SEAWEED

IN SEASON

Photos - Fergus Drennan

Laminaria letters on a Gutweed background.

By Fergus Drennan
FergusTheForager.co.uk

BRITISH SEAWEEDS IN SEASON

AND SOME IDEAS ON FOOD USE

SEAWEEDS

REDS

Black Scour Weed
Ahnfeltia plicata
Bonnemaison's Asparagus Weed
Bonnemaisonia asparagoides
Bunny-eared Bead-weed
Lomentaria articulate
Carrageen *Chondrus crispus*
Clawed Fork Weed
Furcellaria lumbricalis
Cleaved Wart Weed
Gracilaria multipartite
Common Coral Weed
Corallina officinalis (and closely related species)
Creeping Chain Weed
Catenella caespitose
Creephorn
Chondracanthus acicularis
Discoid Fork Weed
Polyides rotundus
Dumont's Tubular Weed
Dumontia cortorta
Dulse *Palmaria palmata*
Flat Fern-weeds/Pepper Dulse *type Osmundea sp*
Grape Pip Weed
Mastocarpus stellatus
Hildenbrand's Red Weed
Hildenbrandia rubra
Slender Wart Weed
Gracilaria gracilis
Laver
Porphyra sp – various species
Longest Wartweed
Gracilariopsis longissima
Northern Tooth Weed
Odonthalia dentata
Sea Beech
Delesseria sanguinea
Sea Noodle
Nemalion helminthoides
Sea Oak *Phycodrys rubens*
Siphoned Feather Weed
Heterosiphonia plumosa
Spiny Straggle Weed
Gelidium spinosum
Slender-beaded Coral Weed
Jania rubens
Winged Weed
Membranoptera alata

BROWNS

Bootlace Weed *Chorda filum*
Broad Leaf Weed
Petalonia fascia
Brown Tuning Fork Weed
Bifurcaria bifurcata
Channelled Wrack
Pelvetia canaliculata
Chipolata Weed
Scytosiphon lomentaria
Dabberlocks *Alaria esculenta*
Divided Net Weed
Dictyota dichotoma
Ectocarpus siliculosus
Egg/Knotted Wrack
Ascophyllum nodosum
Estuary Wrack
Fucus ceranoides
Furbellows
Saccorhiza polyschides
Forest Kelp
Laminaria hyperborea
Golden Kelp
Laminaria ochroleuca
Japweed/Wireweed
Sargassum muticum
Oarweed
Laminaria digitata
Oyster Thief
Colpomenia peregrine
Punctured Ball Weed
Leathesia difformis
Sea Pea
Halidrys siliquosa
Serrated/Toothed/Saw Wrack
Fucus serratus
Slimy Whip Weed
Chordaria flagelliformis
Spiral Wrack
Fucus spiralis
Sugar Kelp
Saccharina latissima
Thin Sausage Weed
Asperococcus fistulosus
Thong Weed
Himanthalia elongata
Wakame *Undaria pinnatifida*

GREENS

Common Green Branched Weed *Cladophora rupestris*
Green Sponge Fingers
Codium fragile
Gutweed *Ulva intestinalis*
Flax Brick Weed
Chaetomorpha linum
Mossy Feather Weed
Bryopsis plumosa
Rooting Green Thread Weed
Rhizoclonium riparium
Sea Lettuce
Ulva lactuca (many other good Ulva species too)
Spongy Weed
Spongomorpha aeruginosa

Those highlighted in bold colours (10 reds, 18 browns, and 8 greens) represent those for which there has been a historical tradition of use as food.

Carrageen showing classic bluish iridescent feature at the frond tips, or wherever it catches the light, (a useful ID characteristic).

Dulse. But don't be misled by common names. This is Pepper Dulse, an Osmundia species.

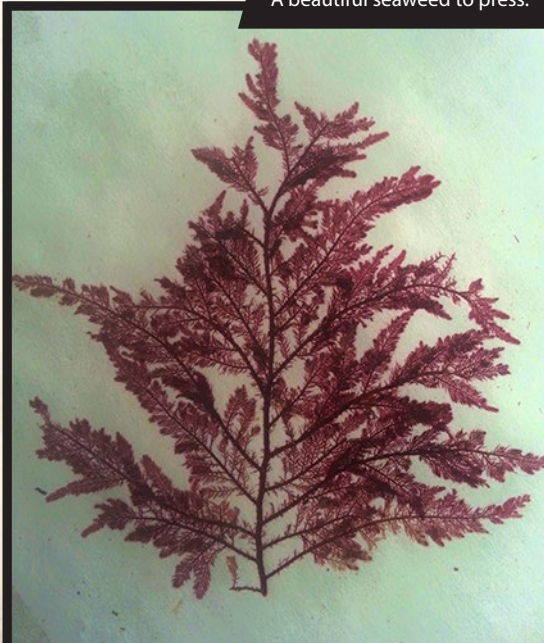
We can choose to work with seaweeds in many different ways; incorporating them into hand-crafted cosmetics, soaps, shampoos and hand and face creams, even putting various species directly—fresh or dried—into a hot bath (with your partner if possible—a sensual delight—just saying as "they" say), for natural dying of wool and other fabrics as well as for paint making, basketry work, as bindings for primitive tools, as liquid or mulched-in fertilizer, as well as for limitless creative artistic projects, and of course, we can simply enjoy being around them—looking, touching, smelling—or playing, as I did a few years ago amongst the low-tide kelp on Bryher (one of the Scilly islands), pretending to be a seal sliding amongst the seaweeds and slipping down into the sea. I'm not sure what the watching seals made of my performance, although I'm still expecting a seal equivalent of an Oscar to arrive by special fish delivery one day while collecting seaweed on the beach.

Last then, but not least, as if all the potential ways to engage with seaweeds mentioned above weren't enough, their food potential is enormous too if collected with care, common, and not so common sense.

Let's explore the world of seaweed then, with respect to discovering some tentative answers to the following questions:

What is seaweed? Which seaweeds are edible? Where and when is it possible to collect seaweed? How can seaweed be preserved and stored? How can seaweed be used as food? How can seaweed be sustainably harvested? Seaweed consumption; What are the risks and benefits? Which books and websites are a good source of information about seaweeds in terms of both food, identification, and general interest?

Heterosiphonia plumosa. A beautiful seaweed to press.



WHAT IS SEAWEED?

Seaweed, in spite of its wondrousness and the fantastical and endless possibilities that it presents to the world, often seems to have to carry its own particular cross—a bad reputation as being just slimy (and smelly) stuff on the beach. But, in actual fact— and I mean 'fact'—it really is sexy stuff! A red seaweed (found in a rare fossil record) dated to 1,200 million years ago, is understood to be the first sexually-reproducing organism EVER; whether or not the experience was also orgasmic, nobody knows.

In terms of the scientific classification of life (and remember, you are free to classify things or not, as you like; perhaps just write a poem or sing a song instead), "Seaweeds are not a single taxonomic entity. Molecular phylogeny (gene sequencing) and other characters show they belong to three kingdoms: Kingdom Plantae (chlorophytes and rhodophytes), the Kingdom Chromista (phaeophytes), and the Kingdom Bacteria (cyanophytes)." So are seaweeds plants? Well… those "that belong to the Kingdom Plantae are, by definition, plants; the others, strictly speaking, are not." The above quotes are taken from Michael D. Guiry's informative seaweed info.
http://www.seaweed.ie/

The seaweeds that we most commonly see are marine macro algae that, although classified according to different orders of life, have evolved and adapted to thrive in a marine environment, hence their, of-necessity, practical similarity of form. There are in the British Isles (according to the Check-list and Atlas of Seaweeds of Britain and Ireland 2006, and 2016 update), 644 species:

348 red seaweeds (rhodophyceae)
183 brown seaweeds (Phaeophyceae)
110 green seaweeds (chlorophyceae)
16 yellow-green species (xanthophyceae)

although amongst the xanthophyceae only one Vaucheria species is truly marine; a hint, of course, that there are also many edible fresh water algae, but that's a story for another time...

Most seaweeds grow attached to rock (or even pebbles and shells) by means of what, in some instances, may look like roots. However, this is a hold fast, of which there are many varieties. Unlike land plants, seaweeds absorb nutrients directly into their cellular tissue from the surrounding sea water, as such they have no need for a root system in the sense of modified specialist cells to draw up nutrients from the substrate to which they are attached.

This physiological ability to take up and concentrate chemicals directly from the surrounding water, is one reason why seaweeds can be a great source of nutrients, although the same mechanisms also allow for the bioaccumulative uptake of pollutants; not so good in terms of the human diet, but great, ultimately and over the long term, in relation to natural or human orchestrated bioremediation of polluted habitats, perhaps?

And what isn't seaweed!? A selection of seaweeds (presented to Pernod Richard's creative team). Spot the joker in the pack—they didn't! (centre of main plate: a tanned and oiled fox intestine. There is more to bushcraft than 'just' wild food)!

Laminaria digitata showing root-like holdfasts.

WHICH SEAWEEDS ARE EDIBLE?

Before addressing this question, it is worth noting that many botanicals are edible, but, without beating about the bush, it would be both true and honest to say that some taste down right disgusting in spite of apparent edibility. For the purpose of this article I am only interested in what tastes good (in my personal experience), bearing in mind of course that some seaweeds will taste great/awful prepared one way, deep fried for example, but can be delicious/horrific dried and powdered as a seasoning or bread ingredient. General rules do not apply—generally.

Seaweed-wise then, what is edible and what isn't; and if it is, why, and if it isn't then why not?

I've deliberately over generalized here, to reflect the question I'm commonly asked about seaweed: Is it edible? The question is usually asked in this way, in relation to seaweeds generally, which I find most surprising. It's a bit like asking if plants or fungi are edible, generally speaking, rather than applying the question to a specific individual, that is, a distinct species such as Thong Weed *Himanthalia elongate* (delicious, by the way). I think it simply reflects the fact that, although there is some difference historically in terms of which folk on the different Isles that make up the British Isles have incorporated a few seaweed species into their diets on a regular basis and those who haven't, more than anything it points to the lack of importance attached to seaweeds as a food source in Britain, both now and in the past.

We have a coastline in this country equivalent in length to that of the world's greatest seaweed eating culture and country: Japan. And we are blessed with approximately 650–700 different species (depending on how you interpret the data), so lots to choose from.

Of those 700-ish I have eaten about 100. The seasonally available list of seaweeds at the top of this article (the reds, browns, and greens), contains 59 different species. These represent the seaweeds that I personally have eaten in relatively large quantities without problems (although see information on bioaccumulation of pollutions below), but that doesn't mean YOU won't have some problem with them. Those highlighted in bold colours in the table at the top (10 reds, 18 browns, and 8 greens) represent those for which there has been a historical tradition of use as food (although, to be honest, 6 of these I have only found referenced in Sonia Surey-Gent and Gordon Morris's 1987 book *Seaweed: A Users Guide*).

Even eating 100 species of British seaweeds (which is probably a lot for most people) is somewhat limited in the context of the 700 potentially available. So why not gastronomically engage with the other 600?

You may have heard that all seaweeds are edible. In fact, in naivety, I probably said it myself about 10 years ago. Putting aside thoughts of potentially health threatening bioaccumulation of pesticides and heavy metals let's, just for argument's sake, assume seaweeds are growing in clean water, remembering, of course, that "assumption" is the mother (substitute whatever familial relation you like) of all mistakes (swear words would be more appropriate here – please substitute your own). The fact is that the majority of seaweeds are reds. This means that although some (including good edibles) can be found on shores exposed at low tide, the majority are either to be found in deeper waters (their preferred habitat), remaining unexposed by even the lowest of spring tides, are tiny, or are simply incredibly rare. 'Tiny' and 'incredibly rare' also applies to both brown and green species. Some species, in particular, those in the genus *Desmarestia*, are to be avoided (generally) due to the sulphuric acid-like chemicals they produce to deter feeding from sea slugs (nudibranchs) and other marine life. Some members of this genus can reach an acidic Ph. of 2! Nevertheless, I've eaten both Landladies Wig *D. aculeate* and Desmarest's Flattened Weed *D. ligulata* without incident (after chemically counterbalancing the acidity to neutral). The best advice though, especially if you are new to seaweeds, is to stick to those colour highlighted in the table or even just these:

REDS:

Carrageen *Chondrus crispus*
Dulse *Palmaria palmata*
Flat Fern-weeds/Pepper Dulse *type Osmundea sp*
Grape Pip Weed *Mastocarpus stellatus*
Slender Wart Weed *Gracilaria gracilis*
Laver *Porphyra spp*

Fresh young Dulse *Palmaria palmata* in mid-May.

Top-right: Single frond of mid-May Dulse. It looks and feels so much like one of those fortune telling 'fish' you can get in Christmas crackers or in toy shops.

BROWNS:

Bootlace Weed *Chorda filum*
Channelled Wrack *Pelvetia canaliculata*
Dabberlocks *Alaria esculenta*
Egg/Knotted Wrack *Ascophyllum nodosum*
Estuary Wrack *Fucus ceranoides*
Furbellows *Saccorhiza polyschides*
Forest Kelp *Laminaria hyperborea*
Golden Kelp *Laminaria ochroleuca*
Japweed/Wireweed *Sargassum muticum*
Oarweed *Laminaria digitata*
Serrated/Toothed/Saw Wrack *Fucus serratus*
Spiral Wrack *Fucus spiralis*
Sugar Kelp *Saccharina latissima*
Thong Weed *Himanthalia elongata*
Wakame *Undaria pinnatifida*

GREENS:

Green Sponge Fingers *Codium fragile*
Gutweed *Ulva intestinalis*
Sea Lettuce *Ulva lactuca*

Please remember, I describe myself as a wild food experimentalist. In other words, I am a risk taker. I enjoy that for the knowledge gained, but my working thought when writing is to keep the integrity of being honest, and telling all I currently know, with a view to helping YOU make your own constructive decisions about what is good or bad, safe or dangerous to eat.

Sea Lettuce (unattached to rocky substrate, but still looking good to eat).

So, some seaweeds are incredibly rare or simply too small to be worth bothering about. Others are just too much hassle to clean: Creeping Chain Weed *Catenella caespitose* or Gutweed *Ulva intestinalis* for instance, although there are always ways around such apparent difficulties. There are, also, some that common sense would simply tell you to avoid: Mrs Griffith's Coral Weed *Griffithsia corallinoides* might look pleasant on a sunny day as it floats by on an out-flowing tidal channel, but it absolutely stinks. Common sense rules apply. Would you eat any food that stinks? Unless you are **Aajonus Vonderplanitz**, probably not. The 59 seaweeds listed above I have used and enjoyed, but in many cases I had to be very creative to bring out the best (food-wise) of the particular species I chose to work with. *Corallina officinalis* for instance, doesn't initially seem very promising as food due to its calcium carbonate content that, when fresh, is textually a million miles away from something more obviously tender and good to eat such as Dulse *P. palmata*, but it works well powdered and incorporated into savoury biscuits or bread. *Hildenbrandia rubra* is my extreme case of creative use: stone soup! It is always worth bearing in mind this sagely wisdom or general rule of modus operandi: ***There are old foragers, and there are bold foragers, but there are few, if any, old and bold foragers***; that is, take too many risks and you are likely to come a cropper. I also like to break the rules, so at 44 years old I am starting to find a little pleasure already in challenging even this most sensible perspective.

Even among seaweeds that have a long tradition of use, our individual subjective appreciation of flavour can differ wildly. For instance, for the past 12 years whilst running foraging courses, I always end the day with a three-course dinner cooked on the beach. For starters we eat a selection of deep fried seaweed. Deep fried fresh Dulse *P. palmata* is consistently peoples top rated seaweed, closely followed, most frequently, by Serrated Wrack *Fucus serratus*, people consistently giving it 8 or 9 out of 10 in terms of texture and flavour; and yet, in their seaweed book, Sonia and Gordon rate the food value and flavour of 28 different seaweeds, giving Serrated Wrack 2 out of 10, and have this to say about it;

"Food rating: Poor. This is not a food wrack for human consumption. Very high in iodine, high in carbohydrate, with moderate protein and trace element content. The iodine makes it bitter as food, but nevertheless it is a useful weed."

Seaweed: A User's Guide, Sonia Surey-Gent and Gordon Morris; Whittle Books 1987 p42.

WHERE AND WHEN IS IT POSSIBLE TO COLLECT SEAWEED?

Laver spp dried onto the rock. Possibly gatherable, but easier to collect when wet on an out-going tide (during the hotter summer months).

Seaweeds are most commonly found growing attached to rocks on the beach, and can be collected at low tide, although they can also be found in estuaries and Scottish lochs. There are also a number of free-floating species such as *Ascophyllum nodosum* ecad *mackayi*—Wig Weed; I'm wearing it in my profile picture. Note: 'ecad' means an organism that is modified by its environment. Generally speaking, to make sure you only harvest the best quality seaweeds, stick to ones attached to rocks. Seaweed that is lying about on the beach may have been washed in and out on successive tides, and be starting to decompose. Obviously it is possible for species that where attached to rocks to be found lying about in great condition, especially in the cooler winter months, but an awareness of what is 'in great condition' only comes with a certain amount of experience, that is, a knowledge of the true colour of any particular seaweed when growing vibrant and healthy.

Although many seaweeds grow all year round, the greatest number of species are available during the summer months. Some species can be found growing across the whole range of shore exposed on the lowest tides, whereas other species are very specific in terms of where they thrive. Channelled Wrack, for instance, can be found growing on rocks of the splash zone right at the top of the beach, whereas Sugar Kelp will only ever be found exposed at very low tides or in deep rock pools. Indeed, in order to see the full complement of seaweed species growing on any particular shore, it is best to time your arrival with low tides occurring on a new or full moon and a few days after (the very lowest of all such tides, occurring in the spring).

The total number of seaweeds growing on any particular beach is dependent on a number of factors: cleanliness of the water, the amount and types of rock present, the gradient of the beach, and how exposed the location is. Indeed some species of seaweed can only successfully reproduce given a certain intensity of wave energy and interaction.

If visiting a new beach or stretch of coast and the tide is in, it is always worth checking the strandline (especially in the winter when seaweed found there is less likely to be rotting), to get a rough idea of what species might be available at that location when the tide is out. Also, especially in the summer months, it can be useful to arrive as the tide is going out, this is especially the case if you wish to gather something like laver. It is superb for wrapping and pit cooking fish, but if you try to gather it from the upper shore on an incoming tide on a sunny day, it will have dried out in the sun and simply disintegrate when you try to pick it up. Also, especially if gathering seaweeds such as dulse or various kelp species (that are only exposed on low tides around the new and full moon), it is far more relaxing and enjoyable to arrive an hour before the low tide, rather than scramble around in panicked desperation because you have arrived 10 mins after the tide has turned and is coming back in!

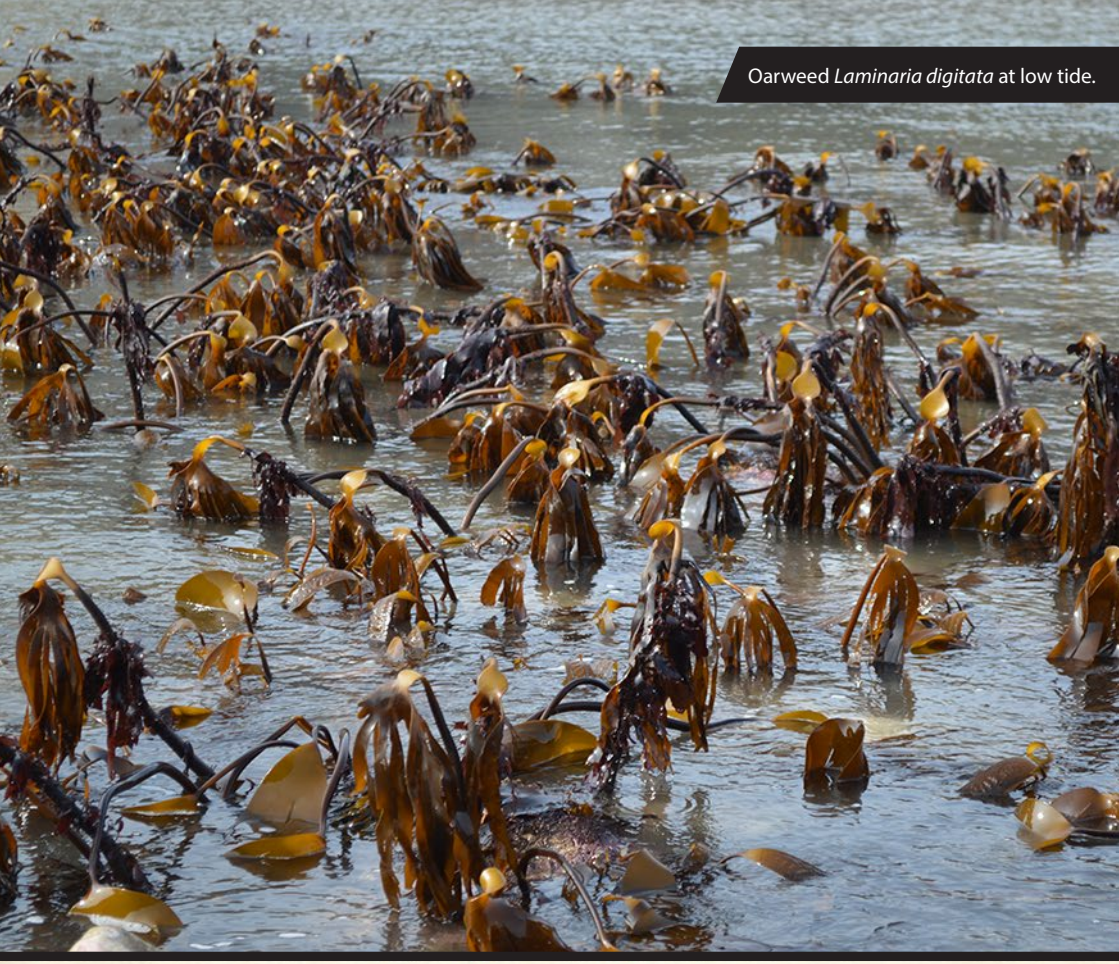
There are various sources of information on high and low tide times that can help you plan your coastal foraging adventures. Tide tables (for the month or year) can be purchased from local fishing tackle shops. Websites can be useful too. I like to use these three:

http://www.bbc.co.uk/weather/coast_and_sea/tide_tables

http://tides.mobilegeographics.com/zones/:Europe/London

http://www.tides4fishing.com/uk/england

Working and aligning with moon phases throws up an interesting question. As a man, or as men are generally, unaligned with moon cycles in perhaps the deep way women are or can be in terms of their menstrual cycles, can aligning with such cycles help develop the feminine component of our being and thereby help us become better foragers? After all, in ancient times, for the most part and across cultures, it was the females who were the most skilled gatherers. Perhaps, foraging aside, moon phase alignment would help us become more well-rounded, intuitive animals, more deeply connected to the natural world generally?



Oarweed *Laminaria digitata* at low tide.

HOW CAN SEAWEED BE PRESERVED AND STORED?

REFRIGERATED

Most seaweeds, if just rinsed in the sea to remove sand and grit, and put in a fridge (without being left around for ages in a hot car or similar situation), will stay in good condition for about 4 days or even a week (it depends on species). If you wash under a tap before refrigerating, they won't stay good for quite so long. You can also store seaweeds as fresh for far longer (a month or more) in the fridge if you toss them in a considerable amount of extra sea salt, then rinse prior to use. I have only done this with laver and sea lettuce, but expect the same principle can be applied to various other species?

FROZEN

Some seaweeds, particularly the more robust types such as the Laminaria, freeze well, whereas others such as Dulse *P. palmata* freeze ok but are not as vibrant once thawed out as they are fresh, although, depending on what you want to do with it cooking-wise, that may not matter.

COLD SMOKED AND PARTIALLY DRIED

This combined technique can add a bit of extra storage life to many seaweeds, but is still best refrigerated in addition. Smoking it certainly produces some great flavours!

DRIED

Depending on species, seaweeds can be hung on a washing line or laid out on a sheet to dry in the sun. If on a sheet, turn them over half way through the drying process, and if not dried a few hours before sunset, bring them in, seal in a plastic bag, and spread out again the next day to finish them off. Drying seaweeds to a crisp, and storing in air-tight containers out of direct sunlight (and preferably in a cool dark cupboard), will mean they can be safely stored for years. You can also dry seaweeds using a solar drier, food dehydrator or oven at its lowest setting with the door ajar. On occasion it can be good to leave some residual moisture so the seaweed can still be preserved for a long time (months) but remains pliable rather than brittle—indeed doing so can help develop various flavour compounds. I store Dulse *P. palmata* this way, and just grab a handful to chew on when the fancy takes me.

COOKED, COOLED AND REFRIGERATED

Treated this way, seaweeds generally stay good to eat for 5-7 days.

Sugar Kelp *Saccharina latisimma* drying on a clothes line.

Some preservation and storage techniques double as food preparation techniques. That is especially the case in terms of hot or cold vinegar pickling, lacto-fermenting or candying. In terms of lacto-fermentation, I have yet to do this successfully with any seaweed species as the sole ingredient (apart from the salt of course), but have had great results with gutweed*, sea lettuce and laver in wild garlic and nettle lacto-ferments, as well as with other botanical combinations. My favourite was a wild garlic and gut weed lacto-ferment that lasted 3 years, unrefrigerated.

** Which I prefer to call Green Mermaid's Hair or Hulk weed—'gutweed' sounds somewhat unappealing.*

Serious point: You are always free to call things whatever you prefer. Just because a book or some 'authority' names a particular entity as such-and-such, it doesn't mean you have to...although be prepared for the consequences.

Tender fronds of Serrated Wrack.
Perfect for cold pickling and much else besides.

HOW CAN SEAWEED BE USED AS FOOD?

Emphasising that seaweed can be a valuable, nutritious, flavoursome and extremely versatile food, they are often referred to as sea vegetables. And in that sense they can be treated and used in many of the same ways you would use vegetables: At the most basic; simply boiled or steamed and served au natural, seasoned or tossed in a suitable light sauce. Fresh or dried seaweeds can be a component or main flavouring and interesting texture provider chopped or pureed in soups, risottos, stews, and pasta sauces for instance. I frequently make a nettle, seaweed and wild mushroom risotto, which may seem like a clash of flavours, but actually—especially when using *Boletus edulis* fungi—is a good way to balance out the seaweed flavours for those who might not be used to them. Sometimes I cook fresh dulse with tomatoes or with onions, Indian spices, tomato puree and cream (delicious, but you probably wouldn't realise it was seaweed unless you knew). An important point to note if using multiple seaweeds in the same soup or risotto is that different species can have very different cooking times to make them tender. Some such as the Laminarias (when mature) can take 3 hours of boiling, whereas dulse is tender in just a couple of minutes. But let's explore a bit more systematically some of the ways I personally have had success with seaweed in the kitchen (or around the fire), looking at their use when in terms of the following categories:

Raw, Shallow Frying, Deep Frying, Pickling, Lacto-fermenting, Ketchup and Other Sauces, Stock, Seaweed Wine Vinegar and Seaweed Vinegar, Ingredient Substitutions, Tempura, Cheese straws, Seasoning (Solid or Liquid), In Bread, Pasta Dough, Biscuits, Candied in Maple Syrup, Seaweed Butters and Oils, Crisps, Desserts, Drinks, Wraps/Haggis, Dogs!

RAW

Perhaps before the industrial revolution and on coastlines away from natural sources of tin, ***lead***, and mercury, seaweed could have been readily eaten straight from the beach without negative consequences. These days, unless you know for certain that it is safe to eat shellfish raw from the place you are gathering seaweed, assume that there will be sufficient levels of E. coli in the water (and perhaps other unwanted contaminates as well), such that the seaweed needs to be cleaned or prepared in such a way as to make it safe to eat. Or if you really want to eat it raw and fresh, know that you have a strong stomach, and only eat very small quantities. Of course, raw need not imply fresh. As I write this article (as would be expected), I have two raw seaweed snacks to hand...

These are both raw, but dried. Drying kills any bacteria. I have dulse that has simply been washed in the sea and sun-dried. It is a chewy delight, bursting with flavour (from a large supply that is now 8 years old)! The other is sea lettuce. It has been washed in fresh water, dried in a food dehydrator at 35˚C, rehydrated in liquid aminos (like soy sauce, only nicer), and re-dried again at the same temperature. I just snack on it, but it could be flaked and used as a seasoning. Washing and cold pickling is another diarrhoea-free way to eat raw seaweed. Sometimes, after washing well in fresh water and leaving for an hour in acidified water (using vinegar or lemon juice), I add finely shredded tender seaweeds such as Ulva spp, laver and dulse to leafy salads, or to dress raw oysters, or blend them in to savoury smoothies.

When writing an article on seaweed, as you would (should) expect, I am sustained by 2 seaweed snacks. One is sea rinsed and dried dulse, the other, sea lettuce that has been fresh water washed, dried, rehydrated in liquid aminos and re-dried. (Being somewhat mean here, but always be suspect of foraging book/article writing authors who don't show evidence of themselves actually engaging with the wild foods they are talking about—so many wild food books around now, and so many rehashing copied nonsense).

Sea-rinsed and sun-dried Dulse, and Sea Lettuce dried at 35°C, then rehydrated in liquid aminos and dried, again at the same temperature. So essentially both still raw.

Photos - Fergus Drennan

SHALLOW FRYING

This is a great way to treat many seaweeds, although some of them can dance and jump about a bit, so a frying pan splash guard can be a crucial tool. Many species that take hours to become tender when steaming or boiling can be tender after only a few minutes of shallow frying. They can then be used as a side vegetable or added to omelettes and the like.

DEEP FRYING

The reason I deep fry most of the seaweeds I find on the courses I run is because whether a particular seaweed takes 5 minutes or 3 hours to become tender enough to enjoy eating (when boiled or steamed), nearly all green, brown (and some more robust red) seaweeds cook to a delicious crispiness in about 10–20 seconds— seaweed fast food! Dulse *P. palmata* is delicious cooked this way, although many of the finer reds will simply disintegrate, so are best used in alternative ways.

Deep frying, done outdoors, is great and explosive fun. The easiest and safest way to do this indoors is to pat your fresh seaweed dry using a tea towel, brush both sides with your favourite oil (with additional seasonings if desired), and dry in a food dehydrator, oven at lowest setting, or in the coolest oven of an aga—basically it is how kale crisps are made.

Photos - Fergus Drennan

Deep frying wet seaweed; fun, explosive and dangerous!

DON'T TRY THIS AT HOME. DONE AT YOUR OWN RISK.

Perhaps the best and only half sensible place to deep fry fresh seaweed in a wok of hot oil is on a beach, and definitely not in the kitchen!

PICKLING

Vinegar pickling is a great way to treat seaweeds. More robust seaweeds such as the Laminaria can be finely sliced or cut into shapes and hot pickled (cold works too though). On the other hand, serrated wrack needs to be cold pickled. Hot pickling it can be misleading in terms of texture. It will hold its form but as soon as you take it out of the jar it becomes a complete mush. Just experiment and see.

How long will they last? Refrigeration is best (in terms of storage life), although I've had cold pickled seaweeds last unrefrigerated for over a year. The main consideration as to how long it has lasted, and is safe to eat, is not so much about a specific time, but more about what you see going on in the jar. If the liquid is clear, all is well. If it is cloudy and sedimentous at the bottom, then your seaweed has started to break down (or perhaps you over cooked it while hot pickling). You can, of course, pickle in your own seaweed vinegar, and have playful fun adding the seaweed as cut out shapes (see below).

I have not tried to salt pickle seaweeds as is traditionally done with capers. It could work with, for example, the incredible looking hold-fasts of Furbellows *Saccorhiza polyschides* (in the same way I do wild garlic flower buds):

https://www.facebook.com/photo.php?fbid=10154100845094025&set=pcb.10154100871339025&type=3

Cold pickled Laminaria seaweed letters

LACTO-FERMENTING

There is a whole world of possibilities to explore here, but note my comments above. My attempts to lacto-ferment Dulse as the main ingredient other than salt has always resulted in a putrid mush, even with very high levels of salt. Note: mixed botanical lactoferments that have worked can be dried and flaked as a seasoning, or the liquid strained off to be used as a liquid seasoning or component of salad dressings, stocks, soups etc.

KETCHUP AND OTHER SAUCES

Seaweed ketchups can be delicious, depending on species used and personal taste preference. Cook and puree selected seaweed (or simply strain out the seaweed and concentrate the flavour by reducing down the cooking water) and combine with your preferred vinegar and pureed caramelised onions in the proportion of 1/3rd for each ingredient, that is, to be precise: 1/3rd vinegar, 1/3rd caramelised onion puree, and 1/3rd pureed seaweed or concentrated cooking liquor. Bear in mind that the higher the acidity of the vinegar you use; the more preserving capacity it will have. Keep refrigerated.

Various seaweeds such as multiple green, red and brown species that are thin or fine and delicate, are great powdered and added to cream, hummus or voluté sauces and such-like, before then going on to do other creative things with them.

STOCK

A combination of seaweeds, boiled for a few hours, topping up the water now and then, makes excellent stock for soups, risottos etc. Really concentrated they are great incorporated into voluté sauces for use in sea food lasagnes and other such dishes. They can also be boiled together with other vegetables or shellfish, crabs and lobster shells etc. to create even richer flavours. Fungi can be added too. Such stocks can be used to cook both meat and vegetables, not just seaweed based dishes. The two best seaweed varieties to use, in my opinion, are laver and Laminaria species. Laver alone is sublime, and the seaweed can be strained out to make ***laverbread*** according to Welsh tradition or mixed with other ingredients, then dried and flaked as a seasoning.

SEAWEED WINE VINEGAR AND SEAWEED VINEGAR

Years ago I made seaweed wine (just as an experiment). It was made from 2 kg of boiled up Ulva intestinalis. I added 1 kg of sugar to the gallon of liquid produced and fermented it with high alcohol tolerant yeast for two months (the time it naturally took to ferment out). It produced a strong and dry yellow wine, but tasted exactly as you would imagine; just like gutweed! I couldn't get my head around the flavour—just too strange and challenging—so I tipped it down the sink. I was telling this tale to some people on a course, who quite rightly berated me for being such a fool.

"Why", they said, "didn't you turn it into seaweed wine vinegar?"

Why? Because it had never occurred to me. Now I make this deliberately, and it is wonderful as a dressing for various seaweed dishes. A quick 'cheats' way to do this works if you add dried (or fresh – but will result in less seaweed flavour) seaweed to a bottle of white wine vinegar. Immerse the bottle in cold water and bring to the boil for 5 minutes. The seaweed can be left in or strained out. This is quite nice but has a far subtler flavour than vinegar made from seaweed wine—which may or may not be a bonus for you?

Fresh Gutweed in white wine vinegar.

INGREDIENT SUBSTITUTIONS

A number of seaweeds can be substituted for more conventional ingredients. I don't mean cooked laver with scrambled eggs instead of spinach (but that too is possible of course). I mean, tenderly cooked large squares of Laminaria species can be used to replace or be intermixed with lasagne sheets when making lasagne—especially seafood lasagne. Or *Gracilariopsis longissima* can be cooked and mixed in with rice noodles, almost as if it were a noodle itself. See the following article for *G. longissima* used as noodles:
http://fergustheforager.co.uk/wp-content/uploads/2013/04/ckAUG10.pdfsunsandandseaweed.pdf

Chocolate and berry liquor is involved in the article linked above: A reminder that when working with wild foods you can be as creative as you like, being less burdened or encumbered by a need to follow the rules of, say, classical French cuisine, let alone the simple 'purities' of a Palaeolithic perspective.

TEMPURA

Cooking seaweeds in a light tempura batter using mostly wheat flour, some rice flour and corn flour as well as chilled sparkling water, can be excellent as a simple snack or to accompany tapas-style marine dishes.

CHEESE STRAWS

These really are delicious, and are a great use of Thong Weed *Himanthalia elongata*. Here is a recipe (and much else besides) in an article I wrote a few years ago:
http://fergustheforager.co.uk/wp-content/uploads/2013/03/ISSUE34.pdf

SEASONING, SOLID OR LIQUID

Many seaweeds, particularly the thinner, less fleshy varieties can be dried then flaked or powdered and sprinkled on food as a salt alternative. This works especially well if, prior to drying, you simply rinse the seaweed in the sea rather than in fresh water. You can also cook these tender seaweeds in passata, mushroom stock, diluted liquid aminos or soy sauce, garlic milk or whatever your creative inspiration feels is worth exploring, and then dry and powder. In whichever way you do decide to make a dry seaweed seasoning, whether from a single variety or a mix of species, it can be lovely to make your own gamashio. This is, essentially, a blend of salt and sesame seeds, so just substitute some of the salt for powdered or flaked dried seaweed (although take care not to over blend or you will end up with a solid unsprinkleable paste). Seaweeds that have been cold pickled for a month or so can also be dried and powdered for a more acidic, tangy seasoning.

IN BREAD

If you enjoy making bread, of whatever variety, and you enjoy eating seaweeds, then I'm sure you'd very much enjoy adding dried and flaked seaweeds to the flour mix prior to kneading. My personal favourite seaweed to use for this is finely flaked laver *P. umbilicalis*. Do remember to clearly label your stored seaweed though. A few weeks ago I made a seaweed sour dough and thought the flaked and dried laver I was using was salt free, having been washed in the sink before drying (I could simply have tasted it of course to check, but didn't). As a result, because I add salt to bread anyway, I essentially ended up salting it twice.

See Issue 7 for a laver sourdough recipe

PASTA DOUGH, SAVOURY CRUMBLE MIXES AND DUMPLINGS, BISCUITS AND PASTRY.

Of course, in the same way dried and flaked or powdered seaweeds can be added to the dry mix prior to making bread, the same can be done when making biscuits, pastry, savoury crumbles, dumplings, and pasta dough. Obviously, adding seaweeds in this way can greatly enhance the dishes made, especially those incorporating fish and other seafood. Finely flaked or powdered seaweed can also be added to mashed potatoes, although green mashed potato doesn't appeal to everybody!

Laminaria digitata prepped for pickling, for candying, and for dehydrating after cooking in liquid aminos.

Photos - Fergus Drennan

CANDIED IN MAPLE SYRUP

Finally, we reach my sweet-toothed favourite subject: sweetened anything. In fact, though, 99% of those who have eaten the candied seaweed I've offered them have really enjoyed it. I've only worked with 2 species in this regard: *Saccharina latissima* and *Laminaria digitata*. Using both these seaweeds, particularly the former, at different stages of growth produces very different results. Young and thin new growth of *S. latissima*, harvested in the spring, once cooked in maple syrup and dried, is so fine and flaky that it almost dissolves in the mouth, and yet still has a delightful crunch to it. More mature specimens of both species are somewhat harder, but have the great advantage of presenting a textured flesh (when raw) that is perfect for cutting shapes out of with food cutters: hearts, letters, animals, whatever takes your fancy. Children (including the big kid in me) really enjoy working with seaweeds in this way. Seaweed, sugar and shapes; silly, sensational, and seriously delicious.

Note: Unlike when candying leaves and other land-based botanicals, perhaps due to their smaller cell size, seaweeds do not seem to take the sugar syrup up internally. Hence there is no point in candying over days as you would when working with non-seaweed items. Just boil for a few minutes in your chosen sugar syrup and lay out on a dehydrator sheet to dry. Halfway through drying you can also brush or spray on extra syrup for additional flavour (in any case, at some point - laborious as it may be, the seaweed needs to be turned over during the drying process, as the side against the non-stick sheet can trap moisture).

Two types of seaweed butter. One made from powdered Osmundia species, the other from powdered Sea Lettuce.

SEAWEED BUTTERS AND OILS

Dried and powdered seaweeds are excellent combined with butter or oils. These can then be melted or poured over fish or shellfish. I have used finely powdered sea lettuce, laver and pepper dulse for this, all producing very different flavours. Dogs love seaweed butter too.

CRISPS

Serrated wrack, rinsed in the sea, dried until brittle and broken into pieces = low fat, tasty crisps. That is an example of seaweed crisps at their most basic. I've made seaweed crisps in many different ways, but here are three that work especially well. Boil *L. digitata* or *S. latissima* in diluted soy sauce or liquid aminos for an hour. Lay out flat and dry to a crisp using a food dehydrator or any of the other drying methods previously mentioned. You can sprinkle with sesame seeds or add other powdered seasonings to the cooked seaweed prior to drying for a bit of additional flavour. Dulse *P. palmata* cooks very quickly. I was trying to make crisps as with the previous seaweed mentioned, and cooked the dulse in tomato juice. The result was an over-cooked mush, or so it seemed. Actually, after liquidizing, spreading thinly on a dehydrator sheet, sprinkling with toasted sesame seeds, then drying, and breaking into large pieces, I ended up with a seaweed crisp that was utterly delightful. Whole fronds of serrated wrack cooked for five minutes in tomato juice, laid out on a dehydrator sheet, sprayed with liquid aminos and dried to a crisp are also divine.

Note: Store all dried seaweed products in air-tight containers (placing in a spoonful of dried couscous wrapped in a piece of muslin will help to keep the seaweeds dry and crisp).

DESSERTS

The candied seaweeds mentioned above can be incorporated into many desserts as garnish or powdered and blended with cream and other sauces, but perhaps the classic seaweed dessert is Irish Moss pudding, which is essentially a panna cotta using carrageenan extract (E407), produced as an extract from either *Chondrus crispus* or *Mastocarpus stellatus*, or a mixture of both. These are both common seaweeds found throughout the British Isles where there is sufficient rocky substrate at the mid to lower part of the low tide exposed shore. Carrageen, in fact, is incredibly varied in its morphology, but produces a beautiful iridescence when seen in the water on a sunny day—a good i.d. feature.

There are a large number of recipes online such as this one:
http://www.rte.ie/lifestyle/food/recipes/2013/0722/744323-carrageen-panna-cotta/

Although personally, unlike in this recipe in which the seaweed is cooked with the milk, I prefer to boil the seaweed, extract and concentrate the carrageenan, and then add the milk or cream (there is no chance of the milk or cream splitting if you do it this way.)

Carrageen panna cotta (stream cooled) in the woods, in the Lake District. With wood sorrel, noble fir needle, and rowan berry syrup. It was delicious. The important point here is that you don't need to live by the sea to work with seaweeds. If you take just one trip to a suitable beach during the year, you can collect and dry it there and then, and have enough to play with for months on end, even deep in the woods!

DRINKS

See mention of seaweed wine above—a distinctly acquired taste! Seaweeds can also be cooked and blended into smoothies, or extracts (such as carrageenan mentioned above) used to thicken both sweet and savoury drinks. In fact, concentrated and dried carrageenan can even be used to make edible 'glasses' for drinking out of, but that's another story.

WRAPS/HAGGIS

Perhaps the classic seaweed wrap is the nori sheet used in sushi making. This uses a species of laver seaweed. A few years ago I experimented making my own nori sheets from native laver seaweeds. Here is the result:
http://fergustheforager.co.uk/2013/01/adventures-of-a-wild-food-experimentalist/

What I don't mention in that article is my final 2 conclusions: Firstly, it is simpler just to buy nori sheets (obviously), and secondly, it is far better to just boil up loads of laver (selecting large pieces fresh from the beach), concentrate the liquid to use as stock, and when cool, use the cooked seaweed (now tender and easy to cut through with a sharp knife when it wraps a sushi roll) to wrap the rice.

Laver is also great used fresh to pit cook fish in a shingle, sand or earth oven. You can add in a few wild herbs before cooking, which takes about 20-25 mins (for instance when using averagely sized sea bass fillets on hot pine wood embers). Dogs love this too.

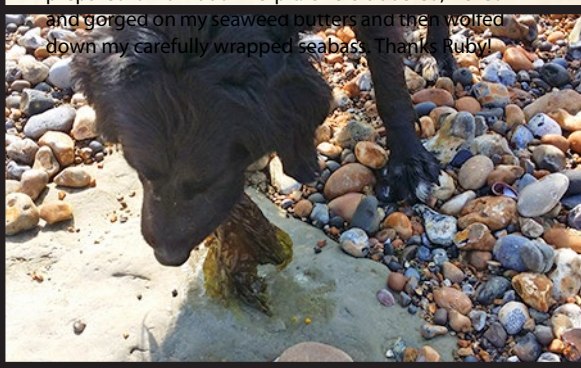
A few years ago after finding some exceptionally large fresh laver sheets, I used them instead of animal stomachs to make a vegetarian haggis. The filling of rice, quinoa, shallow fried and finely chopped vegetables and wild mushrooms were pre-cooked, allowed to cool, formed into large fist-sized balls and wrapped in laver. These were brushed with oil and put back in the oven for 15 minutes.

A picture paints a thousand words and a tragic story: What's happened to this seaweed butter, and why is there no carefully wrapped sea bass on the board?

Sea bass wrapped in raw laver seaweed ready for pit cooking (or could be shallow fried).

DOGS

A forager must, as far as possible, remain aware and conscious of what is going on in the habitats where one is foraging and cooking. A moment's distraction can lead to disaster. It was very funny, but also bloody annoying, that whilst preparing food and photographs for this article, a black Labrador named Ruby came along as I had my back to my carefully prepared drift wood fire pit. She slobbered, licked and gorged on my seaweed butters and then wolfed down my carefully wrapped seabass. Thanks Ruby!



Ruby and the only fish I had, both for dinner and to photograph.

Raw turmeric, onion and garlic salt powder seasoned sea bass about to be wrapped in laver for ember pit cooking.

HOW CAN SEAWEED BE SUSTAINABLY HARVESTED?

California-based forager and wild crafter Rachael Berry expresses some key and well reflected points in regard to sustainable harvesting, that applies as much to seaweeds as land-based plants and fungi.
http://sierrabotanica.com/2015/01/safe-ethical-guidelines-for-wildcrafting/

Common sense rules and respect. Just take a little, don't grub up whole patches of seaweed including the holdfast, be selective, and cut with a knife or scissors, but even if you do choose to be greedy and slap-dash in your harvesting (please don't), it is important to remember that sustainable foraging, in my perhaps naïve opinion, can only benefit all our botanical friend and allies. After all, the greatest threat to all species—including ourselves—is habitat loss occurring both naturally and due to anthropogenic despoliation of the environment. Taking a deep interest in the botanical world and supporting landscapes, whether through direct consumption, painting, identification, or quiet sitting with our botanical friends and allies, will surely lead us, as individuals, to both respect and wish to keep such plants and their habitats heathy and vibrant, for our sakes, for their sakes, and to honour this amazing world we live in.

In 2014 professor Juliet Brodie, Jane Pottas and Jo Wilbraham of the Natural History Museum compiled a draft **Red Data list** for British seaweeds, assessing the threat category for each species. The categories are: **Extinct (EX)** – No known individuals remaining. **Extinct in the wild (EW)** – Known only to survive in captivity, or as a naturalized population outside its historic range. **Critically endangered (CR)** – Extremely high risk of extinction in the wild. **Endangered (EN)** – High risk of extinction in the wild. **Vulnerable (VU)** – High risk of endangerment in the wild. **Near threatened (NT)** – Likely to become endangered in the near future. **Least concern (LC)** – Lowest risk. Does not qualify for a more at-risk category. Widespread and abundant taxa are included in this category. **Data deficient (DD)** – Not enough data to make an assessment of its risk of extinction. **Not evaluated (NE)** – Has not yet been evaluated against the criteria.

It is worth studying, and the comments section is interesting. Fortunately, none of the traditionally eaten seaweeds are vulnerable or near threated across their distribution.

http://www.nhm.ac.uk/resources-rx/files/draft-seaweed-list-132358.pdf

SEAWEED CONSUMPTION: WHAT ARE THE RISKS AND BENEFITS?

The benefits, as indicated above, are in large part based on the incredible range of flavours, textures and colours of the many edible seaweed species and, hence, their diverse and incredibly versatile range of possible food uses. In the human diet they can also provide a vast range of vitamins, minerals, trace elements and other beneficial and health promoting phytochemicals, especially when multiple species are eaten. There are a number of good books, mentioned below, that document the nutrient content of seaweeds.

The risks of eating seaweeds lie in consuming species growing in polluted water, that have not been adequately washed or processed. That in itself is very easy to do, especially in terms of removing or destroying bacteria. The greater unknown is the extent to which a particular seaweed species may have taken up heavy metals, radionuclides, pesticides, and other pollutants, as they are prone to do. Companies that sell seaweed tests for pollutants—if they are responsible companies—for instance, ***Just Seaweed*** provide interesting data for their Scottish gathered species:

https://drive.google.com/file/d/0B2Nbg7VVj5qiQllXZUk1ZkU2eVE/edit

Given these concerns about bioaccumulation, my best advice is to only gather seaweeds from the cleanest of beaches, and certainly not near sewage outflows, areas of heavy industry or by nuclear power stations. Indeed, only species from the cleanest sources can safely be eaten in quantity and over the long term. In less clean areas, once washed, trying a small bit of this and that, probably won't do you any harm, but don't eat lots and on a regular basis from such places.

My hope is that one day we, either individually or through a collective and collaborative endeavour, can make nutritional, bioaccumulation and toxicological data freely available from multiple sites around the UK. If anybody would like to help fund such a project, PLEASE DO GET IN TOUCH. Analysis, unfortunately, doesn't come cheap. Here is a quote I received recently from one laboratory:

The cost of full nutritional analysis including saturated fat and sugars would be £450.

Metals/ minerals would be an additional £80.

The only vitamins we test for are A and E £150.

Pesticide residues are £300.

Moisture, fat, protein and carbohydrate would be £130.

A strong question forcefully arises for me in this context. If we can—as perhaps our ancient ancestors did—develop and evolve (relearn?) a more intuitive approach to our understanding of botanicals, our plant, fungi, and seaweed allies—a huge challenge in itself given the dominant cultural mode of relating to what is generally considered as external nature—could we also learn to intuit whether or not a wild food is safe to eat in terms of it being free-from surface pollutants or toxic accumulation of bioaccumulated substances?

A final point: if you go to a beach and ONLY see gutweed *Ulva intestinalis* as the dominant species to the exclusion of virtually everything else, it probably means there is a sewage out-flow there or very close by (*U. intestinalis* thrives in high nutrient water), which is great for the happy Ulver, but 'high nutrient' can mean, literally, crap. Not so good for you and me! (although read Derrick Jensen's superb 'crap' book, ***What We Leave Behind***).

WHICH BOOKS AND WEBSITES ARE A GOOD SOURCE OF INFORMATION ABOUT SEAWEEDS IN TERMS OF BOTH FOOD, IDENTIFICATION, AND GENERAL INTEREST?

The best thing to do, in my opinion, would be to create your own book. I don't mean like this article, which is so long, it could almost be turned into a book, but rather document your finds in terms of pressing and preserving them. All the photos below (at the end of this article) come from my 'book'—a selection of seaweeds collected and pressed over the years. Not only does this provide a good record of the species to be found on a particular shore or stretch of coastline, they are, quite simply, beautiful to look at. And you will probably learn more about seaweeds in the creation of such a book, than you would studying any other book, as conventionally understood. Having said that, there are some really excellent books available in terms of both seaweed identification and culinary use.

IDENTIFICATION

Seaweeds of Britain and Ireland by ***Francis Bunker*** et al is superb. The authors make identification accessible to the non-specialist by focussing only on species that can be identified by eye or with the aid of a hand lens. I hear rumours of a new edition in the making, including more species...

CULINARY

Prannie Rhatigan's book *The Irish Seaweed Kitchen* is somewhat limited in the number of species used (at least from my somewhat obsessive perspective), but is, nonetheless, a lovely book with great photos and excellent recipes.

Ole. G. Mouritsen's recent book; ***Seaweeds: edible, available, and sustainable*** is really good.

GENERAL INTEREST

Seaweed A User's Guide (1987) by Sonia Surey-Gent and Gordon Morris, although hopeless as an ID guide (in spite of the black and white illustrations), really is an excellent and inspiring book.

WEBSITES

Michael. D. Guiry's excellent and informative website:
http://seaweed.ie/

The British Phycological Society:
http://www.brphycsoc.org/index.lasso

http://www.algaebase.org/search/species/

And last but not least (although some of the links need updating):
http://fergustheforager.co.uk/seaweed/

And, almost, finally...Wild plants, seaweeds and fungi come alive through the tradition of storytelling, and yet the stories we tell today, may become the traditional stories of future times. Let us create our own stories. Here is a site that encourages such endeavours:
http://myths.e2bn.org/mythsandlegends/userstory5247-the-seaweed.html

Finally. The story of *Stone Soup*. Hildenbrand's Red Weed *Hildenbrandia rubra*, is quite a unique and rare gem-like and beautiful rock encrusting seaweed species. One of my favourite folk tales is that of *Stone Soup*:

https://en.wikipedia.org/wiki/Stone_Soup

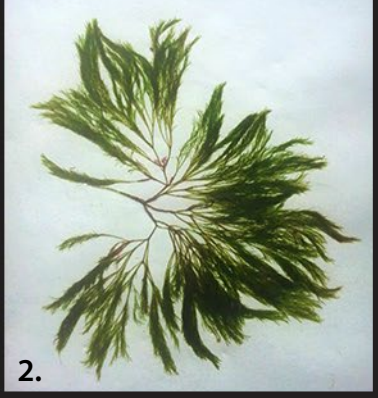
It was after reading this story that, in a creative but absurdly literal fashion, I decided to make stone soup from *H. rubra*. It was great! I mention this because only yesterday I discovered this 'wonderful fact of the day' regarding a fresh water species of Hildenbrandia:

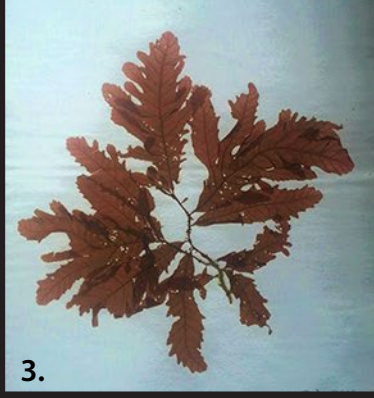
"The presence of Hildenbrandia rivularis near Stonehenge has been put forward as a reason for the site's perceived mystical properties. Flint in pools near the henge takes on a pink hue a couple of hours after being taken out of water due to the presence of the algae. It is assumed that ancient hunter-gatherers would have seen the rocks as having magical properties and would have deemed the site worthy of interest."

https://en.wikipedia.org/wiki/Hildenbrandia

Hildenbrandia rubra encrusting rock like a precious gem. Singing Sands, Ardnamurchan, Scotland.

Help identify seaweeds in for The Marine Conservation Society's ***Big Seaweed Search***.





SOME DRY SEAWEEDS FROM MY PERSONAL COLLECTION

1. Alaria esculenta
2. Cladophora pallucida
3. Phychodrys rubens
4. Calliblepharis ciliata
5. Dilsea carnosa
6. Porphyra umbillicalis
7. Kallymenia teniformis (top) and Scinaia furcellata (bottom)
8. Desmarestia ligulata
9. Sargassum muticum
10. Calliblepharis jubata
(A3 size. Note the colour fading in the middle, where the folded page edge has been more exposed to the light.)

Photo: Fergus Drennan

Absolutely finally, thanks to the following fellow forages who generously provided or offered photos that may or may not have been used in this article: **Mark Williams, Caroline Davey, Vivienne Campbell, Lisa Cutcliffe, Craig Worrall, Emma Gunn, and Nicola Jay Burgess.**

Click names to visit their websites

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By Fergus Drennan
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