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From the Editor's

Dear Readers,

In the May issue of our Newsletter, we received several popular articles from diverse fields. All the authors deserve great appreciation for sharing articles in huge numbers. Please continue sending articles to our Publication team and share published newsletter with your friends also.

I would like to thank the Editorial team including Print, Designer and Publication committee for their efforts throughout the edition.

Your suggestions are always welcome for improvement.

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FRUIT CROP PEST AND DISEASE MANAGEMENT: BIOLOGICAL CONTROL AGENTS

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Fruits are enriched with nutrients, pigments and other metabolites helps in maintaining health of human beings and a regular intake of fresh fruits prevents many adverse ailments on human body. But how safe and healthy are these fruits? Large number of farmers involved in fruit orchard cultivation is unaware of adverse effects of pesticide use on biotic and abiotic factors of nature and its ultimate impact on human health. Because of its simple application techniques, many farmers are following chemical based pest control to increase production and profitability. Heavy use of pesticides leads pesticide residue in fresh fruits and processed products. Excessive pesticide usage harming the beneficial insects which aid in pollination and fruit set, natural pest control and decomposition. Conserving beneficial insects is often undervalued due to the difficulty in measuring and recognizing their impact. However, their importance becomes evident when broad-spectrum insecticides are used, leading to pest outbreaks. Pest outbreak which further leads to use of stronger and more harmful chemical compounds in manufacturing of pesticides. So, in order to stop these unsustainable agricultural practices, integrated pest management practices should be followed. Integrated Pest management involves long term pest and disease control strategies through integrated use of cultural, physical, chemical and biological methods.

One of the important approaches in Integrated Pest Management (IPM) is use of biological control agents where living organisms (predators, parasites and pathogens) are used to control insect pest and pathogenic diseases of crop plants. These agents are natural enemies or competitors of crop pests and diseases. Now days the biological control schemes operate throughout the world as part of the management of pests in agriculture and horticulture.

Types of Bio-Control Agents application:

1. **Classical biocontrol (Importation)** involves the introduction of a pest's natural enemies to a new location where they do not occur naturally. It uses the natural enemy of the pest as a biocontrol agent.
2. **Augmentation:** involves the supplemental release of natural enemies, boosting the naturally occurring population. It involves inoculative release (release of relatively few natural enemies at a critical time of the season) or inundative release (millions may be released).
3. **Conservation:** the conservation of existing natural enemies in an environment is the third method of biological pest control. Natural enemies are already adapted to the habitat and to the target pest, and their conservation can be simple and cost-effective.

List of Bio-Control Agents

1. Predators

Predators are the organisms that feed or consume prey in its whole life time. Insect Predators such as spiders, flies, ladybugs, wasps, beetles, hoverfly species and dragonflies prey on insect pests. Ladybugs feed on aphids, mites, scale insects and small caterpillars. The larvae of many hoverfly species feed upon greenfly, fruit tree spider mites and small caterpillars.

2. Parasitoid Insects

Parasitoids lay their eggs on or in the body of an insect host, which is then used as a food for developing larvae. The host is ultimately killed. Most insect parasitoids are wasps or flies.

3. Micro-Organisms

Pathogenic micro-organisms include bacteria, fungi, and viruses. They infect their host and are relatively host-specific. Various microbial insect diseases occur naturally, but may also be used as biological pesticides. Bacteria used for biological control infects insects *via* their digestive tracts. The bacteria is available in sachets of dried spores which are mixed with water and sprayed onto vulnerable plants such as fruit trees. Fungi that cause disease in insects are known as entomo-pathogenic fungi, including at least fourteen species including *Beauveria bassiana*, *Paecilomyces fumosoroseus*, *Metarhizium spp.*, *Lecanicillium spp.* infecting wide variety of insect pests. Viruses such as Baculovirus also used in biocontrol of pests.

Advantages of using biological control agents:

1. Reduces reliance on chemical pesticide usage in pest control.
2. Chemical residues are minimized.
3. They are environment friendly and with no side effects.
4. No harm to other beneficial insects like pollinators, natural enemies like parasitoid, predator, and entomophagous pathogens and nematodes.
5. Effective in all the seasons, easy to use and easily available.
6. Cost-effective.



The most common problems with use of biological control agents

1. The introduced bio control agents do not always target only the intended species; it can also target native species.
2. Sometimes biological control agents occur *via* predation, parasitism, pathogenicity, competition also attacks on non-target species. For this reason potential biological control agents should be subject to extensive testing and quarantine before release into any new environment.
3. It affects harvestable product quality.
4. Pest is not completely removed.
5. Not very effective for short-scale applications.

Biological control agents in fruit crops

Biological control is taking place in fruit crops all the time, because native and naturalized populations of natural enemies overwinter on the orchard and move into crops to feed on or lay their eggs into pest insects. Predators consume several insects over the course of their development. Parasites (also called parasitoids) tend to lay eggs in their host insect, which then feed internally, develop and kill the host. Pathogens invade the body of the host insect. For example among the insect pest's, mango hoppers is the most serious and widespread pest throughout the country and it leads to sooty mold formation resulting up to 100 percent loss in fruit setting and thereby on yield. Use of chemical insecticides were reported to affect the beneficial organisms such as pollinators that are important for fruit setting. An oil-based formulation of *Metarhizium anisopliae*, an entomopathogenic fungus was developed by the ICAR-IIHR, Bangalore institute with a prolonged shelf life of more than 14 months that was as effective as chemical pesticides. Mango fruit fly, *Bactrocera (Dacus) dorsalis* controlled by field release of natural enemies *Opius compensates* and *Spalangia Philippines*. In citrus sooty mold is a plant disease caused by *Aleurocanthus spiniferus*, that causes extensive damage to citrus crops. Sooty mold is a complex disease involving insect pest and pathogenic fungi. Two bacterial strains, *Bacillus velezensis* MT9 and *Pseudomonas*

chlororaphis MT5, used as biocontrol agents in inhibiting the growth of two fungal strains, *Penicillium* sp. YM1 and YM2, isolated from citrus soot.

Conclusion

Lack of awareness among farmers, limited availability and distribution of bio control agents are the certain barriers need to be considered and addressed to ensure the success of bio control strategies. Sustainable agriculture can be possible by following bio control strategies and other integrated pest management strategies which can benefit the nature.

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ESSENTIAL OILS FROM SPICES AND HERBS AND ITS APPLICATIONS

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Essential oils are volatile, usually liquid and colorless at ambient temperature. They are poorly soluble in water but highly soluble in alcohol, organic solvents, and fixed oils. They have a variable refractive index and a very high optical activity and sometimes a distinctive taste. In nature, the particular aromatic and chemical characteristics of EOs achieve many important functions for the plants such as

- Attracting beneficial insects and pollinators,
- Shielding the plants from some environmental stress (heat, cold, etc.) and
- Protecting the plants from pests and/or microorganisms.

BENEFITS OF ESSENTIAL OILS

Flavours: Essential oils and their constituents are used in foods and beverages to impart desirable flavour (taste and/or smell). (Baser & Buchbauer, 2015). Essential oil of many aromatic plants such as Geranium (*Pelargonium graveolens*), Lavender (*Lavandula officinalis*), Roman chamomile (*Anthemis nobilis*), Rosemary (*Rosmarinus officinalis*) from their different plant parts like flowers, leaves provides a pleasant odour to the food products along with flavour (Koulivand *et al.*, 2013).

Preservatives: EOs inhibit the growth of several pathogenic bacteria and spoilage microorganisms that synthetic compounds are sometimes unable to eliminate and can extend the shelf life of the food product (Zuntar *et al.*, 2018). The incorporation of natural agents such as plant extracts/essential oils can be used for food preservation for several aspects such as:

- **Safety**-slowing/stopping growth of food poisoning micro-organisms
- **Health**-slowing the deterioration of nutrients
- **Quality**-Maintaining texture, taste and aroma
- **Shelf life**- reducing waste and increasing convenience

Medicinal uses: According to the United States Food and Drug Administration (FDA) (2005), EO can be used safely, and its components can be used as additives in antimicrobial drugs to reduce the development of resistance against antibacterial, antifungal, and antiviral drugs.

Active food packaging: Cardboard and paper have been traditionally used as packaging material. Due to water vapor permeability of these materials, it is convenient and necessary to apply a layer of some material that makes them resistant to the presence of water, vapors and gases. EOs are an attractive alternative for the creation of such films. (Buendía–Moreno, Laura *et al.*, 2019)

Cosmetics: Essential oils are widely incorporated into modern skincare products because of their complexity of active compounds, strongly fragrant properties and natural marketing image. (Dreger, *et al.*, 2013). They are also used to induce additional benefits to the skin such as, anti-acne, anti-aging, skin lightening and sun protection. (Wongsukkasem, *et al.*, 2018)

APPLICATIONS OF ESSENTIAL OILS IN DIFFERENT INDUSTRIES

Food Industry: In addition to the wide use of essential oil as an antioxidant agent, they are used in food products in many other ways like favouring, fragrancng and a key element of active packaging. Thyme, oregano, rosemary, marjoram and asafetida essential oil is used in curries, meatballs, pickles, and savoury meals to add umami favour. Thymus,

cinnamon and oregano essential oils has antioxidant and antibacterial properties with the objective of its use for the meat industry (minced beef, cooked ham, or dry-cured sausage). Lavender or bergamot essential oil, is used as a flavoring agent in chocolate and chocolate coating (candy melts) (Muriel-Galet et al. 2015). Turmeric, citrus and chinese cinnamon essential oils have been used as additives in biodegradable films and coatings for active food packaging. They can provide the films and coatings with antioxidant and antimicrobial properties, depending both on their composition and on the interactions with the polymer matrix.

Baking Industry : Clove and peppermint essential oils are extremely pungent and used as a favoring agent in baking industry (cakes, baked goods and candies).

Vanilla essential oils are used as favouring agent in soft drinks. Stevia (*Stevia rebaudiana*), whose leaves contain a range of sweet-tasting essential oils that can be used to sweeten beverages. EOs of many plant species are used as flavouring agent in food and beverages. (Himani *et al.*, 2022)

Food Packaging : Essential oils can be encapsulated in polymers of edible and biodegradable coatings that provide a slow release to the food surface of packages e.g., fruit, meat, and fish. Turmeric and chinese cinnamon essential oils have been used as additives in biodegradable films and coatings for active food packaging. (Mohsenabadi *et al.*, 2018).

Medicinal Industry : Several studies have reported that some plants and EO such as clove, thyme, rosemary , oregano , cinnamon, and pimento showed potent inhibitory effects against various bacterial pathogens. Thyme essential oil contains thymol which has antiseptic properties. (Abdollahzadeh, *et.al.*, 2014)

Agriculture: Cowpea weevils are susceptible to lemongrass essential oil and citral, indicating the possibility of replacing traditional insecticides. Lemongrass essential oil causes decrease in lipid contents, changes in sexual behavior and also alterations of the total activity of biotransformation enzymes. (Alves *et al.*, 2019)

ADVANTAGES AND DISADVANTAGES

There is increasing interest in EOs due their relatively wholesome status, with most generally regarded as safe, easily degradable, environmentally friendly and non-phytotoxic (Fernandez-Pinto *et al.*, 2013). One of the chief problems with large-scale essential oils production is the relatively small yield per unit mass of raw materials that seemingly result in the generally high prices that the oils fetch on the international market. The complex mixtures of compounds, some of which known to be allergens and skin

sensitizing agents, need to be indicated on cosmetics labels, especially for consumers having sensitive, allergic prone skin or existing skin disorders and could opt for patch testing before using products containing them.

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THE BEE APOCALYPSE

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Bees and other insect pollinators like moths and butterflies, flies and beetles contributing to natural pollination are globally showing an alarming decline due to a number of anthropogenic factors. Bees (both honey bees and native/wild bees) are important natural pollinators and essential for the survival of our global agriculture, forestry and apiculture industries. Among factors impacting global decline are extensive and indiscriminate use of synthetic chemical pesticides as well as fertilizers, pollution, lack of proper bee foraging vegetation (melliferous flora) for collecting nectar and pollen, reduced immunity and rise in pest infestations of bee and bee hives and other infectious diseases, Colony Collapse Disorder (CCD), change in land use patterns, Global Warming and Climate Change to mention only a few. Hence it is absolutely important to conserve and protect highly vulnerable pollinator insects like bees that has been worst impacted. The bees have now been designated as the most important animal species on

the entire planet. All kinds of bees are suffering but the worst impact is on our native/wild bees. Honey bees can still be replaced as they are produced commercially, but there is no commercial production of native bees to replace the one we are rapidly losing. Contrary to our common perception that all bees make hives it actually not true. Several native bee species survive in nest within holes made in the soil. The irrigation water with huge surface run off carrying all kinds of residual insect pesticides and synthetic chemical fertilizers percolate down the soil killing entire critically endangered bee colonies along with the Queen bee. Around 95-99% native bee populations have decreased the past two decades. Particularly seed canola and seed alfalfa are heavily dependent on pollinators like bees for maintaining their yield. Bees are primary pollinators are integrated with agriculture, forestry and apiculture industries that employ several millions of people around the planet irrespective developed and developing or under developed nations. Unless great emphasis is laid upon bee conservation, the current insect apocalypse may wipe out both bees and humanity from our planet. We need to think about sustainable solutions towards helping economy and ecology to work hand in hand.

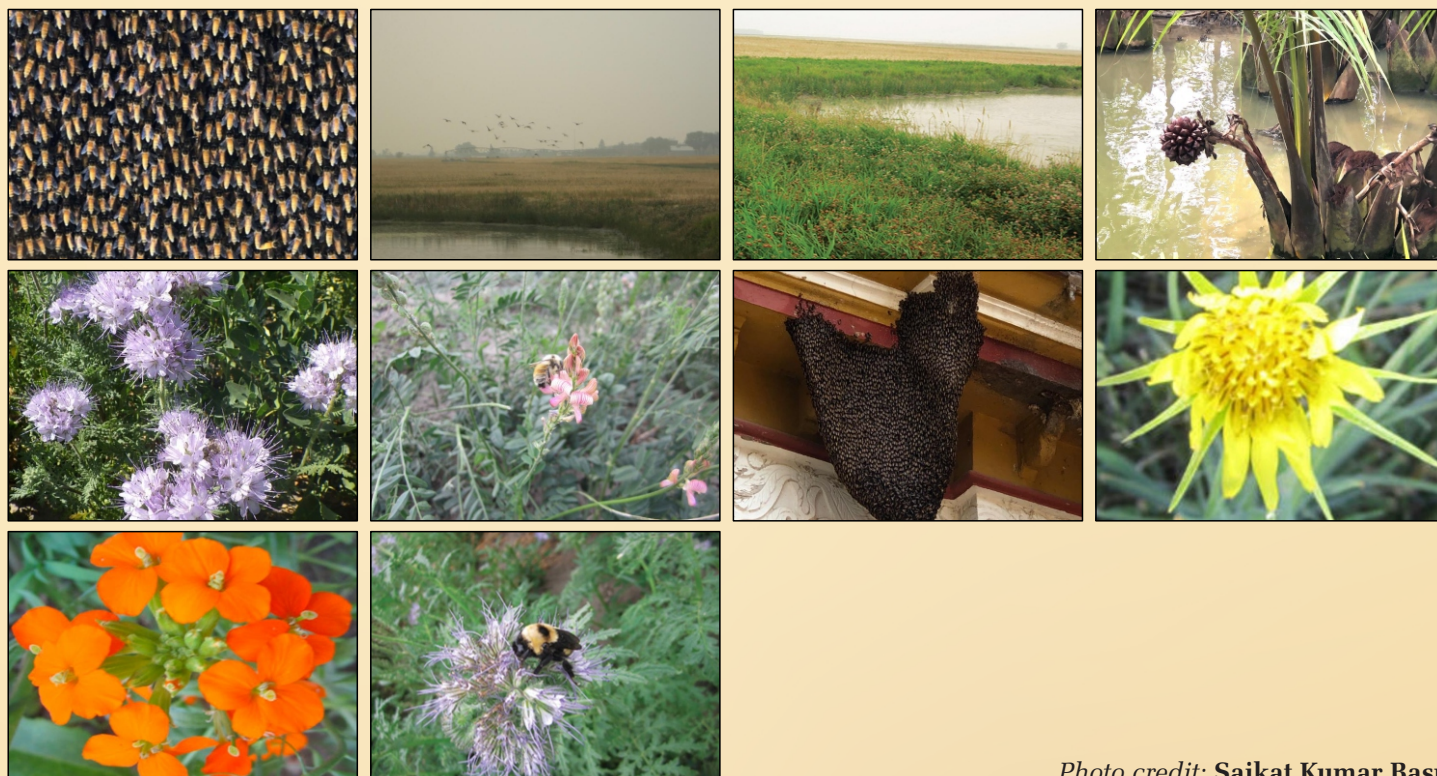


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MEDICAL GEOLOGY: FUTURE PERSPECTIVES

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Introduction:

The field of medical geology is expanding quickly, and it has the potential to assist medical and public health organizations around the globe in addressing a variety of naturally occurring and environmental-related health problems. Health issues brought on by geologic material and processes are typically chronic in nature. Long-term, low-level exposures to trace elements like fluorine, arsenic, radon, mineral dust, and naturally occurring organic compounds in drinking water are among the culprits for these issues. It has been documented that the occurrence of some non-communicable diseases varies geographically around the globe. Examples include goitre, dental caries, multiple sclerosis, cardiovascular conditions, diabetes, and Parkinson's disease. Many biological, behavioural, genetic, and environmental risk factors contribute to the multifactorial aetiology of illnesses (Davies 2000). The aetiology and regional variation of some non-communicable diseases, for instance, may be significantly influenced by specific geological risk factors, which are generally stable. Hippocrates and Aristotle observed connections between environmental conditions and the distribution of many diseases thousands of years ago. Minerals were known to have therapeutic as well as possibly harmful effects in ancient China and India. However, the 20th century championed reductionist science, thus many find the term "medical geology" strange today. Medical geology is defined as the scientific field that investigates the effects of geologic materials and processes on ecosystem and human health. This definition covers both natural and artificial causes of potential health issues, and it also suggests that diseases of both wildlife and plants are included.

The most accurately descriptive term for this field of research, hydro, biogeo, chemo, epidemio, pathoecology will not be used for obvious reasons. On June 7-8, 2002, the International Society for Ecosystem Health (ISEH) hosted the Healthy Ecosystems/Healthy People conference in Washington, DC, where the working group Medical Geology: Earth Systems, Resource Use, and Human Health met. The working group decided to keep using the term "medical geology," acknowledging that the emphasis should be placed on the wide definition provided above.

Exposure to trace elements: Deficiency and toxicity

The normal metabolism and physiological processes of both humans and animals depend on trace elements. About 22 of these substances are recognized as being "essential" for people and other animals. While "micronutrients" are needed in much smaller quantities (e.g., micrograms to milligrammes per kilogramme of diet), "macronutrients"

must be consumed in relatively substantial numbers (e.g., grammes per kilogramme of diet) (Adriano 2001). It has been determined that 16 components are necessary for good health. For example, membranes and bones need calcium, phosphorus, magnesium, and fluoride to perform structural tasks. Cellular water and electrolyte balance depends on the presence of sodium, potassium, and chloride. In addition to iron, the following elements are crucial for the function of enzymes: zinc, copper, selenium, manganese, and molybdenum.

The endocrine system's ability to function depends on chemical components as well. For instance, chromium serves as the main atom in the hormone-like glucose tolerance factor, and iodine is a crucial component of the thyroid hormone thyroxine. These are all important living processes, therefore many "nutritionally essential elements" in the body have their tissue levels maintained within specific ranges and are influenced by a number of physiological processes, most notably homeostatic regulation of enteric absorption, tissue storage, and/or excretion. Short-term dietary deficits or excesses of trace elements may be made worse by changes in certain physiological processes. For both humans and animals, food is an important source of trace elements. For both humans and animals, food is an important source of trace elements. The deliberate ingestion of dirt (geophagia) and water supplies are examples of alternative sources that could also contribute to the dietary intake of trace elements. Iodine, copper, zinc, selenium, molybdenum, manganese, iron, calcium, arsenic, and cadmium are documented trace element diseases as well as excesses. The juvenile cardiomyopathy known as "Keshan Disease" (Fordyce, 2005) and the iodine deficiency disorders such as goitre and myxedematous cretinism have been reported as endemic diseases associated with soil deficits in selenium and iodine, respectively.

In the following paragraphs, examples of adverse health effects due to trace element deficiencies and excesses are described. Chronic exposure to non-essential elements such as arsenic is also described.

Iodine

For iodine, there is strong evidence linking geology materials to trace element deficiencies. Reduced IQ, miscarriages, birth defects, goitre (thyroid gland enlargement), cretinism (mental retardation with physical deformities), and iodine deficiency disorders (IDD) are some of the symptoms of IDD. People with goitre were fed seaweed to provide the necessary iodine in ancient China, Greece, Egypt, and among the Incas. People with goitre were fed seaweed to provide the necessary iodine in ancient China, Greece, Egypt, and among the Incas (Fordyce, 2005). There are still many places of the world where goitre is a serious illness. IDD could affect more than a billion individuals worldwide, most of whom reside in underdeveloped nations. Due to low levels of iodine in bedrock, the iodine content of drinking water is extremely low in all areas with a high risk of IDD.

Selenium

Selenium is a crucial trace element with qualities that help regulate thyroid hormones, redox reactions, and antioxidant protective mechanisms. A severe physiological impairment and organ damage, such as a juvenile cardiomyopathy (Keshan disease) and muscle anomalies in adults (Kashin-Beck disease), have been linked to selenium shortage (caused by soils poor in selenium). Dietary selenium has been very effective in both the prevention and treatment of various disorders (Fuge, 2005).

Toxicity of essential and non-essential elements

Arsenic

Human carcinogens include arsenic and its compounds (IARC, 1987). A number of anthropogenic sources, such as mining, pesticides, medicines, glass, microelectronics, and most frequently natural sources, can expose people to arsenic. Arsenic exposure can happen through ingestion, inhalation, cutaneous contact, and, to some extent, parenteral exposure. Arsenic contamination of drinking water is a significant public health issue. Arsenic contamination of drinking water is a significant public health issue. In several nations across the world where a sizable amount of the drinking water is contaminated with high quantities of arsenic, both acute and chronic arsenic exposure through drinking water has been documented. Poor women and children in Bangladesh are the most negatively impacted. Adult females are typically the most malnourished and susceptible to disease in low-income rural households. Arsenicosis has an impact on sufferers' productivity as well because it frequently renders victims unable to work and a liability for their family. Since they were born, the underprivileged children have consumed filthy water. They might eventually get arsenicosis. The parents of a young woman who is affected may find it extremely difficult, if not impossible, to find her a husband without paying a sizable dowry. The arsenic issue will make the challenging social issue of dowry providing even more onerous.



Figure 1: Squamous cell carcinoma on heel. The patient was from the village of Singergdanga (police station Gaighata), North 24-Paraganas District.



Figure 2: Hyperkeratosis on sole. The patient died of lung cancer. The patient was from the village of Chandpur North 24-Paraganas District.

Fluoride

Over-exposure to trace elements in geologic materials is responsible for toxicity effects in humans and animals. One of the most studied trace elements in this regard is fluorine. The fluoride ion (F^-) stimulates bone formation and also reduces dental caries at doses of at least 0.7 mg/L in drinking water. However, excess fluoride (>1 mg/L) exposure can cause fluorosis of the enamel (mottling of the teeth) and bone (skeletal fluorosis) Teotia & Teotia 1994; Sunitha et al., 2020. Types of mottling are shown in Figure: 3.

CONCLUSION

Future studies in the field of medical geology should focus on establishing a better understanding of the role of minerals in ecosystems and their interaction with biological organisms, for which it will be necessary to resort to the use of advanced technologies in the characterization of samples, providing valuable information not only in relation to environmental conditions but also in relation to the state of human health. However, it is necessary to consider essentiality and non-essentiality minerals with reference to human health, sources of exposure of toxic elements, and health effects induced by deficiency and excess of minerals. This will be essential in defining environmental and public health strategies. Therefore, to be most effective the Colombian geoscience community should be included as one of the key players or agencies involved in environmental health studies. Earth planet contributes to the pollution through volcanic eruptions, radiation, toxic elements, dust, etc., however, if the anthropogenic activities continue contributing to increase the levels of contamination, it would be very difficult to protect the humanity.

The objectives of Medical Geology are to identify harmful geologic agents, determine the conditions of exposure that promote deteriorating health conditions, and develop sound principles, strategies, programs and approaches

necessary to eliminate or minimize health risks. Interaction and communication is necessary between the geoscience, biomedical, and public health communities to protect human health from the damaging effects of physical, chemical and biological agents in the environment. We recommend that Medical geology be included in higher education curricula so that students will be aware of the connection between geology and health and encouraged to pursue a career in Medical Geology. The rapidly emerging scientific discipline of Medical Geology holds promise for increasing our environmental health knowledge base, and contributing to substantial tangible improvements in the well-being of the global community.

The goals of medical geology are to detect dangerous geologic agents, identify the environmental factors that contribute to deteriorating health conditions, and create the sound guidelines, plans, strategies, and methods required to completely remove or significantly reduce health hazards. To safeguard human health from the harmful impacts of physical, chemical, and biological agents in the environment, interaction and communication across the geosciences, biomedical, and public health groups are essential. We recommend that Medical geology be included in higher education curricula so that students will be aware of the connection between geology and health and encouraged to pursue a career in Medical Geology. Medical geology is a fast developing scientific field that has the potential to advance our understanding of environmental health and make a significant, positive impact on how well the entire world is doing. Promoting acceptance of the field of medical geology is a crucial task. By increasing awareness among funding organisations and decision-makers, this may make support for research easier to come by. The general public has to be made aware of the importance of this subject so that they can urge their

elected officials to support this vital cause. This field holds the promise of helping to solve severe public health issues. A partnership between the Society and the IUGS Medical Geology Initiative would certainly be advantageous to both Organisations given the ISEH's guiding principles and objectives. Together, these complementary groups can create Medical Geology, a robust, self-sustaining interdisciplinary scientific discipline.

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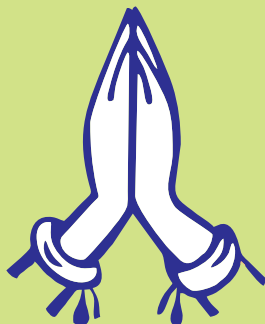
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THOSE WHO INTERESTED TO BECOME A EDITORIAL MEMBER OF THE NESA E-NEWSLETTER ARE REQUESTED TO SEND THE MAIL ALONG WITH THE CURRENT CV.



NESA members are humbly requested to please send the small articles for the NESA E-NEWSLETTER through mail on infonesa88@gmail.com

ACTIVITIES AND SPECIAL DAYS IN THE MONTH OF MAY 2023

V. Sunitha

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1 May: International Labour Day or May Day

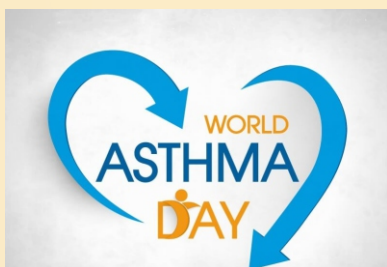


Labour Day or May Day are other names for International Labour Day. It is observed on May 1st all across the world. Labour Day is known as Antarrashtriya Shramik Diwas or

Kamgar Din in India.

2 May - World Asthma Day (First Tuesday of May)

Every year on the first Tuesday in May, the world celebrates World Asthma Day to raise awareness of and concern about asthma. The Global Initiative for Asthma hosts a yearly occasion. The symptoms of asthma include chest tightness, dyspnea, coughing, and chronic bronchitis inflammation.



3 May - Press Freedom Day

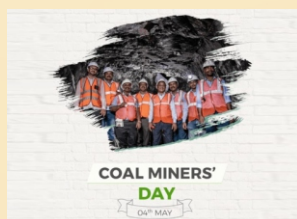


Press Freedom Day, also known as World Press Freedom Day, is held annually on May 3 to assess press freedom throughout the world and to remember journalists who have

died while performing their jobs.

4 May – Coal Miners Day

Coal Miners Day is celebrated annually on May 4 to thank coal miners. Let us inform you that coal is extracted from the ground through the process of mining. One of the riskiest jobs in India is coal mining.



4 May - 'International Firefighters Day



The fourth of May is commemorated annually as International Firefighter's Day. After a proposal was sent out via email to everyone in the world following the deaths of five firefighters in an Australian

bushfire, it was implemented on January 4th, 1999. In order to commemorate and honour the sacrifices firefighters make to keep their communities and surroundings as safe as possible, this day is observed.

6 May - International No Diet Day

Every year on May 6, it is celebrated. It is a celebration of accepting one's body, especially one's fatness and the variety of body types.



8 May - World Laughter Day (first Sunday of May)



Every year on the first Sunday of May, World Laughter Day is observed. The initial event was held in Mumbai, India, in 1998. Dr. Madan Kataria, the man behind the global Laughter Yoga movement, organised it.

8 May - World Red Cross Day

Every year on May 8th, World Red Cross Day is commemorated to mark the birth anniversary of the Red Cross's founder. Let us inform you that Henry Dunant was both the Red Cross and the International Committee of the Red Cross (ICRC) founder.



8 May - World Thalassaemia Day

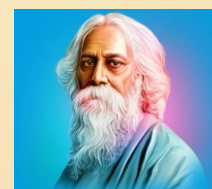


Every year on May 8, World Thalassaemia Day or International Thalassaemia Day is commemorated in remembrance of all thalassaemia patients and their parents, who have never

lost hope for life despite the burden of their illness. Additionally, those who struggle to manage the disease are inspired by this day.

9 May – Rabindranath Tagore Jayanti

The day of Boishakh 25th presently falls on either the 8th or 9th of May according to the drikpanchang. He was a leading figure in Indian art, literature, Bengali poetry, humanism, philosophy, etc. He received the Nobel Prize in Literature in 1913.



10 May- World Lupus Day



On May 10, people all across the world mark World Lupus Day. Its goal was to raise our awareness of the fact that the symptoms, which at first glance might seem unrelated, are actually warning signs of a debilitating, chronic autoimmune disease.

11 May - National Technology Day

Every year on May 11, National Technology Day is commemorated to draw attention to the crucial role that science plays in our daily lives and to inspire youngsters to consider a career in the field. The Pokhran nuclear test took place on May 11, 1998, Shakti.



12 May - International Nurses Day



The anniversary of Florence Nightingale's birth is commemorated each year on May 12 by observing International Nurses Day. This day also honours the contributions that nurses have made to society worldwide.

17 May – World Telecommunication Day

Every year on May 17, the world observes World Telecommunication Day. On May 17, 1865, the first International Telegraph Convention was signed in Paris, thus establishing the ITU. It is also referred to as International Society Day and World Telecommunication Day. It has been observed annually since 1969.



17 May - World Hypertension Day



The World Hypertension League (WHL) observes this day on May 17 each year. The goal of the day is to increase public awareness of hypertension and to motivate people to stop and manage this pandemic that kills silently.

18 May - International Museum Day

Every year on May 18, International Museum Day is commemorated to increase public awareness of museums and their value to society. International Museum Day was established in 1977 by the International Council of Museums (ICOM). Every year, the association proposed a suitable theme, such as globalisation, overcoming cultural divides, or environmental protection.



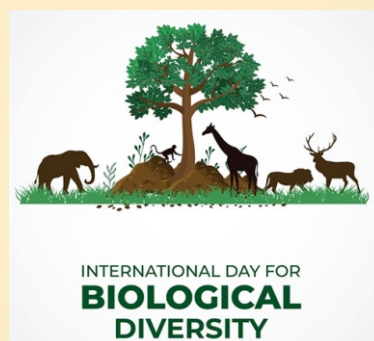
19 May - National Endangered Species Day (Third Friday in May)



National Endangered Species Day is observed annually on the third Friday in May to increase public awareness of the value of conservation and restoration efforts for all threatened species.

22 May - International Day for Biological Diversity

Every year on May 22 to raise public awareness and knowledge of biodiversity challenges, the International Day for Biological Diversity



May 23 - World Turtle Day



Every year on May 23, it is observed to raise awareness about the need to safeguard turtles and tortoises as well as their rapidly diminishing habitats. The future seems brighter with the

possibility of harmonious coexistence between people and turtles.

31 May – Anti-Tobacco Day

Every year on May 31, people all over the world mark Anti-Tobacco Day or World No Tobacco Day to raise awareness and educate them about the detrimental effects of tobacco on health, including heart disease, cancer, tooth decay, and tooth discoloration.

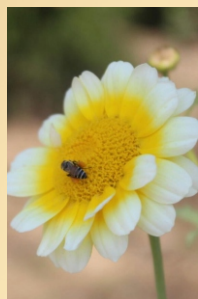


SAVE OUR POLLINATORS

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Insect pollinators such as bees, butterflies, moths, beetles, flies and ants are all vanishing first around the planet due to excessive use of pesticides in agriculture and anthropogenic pollution. According to IUCN, 85% of flowering plants on our planet are dependent on these insect pollinators for their survival and maintaining the balance of our ecosystem. American Beekeeper's

Association reported that bee populations are showing an alarming decline due to a number of factors like environmental pollution, indiscriminate use and over applications of various agro-chemicals, industrial agricultural practices detrimental to nature, changes in the land use patterns; and parasitic diseases of bees as well as lack of adequate supply of nectar and pollens for different bee species due to lack of suitable of bee foraging plants. The yield loss due to lack of suitable pollinators for cross pollination is a serious threat to the future of global agriculture as well as for maintaining the balance of our natural ecosystems.

The worst decline is noticed in developed nations practising high precision industrial agriculture with native bee population crashes between 97-99% in the past two decades has been reported by the Beekeeper's Association of Canada. The major factor behind this rapid decline of pollinator insects is specifically due to extensive application of toxic synthetic pesticides and synthetic fertilizers. The industrial level pesticide spraying in large farms in western countries is dependent on low wind speed and bright sunny mornings. Unfortunately, these are the days when insect pollinator's flock to their foraging ground in large numbers. As a consequence they are being killed in massive numbers impacting ecological balance. Pesticide laden irrigation water and rain water percolates through



holes in the soil to reach the bee colonies to wipe them out completely as investigated by the US based Xereces Society that works actively towards pollinator conservation across the continent of North America.

This kind of bee population declines are not reported from developing nations like India where small plot farming is practised due to lack of large agronomic lands and related infrastructure to maintain such huge averages. Furthermore, there is tremendous crop biodiversity in the sense that rice, mustard, flax, various legumes, aromatic and medicinal herbs, forage crops, ornamentals and fruit orchards are all grown in adjacent areas. Thus pollinator insects have the grand opportunity to move or escape the negative chemical impact by moving into other plots or fields or Forage in an alternate crop.

The toxic chemicals land as droplets on the insect body and stick to them. Bees like other insects have the habit of cleaning their antennae; and through this process they intake toxic pesticides inside their system killing them. Often these chemicals impact their nervous system impacting their precise sense of orientation causing them to land at inappropriate sites causing deaths. Cross contamination with bees having pesticides with them with others in the hives or nest also causes an epidemic resulting in mass deaths of honey bees as well as native bees. While commercial honey bees are raised and can be replaced, native bees on which forest pollination is

completely dependent are being wiped out in this process. In North America and EU over 40% annual productions in apiculture industries have been impacted due to mass deaths of bees (American Beekeepers Association). Unfortunately, reliable data on both honey bee and native bee declines in a India is not easily available or reported scientifically either by Zoological Survey of India or any entomological societies in the country to get a proper estimate of different bee populations, a research domain that needs urgent attention !



Establishing suitable pollinator (bee) gardens or habitats or sanctuaries at suitable sites could prove to be instrumental in both bee and other pollinator insect conservation from a long term, ecological perspective. Using suitable Pollinator Mixes comprising of native grasses, wildflowers as well as annual, biennial, perennial forage crops (forage grasses, legumes, different Brassica family members) can help in establishing Pollinator gardens or habitats or sanctuaries in perimeters of forested areas, under used or unsuitable agronomic lands, unused and available rural locations, city and municipal parks and gardens, lawns, kitchen gardens, unused or hard to farm areas, in sites adjacent to natural or artificial water bodies like ponds, pools, ditches, swamps, bogs, streams, irrigation canals etc

Natural or artificial aquatic habitats like pools, ponds, ditches, swamps, bogs, lakes, canals etc could be targeted

for ecological restoration by planting short or high grasses, salt tolerant aquatic plant species and grasses along with Pollinator mixes comprising of annual and perennial legumes, wildflowers and related pollinator friendly plant species adjacent to water bodies. Such mixes will not only restore aquatic habitats; but, also attract small and medium sized land birds and a wide diversity of pollinator insects like honey bees, native bees, moths, butterflies, certain species of pollinator beetles and flies for nectar foraging, nesting and breeding purposes. If the water bodies are well stocked with indigenous fish species, well protected grassy aquatic habitats will also attract a wide diversity of aquatic birds to nest, forage and breed in such unique environmentally restored ecosystems.

Photo credit: Saikat Kumar Basu



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NOTIFICATION NO. 1

APPLICATIONS ARE INVITED FOR NESA ANNUAL AWARDS – 2023

LAST DATE: 31st August, 2023



This is to notify that applications are invited for the NESA Annual Awards 2023 from the Life Members of the Academy. The prescribed application forms for the following categories can be down loaded from our website: www.nesa-india.org • <http://nesa-india.org/award-form-submission/>

Separate applications should be submitted for independent awards. For detail guidelines the website of NESA may be approached by logging on.

The last date for the all the categories of awards is **31st August, 2023**. The venue and the brochure will be shared soon.

The categories of Awards are given as under:

- (1) NESA FELLOWSHIP AWARD
- (2) NESA INTERNATIONAL SCIENTIST AWARD
- (3) NESA EMINENT SCIENTIST AWARD
- (4) NESA INDIGENOUS TECHNICAL KNOWLEDGE (ITK) AGRICULTURE AWARD
- (5) NESA SCIENTIST AWARD
- (6) NESA ENVIRONMENTALIST AWARD
- (7) NESA GREEN TECHNOLOGY INNOVATIVE AWARD
- (8) NESA DISTINGUISHED SCIENTIST AWARD
- (9) WOMEN EXCELLENCE AWARD
- (10) NESA YOUNG SCIENTIST AWARD
- (11) NESA JUNIOR SCIENTIST AWARD

Contact for more details:
 Mobile : 98112 38475, 8527568320; 9971383650

**MEMBERS ARE REQUESTED
 TO PLEASE PLANT ONE
 TREE IN YOUR
 NEIGHBOURHOOD AND
 SEND US A SMALL BRIEF
 WITH PHOTOGRAPH OF
 THE TREE / PLANT SO WE
 CAN PUBLISH IN THE
 NESA E-NEWSLETTER**

**ENROLL YOURSELF TO NESA
 NEWSLETTER EDITORIAL
 BOARD MEMBER**

Editorial board members of NESA newsletter will be revised for the year 2023. All the interested applicants may send their curriculum vitae to Editor in Chief by **15th June, 2023.**