QUEST

JUNE 2021

CLIMATE CHANGE HAS MADE

Our bees and flowers out of sync!

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Warmer spring temperatures are causing bees to hatch earlier before flowers have bloomed for pollination.

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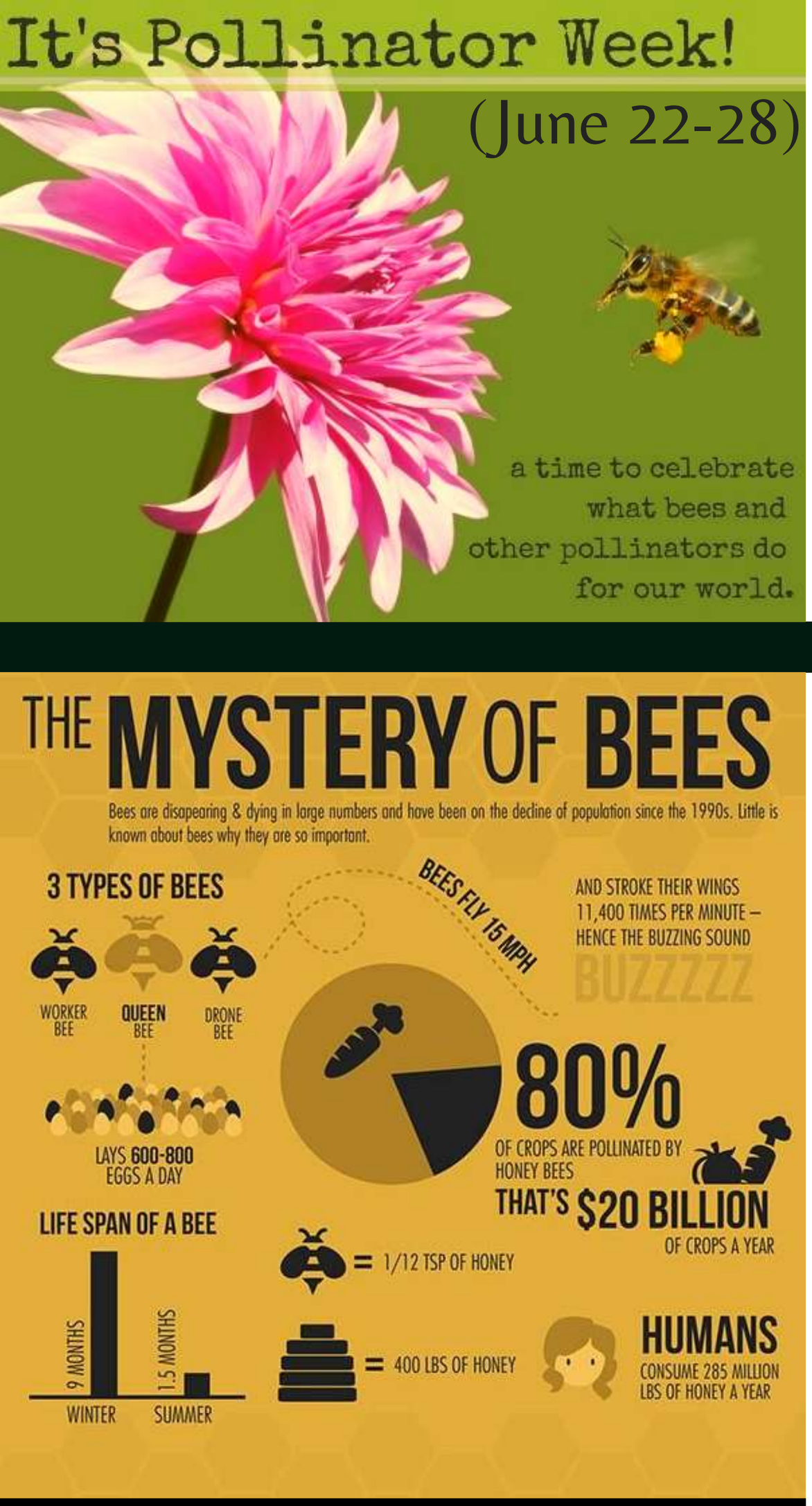
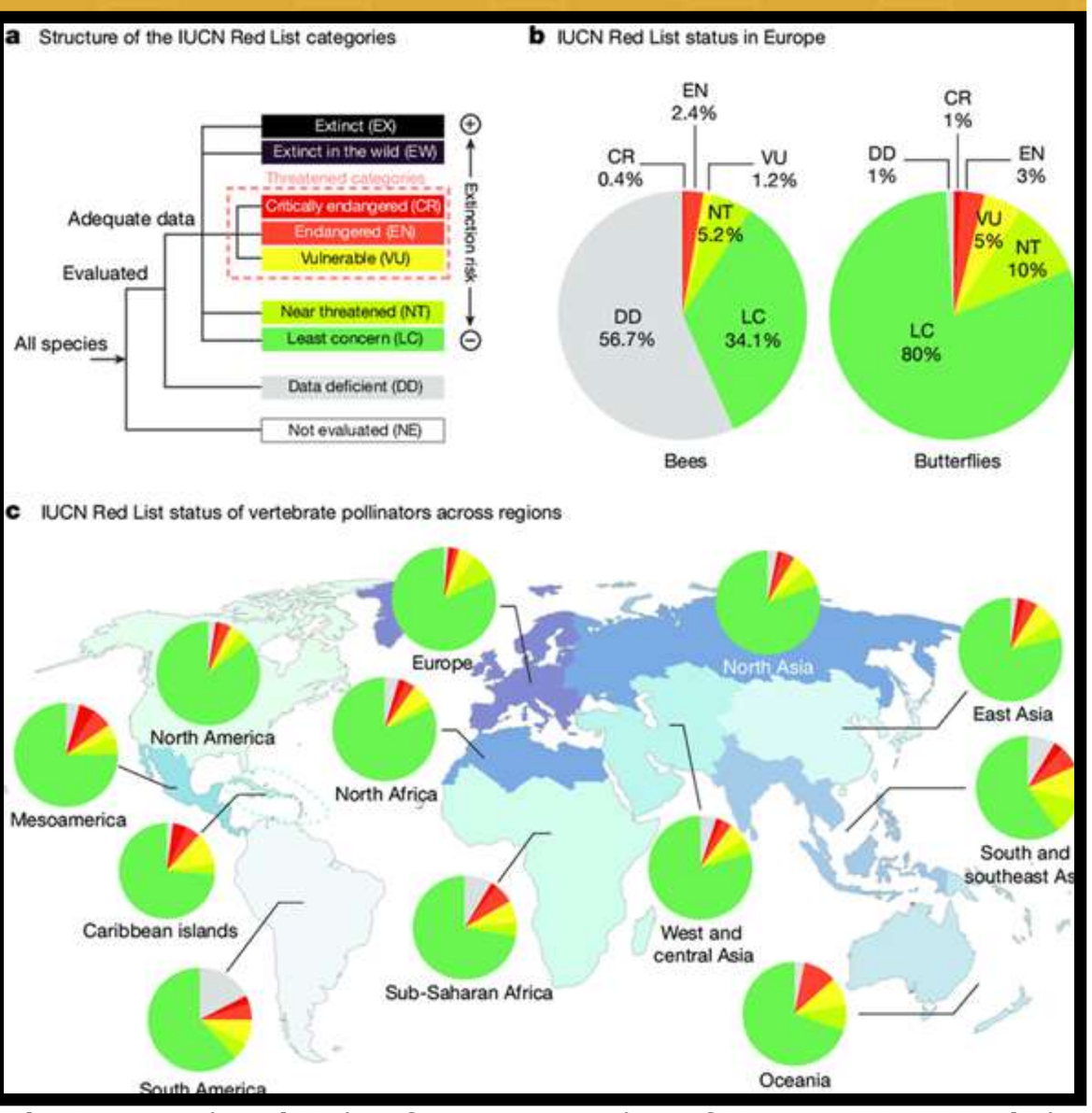




The International Union for Conservation of Nature (IUCN) Red List status of wild pollinator taxa. a, Standardised IUCN extinction risk categories. b, European bees and butterflies. c, Vertebrate pollinators (including mammals and birds) across IUCN regions. IUCN relative risk

Contents

Quest/June/2021

save the bees

plant these to attract and feed beneficial bees

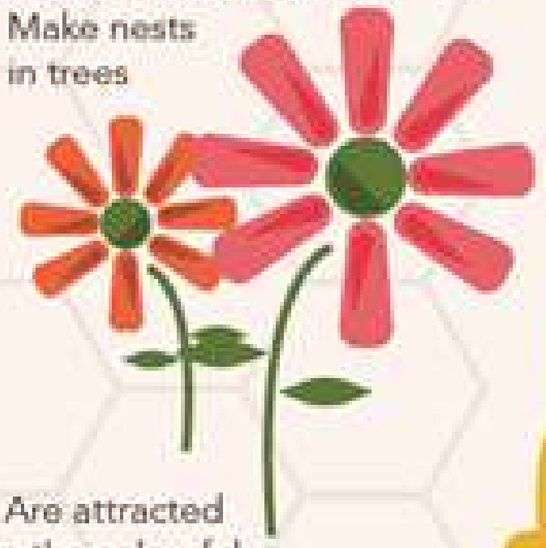
-BY MS. ANJALI CHHIBBER

HOW BEES HELP US

Honeybees don't just make honey... They help make the food that humans eat but they are currently in danger

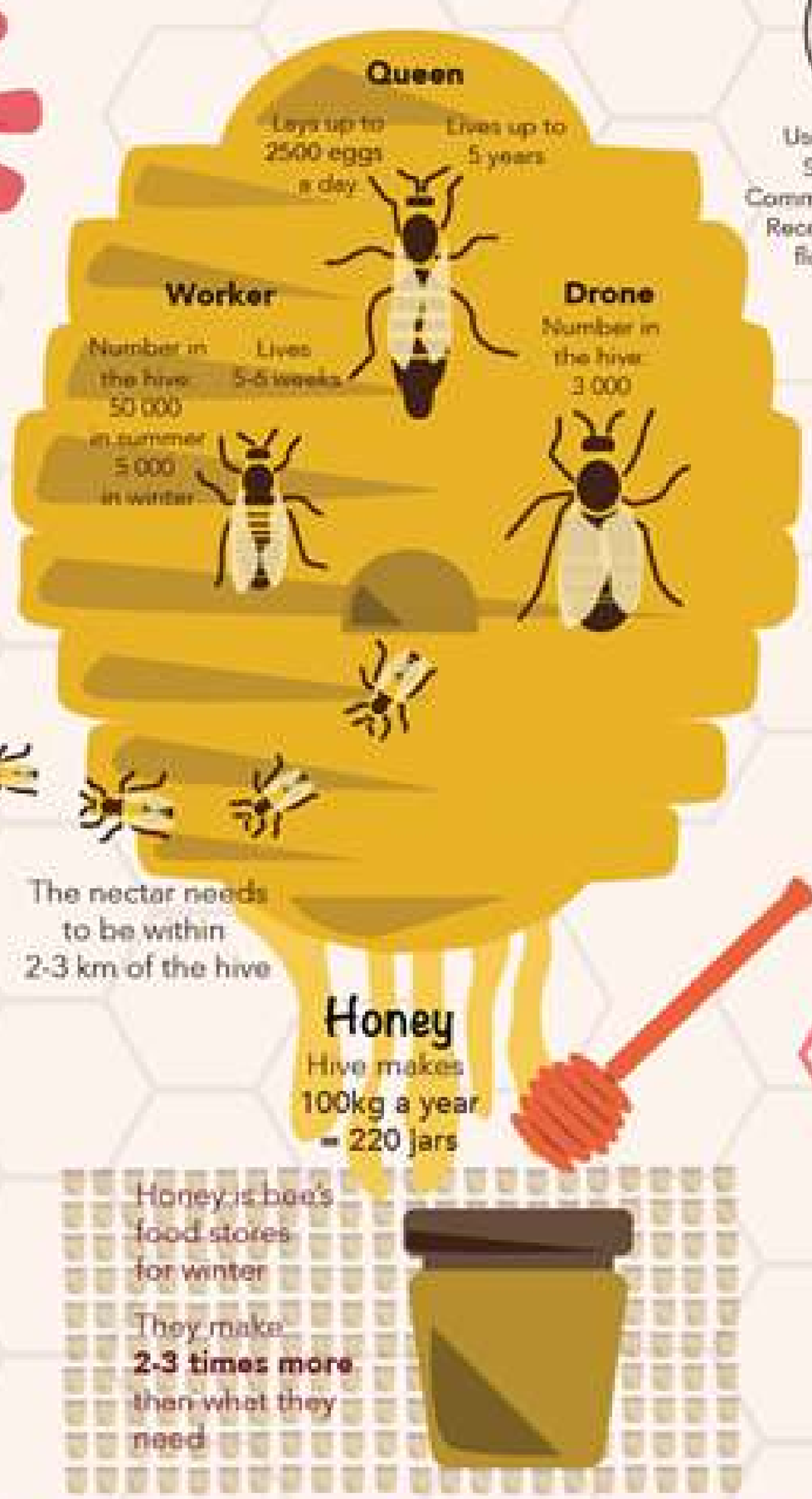
The Bee's Habitat

Make nests in trees



Are attracted to the colourful flowers that suck nectar from

The Colony/Hive



The Bee

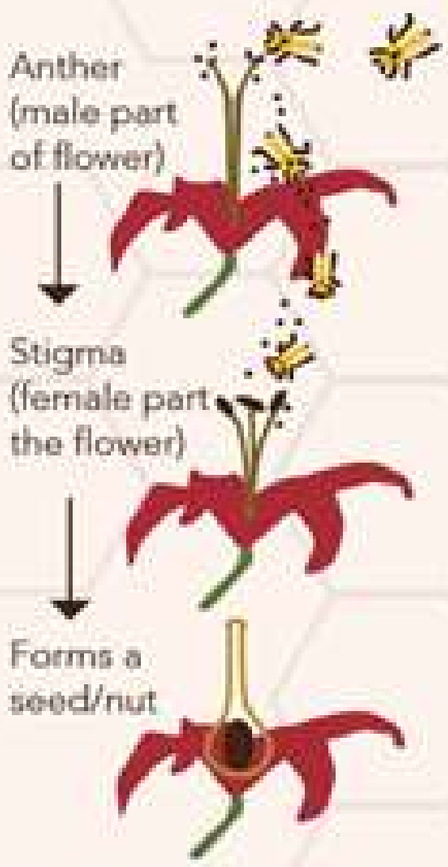
Plays an important role in the FOOD CHAIN

Bees have **170 ODORANT Receptors**

Used for:
Smell
Communication
Recognising flowers

The Pollination Process

Transfers pollen



The nectar needs to be within 2-3 km of the hive

Honey

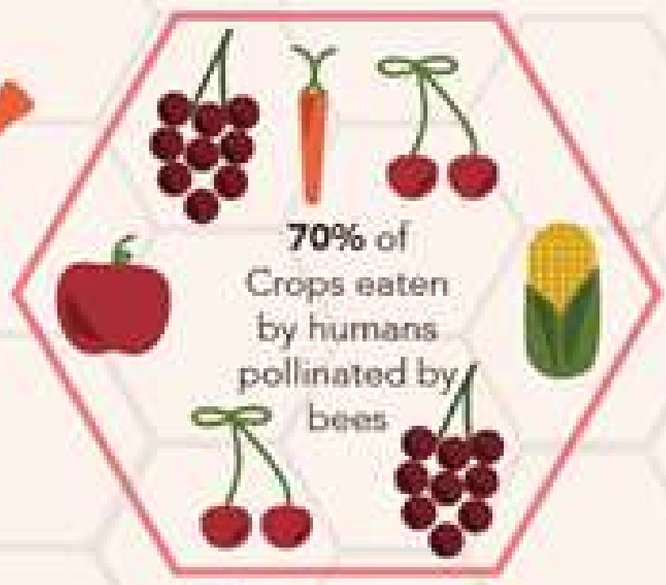
Hive makes **100kg a year = 220 jars**

Honey is bee's food stores for winter

They make **2-3 times more** then what they need

The Importance of Bees as Pollinators:

Need them to get **1/3 of the food** we eat



70% of Crops eaten by humans pollinated by bees

Colony Collapse Disorder

Bees are vanishing from their hives and leaving the queen behind

Bee populations have been decreasing since the 1990s.

Reasons:

How you can help:

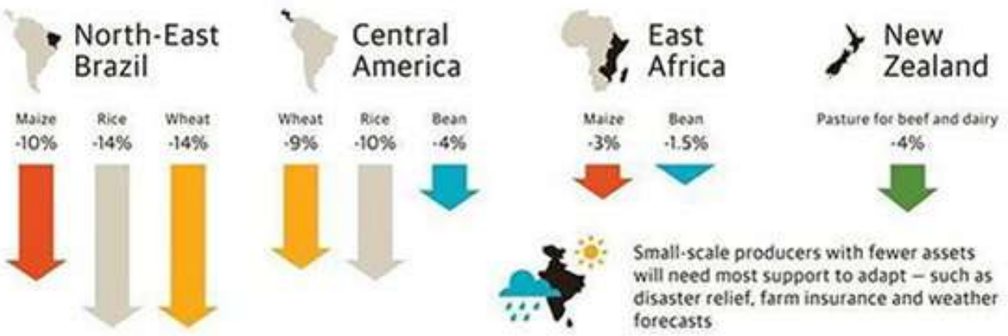
CONTD....

PROBLEM AND SOLUTIONS

The future of food and farming: 2030s

In the 2030s, climate change will affect food and farming more strongly, particularly small-scale producers in poor countries

Crop and pasture yields are likely to decline in many places

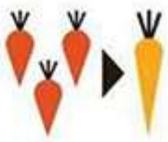


Small-scale producers with fewer assets will need most support to adapt – such as disaster relief, farm insurance and weather forecasts

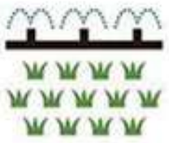
Adaptation will be key

CROPS

Temperate regions will benefit more from adaption than tropical regions



Switching to varieties tolerant to heat, drought or salinity



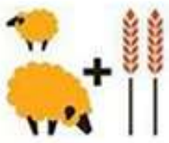
Optimising irrigation

Managing soil nutrients and erosion

LIVESTOCK

Key adaptations for small-scale producers include:

Matching animal numbers to changes in pastures



More farms that mix crops and livestock

Controlling the spread of pests, weeds and diseases

FISHERIES

Key adaptations for small-scale fisheries include:

Switching to more abundant species

Restoring degraded habitats and breeding sites like mangroves

Strengthening infrastructure such as ports and landing sites

SOURCES: Porter, J. R., Xie, L., Challinor, A., Cochrane, K., Howden, M., Iqbal, M. M., Lobell, D., Travasso, M. I. 2014. Food Security and Food Production Systems. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. http://www.ipcc-wg2.gov/
With data from ECLAC 2009, Lobell et al 2008, Margulis, et al 2010, Thornton, et al 2010, Wratt et al 2008

CGIAR Research Program on Climate Change, Agriculture and Food Security — CCAFS

INDIA'S 1ST POLLINATOR PARK

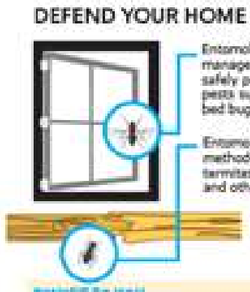
COMES UP AT HALDWANI UTTARAKHAND

THE PARK HAS OVER 40 SPECIES OF BUTTERFLIES, HONEYBEES, BIRDS AND INSECTS

What Can an Entomologist Do for You?

An entomologist is a scientist who studies or works with insects and related animals. With more species of insects on Earth than any other group of organisms, the work of entomologists is vitally important—and affects us all.

DEFEND YOUR HOME



Entomologists advise pest management pros on how to safely prevent and remove indoor pests such as cockroaches, bed bugs, flies, and ants.

Entomologists develop methods for managing termites, carpenter ants, and other wood pests.

BENEFIT TO YOU
A clean, pest-free living space—plus, reduced damage to homes and buildings, lower repair costs, and increased property values.

PROTECT YOUR HEALTH

Entomologists develop methods to reduce the number of biting pests or keep them from biting you.

Military entomologists protect soldiers from insect-borne diseases.

BENEFIT TO YOU
Less itching, less risk of disease, and a safer and stronger military.

CONSERVE OUR FORESTS

Entomologists study how some insects benefit forests by aiding in decomposition and others harm forests by killing trees.

BENEFIT TO YOU
Healthy forests clean our air, cool the planet, produce lumber and paper, and provide habitat for thousands of plant and animal species.

PREVENT OVERUSE OF PESTICIDES

Entomologists identify diverse pest-management tactics, including non-chemical methods.

BENEFIT TO YOU
Pests are managed with minimal use of pesticides, resulting in less chemical exposure in the environment and reduced pest resistance.

PROTECT OUR FOOD SUPPLY

Entomologists work with farmers to reduce pest impact on crops and protect yield.

Entomologists research pollinators to promote high-yielding plants and protect biodiversity.

BENEFIT TO YOU
Fresh foods, juices, and grains stay plentiful and affordable.

MANAGE INVASIVE SPECIES

Entomologists study invasive insects and share knowledge across borders to reduce the impact of invaders.

BENEFIT TO YOU
Integral plants and animals in our local forests, fields, and ecosystems are protected.

RECRUIT INSECT ALLIES

Entomologists discover how insects benefit humanity, like pollinating crops, preying on pests, serving as a food source, or simply revealing nature's wonders.

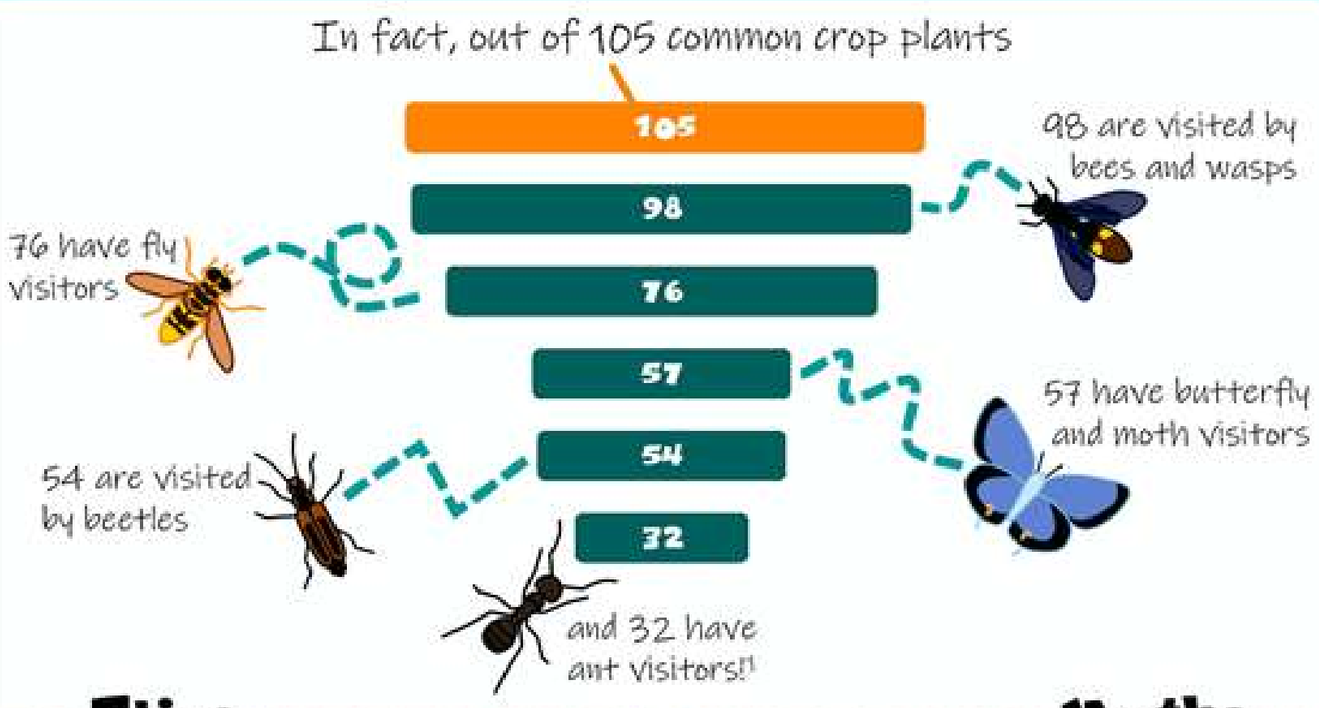
BENEFIT TO YOU
Greater sustainability of our planet's ecosystems and communities—and even insect-inspired technological innovations.

And that's not all that entomologists do. Want to learn more? Visit the Entomological Society of America at www.entsoc.org and the Entomological Foundation at www.entfdn.org.

The buzz about pollinators:

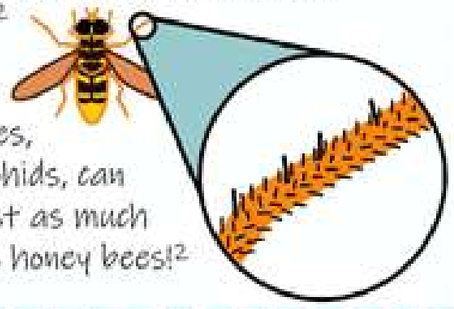
Not just honey bees!

European honey bees (*Apis mellifera* L.) get a lot of credit for pollinating our gardens and crop plants. And they sure do a great job! But did you know that many wild insects are important pollinators, too?



Flies

Many flies have hairy bodies that are great at moving pollen between flowers.[2]



Some flies, like Syrphids, can carry just as much pollen as honey bees![2]

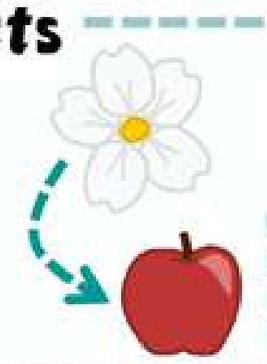
Moths

Some moths faithfully pollinate certain plants like yucca or orchids.[3]

Pollination by moths is likely highly underestimated because insects are challenging to study at night.[3]

Wild insects

Wild insects pollinate many crops better than honey bees – visits from wild insects increase fruit set more than honey bee visits.[4,5]



Non-bee insects are more resilient to land use change, and can serve as pollination "insurance" against honey bee losses.[5]

1. Kaiser et al. 2019 Ann. Rev. Ent.
2. Ortiz et al. 2016 Ins. Sci. 9: 283.
3. Alarie and Brodo 2016 Arthropod-Plant Inter. 10(5): 21-28.
4. Garibaldi et al. 2013 Science 339(6127):1608-1611
5. Kaiser et al. 2016 TAMS 113(1):49-111

Kathyn Catron
ESA 2019

Thank our wild pollinators too!

-BY MS. MINI SETHI

TOP TEN POLLINATORS

BEES

HUMMING BIRDS

BUTTERFLIES

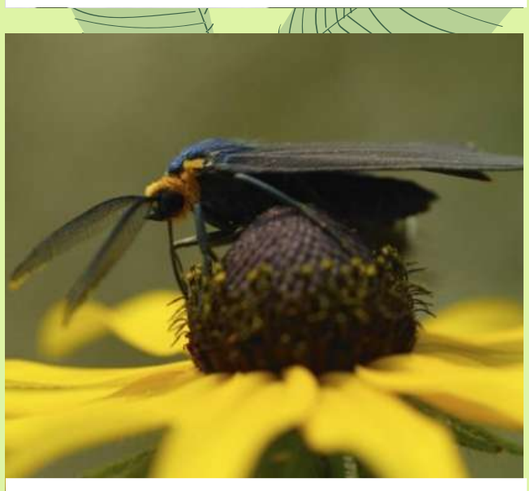
FLIES

BLACK-AND-WHITE RUFFED LEMURS

HONEY POSSUM

BEETLES

BLUE-TAILED DAY GECKGO



MOTHS

BATS

WAYS TO SAVE POLLINATORS

PLANT NATIVE FLOWERING PLANTS

Pollinators rely on these flowering plants as source of food.

AVOID PESTICIDES

Insects are good for native garden as they act as source of food for birds, which in turn are good pollinators .

MAKE MUDDY PATCH FOR POLLINATORS IN YOUR GARDEN

Pollinators love water. Fill birdbath with gravel and water on top or make a muddy puddle in your yard.

BIOHAVEN FLOATING ISLAND

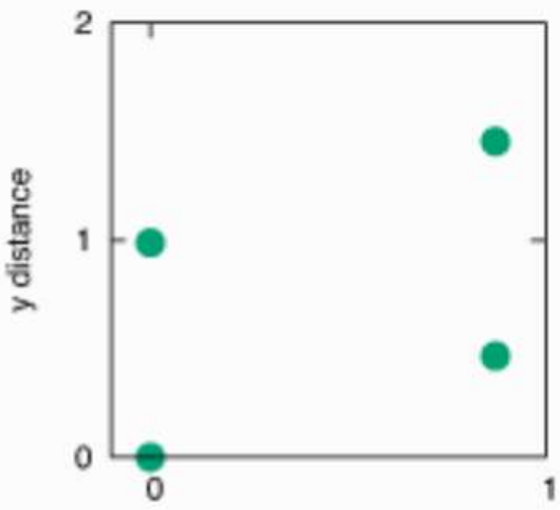
Bind Joe Pye Weed bundles to help bees build nests or plant swamp milkweeds to attract butterflies. Islands provide natural and sustainable habitat for pollinators.

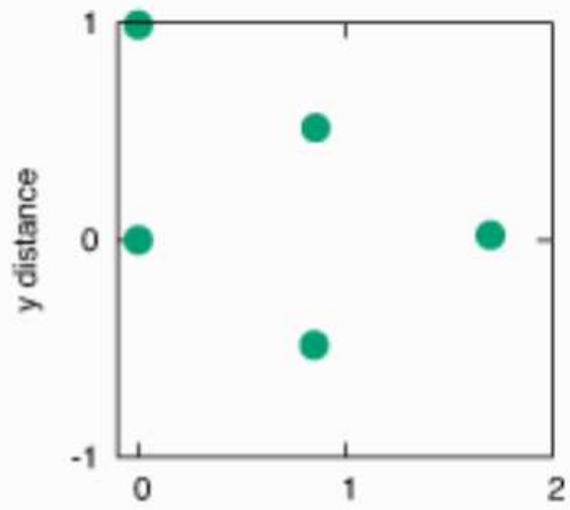
MATHEMATICS IN THE GARDEN: ARRANGING SWEETCORN PLANTS FOR MAXIMUM POLLINATION

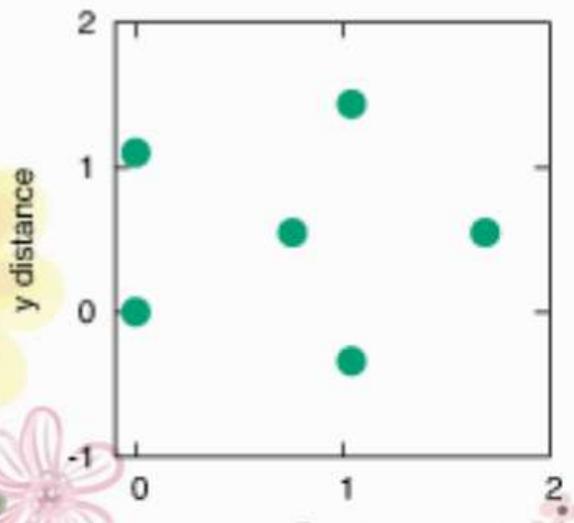
- MS. SIMRAN BHATIA

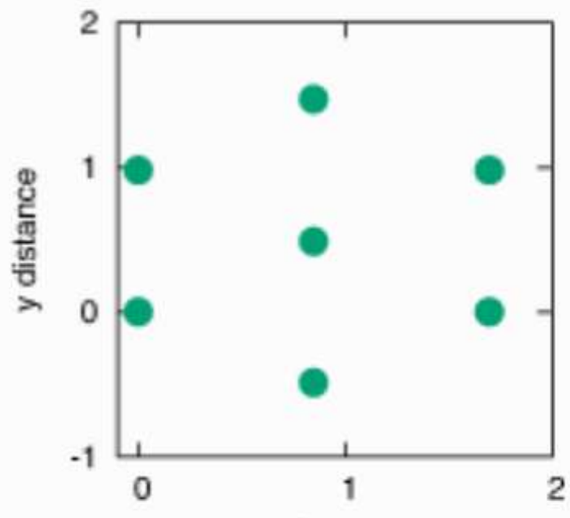
Sweetcorn plant is wind-pollinated (anemophilous), and the recommendation is to grow it in square blocks to assist pollination. Clearly, a mathematical gardener would work out the optimum layout using a mathematical model of wind pollination.

Clearly, a mathematical gardener would work out the optimum layout using a mathematical model of wind pollination. The optimum layouts with no prevailing wind are shown in Figure for 4 to 7 plants. For 3 plants, the solution is to place the plants at the corners of an equilateral triangle.



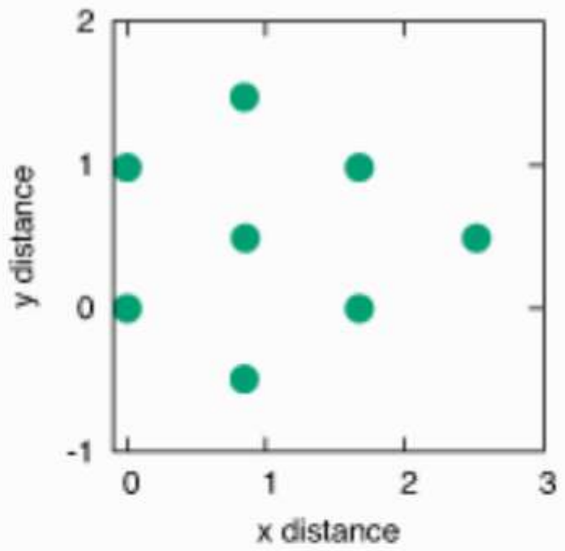


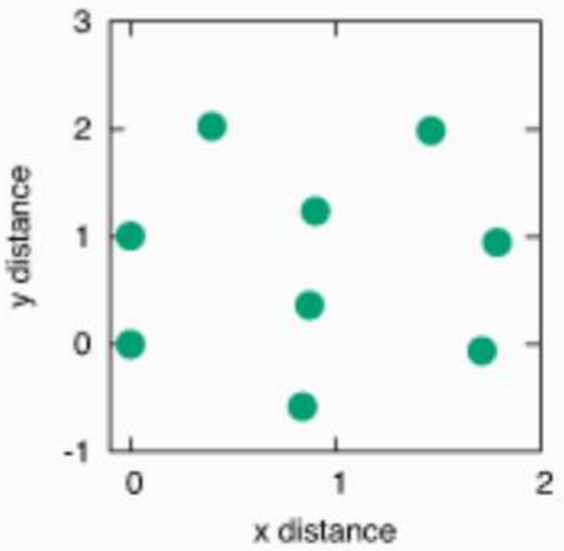


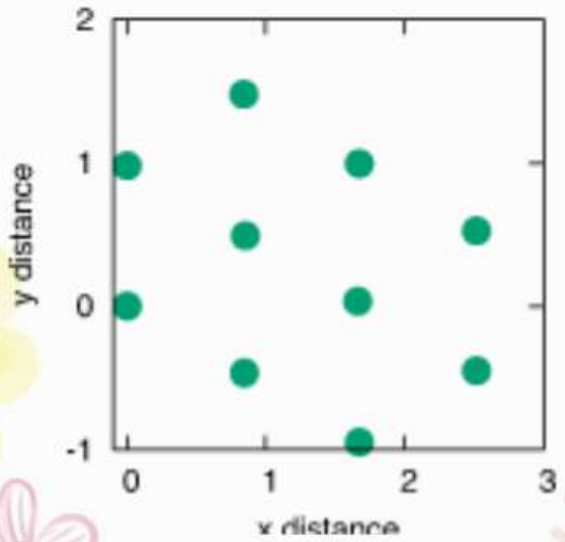


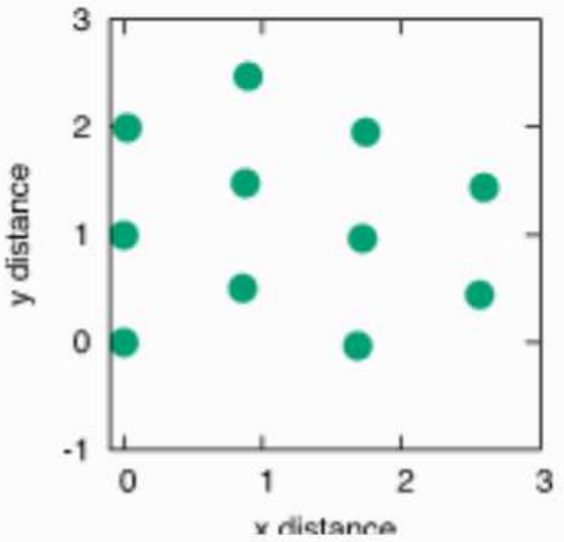
For 4 plants, one would perhaps expect a square layout, but instead the optimal shape is a rhombus. This means that 2 plants are closer to others and get more pollination, and the other 2 get less. To maximise the number of edible kernels of sweetcorn, 2 plants have been partially sacrificed to benefit the others and increase total pollination.

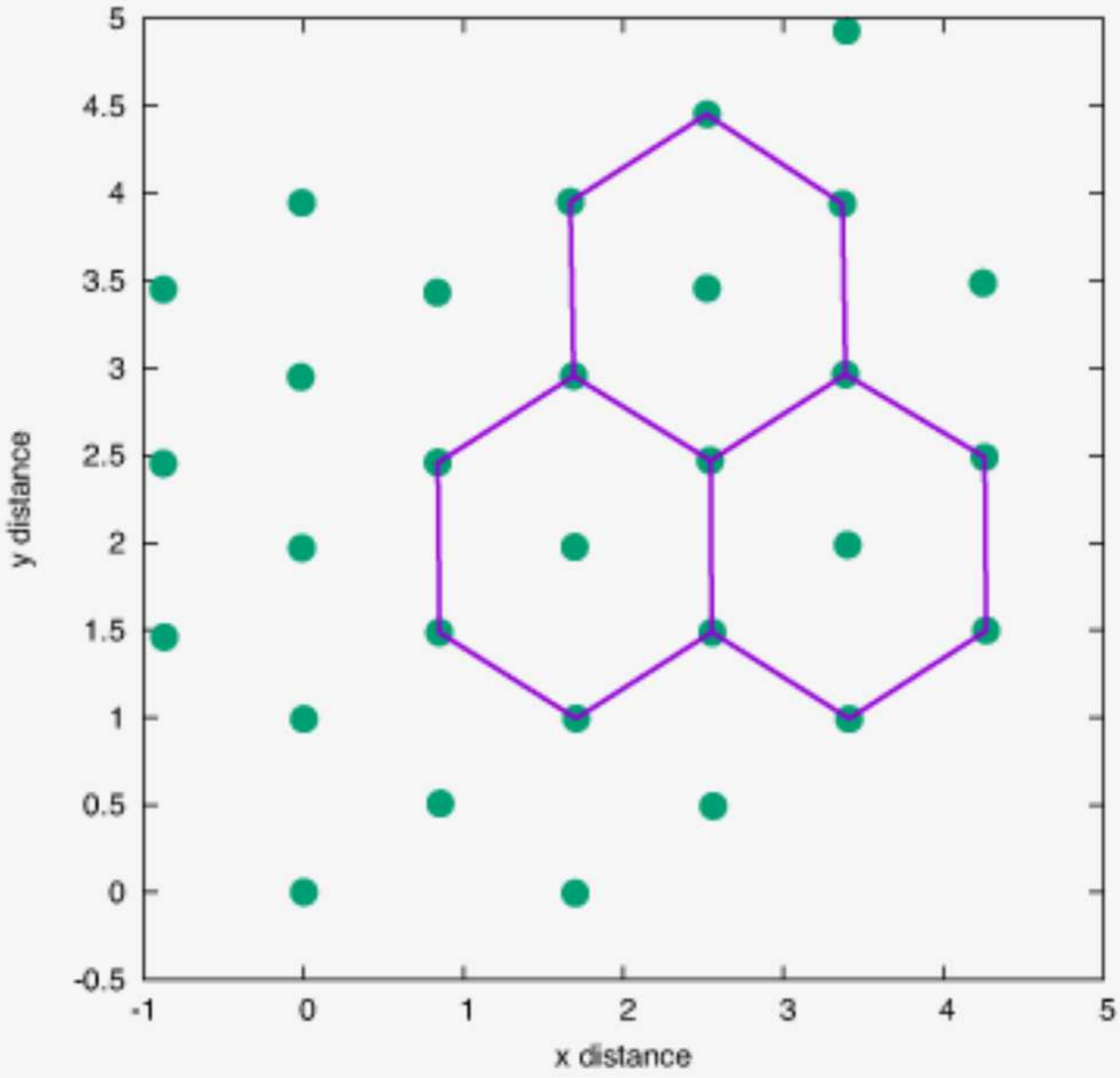
With an angle of 60°, the rhombus reduces to 2 equilateral triangles pasted together. The favoured plants then have 3 near neighbours. With 5 plants, we have 2 staggered rows, and with 6 plants a pentagon with a plant in the centre. There is a big increase in pollination of 0.81 on going to 7 plants, where we have a hexagon with a central plant, compared with 0.35 on going from 5 to 6 plants, and 0.19 on going from 7 to 8 plants. Figure shows the results for 8 to 11 plants.











Hexagonal planting is optimal in general even without wind pollination, because roughly 15.5% more plants can be packed into the same area. The hexagon holds 7 plants, but each plant round the outside belongs to 3 hexagons, so we have 3 plants per hexagon; this can be seen in Figure 4. The area of each of the 6 equilateral triangles is , giving plants per unit area. Each internal plant now has 6 nearest neighbours, instead of the 4 found with a square grid, and edge plants have 3. The unit cell of the lattice can be taken as either a hexagon with a point in the centre or a rhombus. For large numbers of plants, the optimum placement is hexagonal planting, with some deviation at the edges to benefit edge plants.

Time to plant out those sweetcorn!

POLLINATORS IN PERIL

-BY SUHANI RATHI M2-E

Pollinators are insects that transfer pollens from flower to flower, which in turn lead to pollination. Birds, bats, butterflies, moths, flies, beetles, wasps, small mammals and most importantly bees are pollinators. Bees provide flowers with means to reproduce by spreading pollen grains from flower to flower in a process called pollination. Pollinators are vital of creating and maintaining the habitats and ecosystems that many animals rely on for food and shelter. Bees and the flowering plants have a mutualistic relationship where both species benefit. Flowers provide bees with nectar and pollens, which worker bees collect to feed their entire colonies.

Since last few years, the number of pollinators are constantly decreasing. The main reason for this decline are exposure to pathogens, parasites and pesticides; habitat fragmentation and loss; climate change; market forces; intra and inter- specific competition with native and invasive species. Ensuring the safety of pollinators is necessary to save human life on planet Earth. Human beings had a dramatic impact on the ecosystems on Earth, which directly affects many pollinator species. Pesticides and Herbicides: Chemical pesticides and herbicides are causing a big trouble for pollinators. Artificial light attracts insects, pulling them from their natural ecosystems. Electromagnetic pollution and use of neonicotinoid pesticides is making even hard for the honeybees and other pollinators to reproduce, to the peril of the species. Saving pollinators is essential to save human race on planet Earth.

SAVE THE BEES

-BY VIBHOR SHARMA, M2C

- **Bees are the major pollinators.**

- **70-75% of crops producing food and seeds are pollinated by these tiny insects.**

- **Saving the Pollinators are essential for food security and maintaining Biodiversity**

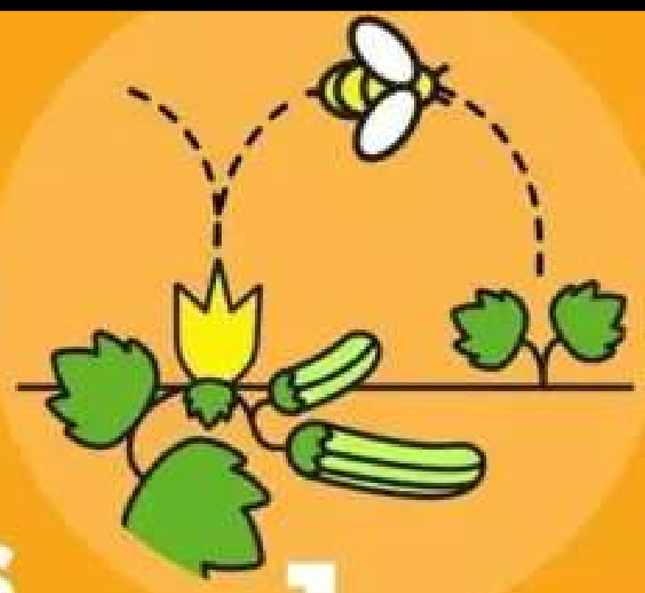
- **Albert Einstein said-**

“If the bee disappeared off the surface of the globe, then man would have only four years of life left.”

- **Protecting the most important Pollinator on Earth for our food security is a must.**

CONTD...

Benefits of **pollinators**



1

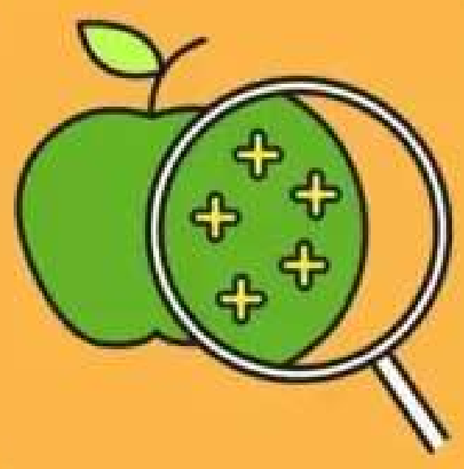
Help 75% of crops producing fruits and seeds to pollinate

2

Increase biodiversity

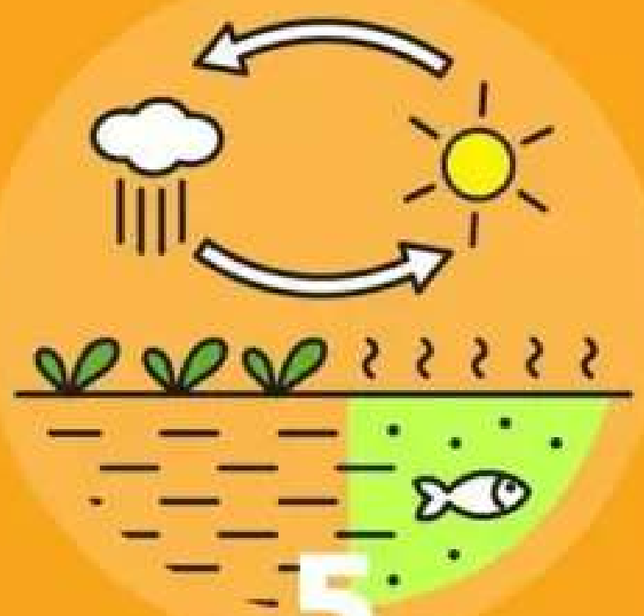
3

Increase food production



4

Provide micronutrient-rich foods



5

Maintain ecosystems

WE NEED TO SAVE BEES #WORLDBEEDAY#20TH MAY

TIME TO PROTECT

-BY AARAV GUPTA, M1B

Introduction:

There are thousands of species of pollinators. Pollinators are important for the survival of every living thing ranging from the smallest species of plants and animals to the largest plants and animals. If there is no pollinator left, then it would affect the plants and animals. The pollinators transfer pollens from one plant to another. Most of the flowers of plants need pollen of other plants to produce fruits. Without pollen some plants will not produce fruits. Without fruits, those plants would not have seeds and they might become extinct.

Importance of Pollinators:

Pollinators sometimes drop pollen and make another plant grow. Most of the plant in world grow with the help of pollinators. Without pollinators, the plants would not grow, this would affect the small insects and herbivores animals who eat plants and make them extinct. When there are no small insects or herbivores the big insects and the carnivores get affected and get extinct too. The omnivores would become extinct too because they have neither plant to eat nor any animal or insect to eat. In some time, all the life would end up on Earth due to extinction of pollinators.

Myth about & threats to Pollinators:

Thus, we should not think that pollinators are pests that may destroy our crops or plants instead protect them. There are many threats to the pollinators. Some such threats are diseases that spread while bees move to other places for pollination because of poor garbage management, spraying of pesticides and insecticides, loss of habitat such as forests and due to deforestation and climate change that may burn some plants.

Pledge to save Pollinators:

Bees are the most important pollinators. On average, about 35,000 bees die per month. To protect pollinators, we should plant more and more plants and don’t use chemical pesticides or insecticides. We should always remember to leave some place so that the pollinators can pollinate there, and bees can breed there as 2/3rd species of bees make their nests underground. We should pledge that we would protect pollinators.

POLLINATORS ARE IN PERIL

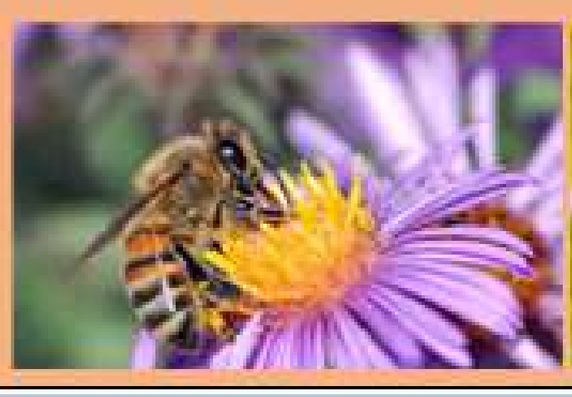
- BY SARTHAK SEN, M2-D

WHO ARE POLLINATORS?

Insects such a bees, ants, beetles, butterflies and moths etc

Animals such as birds and bats.

They visit flowers to drink nectar or feed on pollen and transport pollen as they move from spot to spot.



WHAT IS POLLINATION?

Pollination occurs when pollen is moved within flowers or carried from flower to flower by pollinating agent like bees, birds or other animals or by wind. The transfer of pollen leads to fertilization and successful seed and fruit production for plants.

WHY ARE THEY IMPORTANT?

- *Plants depend on pollination. Nearly 90% of flowering plants need pollinators like bees to transfer pollen. Different kinds of pollinators visit different kinds of flower.*
- *Pollinators support ecosystems.*
- *The production volume of pollinator dependent crops has increased over the last decades, making us more dependent on pollination. These crops include fruits and vegetables.*
- *They provide food, form habitat and provide wide range of other resources for many animal species.*
- *They are fundamental for the conservation of biological diversity.*

WHAT ARE THE CAUSES OF POLLINATORS DECLINE?

- *Loss of natural habitat.*
- *Environmental pollution.*
- *Intensification of modern agricultural practices.*
- *Climatic change has altered the range, abundance and seasonal activities of pollinator.*
- *Pesticides*

BE A FRIEND TO POLLINATORS

- *Plant more flowers. This will help to provide food and other habitat needs to pollinators to survive throughout the changing seasons.*
- *Eliminate pesticides whenever possible. If pesticides are used, apply the least toxic material and spray at night when bees and other pollinators are not so active.*
- *If u want colourful butterflies, grow plants for their caterpillars.*
- *Use organic products which leave no residue.*

LET'S PLEDGE TO

SAVE the POLLINATORS

- BY FELISHA BHATTACHARJEE, SS1

We have been taught the basic concept of pollination since our elementary classes but to give an overview - it is the process of transferring of pollen grains from Anther (Male reproductive Organ of flowers) to Stigma (Female reproductive organ of flowers) for fertilization to take place, in order to bear seeds. This act of transferring of pollen grains is performed by carriers like wind, water, animals and especially insects ; these are called pollinators. More than 1,80,000 plant species, including 1,200 crop varieties, across the world depend on pollinators to reproduce.

The pollinators play a very prominent part in our lives; every two out of the three meals consumed by us, are made possible by bees (One of the most important pollinators). There are two categories of pollinators: invertebrates and vertebrates. Well known invertebrate pollinators include bees, moths, flies, wasps, beetles and butterflies. Monkeys, rodents, lemurs, tree squirrels and birds also facilitate pollination and are among the vertebrate pollinators. Around 40 per cent of invertebrate pollinator species particularly bees and butterflies — face extinction across the world, according to the FAO (Food and Agriculture Organisation).

Since the end of Twentieth century the world has seen a sharp decline in the pollinators' community, many of the important pollinators have been forced into the "Red Data Book" ,which include 45 species of bats, 36 species of non-flying mammals, 26 species of hummingbirds, seven species of sun birds and 70 species of passerine birds.

The most obvious reasons being habitat loss due to constant urbanisation and commercialisation, inefficient waste management, extreme climate changes to which many pollinators are notable to adapt- global warming crisis has also altered the seasonal behaviour of pollinators, usage of chemical fertilizers - instead of natural nitrogenous fixers like Alfa-Alfa ,which are great sources of food for insects like bees , besides the fact that these chemical inputs are gravely harmful for the insects.

CONTD...

Apart from this , changes in cropping patterns like depletion in planting of varied cover crops and sudden shift to mono-culture has concentrated and confined a certain crop to expanded chunks of a certain landscape, which has again disrupted the natural course of several pollinators. All these in totality have contributed greatly towards diminishing the population of pollinators and in disrupting the ecological interactions.

Some of you might recall this reference from the movie “My Name Is Khan” wherein Kajol quoted Albert Einstein that the extinction of bees would apparently be followed by extinction of humans within a few years.

Now coming back to the actual facts...if bees were actually to get extinct, it would surely cause heavy chaos in the agricultural and food production industries, to give a glimpse of this havoc , let me give you an example ; in few angiosperms (fruit bearing flowers), like tomatoes, the anther holds on to the pollen grain very strongly, thus the only way to release it, is to vibrate it till it gets out of the secure hold of the anther, this very specific requirement is only met by the bumblebee (along with some other very few, extremely rare kinds of bees) as they hold on to the flower and vibrate it by shaking their flight muscles to the frequency similar to the musical note “C”.

Imagine, if the bumble bees actually did extinct someday, which is quite possible considering their position on the endangered list, not only the world would lose an integral part of its bio-diversity, but it would also lead to an acute shortage of tomatoes and a few other household ingredients like sunflower(oil) and apples, also the effect of this on the economy would surely be drastic (Given that The fresh tomato industry alone, produced over 24 million pounds worth and estimated 1.1 billion dollars in 2013 <Naeve 2014>).
Now that...is not such a great news for Spain’s iconic La Tomatina.

Pollinators Week is celebrated from 22nd June to 28th June every year . It was initiated and managed by Pollinator Partnership since 2007. So, this pollinators week, let's pledge to play our parts and see how we, as common citizens or more precisely students, can take part in restoring the pollinator’s original numbers. Few direct solutions that can be practiced by us are growing flowering plants native to our own area , encouraging the use of natural fertilizers instead of chemical ones to avoid harming pollinators. Pollinators love water! You could fill a shallow birdbath with gravel and pour water on top, or create a muddy patch in the corner of your yard for pollinators. Another extremely effective measure could be making people aware of the graveness of the situation through initiating campaigns or even just putting up posters.
We, with our combined individual efforts, would most certainly make progress towards the amelioration in the depleting Pollinators status!

HUMAN FRIENDLY POLLINATOR – “THE HONEY BEE”

-By Baladitya Prasad, S-2A
(2020-21 Batch)

Little we know that the ‘Pollinators’ play a key role as the ecosystem service provider i.e., in pollination. The ecosystem services, generally defined as the benefits to human welfare provided by organisms interacting in ecosystem, are considered to be at risk. The same is reflected in the decline of number of plants species. Therefore, for having a balanced ecosystem the protection and preservation of pollinators is essential.

It is interesting to observe that all the pollinators are not human-friendly or crop-friendly, even some acts as pests. However, since ages there is one pollinator which has both these qualities of ‘human friendliness’ and ‘crop friendliness’. And this pollinator is none other than the great “HONEY BEE”. It is the man’s most dependable and most beneficial pollinator which also has additional value in terms of Economics and Medicinal treatments.

One may argue that honeybee’s sting can hurt humans. But if they disappear, it would hurt the humans a lot more. So, lets understand why honeybees are so important and is having such an important place among pollinators.

It is a known fact that about 70% of the world’s agriculture depends on these insects/ living beings known as ‘Honey Bee’. To put it more clearly and directly, one could say that 70 out of 100 food crops are intervened in favour by the bees.

Pollination by bees facilitates reproduction in plants that in turn helps in the production of food. And so indirectly, bees help ensure that there’s food on our table.

Honey Bees are the only living beings that are not a carriers of any pathogens, be it fungi, viruses or bacteria. Thus Honey Bees are mostly not seen as vectors of diseases affecting humans.
Interestingly, the honey produced by these bees not only serves as food / food supplement but also provides many other health benefits; besides playing an important role in additions to the farmer’s income.

CONTD...

Some of the interesting Historic Facts about Honey Bees:

● The oldest known honeybee specimen dates back 100 million years.

● 17th century naturalist Jan Swammerdam discovered the “Queen bee”.

Why are they facing extinction ?

►One of the causes is the extensive use of pesticides in agriculture. These products contain chemicals that act as neurotoxins and attach themselves to insects. They end up being carried by bees to their hives, where they contaminate the colony, which not only affect the honey they produce, but it also endangers the survival of the ‘Honey-bees colony’ itself.

►Another major reason for large-scale disappearance of bees is the mobile telephony – Signal transmission towers. This was affirmed by Swiss scientists after proving that the waves emitted by mobile telephony towers & devices are capable of disorienting these bees, resulting in them losing their sense of direction and ending in their death.

► Few Other reasons include extensive deforestation carried out by humans for industrial & allied activities, which further results into climate change besides the various types of industrial pollution.

Some of the Suggested Ways to save the Pollinators in peril :
Since the crisis is also linked to agriculture and food production, so large-scale solutions will require time and significant investments, to carry out result-oriented research activities, so to devise apt methodologies of preservation and protection for these fast depleting pollinators.

Additionally :

■ Prohibit (not just reduce) the use of toxic pesticides.
■ Promote (preferable completely) natural agricultural practices.
■ Perform constant research and monitor the health, welfare and conservation of Honey bees.

Conclusion :

In the interest of all as well as to move towards ecological sustainability, we have to carry out more research efforts at the community level in crop production and human friendly pollinators especially the ‘Honey bees’ so to help sustained production of diverse crops that nourish humanity.

POLLINATORS: PROTECT THEM

-BY TANISHA ILWADI, S2C (2020-21)

Summer is a wonderful time of the year. The birds are singing, bees are buzzing and the pleasant aroma of flowers wafts the air. One of the main factors of this pleasant weather are the organisms known as pollinators present in our environment.Pollinators, such as birds, bees, butterflies, bats, small mammals, etc., visit flowers to drink nectar and feed off of their pollen and transport the grains from one plant to another so as to start pollination. This allows the plant to reproduce and form seeds, berries, fruits and other plant food and is the beginning of a massive food chain. They also sustain our ecosystems and produce our natural resources by helping plants reproduce. Pollinating animals travel from plant to plant carrying pollen on their bodies in a vital interaction that allows the transfer of genetic material critical to the reproductive system of most flowering plants.

Pollinators assist with reproducing over 80% of the world's flowering plants. 5% of the world's food crops depend on animal pollinators to reproduce. In the United States, pollination by honey bees contributed to over $19 billion of crops in 2010.

But recently we see a decrease in these pollinators across the globe. According to the research of the naturalists, they are on the verge of extinction which is a major cause of concern. Some major causes of this is habitat loss, fragmentation, disease and pesticides. The global warming crisis has also altered the seasonal behaviour of pollinators.

Climate change is causing bees to emerge at different times of the year when flowering plants have not yet emerged. Due to this, many bees die very quickly without their main food source. Monarch butterflies' populations have decreased 90% in 20 years due to the loss of its main caterpillar home in milkweeds plants. Most other plant-eating insects also depend on specific types of plants for their survival, and most birds rely on those insects to feed their young. In addition to the insects, 16% of pollinating vertebrates like birds and bats are also in danger of a massive decline in population levels.

CONTD...

These pollinators are perilously under protected. Pollution, the misuse of chemicals, disease, and changes in climatic patterns are all contributing to shrinking and shifting pollinator populations. In some cases, there isn't enough data to gauge a response, and this is even more worrisome. Pollinators need help and we must help them for both of our betterment.

P2 scientists and research partners that have been studying pollinators for over three decades have been able to show that conservation techniques work. If everyone – home owners, local governments, national governments, and private industry – made the effort we could change the future for pollinators and secure our own.

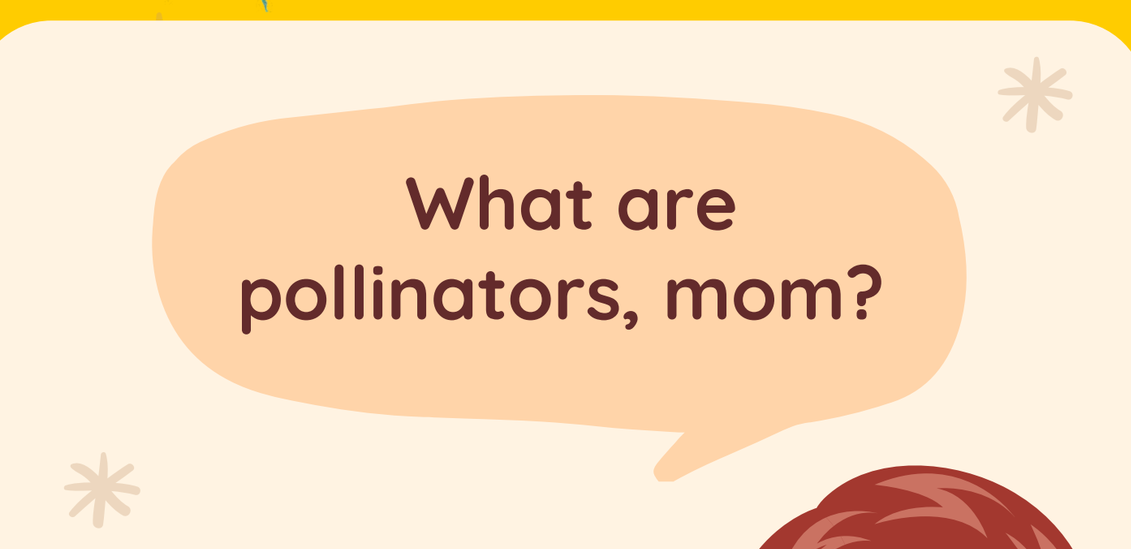
First of all, one must plant native flowering plants in their gardens as these are the plants they rely upon as their main food source. Secondly, one must avoid the use of pesticides as much as they can. Thirdly, one must fill a shallow birdbath with gravel and por water n top of it or create a muddy patch in the corner of your yard for pollinators as they are known to love water. Fourthly, plant the right plants on the right spots. Adding natural habitat areas into farm systems works. Farms that are closer to natural habitat produce more crop yield because they attract more pollinators.

Lastly, we all must spread the word about the importance of pollinators in our environment and how helping them would also help us. We should buy local honey and locally produced organic food so as to help and support the farmers and the beekeepers.

In conclusion, all the pollinators around the world are in desperate need of protection to safeguard their future. And these unique insects, and their pollination services, are vital to the survival of ecosystems. Our lives and culture would be significantly impoverished without these hardworking, underappreciated and declining animals. We need to take aggressive steps to better understand and protect our precious pollinator species before it is too late.

We Can Do It...
Let's save our pollinators

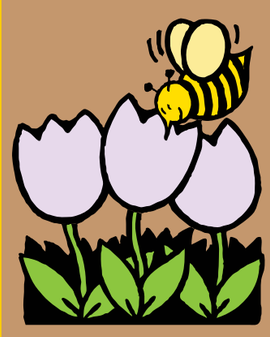
-BY AARNA WADHAWAN, M3A



Yeah! Bees purposefully collect pollen to feed on its rich protein, but a variety of creatures participate in pollination, often accidentally, when they travel between plants. Butterflies, moths, wasps, flies, ants, bats, hummingbirds, and yes, mosquitoes, play a role in plant pollination, although they do not feed on pollen.

Oh I See. That is interesting

Honeybees have experienced massive die-offs in the past, it occurs when worker bees leave the hive and don't return, a behaviour quite unusual for the highly organised domestic honeybee.Bees and other pollinators are notoriously sensitive to pesticide poisoning. Because bees are natural born collectors, they often bring contaminants such as pesticides back to their hives.Most of them are common insecticides and herbicides used in agriculture and around the home.



That is sad. What can we do to save them mom?

One way to reduce stress on honeybees—whether it's from disease, overwork, pesticide poisoning or a combination of all three—is to tap into help from the wild. Wild insects already provide roughly 15 percent of food crop pollinator services.In many ways, native bees are superior pollinators to domesticated honeybees.

Bumblebees will fly in bad weather when their domestic cousins are holed up. As few as 250 orchard mason bees —native metallic-tinted bees present throughout the country—can pollinate an acre of apples, a job that could require 40,000 honeybees. A bumblebee can cling to inverted flowers such as blueberries and efficiently buzz pollinate—shake pollen off by vibrating its wings.

Hmmm...

What are the threats to them in India?

The issue that overshadows every other threat to wild and domesticated pollinators is lack of natural habitat to forage on and live in. There is hard evidence that all is not well with our wild bees. Given the scale of landscape alteration and urbanisation in India, it is expected that these effects are widespread and likely to worsen with time.There is impact of air pollution on pollinators, which would have serious implications for agricultural output in India.

So what measures can be taken to save them, mom?

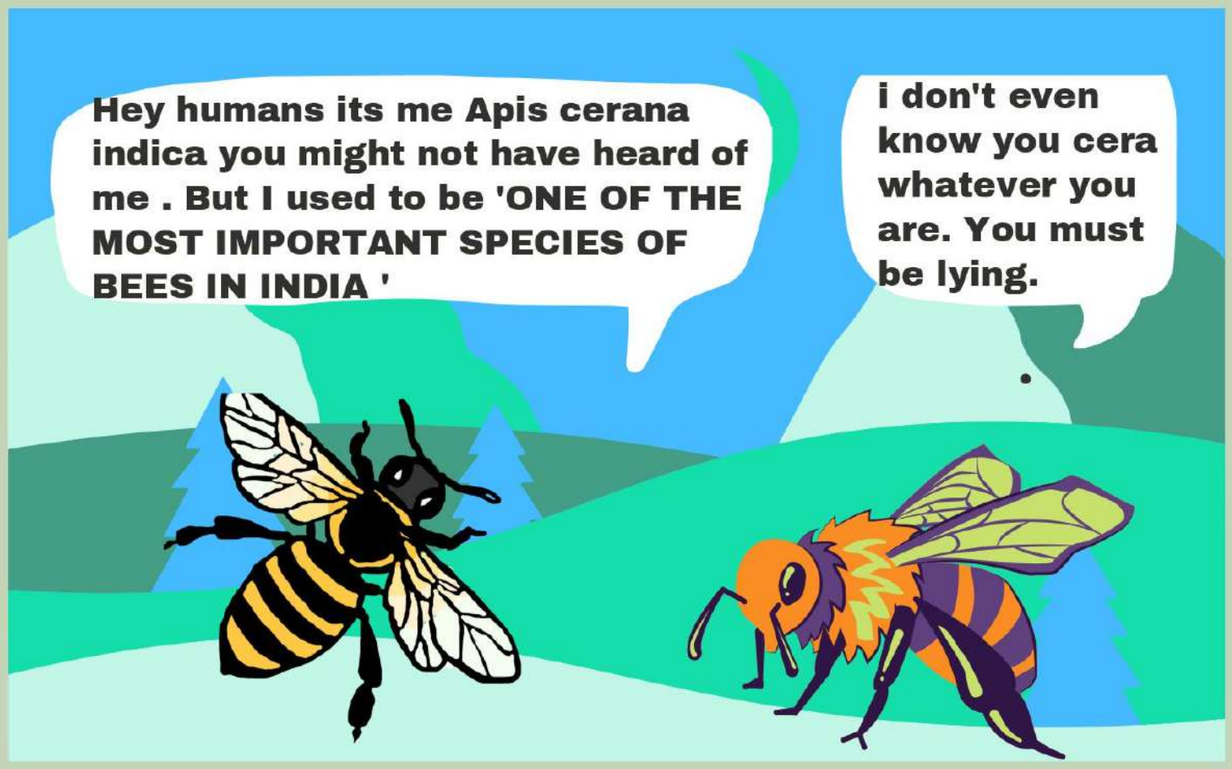
Here are ways to save pollinators:-

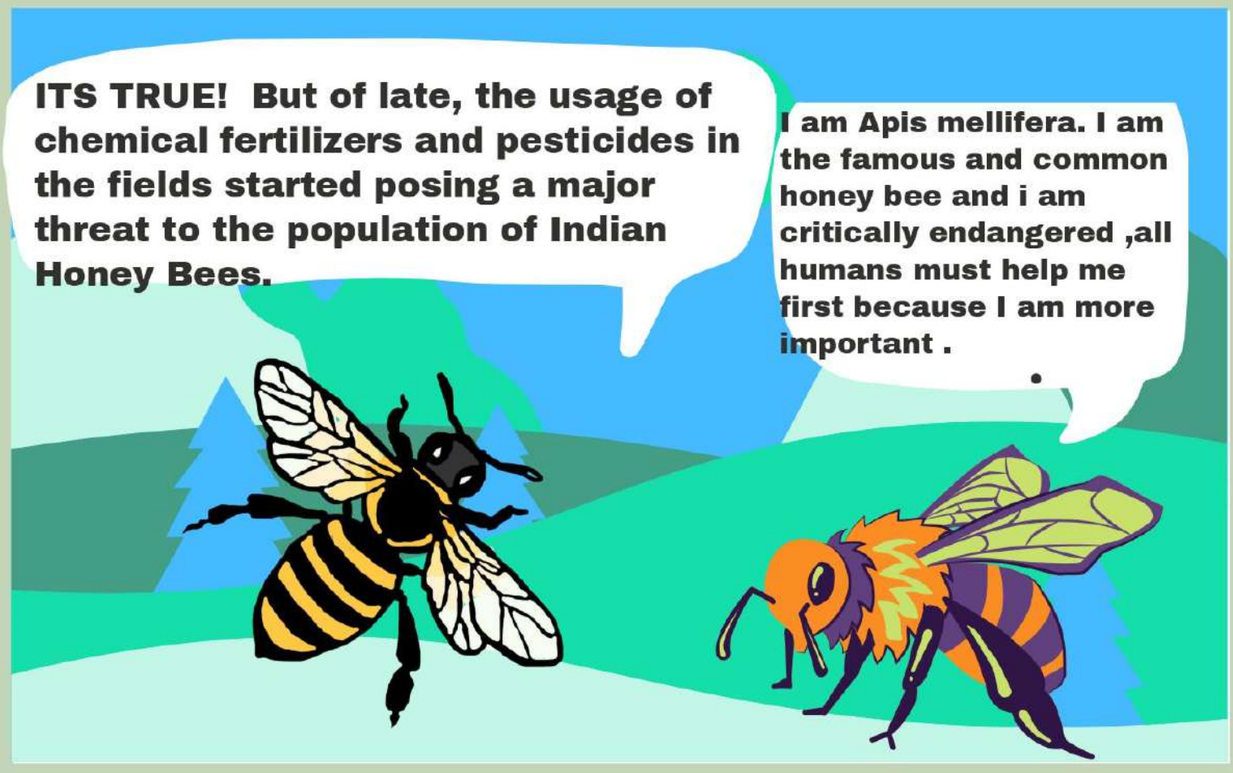
1. Become a Wildlife Gardener
2. Plant Natives
3. Gives Bees Nesting Places
4. Avoid Pesticides
5. Plant Milkweed
6. Adopt a Monarch
7. Protect Grasslands
8. Join NWF Affiliate Efforts in Your State
9. Post a Yard Sign
10. Spread the Word on Social Media

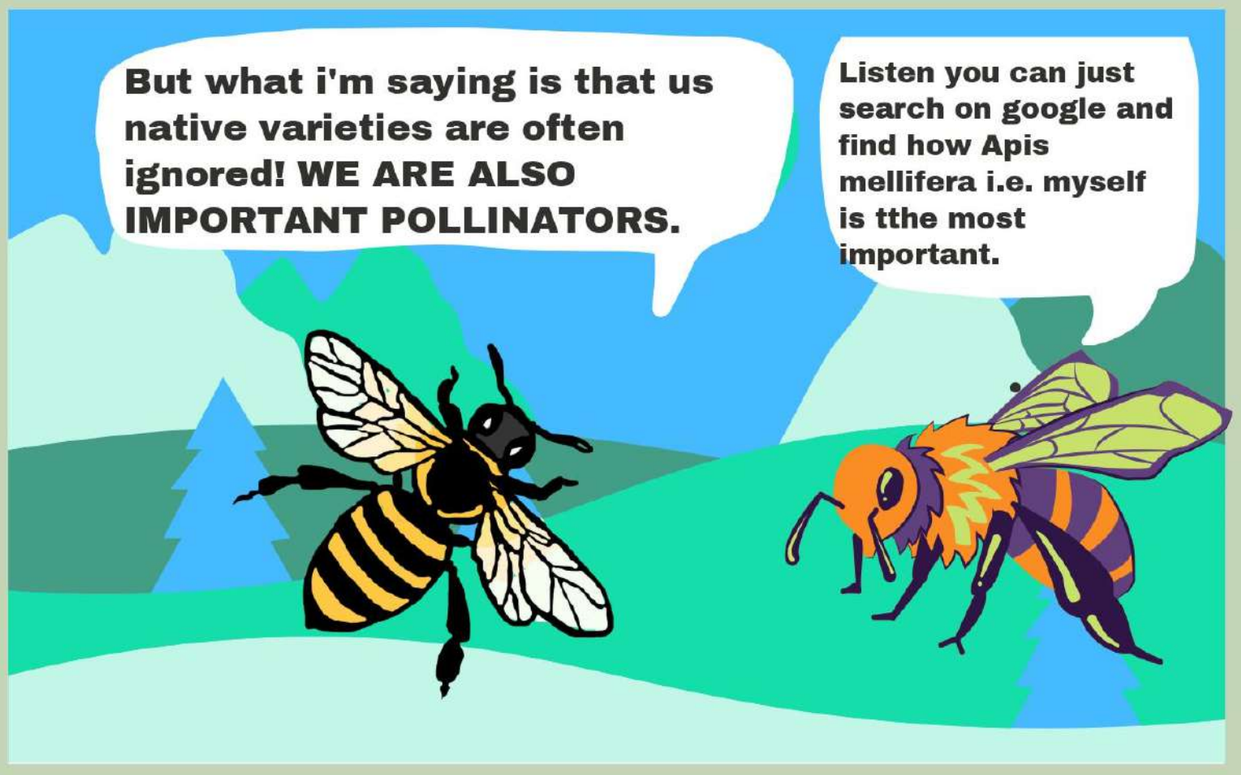
I will definitely contribute in this, mom.

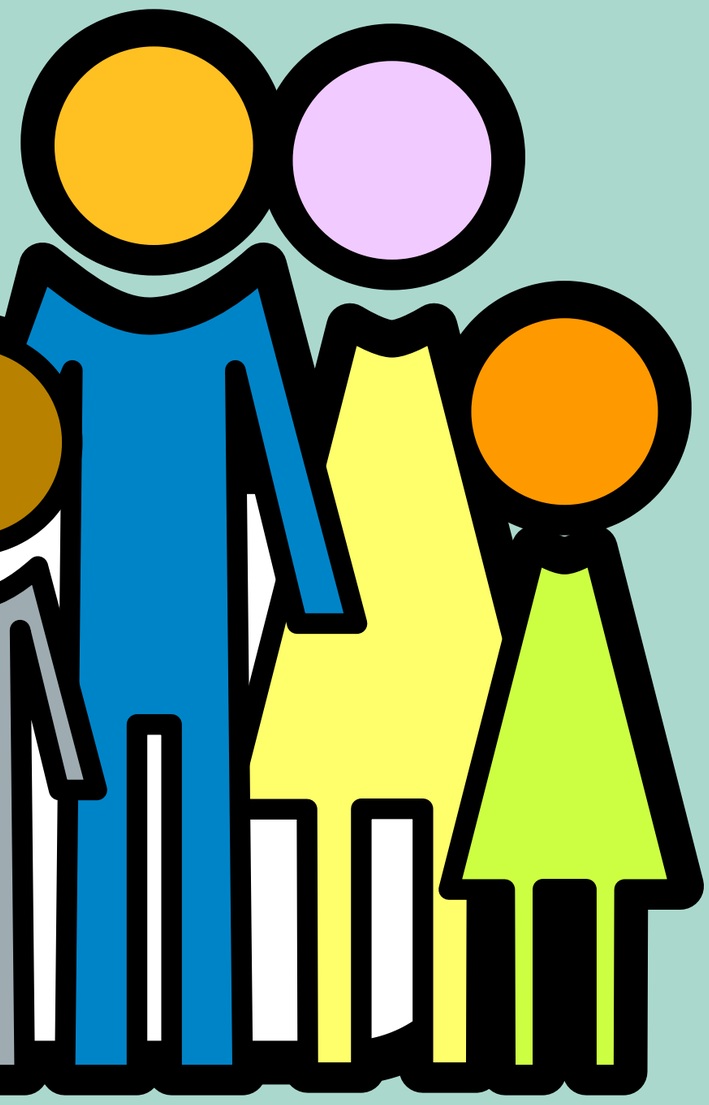
'POLLINATORS IN PERIL'

Made By Shaunak Sood





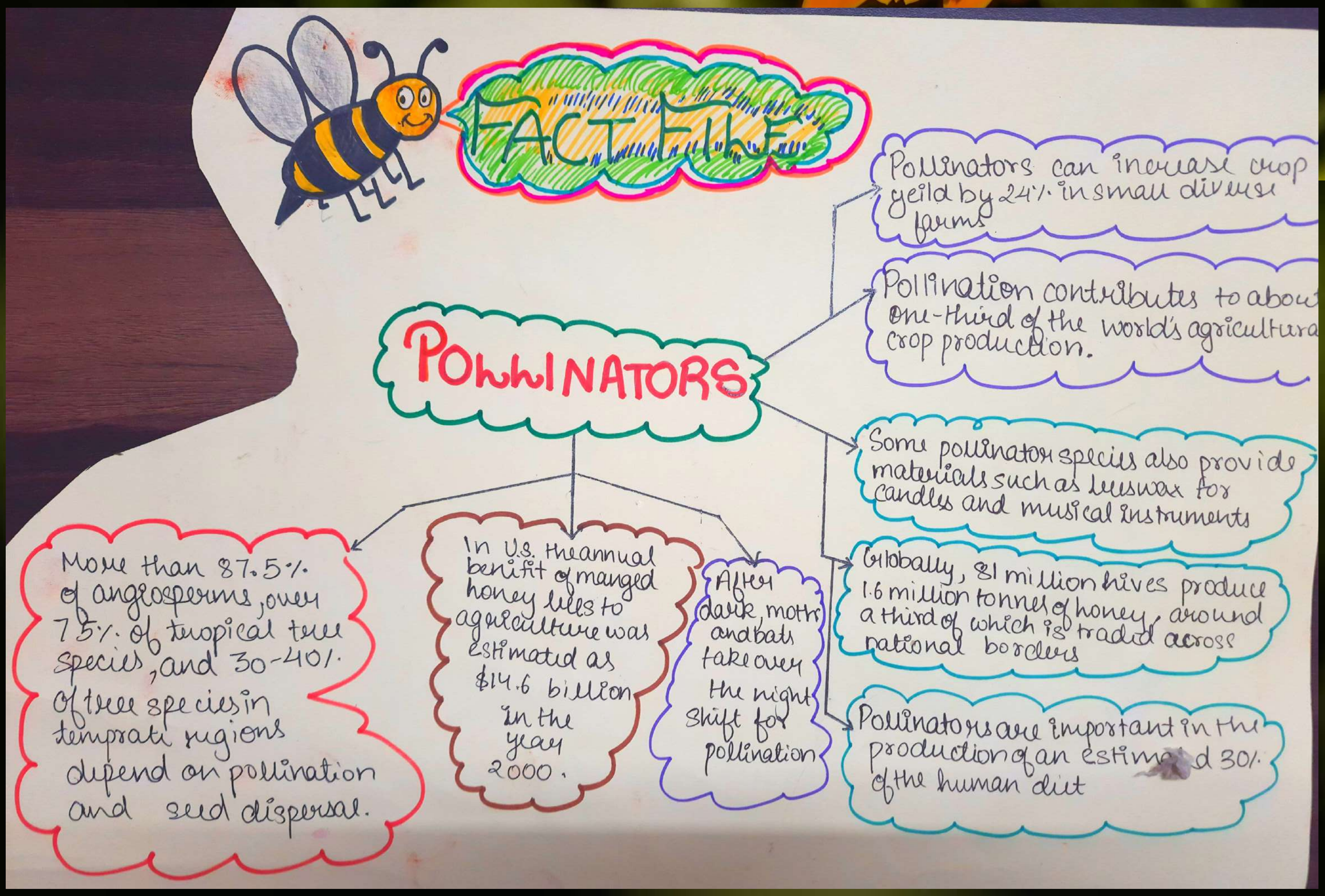


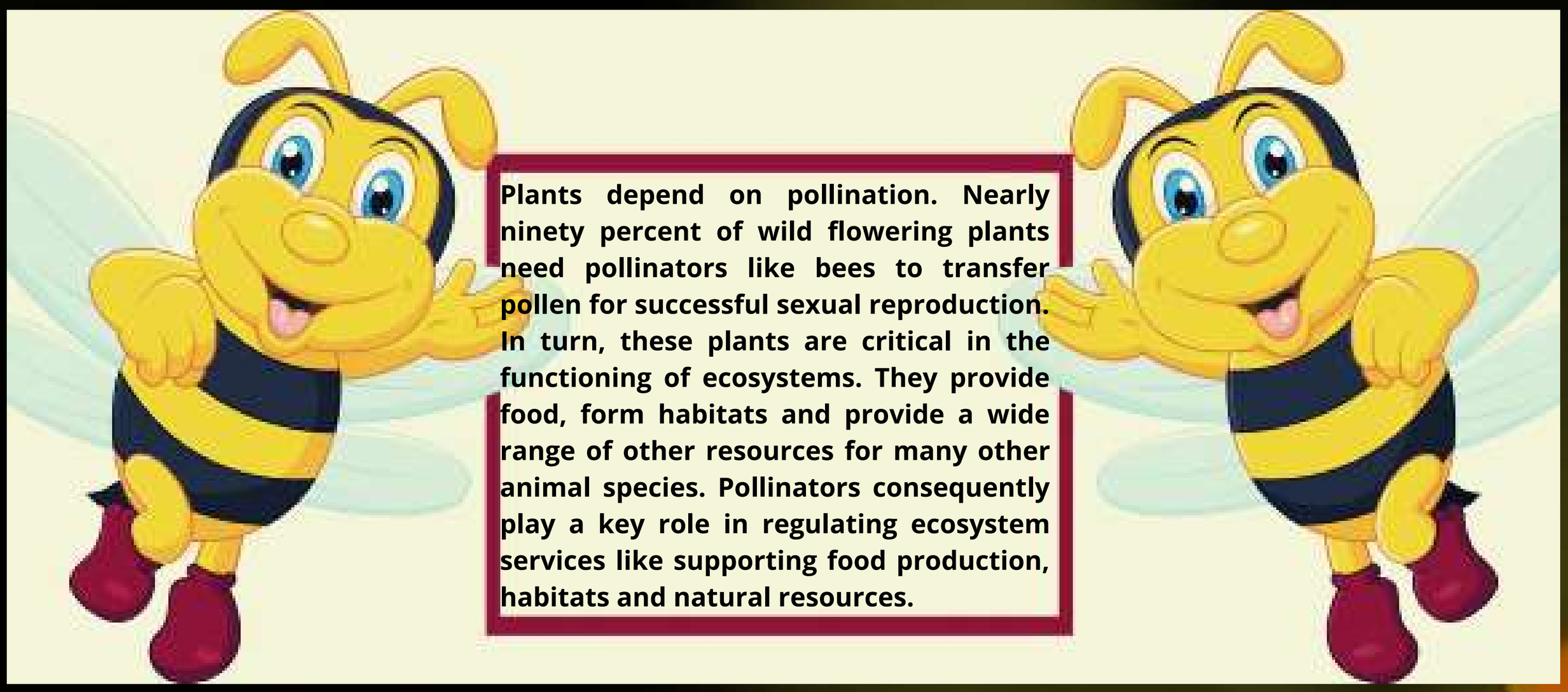


We can & We will

POLLINATORS: FACT FILE

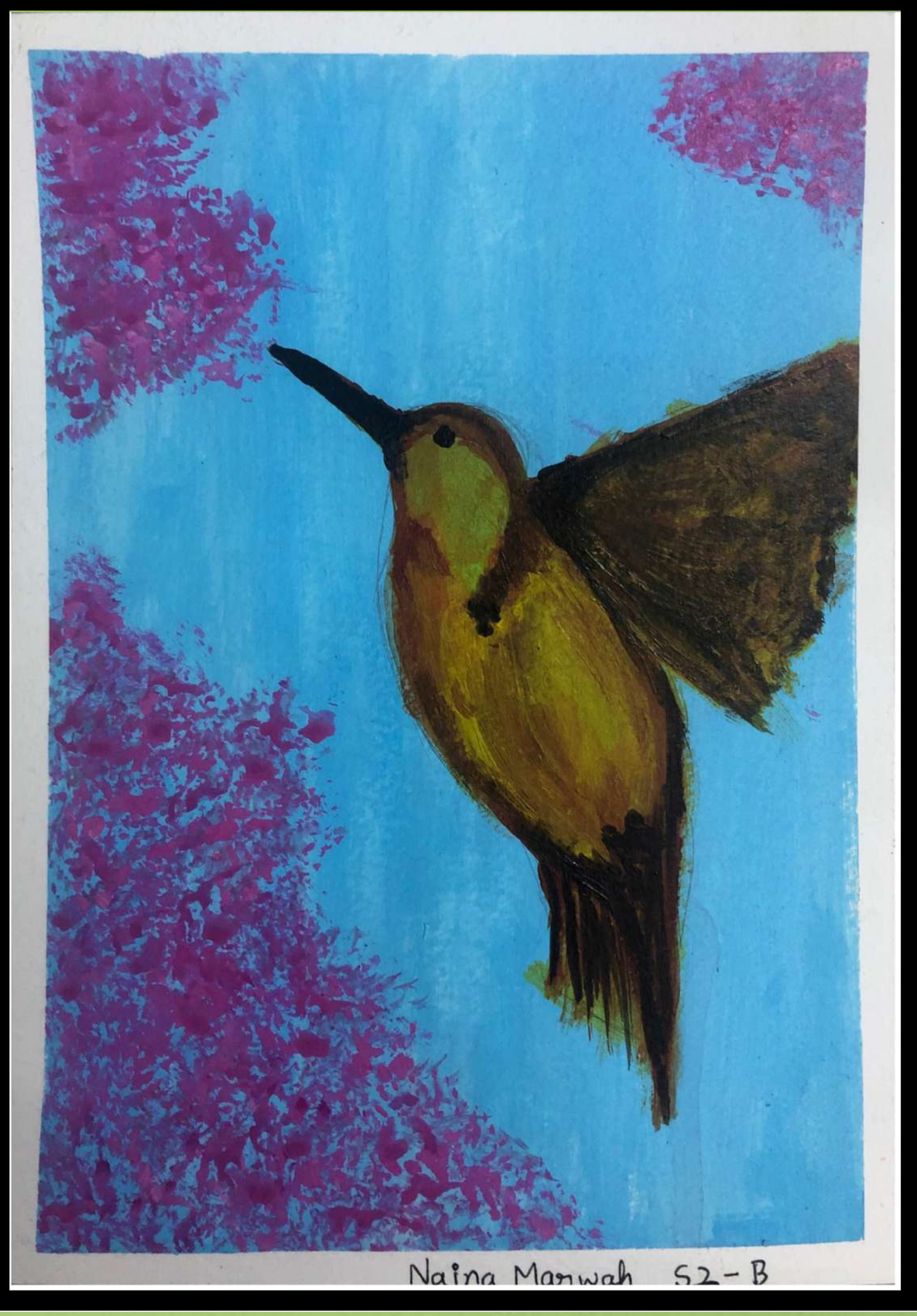
-BY HARSHIT KUMAR
&
SNIGDHA KUNDU, M3C





Plants depend on pollination. Nearly ninety percent of wild flowering plants need pollinators like bees to transfer pollen for successful sexual reproduction. In turn, these plants are critical in the functioning of ecosystems. They provide food, form habitats and provide a wide range of other resources for many other animal species. Pollinators consequently play a key role in regulating ecosystem services like supporting food production, habitats and natural resources.

ART GALLERY



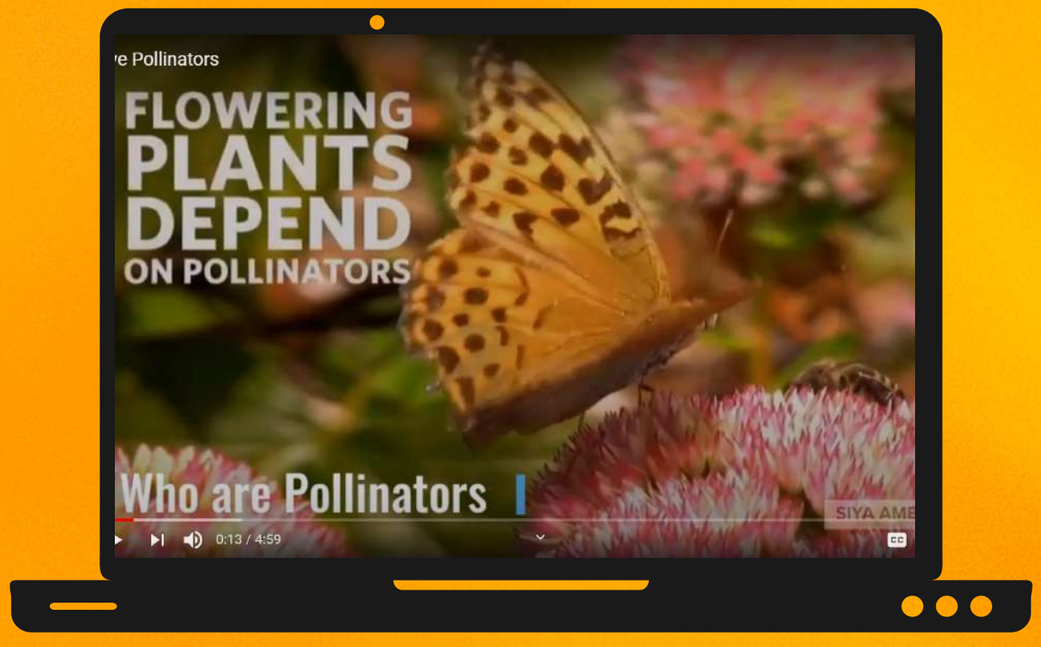
NAINA MARWAH, S2B
(2020-21)

PARIKSHIT BISHT, M1A

JIMIT PAHUJA, P5D

AKANSHA IVY, SS2A

VIDEO GALLERY



SIYA AMBWANI, M2C

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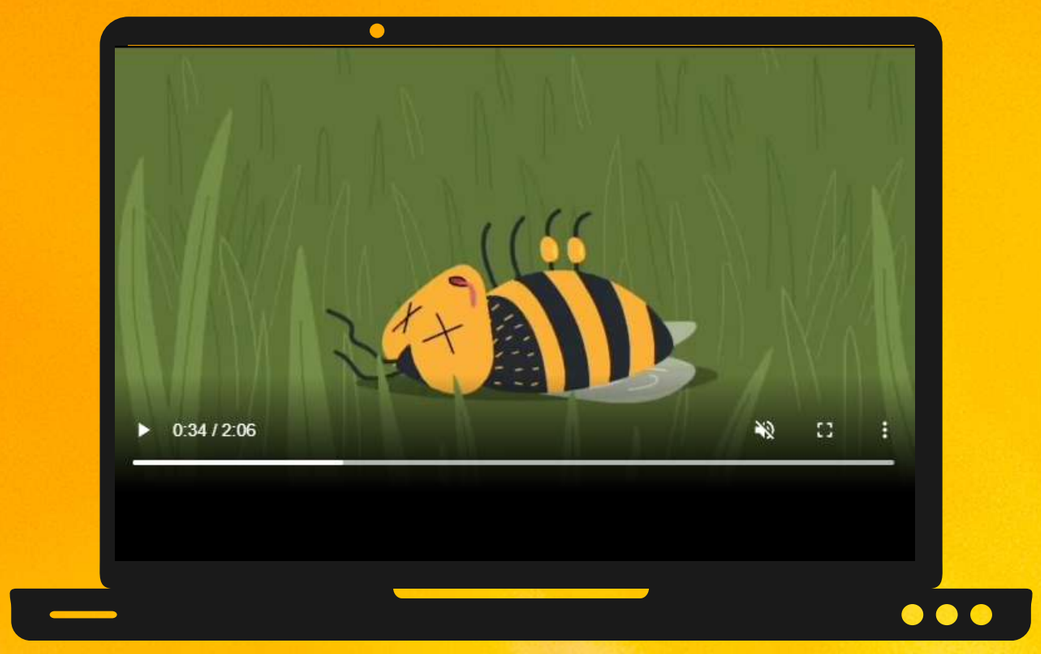

SHIVANG DAGAR, S1B

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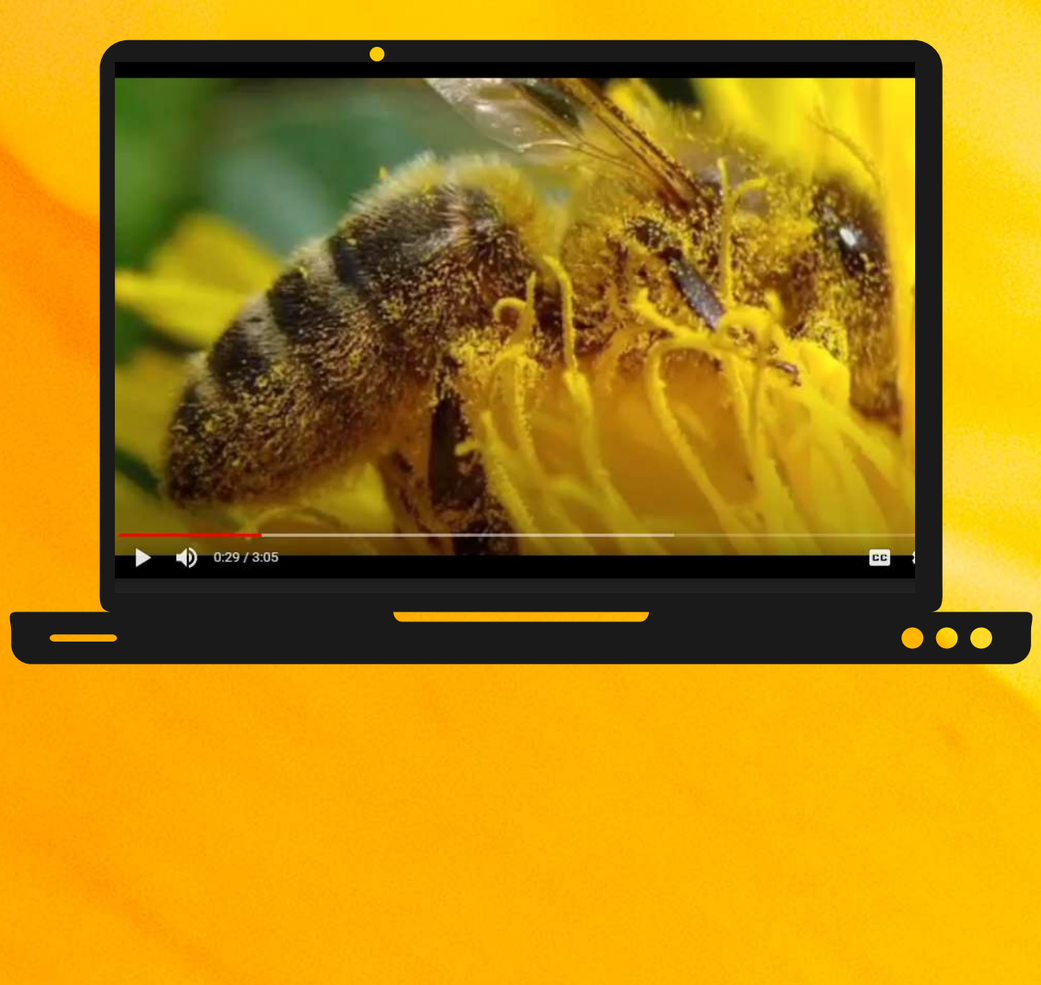

IDIKA SINGH, M3C

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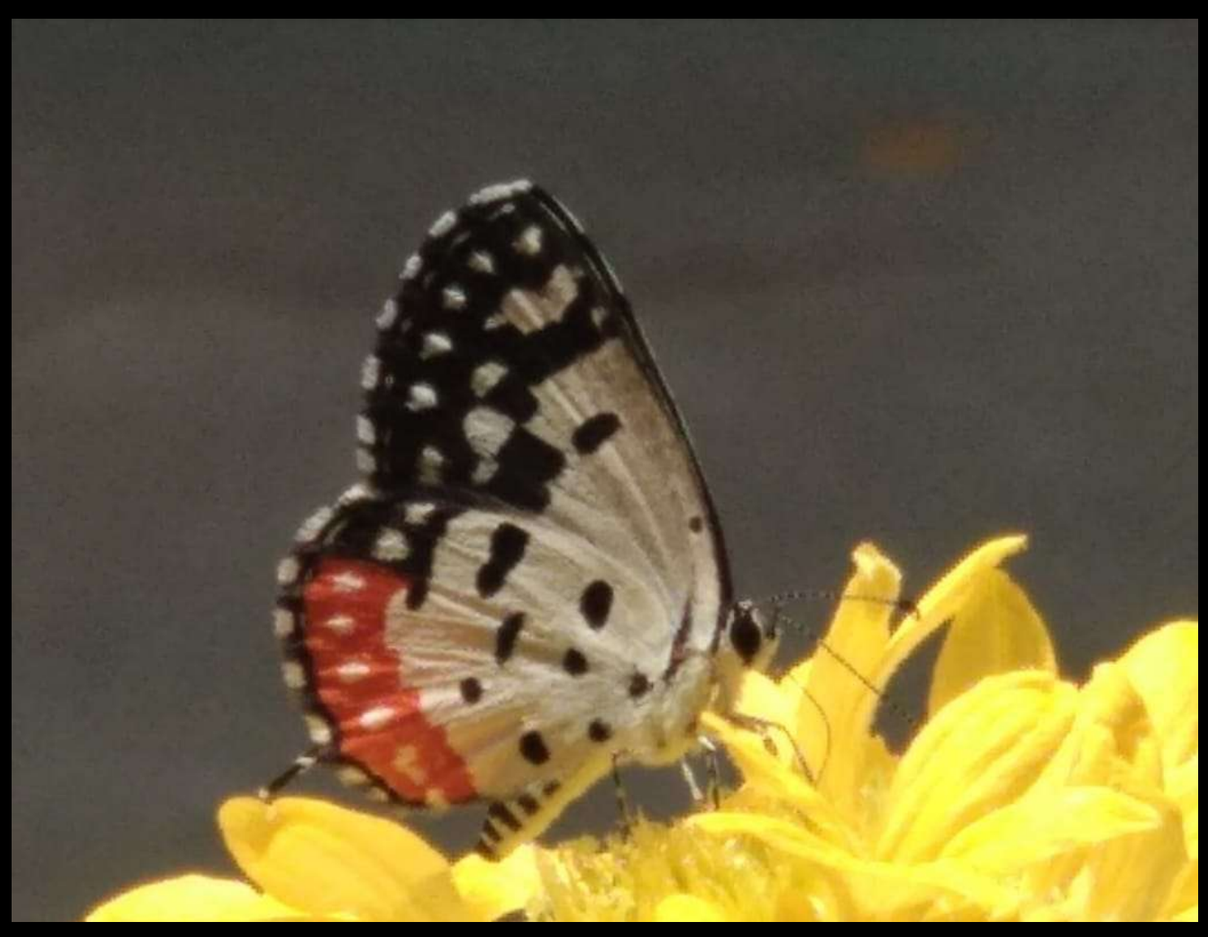
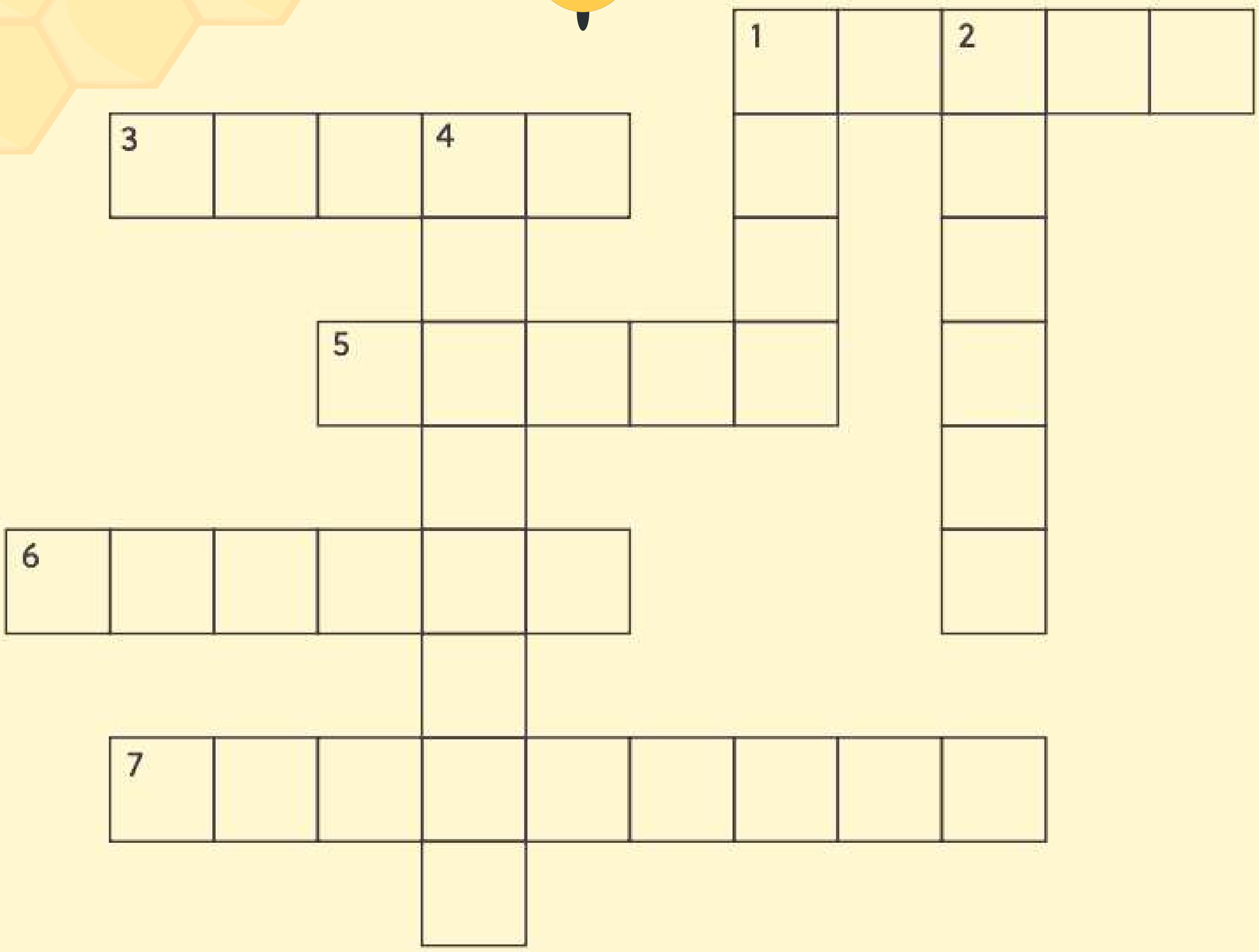
PHOTOGRAPHY GALLERY

RANIA ADIL,S2



DR. MANPREET KAUR

BEE CROSSWORD PUZZLE



ACROSS

1. A sweet fluid produced by bees from nectar
3. Dance bee will do as they get close to food
5. Male bee whose only function is to mate with the queen
6. Dust like cells of the anthers of flowers
7. Cells where honey is stored

DOWN

1. A structure for housing bees
2. Sweet liquid of flowers gathered by bees for making honey
4. Bee that attends to the queen, the babies, or larvae of the hive

If bees disappeared off the face of the earth, man would only have four years left to live.

Albert Einstein