

Plastic-free Gardening

A GUIDE TO REDUCING THE PLASTIC
IN YOUR GARDENING LIFE



FIONA THACKERAY

Praise for *Plastic-free Gardening*

'An excellent well-researched reference and the first book on how to reduce the use of plastics in horticulture. The author offers practical solutions to one of today's key environmental challenges for gardeners.'

Ken Cox, author of *Woodland Gardening*, *Garden Plants for Scotland*, *Fruit and Vegetables for Scotland*

'Author Fiona Thackeray's passion and talent for gardening shine through this comprehensive guide to dealing with the problem of plastic in our gardens.'

Claire Wingfield, author of *52 Dates for Writers* and rookie gardener

'Plastic use, recycling and avoidance, simply explained. A sensible and realistic guide to what you can do with a planned, staged approach to minimising the use of plastic in the garden. I want to buy a copy for all my gardening friends.'

Jan Cameron, author of *The Garden Cure*, publication summer 2020, Saraband

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ABOUT THE AUTHOR

Fiona Thackeray is the Head of Operations at Trellis, the therapeutic gardening charity for Scotland. She has worked in therapeutic gardening for 25 years, in the UK and overseas. In 2019 she received the Dr Andrew Duncan Medal for distinguished service to horticulture. She also writes novels and short fiction, for which she has won awards.

Find out more at www.fionathackeray.wordpress.com

ABOUT TRELIS

Trellis supports therapeutic gardening groups, promotes gardening for wellbeing and helps people set up and develop programmes to share the powerful health benefits of gardening in hospitals, care homes, schools, prisons, hospices and community plots.

Find out more at www.trellisscotland.org.uk

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WHY BE A PLASTIC-FREE GARDENER?



When we think of plastic and the problems it causes, we don't often think of gardening. We think of beaches and riverbanks covered in debris and detritus. We think, perhaps, of the mess outside fast-food shops, in supermarket car parks, on pavements and motorway embankments and caught in the branches of trees in the park. I think of the wrapping that comes with me from the supermarket that I never intended to bring home, the little transparent box for a few pears, the surprise wrapping inside a box of tea, and I think of the unwelcome sight of plastic cups laid out beside a water jug when I go to a meeting.

But gardening seems like the kind of virtuous activity that must surely be almost free of plastic. A pure and timeless pursuit, rustic and noble, tending a haven unpolluted by plastic. Horticulture (encompassing the industry, the science and home gardening) has associations of craftsmanship and durability – tools of steel with turned ash handles, greenhouses built from glass and beech or aluminium, pots of terracotta

and buckets made of zinc. That is how gardening seems to many of us who love it – until that is, we take a closer look.

When you next go into a garden, your own or one you're visiting, sweep your eyes over the materials there. From planters to power tools and plant labels, the chances are you'll see plenty of plastic in evidence. Next time you visit the garden centre, do a plastic audit: it's everywhere. Pots, of course, are the most obvious and prolific items, but there are plastic tools, plastic gloves, plastic fencing, cloches and other plastic coverings for crop protection like tunnels and fleece, and don't forget ground-cover membranes, plastic greenhouses, ornaments and watering cans. Even the clothes we gardeners use often contain an awful lot of plastic.

Then there's the stealth plastic: the stuff you don't know you're buying, or that you buy unwittingly – even unwillingly – as part and parcel of something else. You set out to buy some rocket seeds and later when you open the packet, find it doesn't tear with the crisp rip of paper, but bends and stretches in the strange, shape-shifting way that only plastics do. Only then do you understand that the inside of the seed packet has been coated with a thin plastic layer. You pick up some compost, or manure, gravel or bark mulch, and are obliged to take home bags – of non-recyclable film – wrapped around your purchase. And when you buy plants, not only do you buy a plastic pot, but a little plastic name label too, and sometimes a plastic stake, just for good measure, only a few millimetres thick, but plastic, nevertheless, propping up your plant. Even most books contain plastic, though not, you will be glad to read, this one. These plastics, so abundant and various, are causing all sorts of havoc to our environment which we're only now beginning to understand better. It's a

good time to stop and take stock; to develop a more conscious approach to our use of plastics.

In these chapters, we'll consider some of the effects of the plastic in our gardening lives, as well as some new technologies and ideas that promise to help tackle the problem. We'll look at the good things that gardeners and the horticulture trade are already doing to reduce plastic waste and of course there will be lots of ideas about how we gardeners can reduce our reliance on plastic.

At times, the scale of the plastic waste problem can seem overwhelming, too big for mere gardeners to tackle. But we shouldn't underestimate the power that lies in lots of people making one small change. Look at the recent revolutions that have come about through lots of individuals changing a tiny part of their routine. The plastic-bag tax, five pence on a single-use bag, led to millions of us refusing a bag a couple of times a week. The result: six billion bags saved in six months, a momentous 85% reduction. Later, a combination of tirelessly collected evidence and dedicated campaigning by ordinary people and more well-known folk stopped the use of microbeads in cosmetic products in 2018. Similar efforts to encourage whole cities and states to cut the use of plastic bottles and straws are already bearing fruit.

The UK is a nation of garden lovers, with half of all adults participating in some form of gardening, and we spend billions on this pastime every year. The impact, if we all make a small change in how we use plastic in the garden, will be phenomenal. And all the signs suggest that is exactly what's beginning to happen.

THE PROBLEM WITH PLASTIC

Of course, plastic is fantastic. It doesn't leak, it contains and isolates substances that may otherwise be smelly or toxic or stain our clothes, our cars, our skin. It's strong, lightweight and malleable, able to morph into all kinds of shapes, and it's washable, we can clean it very easily. Finally, it has impressive durability, that most double-edged of plastic's qualities. These many desirable properties go some way to explaining why we fell for plastic so hard and find ourselves surrounded by the stuff today.

In the 1967 film, *The Graduate*, Mr McGuire (played by Walter Brooke) says, rather enigmatically, to a young Dustin Hoffman at his 'Homecoming' party, "I want to say one word to you, just one word. Plastics ... There's a great future in plastics." While there may be other threads to this scene, it certainly expresses the feeling of the era that plastics were a modern wonder product offering huge potential. The year after the film's release saw a huge boom for plastic manufacturing for which many people credit McGuire's line. Brooke once told his nephew that he'd have invested in plastics himself, if he'd known the remark might prefigure such success.

Earlier still, in *It's a Wonderful Life*, Sam Wainwright offers James Stewart's George Bailey a bright future in plastics, "... It's gonna make us all rich ... the chance of a lifetime". When George prevaricates rather than grabbing a slice of the action, Sam suggests he's a bit of a loser, saying, "Unless you're still married to that broken-down building and loan. It's the biggest thing since radio and I'm lettin' you in on the ground floor." During WWII, Wainwright does indeed make a fortune manufacturing plastic hoods for aeroplanes.

Plastics have been used for lots of incredible medical innovations like prosthetic limbs, colostomy bags, heart pumps and stents, syringes and the safe containment and disposal of blades and needles. They have been used to improve hygiene, to create inspiring toys for children, safety-enhancing car parts, beautiful art and all manner of lightweight industrial parts. Plastics truly are an innovation that human beings can be proud of. The problem lies, to a large degree, in their after-life, their permanence after we have no more use for them, and their abundance. We've become so addicted to their convenience that we've turned to them to solve our problems in every area of life – and come to rely on them.

Plastics are a class of substances called polymers, whose long-chained molecular structures are created by fusing together substances with short molecular chains, a process called polymerisation. Although there are polymers in nature, e.g. cellulose, the chains of molecules in synthetic polymers are often far longer. It is this molecular chain length that gives polymers the strength and flexibility we prize.

Plastics manufacturing relies heavily on our limited reserves of fossil fuels, both for raw materials and for the energy needed to process them. And where fossil fuels are being consumed, it generally also implies certain amounts of pollution as a by-product. In addition, some plastics leach chemicals – such as Bisphenol A (BPA) – as they degrade, which can have harmful effects on wildlife and possibly human health. Worse, plastics marketed as biodegradable often have some accelerant ingredient added to speed their breaking down process, and that typically means additional polluting emissions concentrated over a shorter time frame.

Researchers from the University of Hawaii found that the

most common plastics release the greenhouse gases methane and ethylene as well as other chemicals harmful to the environment when sunlight exposure begins to degrade them. The amounts are described as 'traces' though they increase the more a plastic degrades, and plastic waste, considered in aggregate, is still a significant enough source of these gases to affect the climate. Plastic bags, as the world's most produced and discarded synthetic polymer, are the biggest source of such gas emissions from plastic. According to Friends of the Earth, producing these 'degradable' plastics with added accelerants does not help, on balance, with promoting sustainable plastic alternatives.

FROM GOOD INTENTIONS

The early plastics were developed in the 1800s, partly to relieve pressure on wildlife and the environment. Traditionally, buttons, handles, billiards balls and many other common objects were made from the shells of turtles and the horns of various animal species. So, developing a man-made substitute for these items would save the unnecessary exploitation of elephants, turtles, deer and other species for their ivory, horn and tortoiseshell. Today, with terrible irony, discarded plastic has become one of the biggest threats to wildlife, causing illness, disability and death for many creatures, and creating apparently intractable problems for our waterways and land habitats.



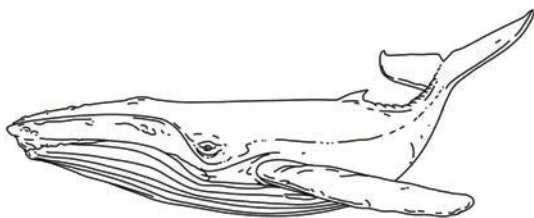
Plastic bags (particularly ‘bunny bags’, the ones whose handles look like rabbit ears) are easily mistaken for jellyfish, favourite food of turtles whose vision is not terribly sharp. The result, for a turtle, of ingesting a plastic bag is a slow death by malnutrition and drowning. A study from the Universities of Exeter and Plymouth, shared online by Sea Shepherd in January 2019 studied 102 sea turtles in three oceans and found every one of them had plastic in their bodies. Plastic rings used to hold beer cans and bottles together in packs of six can also be a plague on wildlife, causing strangulation for birds or trapping body parts in such an impossible position that the animals can’t forage and feed or defend themselves and escape from prey.

In the BBC documentary *Drowning in Plastic*, presented by Liz Bonin (1 Oct 2018), viewers witnessed the tragic spectacle of flesh-footed shearwater chicks on Lord Howe Island with so many fragments of plastic in their stomachs that they were too heavy to lift off into flight. Shearwaters consume more plastic by weight than any other marine bird, and the chicks had 30–40 sharp, coin-sized pieces of plastic in their stomachs, including pieces of caps from drinks cartons and pen

lids. This volume would be equivalent to a human eating ten kilograms of plastic. Apart from preventing them from foraging, these plastics, once lodged in the animals' bodies, are thought to interfere with hormone production and function.

In 2014 on an isolated beach on the northern coastline of Sao Paulo State, Brazil, I found a loggerhead sea turtle being pecked by vultures. Despite bringing the animal to a rescue centre in a nearby town, it died later that night. The cause? Plastic ingestion.

More recently, on 19 November 2018, a sperm whale washed up in Southeast Sulawesi, Indonesia, with a stomach full of plastic waste, nearly six kilograms of it, including 115 plastic cups. Turtles and other marine creatures falling victim to plastic – whether by ingestion or entrapment in fishing lines and nets – are now commonplace events: rescue organisations the world over deal with such cases routinely. The whale hit the headlines perhaps because, being such a big animal, it magnified the scale of the tragedy and so struck us more profoundly.



In reefs of the Asia–Pacific region, corals too are suffering from the plague of marine plastic, and some scientists think that the litter may also be acting as a vector of disease. Assistant Professor Joleah Lamb of the University of California, Irvine, has been studying the spread of a bacteria from the cholera family which she believes is being transmitted between corals in lethal doses by plastic waste. Plastic objects may create a wound on corals when they land, creating a channel for the microbes to enter and set about infecting the host organism. Seagrass meadows may play a role in trapping and disinfecting some of the plastic waste, and research effort will now focus on these crucial ecosystems.

Other unforeseen calamities arising from our plastic habit include the now famous microplastics. These are tiny fragments of plastic products that have begun to degrade but don't fully break down in the environment and instead persist as tiny particles that can be swallowed by animals at all levels of the food chain and so eventually, inevitably, could make it into human food. This is where, if it wasn't a worry already, the situation really begins to hit home for a lot of people. Microplastics, including microfibrils, have been found in the Arctic, in walrus faeces and in plankton, several days' travel from Earth's most northerly human habitations. Nobody, not even the scientists studying microplastics, knows what these tiny remnants might do to the digestive systems and other vital bodily cycles of organisms of every size from microscopic plankton and fish to whales and humans.

Less well known and tinier still are nanoplastics, fragments smaller than a single algal cell. Scientists have begun to look at these more, but they are not so easy to isolate from water or earth samples as microplastics which can be strained out with filters. In theory, nanoplastics could absorb more pollutants

PLANT POTS



When you think of gardening and plastic, what are the first things that come to mind? With me, and with many gardeners, it's pots. Square or round, nine centimetre or five litre, terracotta coloured or (overwhelmingly) black, the little containers we use to sprout our seedlings or carry our new plants home from the garden centre all have one thing in common: they're made from plastic. Even more concerning, they are apparently non-recyclable (or *are* they? More on this later...) which compounds the sense of guilt and wastefulness. But, since it often seems we have little choice but to buy more plastic pots if we want to have plants for our plot, or containers for our bulbs, seeds and cuttings, many gardeners just suck up the guilt or turn a blind eye. Apart from a rueful shake of the head when tossing them into the general waste 'landfill' bin later on, or a vague pledge to reuse them (yes, along with the many hundreds stashed in the shed) we try not to think about our contribution to the plastic waste problem.

Plastic plant pots are often made from different plastics to those used in food packaging and this is given as one reason why so many local authorities are reluctant to take them into kerbside recycling schemes. In some regions another reason is given: soil contamination. Even when pots are made of the same, common plastics as found in food packaging, there seems to be a problem with their black colour – a result of the carbon-pigment they contain. Black plastic doesn't reflect enough light, making it hard for the light-based sensor on the sorting equipment in recycling warehouses to read the symbols indicating plastic type. It can be hard for the human eye to read recycling symbols on black plastic, even on food packaging. Add to that the mix of different plastics that have been used in the past to make pots, and confusing or absent markings on some pots to indicate to consumers whether they can be recycled, and it begins to be clear why they're seen as mostly non-recyclable. Most new black plastic pots are made from recycled post-consumer and industrial waste materials – e.g. from car manufacturing. This extruded polypropylene is a good quality plastic that has high value for reprocessing. But the potential to continue the recycling loop after gardeners have used them is frustrated by the confusion over symbols, acceptability in domestic waste bins and the problem with sensors at sorting facilities.

The statistics for the industry as a whole are sobering: one estimate suggests there are 500 million pots 'in circulation' in the UK each year (*Which* magazine, 2011) – presumably this means on garden centre or nursery shelves or being taken home by customers at any one time. It doesn't take account of the stacks from previous years many of us already have lurking in the back of the shed. Some pioneering garden centre groups have been trying to change this situation by

offering recycling schemes that collect customers' used pots and make new membrane, sheeting or plant pots from them. But these have been relatively small-scale, local operations with limited coordination. Schemes like this also rely on finding a specialist plastics reprocessing company near enough not to incur significant transport costs, and a willingness to dedicate staff time to receiving, sorting and packaging returned pots. It also depends on customers remembering and making the effort to return their pots; only a small percentage will manage this. On top of all these factors, the market value of plastics changes, so what works as a recycling loop one year may not be viable the next as the materials might not be worth enough to justify transport and processing costs.

A small garden centre sells around 40,000 potted plants per year. They rely on wholesale nurseries to provide their stock and have to accept whatever pots it comes in. But there are good reasons why the black plastic pot has become ubiquitous. They are economic, durable, light and cost-effective to transport, as well as being stackable and hygienic. They fit together neatly in trays (mostly) and on shelves and protect plants very well in transit. They also promote root health by absorbing warmth through their walls yet keeping light away from photosensitive roots and letting excess water drain out, directing it down their gently sloping sides through the small holes in the bottom.

Garden centres have no use for old trays and can't return them to suppliers for fear of spreading pests and diseases. Pot manufacturers also tweak the size and shape of their design now and then, leaving growers (domestic and industrial) with pots that won't stack together. It's a similar situation at supermarkets and DIY chains who also sell plants. In view of all

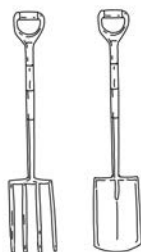
this, tackling the plastic pot status quo looks like a mammoth task.

The National Trust vowed in 2018 to move to biodegradable pots at all its properties within four years. This and similar moves by other larger national plant sellers signifies an important change. The customer feedback antennae of these organisations have been twitching as visitors make their feelings about plastic known. The fact that large bodies with hundreds of outlets and properties that include thousands of acres of gardens have made the pledge to move away from plastic sets an example. This will undoubtedly send ripple effects through the market and reflects a changing public mood.

WHAT TO DO WITH YOUR POT STASH?

First, to address the little (or huge) stack of plastic pots you already have. Those you no longer need, or which are damaged can be taken to your local recycling site and added to the plastics recycling bay. This way there is a better chance they can be recycled than if they were put into kerbside bins. It's not every council recycling facility that has a plastics recycling bay, however, as I discovered recently. Pots surplus to requirements at the Trellis Potting Shed must be put in the Non-Recyclable Waste skip as the council currently offers no way to recycle them. There is clearly work to be done to make local authority recycling programmes more comprehensive and standardised. It's worth asking your council if you can put plant pots into the kerbside plastics collecting bins and remember this may change over time. If you find your area doesn't offer pot recycling through any channels, perhaps your local garden centre might operate a pot return/recycling

TOOLS AND EQUIPMENT



Many gardeners have a special affection for old, time-served things; articles that are handed down and treasured from another age or found and reused. They particularly love glass and wood, things forged from iron or steel, preferring materials not too far removed from their natural state over plastics. After all, working among natural things is what gardening is all about, right? A generalisation perhaps, but that was how I liked to see things – that is until I took a long, steely look inside my tool shed. Indeed, there were lots of things that were very, very old and had been inherited or bought second

hand, possibly third or fourth hand, and stood the test of time because they were solid and well made.

My turf cutter, for instance, has a beautiful angled neck leading to a long wooden shaft and a deep, D-shaped handle carved with an unknown gardener's initials. If you're anything like me, there will be many other such ancient tools in your shed, things of great beauty, the handles carved with the initials of long ago owners, reminding you of your place in a line of gardeners whose hands and years of labour polished the wood and burnished the metal. Sitting alongside all the old and beautiful things, however, are plenty of things made of plastic. They slip into the tool shed, into your shopping basket without you really noticing. You go out in search of a lightweight trowel and it turns out that the only model on offer that's any lighter than the wood and metal ones is plastic. The same Hobson's choice situation arises when you're in the market for a lighter watering can. I really shouldn't make excuses for the many plastic items in my shed; suffice to say the report card summary reads, 'Could do better'.



Spades, Forks and Rakes

These tools are mostly made from wood (often ash) and metal, perhaps carbon steel, although sometimes coated with Epoxy resin – that’s right, a plastic. When the basic model is adapted for comfort or convenience or to reduce its weight, that’s often when plastics are added. Some tools will have foam trim added to the handle to make it soft and more comfortable. There are spades with a circular handle designed to allow them to be gripped from different angles. The handle is made from plastic.

Chillington Tools is an interesting company to explore, selling ‘traditional tools’ with a wide range. The handy thing is you can buy handles and tool heads separately, so if you want to replace the head of a favourite spade or rake, but keep the very comfortable handle, they can help. They also sell extra-long wooden handles which are often a great investment as many tools are sold with a too-short handle: a sure-fire way to end a day in the garden with a very sore back.

Finnish company Fiskars make a lightweight range of tools, called the ‘Light’ range in white or black painted aluminium with steel. They are very nice to use and don’t seem to involve much or any plastic in their construction. Some of their other tool ranges, however, do have plastic and fibre-glass in their handles.

Spear and Jackson also offer spades, forks and rakes with stainless steel heads on hardwood handles. But they sell tools with plastic handles too, which seems to be true of many of the main tool suppliers. Online shopping does let you explore the construction materials used in different tool ranges before you buy. Nothing beats going to the garden centre though, to

heft a spade in your hands and see first-hand what it's made of.

One other idea is to investigate tool libraries in your area. The option of being able to borrow the tool you need from a central collection organised by a group in your community would certainly help reduce the plastic you use. Not every town has a tool library and you may need to use most tools more frequently than practicable for a communal borrowing programme, but it could be an interesting option for scythes, say, or lesser-used tools.

Small Hand Tools

In this category you are likely to find tools made wholly or partially from plastic, especially when seeking lightweight models. There's not really any reason to buy a dibber made of plastic, when the turned-wood, metal or bamboo models are easy to find, cheap, and possibly lighter. But for customers searching for a light, cheap hand fork or trowel, often plastic models seem to fit the bill best. I have it on good authority from a gardener with arthritis in her hands that with small hand tools, excepting badly designed, very heavy tools, the weight is not so much of a consideration when balanced against cutting power and design. If a tool is well shaped, sharp and efficient, that often matters more than how lightweight it is. Indeed, plastic trowels and forks are often too rounded and blunt to be effective, which can cancel out any advantages claimed for their lightweight construction.



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