

# Bulletin Board

## Contents

JUN. 19, 2020

(click on page numbers for links)

### REGULATORY UPDATE

#### ASIA PACIFIC

'Snake oil salesmen': COVID-19 claims under microscope as disinfectants boom.....	4
Taiwan releases guidance for priority existing chemical substances registration .....	6
Amazon hiring spree bolsters its workplace safety team .....	6
Consultation delays US .....	9
Intense PFAS lobbying pits greens against water utilities.....	10

#### AMERICA

US EPA.....	12
-------------	----

#### EUROPE

Chemical recycling Europe calls for legislation to improve circular economy plastics in EU .....	13
UK reach complicates UK-related base oil trade .....	14
Swedish Chemicals Agency (Kemi) .....	16
Danish EPA.....	16

### REACH UPDATE

RAC backs restricting intentional uses of microplastics.....	18
Alternatives to animal testing continue to be widely used .....	19

### JANET'S CORNER

Pool Party .....	22
------------------	----

### HAZARD ALERT

Cadmium.....	23
--------------	----

### GOSSIP

Sixth mass extinctions of wildlife accelerating, scientists warn .....	26
Sugar breaks down neural circuits that may cause us to overeat.....	28
Normal is the problem.....	29

## CONTACT US

subscribers@chemwatch.  
net  
tel +61 3 9572 4700  
fax +61 3 9572 4777

1227 Glen Huntly Rd  
Glen Huntly  
Victoria 3163 Australia

**\* While Chemwatch has taken all efforts to ensure the accuracy of information in this publication, it is not intended to be comprehensive or to render advice. Websites rendered are subject to change.**

## Bulletin Board

## Contents

JUN. 19, 2020

Brazil's native bees are vital for agriculture, but are being killed by it.....	33
Renewable energy stimulus can create three times as many Australian jobs as fossil fuels.....	37
Chronic Lyme disease: how one tick bite can ruin your health for ever.....	39
Scientists say they have found the cleanest air on Earth.....	45
Apollo Bay distillery recalls gin bottles that are actually filled with hand sanitiser .....	47
In the Chesapeake Bay, saving seagrasses can fight ocean acidification....	48
Room-temperature superconductors could revolutionize the world's energy .....	52

## CURIOSITIES

Climate change creates camouflage confusion in winter-adapted wildlife .....	56
Around the world, indigenous seed banks are helping to preserve culture, boost nutrition and protect the environment.....	61
Scientists agree on the need to protect 30% of the seas. But which 30%..	65
Are synthetic chemicals <i>really</i> bad for you?.....	68
Swamp threats rising from the grave.....	69
Tests for Coronavirus vaccine need this ingredient: Horseshoe crabs.....	72
Scientists are trying to save coral reefs. Here's what's working .....	74
Will air-conditioning help spread the Coronavirus? .....	78
Insect wings evolved from legs, mayfly genome suggests.....	81
Milkweed, only food source for monarch butterflies, ubiquitously contaminated .....	83

## TECHNICAL NOTES

(Note: Open your Web Browser and click on Heading to link to section) ...	86
CHEMICAL EFFECTS .....	86
ENVIRONMENTAL RESEARCH .....	86
PHARMACEUTICAL/TOXICOLOGY .....	86
OCCUPATIONAL.....	86

## Bulletin Board

## Contents

JUN. 19, 2020

# Bulletin Board

## Regulatory Update

JUN. 19, 2020

### ASIA PACIFIC

#### 'Snake oil salesmen': COVID-19 claims under microscope as disinfectants boom

2020-06-10

The Therapeutic Goods Administration says it will take swift action against companies that have not registered with the watchdog before claiming their disinfectant products work against COVID-19 amid a sharp increase in advertising complaints related to the pandemic.

"If a therapeutic good is not entered in the Australian Register of Therapeutic Goods (ARTG), the TGA cannot vouch for the safety, quality or efficacy of that product," a TGA spokesperson said.

Since the advertising of unregistered therapeutic goods was prohibited, the watchdog wouldn't have to look into whether they were effective or not in the fight against coronavirus to take compliance action against manufacturers, she explained.

Disinfecting of public spaces has become a "common sight since the pandemic hit.

The TGA has sped up processing times for therapeutic goods related to the virus, but all items including surface disinfectant still have to meet hurdles in order to be registered.

The watchdog issued its warning after receiving a rising number of complaints about disinfectants and products claiming to be disinfecting surfaces that hadn't been registered.

"The COVID-19 pandemic has led to a sharp increase in the number of advertising complaints received by the TGA," the spokeswoman said. "Consistent with our advertising complaints handling policy, the TGA is prioritising cases which have the highest risk of public harm and is taking strong action where necessary."

#### Fines or court proceedings

There are currently 25 disinfectant products registered in Australia that are allowed to make specific claims about their use against COVID-19.

Multinational giants including Clorox and Reckitt Benckiser are among the brands that have successfully registered products for legal supply in Australia.

# Bulletin Board

## Regulatory Update

JUN. 19, 2020

To be able to claim that a product can help curb the spread of COVID-19, the TGA accepts evidence that it works against surrogates of the virus, including Human Coronavirus 229E and Murine Hepatitis Virus.

For brands that aren't registered and still make these claims, the administration has the power to correct advertising, issue fines or take companies to civil or criminal court.

"The TGA reminds advertisers to be very careful when considering making therapeutic claims about SARS-CoV-2, COVID-19 and other related claims," a spokesperson said.

The scrutiny comes as operators prepare for a long-term boom in demand for surface disinfectant as societies reopen in the aftermath of the pandemic outbreak.

ASX-listed Zoono is one of the brands with ARTG registration for its hospital-grade product. Chief executive Paul Hyslop said the company is eyeing global opportunities for its products and is already selling surface sanitiser to the London Underground and German train systems.

"The public now are demanding companies have hygiene protection within their facilities," he said, echoing recent predictions by biotech firms that there will be long-term demand for surface cleaning and testing for coronavirus.

There will be all sorts of snake oil salesmen out there, and I'm sure there are now.

Mr Hyslop said he was concerned about competition from companies making claims about the virus without having those claims tested by authorities.

"There will be all sorts of snake oil salesmen out there, and I'm sure there are now," he said.

The World Health Organisation has advised that surface disinfectant is important for reducing the spread of the virus at home and in the workplace. The WHO advises surface disinfectant should not be sprayed onto surfaces in indoor spaces but instead applied via a cloth or wipe.

The organisation has also said large-scale spraying or fumigation of open air public spaces is not recommended as streets and sidewalks are not considered routes of infection for the virus. Widespread use of sprays in

# Bulletin Board

## Regulatory Update

JUN. 19, 2020

public spaces can cause respiratory symptoms or skin damage, the WHO warns.

The Age, 10 June 2020

<https://www.theage.com.au/business/small-business/snake-oil-salesmen-covid-19-claims-under-microscope-as-disinfectants-boom-20200610-p5514p.html>

22 October 2019

### Taiwan releases guidance for priority existing chemical substances registration

2020-06-09

The standard registration for 106 priority existing chemical substances (PECs) at or above one tonne a year began on January 1, 2020.

The long-awaited Guidance was finally published on June 9 to help businesses to navigate the standard registration of PECs.

Taiwan encourages use of data acquired from public databases and allows registrants to submit the hazard and exposure assessment report later.

The authority is assessing the possibility to postpone the registration deadline for the 106 PECs.

On June 9, 2020, Taiwan finalized the Guidance on Existing Chemical Substances Standard Registration. It was initially drafted in March and updated in September 2019.

ChemLinked, 9 June 2020

<https://chemical.chemlinked.com/news/chemical-news/taiwan-releases-guidance-for-priority-existing-chemical-substances-registration>

### Amazon hiring spree bolsters its workplace safety team

2020-06-12

The world's biggest retailer is boosting its cadre of in-house counsels and advisers with experience in workplace safety and labor and employment litigation, as the company continues to face litigation over alleged unsafe work conditions.

Tressi Cordaro, a Jackson Lewis principal and head of the firm's Workplace Safety and Health Practice Group in Washington, D.C., is the latest to join

# Bulletin Board

## Regulatory Update

JUN. 19, 2020

Amazon.com's team. Cordaro will join Amazon's Worldwide Operations, Workplace Health and Safety, on June 29 as the director of compliance, an Amazon representative confirmed to Bloomberg Law.

Cordaro's move to Amazon is just the latest in a spree of executive hiring by the technology company this year. Carla Gunnin, another former Jackson Lewis attorney who was co-chair of the firm's Workplace Safety and Health Group, joined Amazon as the company's director of governance and external affairs in January.

Amazon's Workplace Health and Safety team hired 20 new staffers this year, including directors and senior managers, Amazon's spokeswoman said.

The new roles were approved in December 2019 before the pandemic hit and were a part of Amazon's Fiscal Year 2020 operations planning. The hires are part of the vision conceptualized by former head of the Occupational Safety and Health Review Commission, Heather MacDougall, who joined the company as vice president of worldwide health and safety last April. MacDougall is aiming to "synthesize leading health and safety expertise with Amazon's tech capability and innovation to create new industry benchmarks for health and safety," the spokeswoman said.

These moves come as the retail giant is increasingly under fire by worker advocates and unions over warehouse safety concerns, compensation policies, and most recently over alleged exposure to the coronavirus. Bringing on experienced attorneys familiar with litigation in these areas is likely to boost the company's ability to fight litigation and respond to continued changes brought on by the coronavirus.

"To hire that many people with labor and employment expertise all at once suggests Amazon decided that they faced legal issues that the company hadn't previously been worried about," said Catherine Fisk, a professor at the University of California, Berkeley School of Law, in a phone interview. "Occupational safety and health is both something a company should care about all the time, but also an issue that can become more acute when we're facing a new health risk like a pandemic."

Since the coronavirus pandemic, businesses have tried to balance the need to stay operational with the complicated and often conflicting health and safety guidelines put out by local and federal agencies since nationwide shutdowns began in March. Just last week, a group of Amazon warehouse employees sued the company in New York, claiming its

**The authority is assessing the possibility to postpone the registration deadline for the 106 PECs.**

# Bulletin Board

## Regulatory Update

JUN. 19, 2020

working conditions put them and their families at risk of contracting the virus.

### Cordaro and Other Hires

Cordaro has advised and represented employers on occupational safety and health issues before federal and state OSHA enforcement agencies. She's represented the National Association of Home Builders and the National Association of Manufacturers in recent cases, according to Bloomberg Law's Litigation Analytics.

"The top brass might be thinking they want to improve workplace culture here. I think from my vantage point bringing in legal and employment law experts working with human resources types can work to change the culture," said Stewart Schwab, professor of law at Cornell Law School during a phone interview.

State and federal officials are closely monitoring Amazon's actions in light of Covid-19. Continuously changing regulations related to the pandemic and staying in compliance is hard for a national employer like Amazon, Schwab said. The additional experienced staff will help navigate those regulations, he said.

Several U.S. states asked the tech and e-commerce giant to provide information about health and safety measures following the death of workers from coronavirus-related illnesses.

Amazon's spokeswoman said the company's top concern is ensuring the health and safety of its employees. The company expects to invest about \$4 billion through June on Covid-related initiatives, including safety measures. In addition to these hires, Amazon has added 500 professionals to its health and safety organization, more than half in response to the pandemic.

### Other Hires at Amazon

Amazon also has beefed up its labor and employment in-house counsel staff across the country, making six new hires in just a few months from Discover, USAA, SAG-AFTRA, and other companies specifically for those roles, according to LinkedIn. Amazon also added Cozen O'Connor real estate attorney Samantha Mazo in April as a senior project manager for real estate in the company's Last Mile Network.

# Bulletin Board

## Regulatory Update

JUN. 19, 2020

Jaime Cole, former attorney at Ogletree Deakins, joined Amazon as the company's senior corporate counsel for labor and employment, in February.

Bruce Larson joined Amazon from Advantage Solutions that same month as corporate counsel for labor and employment.

Raina Jones left Discover to become Amazon's corporate counsel for labor and employment in May.

Nate Hennagin, former in-house counsel at SAG-AFTRA, joined Amazon Studios as corporate labor relations counsel in April.

Claire Tracey joined Amazon in April as a labor and employment counsel from USAA.

Alia Samad-Salameh, a former employment executive at Walmart Inc., joined Amazon in December as a principal for global labor standards.

Bloomberg Law, 12 June 2020

<https://news.bloomberglaw.com/daily-labor-report/amazon-hiring-spree-bolsters-its-workplace-safety-team-1>

### Consultation delays US

2020-06-12

Submission of a final report to the Washington state legislature on a list of priority products to potentially face regulations under a new state scheme has been delayed beyond the 1 June deadline, due in part to the state's response to the Covid-19 pandemic.

The state Department of Ecology published a final draft report last month, identifying a set of priority consumer products to be reviewed under the Safer Products for Washington programme. The final report, however, is still undergoing executive review, "where the people reviewing are also dealing with the Covid-19 response", said Lauren Tamboer, spokesperson for the programme.

"We've been told the governor's office will review it as soon as they can after they receive it," she said. "After that full review, the governor's

**The final report, however, is still undergoing executive review, "where the people reviewing are also dealing with the Covid-19 response", said Lauren Tamboer, spokesperson for the programme.**

## Bulletin Board

## Regulatory Update

JUN. 19, 2020

office will return it to us, and we will make any needed changes before submitting it to the legislature.”

Chemical Watch, 12 June 2020

[https://chemicalwatch.com/125181/covid-19-deadline-extensions-derogations-and-supply-chain-news?utm\\_medium=email&utm\\_campaign=CW%20-%20Covid-19%20notification%2030&utm\\_content=CW%20-%20Covid-19%20notification%2030+CID\\_5faa4532578a4eacd8714ae63ba0fa2f&utm\\_source=Campaign%20Monitor&utm\\_term=Covid-19%20Deadline%20extensions%20derogations%20and%20supply-chain%20news](https://chemicalwatch.com/125181/covid-19-deadline-extensions-derogations-and-supply-chain-news?utm_medium=email&utm_campaign=CW%20-%20Covid-19%20notification%2030&utm_content=CW%20-%20Covid-19%20notification%2030+CID_5faa4532578a4eacd8714ae63ba0fa2f&utm_source=Campaign%20Monitor&utm_term=Covid-19%20Deadline%20extensions%20derogations%20and%20supply-chain%20news)

### Intense PFAS lobbying pits greens against water utilities

2020-06-11

An effort on Capitol Hill to regulate toxic “forever chemicals” is pitting environmental groups against drinking and wastewater utilities that are worried Congress could leave them vulnerable to future lawsuits and high cleanup costs.

House lawmakers are eager to attach language to regulate per- and polyfluoroalkyl substances, or PFAS, to the 2021 National Defense Authorization Act. Policy experts say spending bills and water infrastructure legislation are also potential vehicles in the fall.

That legislative push has triggered an increase in lobbying efforts from companies that produce PFAS — as well as utilities looking to shape government oversight of the chemicals that have contaminated drinking water, soil and air across the United States. Studies have linked PFAS with multiple health issues such as thyroid problems and some cancers.

At the heart of the dispute, utilities are either voicing opposition to a flurry of PFAS bills or asking Congress for an exemption to protect themselves from future litigation. Environmental groups are countering by dismissing those concerns while pushing for stricter oversight.

“The uptick in lobbying corresponds with the uptick in the amount of attention Congress is giving to it,” said Rik Hull, executive vice president of the National Association of Water Companies (NAWC), an association advocating on behalf of privately held water systems.

### Studies have linked PFAS with multiple health issues such as thyroid problems and some cancers.

## Bulletin Board

## Regulatory Update

JUN. 19, 2020

“We were working through the regulatory process, with EPA, and as soon as Congress gets involved, of course we’re going to start trying to educate Congress on our position,” Hull said.

Lobbying disclosures show that two entities lobbied for water utilities relating to PFAS issues in 2018. In 2019, that number more than tripled to 14 organizations.

It’s unclear how much money went specifically into lobbying for PFAS, since federal law doesn’t require firms to break down spending to that level.

Water utilities, for example, have pushed for provisions in various spending bills for funds to install filtration systems or other cleanup costs for the chemicals.

While EPA is wrapping up its comment period on whether it will craft rules for two of the most studied PFAS, lawmakers are charging ahead with attaching provisions that would require EPA to set drinking water standards. Those two chemicals are perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS).

Lawmakers have argued for those provisions to be included in must-pass measures because the agency is moving too slowly with setting standards for PFOA and PFOS.

Last month during a hearing, EPA Administrator Andrew Wheeler told senators the agency would need more than a year to set maximum contaminant levels for PFOA and PFOS (*E&E News PM*, May 20).

On Capitol Hill, utility opposition centers around language that would designate PFOA and PFOS as “hazardous substances” under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, or CERCLA. That designation would initiate federal cleanup standards that water utilities would have to comply with.

The House passed **H.R. 535**, the “PFAS Action Act,” with bipartisan support earlier this year. It included a hazardous designation for PFOA and PFOS, along with a host of PFAS provisions (*Greenwire*, Jan. 10).

A coalition of drinking water and wastewater utilities has **argued** that bill doesn’t go far enough to distinguish water systems as the recipients — not producers — of the chemicals. Utilities already investing in PFAS treatment could face additional costs and lawsuits under the bill, they say.

# Bulletin Board

## Regulatory Update

JUN. 19, 2020

Investor-owned utilities are also raising concerns with Sen. Bernie Sanders (I-Vt.), **S. 3227**, which would similarly require EPA to designate PFAS as hazardous substances under CERCLA.

An E&E News review last year showed how chemical companies and other firms with ties to PFAS have also increased their lobbying (*E&E Daily*, July 24, 2019). One of their top targets is a hazardous designation.

In the Senate, Republicans and Democrats have coalesced around compromise language to set a drinking water standard for PFAS, but House Democrats say it's not strong enough. Senators have rejected a hazardous designation (*E&E Daily*, April 27).

The Senate Armed Services Committee finished marking up its fiscal 2021 NDAA last night but has yet to release the legislation. The House panel will mark up its version later this month.

EENews, 11 June 2020

<https://www.eenews.net/stories/1063366935>

## AMERICA

### US EPA

2020-06-12

Democratic chairs of several US House of Representatives committees have called on the US EPA to provide additional information on the relaxed enforcement policy it put in place in response to the Covid-19 pandemic.

The 10 June letter calls for details on how the agency will wind down the policy and for increased transparency on which industries and companies have requested enforcement modifications, among others.

Chemical Watch, 12 June 2020

[https://chemicalwatch.com/125181/covid-19-deadline-extensions-derogations-and-supply-chain-news?utm\\_medium=email&utm\\_campaign=CW%20-%20Covid-19%20notification%2030&utm\\_content=CW%20-%20Covid-19%20notification%2030+CID\\_5faa4532578a4eacd8714ae63ba0fa2f&utm\\_source=Campaign%20Monitor&utm\\_term=Covid-19%20Deadline%20extensions%20derogations%20and%20supply-chain%20news](https://chemicalwatch.com/125181/covid-19-deadline-extensions-derogations-and-supply-chain-news?utm_medium=email&utm_campaign=CW%20-%20Covid-19%20notification%2030&utm_content=CW%20-%20Covid-19%20notification%2030+CID_5faa4532578a4eacd8714ae63ba0fa2f&utm_source=Campaign%20Monitor&utm_term=Covid-19%20Deadline%20extensions%20derogations%20and%20supply-chain%20news)

# Bulletin Board

## Regulatory Update

JUN. 19, 2020

### EUROPE

#### Chemical recycling Europe calls for legislation to improve circular economy plastics in EU

2020-06-10

In a recent position paper, Chemical Recycling Europe, a trade association founded last year to promote and implement innovative solutions for the chemical recycling of plastic waste, has called for faster recognition and legislation review to unlock the potential of chemical recycling.

In a recent position paper, Chemical Recycling Europe, a trade association founded last year to promote and implement innovative solutions for the chemical recycling of plastic waste, has called for faster recognition and legislation review to unlock the potential of chemical recycling.

The organisation explained that the recycling industry plays an important role in the transition to a more circular economy by turning polymeric waste into new value-added materials.

It went on to argue that the sustainable management of waste and use of resources is at the heart of the European Green Deal.

According to Chemical Recycling Europe, while the new Circular Economy Action Plan aims at accelerating transformational change required by the EU Green Deal, in order to meet its ambitions and to reach EU recycling targets laid down in the EU Plastics Strategy, there is an urgent need to develop and implement new technologies for the recycling of polymeric waste, going beyond the limitations of traditional mechanical recycling.

Chemical recycling, said the organisation, complements the current recycling approaches and has the potential to be "an environmental game-changer" by processing polymeric wastes which are currently difficult to recycle.

It concluded that that investment in developing chemical recycling technologies and infrastructure will lead to the creation of new jobs and the protection of our environment by curbing CO2 emissions and increasing EU recycling capacity.

The full position paper can be read below.

#### Introduction

**The organisation explained that the recycling industry plays an important role in the transition to a more circular economy by turning polymeric waste into new value-added materials.**

# Bulletin Board

## Regulatory Update

JUN. 19, 2020

The recycling industry plays an important role in the transition to a more circular economy by turning polymeric waste into new value-added materials.

The sustainable management of waste and use of resources is at the heart of the European Green Deal<sup>1</sup>. While the new Circular Economy Action Plan<sup>2</sup> aims at accelerating transformational change required by the EU Green Deal, in order to meet its ambitions and to reach EU recycling targets laid down in the EU Plastics Strategy<sup>3</sup>, there is an urgent need to develop and implement new technologies for the recycling of polymeric waste, going beyond the limitations of traditional mechanical recycling.

Chemical Recycling complements the current recycling approaches and has the potential to be an environmental game-changer by processing polymeric wastes which are currently difficult to recycle. Investment in developing chemical recycling technologies and infrastructure will lead to the creation of new jobs and the protection of our environment by curbing CO<sub>2</sub> emissions and increasing EU recycling capacity.

Waste Management World, 10 June 2020

<https://waste-management-world.com/a/chemical-recycling-europe-calls-for-legislation-to-improve-circular-economy-for-plastics-in-eu>

### UK reach complicates UK-related base oil trade

2020-06-10

Companies importing and exporting base oils, additives and lubricants to and from the UK face the prospect of additional administrative and testing costs as the country prepares a new regulatory framework from the start of 2021.

UK Reach, a new regulatory framework independent of EU Reach, will come into effect from 1 January 2021 when the UK exits the European Union.

Regulation, Evaluation, Authorisation and Restriction (Reach) is an EU regulation that protects human health and environment from risks that can be posed by chemicals. UK Reach will retain the objectives but operate separately from EU Reach and will not be within the jurisdiction of the European Courts of Justice. It will not be a member of the European Chemicals Agency (ECHA).

UK Reach will impact UK-based companies that import base oils, additives and finished lubricants from the EEA, UK-based companies that export

# Bulletin Board

## Regulatory Update

JUN. 19, 2020

chemical products, including base oils and finished lubricants to the EEA and EEA-based companies that export base oils, additives and finished lubricants to the UK.

UK lubricant manufacturers are contacting suppliers to check the registration status of EU and UK markets for each chemical component. Some of the finished lubricant components, such as additive packages, are chemical mixtures requiring checks down to the beginning of the supply chain, which is adding an administrative burden to companies.

“The UK Lubricants Association (UKLA) is working with member companies to understand the implications arising from the implementation of a UK Reach regulation and the impact on the availability of speciality chemicals on the UK market in 2021,” director general David Wright said.

To facilitate the transition, the UK government has allowed a two-year time period for UK-based and EEA-based companies to submit technical information to gain UK Reach. Where data may not be available or insufficient to meet requirements, testing would be necessary. Obtaining data from testing within a two-year time period may be challenging and have cost implications.

UK-based companies with EU Reach registrations can carry across the registration to UK Reach. The company must provide basic information within 120 days of the regulation coming into force, followed by technical information within two years of that date.

UK-based exporters of chemical substances to the EU/EEA market would need to transfer their registrations to an EU/EEA-based legal entity or support their EU/EEA-based importers to become registrants. UK exporters could provide support by sharing technical data with customers.

EU-based companies with EU Reach registration will be able to notify the HSE of their intention to maintain operations in the UK market by submitting a Downstream User Import Notification within 180 days of UK Reach coming into force. This must be followed by a new registration to gain UK Reach within two years to retain UK market access.

Argus Media, 10 June 2020

<https://www.argusmedia.com/en/news/2113130-uk-reach-complicates-ukrelated-base-oils-trade>

### UK Reach, a new regulatory framework independent of EU Reach, will come into effect from 1 January 2021 when the UK exits the European Union.

# Bulletin Board

## Regulatory Update

JUN. 19, 2020

### Swedish Chemicals Agency (Kemi)

2020-06-12

The Swedish Chemicals Agency (Kemi) has extended a derogation until 30 September that allows disinfectant manufacturers to source substances from unregistered suppliers.

The derogation exempts producers of disinfectants from the rules of the EU biocidal products Regulation's (BPR) Article 95, which bind companies to sourcing biocidal active substances only from a list of approved substance suppliers.

This was due to expire on 30 June. But Kemi says it remains important to ensure a solid supply of disinfectants to meet the high demand during the pandemic.

Chemical Watch, 12 June 2020

[https://chemicalwatch.com/125181/covid-19-deadline-extensions-derogations-and-supply-chain-news?utm\\_medium=email&utm\\_campaign=CW%20-%20Covid-19%20notification%2030&utm\\_content=CW%20-%20Covid-19%20notification%2030+CID\\_5faa4532578a4eacd8714ae63ba0fa2f&utm\\_source=Campaign%20Monitor&utm\\_term=Covid-19%20Deadline%20extensions%20derogations%20and%20supply-chain%20news](https://chemicalwatch.com/125181/covid-19-deadline-extensions-derogations-and-supply-chain-news?utm_medium=email&utm_campaign=CW%20-%20Covid-19%20notification%2030&utm_content=CW%20-%20Covid-19%20notification%2030+CID_5faa4532578a4eacd8714ae63ba0fa2f&utm_source=Campaign%20Monitor&utm_term=Covid-19%20Deadline%20extensions%20derogations%20and%20supply-chain%20news)

### Danish EPA

2020-06-12

The Danish EPA has released a video explaining the enforcement actions it has taken to crack down on illegal hand sanitisers.

Since the beginning of the Covid-19 crisis, the EPA has checked 165 products and taken enforcement action on 55 of these, it says. The agency has published a list of products that companies were forced to recall from the market.

Chemical Watch, 12 June 2020

[https://chemicalwatch.com/125181/covid-19-deadline-extensions-derogations-and-supply-chain-news?utm\\_medium=email&utm\\_campaign=CW%20-%20Covid-19%20notification%2030&utm\\_content=CW%20-%20Covid-19%20notification%2030+CID\\_5faa4532578a4eacd8714ae63ba0fa2f&utm\\_source=Campaign%20Monitor&utm\\_term=Covid-19%20Deadline%20extensions%20derogations%20and%20supply-chain%20news](https://chemicalwatch.com/125181/covid-19-deadline-extensions-derogations-and-supply-chain-news?utm_medium=email&utm_campaign=CW%20-%20Covid-19%20notification%2030&utm_content=CW%20-%20Covid-19%20notification%2030+CID_5faa4532578a4eacd8714ae63ba0fa2f&utm_source=Campaign%20Monitor&utm_term=Covid-19%20Deadline%20extensions%20derogations%20and%20supply-chain%20news)

# Bulletin Board

## Regulatory Update

JUN. 19, 2020

[term=Covid-19%20Deadline%20extensions%20derogations%20and%20supply-chain%20news](#)

**But Kemi says it remains important to ensure a solid supply of disinfectants to meet the high demand during the pandemic.**

# Bulletin Board

## REACH Update

JUN. 19, 2020

### RAC backs restricting intentional uses of microplastics

2020-06-10

Helsinki, 10 June 2020 – RAC has adopted its opinion on ECHA's proposal to restrict the use of microplastics that are intentionally added to products on the EU/EEA market, in concentrations of more than 0.01 % weight by weight. The proposal was considered appropriate for reducing releases to the environment.

In its opinion, the committee recommended the following:

**Biodegradable polymers:** ECHA's proposal set out specific test methods and pass criteria for identifying biodegradable polymers, which are excluded from the restriction. RAC wanted to see greater evidence that microplastics are biodegradable in the environment (e.g. soils, marine environment, freshwater).

**Use of microplastics as infill material on artificial turf pitches:** RAC recommended a complete ban after a transition period of six years as there was incomplete information on the effectiveness of risk management measures. A ban would also be more effective than risk management measures in preventing environmental releases in the long term.

**The definition of 'a microplastic':** ECHA proposed a lower size limit of 100 nanometres for a microplastic as analytical methods for detecting microplastics in products (i.e. mixtures) are still in development. RAC recommended that a lower size limit is not necessary as the potential restriction can also be enforced in other ways, such as by looking at raw materials in supply chains.

ECHA's Committee for Socio-economic Analysis (SEAC) agreed on its draft opinion on the costs and benefits of this proposal for society. SEAC supports the wide scope of the proposal and the transition periods for different product groups to give companies time to prepare. Although the benefits cannot be assessed in monetary terms, the cost-effectiveness of the proposal can be estimated. It noted that microplastic pollution is irreversible and that early action to reduce emissions can be beneficial for society.

For practical reasons and to ease enforcement, SEAC recommends a lower size limit of 100 nanometres until suitable analytical methods are available.

SEAC also noted that risk management measures to contain synthetic infill material on artificial pitches cost less than a complete ban, but a ban

**The definition of 'a microplastic': ECHA proposed a lower size limit of 100 nanometres for a microplastic as analytical methods for detecting microplastics in products (i.e. mixtures) are still in development.**

# Bulletin Board

## REACH Update

JUN. 19, 2020

would be more effective in preventing releases in the long term. Based on the available information, the committee does not prefer one option over the other.

### Next steps

A 60-day consultation of SEAC's draft opinion will start soon. The consolidated opinion of both committees is expected to be ready by the end of 2020. The decisions on REACH restrictions are taken in the European Commission by the EU Member States and scrutinised by the Council and the European Parliament.

### Background

In January 2019, ECHA proposed a wide-ranging restriction on intentional uses of microplastics in products placed on the EU/EEA market to avoid or reduce environmental pollution. Currently, the releases of intentionally added microplastics in the EU/EEA are estimated to be around 42 000 tonnes a year. Additional releases from infill material used in artificial turf pitches could amount to 16 000 tonnes per year. The proposed restriction would prevent more than 90 % of these releases, or 500 000 tonnes of microplastic releases over a 20-year period.

The restriction proposal was developed in the context of the EU Plastics Strategy, which aims at circular plastics economy and contributes to reaching the 2030 sustainable development goals, the global climate commitments and the EU's industrial policy objectives.

ECHA, 10 June 2020

[https://echa.europa.eu/-/rac-backs-restricting-intentional-uses-of-microplastics?utm\\_campaign=5cfdec6599bdab0001a52896&utm\\_content=5ee0d61d9ccc560001410c82&utm\\_medium=smarpshare&utm\\_source=linkedin](https://echa.europa.eu/-/rac-backs-restricting-intentional-uses-of-microplastics?utm_campaign=5cfdec6599bdab0001a52896&utm_content=5ee0d61d9ccc560001410c82&utm_medium=smarpshare&utm_source=linkedin)

### Alternatives to animal testing continue to be widely used

2020-06-08

Helsinki, 8 June 2020 – The findings of ECHA's fourth report on the use of alternative methods to animal testing under REACH show, in general, relatively few changes in the use of alternatives since the last report in 2017.

**The most common adaptation was the use of information on similar substances (read-across, 25 %).**

# Bulletin Board

## REACH Update

JUN. 19, 2020

The most common adaptation was the use of information on similar substances (read-across, 25 %). This is followed by justifications for omitting data (data waiving), combining information from different sources (weight of evidence) and predicting properties from structurally similar substances using computer models (QSAR).

The amendment of the REACH annexes in 2016, that requires companies to use non-animal testing (*in vitro*, *in chemico*) for certain endpoints, has had a clear impact since their use has tripled for skin corrosion/irritation, quadrupled for serious eye damage/eye irritation and increased more than 20-fold for skin sensitisation.

Registrations for substances registered between 10-100 tonnes per year generally follow a similar pattern in terms of alternative methods and adaptations as those in higher tonnage bands. The exception to this is for acute toxicity, where there have been 3 % fewer experimental studies – but the use of weight of evidence, QSAR and data waiving have increased since 2017.

For the lowest volume substances (between 1-10 tonnes per year), fewer experimental studies and less read-across have been observed, but this is balanced with more weight of evidence, QSAR and data-waiving.

Looking towards the future, the data collected in the REACH registration database is a good starting point for developing a unique chemicals knowledgebase that could be used to develop alternative approaches to animal testing and lend support to increasing the production and use of sustainable chemicals and the goals of the European Green Deal and the Digital Agenda.

Since many registration dossiers still need to be updated for them to be compliant with REACH, ECHA urges companies to make use of all guidance and tools at their disposal to strengthen their use of alternative approaches when reviewing and updating their registrations.

### Background

Every three years, ECHA reports to the Commission on how the alternative methods have been used to generate information on intrinsic properties of chemical substances and for risk assessment. The report published now is based on registration datasets extracted in 2016 and in 2019 – presenting a comprehensive understanding of the range of alternative methods and testing strategies used for all registered chemicals in the EU.

# Bulletin Board

## REACH Update

JUN. 19, 2020

Testing on vertebrate animals is only allowed as a last resort under REACH and ECHA's objective is to promote non-animal testing methods and other alternatives.

ECHA, 8 June 2020

<https://echa.europa.eu/-/alternatives-to-animal-testing-continue-to-be-widely-used>

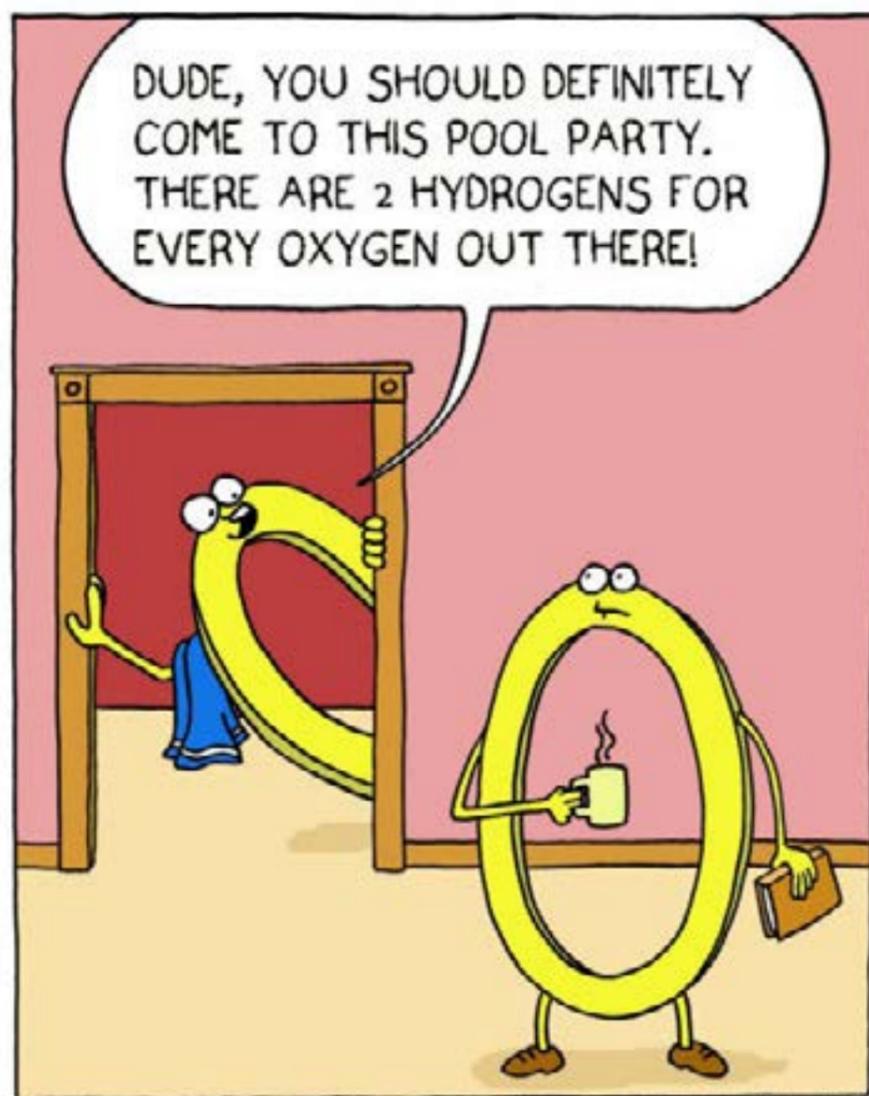
## Bulletin Board

## Janet's Corner

JUN. 19, 2020

## Pool Party

2020-06-19



© 2011 sardonic salad

<https://www.chemistryjokes.com/jokes/dude-you-should-definitely-come-to-this-pool-party/>

## Bulletin Board

## Hazard Alert

JUN. 19, 2020

## Cadmium

2020-06-19

Cadmium is a malleable blueish, silvery-white heavy metal. Commercially, it is produced as a by-product of treating other metals, including zinc, lead and copper ores. Today, cadmium is produced where zinc is refined, rather than where it is mined. It occurs naturally in the mineral Greenockite. Most cadmium compounds have been classified as a Category 1 carcinogen—carcinogenic in humans. [1,2,3]

## USES [3,4,5]

Cadmium is used across various industries, although it is being phased out, due to its toxicity. Its primary use is in rechargeable nickel-cadmium batteries. It is also found in cordless power tools, cameras, computers, emergency power supplies, mobile phones and lights. Cadmium is used in nuclear reactors to control atomic fission, and to electroplate steel to protect it from corrosion.

## ROUTES OF EXPOSURE [4,6]

- The primary route of exposure for cadmium is via inhalation.
- Occupational exposure is a primary route of exposure.
- Cigarette smoke contains cadmium; smokers may inhale twice the amount of cadmium as a non-smoker.
- Vegetables grown in contaminated soils can have small traces of the heavy metal.
- Livers and kidneys of shellfish and animals may contain higher amounts of cadmium than other foods.

## HEALTH EFFECTS

Cadmium poisoning affects a range of systems including the respiratory and nervous systems.

## Acute Effects [6]

Severity of symptoms depend on the level and type of exposure.

- Initial inhalational exposure to the chemical can result in respiratory symptoms, including inflammation of the throat and a cough.
- It can then be followed by 'metal fume fever': a flu-like illness with accompanying symptoms.

**Cadmium is a malleable blueish, silvery-white heavy metal.**

# Bulletin Board

## Hazard Alert

JUN. 19, 2020

- These symptoms include: conjunctivitis, sweating, muscle aches, fever and chills, a headache, a metallic taste in the mouth and an impaired sense of smell.
- Symptoms from eight hours to seven days post exposure include: nausea, diarrhoea, nocturia, abdominal pain, persistent cough, weakness and malaise and severe dyspnoea and wheezing.
- Workers who have been exposure to the extremely irritating fume of heated carbon could experience pneumonitis or pulmonary oedema—with the onset of symptoms delayed for several hours or days.

### Chronic Effects [6]

Cadmium is toxic to multiple body systems. Long-term exposure to the chemical can result in irreversible cadmium-induced tubular proteinuria. Chronic exposure to cadmium is associated with osteoporosis, increased fractures and osteomalacia. Long-term inhalation of the heavy metal can result in respiratory insufficiency, namely a chronic obstructive airway disease. Cadmium's Category 1 status as a carcinogen is related specifically to the development of lung cancer.

### SAFETY

#### First Aid Measures [7]

- Ingestion: DO NOT INDUCE VOMITING. Immediately contact a medical professional.
- Skin contact: Immediately wash affected skin with water for at least 15 minutes, and remove contaminated clothing. Do not re-wear until it has been thoroughly de-contaminated. Continue rinsing contaminated skin. Immediately contact a healthcare professional.
- Eye contact: Check for and remove contact lenses if easy to do so. Rinse eyes carefully with water or normal saline solution for at least 15 minutes. Take the victim to a medical centre.
- Inhaled: Take victim to the nearest fresh air source and monitor their breathing. If they are not breathing, and you are qualified, you can administer CPR—with a pocket mask or one-way valve. Immediately contact a medical professional.
- General: Never administer anything by mouth to an unconscious, exposed person.

# Bulletin Board

## Hazard Alert

JUN. 19, 2020

### Exposure Controls/Personal Protection [7]

- Engineering controls: Emergency eyewash fountains and safety showers should be accessible in the immediate area of the potential exposure. Ensure there is adequate ventilation. Only use cadmium under a chemical fume hood.
- Personal protection: Safety glasses, protective and dustproof clothing, gloves, an apron and an appropriate mask. Follow the PPE guidelines set in your jurisdiction.

### REGULATION [8]

#### United States:

The Occupational Safety and Health Administration (OSHA) has set an 8-hour time weighted average (TWA) concentration limit for cadmium of 0.01mg/m<sup>3</sup>.

#### Australia [6]

Safe Work Australia has set an 8-hour time TWA for cadmium of 0.01mg/m<sup>3</sup>.

### REFERENCES

1. <https://www.osha.gov/SLTC/cadmium/>
2. <https://www.betterhealth.vic.gov.au/health/HealthyLiving/cadmium>
3. <https://www.livescience.com/37044-cadmium.html>
4. <https://www.betterhealth.vic.gov.au/health/HealthyLiving/cadmium>
5. <https://www.rsc.org/periodic-table/element/48/cadmium>
6. [https://www.safeworkaustralia.gov.au/system/files/documents/2002/health\\_monitoring\\_guidance\\_-\\_cadmium.pdf](https://www.safeworkaustralia.gov.au/system/files/documents/2002/health_monitoring_guidance_-_cadmium.pdf)
7. <https://www.fishersci.com/store/msds?partNumber=C3500&productDescription=CADMIUM+METAL+GRAN+PURIF+500G&vendorId=VN00033897&countryCode=US&language=en>
8. <https://www.ncbi.nlm.nih.gov/books/NBK158839/table/T41/>

## Bulletin Board

## Gossip

JUN. 19, 2020

**Sixth mass extinctions of wildlife accelerating, scientists warn**

2020-06-02

The sixth mass extinction of wildlife on Earth is accelerating, according to an analysis by scientists who warn it may be a tipping point for the collapse of civilisation.

More than 500 species of land animals were found to be on the brink of extinction and likely to be lost within 20 years. In comparison, the same number were lost over the whole of the last century. Without the human destruction of nature, even this rate of loss would have taken thousands of years, the scientists said.

The land vertebrates on the verge of extinction, with fewer than 1,000 individuals left, include the Sumatran rhino, the Clarión wren, the Española giant tortoise and the harlequin frog. Historic data was available for 77 of the species and the scientists found these had lost 94% of their populations.

The researchers also warned of a domino effect, with the loss of one species tipping others that depend on it over the edge. "Extinction breeds extinctions," they said, noting that unlike other environmental problems extinction is irreversible.

Humanity relies on biodiversity for its health and wellbeing, scientists said, with the coronavirus pandemic an extreme example of the dangers of ravaging the natural world. Rising human population, destruction of habitats, the wildlife trade, pollution and the climate crisis must all be urgently tackled, they said.

"When humanity exterminates other creatures, it is sawing off the limb on which it is sitting, destroying working parts of our own life-support system," said Prof Paul Ehrlich, of Stanford University in the US, and one of the research team. "The conservation of endangered species should be elevated to a global emergency for governments and institutions, equal to the climate disruption to which it is linked."

"We are facing our final opportunity to ensure that the many services nature provides us do not get irretrievably sabotaged," said Prof Gerardo Ceballos of the National Autonomous University of Mexico, who led the research.

The analysis, [published in the journal Proceedings of the National Academy of Sciences](#), examined data on 29,400 land vertebrate species

## Bulletin Board

## Gossip

JUN. 19, 2020

compiled by the IUCN Red List of Threatened Species and BirdLife International. The researchers identified 515 species with populations below 1,000 and about half of these had fewer than 250 remaining. Most of these mammals, birds, reptiles and amphibians were found in tropical and subtropical regions.

Scientists discovered that 388 species of land vertebrate had populations under 5,000, and the vast majority (84%) lived in the same regions as the species with populations under 1,000, creating the conditions for a domino effect.

Known examples of this include the overhunting of sea otters, the main predator of kelp-eating sea urchins. A boom in urchins devastated kelp forests in the Bering Sea, leading to the [extinction of the kelp-eating Steller's sea cow](#).

The researchers said their findings could aid conservation efforts by highlighting the species and regions requiring the most urgent attention.

Prof Andy Purvis, at the Natural History Museum in London, and not part of the new analysis, said: "This research provides another line of evidence that the [biodiversity crisis is accelerating](#). The hardest problem [the researchers] faced is that we don't know more about the history of species' geographic distributions. They only had that information for 77 of the species on the brink, and we can't know for sure how typical those species are."

"But that doesn't undermine the conclusion," he said. "The biodiversity crisis is real and urgent. But – and this is the crucial point – it is not too late. To transition to a sustainable world, we need to tread more lightly on the planet. Until then, we are essentially robbing future generations of their inheritance."

Prof Georgina Mace, of University College London, said: "This new analysis re-emphasises some startling facts about the extent to which vertebrate populations have been reduced worldwide by human activities." But she said she was not convinced that simply having a population less than 1,000 was the best measure of a species being on the brink. A declining trend for the population is also important and both factors are used in the IUCN Red List, she said.

"Action is important for many reasons, not least of which is that directly and indirectly we rely on the rest of life on Earth for our own health and wellbeing," she said. "Disrupting nature leads to costly and often hard-to-

## Bulletin Board

## Gossip

JUN. 19, 2020

reverse effects. Covid-19 is an extreme present-day example, but there are many more.”

Mark Wright, the director of science at WWF, said: “The numbers in this research are shocking. However, there is still hope. If we stop the land-grabbing and devastating deforestation in countries such as Brazil, we can start to bend the curve in biodiversity loss and climate change. But we need global ambition to do that.”

[theguardian.com](https://www.theguardian.com), 2 June 2020

<https://www.theguardian.com>

### Sugar breaks down neural circuits that may cause us to overeat

2020-06-09

It is well known that consuming food and drink high in sugar is not great for us, but scientists are continuing to unravel the intricacies of how the sweet stuff drives negative health outcomes. The latest finding comes from researchers at the University of Michigan, who through studies in fruit flies have found that excess amounts of sugar can shut down crucial neural circuits linked to regulating satiety, possibly leading to overeating in humans.

While the dining habits and resulting bodily functions are quite different between fruit flies and humans, there are some useful similarities. The insects have proven an invaluable model for studying various aspects of human health due to the many genes that they share with us, offering insights into how we might treat Parkinson's, detect cancer or address problems associated with poor sleep, to name just a couple of examples.

Likewise, the neural circuits that fruit flies rely on to process the taste of sugar share enough similarities with humans to offer scientists a way of investigating the mechanics at play. These involve the neurotransmitter dopamine, which plays a key role in the brain's reward system. So the researchers bred fruit flies with a genetic marker in the neurons that produce dopamine, enabling them to observe how they responded to sugar intake.

Feeding the insects a high-sugar diet was indeed found to lower and delay the activity of these neurons. To investigate further, the team bred a molecule into the neurons that enabled them to be activated to the same

## Bulletin Board

## Gossip

JUN. 19, 2020

levels as those in healthy fruit flies using light. When the dopaminergic neurons were activated in this way, the team found the flies on a high-sugar diet ate the equivalent to one cookie, even when offered the equivalent to an entire box. Meanwhile, fruit flies that didn't benefit from the neuron activation continued eating for hours, due to sugar's role in quelling the sensation of satiety.

“On a high-sugar diet, we find that the fruit flies' dopaminergic neurons are less active, because the high sugar intake decreases the intensity of the sweetness signal that comes from the mouth,” says Monica Dus, lead investigator of the study. “Animals use this feedback from dopamine to make predictions about how rewarding or filling a food will be. In the high-sugar diet flies, this process is broken – they get less dopamine neuron activation and so end up eating more than they need, which over time makes them gain weight.”

The scientists see these greedier flies as evidence that excess sugar causes them to miss the satiety cues they would normally rely on to know when they're full. The team also found that by getting them off the high-sugar diet could actually reverse the process, restoring the dopaminergic neurons to normal function.

“We think that essentially this processing of sweetness in the dopaminergic neurons is probably used as a cue, as an alarm to tell the brain to start slowing down,” Dus says. “If that process is not there anymore, then you have to wait for other cues to tell you that you're full. By that time, you've already eaten a lot of cookies.”

[newsatlas.com](https://www.newsatlas.com), 9 June 2020

<https://www.newsatlas.com>

### Normal is the problem

2020-05-30

Sharon Wilson is a fifth-generation Texan who drives around rural communities and takes pictures of oil and gas facilities with an infrared camera. The pictures make visible all the methane pollution that industry and governments pretend is not happening in rural communities.

Wilson recently tweeted these two sentences: “We can and must do better than going back to normal. Normal is the problem.”

And she is right as rain about that. Normal has become a pathological state.

**Feeding the insects a high-sugar diet was indeed found to lower and delay the activity of these neurons.**

**Let's face facts: our hi-tech, globalized-trade-everything-for-peanuts world run mostly by tyrants isn't natural.**

## Bulletin Board

## Gossip

JUN. 19, 2020

After the random normlessness of this pandemic, I don't want to go back to normal either. Or its idiotic child, "the new normal."

Let's face facts: our hi-tech, globalized-trade-anything-for-peanuts world run mostly by tyrants isn't natural.

Since 1970, an outpouring of normality has just about destroyed the Earth: It has created an abnormal economic machine, blind to energy spending, that doubled the global population and boosted per capita consumption by 45 per cent.

At the same time the so-called value of global economic activity grew by 300 per cent. Meanwhile global trade has exploded like a coronavirus by 900 per cent. To support all this consumption and trade, the extraction of "living materials" from nature has jumped by 200 per cent.

Now here's just a partial list of the cost of all this exponential normality: Humans have appropriated or altered 70 per cent of the world's lands with mines, roads, industrial farms, cities and airports. We have engineered more than 75 per cent of the world's longest rivers. We have filled the ocean with plastics and slaughtered coral reefs. Anyone who calls that kind of behaviour normal is crackers. It's ecological imperialism, and nothing more than a full-scale assault on the dignity of local life.

The list goes on, and scientists now think it's normal to publish papers on "the pervasive human decline of life." Humans, for example, have destroyed 85 per cent of the wetlands. That's like eating your kidneys for dinner, and I can't think of anybody who would consider that normal except Hannibal Lecter.

We have eliminated 40 per cent of the world's original forests. We have extirpated (and there's a word for these normal times) most of the world's large mammals. An estimated one million species of animals and plants stand on the brink of extinction.

Homo sapiens, another mammal, are on that list, and we pretend that's normal. As these species disappear, our ever-expanding artificial intelligence probably won't wave goodbye because replacing the natural with artificial is what normal is all about.

Three hundred years ago, no one talked about normal or yearned for normal because it didn't exist. That's because *normalis* was a Latin word that described right angles made by a carpenter's square.

## Bulletin Board

## Gossip

JUN. 19, 2020

Only with the advent of industrialization and machine thinking did the word normal colonize our vocabulary and gain currency in the 18th century.

The standardized machine system demands normalcy because everything must conform to the right angles of progress, which means endless growth and consumption — all fuelled by the fiction of cheap energy.

Normal really means big-box living and being a slave to machines. It means you're so distracted by screens, speed and mobility, you can't pay attention to what matters. Normal means you don't have any respect for limits or sacred places. Normal means you think you can simply swap fossil fuels with so-called "clean energy" and protect the norm. But it mostly means you have surrendered your capacity to be human and to love this place.

So I don't want to go back to normal.

I don't want to go back to a world where it's okay to industrialize and then globalize the care of old people as though they are just another resource to be mined before they die.

Vampires behave that way, and no one thinks that's normal.

I don't want to go back to the digital contagion uprooting our minds and souls where authoritarian males justify the mining of our computers for data to improve their ability to engineer our behaviours.

That's just predation.

I don't want to go back to a world where lawyers and judges don't understand the difference between a legal system and a justice system. I don't want to go back to a world where governments think it is okay to sacrifice agricultural communities with disruptive fracking technologies that cause earthquakes, pollute groundwater and consistently lose money.

That's just white-collar crime with a high-pressure water pump.

I don't want to go back to a world where a few foreign-owned meat-packing corporations control the slaughter and distribution of so-called "cheap meat."

That's just cultivating food insecurity (and obesity) for the many to serve a rapacious few.

## Bulletin Board

## Gossip

JUN. 19, 2020

I don't want to go back to a world where we accept the status quo of escalating wealth inequalities and polarized political thinking.

Polarization ends in one of three bloody ways: civil war, revolution or slavery.

I don't want to go back to a world where economists from the evangelical church of exponential growth preach infinite consumption on a finite planet.

I don't want to go back to a world where the solution to everything is either more education or more technology.

Our universities and technocrats now posit that thinking like machines or not thinking much at all is "the new normal."

I don't want to go back to a world where political parties cultivate men and women obsessed with power and deny the truth. That's just evil.

I don't want to go back to world where people don't know their neighbours, or the names of the birds in their trees.

I don't want to go back to a world where billionaires think so little of this Earth that their primary obsession is to escape to Mars.

I don't want to go back to a world where political leaders don't have the courage to talk about cheap energy, reckless consumption, over-population and climate change in the same sentence.

And I don't want to go back to a world where the media can't admit that our civilization, as William Ophuls puts it, "has gotten too big, too complex and too hard to manage."

I don't want to go back to an economy where corporations socialize all costs and privatize all gains. That's robbery and theft. And it must end.

I don't want to go back to a world where governments subsidize bottom trawlers to scrape the floor of the ocean to support globalization.

That's a normal world hell-bent on annihilation.

I don't want to go back to a world that regards the precautionary principle as just another tweet.

I don't want to go back to a world that doesn't understand life is a precious miracle composed equally of joy, astonishment, love, tragedy and death.

## Bulletin Board

## Gossip

JUN. 19, 2020

So Sharon Wilson got it right. Normal is the problem, and the normlessness of a pandemic has exposed the fat tail of normal as pathology.

And I am not going back to it.

Sharon Wilson says we can leave normal for better this way: "Do all things with love, and be damn fierce about it."

Amen to that.

b~sthyee.ca, 30 May 2020

<https://www.thetyee.ca>

### Brazil's native bees are vital for agriculture, but are being killed by it

2020-06-01

When we think of bees, we don't always recognize the huge diversity of species they represent. Almost all the honey we consume comes from western honey bees (*Apis mellifera*), a hybrid of European and African species. But there are another 20,000 different bee species in the world. Brazil alone has more than 300, and the vast majority, unlike western honey bees, don't sting. The country has the world's greatest diversity of this type of bee.

The importance of Brazil's stingless bees is increasingly being acknowledged, since agricultural crops of high economic value depend on pollination by these insects. And beekeeping helps conservation: Keepers of *Melipona*, a genus of stingless bees, usually preserve local ecosystems and restore areas used in their activity, since native Brazilian bees depend on a healthy habitat to reproduce.

"Their appreciation is on the rise. Places that maintained the culture of native beekeeping can now make this an alternative for income generation," says Jerônimo Villas-Bôas, author of a manual that addresses practices associated with stingless beekeeping in Brazil.

In the fine dining sector, Brazilian honey has already reached the kitchens of well-known chefs, including Alex Atala, whose São Paulo restaurant has two Michelin stars.

Products from Brazilian bees — honey, propolis, pollen, wax and royal jelly — have been known for centuries. Reports written in 1577 by Hans Staden, who lived among the Tupinambá people on the coast of what

**Brazil alone has more than 300, and the vast majority, unlike western honey bees, don't sting.**

## Bulletin Board

## Gossip

JUN. 19, 2020

is today São Paulo state, mention three native bees used by indigenous people for medicine and food purposes — probably *mandaçãia* (*Melipona quadrifasciata*), *mandaguari* (*Scaptotrigona postica*) and *jataí-amarela* (*Tetragonisca angustula*).

“For my doctoral thesis, I tested honey from three stingless bee species: *jataí*, *canudo* [*Scaptotrigona depilis*] and *borá* [*Tetragona elongata*],” says Raoni da Silva Duarte, who has a Ph.D. in entomology from the University of São Paulo (USP). “During in vitro tests, the honeys had antimicrobial effects against several pathogens that may cause diseases in humans.”

Native beekeeping is currently expanding in Brazil, for purposes ranging from scientific research to community-based honey production, with several benefits. “Beekeepers seek areas with preserved vegetation,” Villas-Bôas says. “Stingless beekeeping enables us to conserve the species involved and, indirectly, other animals in the ecosystem such as birds and mammals.”

According to the U.N. Food and Agriculture Organization (FAO), more than 75% of crops intended for human consumption depend on pollination.

Most plant species, whether cultivated or native, are pollinated by animals such as bats, moths, butterflies, wasps, beetles — and mainly bees. The [Brazilian Platform for Biodiversity and Ecosystem Services](#) (BPBES) estimates the value of the environmental pollination service for food production in the country at about 43 billion reais (\$8 billion) per year, accounting for 44 cultivated and wild plants.

Certain plant species are pollinated only by Brazilian stingless bees. “They are chiefly responsible for pollinating native vegetation, providing cross-fertilization, which guarantees variability in plant species,” says Generosa Sousa Ribeiro, from the *Melipona* Beekeeping Department at the State University of Southwest Bahia (UESB). “Several plants need native species. For instance, the acerola cherry depends on solitary bees of the *Centris* genus.”

Evidence shows that establishing stingless bee colonies in agricultural areas has positive effects on production of coffee, canola, guava, apple, passion fruit, cucumber and oil palm, among other crops. For strawberry, pollination by the *irai* bee (*Nannotrigona testaceicornis*) reduces fruit deformation. And a study shows that the *uruçu-nordestina* bee (*Melipona scutellaris*) plays a major role in orange tree pollination.

## Bulletin Board

## Gossip

JUN. 19, 2020

“The more we know about Brazilian stingless bees, the more important they become,” says Juliana Feres, a researcher and founding partner of [Heborá](#), a platform that focuses on improving production of Brazilian honey by rural women.

Stingless bees also provide a specialized service known as buzz pollination. When they land on flowers, many species, whether social or solitary, can vibrate by contracting their thoracic muscles, thus releasing pollen from the flowers and benefiting crops such as tomatoes and eggplants.

Nevertheless, native species are still underused. Western honey bees are still preferred not just to produce honey but also to supplement pollination of agricultural crops, because farmers are familiar with their management and their population is abundant. The *Thematic Report on Pollination, Pollinators and Food Production in Brazil* shows the dangers of generalizing: several crops need specific pollinators.

## Threats in the air

However, native stingless bees face a paradox: while they are important for agricultural activity, they are threatened by agriculture itself. “Our food production system is the main reason why bees are disappearing,” Villas-Bôas says. “Plant suppression affects their natural habitat. In addition, uniform landscapes do not provide the diverse diet that insects need. To make matters worse, there is abusive use of pesticides.”

When pesticides do not kill, they may decrease the longevity of bees, hamper their ability to return to the hive, interrupt the laying of eggs by the queen, prevent communication, disrupt work organization and division, and paralyze wings and legs, among other harmful effects that end up weakening or even decimating the hive.

“The populations [of stingless species] are much smaller than those of *A. mellifera*, which makes it difficult to reorganize these bees after continued spraying. In 2017, we collected samples in areas of mass spraying, and we found more than 10 pesticides that were lethal for native bees,” says Ribeiro from UESB.

Western honey bees are a priority in agrochemical tests conducted in Brazil, based on OECD protocols. However, some studies already show that stingless bees are more sensitive to pesticides than the ubiquitous western bees. “There are still few results, given the very serious damage that poisons have been causing to pollinators in recent decades,” Ribeiro says.

## Bulletin Board

## Gossip

JUN. 19, 2020

A 2018 publication by Brazil's environmental protection agency, known as IBAMA, calls for more specific studies that are not restricted to a single species.

Other works have since followed. A study conducted by researchers at São Paulo State University (UNESP) and published in 2019 assessed the effect of dimethoate, which is used as an international reference in toxicity tests. It showed that the dosage to kill 50% of a population of urucu-nordestina larvae is 320 times lower than the dosage that kills an equal percentage of *A. mellifera* larvae.

Also in 2019, at the University of São Paulo's Luiz de Queiroz Higher School of Agriculture (Esalq-USP), another study showed that thiamethoxam, widely used in agriculture, and three other insecticides from the neonicotinoid group may cause behavioral changes in adult jataí bees, such as reducing flight speed and distance traveled.

A 2016 article focused on *S. postica* showed that the active ingredient imidacloprid, used in insecticides, interferes with the behavior of that bee, affecting its ability to recognize food and restraining its movements in the field.

An indicator of how serious the issue of pesticide use in agriculture is — and its harmful effects on human health and pollination — is the fact that imidacloprid continues to be found in tests performed on food samples under the Program for Analysis of Pesticide Residues on Food from Brazil's National Health Surveillance Agency (Anvisa). The latest edition of the report was published in December 2019.

Loss of pollinators in an ecosystem may be irreversible, and nothing is known about the possibility of natural recolonization. "Brazil's bees have co-evolved with its native flora for a long time," Duarte says. "Each plant has adapted to the benefits that some species provided to its reproduction. At the same time, bees have adapted to specific resources such as nectar, pollen, oils and resins. In other words, Brazilian flora and native bees are highly dependent on each other."

news.mongabay.com, 1 June 2020

<https://www.news.mongabay.com>

## Bulletin Board

## Gossip

JUN. 19, 2020

### Renewable energy stimulus can create three times as many Australian jobs as fossil fuels

2020-06-07

Stimulus programs backing clean energy as a path out of recession would create nearly three times as many jobs for every dollar spent on fossil fuel developments, according to a financial consultancy analysis.

The assessment by professional services firm Ernst & Young (EY) says a government focus on renewable energy and climate-friendly projects to drive the economic recovery from the Covid-19 pandemic could create more than 100,000 direct jobs across the country while cutting greenhouse gas emissions.

Commissioned by environment group the World Wide Fund for Nature, the EY report suggests fast-tracking wind and solar farms that have already been approved, increasing electricity transmission capacity and backing new industries in battery manufacturing, electric buses, renewable hydrogen and manufacturing powered by renewable energy.

It estimates every \$1m spent on renewable energy and exports creates 4.8 full-time jobs in renewable infrastructure or 4.95 jobs in energy efficiency. By comparison, \$1m on fossil fuel projects has been found to create 1.7 full-time jobs.

That suggests that if 10% of what the federal and state governments had indicated they would spend in response to Covid-19 was directed towards clean projects it could create 160,000 jobs.

"It represents a fraction of the immediate government stimulus package while generating significant job numbers and reorienting the economy towards a more strategic, low-carbon trajectory," it says.

It follows a push by the United Nations, banks, investors and financial institutions, and a cross-sector collection of groups representing much of Australian society including business organisations for measures to help recovery from Covid-19 to also address the climate crisis.

While several countries, including the European Union, South Korea and Canada, have backed green recovery measures, an analysis by Bloomberg New Energy Finance found the vast majority of stimulus money so far announced by governments would prop up the fossil fuel economy. The Morrison government has called for a recovery built on gas.

**It estimates every \$1m spent on renewable energy and exports creates 4.8 full-time jobs in renewable infrastructure or 4.95 jobs in energy efficiency.**

## Bulletin Board

## Gossip

JUN. 19, 2020

The EY report suggests about 58,000 jobs could be created in construction by clearing the way to accelerate the development of solar and wind farms that had already been planned.

WWF also called for a federal renewables stimulus package of nearly \$2bn, including 90% to be spent in the next two years, saying it could generate nearly \$10bn of economic benefits. The largest portion, \$520m, would be spent on improving energy efficiency and increasing renewable energy in manufacturing, with a goal of Australia becoming a global clean energy manufacturing hub.

Other recommended programs would help create manufacturing industries in batteries and electric buses and cut the cost of solar power for thousands of community organisations. It also recommends further boosting support for renewable hydrogen, which the government and industry have identified as a potential major export industry and local energy source.

Nicky Ison, WWF Australia's energy transition manager, said federal, state and territory governments had an opportunity to rebuild the economy in a way that set it up for prosperity in a world that valued low-carbon goods, in line with the Paris agreement.

She said an energy efficiency drive was a "no regrets" approach as it cut emissions while improving productivity, and an economic rebuild based on renewable energy could re-employ people in industries that had suffered some of the biggest job losses, including construction, manufacturing and professional, scientific and technical services.

"We think that this is a moment. The economy was struggling before the Covid crisis and it is struggling even more now, but a clean stimulus package can address issues holding back renewables and get the ball rolling on more than 100,000 jobs," she said.

A [leaked report](#) by a taskforce advising Australia's National Covid Coordinating Commission focused on finding ways to lower the cost of gas to help manufacturing recover and did not consider alternatives. Government agencies have found renewable energy is cheaper than fossil fuels. The commission's chair, Nev Power, later [distanced himself](#) from the recommendations in the leaked report but backed gas as central to the recovery.

An assessment by the Intergovernmental Panel on Climate Change, commissioned at the Paris summit by all signatories including Australia,

## Bulletin Board

## Gossip

JUN. 19, 2020

found limiting global heating to 1.5C above pre-industrial levels was likely to require the world [reaching net zero emissions by 2050](#). The Morrison government has not set this target for Australia.

Scientific analyses have found under current policies the world is currently headed for more than 3C of warming, an increase scientists have warned would lead to significant ecological collapse.

[theguardian.com](#), 7 June 2020

<https://www.theguardian.com>

### Chronic Lyme disease: how one tick bite can ruin your health for ever

2020-06-03

BARELY a summer day went by that I didn't hear someone talking about Lyme disease. In the four years I lived on Long Island in New York, checking for ticks became second nature. After a walk in the woods. After a stroll in the marshy grasses by the beach. After a backyard barbecue.

I remember the first one I found [on my clothing](#): a lone star tick, its distinctive white dot almost shining up at me from the crook of my elbow. I panicked until I found out that lone stars don't transmit Lyme disease.

The first time I found the kind of tick that does spread the disease burrowing into my leg, I retched, then rushed to the doctor; the second time, I calmly went to the clinic to have it removed and get tested. In time, panic gave way to low-level, background worry.

Maybe I was right to be alarmed. Lyme disease is on the rise around the world. This bacterial infection spread by tick bites can lead to joint pain, fatigue, neurological damage and even temporary facial paralysis. If caught early, it is treatable – in most cases. But some people report symptoms that never go away, even after treatment.

"For some people, Lyme disease symptoms never go away"

This condition is commonly known as chronic Lyme disease. Yet we still don't know whether Lyme disease, which is maddeningly difficult to diagnose, is [the true culprit](#). What is clear is that a growing group of people are in pain and distress. Helping them means finding an answer to a surprisingly difficult question: does chronic Lyme disease exist? Can a single tick bite really undermine your health for the rest of your life?

**"For some people, Lyme disease symptoms never go away"**

## Bulletin Board

## Gossip

JUN. 19, 2020

It is undisputed that Lyme disease is becoming more common. In the US, around 15,000 cases were reported each year in the late 1990s. Today, it is about 30,000 cases, although recent estimates from the Centers for Disease Control and Prevention suggest that 10 times as many people get the infection. In the UK, there are an estimated 2000 to 3000 new cases every year, but a recent analysis suggests the real figure may be closer to 8000. Elsewhere in Europe, Lyme disease cases have been steadily rising for more than 30 years, and the World Health Organization estimates that now at least 65,000 people in the region get the disease annually.

Lyme disease is nothing new. A bacterium that causes it, *Borrelia burgdorferi*, can now be found throughout North America as well as in parts of Europe and Asia. It was thought to have originated in North America, until a 2008 study of the bacterium's genes placed its origins in Europe. But by around 15,000 years ago – long before humans crossed the Bering Strait – it was present in North America, quietly colonising birds, small rodents and deer.

When humans arrived, we slowly reduced the number of predators that kept these host animals' numbers in check. As their numbers grew, so too did the number of ticks that transmit *B. burgdorferi*.

We didn't know about this particular danger until 1977, when Lyme disease was first identified. It was named after a town in Connecticut where a cluster of children developed what seemed to be juvenile arthritis after first getting a mysterious bullseye rash. This "Lyme arthritis" was eventually renamed Lyme disease, and a few years later entomologist Willy Burgdorfer pinned the blame on *B. burgdorferi*, a spirochete bacterium, so-called because it is shaped like a corkscrew. It causes the vast majority of Lyme disease cases in the US. In Europe, *B. burgdorferi* is still present, but two other species, *Borrelia afzelii* and *B. garinii*, cause most cases of Lyme disease.

The precise mechanisms behind Lyme symptoms aren't well understood, but we do know that when a tick carrying a type of *Borrelia* bites you, the bacteria replicate in the tick's gut and pass through its salivary glands into your bloodstream, a process that can take up to 48 hours. That may sound like a long time not to notice a tick hanging off your body, but most Lyme disease infections are brought on by a bite from a nymph, an immature tick that can be as small as 2 millimetres wide.

Some research indicates that the bacteria then activate enzymes that can cause collagen fibres – like those in tendons or ligaments – to break down, resulting in weakness or arthritis-like symptoms. Pain and tingling, as well

## Bulletin Board

## Gossip

JUN. 19, 2020

as more severe neurological damage, may be caused by the inflammation of tissues or nerves after direct contact with the bacteria, or it could be a result of immune responses to the bacteria.

Detecting *B. burgdorferi* is difficult. It replicates slowly but moves quickly out of the blood and into body tissues, making direct blood tests less effective. Even when we can find the bacteria, they are nearly impossible to grow in culture, meaning we need highly sensitive tests to identify them in order to confirm an infection. We simply don't have those, says John Aucott at Johns Hopkins University in Maryland.

Instead, we keep an eye out for a telltale bullseye rash, or erythema migrans, that 70 to 80 per cent of people get. It usually crops up a few days to a month after a tick bite and can linger for weeks. Spotting this distinctive rash isn't a foolproof diagnostic method, however. It can be easy to miss – either because it is in a hard-to-see place on your body or has faded before you notice.

It also may not also be visible under hair or on darker skin. A recent study led by researchers at the University of Maryland found that African Americans were less likely to notice the rash than white people, and were also more likely to have arthritis after contracting Lyme disease. One reason may be that if people don't see the rash, they are less likely to receive treatment before long-term symptoms set in.

If a rash has been spotted or you suspect Lyme infection, there are several kinds of tests that look for antibodies that the immune system produces to fight the infection. It can take several weeks for the body to produce enough antibodies to show up on these tests. These antibodies can also have similar proteins to those deployed to fight other invaders, leading to false positive results. And antibodies to Lyme disease can linger in the body after an infection has cleared, so these tests cannot determine whether someone has a current infection. All these issues mean that a combination of the two most common tests are only accurate about 40 per cent of the time.

For doctors, it can be a very frustrating situation, especially when it comes to assessing chronic symptoms. Lyme disease should be simple to treat because we have antibiotics that fight the bacteria that cause it. But because many people don't realise they are infected and tests for Lyme disease are so unreliable, it can be nearly impossible to determine whether someone who seems to have chronic Lyme disease was actually infected with Lyme initially or has another condition altogether.

## Bulletin Board

## Gossip

JUN. 19, 2020

"A lot of the work we do on a day-to-day basis as a clinician is detective work. And when you cannot find a clear biological marker that justifies what disease the patient has, it's extremely frustrating. But we often cannot find any evidence that bacteria are still there," says Marcelo Campos, a primary care physician in Massachusetts and a lecturer at Harvard Medical School.

That fact, and the nebulous definition of chronic Lyme disease, has led some doctors to question whether *B. burgdorferi* is really to blame. This scepticism has driven a bitter conflict between patient groups fighting for recognition of chronic Lyme disease and a medical establishment baffled by how to diagnose, let alone treat, something with no discernible cause.

This conflict is worsened by the tension over misuse of antibiotics: some activist groups, such as the International Lyme and Associated Diseases Society, advocate long-term antibiotic treatment for people with chronic Lyme disease. This is despite several clinical trials demonstrating that the approach works no better than placebo and comes with significant risks, including contributing to the rise in antibiotic-resistant bacteria.

These so-called Lyme wars are one of the latest chapters in a long history of the medical establishment dismissing hard to define chronic illnesses – such as chronic fatigue syndrome or fibromyalgia – or chalking up symptoms to attention-seeking or misidentified mental health issues.

"There is no doubt that chronic Lyme exists. The question is the cause"

To find out more, Aucott and his colleagues are running studies that enrol people at the time of their skin rash, so it is clear they have recently contracted Lyme disease. These participants have also never been diagnosed with other chronic pain or fatigue conditions. "They get treated with standard antibiotic therapy and most people get better, but about 10 per cent don't," he says. "So I don't know how anyone could say it doesn't exist."

He says there is now plenty of evidence to show that chronic Lyme, or what doctors now call post-treatment Lyme disease syndrome, definitely does exist. "[For people with Lyme disease], there's always a subgroup that has symptoms after therapy. There's really no doubt that they're there, the question is the cause. That's the controversy," says Aucott.

Because of the overlap in symptoms with some common pain and fatigue conditions, there aren't reliable figures for how many people report long-term Lyme symptoms. But some estimates suggest that up to 20 per

## Bulletin Board

## Gossip

JUN. 19, 2020

cent of people who get Lyme disease may experience post-treatment symptoms. If that is the case, a recent analysis calculated that, in 2016, there would have been between 69,000 and 1.5 million people in the US with post-treatment Lyme disease. The estimates for 2020 reached as high as 1.9 million cases.

"That the numbers were so high was an eye-opener," says Alison DeLong at Brown University in Rhode Island, who worked on the study. She and her colleagues believe the increasing rates of post-treatment Lyme disease syndrome may not be restricted to the US, especially in light of climate change (see "Ticks in a warming world").

These people may be forever changed after a tick bite. "Normally if you have an acute infection, everything gets better in a few weeks. This illness, if you get this, you never feel good again. There's something profoundly altered in the physiology of this unfortunate subset [of people] that develops post-treatment Lyme disease syndrome," says Aucott.

There are several hypotheses as to what that could be. Aucott and his team have found that changes in the body's immune response brought on by altered gene regulation patterns are seen in people who have had Lyme disease. This supports the idea that the infection triggers an autoimmune response, in which the body turns against its own healthy cells. This wouldn't require the presence of living bacteria, which would explain the experience of ongoing fatigue and pain after antibiotic treatment.

Another possibility is that antibiotics don't kill all the bacteria and instead leave behind some damaged organisms. In animal studies, these zombie bacteria grow slowly, cause more severe arthritis symptoms and resist standard antibiotic treatment. Here, though, there is some hope: last year, a study led by Ying Zhang at Johns Hopkins University found that a cocktail of three antibiotics cleared these persistent bacteria from mice.

There is a third possibility that is a bit of both of these: the amber theory. "The bacteria are dead and killed, but may leave behind protein and cellular fragments as if preserved in amber," says Aucott. These fragments may cause inflammation that results in joint pain and stiffness. "But it's a little hard for me to imagine these not being cleared away by the body's immune system for years," he says.

It could also be that there are no bacteria left at all, but that the illness alters neural networks, rewiring how a person perceives pain and fatigue. The repetition of pain over several months or years may change a person's attention to, or even anticipation of, pain, creating a kind of feedback loop.

## Bulletin Board

## Gossip

JUN. 19, 2020

"It's a neural pathway realignment that becomes self-perpetuating. And you see that in people with fibromyalgia," says Aucott.

Or it may be simpler than any of that. Post-treatment Lyme disease syndrome could be an entirely different condition caused by another bacteria passed on by ticks, says Campos. Just last year, a new tick-borne illness was identified in Mongolia after a farmer with a history of tick bites went to her local hospital complaining of fever and headaches. She tested negative for known tick-borne diseases, but when researchers analysed her blood and that of 86 others in the region with similar symptoms, they identified a new condition, naming it Alongshan virus after her hometown.

"We know ticks carry many bacteria and co-infection is quite common," says Campos. "But if you don't know what you're looking for, how do you test for it?"

Efforts are under way to create more reliable diagnostic tests, but for now, the best defence is to avoid tick bites (see "Tick check"). Soon, though, we may have a vaccine for Lyme disease. There was one, Lymerix, on the market briefly in the late 1990s, but it was caught up in anti-vaccine sentiment on the rise at the time. Despite a US Food and Drug Administration study confirming it was safe, Lymerix was voluntarily pulled by the manufacturer, wary of an endless string of lawsuits.

A new vaccine on the way should be effective against the six types of *Borrelia* that cause most Lyme disease in the US and Europe. "We are developing these vaccines for people living in the northern hemisphere on both sides of the Atlantic," says Thomas Lingelbach, president of the French biotech company Valneva, which is running human trials of the vaccine. Depending on the type of bacteria, between 70 and 90 per cent of people in the trials develop antibodies, he says. The vaccine should be available in 2023.

The trick won't just be making sure that the vaccine works, though. It is also fighting anti-vaccine sentiment and building enough trust to get people to take it, says Lingelbach.

Knowing a vaccine is on the near horizon may help ease the worry of those living in areas where Lyme disease is rife. But it won't help people who already have chronic Lyme.

Acknowledging the reality of post-treatment Lyme disease syndrome is a crucial first step towards solving the mystery of what causes it, and

## Bulletin Board

## Gossip

JUN. 19, 2020

developing treatments. But there is a long way to go before we can offer these people the relief that they seek.

newscientist.com, 3 June 2020

<https://www.newscientist.com>

### Scientists say they have found the cleanest air on Earth

2020-06-03

Scientists believe they have identified the world's cleanest air, free from particles caused by human activity, located over the Southern Ocean, which surrounds Antarctica.

In a first-of-its-kind study of the bioaerosol composition of the Southern Ocean, researchers from Colorado State University identified an atmospheric region which remains unchanged by human activity.

Weather and climate are closely linked, connecting each part of the world with other regions. As the climate changes rapidly because of human activity, scientists and researchers struggle to find a corner of the Earth unaffected by people.

However, professor Sonia Kreidenweis and her team suspected that the air over the Southern Ocean would be least affected by humans and dust from the world's continents.

Researchers found that the boundary layer air, which feeds the lower clouds over the Southern Ocean, was free from aerosol particles produced by human activity -- including burning fossil fuels, planting certain crops, fertilizer production, and wastewater disposal -- or transported from other countries around the world.

Air pollution is caused by aerosols, which are solid and liquid particles and gases that are suspended in the air.

Researchers decided to study what was in the air, and where it came from, using bacteria in the air as a diagnostic tool to infer the properties of the lower atmosphere.

Research scientist and co-author of the study Thomas Hill explained that "the aerosols controlling the properties of SO (Southern Ocean) clouds are strongly linked to ocean biological processes, and that Antarctica appears to be isolated from southward dispersal of microorganisms and nutrient deposition from southern continents," he said in a statement.

**"Overall, it suggests that the SO is one of very few places on Earth that has been minimally affected by anthropogenic activities," he added.**

## Bulletin Board

## Gossip

JUN. 19, 2020

“Overall, it suggests that the SO is one of very few places on Earth that has been minimally affected by anthropogenic activities,” he added.

Scientists sampled the air in the marine boundary level -- the part of the atmosphere that has direct contact with the ocean -- while aboard a research boat traveling south to the Antarctic ice edge from Tasmania, Australia. Scientists then examined the composition of airborne microbes, which are found in the atmosphere and often dispersed thousands of kilometers by the wind.

Using DNA sequencing, source tracking and wind back trajectories scientist and first author Jun Uetake found that the microbes' origins were from the ocean.

From the bacterial composition of the microbes, researchers concluded that aerosols from distant land masses and human activities, such as pollution or soil emissions caused by land use change, were not traveling south and into the air.

Scientists say that the results show a stark difference to all other studies from oceans both in the northern hemisphere and subtropics, which found that most microbes came from upwind continents.

In the study, published Monday in the Proceedings of the National Academy of Sciences journal, scientists described the area as «truly pristine.»

Air pollution is already a global public health crisis, and kills seven million people each year, according to the World Health Organization (WHO).

Studies have shown that air pollution increases the risk of heart disease, stroke and lung cancer.

More than 80% of people living in urban areas that monitor air pollution are exposed to air quality levels that exceed WHO guideline limits, the health organization said, and low- and middle-income countries suffer from the highest exposures.

However, as studies have shown, air pollution can cross geographical boundaries, and affect people hundreds of miles away from where it originated.

wqad.com, 3 June 2020

<https://www.wqad.com>

## Bulletin Board

## Gossip

JUN. 19, 2020

### Apollo Bay distillery recalls gin bottles that are actually filled with hand sanitiser

2020-06-10

A Victorian distillery has been forced to recall some of its gin bottles after it was revealed they were actually filled with hand sanitiser.

The Apollo Bay Distillery sold nine bottles of its SS Casino Gin over the weekend before realising they had been incorrectly labelled.

The gin bottles were actually filled with hand sanitiser containing 1.45 per cent glycerol and 0.125 per cent hydrogen peroxide.

The bottles were all sold through the Great Ocean Road Brewhouse bottleshop.

A spokesman for the Apollo Bay Distillery said one woman had reported feeling nauseous after consuming the hand sanitiser, but had since recovered.

“The bottles were incorrectly labelled and had no seal,” the spokesman said.

“We understand they are not toxic.

“Should you have purchased a bottle of SS Casino Gin between Friday 5 June to Sunday 7 June please return it to where you purchased it from for a full refund or replacement.”

The spokesman said by late Tuesday afternoon six of the nine bottles had been recovered and the team had purchasing details from the other three sales and were working to track the customers down through their bank details.

The mix-up has been put down to human error.

According to the product safety recall notice, the bottles can be identified because they have no shrink wrap seal.

“This product is not to be consumed,” the recall notice says.

“Consumption of the product may have side effects including nausea, headaches, dizziness, bloating, vomiting, thirst and diarrhea.

“If you experience any of these symptoms please seek medical advice.”

**The Apollo Bay Distillery sold nine bottles of its SS Casino Gin over the weekend before realising they had been incorrectly labelled.**

## Bulletin Board

## Gossip

JUN. 19, 2020

Many small distilleries made the switch from alcohol to hand sanitiser when the coronavirus restrictions impacted heavily on their businesses.

abc.net.au, 10 June 2020

<https://www.abc.net.au>

### In the Chesapeake Bay, saving seagrasses can fight ocean acidification

2020-06-02

When scientist Wen Jun Cai and his colleagues boated across the pea-soup-like waters of the upper Chesapeake Bay in the summer of 2016, water sampling kits and pH sensors in hand, they didn't expect to find chemical magic at play.

The scientists were taking stock of a looming problem facing the 200-mile-long bay: the acidification of its waters, a human-caused phenomenon that threatens the health of the crabs, oysters, and fish iconic to the large estuary.

They started collecting their samples in the recently restored, vibrant underwater grass beds of the Susquehanna Flats near the top of the bay, and motored their way some 60 miles downstream to the deep central channel.

When they rounded up their hundreds of data points and analyzed them, they found evidence of something surprising and encouraging: Gently waving seagrasses in the bay are performing a magnificent chemical trick. As they photosynthesize in the beating sunshine, they produce tiny granules of a carbon-based mineral that acts like a miniature antacid tablet.

And those acid-neutralizing "micro-Tums" don't stay put. They're swept miles down the length of the bay, eventually dissolving into the deepest waters, which have long been soured by acidification caused by human sources like agricultural runoff and untreated waste.

"It's like the seagrasses are producing antacids that counter the indigestion of the bay," says Jeremy Testa, a marine ecologist at the University of Maryland and an author of the paper in Nature Geoscience describing the newly discovered phenomenon.

## Bulletin Board

## Gossip

JUN. 19, 2020

Without this acid-neutralizing trick, the bay's waters and shelled creatures would be even more vulnerable to the human-caused threats, he says.

#### Acid waters run deep

The Chesapeake gets its name from the Algonquin word for "great shellfish bay." For thousands of years, its rich ecology depended on the ways its shellfish, grasses, fish, and other species interacted; each influenced the chemistry and biology of the others, in a delicate biological dance.

Seagrasses and other underwater plants packed the bay's shallows, stilling and smoothing the surrounding water, leaving it clear and clean for baby fish, crabs, and shellfish to populate. Vegetation stabilized the muddy bottom during storms. And it absorbed the brunt of wind and waves, protecting shorelines against erosion.

But as more and more people populated the land around the bay, the grasses took hit after hit. A steady flow of nitrogen-rich pollutants overloaded the waters; the grasses and other underwater plants died off en masse. Between the 1950s and 1980s, vegetation coverage across the bay plummeted. Only 10 percent of sites in the upper bay had vegetation when they were surveyed in 1980.

The nutrient overload also spurred enormous, suffocating algal blooms at the water's surface. When such blooms happen, the algae die off and sink to deeper water, where they're eaten by bacteria that use up any oxygen in the water and breathe out carbon-rich acid waste, creating "dead zones." Almost nothing can survive in such corrosive waters. Worse, during strong winds or at certain times of the year, currents can sweep that deep, super-acidic water into places populated by creatures like oysters and crabs, potentially eroding their ability to maintain their calcium-carbonate based shells.

"Acidified waters can be really challenging for oysters, especially in their larval stage," says Allison Colden, a biologist with the Chesapeake Bay Foundation.

In other coastal regions, particularly along the U.S. West Coast, acidification has already damaged shellfish populations, thinning their shells and messing with their offspring's ability to mature. But scientists aren't totally sure if those same effects have hit the East Coast. In estuaries like the Chesapeake, natural acid levels vary a lot, so shell-forming creatures have a built-in ability to deal with some amount of ups and downs. The worry, for

## Bulletin Board

## Gossip

JUN. 19, 2020

some scientists, is that there might be a tipping point beyond which the iconic species of the bay might not be able to adjust.

“We don’t have enough data anywhere in the world to tell us exactly how those creatures are going to meet the thresholds of acidification,” says [Doug Myers](#), a scientist also with the Chesapeake Bay Foundation.

They’re particularly concerned because there’s another force, besides nutrient overloading, that’s making the bay’s water more acidic: human-caused burning of fossil fuels. That leads to the buildup of carbon dioxide in the air, which gets pulled into the surface waters as ocean and air make their way toward equilibrium, where it dissolves and makes the water more acidic.

During the early 2000s, states bordering the bay collaborated to rein in polluting runoff, putting the bay a “[nutrient diet](#)—” and in response, it began to heal. Old seagrass seeds, long buried in the gooey sediments, started to sprout as the water above them cleared. By the mid-2010s, underwater vegetation covered expanded over an extra 65 square miles of the Bay, more than 300 percent more area than was covered in the 1980s.

Those grasses, like the ones in the Susquehanna Flats, can offset some of the acidity. But they’ll have to work harder and harder as carbon dioxide concentrations in the atmosphere grow.

“This is one of the big questions for us all,” says [Emily Rivest](#), a biologist at the Virginia Institute of Marine Science. “What’s going to happen to our oysters, our blue crabs, all the things that live in our waters, as the waters get more acidic?”

#### Grasses to the rescue

It’s obvious just from looking at the Susquehanna Flats that they’re doing something special, Testa says. Outside the beds, the water often looks pea-green. But inside, it’s crystal clear and much warmer than the water outside the Flats. When they looked closely, they found that even the chemistry was different.

As they photosynthesize, seagrasses and other vegetation pull particular forms of carbon out of the surrounding water, making that water less acidic. They use some of that carbon to build their plant bodies, but turn some of it into tiny crystals of calcium carbonate, a chemical variant on the material that shells are made of. The plants hoard these crystals—which are essentially tiny antacids—both inside and on the surface of their leaves.

## Bulletin Board

## Gossip

JUN. 19, 2020

The crystals are big enough to feel with your fingers, like a fine grit coating the leaves, says Myers. When a grass dies, it disintegrates, releasing the built-up crystals from its inside as well as out.

The crystals make a big difference for the water chemistry and biology up near the Susquehanna Flats. But they also make a big difference far downstream, demonstrating with unusual clarity how interconnected the ecology of the bay can be. In total, the team calculated, the seagrass-sourced crystals reduced the acidity of the down-bay waters, some 60 miles away, by about 0.6 pH units. They reduced the acidity of the water by four times than it otherwise might have been (because the pH scale is logarithmic, small changes in the numbers on the pH scale mean big changes in terms of acidity).

“If not for the dissolution [of the tiny crystals], the pH downstream would be even lower,” says Cai (a lower value of pH signifies a more acidic environment). “So the vegetation upstream provides a more stable environment for what’s living down the bay.”

Seagrasses and other vegetation do this chemical trick elsewhere, as well, and scientists have seen similar local chemistry shifts in places where grasses have been restored, like the estuaries fringing the Loire River and Tampa Bay. But they haven’t seen this long-range effect before.

It’s not yet clear exactly what impact the seagrass-driven help has on the blue crabs or the oysters. But it does seem clear to many scientists that the whole bay can benefit from the effect as the grasses spread their little acid-neutralizing crystals far and wide—also serving as building material for the shell-growers downstream.

“The dissolving of last year’s grass beds is helping to feed this year’s oysters [to help them build their shells],” says Myers.

The new discovery makes a strong case for restoring even more of the seagrasses in the bay, says [Jonathan Lefcheck](#), an ecologist at the Smithsonian Environmental Research Center in Edgewater, Maryland. “You just see so clearly that there are these knock-on effects [from the seagrass restoration],” he says.

## Bulletin Board

## Gossip

JUN. 19, 2020

"Everything is connected. Something that was happening under our noses—this big unintended benefit, this added value—it turns out we're solving two problems by attacking just one."

[nationalgeographic.com](https://www.nationalgeographic.com), 2 June 2020

<https://www.nationalgeographic.com>

### Room-temperature superconductors could revolutionize the world's energy

2020-06-07

Waste heat is all around you. On a small scale, if your phone or laptop feels warm, that's because some of the energy powering the device is being transformed into unwanted heat.

On a larger scale, electric grids, such as high power lines, lose over 5% of their energy in the process of transmission. In an electric power industry that generated more than US\$400 billion in 2018, that's a tremendous amount of wasted money.

Globally, the computer systems of Google, Microsoft, Facebook, and others require enormous amounts of energy to power massive cloud servers and data centers. Even more energy, to power water and air cooling systems, is required to offset the heat generated by these computers.

Where does this wasted heat come from? Electrons. These elementary particles of an atom move around and interact with other electrons and atoms. Because they have an electric charge, as they move through a material – like metals, which can easily conduct electricity – they scatter off other atoms and generate heat.

Superconductors are materials that address this problem by allowing energy to flow efficiently through them without generating unwanted heat. They have great potential and many cost-effective applications. They operate magnetically levitated trains, generate magnetic fields for MRI machines, and recently have been used to build quantum computers, though a fully operating one does not yet exist.

But superconductors have an essential problem when it comes to other practical applications: They operate at ultra-low temperatures. There are no room-temperature superconductors. That "room-temperature" part is what scientists have been working on for more than a century. Billions of dollars have funded research to solve this problem. Scientists

## Bulletin Board

## Gossip

JUN. 19, 2020

around the world, including me, are trying to understand the physics of superconductors and how they can be enhanced.

UNDERSTANDING THE MECHANISM — A superconductor is a material, such as a pure metal like aluminum or lead, that when cooled to ultra-low temperatures allows electricity to move through it with absolutely zero resistance. How a material becomes a superconductor at the microscopic level is not a simple question. It took the scientific community 45 years to understand and formulate a successful theory of superconductivity in 1956.

While physicists researched an understanding of the mechanisms of superconductivity, chemists mixed different elements, such as the rare metal niobium and tin, and tried recipes guided by other experiments to discover new and stronger superconductors. There was progress, but mostly incremental.

Simply put, superconductivity occurs when two electrons bind together at low temperatures. They form the building block of superconductors, the Cooper pair. Elementary physics and chemistry tell us that electrons repel each other. This holds true even for a potential superconductor like lead when it is above a certain temperature.

When the temperature falls to a certain point, though, the electrons become more amenable to pairing up. Instead of one electron opposing the other, a kind of "glue" emerges to hold them together.

KEEPING MATTER COOL — Discovered in 1911, the first superconductor was mercury (Hg), the basic element of old-fashioned thermometers. In order for mercury to become a superconductor, it had to be cooled to ultra-low temperatures. Kamerlingh Onnes was the first scientist who figured out exactly how to do that – by compressing and liquefying helium gas. During the process, once helium gas becomes a liquid, the temperature drops to -452 degrees Fahrenheit.

When Onnes was experimenting with mercury, he discovered that when it was placed inside a liquid helium container and cooled to very low temperatures, its electric resistance, the opposition of the electric current in the material, suddenly dropped to zero ohms, a unit of measurement that describes resistance. Not close to zero, but zero exactly. No resistance, no heat waste.

This meant that an electric current, once generated, would flow continuously with nothing to stop it, at least in the lab. Many

## Bulletin Board

## Gossip

JUN. 19, 2020

superconducting materials were soon discovered, but practical applications were another matter.

These superconductors shared one problem – they needed to be cooled down. The amount of energy needed to cool a material down to its superconducting state was too expensive for daily applications. By the early 1980s, the research on superconductors had nearly reached its conclusion.

**A SURPRISING DISCOVERY** — In a dramatic turn of events, a new kind of superconductor material was discovered in 1987 at IBM in Zurich, Switzerland. Within months, superconductors operating at less extreme temperatures were being synthesized globally. The material was a kind of ceramic.

These new ceramic superconductors were made of copper and oxygen mixed with other elements such as lanthanum, barium, and bismuth. They contradicted everything physicists thought they knew about making superconductors. Researchers had been looking for very good conductors, yet these ceramics were nearly insulators, meaning that very little electrical current can flow through. Magnetism destroyed conventional superconductors, yet these were themselves magnets.

Scientists were seeking materials where electrons were free to move around, yet in these materials, the electrons were locked in and confined. The scientists at IBM, Alex Müller, and Georg Bednorz had actually discovered a new kind of superconductor. These were the high-temperature superconductors. And they played by their own rules.

**ELUSIVE SOLUTIONS** — Scientists now have a new challenge. Three decades after the high-temperature superconductors were discovered, we are still struggling to understand how they work at the microscopic level. Creative experiments are being conducted every day in universities and research labs around the world.

In my laboratory, we have built a microscope known as a scanning tunneling microscope that helps our research team “see” the electrons at the surface of the material. This allows us to understand how electrons bind and form superconductivity at an atomic scale.

We have come a long way in our research and now know that electrons also pair up in these high-temperature superconductors. There are great value and utility in answering how high-temperature superconductors work because that may be the route to room-temperature

## Bulletin Board

## Gossip

JUN. 19, 2020

superconductivity. If we succeed in making a room-temperature superconductor, then we can address the billions of dollars that it costs in wasted heat to transmit energy from power plants to cities.

More remarkably, solar energy harvested in the vast empty deserts around the world could be stored and transmitted without any loss of energy, which could power cities and dramatically reduce greenhouse gas emissions. The potential is hard to imagine. Finding the glue for room-temperature superconductors is the next million-dollar question.

[inverse.com](https://www.inverse.com), 7 June 2020

<https://www.inverse.com>

## Bulletin Board

## Curiosities

JUN. 19, 2020

**Climate change creates camouflage confusion in winter-adapted wildlife**

2020-06-01

A thousand feet above the winter landscape, a golden eagle is on the hunt.

Riding the wind, the bird careens over scrubby contours and rolling hillsides. It's late April and the days are growing longer. The snow melted weeks ago, revealing the dormant vegetation beneath. Suddenly, the eagle spots a shock of white on the brown landscape. The bird swoops, extending its talons toward the bounding white blob.

Here, on the dark earth, the snowshoe hare meets an untimely end.

Across the world's temperate regions, climate change is toying with the survival strategies of winter-adapted animals. Twenty-one species, from lemmings to ptarmigans, cope with the changing of the seasons by molting from brown to white, and back again. This transformation allows the animal to avoid easy detection by predators, such as birds of prey, foxes and lynx, during the harsh winter.

Molting is triggered by changes in air temperature, as well as a baked-in biological response to the predictable change in day length, known as the photoperiod, that occurs at the same time every fall and spring. But snow cover is diminishing due to climate change, with snows arriving later in the fall and melting earlier in the spring. This has created a phenological mismatch for at least half of the species that rely on winter camouflage to make it through the season. Rather than disappearing into their surroundings, their ill-adapted coats are making them stand out—often with fatal consequences.

Such climate-change induced phenological mismatches have been the subject of robust study in recent decades when it comes to hibernation, spring green-up, and migration. But research on the consequences of climate change for winter camouflage is still in its infancy.

In North America and Europe, a growing contingent of researchers is exploring what the future may hold for these vulnerable white beacons as the world grows warmer and snow cover declines.

**Survival of snowshoe hares**

Of all the winter-white species, the snowshoe hare, *Lepus americanus*, is the best understood when it comes to camouflage mismatch. That's

## Bulletin Board

## Curiosities

JUN. 19, 2020

largely thanks to Marketa Zimova, a biologist and post-doctoral student at the University of Michigan who has dedicated nearly a decade to studying the coloring of the animals.

Snowshoe hares can be found across Canada and in more than a dozen U.S. states, with their range extending as far south as the Sangre de Cristo mountains in New Mexico.

Between 85 and 100 percent of snowshoe hare mortality is already related to predation. To fend off would-be predators, hares stay completely still, refusing to hide or flee until they have no other choice. But when considering a lack of camouflage, this survival strategy is ill-fitting; the hares simply contrast too greatly with the bare, brown ground to go unnoticed.

In a 2016 analysis of snowshoe hares in Montana, Zimova and her colleagues found that weekly survival rates decreased by up to 7 percent in snowshoe hares with mismatched coats. By mid-century, snowpack duration in the state is forecasted to shorten by up to 35 days, and by up to 69 days by 2100.

In turn, this color mismatch will only worsen, creating a four- to eight-fold increase in the number of days when the hares are out of sync with their environment.

It's possible the animals could alter their behavior by sticking to areas with dense understory or rocks, but so far it doesn't appear the rabbits have made any changes to their daily regimen.

Without such behavioral adaptation, Zimova predicts the hare's population growth rate could decrease by up to a quarter by the end of the century in Montana, leading to steady population decline of about 12 percent per year. Other researchers studying Wisconsin's snowshoe hares found that weekly survival rates decreased by 12 percent in mismatched animals and that the hare's range is shifting northwards by about 5.5 miles per decade.

In a study of mountain hares, *Lepus timidus*, in Norway, researchers reviewing one 12-year period from 2003 to 2014 also found that the abundance of mountain hares decreased in years when snow cover was short-lived and the loss was even greater in areas with lots of predators.

From east to west, things don't look good for the milk-white hares.

**Rather than disappearing into their surroundings, their ill-adapted coats are making them stand out—often with fatal consequences.**

## Bulletin Board

## Curiosities

JUN. 19, 2020

However, Zimova and her colleagues are exploring the potential for another crucial adaptation strategy—the hare’s ability to adjust the timing of when it switches to brown or white.

“The availability of light is the main trigger, and that starts this whole cascade of shedding and growing a new coat,” she explained to EHN. “But the fine-tuning of it—how quickly or slowly that happens—can be adjusted based on temperature and snow cover.”

In early studies, Zimova didn’t believe that the hares had much control over when molting occurred. But more recent investigations revealed that the hares have more plasticity than originally thought.

Zimova has found that if the air temperature is really cold in March or April, the hare’s reversion to brown will be delayed—similar to how a plant might hold off on flowering.

“But there’s still a limit to how much it can be tweaked—about three weeks. It’s not enough to avoid the mismatch altogether in years with really low snow cover,” she said.

#### The potential loss of “a beautiful, original bird”

Winter camouflage isn’t limited to mammals; some birds also swap out their brown plumage as cold weather arrives.

The willow ptarmigan, or willow grouse, *Lagopus lagopus*, makes its home in the birch forests and tundra of Europe, Canada, Alaska, and Siberia. In Finland, the willow ptarmigan is found in the Arctic and sub-Arctic, but also in the country’s central and southern boreal forests where they often dwell near mires and bogs.

Since the 1960s, this southerly population of willow ptarmigan has been declining, often tracking closely with the human drainage and afforestation of peatlands. But scientists suspect that a mismatch in camouflage may also be contributing to the bird’s demise in more recent decades.

In a study published earlier this year in *Scientific Reports*, researchers at the [Natural Resources Institute Finland](#) dug through 21 years of willow ptarmigan census data, predator abundance data, and local daily snow depth measurements to see if they could unearth a phenological camouflage mismatch contributing to the bird’s decline.

Snow typically arrives in October and November and disappears by May in Finland. They found that “there was a quite clear result that the decline of

## Bulletin Board

## Curiosities

JUN. 19, 2020

the species was strongest at the sites where, and during the specific years when the preceding April was most snow-free,” Markus Melin, lead author of the study, told EHN.

According to their analysis, each snow-free day in April caused a population decline of 3.1 percent. Comparatively, a lack of snow in the autumn did not have the same severe repercussions for the birds.

“In the autumn, the birds are more mobile,” said Melin. “But in springtime, the females are settling into their nesting sites which makes them more vulnerable. And the males are more careless because they’re getting ready to breed.”

The stark white birds against the dark ground, therefore, are an easy target for predatory goshawks which dine on the ptarmigans in abundance. During snow-free years, Melin noted scientists found an excessive amount of ptarmigan bones and feathers in goshawk nests.

Saving the southern willow ptarmigan will be tricky. Finland should continue its conservation efforts that restore peatlands, asserted Melin, as the birds are efficient breeders and have been found to breed in these restored areas.

The loss of snow cover, however, is predicted to worsen. In southern and central Finland, “all projections point to more and more snow-free seasons,” said Melin, which would likely mean the loss of “a beautiful, original bird.”

#### Weasels “are waiting for months for the first snow”

In northern ecosystems, weasels play the role of both predator and prey. These slinky animals will feed on small rodents, like mice and voles, as well as birds, frogs, fish, and eggs. But they’re also hunted by foxes, pine martens, and birds of prey.

There are three species in the mustelidae family that molt between the seasons: long-tailed weasel, least weasel, and stoat.

In Poland’s Białowieża Forest, scientists have been studying the least weasel, *Mustela nivalis*, which occurs in two varieties: one subspecies that stays brown year-long, and another that adopts winter white camouflage.

Even under normal circumstances, between 80 and 90 percent of the population is killed by predators during the winter. The weasels often make up for this loss with high reproductive rates, giving birth to kits twice a year.

## Bulletin Board

## Curiosities

JUN. 19, 2020

But like elsewhere in the world, winter snow cover isn't what it once was. Typically snow arrives in December and lasts through the end of March. "Last winter, there was almost no snow at all," Karol Zub, a biologist at the [Mammal Research Institute of the Polish Academy of Sciences](#), told EHN. "And the snow that was there was in such a thin layer it didn't cover the weasels; they needed at least five to six centimeters. It was patchy and not a perfect background for camouflage."

Zub and his colleagues have found that the white subspecies has been declining in Białowieża Forest as snow cover decreases. "The problem is that they are turning white at the beginning of November. The air temperatures are similar to what they were 20 years ago so it's still cold. The day is shorter. The signal for molting is the same. But then they are waiting for months for the first snow."

During that time, the weasels are easily hunted by larger animals.

The one thing that might save the weasels from a snowless future would be if air temperatures were to warm in November as well. That would delay the molt, which Zub said is slowly beginning to happen in the forest.

But other researchers wonder if there could be another solution.

#### Adaptation by natural selection

At a [University of Montana](#) laboratory, scientists are investigating whether winter-white species could adapt via evolutionary rescue—the process whereby evolutionary adaptation occurs fast enough to allow the population to recover before they disappear.

Already, some snowshoe hare populations no longer turn white in winter. "Those are in areas with less snow, or unpredictable snow, in places like Washington and Oregon," said Zimova. "But we don't know when or how these [populations] arose." This is the next critical stage of research.

Jeff Good, an evolutionary biologist and director of the University of Montana lab, is using a genetic approach to understand the potential for adaptive response in hares. He hopes to map out what determines the frequency and the locations of different camouflage strategies.

Anecdotally, scientists have observed snowshoe hares in all different color phases on a single day in Montana, suggesting that the animals aren't all molting at the same rate.

Right now, the lab is in the early stages of figuring out the specific genes and genetic changes that determine what makes a hare brown or white

## Bulletin Board

## Curiosities

JUN. 19, 2020

during the winter. "The difference between brown and white is encoded in a single gene that involves pigmentation," Good told EHN. "It seems to be a relatively simple switch that determines if you grow out a white coat or a brown coat."

The winter-brown gene is a recessive trait, which means that many winter-white hares have the potential to make a winter-brown hare if they were paired with another winter-white hare that carried the same recessive brown gene. In Montana, less than about 1 percent of the snowshoe hare population stays brown, but Good's genetic testing reveals that the adaptation potential for winter-brown could be greater than what is visible to the naked eye.

Whether or not natural selection works depends on how that winter-brown gene is spread around populations. Even though the variation for winter-brown exists, it might not exist in a sufficient amount for populations to actually respond at a large scale.

In places like Poland's Białowieża Forest, such natural selection could be easier for the least weasel, since one abundant variety already stays brown year-long.

Still, Good thinks it's likely that this winter-brown adaptation will become more prominent as snow cover decreases. The hares that turn white will be killed off in higher numbers, selecting for those that remain brown year-long. However, he cautions that natural selection might not work rapidly enough to respond to loss of snow. But, "it tells us how these populations could possibly adapt."

[ehn.org](#), 2 June 2020

<https://www.ehn.org>

#### Around the world, indigenous seed banks are helping to preserve culture, boost nutrition and protect the environment

2020-06-02

In the central highlands of Guatemala, Rosalia Asig Cho ushers a small group of visitors into a one-room building, filled floor to ceiling with shelves of earthenware cylinders containing seeds from Indigenous families across the area: corn, amaranth and other crops almost lost during Guatemala's [decades-long civil war](#).

**Now around 95 percent of the energy we get from food comes from only about 30 kinds of food crops.**

# Bulletin Board

## Curiosities

JUN. 19, 2020

Seed banks, usually associated with the massive “doomsday vault” in Svalbard, with its nearly 1 million samples, are seen as backup copies of crops that might otherwise be lost due to natural or human factors.

Experts say seeds from traditional agricultural varieties — otherwise known as landraces or heirloom breeds — could help solve food shortages and malnutrition, as well as boost food system resilience to climate and cultural challenges.

According to the Food and Agriculture Organization of the United Nations (FAO), in the 20th century, around three-quarters of the world’s crop genetic diversity has been lost as farmers adopted high-yielding breeds with relatively little genetic diversity. Now around 95 percent of the energy we get from food comes from only about 30 kinds of food crops.

But as Asig Chó, coordinator of the agricultural development non-governmental organization Qachuu Aloom, explains, Indigenous communities around the world have been pioneers in preserving and reintroducing traditional agricultural varieties.

“Our work began in 2003, when families began to gather the seeds they have in their home, mainly corn and beans,” she says, “But most of the families did not have seeds from native plants.”

She says many of the families lost their seeds during the country’s armed conflict. Another factor was the introduction of hybrid seeds and agrochemical-based farming methods from overseas.

Now the organization has 500 active members — 80% of them women — spread across the territory of the Maya Achi Indigenous group of Guatemala. Their aim is to help farmers get better at traditional and agroecological farming practices while helping to preserve native seed. The seed room provides the raw materials for this process and for the circular gardens and raised beds at their main seed farm outside of Rabinal, Guatemala. The project also has a diplomatic role: Seeds from the collection have been sown in the United States by students and supporters of the organization.

Indigenous efforts to preserve seeds scattered by conflict aren’t limited to Guatemala. In February 2020, the Cherokee Nation became the first Indigenous nation in the U.S. to deposit its traditional seeds in the Svalbard vault.

Pat Gwin, senior director of the Cherokee Nation’s Environmental Resources group, says the tribe has focused since 2005 on finding and

# Bulletin Board

## Curiosities

JUN. 19, 2020

cultivating the crops lost during the forced relocation of the Cherokee people from the southeastern U.S. to Oklahoma during the 1830s.

“In 1838, only one crop went with the tribes because the tribes didn’t feel like it was right to uproot them,” he says. “Ninety-nine percent of those things were not removed with us, so we started at zero.”

He says the Cherokee Nation Seed Bank now preserves more than 100 different kinds of seeds. Last year they distributed close to 10,000 packages of seeds to growers across the U.S.

### Better Nutrition

Colombian scientist Nora Castañeda-Álvarez, project manager with the Seeds for Resilience project at the international NGO Crop Trust, says seed banks conserve many crops that are relevant to food security.

Part of the same organization that runs the Svalbard vault, Seeds for Resilience works with national-level seed banks in Africa to drive more resilient and diversified food production incorporating crops such as sorghum, millets and cowpea.

Castañeda-Alvarez says that traditional varieties can be more nutritious than other varieties. Separate studies have shown this to be true in eggplants and chickpeas.

“Nowadays, landraces are being used in breeding programs to enhance the nutritional profile of several crops,” Castañeda-Alvarez says, adding that one example of this is in the development of a more nutritious breed of maize (corn).

Back in Guatemala, Asig Cho also highlights nutrition as an advantage.

“The varieties of the seeds that we have in our seed house are from the region of the Maya Achi people, in the northern region of Guatemala,” Asig Cho says. “This ancestral seed has nutritional properties that can prevent malnutrition in children and the family in general.”

### Toolbox for Climate Change

Ebrahim Jahanshiri, Malaysian-based program director at Crops For the Future, an international partnership organization, says local crop varieties are key to boosting food security as climate changes.

Jahanshiri says many underutilized crops, which Crops For the Future is aiming to further develop, are grown in marginal conditions, and that

# Bulletin Board

## Curiosities

JUN. 19, 2020

makes them suitable candidates for developing solutions for climate change.

“A solution might also come from using other adaptable crops in the food system rather than just digging deeper into the genetic makeup of major crops like maize,” Jahanshiri says, “They could also potentially require less investment and quicker returns compared to over-researched crops because the majority of them are native crops that are domesticated locally but are neglected by the governments and researchers.”

Castañeda-Alvarez offers the example of a sorghum variety from Burkina Faso as a good illustration of the potential of traditional varieties.

“A traditional sorghum landrace was rediscovered through participatory plant breeding, and it has traits that help the crop to cope with the changing climatic conditions,” she says.

### Preserving Cultural Heritage

Both Gwin and Asig Cho say that their seed banks are also key to preserving the cultural heritage of their respective Indigenous groups.

Given that the Cherokee people were scattered across the continental U.S., Gwin says that anecdotally, many of those cultivating the traditional varieties see it as part of keeping their traditions alive.

“A lot of Cherokees live in California and they view the opportunity to grow these crops as a tangible connection to their heritage,” he says.

### Bottom of Form

Gwin says the four most important preserved varieties are corn, beans, squash and native tobacco.

“One of our ceremonies is the green corn ceremony, so of course, you need green corn for that,” he says.

For Asig Cho, the preservation of seeds is closely linked to the success of Guatemalan Indigenous communities, particularly the women members.

“The dream is to achieve the strengthening and consolidation of an organization that watches over the well-being of its own people, especially women and their families,” she says.

She tells the visitors gathered in the seed room that Qachuu Aloom, which translates as “Mother Earth,” uses its role as a women’s organization to

# Bulletin Board

## Curiosities

JUN. 19, 2020

focus on using the conservation of native seeds as the basis of their own development.

After eating a lunch that includes leafy green and whole-grain tortillas prepared using ingredients that are only still available thanks to the efforts of the seed bank, the guests leave — taking with them new awareness of the potential of Indigenous seeds, small as they seem, to change the world in a very big way.

ensia.com, 2 June 2020

<https://www.ensia.com>

### Scientists agree on the need to protect 30% of the seas. But which 30%

2020-06-08

Sail 200 nautical miles, or 370 kilometers, from any coastline, and you’ll enter a region called the “high seas,” beyond the control of any country. While many people never get to dip below the surface of the open ocean, it hosts a rich and complex submarine world. The upper layers generate rich phytoplankton blooms, which attract a multitude of species and create ideal feeding grounds for whales, sharks and turtles. Dive deeper, and you’ll find bioluminescent jellyfish, long-snouted eels, and sponges made from silica, the same substance as in glass. There are entire mountain ranges in the deep ocean, as well as hydrothermal vents formed from millions of years of volcanic activity.

Despite the rich biodiversity of the high seas, only about 1% are currently protected. The United Nations Convention on the Law of the Sea does provide some specification of what activities can and can’t be done in the open ocean, but experts say it doesn’t do enough to protect the high seas.

In 2018 and 2019, representatives from the U.N. gathered to discuss the establishment of a new high seas treaty, which would aim to protect marine biodiversity through a series of marine protected areas (MPAs). Right now, most MPAs are established near coastlines and within the exclusive economic zones (inside that 200-nautical-mile band) of various countries, falling within those nations’ authority. To establish MPAs in the high seas would be an unprecedented move, and would require the cooperation of many governmental bodies and organizations. But if it’s accomplished, it would be a landmark deal and a game changer for ocean conservation.

**Despite the rich biodiversity of the high seas, only about 1% are currently protected.**

# Bulletin Board

## Curiosities

JUN. 19, 2020

The U.N. negotiations have focused on protecting 30% of the ocean by the year 2030, which is what scientists say is necessary to safeguard biodiversity, avoid fishery collapse and build ocean resistance to climate change.

“The high seas, being two thirds of the world’s oceans, has a lot to contribute to a global target of protecting 30% of the world’s oceans,” Elizabeth Karan, project director of the Protecting Ocean Life on the High Seas program at [Pew Charitable Trusts](#), told Mongabay. “But there is no legal mechanism to do so just yet, so we really need to push towards finalizing the new high seas treaties ... so we can take those actions in the high seas, in addition to what countries may be able to do and need to do domestically to protect their waters.

Two reports were put forward to demonstrate the feasibility of protecting at least 30% of the ocean through a network of MPAs. The [first report](#), “[30x30: A Blueprint For Ocean Protection](#),” published in April 2019, came from a group of researchers at the University of Oxford and the University of York, who collaborated with nonprofit organizations Greenpeace UK and REV Ocean.

This group used a software tool called Marxan to figure out how to efficiently protect 30% of the ocean while considering certain constraints and stakeholder inputs. The team divided the sea into a grid of about 25,000 squares, each measuring 10,000 square kilometers (3,860 square miles) in area, and gathered data on the distribution of species like sharks and whales, and ecologically important features like seamounts, trenches and hydrothermal vents. The team also considered pressures from the commercial fishing industry and deep seabed mining.

“Each planning unit was assigned a value relating to the overall extent of each conservation feature that overlapped it and input to Marxan,” Callum Roberts, one of the study’s authors, wrote in the executive summary of the report. “We ran the program hundreds of times to develop network designs that for any given set of inputs achieved the targets set while minimising costs.”

The study also accounted for environmental changes and uncertainty by assessing sea-surface temperature variability, which would help identify how different parts of the ocean will react to climate change.

A year later, a [second report](#), “Data-driven approach for highlighting priority areas for protection in marine areas beyond national jurisdiction,” emerged from a group of researchers at the University of California, Santa

# Bulletin Board

## Curiosities

JUN. 19, 2020

Barbara (UCSB) and other universities and institutions. This team used an optimization algorithm and incorporated data on biological diversity, threatened species, habitat diversity, and anthropogenic activities like fishing.

“The goal was to identify data that was globally distributed and standardized throughout the high seas, because the high seas is such a large area in the ocean,” Morgan Visalli, a scientist at UCSB’s Marine Science Institute and lead author of the report, told Mongabay. “It’s important to identify data that isn’t only collected in one small part of the high seas, so that was kind of an important deciding factor in which data to incorporate into the analysis.”

The report highlighted certain places as having conservation values worthy of protection, including the Salas y Gómez and Nazca Ridges, the Costa Rica thermal dome, and the Lord Howe Rise and South Tasman Sea. While this team didn’t take sea temperature variability into account, it used forecast models to predict how climate change might affect the distribution of certain species, such as whales, seabirds and tuna.

Besides taking separate methodological approaches, the two reports highlight different regions as important places to protect. For instance, the 2019 report prioritized large portions of the Southern Ocean and Antarctic Polar Front, while the 2020 study recommended protecting the Agulhas Front, a patch of sea in the Indian Ocean.

But there were also many similarities. For instance, both teams recommended protecting portions of the North Atlantic Current, Northeast Pacific, Arabian Sea, and regions off western South America, including the Salas y Gómez Ridge.

“We actually saw a lot of overlap in some of the areas that we highlighted even though we used a different algorithm and different data inputs,” Visalli said. “We also saw good alignment with areas that have been identified as ecologically or biologically important by these expert groups that have convened around the world as part of this process ... and that really strengthens those places as being important to protect.”

Visalli said the two groups have been in contact with each other to collaborate and share ideas. “Our perspective is really that the more scientists and data and perspectives ... the stronger the results will be, and we’ll have better planning for these really important pieces of the high seas” she said.

## Bulletin Board

## Curiosities

JUN. 19, 2020

Karan, who worked closely with Visalli and her team, said the two reports were created to illustrate how MPAs can be devised in the high seas, but they aren't actual proposals since "there isn't a treaty yet."

"They're not definitive guides, so countries will be able to ... develop proposals for other areas that they've identified as important for them, and we would definitely support countries to do so," she said.

The U.N. representatives were meant to meet this past March to finalize their negotiations on the high seas treaty, but this was postponed due to the COVID-19 pandemic. While some informal meetings have taken place online during the pandemic, official meeting dates have yet to be set, Karan said. However, she said she's optimistic that things will get back on track.

"If not in 2020, then very soon in 2021," Karan said. "We're hopeful that the commitment that we're seeing from governments to participate in these informal dialogues and webinars ... just shows that this issue is still important to governments. It shows their commitment, and we're hoping that it helps to pave the way towards a more successful negotiating session when the time comes."

[news.mongabay.com](https://www.news.mongabay.com), 8 June 2020

<https://www.news.mongabay.com>

### Are synthetic chemicals *really* bad for you?

2020-06-10

Perhaps one of the most persistent myths about chemistry – that synthetic chemicals are bad, but organic things are good – has two roots. One is a matter of history, the other poor communication by scientists.

Back when chemistry was newborn and scientists were first classifying things as chemicals, it was believed that there was some fundamental difference between chemicals made by living creatures, called *organic* and "dead" chemicals isolated from minerals, called *inorganic*.

This theory was called "Vitalism" and though it was first disproven in 1828 when Friedrich Wöhler synthesised urea (the major component in urine) from the inorganic compound ammonium cyanate, it took over a century for it to really die.

As such, the idea of "organic" as vital and good and healthy, and "inorganic" as dead and bad took root in the popular consciousness.

**The truth is that synthetic and naturally occurring, organic and inorganic, are neither good nor bad.**

## Bulletin Board

## Curiosities

JUN. 19, 2020

The second part is, unfortunately, a common problem. All scientists have to communicate precisely and internationally, and so we use words with very rigid and limited definitions. These words have a tendency to escape into popular culture, get used in a very different way, and evolve over time. This causes problems when they clash with popular ideas like "organic is good".

To a scientist, "synthetic" just means "made in some way" – it means something which we didn't dig out of the ground. To a scientist, the sugar you put in your tea is synthetic (plants make it from water and CO<sub>2</sub>) but the salt you put on your chips is not – we literally dig it out the ground in salt mines. The organic compound is synthetic, the inorganic one is not, and both are delicious in food.

The truth is that synthetic and naturally occurring, organic and inorganic, are neither good nor bad. They're just descriptions. Many naturally occurring compounds are also synthesised industrially, and so are many biologically synthesised compounds as well.

It turns out that Mother Nature is better at making some things than we are (no one would ever synthesise sugar when you can just plant sugarcane), but we're better at others.

Taxol, the fantastic anti-cancer drug, was first discovered in Pacific Yew trees, but there just aren't enough trees to feed the world's demand, so this life-saving medicine is now synthetic and man-made.

Actually, almost no chemical can be called good or bad – it all depends on how much there is and where it is. The element selenium is incredibly toxic in large doses, but we need small quantities for our bodies to function. Oxygen supports us with every breath we take, but it is also responsible for much of the ageing process.

Chemicals, like everything else, are more complicated than a shocking newspaper headline will have you believe, but (to a scientist) that makes them interesting, not scary.

[sciencefocus.com](https://www.sciencefocus.com), 10 June 2020

<https://www.sciencefocus.com>

### Swamp threats rising from the grave

2020-06-07

As natural wonders go, swamps are not high on my list.

**Titanium oxide is probably within a few feet of wherever you're reading this. It's the white in white paper, or the white paint on your walls.**

# Bulletin Board

## Curiosities

JUN. 19, 2020

I've spent less than 48 hours each in the Everglades and the Okefenokee. Between the bugs, the nearly-liquid atmosphere, and the overall gloom, I'd prefer to admire their ecological grandeur from afar.

So, feel free to call me a dilettante. Give me Yosemite, Yellowstone, a dozen national seashores or lakeshores, wild and scenic rivers, Thomas Edison's historic labs, and scads of other federally protected, publicly venerated places that rank higher on my bucket list.

But I'm still stunned that a long-dormant threat to the Okefenokee—a vast, mostly protected wetland straddling the Georgia-Florida border—has roared back to life.

In the mid-1990's, DuPont floated a proposal to mine titanium ore within a few miles of the swamp's southeast corner. The Trail Ridge, a mile-wide, 100-mile-long minerals-rich mound, beckoned.

The ridge also held down the day job it's had for the past hundred thousand years or so: blocking in the water that makes the Okefenokee Swamp a swamp.

Titanium oxide is probably within a few feet of wherever you're reading this. It's the white in white paper, or the white paint on your walls.

The Trail Ridge of Georgia and North Florida is loaded with the stuff, as well as zirconium, a rare element with a dozen exotic uses, including the making of fuel rods for nuclear power plants. The ridge is a geologic freak—a forested sandbar that's 40 miles away from the ocean.

Critics said that the planned strip-mining of the sandy soil could permanently alter a section of the ridge, imperiling the swamp and the slow-flowing rivers it feeds. Endangered species like the gopher tortoise and red-cockaded woodpecker could also be at risk.

DuPont's proposal ran into a buzzsaw of grassroots blowback. Bruce Babbitt, Interior Secretary in the Clinton era, led bipartisan political opposition. DuPont placed its plan on hold in 1997, declared it dead two years later, and even donated thousands of acres to conservation groups.

At least 600,000 people disagree with me on the lure of swamps. That's how many people visit the Okefenokee each year, and their swamp-ophilia is being called upon anew. Last year, an Alabama-based company called Twin Pines Minerals applied for the same type of operation.

# Bulletin Board

## Curiosities

JUN. 19, 2020

Three federal agencies—the Environmental Protection Agency, the Fish & Wildlife Service, and the Army Corps of Engineers—raised questions about Twin Pines' plan.

Conservationists, local governments and residents again barraged the feds. Twin Pines withdrew its permit request and re-filed a less ambitious one, which now awaits federal approval. That's federal approval from *Trump Administration*-led agencies.

Stay tuned.

There are two lessons here. First, many environmental victories have to be won more than once. The Endangered Species Act, the Clean Water and Air Act and the agencies charged with enforcement of these and countless others are under assault.

Second, let's say Twin Pines gets its less ambitious plan approved. Tom Horton is a legendary writer and reporter on issues around Baltimore and the Chesapeake Bay.

Years ago, he mentioned something to me that brought clarity to just how *hard* it can be to deal with environmental issues. He had covered a local controversy where developers sought to level hundreds of acres of forest, replacing them with upscale homes and businesses.

Local conservationists forced the developers to roughly halve the project, saving hundreds of trees. They claimed victory. A downsized upscale community went in, at the sacrifice of hundreds of un-saved trees causing Horton to wonder: Just how many more "victories" can a healthy environment sustain?

Should it be approved, the Okefenokee mining plan would indeed be smaller than DuPont's 1990's version.

Let's hope no conservationists celebrate the "victory" of a smaller threat.

A new, smaller threat to a treasured spot is no victory.

[ehn.org](https://www.ehn.org), 7 June 2020

<https://www.ehn.org>

**The billions of doses of candidate vaccines, and many of the ingredients at many steps in the production process will all have to undergo endotoxin testing.**

# Bulletin Board

## Curiosities

JUN. 19, 2020

### Tests for Coronavirus vaccine need this ingredient: Horseshoe crabs

2020-06-03

For decades, drug companies have depended on a component in the blood of the horseshoe crab to test injectable medicines, including vaccines, for dangerous bacterial contaminants called endotoxins.

Conservationists and some businesses have pushed for wide acceptance of an alternative test, to protect the horseshoe crabs and birds that feed on their eggs. Earlier this year, these people seemed to be on the brink of success as the nongovernmental group that issues quality standards for such tests moved toward putting the alternative test on the same footing.

But on Friday, that organization, the U.S. Pharmacopeia, announced that the alternative test known as rFC (recombinant factor C) requires significantly more study.

Pharmacopeia representatives said they have 30 years of data on the current test and only two years on the new test so they needed more information.

Internationally, the European Pharmacopeia has approved widespread use of the alternative test.

The debate has been widely monitored as demand has grown for testing new vaccines against the coronavirus. Billions of vaccine doses would eventually require endotoxin testing.

Endotoxins are molecules in the cell walls of many common bacteria. *E. coli* is one, salmonella another. The toxins can cause fever and death in humans even if the bacteria that produced them have been killed. Toxic shock syndrome is caused by endotoxins.

Pharmaceutical companies must make sure the toxins are not present in any injectable drugs they make. Ingredients, like water, must be tested at each step of the manufacturing process, as well as in the final product.

"It is crazy making that we are going to rely on a wild animal extract during a global pandemic," Ryan Phelan, the head of the nonprofit Revive and Restore, said before the recent decision. Her group supports technological solutions to conservation problems, including replacing the test that uses a component of horseshoe crab blood, called LAL, with a test that uses rFC. It is the synthetic equivalent of a chemical in the crab blood, produced by inserting genes for its creation into microorganisms grown in the lab.

# Bulletin Board

## Curiosities

JUN. 19, 2020

The billions of doses of candidate vaccines, and many of the ingredients at many steps in the production process will all have to undergo endotoxin testing. But companies that produce LAL from horseshoe crab blood say that the supply is adequate.

Lonza AG, a multinational biotechnology company, sells both tests. Also, Lonza recently struck a deal with Moderna to produce a much publicized vaccine candidate for Covid-19. Lonza said in a statement that five billion doses of vaccine would require "less than a day's combined production for all three LAL manufacturers in the United States." The three manufacturers are Lonza, Charles River and Associates of Cape Cod. They all argue that the supply of crabs is more than adequate and current production could handle the vaccine surge without difficulty.

Ms. Phelan said this calculation "boggles the mind" because, "for every dose going out the door — each manufacturer will use 10 times the amount of LAL to test every step along the way in the process." That includes vials, stoppers and other ingredients in the vaccines. In addition, Ms. Phelan said there are likely to be numerous companies producing vaccines in the test phase and along the way.

The rFC test is allowed by the Food and Drug Administration, which is the governmental agency that rules on the safety of drugs, but companies must do more work for their F.D.A. submissions than if they were to use the standard test.

The F.D.A. relies both on work done by manufacturers and on the standards set by the U. S. Pharmacopeia. If a company uses rFC, it must demonstrate to the F.D.A. that, for each new drug, rFC is as effective as the standard LAL test.

The U.S. Pharmacopeia also announced that it would provide some additional information for any vaccine makers to assist them in doing the tests to validate rFC. Revive and Restore had been asking for some form of emergency authorization for use of rFC, given the stress of potential vaccine production.

One company that is turning to the new test in a big way is Eli Lilly, which also pushed for broader approval of the new test.

Jay Bolden, a biologist with Eli Lilly, said the company had been looking at rFC testing since 2015 for several reasons, including a consistent quality of a lab product, a supply that doesn't depend on an animal population,

# Bulletin Board

## Curiosities

JUN. 19, 2020

a company commitment to replace animal use when possible and a reduction in costs.

"In 2016," he said, "we kind of drew a line in the sand." The company decided to use rFC for new injectable products even if additional work is required. It has since had one new product, a migraine medicine, approved in the United States by the F.D.A.

On Monday, Mr. Bolden expressed disappointment with the Pharmacopeia decision. "It probably looks like a three-to-four year delay with no guarantee," he said, that rFC would be considered equivalent to the LAL test.

Rob Anderson, the vice president of global communications at the U. S. Pharmacopeia, said that more evidence is needed to show the equivalence between the two tests because of the many years of data on LAL and a lack of data on rFC.

Fouad Atouf, the vice president of global biologics for the rFC, said the reason for caution was that "we are dealing with a safety test." And more evidence was needed on rFC.

"We're working to build that evidence base and data," Mr. Anderson said, "But we can't put a time on that."

Dr. Bolden, at Eli Lilly, said that given the delays his company will continue using rFC but follow a different path in submissions to the F.D.A.

"We'll just start using the European test chapter," he said, referring to the European pharmacopeia's inclusion of rFC, which "goes live July 1." He said the company had reason to believe the F.D.A. would accept the information from the European group, which would, essentially, put the alternative test and the traditional one "on an even playing field."

nytimes.com, 3 June 2020

<https://www.nytimes.com>

### Scientists are trying to save coral reefs. Here's what's working

2020-06-04

The world's coral reefs do more for the planet than provide underwater beauty.

# Bulletin Board

## Curiosities

JUN. 19, 2020

They buffer shorelines from the effects of hurricanes. An estimated 500 million people earn their livelihoods from the fishing stocks and tourism opportunities reefs provide. The tiny animals that give rise to reefs are even offering hope for new drugs to treat cancer and other diseases.

Despite their importance, warming waters, pollution, ocean acidification, overfishing, and physical destruction are killing coral reefs around the world. Schemes to save those reefs are as creative as they are varied; most recently, scientists released data showing that marine protected areas can help save reefs if they are placed in just the right spots. Genetics is also becoming a larger area of coral research, giving scientists hope they might one day restore reefs with more heat tolerant coral.

But now, in the lead-up to World Oceans Day on June 8, scientists caution that these and other strategies may only buy reefs time until world leaders implement aggressive climate change action.

Without a mix of long-term cuts in emissions and short-term innovation, there's a not-so-far-off future where coral reefs as we know them simply cease to exist, says Anne Cohen, a coral expert at the Woods Hole Oceanographic Institution in Massachusetts.

Parks under the sea

Scientists often compare coral reefs to underwater rainforests, yet unlike the leafy plant base of a forest, corals are animals. The soft polyps inside the hard parts of corals are naturally translucent and get their famously vibrant color from algae living inside them.

When corals experience stress from hot temperatures or pollution, they end their symbiotic relationship with this algae, typically expelling them and turning white, though one recent study indicates some coral turn a bright neon color when stressed. Coral are still alive when they bleach, but they're at risk—essentially immunocompromised—and many eventually starve and die, turning a dark brown.

People first noticed coral bleaching events in the 1980s. The problem intensified in 2016, when an El Niño weather pattern, which causes warmer waters in the Pacific Ocean, mixed with an already unseasonably warm ocean and killed off a third of the corals on the Great Barrier Reef. Since then, roughly half the corals on Australia's famous reef have died in subsequent bleaching events, jeopardizing an underwater landscape 1,500 miles long.

**Despite their importance, warming waters, pollution, ocean acidification, overfishing, and physical destruction are killing coral reefs around the world.**

## Bulletin Board

## Curiosities

JUN. 19, 2020

Scientists around the world are looking for all kinds of ways to protect and maybe even revive corals. One option is to create more marine protected areas—essentially national parks in the ocean. Scientists say creating marine refuges, where fishing, mining, and recreating are off limits, make the reefs healthier, and so more resilient.

An estimated 4,000 fish species, and some 25 percent of marine life, depend on coral reefs at some point in their existence. Fish keep the algae that grow on corals in check, allowing corals to breathe and access sunlight. While an MPA won't protect corals from heat waves, these natural safe zones can keep fisheries more sustainable in the long term, and fishers around well-managed MPAs often benefit from the "spillover" of healthy fish stocks that populate surrounding waters.

At a talk hosted by the Woods Hole Oceanographic Institution on Wednesday, renowned marine biologist Sylvia Earle promoted the idea of using marine parks to protect coral, which she does through her organization Mission Blue.

"Reefs that have been protected or not yet exploited by fishing impacts survive when nearby places do not," she says.

A recently published assessment of 1,800 reefs in 41 countries found that only 5 percent of reefs were able to provide all of their lucrative byproducts, such as healthy fish stocks and biodiversity. To increase that percentage, new marine reserves will need to be strategically placed in areas well away from humans, say experts. It wouldn't save all reefs, but it would help ensure that more reefs function at 100 percent of their potential instead of just a fraction, says Alan Friedlander, the chief scientist for National Geographic's Pristine Seas initiative and an ecologist at the University of Hawaii who helped author the reef assessment.

"Without this protection," he says, "any technological enhancements will suffer the same fate as natural reefs, since the stresses have not abated."

Innovation to the (immediate) rescue

Beyond such nature preserves, some conservationists are looking to more hands-on methods. One research center in the Florida Keys is exploring a form of natural selection to keep corals afloat.

The reef system in the Keys has been hit hard by climate change and disease, which is especially tough, because corals there help support fisheries worth an estimated \$100 million every year. In addition, corals off Florida's coasts are polluted by agricultural and sewage runoff.

## Bulletin Board

## Curiosities

JUN. 19, 2020

The additional stress from warming waters is like "the proverbial nail in the coffin," says Erinn Muller, the science director at the Elizabeth Moore International Center for Coral Reef Research and Restoration at the Mote Marine Laboratory in Sarasota, Florida.

To keep the wild ecosystem alive, Muller and her team are harvesting samples of the corals that have survived the environmental stresses naturally, breeding them by hand, and reattaching them to the reef. At any given time, the center has 46,000 corals growing on underwater plastic lattices in its nursery. So far, the center has regrown over 70,000 corals from five different species on damaged reefs.

"The ultimate goal is we put ourselves out of a job," says Muller.

In the Bahamas, Ross Cunning, a research biologist at Chicago's Shedd Aquarium, is focusing on corals with robust genes that could make them natural candidates for restoration projects. He recently published a study of two Bahamian reefs, one that seemed to survive an intense 2015 heat wave, and one that didn't.

"It sets the stage to find out which genes are responsible for thermal tolerance," says Cunning, adding that he hopes identifying those genes will help scientists one day breed more heat-tolerant coral.

In Massachusetts, Cohen's research has found two key elements that seem to protect corals. The first: internal waves beneath the ocean's surface that bring cooler currents to heat-struck corals, essentially air-conditioning them as temperatures rise. The second: adaptation, a trait that corals found in Palau's warm lagoons seem to exhibit.

"What we've realized is these corals are sitting in naturally hot water all the time," she says. On average, these lagoons submerge coral in water that is two degrees Celsius warmer than the water outside the lagoons. "We think the fact that they can deal with these higher temperatures is built into their genetics and allows them to deal with the heat waves."

She's also found evidence of corals evolving more quickly in the past two decades to withstand rapidly warming temperatures. The big question scientists are now investigating, says Cohen, is whether there's a cap on how much more heat corals can adapt to.

Cohen calls these regions with heat-adapted corals as "super reefs," and like Friedlander, advocates for using marine reserves to protect them.

A race against warming

## Bulletin Board

## Curiosities

JUN. 19, 2020

Muller notes that their efforts on the Florida reefs can help keep them from what she describes as “functional extinction.” But she says the reefs ultimately won’t be restored to their potential until their environment becomes more hospitable to their survival.

All the scientists interviewed for this article noted that mitigating climate change is the only long-term, sustainable solution to conserve and restore coral reefs. Despite global lockdowns and sharply falling emissions, atmospheric carbon dioxide still reached a record high in May.

Global warming is “raising the background temperature,” compounding regular heat waves and making them even deadlier for corals, says Kristopher Karnauskas, an atmospheric scientist at the University of Colorado Boulder who recently published a study investigating the physical causes of the 2016 event.

The oceans absorb and store heat very efficiently; as Earth warms, the oceans take in over 90 percent of the planet’s heat trapped in the atmosphere by human-generated greenhouse gases. But their heat-storing capacity isn’t limitless, and excess heat over time takes its toll on ocean inhabitants.

In evolutionary history, corals date back 400 million years, and with each global temperature change Earth has undergone, corals have adapted—but never as quickly as they must today.

“We know that because there have been six major coral reef extinctions in the geologic past where they were basically wiped out. All those have been associated with excessive heat and ocean acidification,” Cohen says. “Coral reefs always come back, but it takes tens of thousands of years.”

Now, with climate change-driven temperatures rising at a rate higher than corals have ever had to naturally adapt to, Cohen says, “we don’t have that kind of time.”

[nationalgeographic.com](https://www.nationalgeographic.com), 4 June 2020

<https://www.nationalgeographic.com>

### Will air-conditioning help spread the Coronavirus?

2020-06-04

Across the country, as COVID-19 deaths begin to slow and cities and states start opening up businesses, people are forced to try to answer questions about how likely transmission will be in places such as

## Bulletin Board

## Curiosities

JUN. 19, 2020

restaurants, barbershops, and offices. And now that Memorial Day and the unofficial start of summer is behind us, the question comes with an added complication: Will being in a space with the AC blasting put you more at risk for contracting the virus?

There are multiple factors to consider, such as how AC could enable the circulation of viral particles in the air and increase the speed and distance they travel. There are also different types of AC systems, which circulate air in different ways. Still, medical professionals and HVAC experts alike agree that, while it’s possible, there’s little evidence that AC is a large contributor to infection. In fact, some types of air-conditioning can, inversely, be an effective tool to mitigate the spread.

We’ve come to know that close-contact droplet transmission is the primary method of coronavirus infection. Those big, heavy viral droplets (microscopically speaking) can go from person to person—but if they don’t, they fall to the ground very soon after being expelled. In the summer, the humidity pulls them down even faster.

This aerosol transmission is the concern when considering the effect of AC. “If an infectious dose of the virus can hover in the air long enough to be recirculated by air-conditioning, it could cause transmission in a remote place,” says William Schaffner, professor of preventive medicine and infectious diseases at the Vanderbilt University Medical Center. But so far there’s little evidence of AC-spurred contamination. Though that may be because health professionals have been swamped with the crisis and taking care of sick people—maybe, as Schaffner says, “public health departments haven’t been looking, as epidemiologists usually do, for distinctive common denominators among cases.”

There is one South Korean CDC study that’s been cited as suggestive of a correlation. It investigates an air-conditioned restaurant in Guangzhou, China, where people dined far apart from each other on January 24, and nine people got sick by February 5, all from a single sick diner who had traveled from Wuhan. The researchers concluded that “in this outbreak, droplet transmission was prompted by air-conditioned ventilation.” The theory is that the force of the strong airflow of the air conditioner in the restaurant propelled large respiratory droplets faster and beyond the range normally associated with the coronavirus. The AC facilitated close-contact transmission, even though the diners were socially distant.

The study admits that it doesn’t consider the aerosol route. A follow-up study (which has not yet been peer-reviewed) was “more thorough,” according to Bill Bahnfleth, a professor of engineering at Penn State

## Bulletin Board

## Curiosities

JUN. 19, 2020

University and a fellow at the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), for which he's chairing a coronavirus task force. That study suggests that transmission probably happened through the airborne route, due to poor ventilation.

Bahnfleth explains that the poor ventilation means that the aerosol contaminant that lingers in the air is able to become more concentrated into a dose large enough to be a threat. The risks are much higher if there is no chance for virus particles in the air to escape through a window or exhaust fan or to get diluted via a high-quality AC system (or air currents outdoors). The AC that was running in the restaurant, Bahnfleth says, would not pass U.S. standards for commercial spaces, because it didn't bring in any fresh air from the outside—a key component of code-compliant HVAC systems.

Conversely, high-quality AC could actually have been useful to decrease the chance of infection. "There's nothing inherently wrong with the HVAC system," says Joseph Allen, assistant professor of exposure assessment science at the Harvard School of Public Health. In fact, HVAC should be leveraged to minimize the risk of airborne transmission, especially if it's fitted with high-efficiency filters designed to strain pollutant particles out of the air. It's also potentially better than industrial fans, in workplaces such as meatpacking buildings and factories, which could increase the velocity of large droplets—much higher than in an AC system—carrying them farther in fast jets of air.

That said, your trusty AC window unit at home is different. That does not bring in fresh air from the outside to dilute and replenish the internal air; it merely cools and constantly recirculates the air currently in the room. That's where it could become a problem, Allen says, "because then you're potentially moving contaminated air around the space." That's a concern in public places that use only a window unit, such as restaurants, and that have a higher density of people. That risk can be mitigated if the restaurant follows limited-capacity guidelines once it reopens. "If you're then ventilating at the same rate," Bahnfleth says, "you're getting a lot more dilution of whatever infectious aerosol there is in the space."

This guidance could change if epidemiologists find clusters of sick people that originate from a ventilated area, at which point they could be tasked with working back to find the source. That might spur the funding of controlled, scientific lab experiments, which were not done in the China study, to simulate an air-conditioned environment to test if animal subjects catch the virus from others.

## Bulletin Board

## Curiosities

JUN. 19, 2020

But, at home, even if your AC window unit or a fan is recirculating the same air, there's a lower density of people likely to be carrying infectious particles. And the chances are that if you've been self-quarantining safely with family or roommates, that air shouldn't be infected, anyway.

There, at least, can you crank up the AC at home during the upcoming restless, stuffy nights? "Sure," Schaffner says.

fastcompany.com, 4 June 2020

<https://www.fastcompany.com>

### Insect wings evolved from legs, mayfly genome suggests

2020-06-02

Along rivers and streams around the world, mayflies are a rite of spring. The mosquito-size insects lead double lives, with the young thriving in water and the adults emerging by the millions around June for just a few hours to mate and quickly die. There can be so many that they **clog traffic**, make roads slick, and even create a smelly mess.

Now, by sequencing the genome of one remarkable mayfly species—whose males have a second set of skyward-pointing eyes—researchers have learned how aquatic young transform into airborne adults. They've also discovered new clues about how all insects evolved to fly in the first place.

The amount of information gleaned from the study is impressive, says Craig Macadam, an entomologist at the U.K.-based nonprofit insect conservation organization Buglife. "It really shows that once we know the genetic makeup of a species, we can start to work out a huge amount about [it]."

Because of their sheer numbers, mayflies are important food for birds, fish, and mammals. They spend most of their lives underwater eating dead bits of leaves and other material. When the temperature warms up in late spring, the **muscular young**, which look like miniature six-legged shrimp, crawl out of the water and molt into the delicate, two- or four-winged adults. Fly fishermen rush out to streams when the adults emerge because they know fish will be biting.

Evolutionary biologists are intrigued by mayflies because they and their cousin, the dragonfly, belong to an early evolving branch of the insect family tree; indeed, they still look a lot like the earliest airborne insects.

**They've also discovered new clues about how all insects evolved to fly in the first place.**

## Bulletin Board

## Curiosities

JUN. 19, 2020

Getting a high-quality genome from a tiny insect is tough, however. Scientists need to combine the DNA from several individuals, and each individual insect has a slightly different genome. So, before they could sequence the mayfly *Cloeon dipterum*, Isabel Almudi and Fernando Casares, integrative biologists at the Andalusian Center for Developmental Biology and colleagues had to figure out how to breed this species in the lab. That enabled them to sequence the genome and then measure gene activity in all life stages and in a variety of tissues, a first for mayflies.

There were several surprises. For one, the males have two extra light sensing proteins called opsins that females lack. These opsins sense blue and ultraviolet light and are active in the second set of eyes, perhaps helping the male see females above him, the team speculates.

The biggest news, however, came from the genetic activity of the juvenile mayfly's gills. Once thought to be used only to take in oxygen, mayfly gills also seem to be a nose of sorts. Almudi and her team discovered unusually high numbers of proteins involved in smell and taste in this tissue, they report in *Nature Communications*.

The finding "may help us understand more about how mayflies sense their surroundings," Macadam says. These extra proteins may also help mayflies coordinate their mass transformation to adults, suggests Yoshi Tomoyasu, an evolutionary biologist at Miami University.

While they were teasing out genes active in development, the researchers discovered several **in juvenile mayfly gills that also play a role in the development of adult wings**.

Insect wings are a major evolutionary innovation, and their origin has been hotly debated. "The discovery of common genetic programming between gills and wings is another piece towards understanding the puzzling origins of insect wings—and flight," says Luke Jacobus, an entomologist at Purdue University who runs a **mayfly website**.

Some biologists think wings first evolved as an extension of the body wall, whereas others think they evolved from ancient legs. Mayfly gills are thought to arise from the upper legs. So, the finding of similar gene activity in both wings and gills "provides the first genomic support" for the idea that wings and gills evolved at least in part from legs, Tomoyasu says. But, Macadam says, "Whether this means that wings are derived from gills is still debatable."

## Bulletin Board

## Curiosities

JUN. 19, 2020

Jacobus sees the mayfly genome and these initial findings as just a first step. "I hope that this study stimulates more work on mayflies," he says. They "have untapped potential," he says, for understanding how all insects evolved.

sciencemag.org, 2 June 2020

[https://www.sciencemag.org/news/2020/06/insect-wings-evolved-legs-mayfly-genome-suggests?utm\\_campaign=news-daily\\_2020-06-02&et rid=101614567&et cid=3349384](https://www.sciencemag.org/news/2020/06/insect-wings-evolved-legs-mayfly-genome-suggests?utm_campaign=news-daily_2020-06-02&et rid=101614567&et cid=3349384)

"><https://www.sciencemag.org>

### Milkweed, only food source for monarch butterflies, ubiquitously contaminated

2020-06-08

New evidence identifies 64 pesticide residues in milkweed, the main food for monarch butterflies in the west. Milkweed samples from all of the locations studied in California's Central Valley were contaminated with pesticides, sometimes at levels harmful to monarchs and other insects.

The study raises alarms for remaining western monarchs, a population already at a precariously small size. Over the last few decades their overwintering numbers have plummeted to less than 1% of the population size than in the 1980s – which is a critically low level.

Monarch toxicity data is only available for four of the 64 pesticides found, and even with this limited data, 32% of the samples contained pesticide levels known to be lethal to monarchs, according to a study released today in *Frontiers in Ecology and Evolution*.

"We expected to find some pesticides in these plants, but we were rather surprised by the depth and extent of the contamination," said Matt Forister, a butterfly expert, biology professor at the University of Nevada, Reno and co-author of the paper. "From roadsides, from yards, from wildlife refuges, even from plants bought at stores – doesn't matter from where – it's all loaded with chemicals. We have previously suggested that pesticides are involved in the decline of low elevation butterflies in California, but the ubiquity and diversity of pesticides we found in these milkweeds was a surprise."

Milkweed was chosen as the focus of this study because it the only food source for larval monarch butterflies in the West, and thus critical for their survival.

**Over the last few decades their overwintering numbers have plummeted to less than 1% of the population size than in the 1980s – which is a critically low level.**

# Bulletin Board

## Curiosities

JUN. 19, 2020

“We collected leaf samples from milkweed plants throughout the Central Valley and sent them to be screened for pesticides,” Chris Halsch, lead author of the paper and a doctoral student in the University’s Ecology, Evolution, and Conservation Biology program, said. “This study is the first necessary step for understanding what butterflies are actually encountering. Now we can use these data to design experiments to test hypotheses about the relative importance of pesticide use and other stressors such as climate change on local butterflies.”

While this is only a first look at the possible risks these pesticides pose to western monarchs, the findings indicate the troubling reality that key breeding grounds for western monarchs are contaminated with pesticides at harmful levels.

“One might expect to see sad looking, droopy plants that are full of pesticides, but they are all big beautiful looking plants, with the pesticides hiding in plain sight,” Forister, who has been a professor in the University’s College of Science since 2008, said.

Western monarchs are celebrated throughout the western states and especially along the California coast where large congregations overwinter in groves of trees. Population declines also have been documented in the breeding grounds. Areas of inland California, including the Central Valley, offer important monarch breeding habitat throughout the spring and summer, including being the home to the very first spring generation which will continue the migration inland to eventually populate all western states and even southern British Columbia.

Declines in the population of western monarch butterflies have been linked with various stressors, including habitat loss and degradation, pesticide use, and climate change, among others. While pesticide use has been associated with declines, previous studies had not attempted to quantify the residues that butterflies can encounter on the western landscape.

The study’s findings paint a harsh picture for western monarchs, with the 64 different pesticides identified in milkweed. Out of a possible 262 chemicals screened, there was an average of nine types of individual pesticides per sample and as many as 25. Agricultural and retail samples generally had more residues than wildlife refuges and urban areas, but no area was entirely free from contamination. Certain pesticides were present across all landscapes, with five pesticides appearing more than 80% of the time. Chlorantraniliprole, the second most abundant compound, was found at lethal concentrations to Monarchs in 25% of all samples.

# Bulletin Board

## Curiosities

JUN. 19, 2020

Understanding of pesticide toxicity to the monarch is limited, and is based on previously reported lab experiments. Thus we have much to learn about the concentrations encountered in field, but these new results raise concerns nonetheless. While this research focused on monarch toxicity, other pollinators and beneficial insects are also at risk from pesticide contamination throughout the landscape.

“We can all play a role in restoring habitat for monarchs,” said Sarah Hoyle, Pesticide Program Specialist at the Xerces Society for Invertebrate Conservation and coauthor of the paper. “But it is imperative that farmers, land managers and gardeners protect habitat from pesticides if we hope to recover populations of this iconic animal.”

unr.edu, 8 June 2020

<https://www.unr.edu>

# Bulletin Board

## Technical Notes

JUN. 19, 2020

**(NOTE: OPEN YOUR WEB BROWSER AND CLICK ON HEADING TO LINK TO SECTION)**

### CHEMICAL EFFECTS

The stability and efficacy of tricaine methanesulfonate (MS222) solution after long-term storage

Analysis of pesticides mixtures discharged to the Lagoon of the Great Barrier Reef, Australia

Sulfur-aided composting facilitates ammonia release mitigation, endocrine disrupting chemicals degradation and biosolids stabilisation

### ENVIRONMENTAL RESEARCH

A scoping review of non-occupational exposures to environmental pollutants and adult depression, anxiety, and suicide

In utero exposure to organochlorine pesticide residues and their potential impact on birth outcomes and fetal gender

### PHARMACEUTICAL/TOXICOLOGY

Hyperactivity disorder in children related to traffic-based air pollution during pregnancy

Dendritic epidermal T cells in allergic contact dermatitis

### OCCUPATIONAL

Occupational exposure and the risk of airway obstruction and mortality

Respiratory symptoms and diminished lung functions associated with occupational dust exposure among iron ore mine workers in Iran

Occupational exposure to metals and solvents: allergy and airway diseases