VATIS UPDATE

Ozone Layer Protection

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Apprise yourself with the latest technological innovations

Highlights

- New ozone-depleting gases discovered in atmosphere
- Scientists build thermoacoustic heat pump
- A new concept for cleaning parts with aqueous media
- Water mist system for maritime applications
- Novel microcellular injection foaming method
- Research aims to bolster strawberry production

APCTT
Asian and Pacific Centre for Transfer of Technology

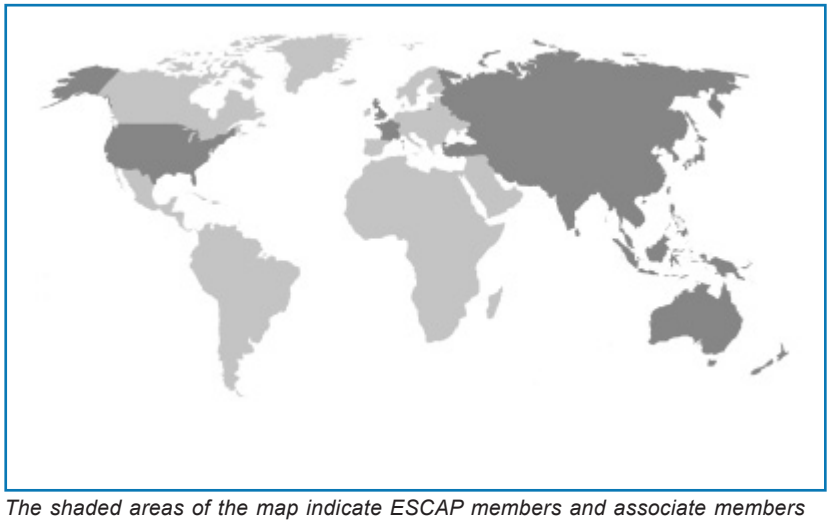
UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Ozone Cell
Ministry of Environment and Forests
Government of India

The **Asian and Pacific Centre for Transfer of Technology (APCTT)**, a subsidiary body of ESCAP, was established on 16 July 1977 with the objectives: to assist the members and associate members of ESCAP through strengthening their capabilities to develop and manage national innovation systems; develop, transfer, adapt and apply technology; improve the terms of transfer of technology; and identify and promote the development and transfer of technologies relevant to the region.

The Centre will achieve the above objectives by undertaking such functions as:

- Research and analysis of trends, conditions and opportunities;
- Advisory services;
- Dissemination of information and good practices;
- Networking and partnership with international organizations and key stakeholders; and
- Training of national personnel, particularly national scientists and policy analysts.



The shaded areas of the map indicate ESCAP members and associate members

Cover Photo

Natural refrigerant R1270 hydrocarbon-based chillers developed by SRS Frigadon Ltd, in conjunction with Swedish sister company Frigadon AB

(Credit: Mercator Media Ltd, UK)

VATIS* Update
Ozone Layer Protection
is published 6 times a year to keep the readers up to date of most of the relevant and latest technological developments and events in the field of Ozone Layer Protection. The Update is tailored to policy-makers, industries and technology transfer intermediaries.

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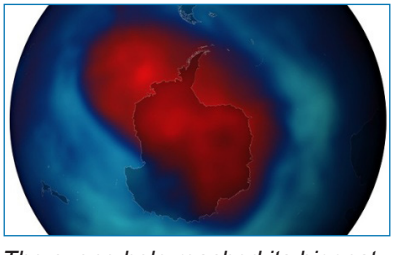
New ozone-depleting gases discovered in atmosphere

Researchers at the University of East Anglia (UEA), the United Kingdom, have found two new types of chlorofluorocarbons (CFCs) and one new hydrochlorofluorocarbon (HCFC)in the atmosphere.

The latest discovery comes after the UEA researchers identified four new man-made gases, which contribute to destruction of the ozone layer in March, bringing the total number of newly discovered CFCs and HCFCs to seven.

Research published in the journal *Atmosphere* shows the scientists discovered the latest gases by comparing today's air samples with air collected between 1978 and 2012 in unpolluted Tasmania and samples taken during aircraft flights.

The gases which have been identified in the latest research are at much lower concentrations than those found earlier this year, and are unlikely to pose a threat to the ozone layer, the scientists said.But the researchers said it supported their argument that there were many more gases out there, which could have a cumulative impact.



The ozone hole reached its biggest extent for the year on 26 September, 2013 (Credit: NOAA)

"Two of the gases that we found earlier in the year were particularly worrying because they were still accumulating significantly up until 2012. We have now identified another two CFCs and one HCFC, although these have much lower concentrations than the previous ones," said Dr. Johannes Laube at UEA. Controls on CFCs to preserve ozone in the stratosphere that protects life on Earth by absorbing harmful ultraviolet radiation from the sun came into force under the Montreal Protocol in 1989, with a total global ban implemented by 2010.

Source: http://www.theguardian.com

Forecasting temperature extremes with ozone

For the past two summers, Australians have sweated through record heat waves, with thermometers climbing as high as 118 Fahrenheit in parts of the country. In January, officials were forced to halt tennis matches during the Australian Open due to extreme heat – a decision made following several days of sizzling temperatures.

Now researchers from the Massachusetts Institute of Technology (MIT), the United States, have found that the intensity of summer temperatures in Australia and elsewhere in the Southern Hemisphere may be better predicted as early as the previous spring by an unlikely indicator: ozone.

According to their study, published in the Journal of *Climate*, the scientists found that as the springtime ozone hole's severity varies from year to year, the temperatures in Australia and southern regions of Africa and South America reveal correlations: Years with higher springtime ozone experience hotter summers, and vice versa.The results suggested that ozone levels may help meteorologists predict the severity of summertime temperatures months in advance. "No one has actually looked at the variation of ozone as a way to forecast or predict the climate or the next summer's temperature. This could be especially important for farmers, and for areas like southeastern Australia, where most of that nation's population resides," said lead author Justin Bandoro, a graduate student at MIT.

The link between springtime ozone and summertime temperatures is particularly strong for the present period, while ozone is still in a recovery phase. When the researchers examined this link from a period before the ozone hole had begun to form, they observed a much weaker correlation. The implicationis that as ozone levels likely rise in the coming decades, these parts of the Southern Hemisphere will probably experience systematically hotter summers. "We can expect that these types of summers are going to be more frequent as the ozone hole recovers in coming decades. When the ozone hole is deep, it essentially holds back climate change from showing its face, and Australia is just starting to feel this effect in the summertime in years with shallower ozone holes,"Bandoro said.

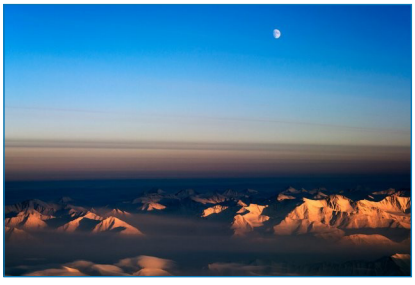
Source: http://www.phys.org

Plugging an ozone hole

Since the discovery of the Antarctic ozone hole, scientists, policymakers, and the public have wondered whether we might someday see a similarly extreme depletion of ozone over the Arctic. But a new study finds some cause for optimism – Ozone levels in the Arctic haven't yet sunk to the extreme lows seen in Antarctica, in part because international efforts to limit ozone-depleting chemicals have been successful. "While there is certainly some depletion of Arctic ozone, the extremes of Antarctica so far are very different from what we find in the Arctic, even in the coldest years," said Susan Solomon, at Massachusetts Institute of Technology (MIT), the United States, and lead author of a paper published in the *Proceedings of the National Academy of Sciences*.

To obtain their findings, the researchers used balloon and satellite data from the heart of the ozone layer over both polar regions. They found that Arctic ozone levels did drop significantly during an extended period of unusual cold in the spring of 2011. While this dip did depress ozone levels, the decrease was nowhere near as drastic as the nearly complete loss of ozone in the heart of the layer seen in many years in Antarctica.

The MIT team's work also helps to show chemical reasons for the differences, demonstrating that ozone loss in Antarctica is closely associated with reduced levels of nitric acid in air that is colder than that in the Arctic. "We'll continue to have cold years



An aerial view of clouds over a mountain range in Greenland (Credit: Michael Tudinger/NASA Earth Observatory)

with extreme Antarctic ozone holes for a long time to come. We can't be sure that there will never be extreme Arctic ozone losses in an unusually cold future year, but so far, so good – and that's good news," said Solomon.

Source: http://www.sciencedaily.com

Harmful gases found in atmosphere, despite ban

A team of researchers from Europe and Australia, have found four new ozone-destroying gases in the atmosphere, most likely put there by humans in the last 50-odd years despite a ban on these dangerous compounds. It is the first time since the 1990s that new substances damaging to Earth's stratospheric shield have been found, and others may be out there. According to their study published in the journal *Nature Geoscience*, researchers wrote"Our research has shown four gases that were not around in the atmosphere at all until the 1960s, which suggests they are man-made. "They analysed unpolluted air samples collected in Tasmania between 1978 and 2012, and from deep, compacted snow in Greenland.

"We don't know where the new gases are being emitted from, and this should be investigated."Three of the gases are chlorofluorocarbons (CFCs) – a group which includes chemicals traditionally found in air-conditioning, refrigerators and aerosol spray cans but banned under the Montreal Protocol. The fourth is a hydrochlorofluorocarbon (HCFC), part of a closely-related group of compounds, which replaced CFCs but are being phased out.More than 74,000 tonnes of the four newly-identified gases had accumulated in the atmosphere by 2012, said the team.This is very small compared with peak emissions of CFCs in the 1980s of more than a million tonnes per year.

However, the reported emissions raise questions about the sources of these gases.Two of the gases, one CFC and the HCFC, are still accumulating. Previously, seven types of CFC and six of HCFC were known to contribute to ozone destruction.The ozone layer comprises triple-atom oxygen molecules that are spread thinly in the stratosphere.It plays a vital role in protecting life by filtering out ultraviolet rays that can damage vegetation and cause skin cancer. In high latitudes in the Southern Hemisphere, where the ozone layer is damaged or subject to seasonal fluctuations, people are advised to cover exposed skin and wear sunglasses.Possible sources for the new gases include chemicals used for insecticide production and solvents for cleaning electronic components, said the researchers.

Source: http://www.thehindu.com

Activities under HPMP Stage-I

Since the approval of the HPMP Stage-I, a number of activities have been conducted by the Ozone Cell, Ministry of Environment, Forests & Climate Change (MoEF & CC), India, in close cooperation with the implementing agencies and stakeholders. The interagency meeting was held in September, 2012 to discuss the implementation modalities of HPMP Stage-I. Subsequently, stakeholders consultative meeting on amendment of Ozone Depleting Substances (ODS)rules was organized in October, 2012 to seek inputs from the stakeholders on the proposed amendment to the ODS (Regulation and Control) rules, 2000. A stakeholder'sworkshop was organized in February, 2013.

The workshop was well attendedby the stakeholders especially the industry representatives from foam manufacturing, Refrigeration and Air-Conditioning (RAC) manufacturing and RAC servicing sectors. On this occasion, the HPMP Stage-I was also launched. A number of training of trainers on Good Servicing Practices have been organized to create a pool of trainers for training the technicians in the RAC sector in the country.The HPMP Stage-I is being implemented successfully on time to achieve the specified targets of phase-out of HCFCs in 2015.

Source: http://www.ozonecell.com

Eco Green balance air conditioners

Godrej Appliances,India, a leader in consumer durables manufacturing vertical and pioneers in the sector has been awarded with the prestigious "Indian Design Mark – Good Design Award" for their Godrej Eon Green Balance AC. The Revolutionary Green Balance Air Conditioner was awarded by the Government of India through the India Design Council. The award was conferredon the company for designing and manufacturing India's first commercially manufactured Green Air Conditioner – the 'Godrej Eon Green Balance AC'.The Air Conditioners stands tall as the only one being recognized for this award in the entire Indian Air Conditioning Industry.

Green balance air conditioners from Godrej

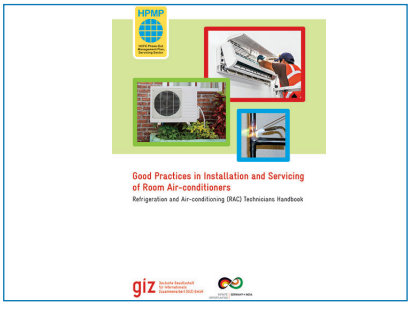
The Green Balance Air Conditioners use eco-friendly R290 refrigerant ensuring 'Zero Ozone Depletion Potential (ODP)' and a minimum global warming potential of just 3 (against competition's over 1600). These Air Conditioners use highly advanced technology that helps them perform and achieve efficiency much beyond the set Indian standards by the Bureau of Energy Efficiency (BEE) and consume even lesser power than a hair dryer. With up to 10% more energy efficiency of 5 star ACs – Godrej Eon Green Balance has achieved a six-star performance and boasts of being the world's greenest AC with Zero Ozone Depletion Potential (ODP) and a much reduced global warming potential of 3

Source: http://www.investobharat.com

A handbook for Indian technicians

GIZ Proklima, the German Society for International Co-operation, has produced a handbook for Indian technicians servicing room air conditioners.While produced specifically to assist in training engineers in India as part of India's attempts to phase-out R22 under the Montreal Protocol, this 96-page handbook could provide a useful basic reference guide for engineers everywhere.

The handbook explains in a simple and easy to understand manner, the principles of air-conditioning and how the refrigerants if vented into the atmosphere have an impact on the environment.The right hand tools and equipment for the job and descriptions are listed and the book explains how quality materials like copper tubing form an important role in the proper functioning of the air-conditioners.



The GIZ Proklima document is a useful reference source

Correct installation practices are emphasised and maintenance procedures explained.Potential alternatives to Hydrochlorofluorocarbons (HCFCs) are discussed along with recovery and recycling techniques. The average consumption of R22 for servicing in India in 2009 and 2010 was 5,042 tonnes. This consumption is expected to exceed 10,000 tonnesin 2014.

Source: http://www.coolingpost.com

South Asian ozone network meeting in Sri Lanka

With the theme "Only 219 days to 1.1.2015!!," officials and experts from 13 countries in the South Asia region gathered in the beautiful capital city of Sri Lanka from 27-30 May 2014 for the Regional Ozone Network Meeting for South Asia, organized by United Nations Environment Programme(UNEP) and the Government of Sri Lanka, through Ministry of Environment and Renewable Energy. This forum is part of a global programme to enable National Ozone Units (NOUs) to meet their countries' commitments under the Montreal Protocol on substances that deplete the Ozone Layer.

This multilateral environmental agreement includes time-bound and measurable deadlines to phase-out ozone-depleting substances (ODS). The theme refers specifically to the 1 January 2015 target for hydrochlorofluorocarbons (HCFCs), ozone depleting gases that are used widely in South Asia in air conditioners and foam manufacturing. All countries in the region must reduce their consumption of these gases by 10% by that date. It also includes 100% phase out of another gas, Methyl Bromide, used in agriculture and fumigation.

The South Asia network includes: Afghanistan, Bangladesh, Bhutan, China, India, Iran, Republic of Korea, Maldives, Mongolia, Nepal, Pakistan and Sri Lanka. Japan is the developed country partner of the network. The network is managed by UNEP's Compliance Assistance Programme (CAP) with financial support from the Multilateral Fund for the Implementation of the Montreal Protocol. The European Commission, the Multilateral Fund Secretariat, UNDP, United Nations Industrial Development Organization (UNIDO) and World Bank participated in the meeting. The European Commission provided details of new European regulations designed to control and reduce hydrofluorocarbons (HFCs), alternatives to HCFCs but many of which are high global warming potential.

Source: http://www.unep.org

Workshop on HCFC phase-out efforts

United Nations Environment Programme (UNEP) OzonAction Compliance Assistance Programme (CAP) Regional Office for Asia and Pacific (ROAP) and United Nations Industrial Development Organization (UNIDO), jointly organized a National Stakeholders Awareness Workshop to disseminate and exchange information on HCFC phase-out efforts for the National Ozone Unit (NOU) of Republic of Korea and other national stakeholders. Although, the HCFC Phase-out Management Plan (HPMP) of Republic of Korea is yet to be approved, this awareness workshop was organized as a part of CAP's special services provided by UNEP to build the capacity of key national stakeholders of Republic of Korea on HCFC phase-out issues.

CAP (ROAP) team with assistance from China's Foreign Economic Cooperation Office (FECO) within the Ministry of Environmental Protection (MEP) and UNIDO also organised a study tour on alternatives to HCFCs, policy and regulatory regimes and phase-out approaches from 8-15 April 2014 for 7 national stakeholders from Republic of Korea. The National Stakeholders Awareness workshop included an awareness component and a training component. Under the south-south cooperation framework, UNEP CAP invited external experts from China and India to provide training and awareness on alternative technologies and HCFC phase-out. The workshop informed the national stakeholders of various HCFC phase-out issues and increased their awareness on:

- Policy and enforcement measures adopted for HCFCs phase-out in China;
- Alternative technologies for HCFC phase-out in both the consumption and production sectors; and
- Approaches for the HCFC phase-out in the servicing sector.

A day long practical session for servicing technicians on good practices for HCFC management was also conducted by the invited technical experts. Representatives of UNEP and UNIDO also held a meeting with the National Coordination Committee Environment (NCCE) on steps to be taken for submission of the HPMP to the Executive Committee of the Multilateral Fund Secretariat. increased their awareness on:

Source: http://www.unep.org

An effort to promote compliance of Montreal Protocol

To assist developing countries in their efforts to ensure compliance with the Montreal Protocol and to combat illegal trade in ozone

depleting substances (ODS), the network meeting of Ozone Officers in the Southeast Asia region (SEA) was held by the United Nations Environment Programme (UNEP) OzonAction Regional Office for Asia and the Pacific (ROAP) in collaboration with the Pollution Control Department of Lao PDR, from 1-3 April 2014. This meeting was held in parallel with a Capacity Building Workshop of SEAP's Customs Officers on illegal trade in chemicals and wastes and culminated on 4 April 2014 in a Joint Meeting of Ozone Officers and Customs Officers from Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Papua New Guinea, the Philippines, Singapore, Thailand, Timor Leste and Viet Nam.

The objective of the Network Meeting was to promote effective implementation of HCFC Phase-out Management Plans (HPMPs), focusing on sharing of experiences and to review the policy and technical challenges necessary for countries to complete the phase-out of methyl bromide by 1 January 2015. The meeting also informed participants of the newly approved EU F-gas regulation and provided updates and discussion of the policy and technical developments from the recent Montreal Protocol and Executive Committee meetings. A number of other important issues were discussed such as: the issue of international standards in refrigeration and air-conditioning, maximizing climate benefits from HCFC phase-out, and incorporating alternative refrigerants into room air conditioner energy efficiency labeling systems.

"We will maintain cooperation with the National Ozone Units (NOU)to ensure that Lao PDR will be able to meet all remaining obligations under the Montreal Protocol i.e. 10% reduction in 2015, 35% reduction in 2020, 67.5% reduction in 2025, 97.5% reduction in 2030 and complete phase-out in 2040", said Keobang A. Keola, Director General, Pollution Control Department. The parallel Customs workshop aimed at enhancing the capacity of frontline Customs Officers on prevention and control of illegal trans boundary trafficking of ODS, other chemicals and wastes as a cost effective, efficient means to build synergies for Montreal Protocol compliance, to combat illegal trade of ODS and other chemicals and wastes, as well as strengthening cooperation between relevant government authorities.

Source: http://www.unep.org

Tajikistan to stop illegal trade of ODS

During the third award ceremony held in Sarajevo, Bosnia and Herzegovina, on 20-21 May 2014, the Republic of Tajikistan received the Ozone Protection Award Medal. The global community strived to protect the Ozone Layer and calls all parties – country –members of the Montreal Protocol and Vienna Convention to actively participate in preventing ozone-depleting substances (ODS) around the world. One of the global initiative is Europe and Central Asian Ozone Protection Award for Customs & Enforcement Officers launched by United Nations Environment Programme (UNEP), Division of Technology, Industry and Economics(DTIE) Ozone Action Programme in 2010. It aims to provide incentive and recognition to customs and enforcement officers and their respective organizations, who successfully prevented illegal/unwanted trade of substances, equipment or products relevant for the implementation of the Montreal Protocol. It contributes to raising awareness about the Montreal Protocol and promotes cooperation between national customs services and ozone units. In 2013, Tajik Customs discovered seven refrigerant cylinders containing 98 metric kg of R22 during Customs inspection of a lorry at the entrance of the capital Dushanbe. The cylinders were inside the sealed lorry and originating from China and transported in the name of Tajik companies. They were seized because the shipment papers referred to consumer goods without mentioning the cylinders and because the importer had not obtained an import license.

The analysis of the cylinders with a refrigerant identifier confirmed 100% R22. According to the Civil and Customs Codes, an administrative fine of USD 347 (or 1735 Tajik Somoni) was applied which corresponds to the value of the confiscated goods. The cylinders were released to the market.In accordance with ratified HCFCs phase-out schedule of the Montreal Protocol the Republic of Tajikistan has to freeze the consumption of Hydrochlorofluorocarbons (HCFCs) by 90% in 2015 and such actions taken by the customs will definitely prevent illegal/unwanted trade of ODS and indeed, enable Tajikistan to fulfill its commitments under the Montreal Protocol and its amendments.

Source: http://www.tj.undp.org

China sets target to slash potent 'f-gas'

The Chinese government has announced that it would cut emissions from production of hydrofluorocarbons (HFCs) by 280 million tonnes of carbon dioxide (CO2) equivalent – similar to the annual carbon footprint of Spain – as the country implements an agreement to curb the use of the chemicals.A Chinese language copy of the government's "2014-2015 energy saving low-carbon development action plan" dated May 28, includes an intention to accelerate the destruction of HFCs and pursue alternatives used in refrigeration and airconditioning (RAC), demand for which has soared.

"This sends a strong signal to HFC producers and consumers around the world to speed up their efforts to get out of HFCs and into climate friendly alternatives," said Durwood Zaelke at Institute for Governance & Sustainable Development, the United States, which monitors efforts to phase out the climate-changing chemicals. Campaigners say a fast phase-down of HFCs by 2020 under the 1987 Montreal Protocol would prevent up to 200 billion tonnes of CO2e being pumped into the atmosphere by mid-century, and avoid up to 0.5C of warming by 2100.Without action to curb HFCs, by 2050, emissions from the gases could be equivalent to 12% of annual CO_2 emissions under a business-as-usual scenario, and up to 75% of annual greenhouse gas emissions if countries make big cuts to energy-related CO_2.

China's target to cut CO_2 emissions from the HFC production follows a deal signed between President Obama and President Xi Jinping in 2013, including a formal agreement to use the Montreal Protocol, rather than the Kyoto Protocol, to cut the production and use of the chemicals.US conglomerate Honeywell has set up joint ventures with Chinese chemical companies to produce 'Hydrofluoroolefins' or HFOs, a type of HFCs that have a much lower potential to warm the earth.China's chemicals industry – the world's biggest producer of HFCs – has for the past decade lobbied against curbs being agreed under the Montreal Protocol, and made fat profits from destroying the gases through the Kyoto Protocol's international carbon market.

Source: http://www.rtcc.org

Philippines to find environment-friendly coolants

In its bid to fully phase-out ozone depleting substances (ODS) in line with its commitment to the Montreal Protocol, the Philippines is now faced with finding a more environment-friendly alternative coolants that do not contain global warming potential (GWP).Ella Deocadiz, program manager of the Department of Environment and Natural Resources-Environmental Management Bureau (DENR-EMB), Philippines Ozone Desk, said there is no commercially viable, environment-friendly alternative to Hydroflourocarbon (HFC), specifically HFC134a, being used for car air-conditions; and Hydrochloroflourocarbons (HCFC), specifically HCFC123, which is widely used for chillers and air-conditioning system in the country.

HFCs and HCFCs have high GWP that can contribute to greenhouse-gas (GHG) emissions that cause global warming, she explained.Deocadiz said in European countries, the more environment-friendly Hydrofluoro-olefins (HFO) is a lot expensive than HFC134a and HCFC123."While there are environment-friendly alternatives to ODS, they are not yet commercially viable," she noted, citing that HFOs are still patented while other alternatives have limited use.Under the Montreal Protocol, member-countries committed to reduce and eventually eliminate the production and consumption of ODS following an agreed timetable for developed and developing nations.

Philippines' contribution to the Montreal Protocol include the phase-out of 98 percent of historical production and consumption of ODS, and the anticipated healing of the ozone layer following 2012 reports that the ozone hole has shrunk and was recorded to be the smallest in the last decade.Environment reports said the Montreal Protocol has already averted GHG emissions equivalent to more than 135 billion tons of carbon dioxide.Meanwhile, the DENR, in partnership with the Philippine Chiller Energy-Efficient Project (PCEEP), is considering the giving of grants that will help fund the shift to nationwide use of chillers which are environment-friendly, energy-efficient and with refrigerants having either low or no substances that deplete the ozone layer.

Source: http://www.ptvnews.ph

New ice cube maker with hydrocarbon refrigerant

Hoshizaki, Japan, has unveiled the IM-240ANE-HC, its first cube machine to use hydrocarbon as a refrigerant, making it 'one of the few available in the UK'.The ice-making specialist said the high-capacity 210 kg per day machine is targeted primarily at larger outlets under pressure to demonstrate environmental awareness and realise major energy and water savings. The firm added that the R290 refrigerant provides a further benefit in that it reduces energy consumption by approximately 20%, is in addition to other water and energy saving features developed by Hoshizaki's R&D team.

Manufactured to –25°C, the ice remains solid for the longest possible time. In addition, the machine will operate continuously at temperatures of up to 40°C. Other features include a closed cell, jet ice making system that contains the water in the ice making process, thus reducing cleaning and potential bacteria build-up and bespoke water filters that improve water quality by removing discolouration, odour and treat hard water. This, 'contributes to the production of perfect ice' as well as reduced machine maintenance, Hoshisaki said.

Source: http://www.racplus.com

Magnetic cooling enables 'green' refrigeration

Magnetic cooling is a promising new refrigeration technology boasting several advantages – ranging from lower energy consumption to eliminating the use of hazardous fluids – that combine to make it a much more environmentally friendly option than today's standard fluid-compression form of refrigeration. One novel magnetic cooling approach, by a team of researchers from Université de Sherbrooke, Canada, in association with Bulgarian researchers, relies on solid magnetic substances called magnetocaloric materials to act as the refrigerant in miniaturized magnetic refrigerators. As the team describes in the journal *Applied Physics Letters*,from AIP Publishing, these materials are the key to the development of a "green" cooling technology whose efficiency is able to scale directly with the generated magnetocaloric effect.

The magnetocaloric effect is "the thermal response of a magnetic material to the change of an external magnetic field, which manifests as a change in its temperature," explained Mohamed Balli, a researcherat the Université de Sherbrooke. Ferromagnetic materials, for example, are known to heat up when magnetized and to cool down when the magnetic field is removed."The presence of a magnetic field makes ferromagnetic materials become more ordered. This is accompanied by disorder within the atomic lattice, which causes an increase in the material's temperature," Balli said. Inversely, the absence of a magnetic field means that the atomic lattice is more ordered and results in a temperature decrease. Magnetic refrigeration essentially works by recapturing produced cooling energy via a heat transfer fluid, such as water.

The researchers originally set out to measure the standard magnetocaloric effect in the multiferroic compound HoMn2O5, because this material possesses an insulating behavior that prevents energy losses associated with electric currents passing through it when altering its magnetic field.But, much to their surprise, they discovered that a giant magnetocaloric effect can be obtained by simply rotating a crystal of HoMn2O5 within a constant magnetic field – without requiring moving it in and out of the magnetic field zone (which is the case for materials exhibiting standard magnetocaloric effects).This discovery is an important step toward the development of magnetic cooling technology, and will likely lead to efficient, "green" cooling systems for both domestic and industrial applications.

Source: http://www.phys.org

Rapid growth expected in adoption of R1234yf refrigerant

DuPont Chemicals & Fluoroproducts, Japan, has announced that it estimates nearly 3 million vehicles worldwide will use HFO-1234yf as a refrigerant by the end of 2014. This will help reduce the environmental impact of automobiles, a significant challenge facing today's world. Most automakers are currently using HFO-1234yf, not only to comply with the European Union (EU) Mobile Air Conditioning (MAC) Directive but also to voluntarily take advantage of U.S. Environmental Protection Agency (EPA) credits designed to encourage the use of products with reduced climate

impact. “The EPA credits alone provide enough incentive to automakers that we expect to see more than 50 percent of automobiles in the U.S. market converted to HFO-1234yf by 2018,” said Thierry F. J. Vanlancker, at DuPont.

HFO-1234yf was specifically developed to enable automakers to comply with the EU MAC Directive, which requires that all new model type cars sold in EU Member States use an automotive refrigerant that has a global warming potential (GWP) of less than 150. By 2017, all new cars sold in Member States must meet this requirement. Most of the world’s automakers have indicated they will adopt HFO-1234yf, which DuPont sells as Opteon® YF.Opteon® YF has a GWP of less than one, which is well below the threshold established by the MAC Directive. The GWP of Opteon® YF is 99.9% lower than that of HFC-134a, the refrigerant it was developed to replace. In addition to its extremely low GWP, Opteon® YF also is quite energy efficient, which can help maximize the fuel efficiency of cars, further reducing potential impact to the climate.

While a few voices in Germany continue to raise concerns about this product relative to flammability and potential incineration byproducts, these claims have been extensively and thoroughly investigated by third party research initiatives in settings that simulate real-life situations. Based on results of these evaluations, HFO-1234yf has been accepted by the automotive industry and by regulatory bodies. Most recently, a German professor pointed at potential safety risks based on lab results showing formation of carbonyl fluoride from decomposition of this product through combustion. However, a number of automotive industry groups and government authorities have concluded after extensive testing that HFO-1234yf can be safely used in automotive air conditioning.

Source: https://www.automotiveworld.com

British engineering team wins IEA heat pump award

A team of engineers led by Dr. Andrew Pearson and his team from Star Refrigeration, the United Kingdom, has received the prestigious Rittinger Award at the International Heat Pump Conference in Montreal,for breakthrough heat pump technology that fights climate change. The team is responsible for the world’s largest zero carbon 90°C (194°F) ammonia district heat pump, which has been installed in Scandinavia, but designed and manufactured in Glasgow by Star Refrigeration. Dr. Pearson received the award for his groundbreaking research, design and development work in the field of heat pump technology.

His pioneering technology has made it possible to deliver heat at high temperatures using ammonia, a non ozone-depleting refrigerant with zero global warming potential (GWP), to run the system. The substitution of HFC gases for ammonia eliminates an equivalent of 800,000 km in car travel from gases leaking to the atmosphere.The industrial water heat pump design allowed an energy efficiency increase of 25%, in comparison to conventional commercial heat pumps. It also permitted the use of renewable energy – hydroelectricity – ensuring the heat pump makes zero carbon heat available from a fjord.

“This awards demonstrates the UK’s businesses strength in innovation and leading expertise in technical design of climate friendly technologies”, said Dr. Pearson.

Source: http://www.pwemag.co.uk

eCO_2 setting the standard

A-Gas, the United Kingdom, has launched a new high specification carbon dioxide (R744) refrigerant.Known as ‘eCO_2’ due to its environmental credentials, the new refrigerant is produced sustainably from waste sugar beet, is UK-sourced, and has excellent thermodynamic properties. According to A-Gas, eCO_2 sets the standard for those looking for a green alternative to HFC gases like R22, commonly used in these industries.The cooling industry has known for several years that R22 is being phased out but under recent amendments to the F-Gas Regulations, HFC refrigerants with a global warming potential (GWP) of 2500 are on a cap and phase down, with future supply being restricted.

Many retrofit refrigerants also fail the F-Gas test, so the eCO_2 product from A-Gas provides a cutting-edge alternative for those looking for a sustainable option.“The X Factor for eCO_2 is the sustainable way it’s produced. Most eCO_2 refrigerants are recovered from dirty industrial processes which are far from green in their methods. eCO_2 is a by-product of bioethanol production from waste sugar beet – using crops not destined for sugar production,”said Rob Parker,A-Gas Operations Manager. This is a first for A-Gas and the UK market, as a CO_2 refrigerant produced from waste sugar beet has never been on sale before on a commercial basis.

Source: http://www.gasworld.com

Solutions for injection molders and plastic manufacturers

At the Innovation and Emerging Plastics Technologies Conference held at Pennsylvania, USA, on June 18-19, Linde LLC, the United States, showcased solutions for injection molders and plastic manufacturers including: enhanced Gas-Assist Injection Molding (eGAIM), and cryogenic spot cooling and cleaning systems. The CRYOCLEAN® Snow system is a waterless, solvent-free system for cleaning automotive, plastic and other manufactured parts. The CRYOCLEAN® Snow system removes residue and other contaminants from plastic and metal surfaces using a pressurized stream of cryogenic carbon dioxide and micro-particles of dry ice. Carbon dioxide (CO_2) is inert, so there are no ozone-depleting solvents, and no potential for oxidizing metal as with aqueous-based cleaning systems.

In addition, Linde featured the new PRESUS™ C system, a liquid carbon-dioxide (LCO_2) pressure booster that can help plastic foam manufacturers and gas-assist injection molders (GAIM) improve efficiency and quality. Designed for precision and long service-life, PRESUS C systems can supply high-mass-flow LCO_2 at a constant high pressure to a variety of industrial processes. Applications include high-performance spot-cooling of hot spots in plastic injection molds, and the supply of bubble-free LCO_2 to metering systems such as the Linde DSD 500 for the physical foaming of polystyrene (PS) and low-density polyurethane (PUR).

Source: http://www.virtualpressoffice.com

A new concept for cleaning parts with aqueous media

DürrEcoclean, Germany, presented an all-new machine concept developed for cleaning parts with aqueous media, at this year's parts2clean trade show in Germany from June 24-26.Key features of the innovative EcoCWave include its universal application capability, ranging from coarse to fine cleaning, plus minimized space requirements. Equipped to optimize cleaning quality while cutting per-unit costs, the new all-round talent from Filderstadt also sets new standards in terms of visual appearance.

The media used in wet chemical cleaning of parts and surfaces are often water-based. Depending on the task on hand, they may be formulated as acid or neutral or alkaline cleaning fluids. Application levels may range from coarse to fine cleaning. But regardless of whether the aim is to remove coarse contamination between or after machining operations or to meet defined cleanliness specifications, the cleaning process must be carried out rapidly and in a cost and energy-efficient manner. In developing the EcoCWave system, DürrEcoclean's engineers therefore focused on just these requirements.

The EcoCWave has been built to adapt optimally to any cleaning task and can be expanded as needed. The new single-chamber system also provides maximum flexibility when it comes to batch sizes. Its technical features ensure that the specified cleaning result will be achieved quickly and with minimum energy input. Apart from its exceptional performance, the EcoCWave

EcoCWave system developed by DürrEcoclean, Germany

distinguishes itself by its low space demand – the engineers have managed to reduce its footprint to a minimum. With its attractive design, the new cleaning line also represents a visual highlight. Replacing its predecessor model Universal 81 W. *Contact: Kathrin Gross, DürrEcoclean GmbH, Germany. Tel: +49-711-7006-0; Fax +49-711-7006-148; E-mail: kathrin.gross@ecoclean.durr.com*

Source: http://www.ucm-ag.com

Ultrasonic vapor degreaser

TVapor degreasing is a popular cleaning process that has a long and storied past as the cleaning process of choice for providing parts free of contamination. Within the aerospace industry, vapor degreasing is a commonly used cleaning method because it is both simple and effective. Other high reliability industries, such as medical, electronics and automotive, also rely on this process to ensure the cleanliness of critical components.A major U.S.-based commercial airline employs a vapor degreasing process in a traditional open-top vapor degreaser to clean landing gear components from each aircraft during the Federal Aviation Administration (FAA), USA,mandated "D Checks." The company had reached a decision

to replace both TCE and nPB, the vapor degreasing solvents currently in use, because of environmental and employee exposure concerns.

Petroferm, the United States, a supplier of specialty cleaning agents, directed this customer toward Lenium FHD, a hydrofluorocarbon (HFC) based vapor degreasing solvent that is designed to be used in open-top or vacuum vapor degreasing systems. This solvent can act as a drop-in replacement for TCE and nPB, as well as HCFC-141b, HCFC-225 and perchloroethylene (PERC). The solvent leaves low surface residue and is safe for use with a range of metallic ferrous and nonferrous alloys, including aluminum, copper and copper alloys, magnesium, nickel, steel, stainless steel, titanium and zinc. It is also compatible with many polymeric substrates and elastomers. While this customer was particularly concerned with oil removal, the solvent is also capable of handling other soils such as adhesives, buffing compounds, corrosion inhibiting compounds, greases, hydraulic fluids, metalworking fluids and other particulate.

Especially important to the customer was that the solvent meets the Boeing BAC 5408 vapor degreasing specification, but it also conforms to Boeing D6-17487 and Douglas CSD #1 (except stress crazing on acrylics) and has been approved by Rolls-Royce OMat 1/21E vapor degreasing, Lockheed Martin EMAP G41.149, and Goodrich Power Systems mono-solvent vapor degreasing NO: 914-014-078 to 085.This blend of SNAP-approved components is non-flammable and non-carcinogenic and is not considered a HAP. The VOC content is half that of TCE and nPB, and the recommended exposure limit of 200 ppm is also considerably higher than that of TCE and nPB. The solvent also has no ozone depleting potential.

Source: http://www.productionmachining.com

HFE based cleaning fluid

Developed by 3M, the United States, the Volition VF-45 Maintenance Cleaning system consists of a bottle of Volition HFE-Based Cleaning Fluid designed for cleaning VF-45 sockets and plugs.HFE-based cleaning fluid is non-flammable and non-conductive. (400 cleanings per 16 oz. bottle). *Contact: 3M, 6801 River Place Blvd., Austin, Texas, USA. Tel: +1-800-426-8688; Fax: 800-626-0329*

Source: http://www.solutions.3m.com

New environmentally friendly solvent

Honeywell, the United States, has introduced a new high-performance, low-global-warming-potential (GWP) solvent that offers excellent cleaning power for metal and plastic parts. The new solvent, Solstice® PF, is a low GWP alternative to traditional solvents, helps manufacturers meet current and future environmental and safety standards. It effectively cleans oils, greases and other substances commonly encountered in many cleaning applications, ranging from electronics manufacturing to military and aerospace equipment repair. Solstice PF has a global warming potential (GWP) of 1, which is more than 99 percent lower than the GWPs of today's most commonly used solvents. The new material provides solvent users with a cost-effective, energy-efficient and environmentally-preferable alternative to high-GWP solvents.

"Solstice Performance Fluid meets all of the needs of today's solvent users, blending superior cleaning power with an excellent health, safety and environmental profile," said David Cooper, at Honeywell. Solstice PF is suitable for use in vapor degreasing equipment and line flushing, and can be dispensed from an aerosol can. It is an environmentally-preferable alternative to high-GWP HFC and HFE solvents used today, including HFC- 4310mee and HFE-7100. It is also a suitable replacement for HCFC- 225ca, which will be prohibited in the U.S. beginning January 2015.

Solstice PF is nonflammable, per ASTM E681 testing, and is not a volatile organic compound (VOC) as determined by the U.S. Environmental Protection Agency (EPA). Solstice PF also has an occupational exposure limit (OEL) of 800 parts per million (ppm), compared with 10 ppm for n-propyl bromide (nPB). Solstice PF is the latest addition to Honeywell's family of Solstice-branded products, which includes stationary and mobile refrigerants, liquid and gaseous blowing agents, and propellants. The Solstice product line is based on Honeywell's new hydrofluoro-olefin technology, which is designed to help customers lower their carbon footprint without sacrificing end-product performance. *Contact: Dan Mulcahey, Honeywell International, 101 Columbia Rd., PO Box 4000, Morristown, NJ-07962, USA. Tel: +1-973-455-4242; Fax: +1-973-455-4807; E-mail: daniel.mulcahey@honeywell.com.*

Source: http://www.honeywell.com

Water mist fire sprinklers

Developed by Ultrasafe Fire Suppression, the United Kingdom, the Low Flow Stored Pressure Fire Sprinkler System (LFSP) uses low flow sprinkler heads to generate a water mist style spray. This requires a lower flow of water to operate effectively. As less water is used, less water stored. Its effectiveness is helped by the fact that the flow of water is stored within tall storage cylinders (CE marked) which are charged with pressure.

The system has been extensively tested and researched. Advanced nozzle testing has been conducted the University of Greenwich and the University of Central Lancashire. The fire sprinkler system do the following:

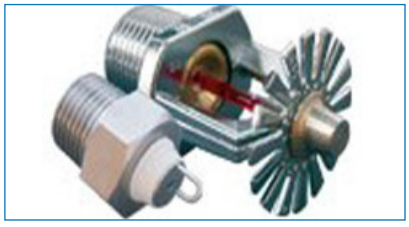
- Operate in the event of a complete and total electrical failure;
- Operate in the event of a complete and total mains water failure;
- Utilise restricted storage areas; and
- Use concealed sprinkler heads.

Contact: Ultrasafe Fire Suppression, Unit 1, Bowlings Corner, Marley Lane, Battle, East Sussex, TN33 0RE. UK. Tel: +0800-599-9251; Fax: +01424-871439; E-mail: info@ultrasafe.org.uk.

Source: http://www.ultrasafe.org.uk

Water mist system for maritime applications

Autronica Fire and Security AS, Norway, has developed a new water mist nozzlefor the FlexiFOG® water mist system. FlexiFOG® micro accommodation water mist system protecting public space, cabins, corridors and storage



FlexiFOG® water mist system

areas is the number one solution providing a highly efficient water mist fire suppression system with low weight, easy installation and state-of-the-art design.

FlexiFOG® can be integrated into a single-supplier fire detection and suppression system. This water mist fire suppression system can protect accommodation areas, machinery space areas as total flooding and local protection with one single pump package. Additionally, the control system can be integrated with AutroSafe fire detection system including AutroMaster 5000 presentation system. This means the bridge can have total control of the vessel's entire fire protection system on one single computer screen.FlexiFOG® micro deserves its name in more than one capacity:

- Uses less power and water;
- Weighs less;
- Takes up less space;
- Less visible; and
- Costs less.

Contact: Autronica Fire and Security AS, Haakon VII´s Gate 4, Trondheim, 7483, Norway. Tel: +47-7358 2500; Fax: +47-7358-2501.

Source: http://www.thebigredguide.com

Water-mist may prevent rain of sparks

Fire researchers have shown that sparks from a burning house can be prevented from spreading if the loft is fitted with an extinguishing system based on water-mist, i.e. tiny water droplets that turn into steam. An eleven-year-old report from the Norwegian Fire Research Laboratory (SINTEF), has become highly relevant, after a catastrophic fire in Lærdal in Western Norway, which destroyed 40 buildings. When fire crews obtained permission to set fire to an old timber house, then under construction, SINTEF's fire researchers were given the chance to test the effects of a water-mist system that they had installed in the loft.

"We found that the water-mist kept the temperature in the loft fairly low for a reasonable length of time, in fact well below 100°C, and this prevented the fire from breaking through the roof. When fire breaks out in a district of densely packed timber houses, it is important to be able to do just that, because it is when the flames rise through the roof that we get a rain of sparks," said Anne Steen-Hansen, research manager at SINTEF. On the recommendation of SINTEF, water-mist systems were installed in the lofts of all the houses in a block of buildings in the World Heritage City of Røros.

Water-misting is a relatively new extinguishing method, which so far has mainly been used in ships, offshore platforms and industrial buildings, etc.The method consists of drenching the site with tiny droplets of water, much of which is turned to steam by the heat of the fire. This has a number of fire-restricting effects: the water's own uptake of heat, particularly when it evaporates, cools down the flames. The water that reaches the surface of the fuel also helps to cool it down. At the same time, the volume of the water increases dramatically as it turns into steam, displacing oxygen that would otherwise feed the flames.

Source: http://www.sciencedaily.com

Reliable metering of blowing agent

The Ecofoam System from Lewa, Germany, is a new complete solution including pump, measurement and control technology that is characterized by its precision and minimum downtimes. It conveys a volume of blowing agent proportional to the speed of the extruder, ensuring exact metering even under fluctuating pressures. The system was shown at the K 2013 trade show in Düsseldorf, Germany – along with heated systems for the metering of additives that permit fully automatic, reliable, and flexible extrusion.

With Lewa Ecofoam, blowing agents such as CO_2, propane, butane, halogenated hydrocarbons, and pentane can be precisely metered into the plastic melt of an extrusion process. Since the quality of the end product is primarily determined by the even expansion of the blowing agent, the metering system is optimized to that effect. Consisting of an Ecoflow metering pump, a suction side dirt trap, and two contact manometers for pressure monitoring in the pipeline, this system is suitable for pressures from 50 to 500 bar, with flow rates between 0.5 kg/hr and 250 kg/hr.

One special feature of this controller is that it knows the pump's characteristic curve. This enables the system to be adjusted significantly faster compared with a conventional PID controller. The pump's pressure-firm characteristics ensure exact metering – even at varying extruder pressures. A safety valve also protects the system from over-pressure. Due to its robust, hermetically tight pump technology, the Ecofoam system achieves a high level of operational safety. *Contact: LEWA GmbH, Ulmer Str.10, 71229 Leonberg, Germany. Tel: +49-7152-14-0; Fax: +49-7152-14-1303; E-mail: lewa@lewa.de.*

Source: http://www.lewa-inc.com

Gas-assisted foam injection molding technology

Researchers at the department ofMechanical and Industrial Engineering, University of Toronto, Canada, have developed innovative gas-assisted foam injection molding (GAFIM) technology, which is the result of a synergistic combination of two existing manufacturing technologies, foam injection molding (FIM) and gas-assisted injection molding (GAIM), in order to produce a unique thermoplastic foam structure with proficient acoustic properties. The foam structure manufactured by GAFIM consists of a solid skin layer, a foam layer, and a hollow core; and its 6.4-mm thick sample outperformed the conventional 22-mm thick polyurethane foam in terms of the acoustic absorption coefficient. With respect to foaming technology, GAFIM was able to achieve a highly uniform foam morphology by completely decoupling the filling and foaming phases.

Moreover, the additional shear and extensional energies from GAFIM promoted a more cell nucleation-dominant foaming behavior, which resulted in higher cell density and smaller cell sizes with both CO_2 and N_2 as physical blowing agents. Lastly, it provided more direct control of the degree of foaming because the pressure drop and pressure drop rate was controlled by a single parameter, that being the gas injection pressure. In summary, innovative, gas-assisted foam injection molding technology offers not only a new strategy to produce acoustically functioning thermoplastic foam products, but also technological advantages over the conventional foam injection molding process. Gas-assisted foam injection molding can become the bedrock for more innovative future applications

Source: http://www.tspace.library.utoronto.ca

Novel microcellular injection foaming method

In a study, researchers from University of Wisconsin (UW), the United States and South China University of Technology (SCUT), China, has developed a novel microcellular injection foaming method employing supercritical CO_2 ($scCO_2$) and water as co-blowing agents to produce thermoplastic polyurethane (TPU) tissue engineering scaffolds with a uniform porous structure and no solid skin layer. Various characterization techniques were applied to investigate the cell morphology, crystallization behavior, and static and dynamic mechanical properties of solid molded samples, foamed samples using CO_2 or water as a single blowing agent, and foamed samples using both CO_2 and water as co-blowing agents.

Compared with CO_2 foamed scaffolds, scaffolds produced by the co-blowing method exhibit much more uniform cell morphologies without a noticeable reduction in mechanical properties. Moreover, these TPU scaffolds have almost no skin layer, which permits free transport of nutrients and waste throughout the samples, which is highly desirable in tissue engineering. The effect of these blowing agents on the shear viscosity of various samples has been also reported.

Source: http://proceedings.asmedigitalcollection.asme.org

Research aims to bolster strawberry production

As a new research center for strawberries gears up, scientists are already in the midst of projects to improve strawberry nutrition, monitor lygus bug infestations and facilitate farming without fumigants. Researchers from University of California (UC), the United States, are involved in about 15 studies to help strawberry growers continue to thrive in a new era when water is more scarce and methyl bromide has been phased out.Among the concepts that scientists have been trying out to control berry-busting bugs and diseases are raised bed troughs and "soilless" fields, according to a more than 200-page summary of the most recent projects by the California Strawberry Commission."Increasing regulatory restrictions and rising production costs make the efforts of these researchers critical for the continued viability of the California strawberry industry," said Carl Lindgren,research committee chairman.

The projects come as California Polytechnic State University (Cal Poly), the United States, has hired two renowned plant pathologists – Gerald Holms and Kelly Ivers – to head research and development at its new Strawberry Sustainability Research and Education Center. The center will work on soil-borne plant pathogens and other issues, using area growers as well as faculty and students for its projects. All the research will be useful to growers such as Lai Seng Saetern, whose family farms organic strawberries on rented ground near Cottonwood, Calif. With the loss of key fumigants looming, organic acreage statewide went from 1,776 in 2012 to 2,532 acres last year, according to the commission.

The methyl bromide phase-out was supposed to be completed by 2005, although agricultural users with no feasible alternatives have been given a critical-use exemption. A state study last year acknowledged that California's $2.3 billion strawberry industry will have to keep using fumigants for years to avoid a drop in revenue.The commission and the state Department of Pesticide Regulation are in the midst of a three-year, $500,000 effort to grow strawberries in peat, tree bark or other non-soil substances that are disease-free.The research aims to help growers combat such pests as the lygus bug, whose infestation can lead to smaller or irregularly shaped berries, according to the UC's Statewide Integrated Pest Management program.Meanwhile, new UC-developed strawberry varieties that yield more fruit per acre are one reason California strawberry projection has set records in seven of the past eight years.

Source: http://www.capitalpress.com

Researcher ideas to remove pest from groves

Continued exports of California citrus to Republic of Korea are in jeopardy due to the Fuller rose beetle (FRB). Growers are urged to immediately develop aggressive management protocols ahead of trade talks between Republic of Korea and the United States.At the heart of the issue is Republic of Korea's desire to keep the pest out of its country. A bilateral agreement between the U.S. and Republic of Korea will likely require specific management protocols by California producers, including skirt pruning, weed control, and chemical treatments.Republic of Korea is California's largest orange export market, so any disruptions caused by FRB could have serious consequences. However its new policy on methyl bromide fumigation makes the issue that more critical for growers to eradicate the pest from groves, according to James Cranney, Jr., president of the California Citrus Quality Council.

According to the University of California's Integrated Pest Management, the beetle does not generally cause economic damage to citrus, but the presence of viable eggs on fruit exported to countries like Republic of Korea present a quarantine concern as Korea does not have the pest and wants to keep it that way. "While methyl bromide fumigation procedures will kill the pest, Republic of Korea wants to move away from the fumigant this season. As a result, California must demonstrate full control of the Fuller rose beetle prior to this year's harvest, said Cranney. Other control measures to remove adult populations and their resulting egg masses from groves are also under investigation.

Required control measures include skirt pruning of trees so that FRB cannot climb on low hanging tree branches. Weed management is another issue growers must implement since weeds can provide another pathway into the tree.The point is to reduce pathways that allow the crawling insect access to the tree. Fuller rose beetles do not fly. They only crawl. A foliar insecticide application and packinghouse agreements could also be part of the trade agreement, Cranney said.The beetle tends to have a long lifespan – about 111 days in the lab on average.As a result, aggressive treatment programs can provide good control of the beetle if they are sustained.FRB populations are more active at night.

Source: http://www.westernfarmpress.com

Scientist fights nematode threat

Microscopic worms called nematodes may seem harmless, but they can devastate a tobacco field, reducing yields, stunting plant growth and cutting into farmer profits. A scientist from University of Georgia, the United States, is studying different management systems in hopes of reducing the nematode's impact on Georgia agriculture. "I'd say nematodes are one of the (fastest) growing pest problems we've got in the state of Georgia, not only on tobacco but just about all the crops," said Alex Csinos. Wheat, corn, oats, barley and sorghum – all grass crops – aren't as vulnerable to nematode damage, he said. Including these commodities in rotations will help farmers greatly decrease nematode populations.A main cause for tobacco farmers' concerns are the lack of nematicides. One nematicide still being used by farmers is Telone II, a soil fumigant that can effectively control nematode populations.

Whether the result of US Environmental Protection Agency (EPA) restrictions or a chemical not being renewed by the company, farmers are not as equipped to manage nematodes as they once were. As a result, Csinos encourages producers to check for nematodes during harvest time by pulling the stalks out of the ground and examining the root systems. This will give farmers a good idea of problem areas in the field and allow them to determine if there is a nematode crisis."We have complaints every year about nematode problems. A lot of times, too, our growers understand they've got a problem but don't necessarily know what's causing the problem. That's one thing growers need to do on a more scheduled basis, is to check their fields for nematodes," Csinos said.

Why is Csinos' research into nematode control necessary? Nematodes infect a tobacco plant's root system and cause a swelling or gall on the root. The gall reduces the movement of water and nutrients into the plant. The result is an immature plant lacking normal size. Nematodes cause more populations in south Georgia because they prefer sandier soils. Sandy soils have a lot of air space in it. That air space also has films of water in it, where nematodes can travel through. "Nematodes can't move and thrive in the clay soils of north Georgia," Csinos added.

Source: http://www.moultrieobserver.com

Biofumigant crops as replacements for soil sterilisation

Strawberry production in the United Kingdom, has an ex-farm value of £118M and is expanding rapidly to meet rising consumer demand. Production is 95% soil-based and a lack of virgin land is a problem for both conventional and organic growers. The most important soil borne disease is caused by the fungus *Verticillium dahliae*, which is capable of causing significant crop and economic losses. Effective control of *V. dahliae* can only be achieved by soil sterilisation resulting in the widespread use of methyl bromide to sterilise soil used for strawberry production. Methyl bromide has been banned for use in 2008 and other chemical controls, such as chloropicrin and dazomet, are less effective and it is uncertain how much longer their use will be permitted or acceptable to the consumer. Steam sterilisation is being considered, but is currently uneconomic and energy inefficient for most soil types.

In organic production systems soil sterilisation by chemicals or steam is not an option. Development of strawberry varieties with increased disease resistance could provide a long-term solution, but resistance tends to be pathogen and cultivar specific. 'Elsanta', a disease prone variety, is currently favoured by supermarkets for both conventional and organic sales and this is unlikely to change in the medium term. What is needed in the short to medium term is an alternative to chemical soil sterilisation that is reliable, has a high level of efficacy, is.environmentally benign, is acceptable to the consumer and can be incorporated into standard farming practice, including organic production. Biofumigation, based on the process of using plant-derived volatile chemicals to supress soil borne diseases, has such potential.

As result, ten potential biofumigant crops were screened in laboratory trials for their effects on reducing soil populations of V. dahliae. These included several brassica species known to produce isothiocyanates (ITCs), sudan grass, onion, lavender and the soil amendment, BioFence. The brassicas showed a good effect, but the most effective was lavender. Chemicals given off by the plant residues were characterised. These included ITC's but also large quantities of several sulphides and monoterpenes from the lavender. Field trials are in progress to compare effects of Brassica juncea, Sinapis alba and BioFencein both conventional and organic plots.*Contact: Natural Resources Institute, University of Greenwich, Central Avenue, Chatham Maritime Kent ME4 4TB,UK. Tel: +44-0-1634-8800-88; Fax: +44-0-1634-8833-86.*

Source: http://www.nri.org

RECENT PUBLICATIONS

International Standards in Refrigeration and Air-Conditioning — An introduction to their role in the context of the HCFC phase-out in developing countries

This guide provides an introduction and simple overview of the issues related to international standards in the refrigeration and airconditioning sector and how they can be useful in the context of the phase-out of hydrochlorofluorocarbons (HCFCs) in developing countries as required by the Montreal Protocol on Substances that deplete the Ozone Layer.

Phasing-out Methyl Bromide in Developing Countries: A success story and its challenges

This booklet addresses the efforts undertaken to phase-out Methyl Bromide in developing coun¬tries, the lessons learned and what is pending to reach final phase-out. It further analyses factors that may impact or put at risk the continuity of the phase-out and possible ways to mitigate them. It aims to promote the south-south and north-south-south cooperation, facilitate information exchange on advanced technologies for materials, varieties, rootstocks, etc. and raise awareness on risk of reversibility of MB uses and encourage policy to avoid it happening.

For the above two books, contact: UNEP DTIE OzonAction Branch, 15 rue Milan, 75441 Paris Cedex 09, France. Tel: +33-1-4437 1450; Fax: +33-1-4437-1474; E-mail: ozonaction@unep.org

2014 ASHRAE Handbook — Refrigeration

The 2014 ASHRAE Handbook—Refrigeration, covers refrigeration equipment and systems for applications other than human comfort.The 51 chapters in this volume include information on cooling, freezing, and storing food; industrial applications of refrigeration; and low-temperature refrigeration.

Contact: ASHRAE Customer Contact Center, USA. Tel: +1-800-527-4723; Fax: +678-539-2129; E-mail: jscott@ashrae.org

TECH EVENTS

10-12 Sep
Singapore

HVACR Asia 2014
Contact: Mr. Wangyang HU
Tel: +86-10-684-346-83
E-mail: gl2014@car.org.cn
Web: http://www.gl2014.org

15-17 Oct
Shanghai, China

12th China International Auto Air-conditioning & Transport Refrigeration Exhibition (CIAAR 2014)
Contact: Ms. Jasmin Lin
Tel: +86-21-34141312
E-mail: ciaar.int1@autocoolexpo.com
Web: http://www.autocoolexpo.com

28-29 Oct
Dubai, United Arab Emirates

4th Regional Symposium on Alternative Refrigerants for High-Ambient Countries; Installation, Service, and Risk Assessment of Future Refrigerants
Contact: Dr. Ahmed Alaa Eldin Mohamed
Tel: +971-50 641 8999,
E-mail: ahmed.alaa@ashraeuae.org

4-6 Oct
Jakarta, Indonesia

HVAC INDONESIA 2014
Contact: Informa Exhibitions Pte Ltd
111, Somerset Road #11-08
TripleOne Somerset Singapore-238164
Tel: +65-6411-7777
Fax: +65-6411-7778

4-6 Nov
Florida, USA

Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions (2014)
Contact: Methyl Bromide Alternatives Outreach 6556 N. Dolores Ave.
Fresno, CA 93711, USA
Tel: +1-559-449-9035
Fax: +1-559-449-9037
Web: http://www.mbao.org

13-16 Nov
Nonthaburi, Thailand

HVACR Thailand 2014
Contact: Anna Cheong
Exhibitions Director
Tel: +65-6411-77025
Web: anna.cheong@informa.com

20-21 Nov
Kobe, Japan

The International Symposium on New Refrigerants and Environmental Technology (2014)
Contact: The Symposium Secretariat
The Japan Refrigeration and Air Conditioning Industry Association
Kikai Shinko Bldg. 201, 3-5-8, Shibakoen, Minato-ku,
Tokyo 105-0011, Japan
Tel: +81-3-3432-1671
Fax: +81-3-3438-0308
E-mail: kobesympo2014@jraia.or.jp
Web: http://www.jraia.or.jp

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BOOKS

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