

Spinning out of control

Microscopic plastic particles from our laundry are threatening the planet's rivers, oceans, wildlife – and ultimately, us

There's a segment in Leonardo DiCaprio's 2007 climate change documentary, *11th Hour*, which still resonates loudly 11 years later. The Hollywood actor, known for his strong environmental stance, describes how during times of war – times of real emergency – industries can turn on a dime.

When the US made the decision to join World War Two in 1941, a mass production of goods was required to help the alliance's effort. Within a matter of weeks, factories switched from making consumer wares to producing fighter plane parts, guns and ammunitions.

The global crisis sparked the political will to make necessary, radical change. There was little time for debate; for having meetings; for voting on reform or theorising. The call was made and what needed to happen... happened.

Fast-forward 77 years and many would argue that the world is again facing a global catastrophe – but this time, all life on Earth is at risk. And, it seems, none of the world leaders is making that call. Having meetings, theorising, debating, no doubt having some very long lunches. But reacting with urgency to fight one of the biggest threats of modern times – not so much.

The threat? Plastic. The devastating effect it is having on the planet's oceans, marine life and people's health is now well reported. Moves are being made to stem the tide with bottle return schemes, banning of single-use plastics and water dispensers popping up in cities around the globe. But go on almost any aeroplane journey and you'll be buried in single-use plastic wrappers, cups, cutlery, bags and containers – bombarded by 'disposable' stuff, which will never, ever, degrade. It's clear that humans are in a crawl, rather than a race, to a plastic-free future, and while the world dreads its collective (plastic, of course) heels on the

issue, scientists are discovering that another menacing plastic-derived pollutant is insidiously infiltrating the world's oceans.

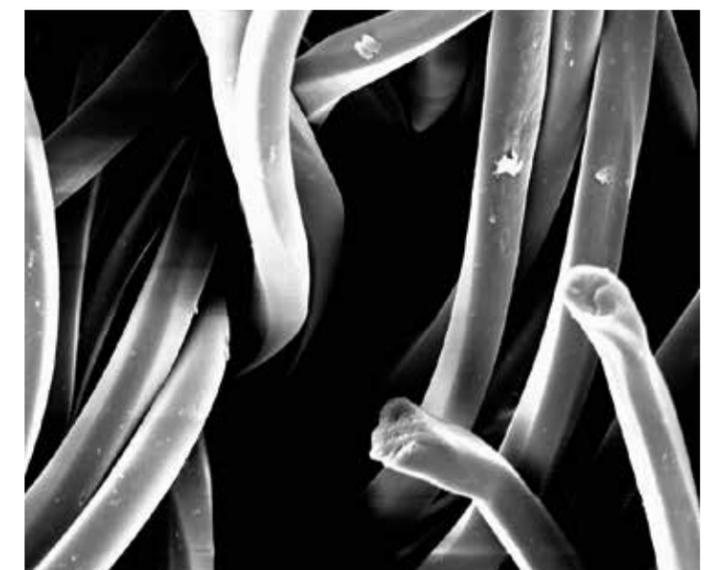
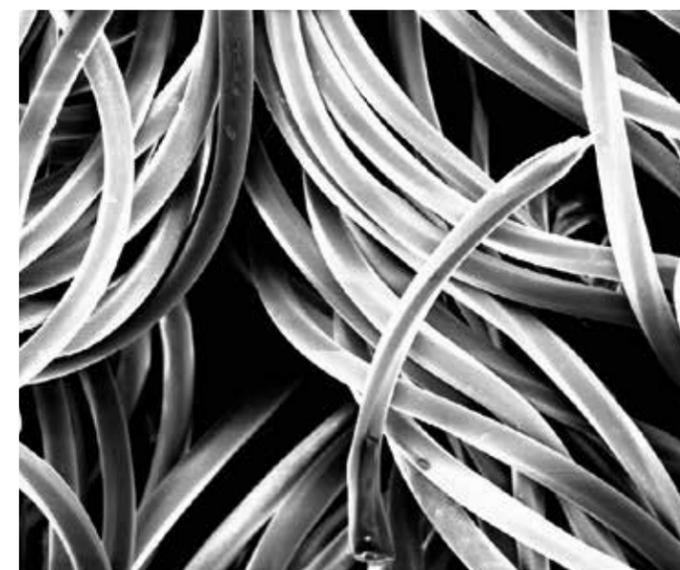
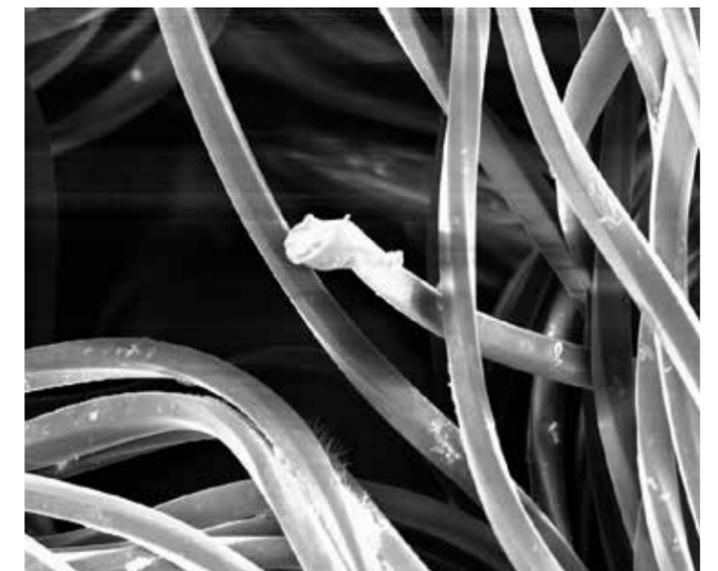
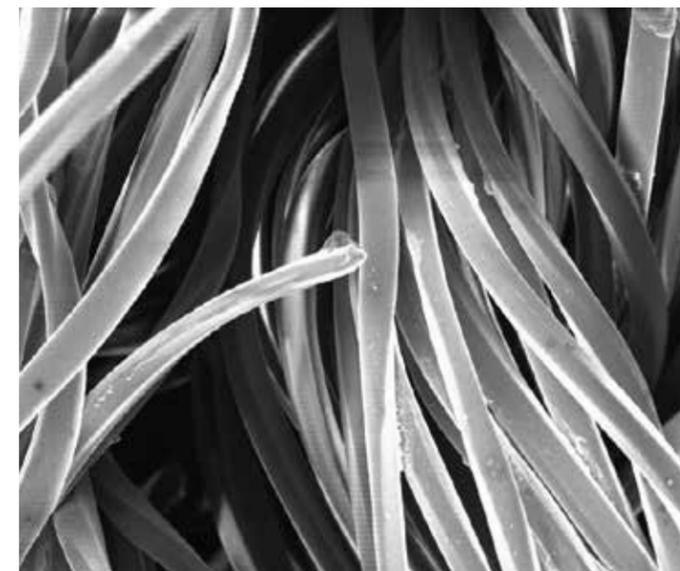
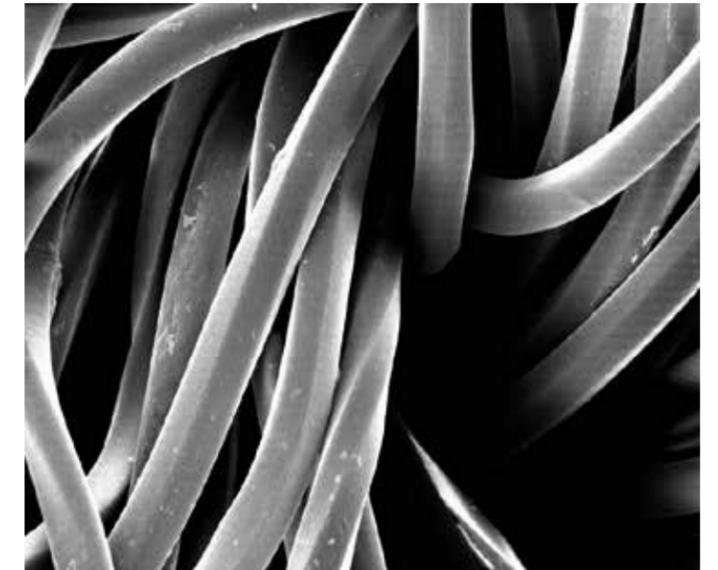
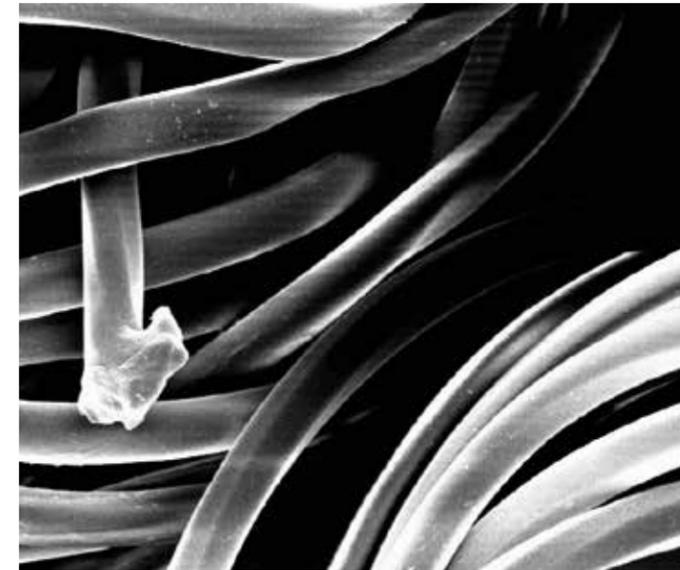
HIDDEN TRUTH

Most people wear synthetic fabrics like polyester, nylon or Lycra in some form every day. Dresses, trousers, yoga pants, fleeces and underwear are all increasingly made of synthetic materials containing polymers. But these man-made fabrics, from which over 60 per cent of all the world's clothing is derived, have a shocking surprise up their sleeve: when they're washed, they release tiny plastic particles – called microfibrils – that flow with the waste water down the drain, through water-treatment plants and out into rivers, lakes and oceans by the billions.

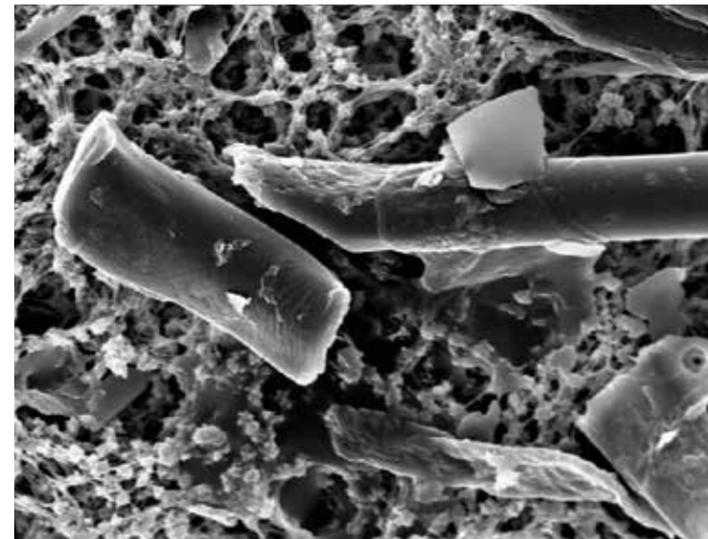
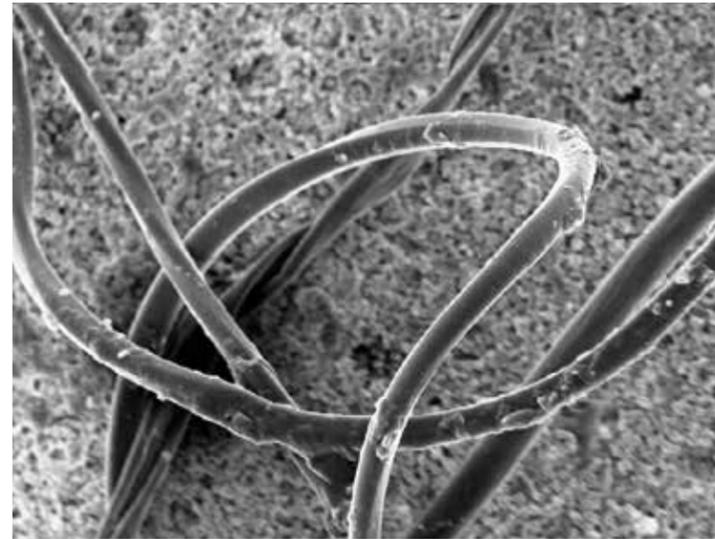
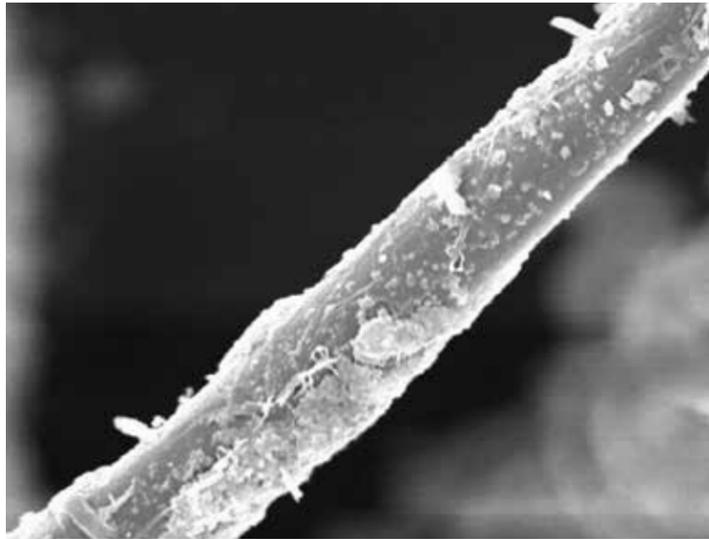
'Different types of fabrics can have very different levels of emissions,' says Richard Thompson, professor of marine biology at Plymouth University, whose team conducted a 12-month investigation into what happens when synthetic materials are washed in a machine.

Using different combinations of water temperature and detergents, they found that acrylic shed the most synthetic particles, releasing a staggering 730,000 microfibrils per wash, five times more than polyester-cotton blend fabric, and nearly 1.5 times as many as polyester.

'We need to understand why some types of fabric are releasing far more fibres than others,' says Richard, 'and what other factors, such as spin speeds and wash duration, affect emissions. Industry needs to think about the design of fabrics to ensure their environmental emissions are minimised.' They need to understand and act fast.



‘There are coalitions around the world working on how to tackle the issue, but their deadlines are far away and they put the responsibility on consumers’



Too small to be captured by standard washing-machine filters, the particles track through domestic waste water into sewage treatment plants where, again, the majority slip through the filtration process and find their way into rivers, lakes and oceans. There, they gather other pollutants to them, becoming tiny toxic time bombs, ingested by molluscs and other marine life, entering the food chain and winding up in people.

TIME TO ACT

While much more research needs to be done, scientists have already proven the problem to be widespread.

‘Clothing fibres are the most abundant form of waste material that we find in habitats worldwide, and the problem is worsening,’ says Dr Mark Anthony Browne, a senior research associate with the School of Biological Earth and Environmental Sciences at the University of New South Wales, Australia.

In his groundbreaking paper published in 2011, Dr Browne revealed that microfibres made up 85 per cent of human-made debris on shorelines around the world. ‘In estuarine habitats, the quantity of microplastics can be nearly twice that of larger plastic debris, yet it is a contaminant that has been largely ignored.’

Unlike the plastic bag that can be photographed enticing a turtle that mistakenly thinks it’s eating a jellyfish, or the deadly discarded fishing gear seen ensnaring a seal, the danger lurking in laundry is invisible: and until now it has largely been a case of ‘out of sight, out of mind’.

‘We’ve known about this problem for seven years and yet the clothing industry hasn’t done anything to mitigate the damage their products are doing,’ says Stiv J Wilson, who works with community-minded environmental project, The Story of Stuff.

‘They are passing the responsibility on to consumers and washing-machine manufacturers, but from an enforcement standpoint, it would be extremely impractical to filter washing-machine effluent – there are more than 100 million machines in the US alone.’

Douglas Herbison, Chief Executive at AMDEA (the Association of Manufacturers of Domestic Appliances), agrees that a ‘quick-fix’ is unlikely to come in the form of a washing-machine filter.

‘Plastic microfibre contamination is an issue that deeply concerns our industry. However, even if we were able to determine the micro- or nano-size of the particles and include filters in all washing machines, consumers would still have to empty these filters. The public would then have to be provided with, and persuaded to use, an

environmentally sound means of separately recycling this waste stream. Otherwise the contents will end up in the residual waste and landfill, compounding the problem.’

LOOKING FOR SOLUTIONS

Yet surely with an accompanying widespread awareness campaign, the correct collection and disposal services in place and government backing and guidance, even forgetful, lazy consumers could learn what to do with washing-machine-filtered microfibre waste – just as recycling and composting has become second nature in so many homes?

German washing-machine manufacturer, Miele, is one of the companies that’s been exploring the viability of filtering out the pollutants during the wash cycle but, it says, it could take some time to find an effective solution.

‘Our product developers have addressed the subject of microplastics at great length,’ explains a Miele spokesperson. ‘They found that plastic particulate matter from clothing is far too small to be mechanically filtered out, so a chemical method of removing these particles from discharged water must be developed. Removing plastic nanoparticles from water would present an enormous challenge to our product engineers, and any

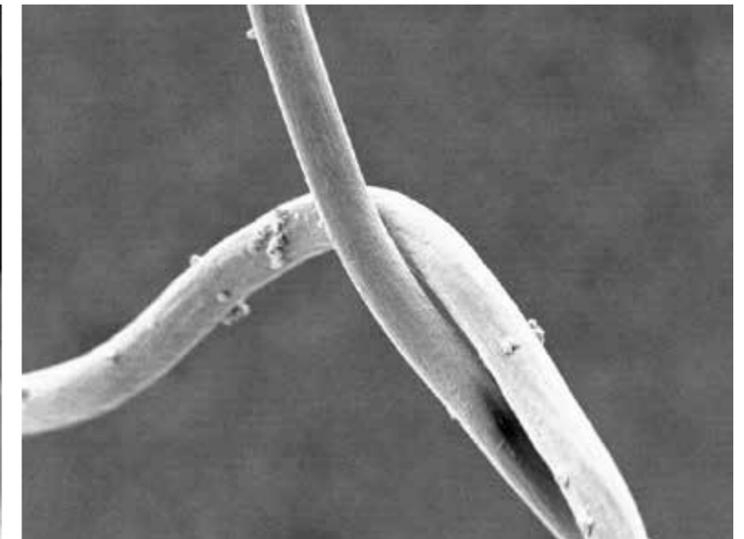
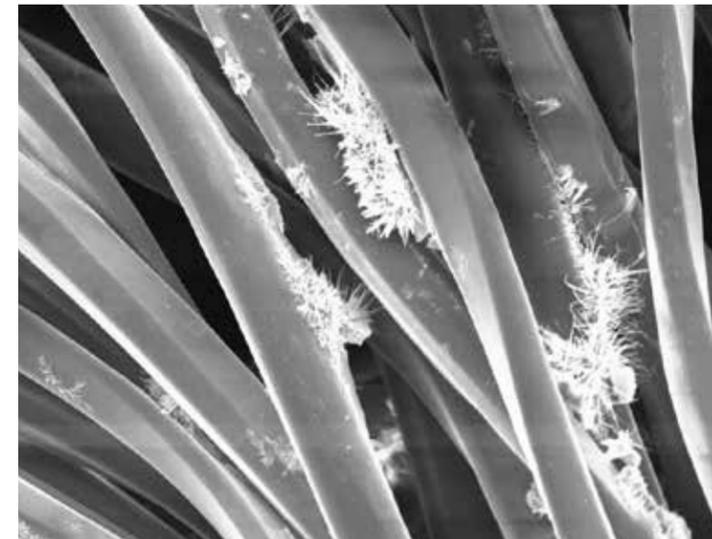
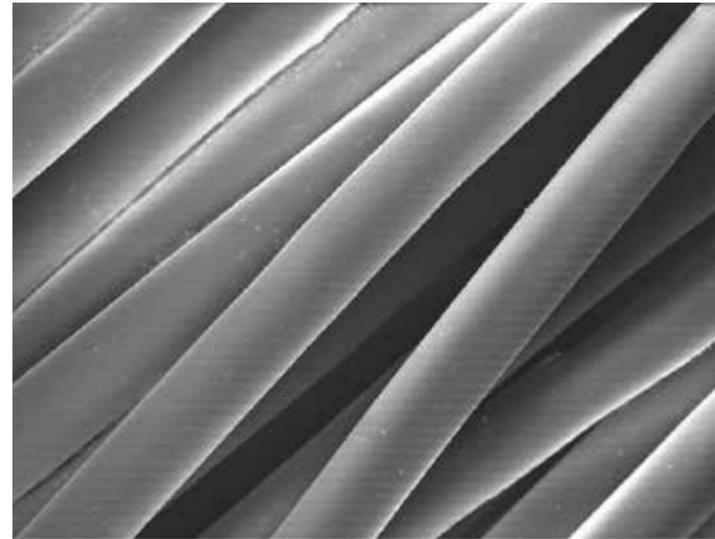
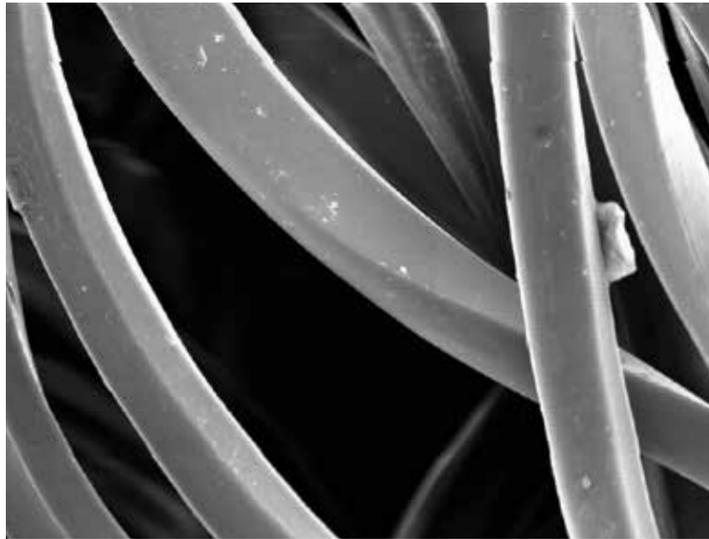
implementation would have far-reaching consequences on cycle times, wash performance and consumption. Given the current technical situation, a solution is unfortunately unlikely to be forthcoming in the foreseeable future.’

On a more positive note, the company is one of nine partner organisations involved in a multi-disciplinary initiative, funded by the Federal Ministry of Education and Research, to look at ‘Plastic in the environment – sources, reduction and possible solutions’. Working with sports clothing brand Adidas, two universities, WWF Germany and the National Association of the German Sporting Goods Industry, TextileMission aims to develop biodegradable, environmentally friendly textiles and clothing that shed significantly fewer micro-particles than those currently on the market, and gather data on washing and waste water treatment processes.

Acknowledging a shared responsibility for the problem and collaborating on finding a solution will hopefully yield a much-needed breakthrough.

In the US, the governments of California and Connecticut have recently passed bills forcing clothing manufacturers to include warning labels on any plastic-polluting synthetic apparel, and the Sustainable Apparel Coalition (apparelcoalition.org) has launched the Higg Index – a suite of tools that enables brands, retailers and

‘An alarming study found that up to 40 per cent of microfibres enter rivers, lakes and oceans after passing through treatment plants’



other organisations to measure and score a company or product’s sustainability performance.

Meanwhile, the Plastic Soup Foundation, which campaigns against plastic waste in water, has launched Ocean Clean Wash, bringing together a steering group of scientists, industry organisations and fashion brands to look for solutions to the microfibre problem.

‘There are coalitions around the world working on how to tackle the issue, but their deadlines are far away and put the responsibility on the consumers,’ says Laura Díaz Sánchez, project coordinator and campaigner for the Plastic Soup Foundation. ‘Solutions need to be developed in the short-term while long-term actions are put in place. We’re not aware of any fabrics being developed that shed no fibres at all, but there’s a pectin coating that can reduce shedding by 80 per cent. What we need is funding into further research and development.’

The European Outdoor Group (EOG), an association for more than 100 brands, retail and technology members working in the outdoor industry, is also involved in positive initiatives to reduce microfibre pollution.

High-profile retailers including IKEA, North Face, Marks & Spencer, Next and Berghaus are members of its Microfibre Consortium, which is helping to build knowledge and find solutions.

But, as EOG’s sustainability project manager Katy Stevens explains, it’s not as simple as ditching synthetics and reverting to natural materials. ‘Microfibre (as opposed to microplastic) release is a problem from both synthetic and natural clothing, and some preliminary research in the area even shows that natural fibres will shed more, as they’re shorter than synthetic fibres. Natural materials are also often subjected to more processing chemicals, so they could be as problematic, but for different reasons.’

Unsurprisingly, EOG also urges consumers not to heap the blame for the microfibre crisis squarely on the fleece- and Gore-tex-covered shoulders of the clothing industry.

‘We still don’t conclusively know the contribution of microfibre pollution from laundry (and the consumer-use phase in general), compared to other air/water emissions during the rest of the production cycle, and shedding from non-apparel items such as carpets, car interiors and geo textiles,’ says Katy.

THE FULL TREATMENT

A 2017 study carried out by the Danish Environmental Protection Agency points to treated waste water effluent being a small (three per cent) contributor to plastic pollution, with polyamide/nylon to be the most abundant

plastic material in the waste water samples studied, likely originating from textiles, clothing and carpets. Its work suggests there are bigger plastic polluters at play, such as storm water run-off, combined sewer overflows and atmospheric deposition, but it seems differing treatment technologies and local consumer and washing habits could be affecting results.

A report by researchers at the University of California at Santa Barbara, funded by outdoor-clothing manufacturer Patagonia, found that up to 40 per cent of microfibres enter rivers, lakes and oceans after passing through treatment plants. Another study found that human-made debris found in fish in Indonesia was mainly plastic, while in the US, it was mainly microfibres: unsurprising, when you consider the prevalence of washing machines and high-performance, synthetic fabrics in the US compared with Indonesia.

As clothing brands and domestic appliance manufacturers work towards effective solutions, the final link in the microfibre chain – the waste water treatment plant – is also coming under pressure to reduce emissions.

‘Treatment facilities aren’t currently equipped to capture these tiny particles,’ says Dr Geoff Brighty, technical director for the Plastic Oceans Foundation, which campaigns against plastic pollution and produced the first feature length film on the topic – *A Plastic Ocean*.

‘Water companies are developing analytical techniques and beginning to run sampling programmes now, but improvements in fibre capture are unlikely to come into play until 2020-25.’

Meanwhile, billions more fibres will be entering the waterways and finding their way into the food chain. ‘Progress does seem slow, but it’s a complex problem and effective solutions won’t come overnight.’

Working with the Norfolk Rivers Trust (norfolkriverstrust.org), Geoff is pioneering an innovative method of removing lingering toxins from treated water, establishing integrated wetlands or ‘aquatic gardens’ which naturally remove polluting phosphates, nitrates and ammonia. Current studies suggest they could be effective in capturing microfibres, too.

‘Most countries are now aware of the issues and taking action,’ says Geoff. ‘We’ve banned polluting microbeads and legislation is coming in to limit single-use plastics. I’m confident we will solve the microfibre problem, but by jumping too fast to find a “solution”, humans can sometimes do the wrong thing. Our dependency on plastics is proof of that.’

The 11th Hour is almost up. Let’s hope that the planet has time left to wait.

CONSUMER POWER: MAKE YOUR VOICE HEARD

Three key sectors need to work together to find solutions for the world's microfibre crisis. Consumers hold great power and can elicit great change, so take time to contact some of the organisations involved in the areas below, and ask what they are doing about microfibres

CLOTHING MANUFACTURERS

The manufacturing companies that make people's clothes need to use man-made or natural materials that won't shed environmentally polluting microfibres, and employ fewer harmful chemicals during the production process.

Take action: Write to a handful of your favourite clothing brands or shops and ask what plans they have in place to reduce their microfibre contribution and use of toxic chemicals during the production process.

WASHING MACHINE MANUFACTURERS

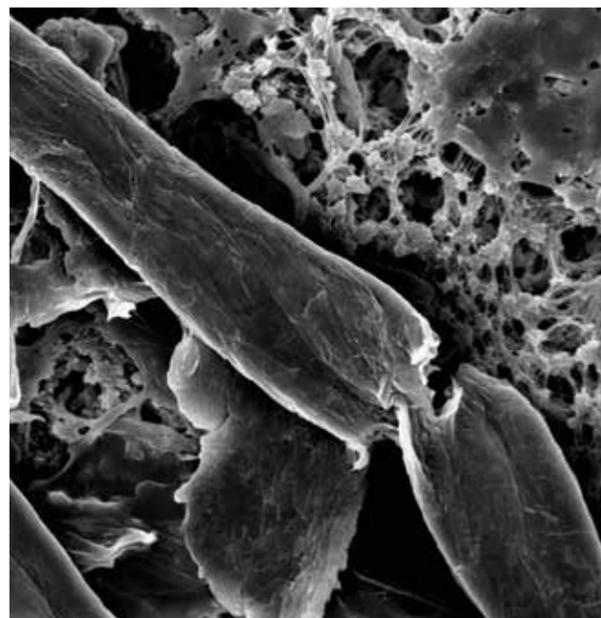
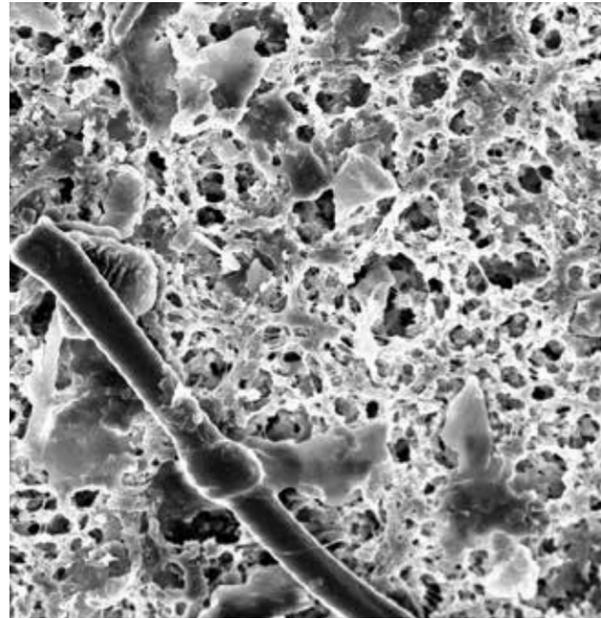
Some brands are already looking into the viability of installing filters that could capture more microfibres with each laundry cycle. Others are looking at potential chemical solutions, but progress appears to be slow.

Take action: Contact the manufacturer of your own washing machine to see what it is doing to reduce microfibre release during the wash cycle. Let it know your next purchase will take its environmental credentials into account.

GOVERNMENT

At the moment, only Australia categorises the polymers used to make synthetic clothes (and other products) as environmental pollutants, so most manufacturers are free to produce materials that are known to shed plastic-derived microfibres. Other governments urgently need to address this and to fund research into waste water-treatment processes, to ensure microfibres are kept out of water systems.

Take action: Write to your local MP expressing your concerns and ask them to raise the issue of microfibres in Parliament. Ask for stricter manufacturing laws and funding for research into waste water treatment.



10 WAYS TO CLEAN UP YOUR LAUNDRY

While there's currently no 'silver bullet' for stopping the microfibre menace, there are things you can do at home to ensure fewer fibres are entering the water system

BUY FEWER, HIGHER QUALITY, NATURAL PIECES OF CLOTHING

At the moment there is no evidence that natural materials shed less than synthetic ones, but fibres from natural fabrics such as cotton, bamboo or hemp are more degradable, so they have less environmental impact (when not heavily chemically treated).

USE THE WASHING MACHINE LESS OFTEN

Washing a full load of laundry each time means there is less friction between clothes, so fewer fibres are released into the drum during the wash cycle.

SWITCH TO WASHING LIQUID INSTEAD OF POWDER

The 'scrub' function of the powder grains loosens clothing fibres more than liquid detergent.

USE A FABRIC SOFTENER

Some ingredients in fabric softeners reduce friction between fibres, so the release decreases.

WASH AT A LOW TEMPERATURE

Washing clothes at a high temperature can damage some fabrics, leading to an increase in fibres being released.

AVOID LONG WASH CYCLES

Long periods of washing causes more friction between fabrics, which leads to more tearing of the fibres.

DRY SPIN CLOTHES AT LOW REVS

Higher revolutions increase the friction between the clothes, so fibres are more likely to be released.

INVEST IN A CORA BALL

Pop one in your washing machine and this innovative new capture ball, developed by the Rozalia Project in the US, will reduce the number of microfibres in the waste water heading down your drain. coraball.com

GET A GUPPY FRIEND

Try washing your clothes inside this simple mesh bag from Berlin outdoor brand, Langbrett. It is placed inside the washing machine, capturing many of the microfibres released during the wash cycle. guppyfriend.com

CLEAN UP YOUR KITCHEN, TOO

Washing-up cloths and scouring pads can be a source of microfibres too, so try to opt for natural products whenever you can.

FOR MORE INFORMATION Discover tips for reducing microfibres in the Mermaid's Good Practice Guide, produced by The Plastic Soup Foundation. life-mermaids.eu; plasticsoupfoundation.org

Find out more about microfibres in the ocean at Plastic Oceans UK, plasticoceans.uk and Story of Stuff, storyofstuff.org