CUBE National Meet 2022

Seasonomics

A CITIZEN SCIENCE PROJECT

STEM CHAT GAMES

Season: The period normally characterized by a particular kind of climate

+ omics: Analysis of large data representing an entire set of some kind

---

Seasonomics: Collecting and analyzing **data** throughout the year & address questions

Types:

- Trees
  - New leaves sprouting, flowering, and fruiting
- Animals
  - Feeding, Interaction with other animals, etc.

What do we have in the Seasonomics basket?

Context of Mango Mapping: A Citizen Science Project

- Mango trees were being mapped in terms of their leaves sprouting, flowering, & fruiting status

- **We take pictures of the trees, fill up a form and submit them in a map**.

- Studying seasonal variations in different parts of our country affects different aspects of the Mango trees such as its **flowering and fruiting timings**, **amount of fruiting**, **leaf colouration**, and so on.

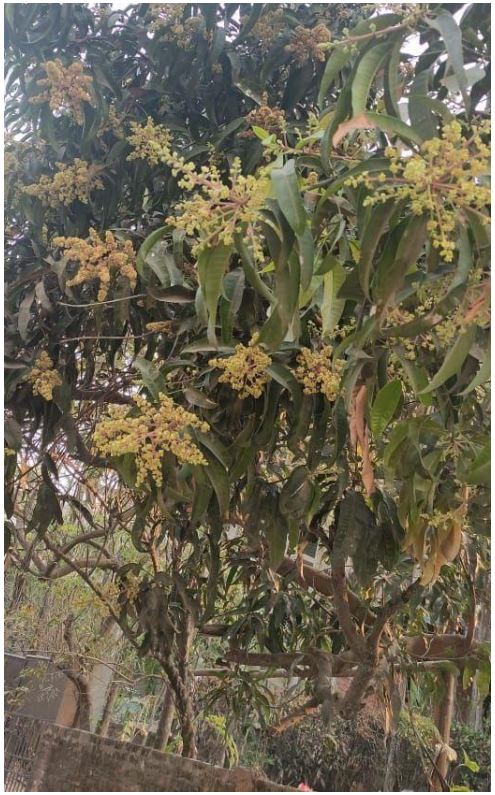


Image Courtesy: Sunil kr Borah, Asam

The Cycle

Non-flowering

New Leaves Sprouting

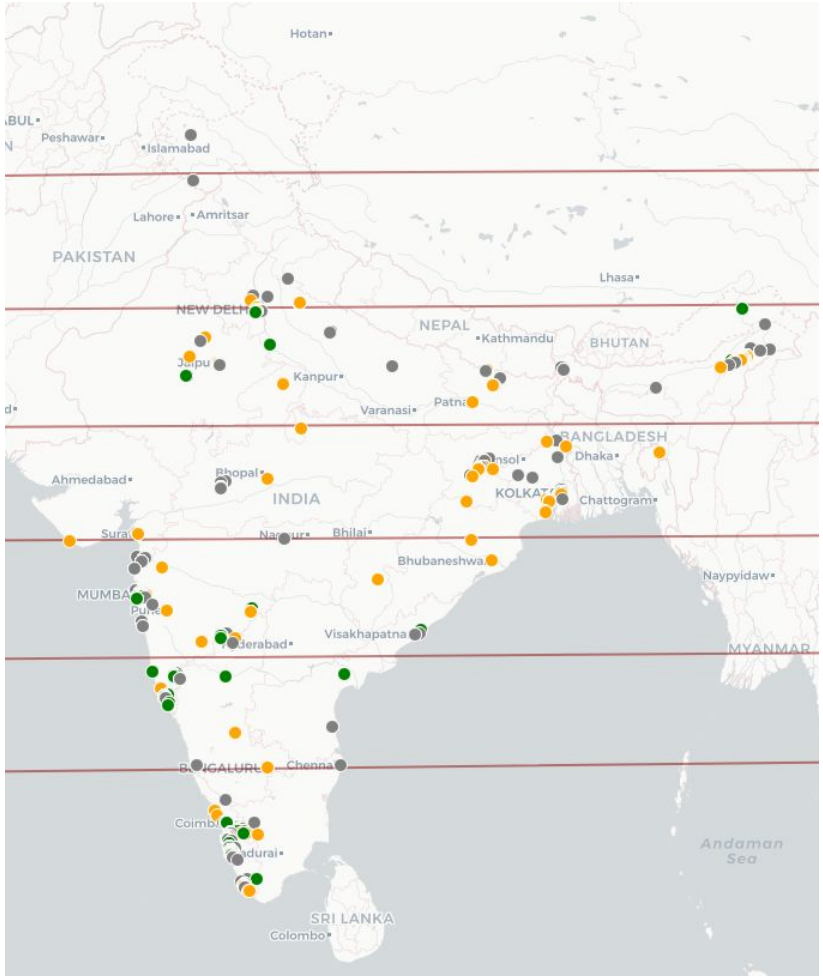
Flowering

Fruiting

Mango Map 2020-2021

COLOUR CODES:

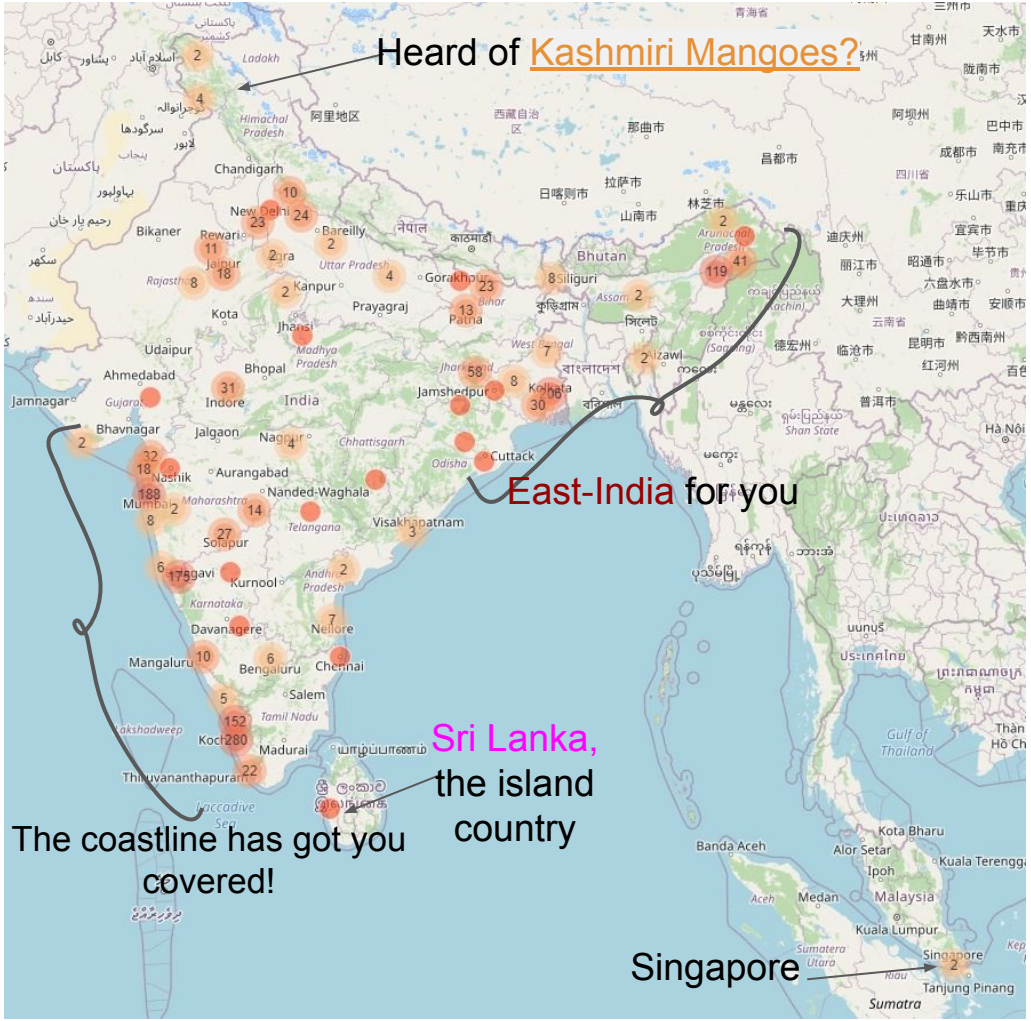
- Yellow Dots: Flowering Trees
- Green Dots: Fruiting Trees
- Grey Dots: Non-flowering Trees
- Red Lines: Latitude Bands



Link: https://umap.openstreetmap.fr/en/map/cube-mango-phenology-2020-21

Data over Large Distributional Area

Location	Latitudes
Karan Nagar [Jammu and Kashmir, India]	34.08°N 74.79°E
Geylang Park [Singapore]	1.30°N 103.88°E
Kirmani Nagar [Gujarat, India]	20.55°N 70.22°E
Chamro [Arunachal Pradesh, India]	27.20°N 96.01°E



Source: KoboToolbox Database

As we go northwards, from south, the % of flowering decreases at a period of time

The Season Cycle

1. March (equinox)

Mango Season commences at 8°N to 27°N

2. June (solstice)

Mango Season at peak in North and North-East markets

3. September (equinox)

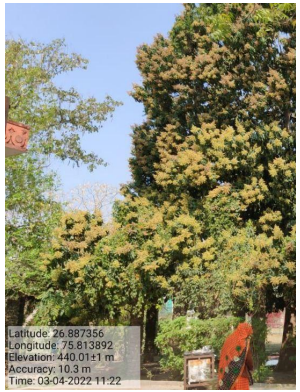
Mango Flowering commences at 8°N

4. December (solstice)

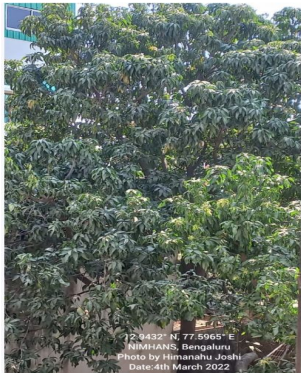
Fruits start to appear at 8°N

Mango-Mapping 2020-2021

CUBE Mumbai



CUBE Jaipur

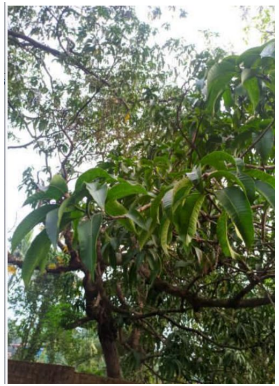


CUBE Bengaluru

CUBE Ranchi

CUBE Delhi

CUBE Kolkata



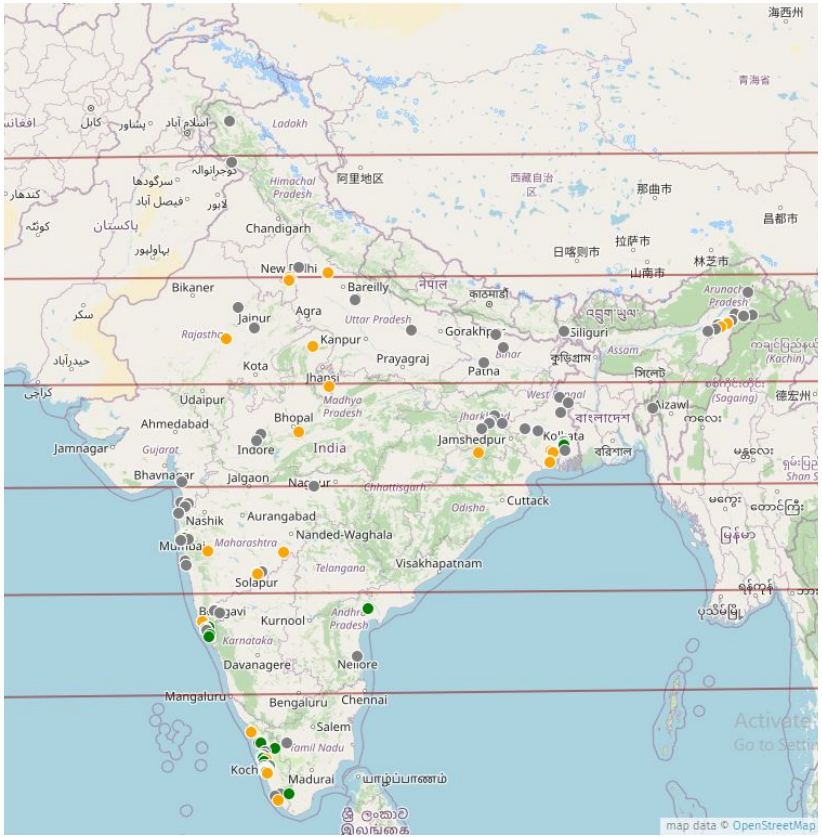
CUBE Sindhudurg

AND
MANY
MORE....

Source: KoboToolbox Database

Comparison of Datasets (December)

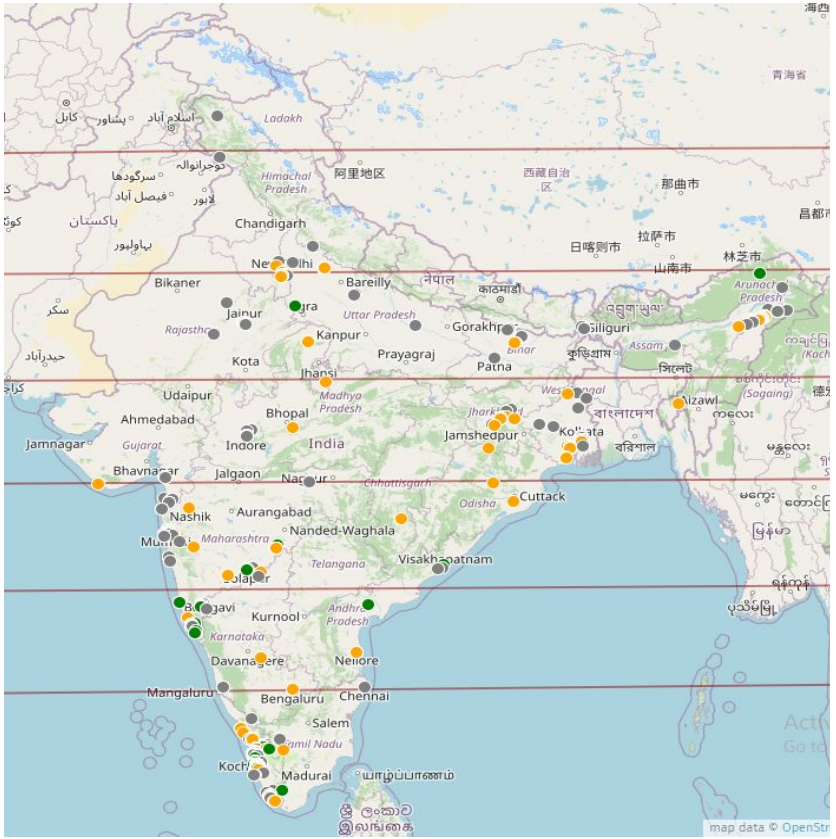
December 2017



December 2020

Comparison of Datasets (January and February)

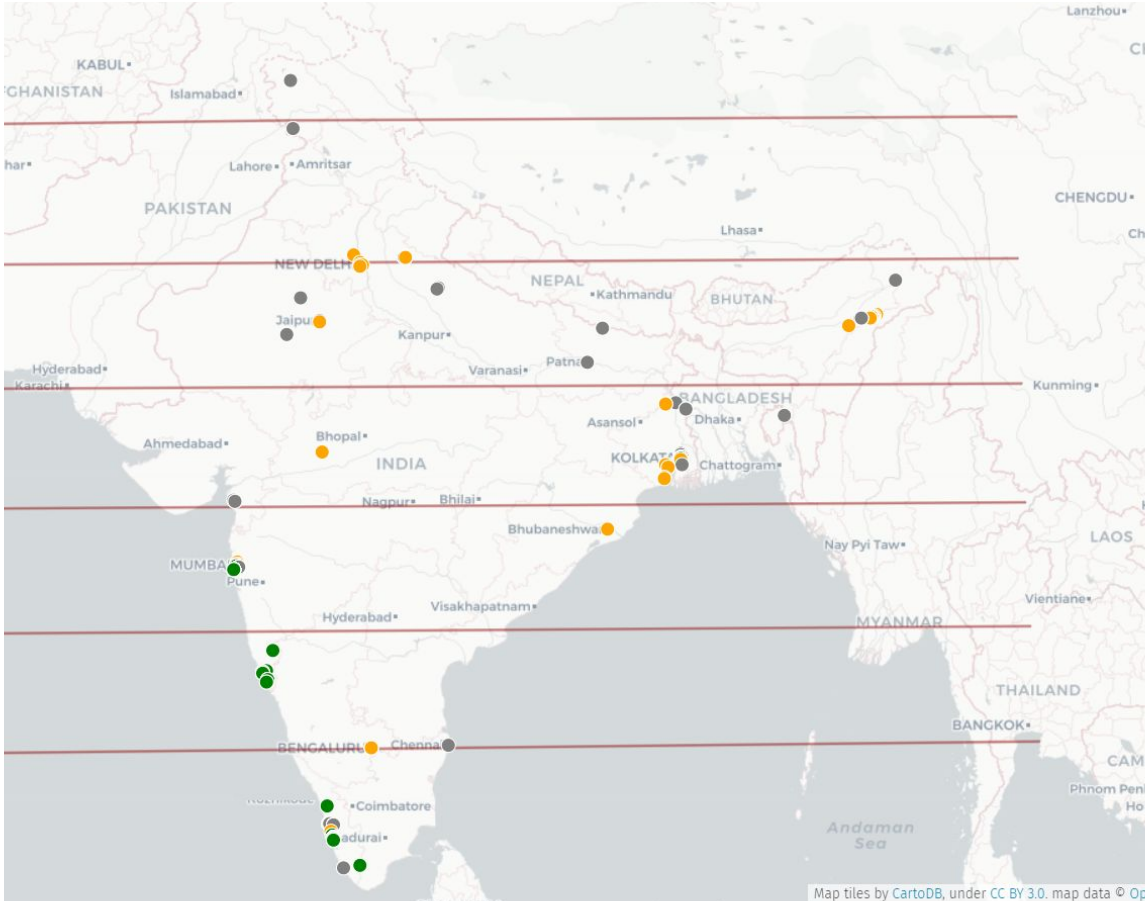
January & February 2017



January and February 2021

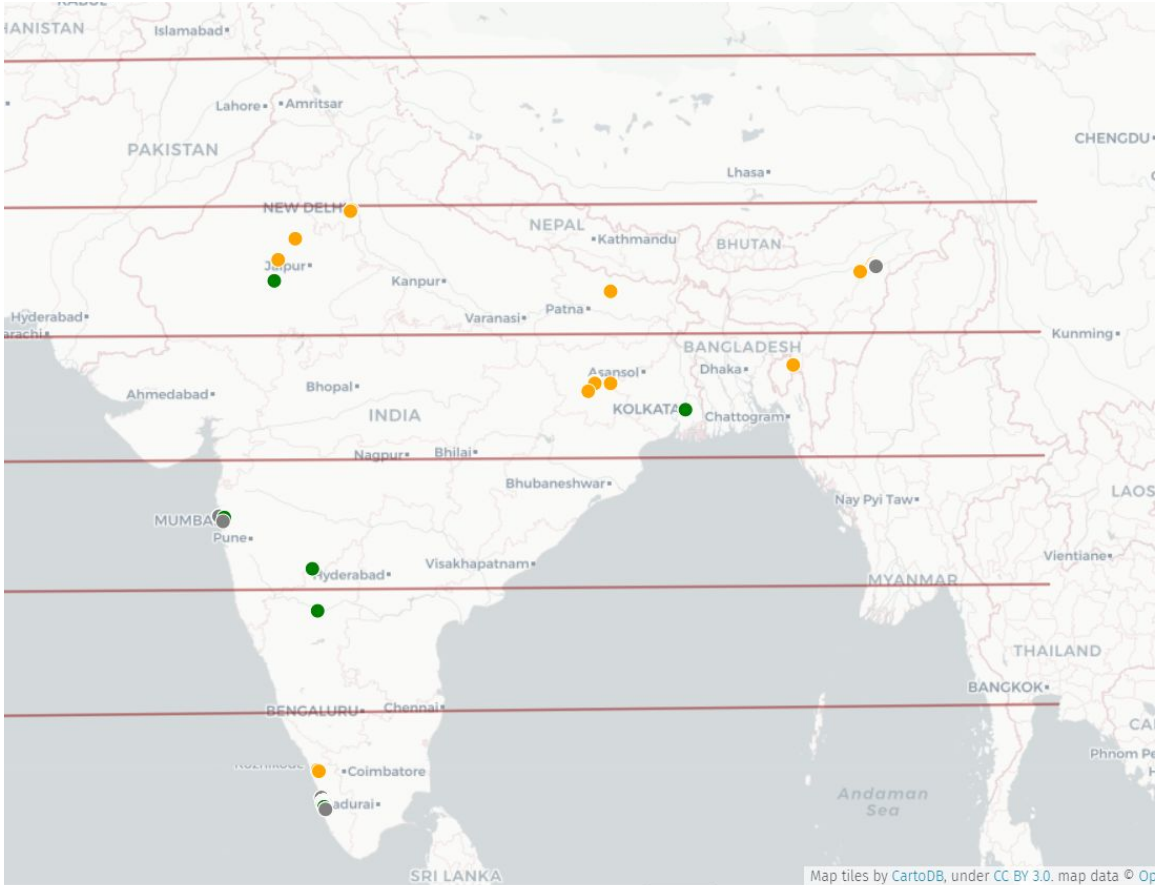
February 2021

- Yellow Dots: Flowering Trees
- Green Dots: Fruiting Trees
- Grey Dots: Non-flowering Trees
- Red Lines: Latitude Bands



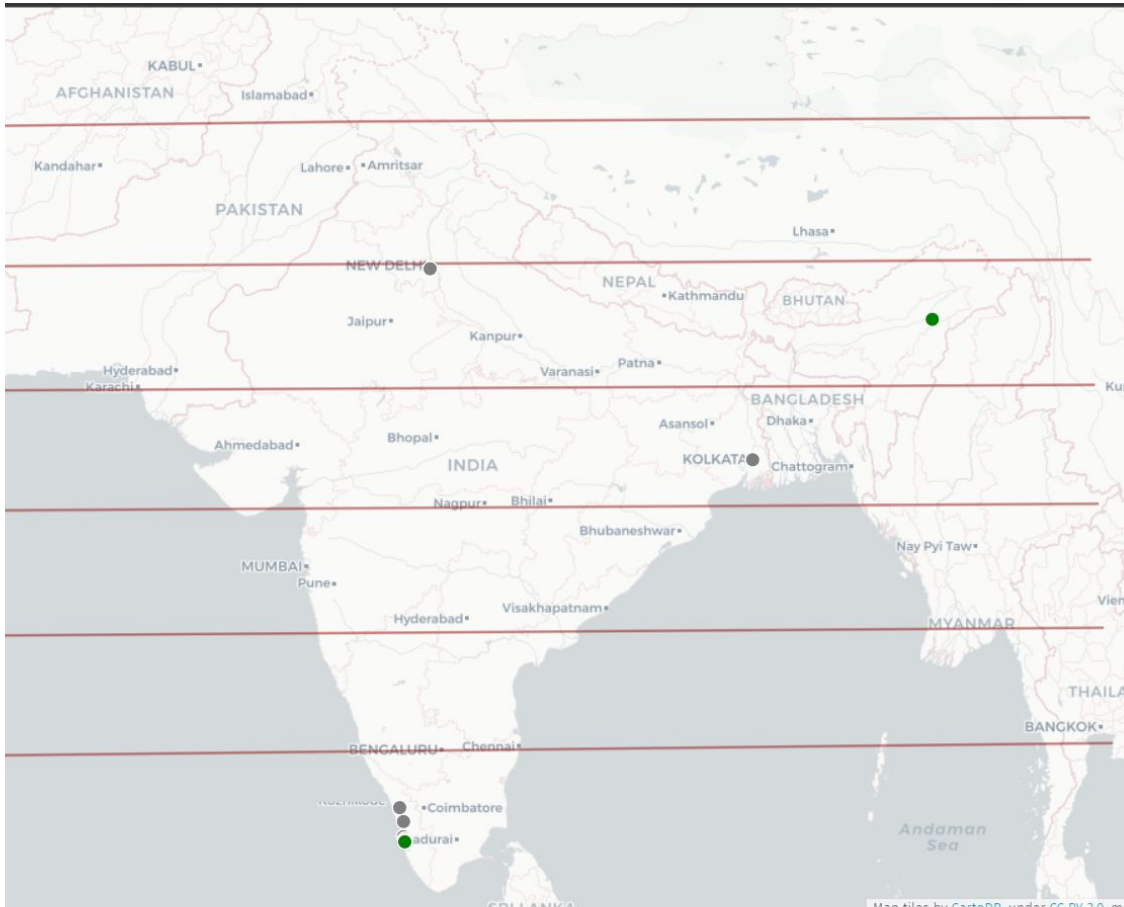
March 2021

- Yellow Dots: Flowering Trees
- Green Dots: Fruiting Trees
- Grey Dots: Non-flowering Trees
- Red Lines: Latitude Bands



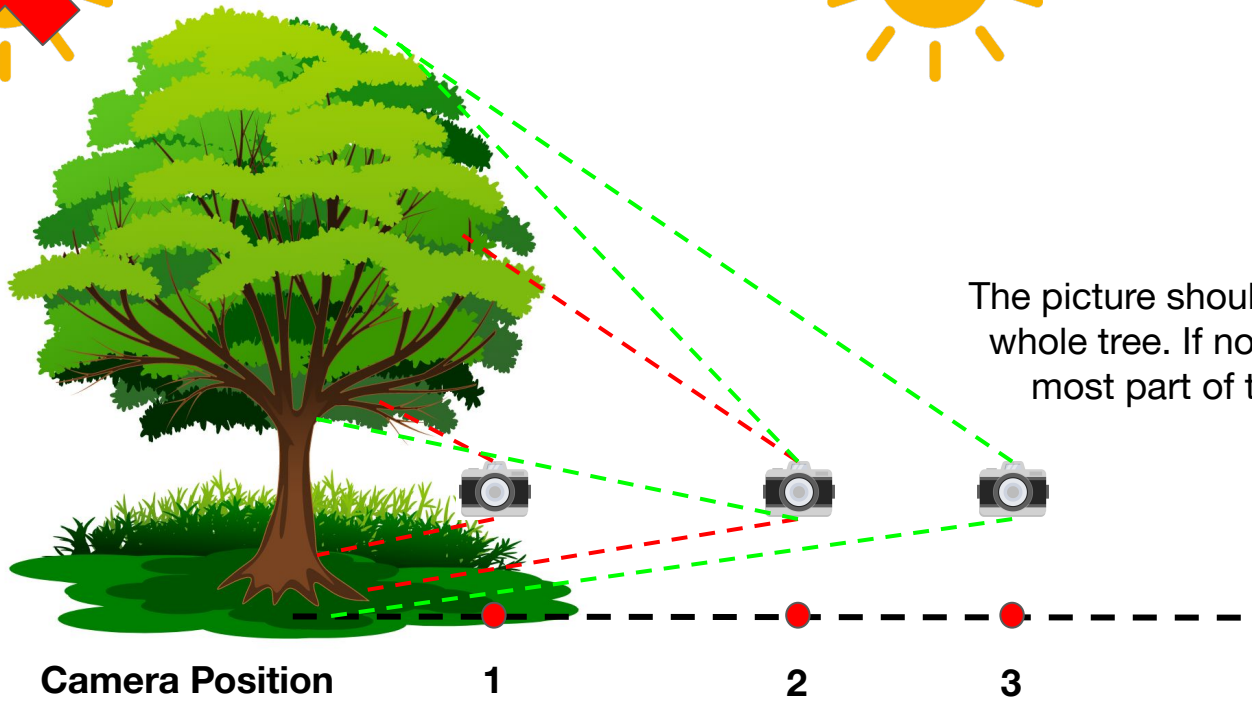
April 2021

- Yellow Dots: Flowering Trees
- Green Dots: Fruiting Trees
- Grey Dots: Non-flowering Trees
- Red Lines: Latitude Bands



Taking a Good Picture

The picture should not be against the light.



The picture should cover the whole tree. If not, then the most part of the tree.

Good Picture vs Not so Good Picture

- Good lighting conditions
- Clear to the audience

VS

- Bad lighting conditions
- Not so clear to the audience

Some More Snaps

NOT SO GOOD

GOOD

GOOD

Delonix regia

Sumita Kachhwaha,
Jaipur, Rajasthan

Source: KoboToolbox Database

Peltophorum pterocarpum
When does Copper Pod blossom?

Priti Kanade @Mulund, Mumbai
26th January 2021

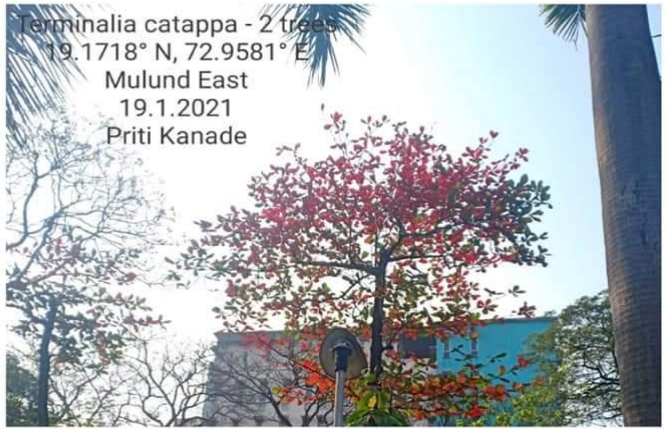
Flowering twice in a year?

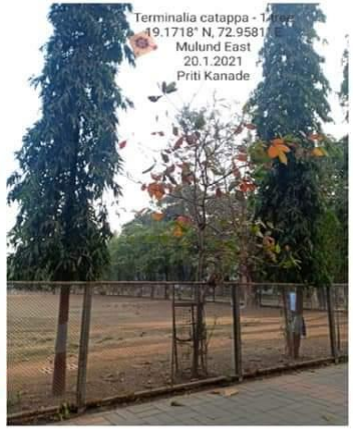
Abhijeet Singh @Tilak Nagar Rly. Stn., Mumbai
21st September 2021

Source: KoboToolbox Database | metaStudio.org

Terminalia catappa
Junglee Badam

Terminalia catappa
30.9.19





Terminalia catappa
19.1.21

Cassia fistula
Golden Shower

What are ants doing on the leaves?

Plant-Animal interaction?

Deborah Dutta @HBCSE, Mumbai
1st May 2021

More flowers than leaves!

Isha Pawle @Worli, Mumbai
30th April 2021

Source: KoboToolbox Database

Spathodea campanulata
African Tulip

Right-half flowering

Why?

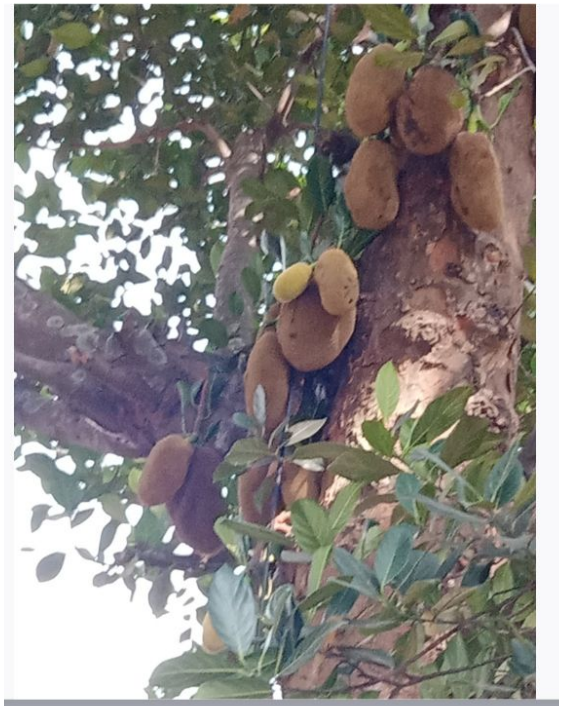
Left-half not flowering

Rechel Tirkey @Ranchi, JH
September 2021

https://www.google.com/url?sa=i&url=https%3A%2F%2Fanimals.sandiegozoo.org%2Fplants%2Fafrican-tulip-tree&psig=AOvVaw0nMqKPf7xaplraZfUTA8ID&ust=1632742033546000&source=images&cd=vfe&ved=0CAwQjhxqFwoTCKCVqpzEnPMCFQAAAAAdAAAAABAD

Artocarpus heterophyllus
Jackfruit

More water, better yield, healthy fruits!



Neha Rane, Sawantwadi, Sindhudurg, Mahrashtra

Source: KoboToolbox Database

Alstonia
Devil's Tree

18th September 2021

21st September 2021

20th September 2021

Aditya Joshi @Kalyan, MH

Source: CUBE Seasonomics WhatsApp group

Cuckoo Calling

Crow Nesting and Behaviour

Source: Priti Kanade, Mumbai

Smart Crow Behaviour: Sorting food from water

Source: Priti Kanade, Mumbai

Research Questions

1. **Short-term Questions**
    a. How does the flowering and fruiting pattern changes across latitudes?
    b. What plant-animal interactions are happening everyday in our vicinity? Why such interactions are happening? Is any seasonal pattern observed?
    c. What is the difference in flowering of a particular tree in Northern and Southern hemisphere?

1. **Long-term Questions**
    b. Does climate change shift flowering patterns as we move northwards from south?
    c. Does the Plant-Animal Interaction show any shifts on their seasonal patterns? Why? How they are adapting to the such changes?

Process for Data Collection

Capturing the pictures of the trees

↓

Sharing the pictures with other CUBists

↓

Uploading them in the kobo-form →

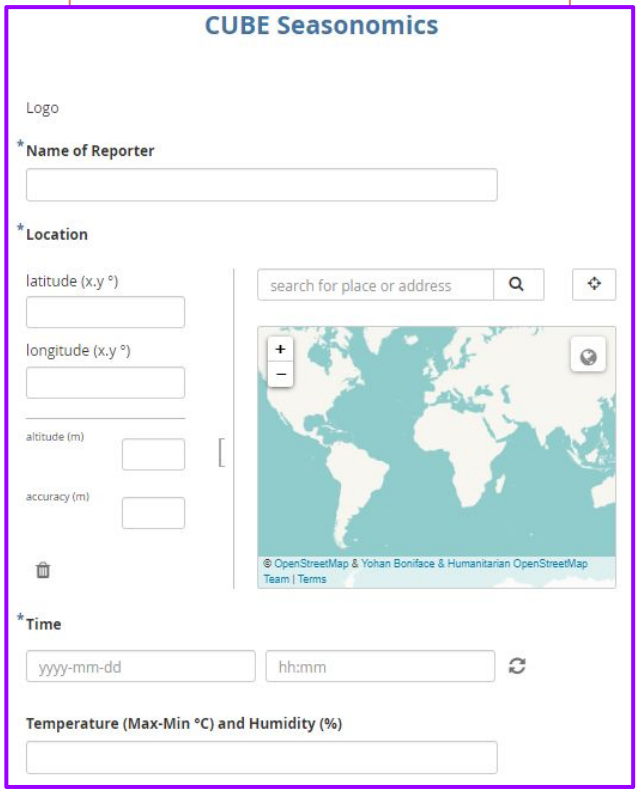
↓

Timely updating the status of the trees at the survey site

↓

Noting down any important observations during the collection of the data

bit.ly/seasonomics



Over 2015 Observations Till Date!!

*Model System

- Mango
- Gulmohar
- Copper pod
- Cassia Fistula (Golden shower/ Indian Labrunam)
- Junglee Badam (Wild Almond)
- Jack Fruit
- African Tulip
- Peepal
- Alstonia (Indian Pulai, Devil tree)
- Other Plant Seasonal Behaviour
- Mosquito
- Koel cooing
- Crow Nesting
- Other Animal Seasonal Behaviour

Details of the Tree

1

Header	Yes	No	Not Clear
*Sprouting Leaves			
*Flowers			
*Fruits			

−

+

- Mosquito
- Koel cooing
- Crow Nesting
- Other Animal Seasonal Behaviour

Additional Description

*Record the audio (10-15 sec)

Click here to upload file. (< 10MB)

Additional Picture

Click here to upload file. (< 10MB)

Additional Video

Click here to upload file. (< 10MB)

Save Draft

Submit

For some of us having a sweet tooth!

Data Insights: Dr Nisy Prasad

Alphonso (Maharashtra)

Himsagar (West Bengal)

Chausa (UP)

Safeda (AP)

Amrapalli
(Dashera x Neelam)

Sindhu
(Ratna x Alphonso)

Arka Aruna
Banganapalli x Alphonso

Ratna
(Neelum x Alphonso)

CUBE CHATSHAALA: 14/5/22

Native Mangoes in Sawantwadi, Maharashtra.

Lattitude: 15.9*N
Longitude: 73.8°E

Name of Native mangoes:
Alphonso, Raival Mango

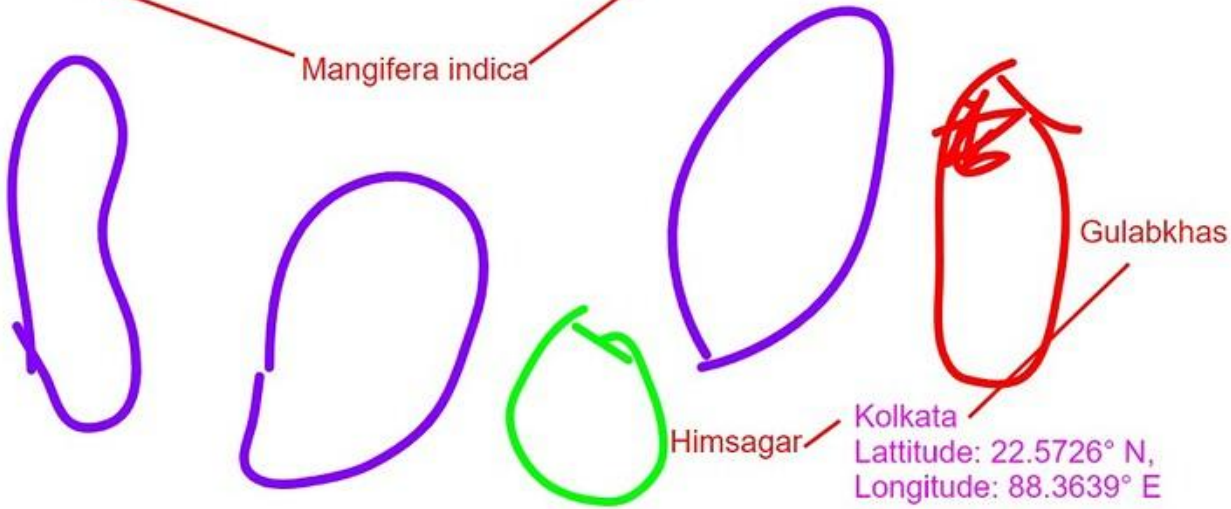
Ulwe, Navi-Mumbai
Lattitude: 18.9*N
Longitude: 73.0*E

Mapusa, Goa
Lattitude:15.5937° N,
Longitude: 73.8142° E

Varkala
Lattitude: 8.7379° N
Longitude: 76.7163° E

Name of native mangoes:
Kappa manga,Kilichundan
Kottukonam, Moovandan

Mangifera indica



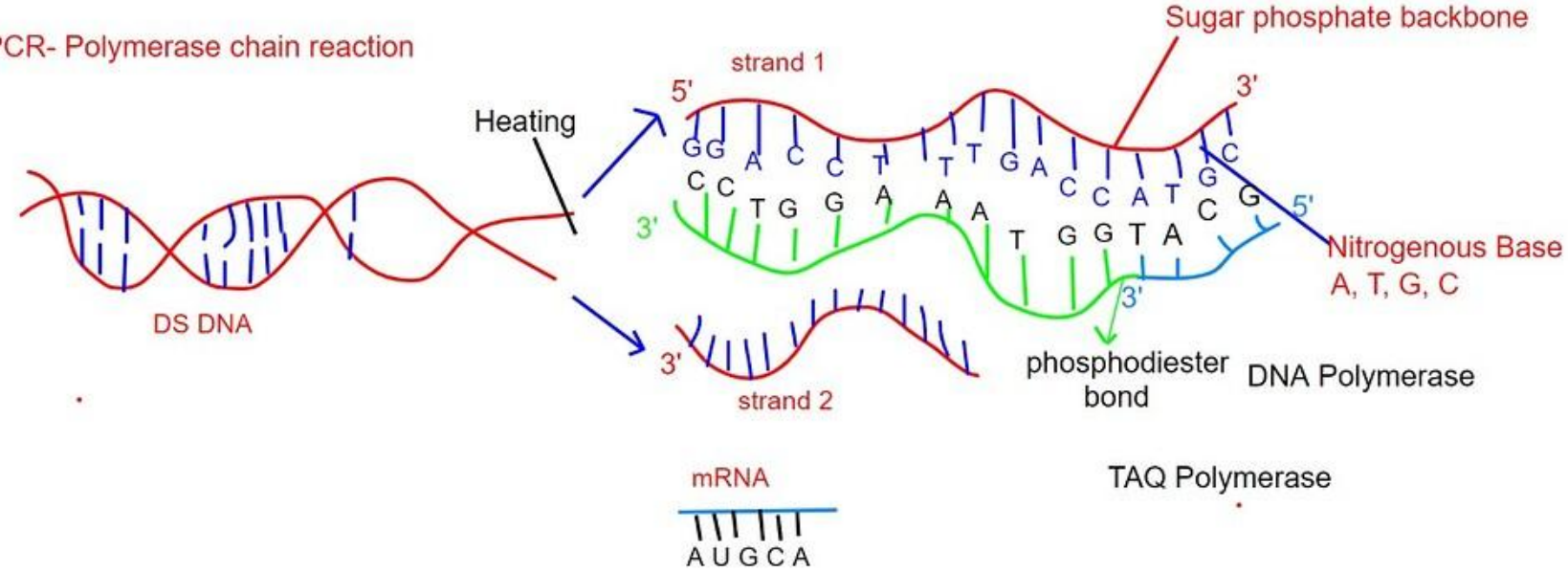
Pamgarh, Chattisgarh
lattitude:21.8746° N,
Longitude: 82.4504° E

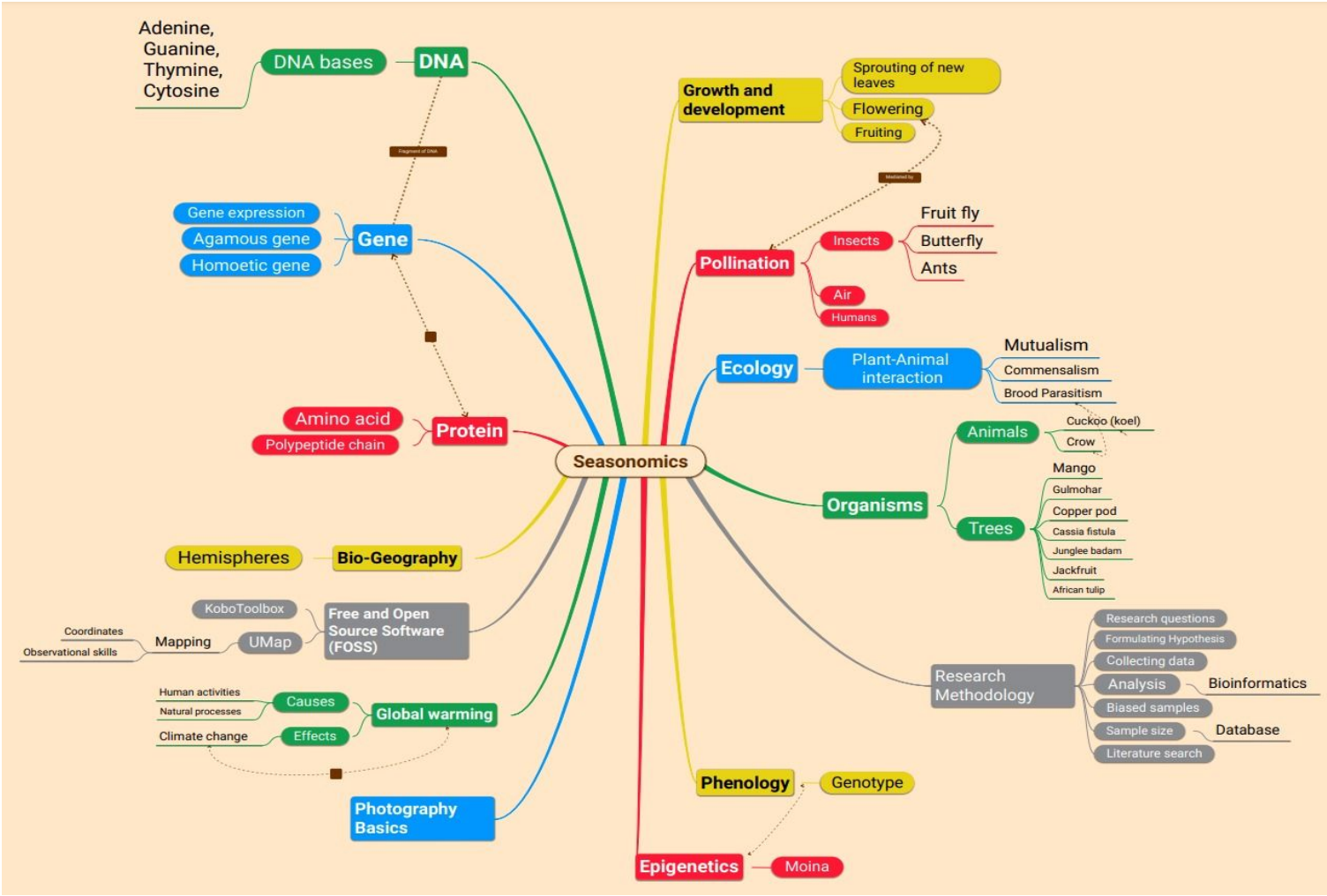
Kalmi

Kolkata
Lattitude: 22.5726° N,
Longitude: 88.3639° E

CUBE CHATSHAALA: 14/5/22

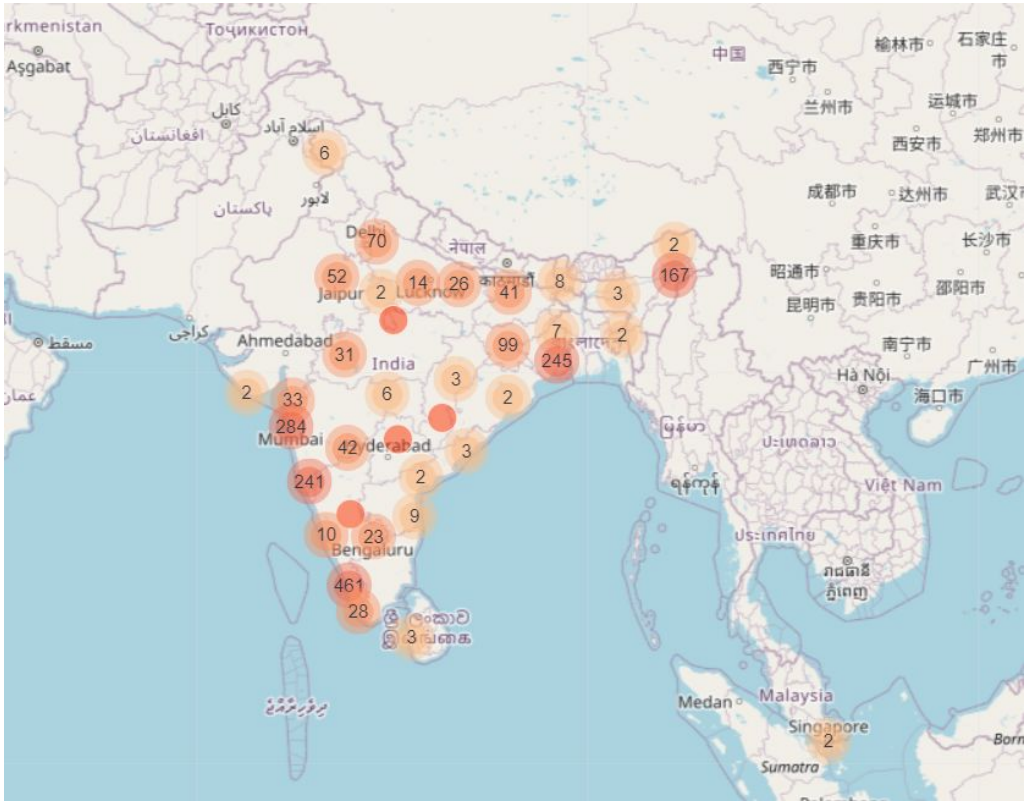
PCR- Polymerase chain reaction





Concept Map Credits: CUBist Collaborators

- How many centers? ~110
- How many cubists? ~150
- For how much time? Since November 2020 we have initiated the systematic data collection process.
- How much data entries do we have? Over 2015 submissions by March 26th, 2022.



THANK YOU