seed. Therefore, in order to perpetuate stocks, it is necessary to either take cuttings in the autumn or maintain plants through the winter months in order for it to flower the following year.

² For more information on the chemistry of indigo dyeing, see Journal 231 Autumn 2009, *Indigo and the Tightening Thread*: Jane Callender

³ Cardon, Dominique: *Natural Dyes: Sources, Tradition, Technology and Science*, Archetype 2007



Handwoven Indian shawl dip dyed in Japanese indigo



Above: Indigo on wool scarf dip dyed in graduations.

Below: Wool scarves dyed in Japanese indigo with overdyes of cochineal, and weld.



Christina, a past Chair of the Highland Guild, is a keen spinner, weaver and dyer who particularly enjoys the adventure of experimenting with natural dyes.

Isabella is a textile artist, dyer and teacher with a special interest in resist techniques. She also researches the historical dye trade in orchil. Isabella teaches at Denman College, Dillington House and West Dean and is a member of the Devon Guild of Craftsmen. For details of her courses visit her website www.isbellawhitworth.co.uk