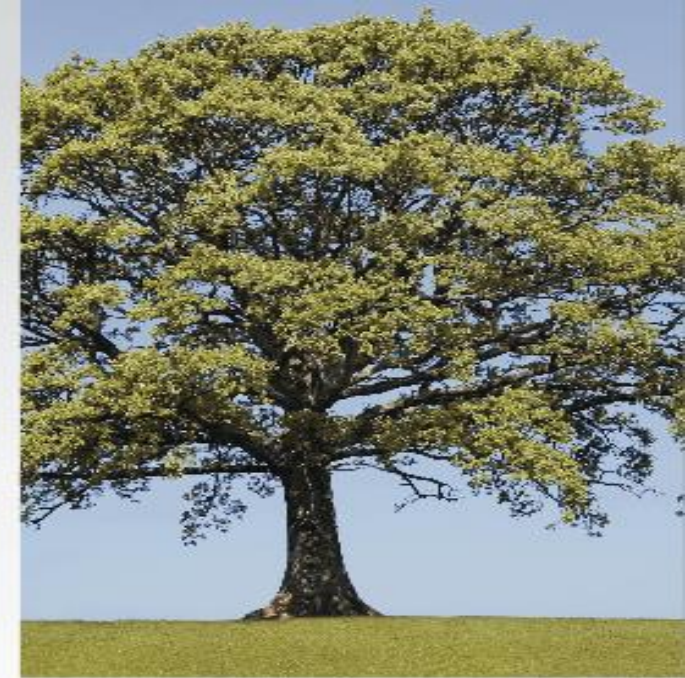


Phenology campaign

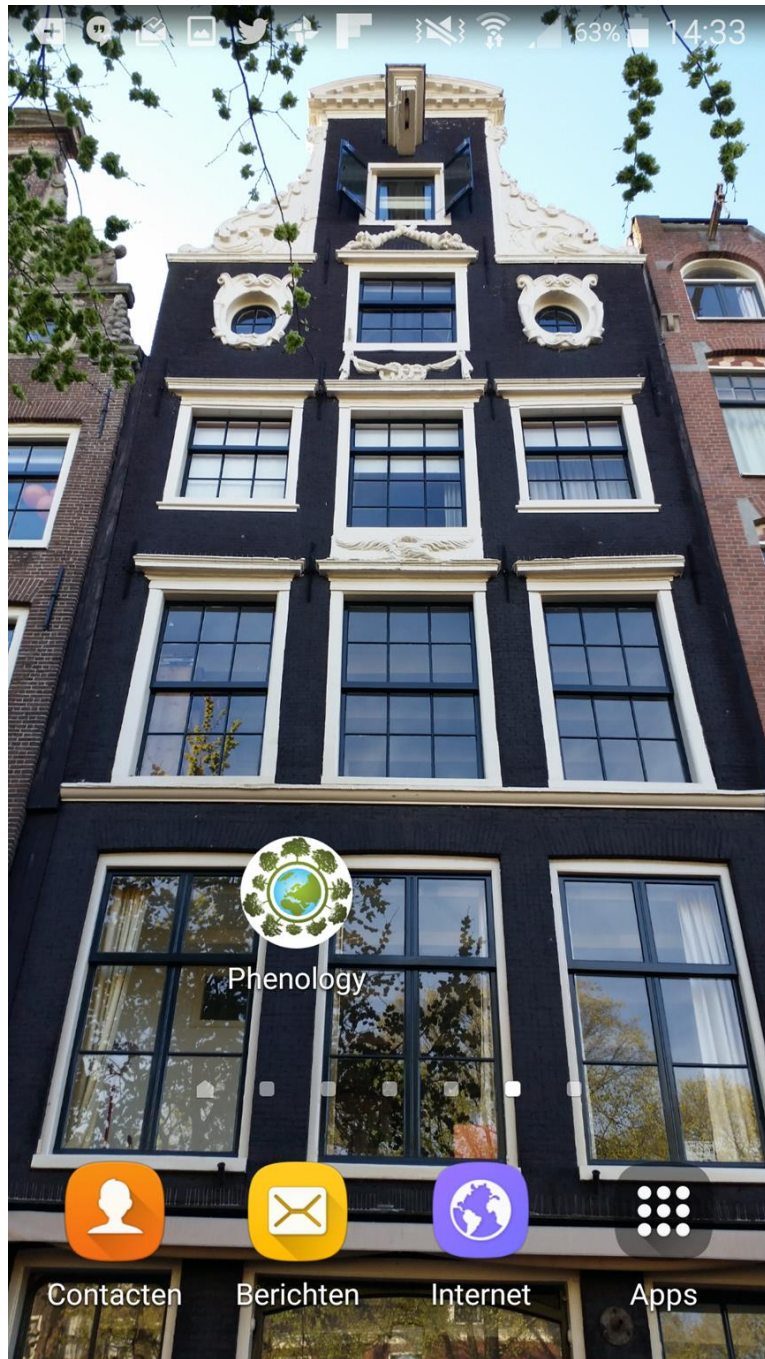


Phenology campaign for Europe & Eurasia

In this campaign students are going to make a movie of a tree that is changing during a year. For this they use an app on their smartphone or tablet. The pictures they take are automatically transformed into a time lapse movie that shows how the tree changes over the seasons and grows over the years.

To help scientists they will also use the app to gather green-up and green-down data for GLOBE and/or information about the moment of flowering, ripening of fruit and green index for Nature Today scientists.

www.globe.gov/web/european-phenology-campaign



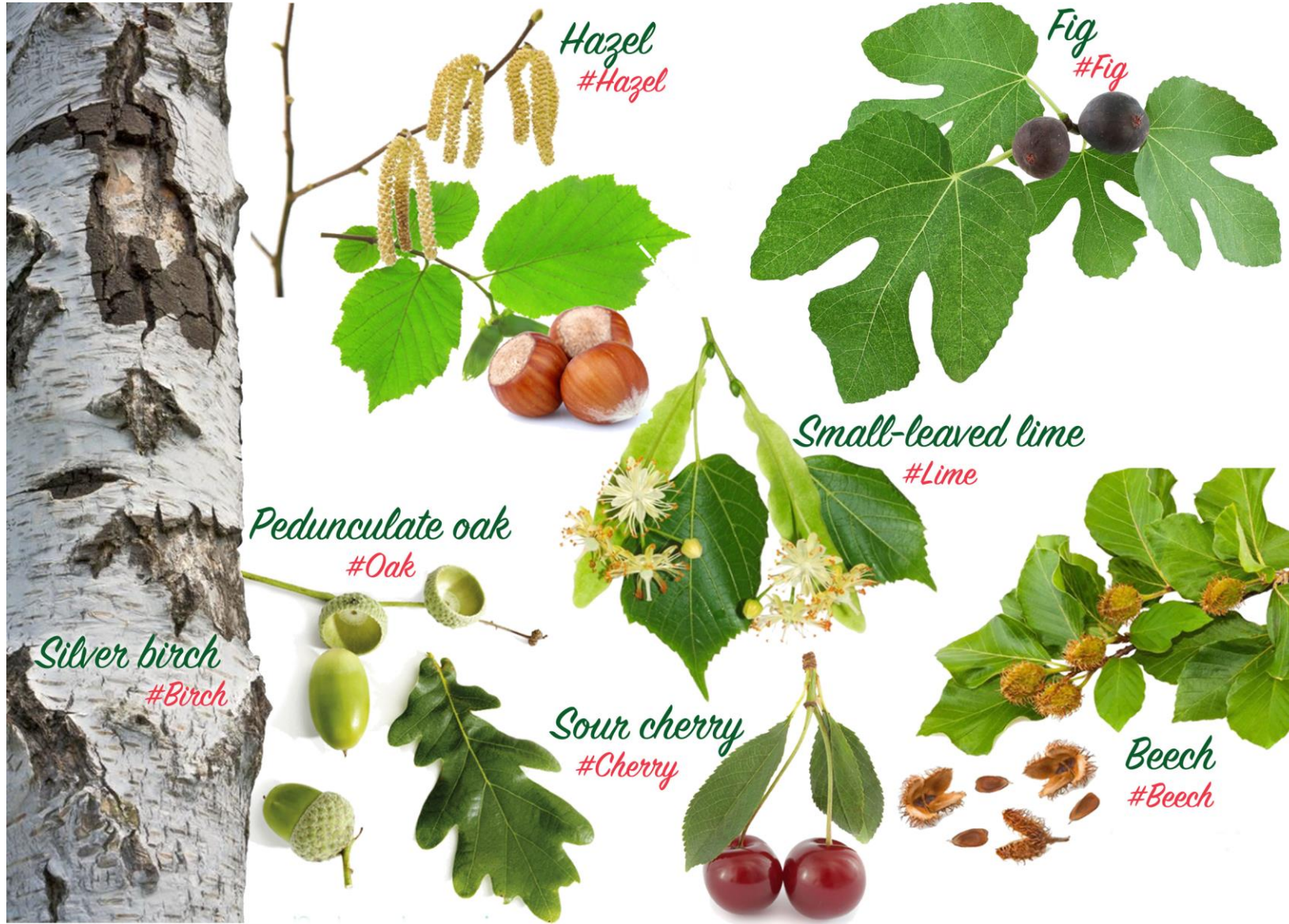
Download GrowApp at:

www.growapp.today

www.globe.gov/web/european-phenology-campaign

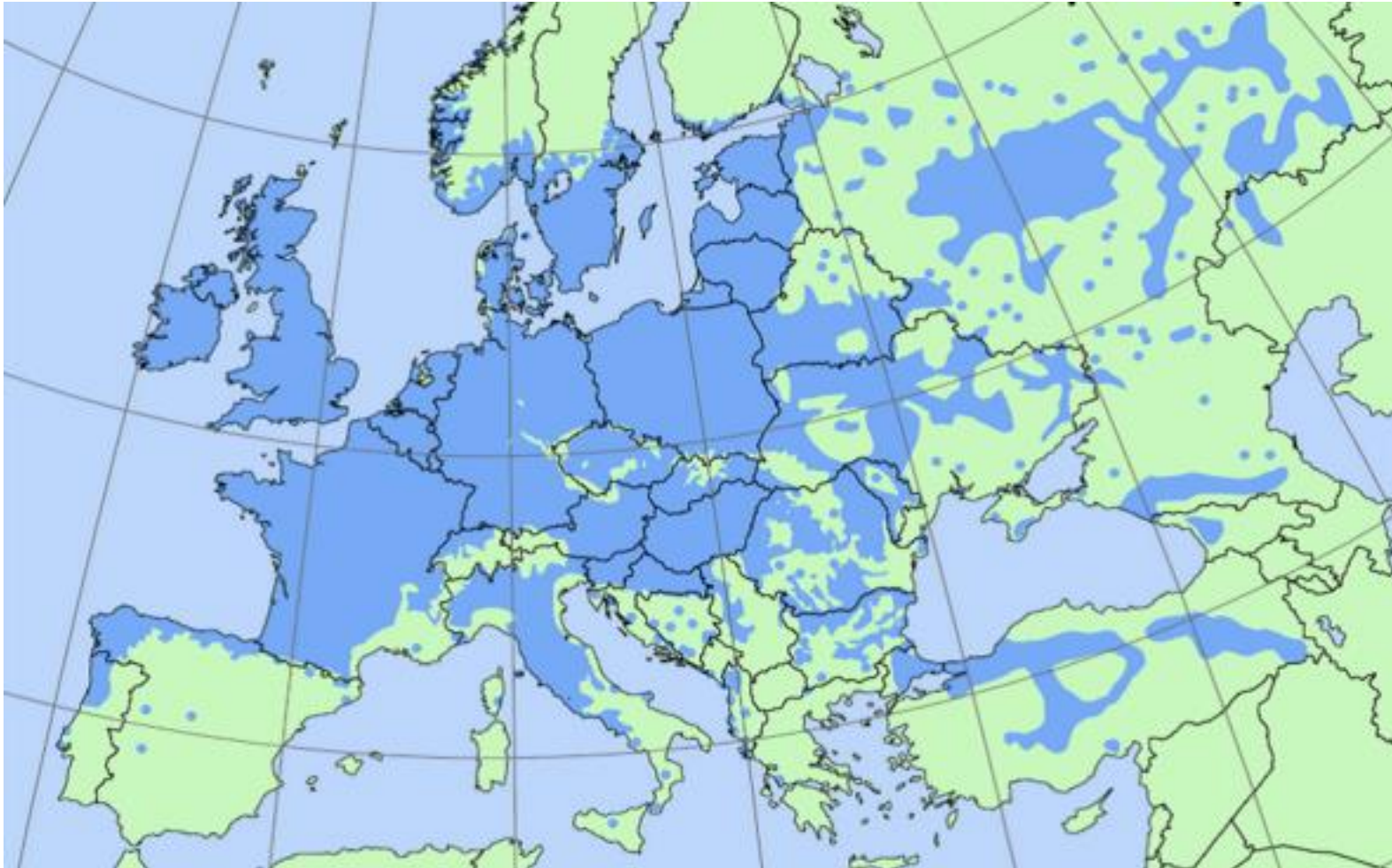
European campaign

Investigate 7 species with a Europe wide distribution



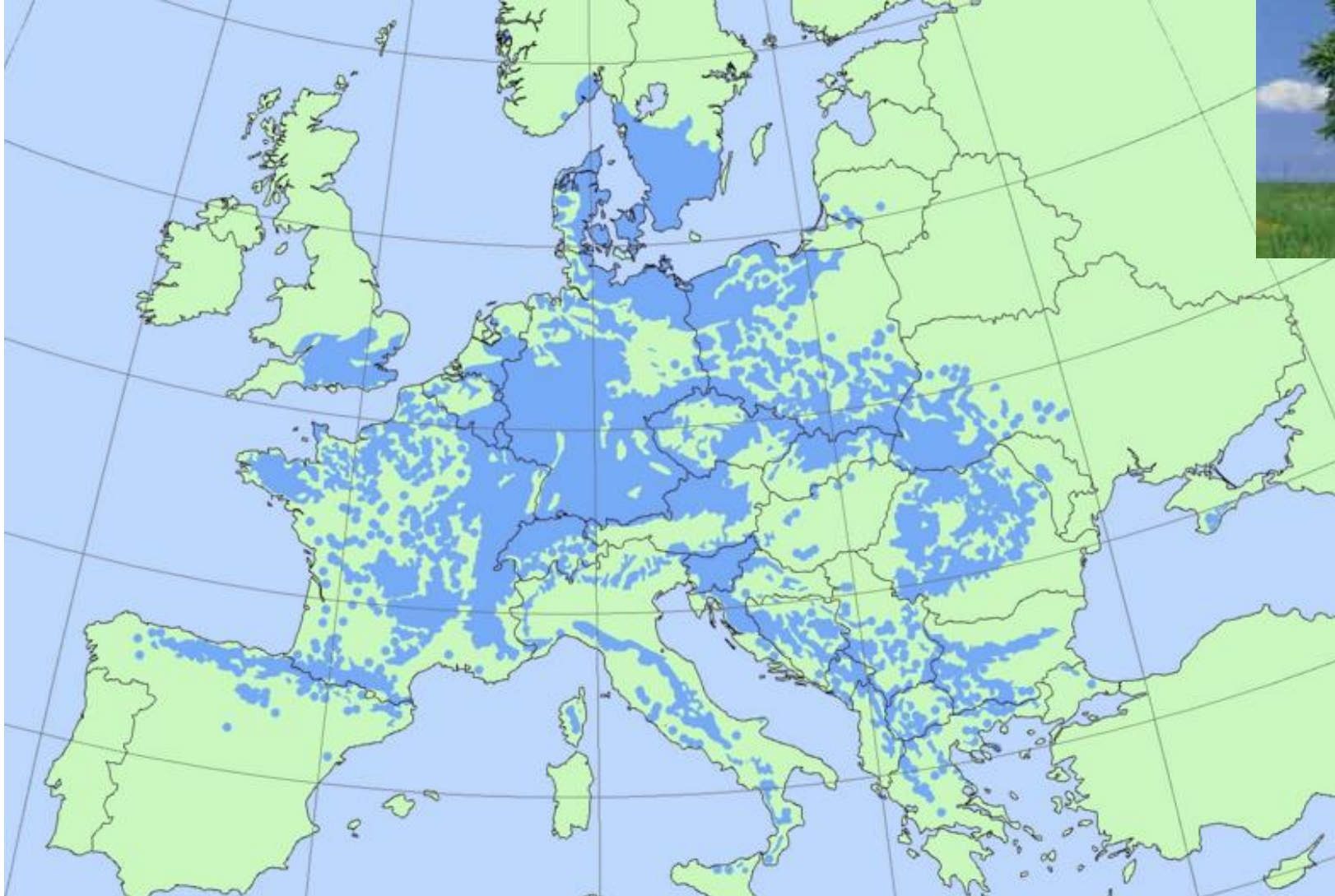
Oak (*Quercus robur*)

#Oak



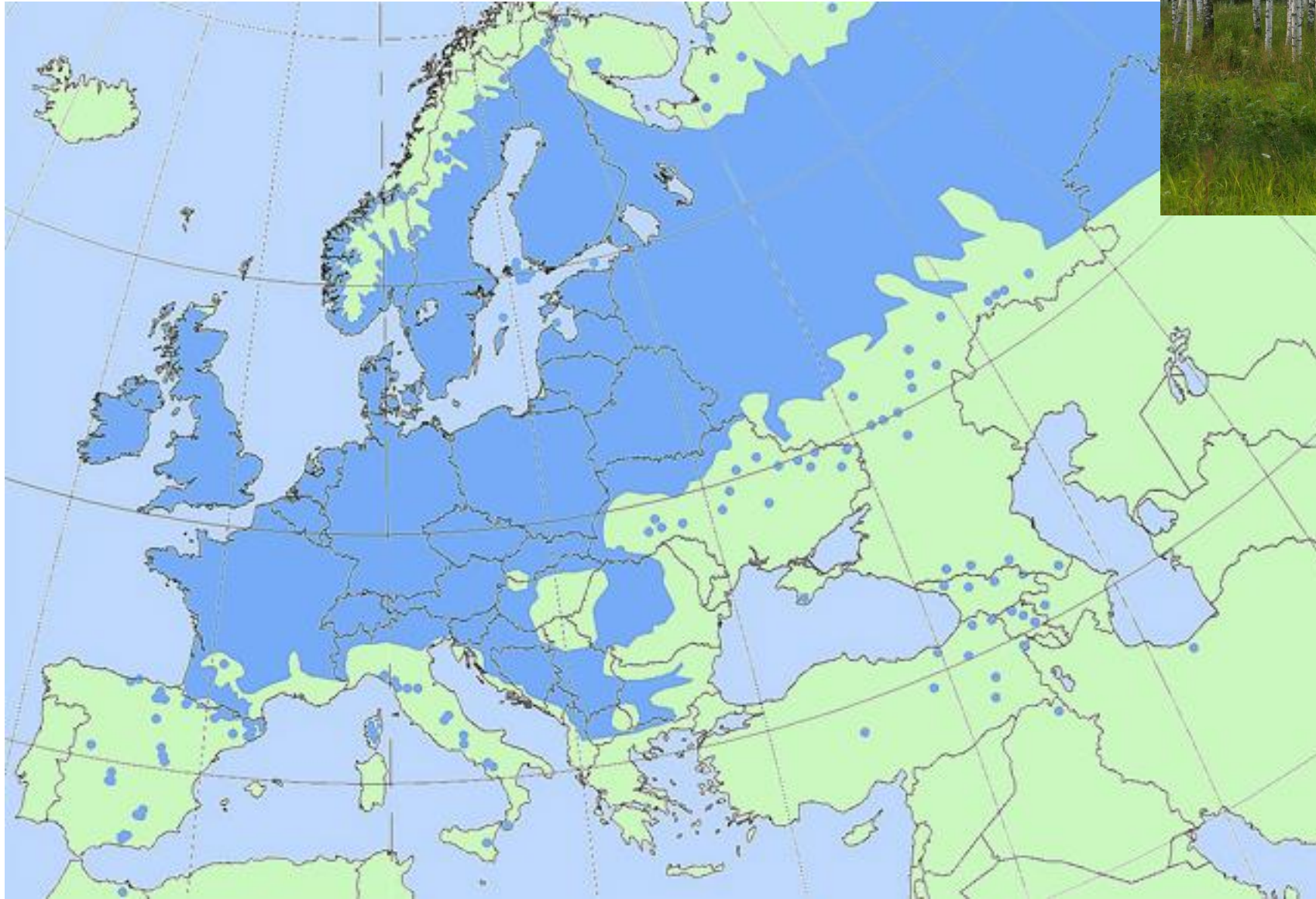
Beech (*Fagus sylvatica*)

#Beech



Birch (*Betula pendula*)

#Birch



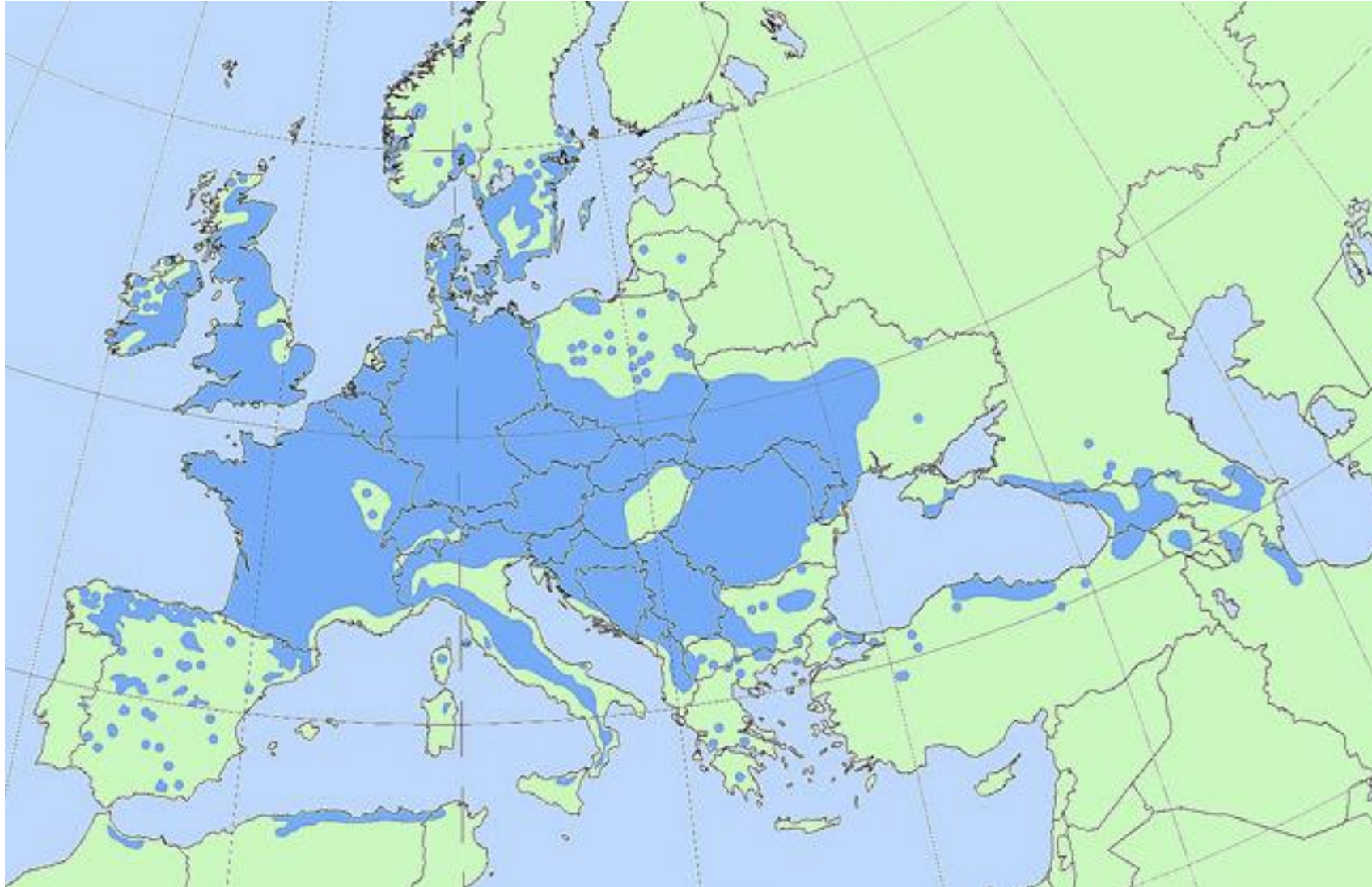
Hazel (*Corylus avellana*)

#Hazel



Sour cherry (*Prunus cerasus*)

#Cherry



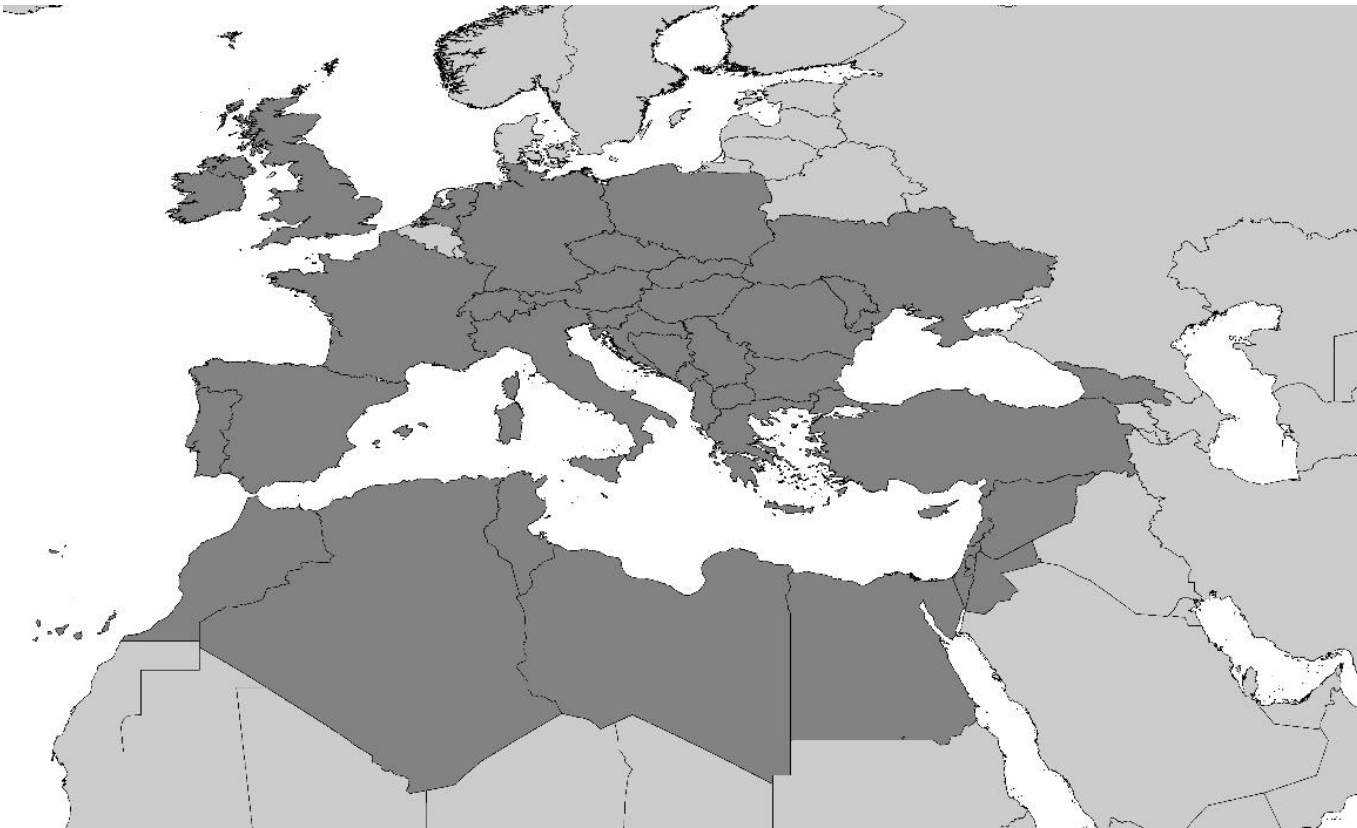
Small-leaved lime (*Tilia cordata*)

#Lime



Fig (*Ficus carica* L.)

#Fig





School project (1)

1. Select a tree (trees) out of the 7 species, which are:

- *Close to your school or any location, where you can observe it often*
- *With at least one branch that is positioned low so that you can observe the buds closely*
- *Not shaded by a building (Ideally, the tree-building distance is more than the height of the building)*

2. Try to pick individuals in different habitats, so that you can study the factors that influence the phenology events:

Shade and sun

Dry and wet

In and out of the city

Different temperature and soil type

3. Describe the tree and the site where it grows:

- *Take GPS coordinates and write down altitude as well*
- *Find out what is the Latin name of the tree species (e.g. *Corylus avellana* for hazel)*
- *Name the tree (e.g. Hazel 1)*

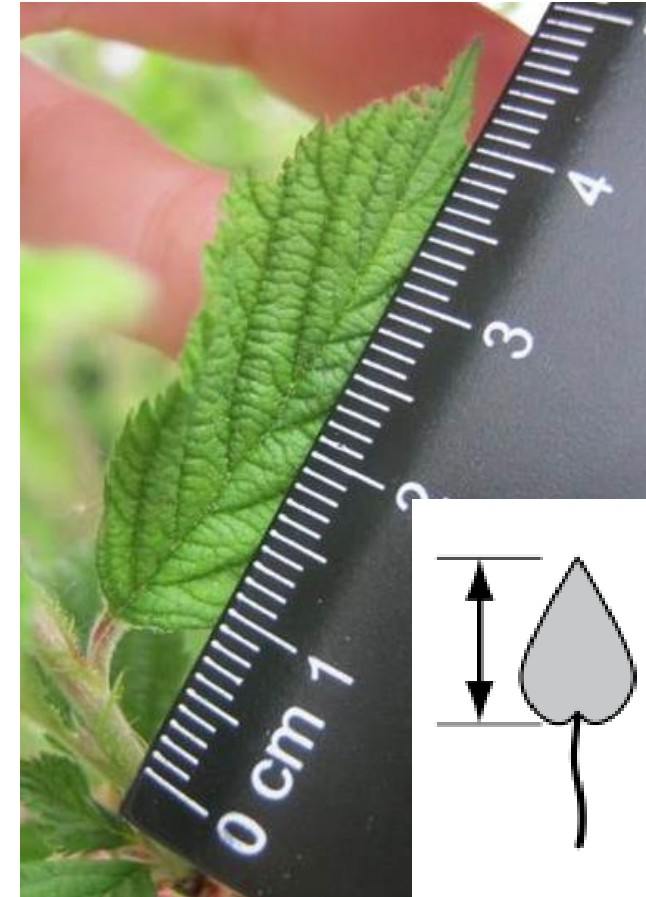


School project (2)

1. Take picture(s) of the tree using GrowApp:
 - *Take a first picture when the tree is still completely bare.*
 - *In the description field give it the following hashtags: **#species** (see pictures above), **#GLOBE**, **#Name of the school***
2. As soon as you see that the buds of the tree swelling, start to observe the twig more often (twice a week minimum):
 - *Follow the GLOBE Green Up protocol, report the stage of bud opening and measure the length of the leaf.*
 - *Take more photos of the tree and add them to the first one you took (open the first picture and click Camera+ icon).*
 - *You continue until the date when the tree is completely green and the leaves do not grow anymore.*
3. As soon as the tree is starting to green down:
 - *Follow the GLOBE Green Down protocols: report the color change of the leaves.*
 - *At the same time take pictures with the GrowApp.*
4. When the tree is completely green in summer or bare in winter, you can take pictures less frequently (twice a month).

GLOBE Green-up

- Determine whether there are more than one green down cycles (in Europe it will be mostly one cycle)
- Select a healthy and relatively large branch at south side
- Mark the branch with flagging tape (beginning at least two weeks prior to the anticipated start of green-up)
- Label 4 buds closest to the end of branch
- Examine each bud and record (at least twice a week):
 - “dormant” if the bud is unchanged.
 - “swelling” if the bud is getting bigger.
 - “budburst” the first day you see the green tips of leaves.
 - “lost” if the bud is damaged and you cannot continue
- After each budburst measure the length of the leaf or leaves.



Data entry Green up

Greening *Editing*

Measured at date
2016-05-31

What Green-Up/Green-Down Measurement Did You Take? Green Up

Growing season cycle number 1

* Indicates required sections or fields

Z

Leaf 1 Leaf Photo

Leaf 2 Leaf State

Leaf 3 Leaf State

Leaf 4 Leaf State Leaf length

Comments

Send Data Cancel Reset

Leaf Photo

- ✓ Dormant
- Swelling
- Budburst
- Length Measurable
- Lost

Leaf State

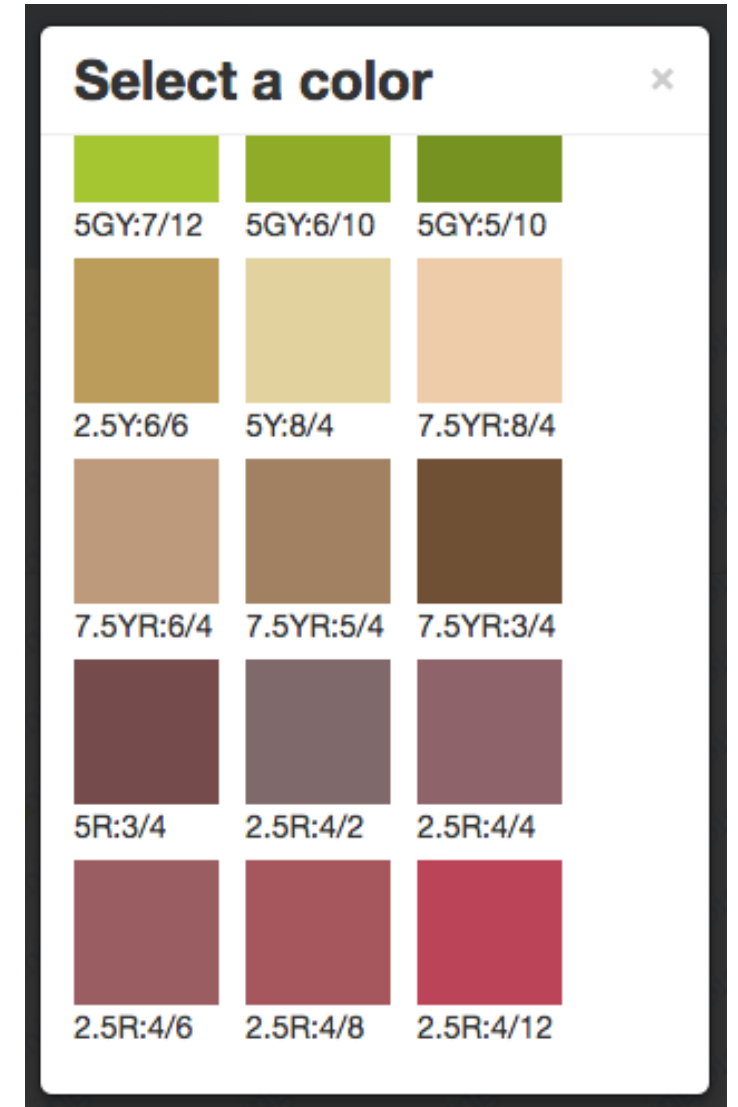
Leaf State

Leaf length

3 mm

GLOBE protocol: Green down

- Find a tree of one of the 7 species
- Tag a branch with flagging tape
- Determine whether there are more than one green down cycles
- Label the 4 leaves at the end of the branch with 1,2,3 or 4 dots
- Check the colour of the leaves at least twice a week until they have fallen off
 - Start at least 2 weeks prior to the expected start of green down
 - Use the GLOBE Plant Color Guide to estimate the dominant color of each leaf



Data entry Green down

Greening *Editing*

Measured at date

2016-05-31

What Green-Up/Green-Down Measurement Did You Take?

Green Down

Growing season cycle number

1

Z

Leaf

1

Leaf State

Color Change

Leaf color

Leaf

2

Leaf State

Fallen

Leaf color

Leaf

3

Leaf State

Snow Covered

Leaf color

Leaf

4

Leaf State

Color Change

Leaf color

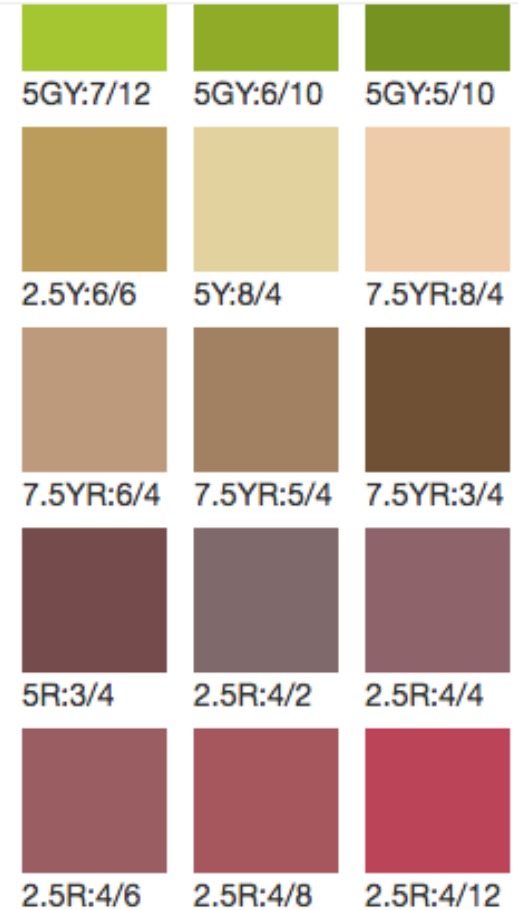
Comments

Send Data

Cancel

Reset

Select a color



Using the GrowApp



PICTURE LOCATIONS

Press the camera to start a new picture location



ONION SKIN

See the previous picture transparent for perfect outlining



SATELLITE DATA

Compare with several satellite background layers



ADD PICTURES

Click on the 'camera with +' to add a new picture to this location



TIME LAPSE MOVIE

Pictures are automatically played in a time lapse movie

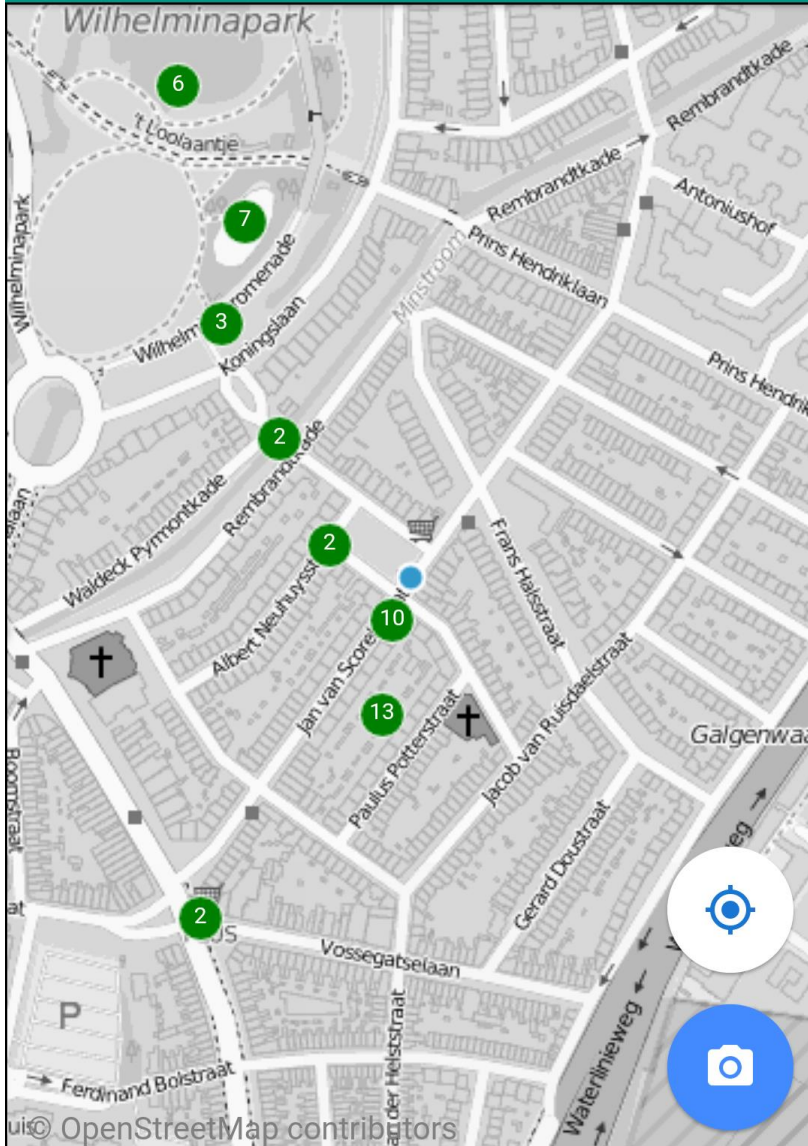


CITIZEN SCIENCE

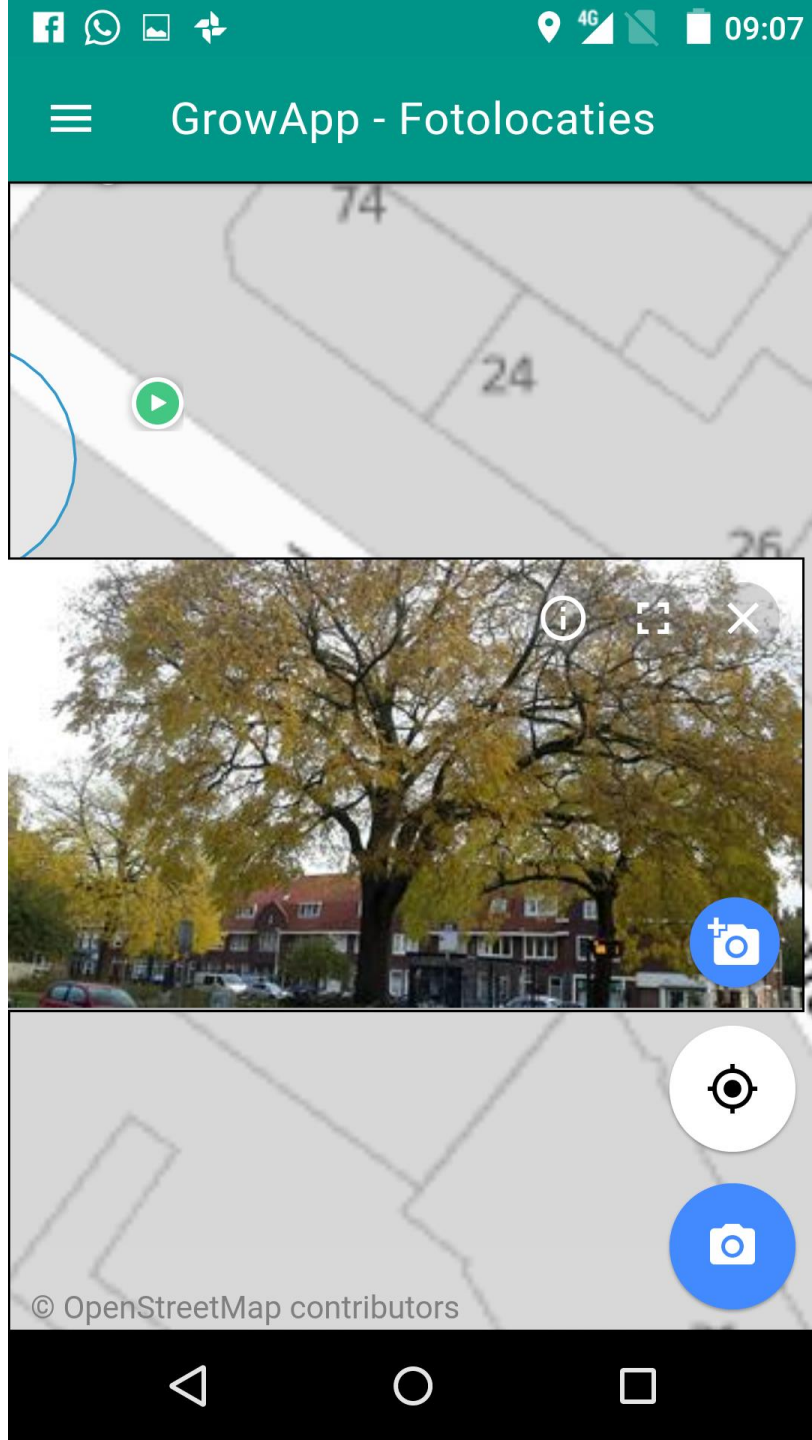
Your pictures will be used by scientists for their research. Optionally you can provide extra info to help scientists



GrowApp - Fotolocaties



- Open the app
- Switch on GPS
- Make sure you have internet connection
- Select a language (in Android version and for some languages only)
- Take a picture of a tree (everyone take another tree)



Add a picture to a picture location (of somebody else)

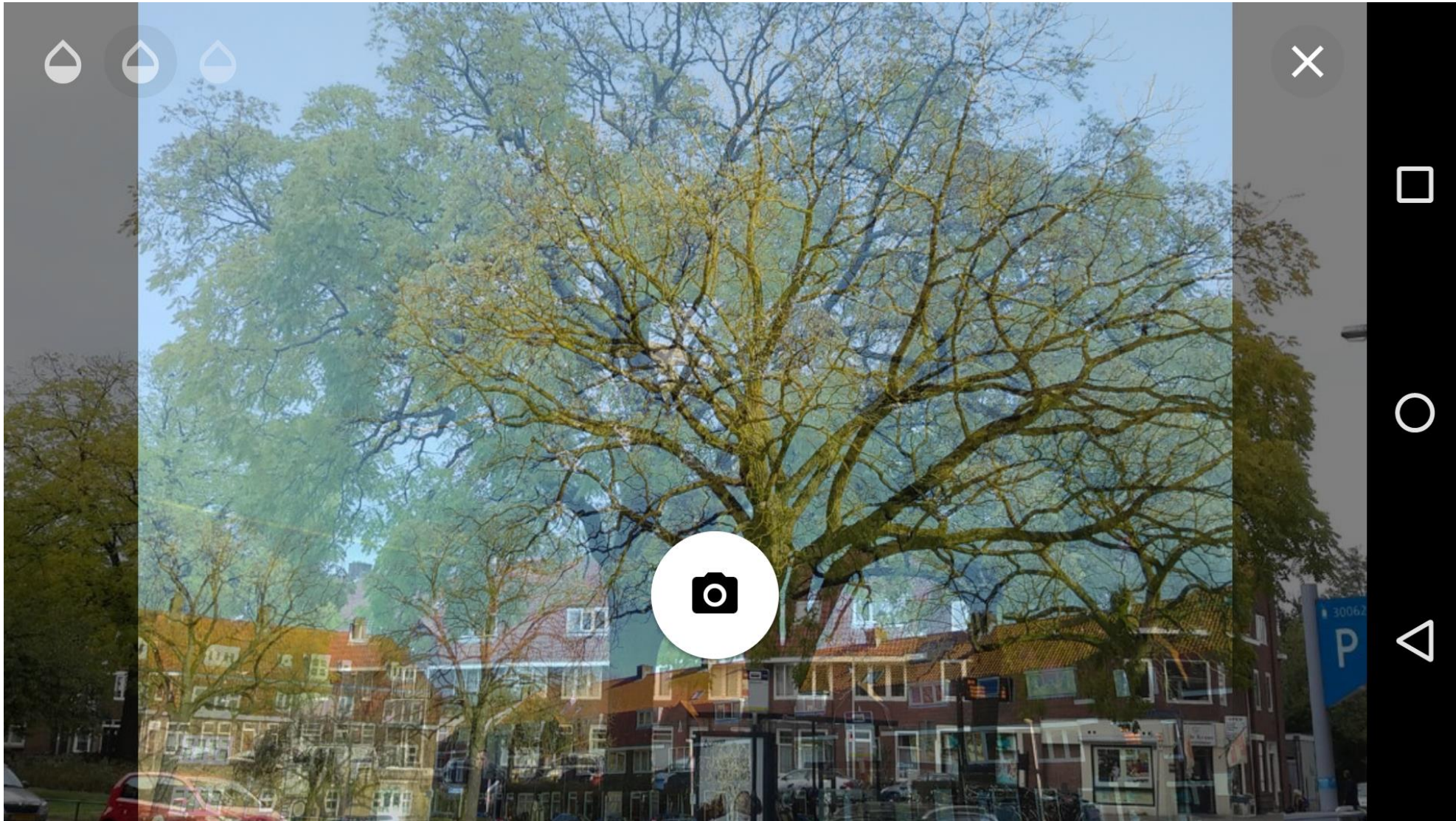
Add picture to existing picture location

Create new picture location (first picture in an animation)

Show camera preview on top of picture 'Onion Skinning'

Adjust transparency

Close



Picture taken!

Cancel (try again)

Adjust transparency to check
picture overlay



Add description = type hashtags of the tree species, globe and
your school

Send picture to be shown
publicly on the map

Add information and #tags

Tags make it possible to filter photo's on www.growapp.today. In the European campaign use the # for the 7 species. GLOBE schools also add **#GLOBE**, **#Name of the school**

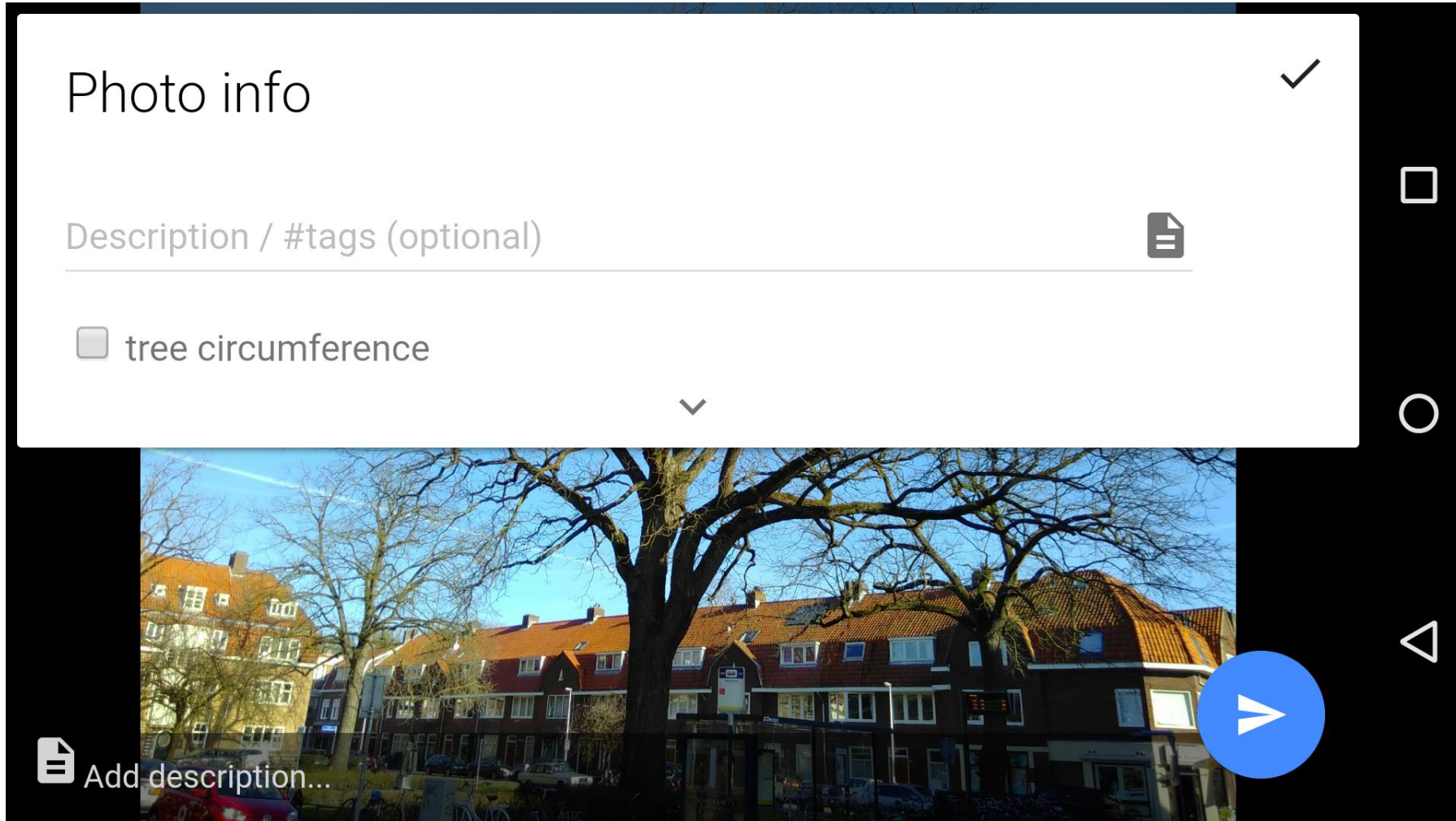





Photo info ✓

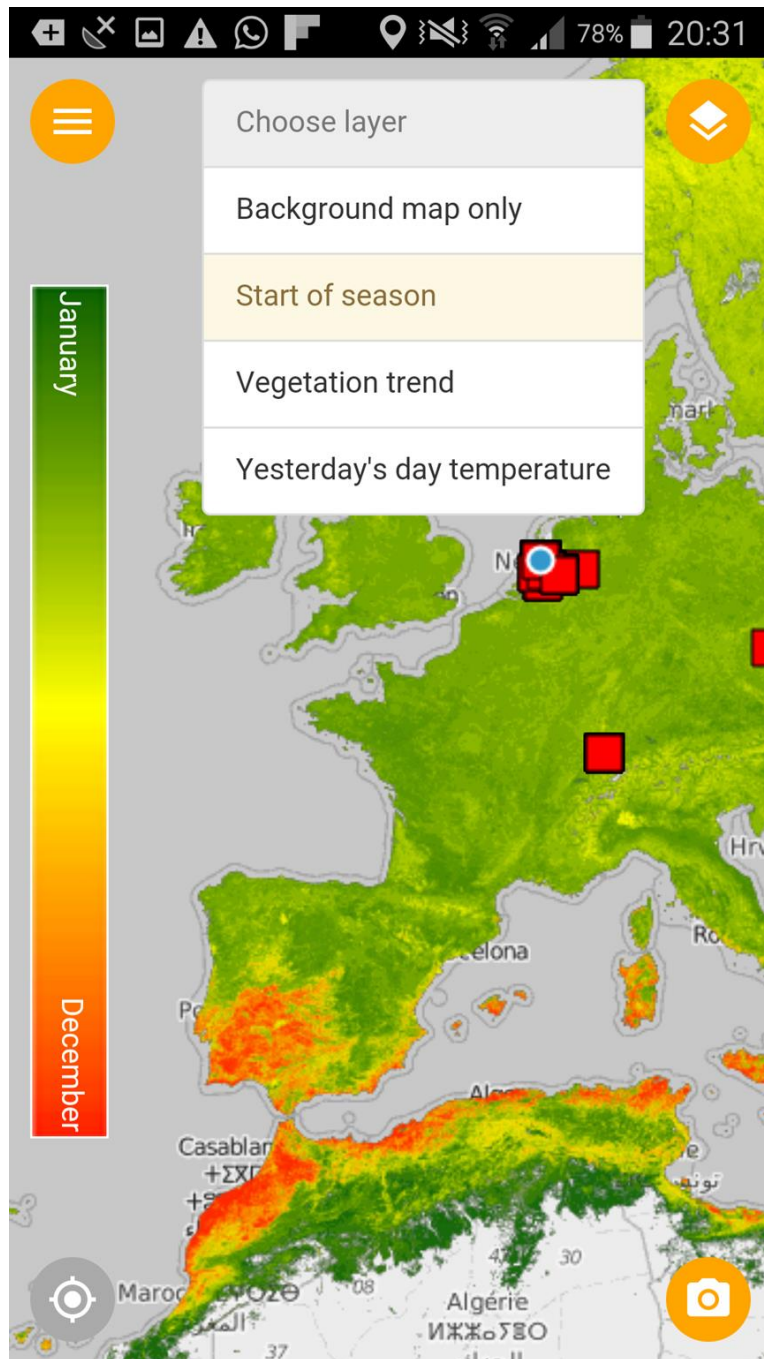
Description / #tags (optional) 

☐ tree circumference

▼

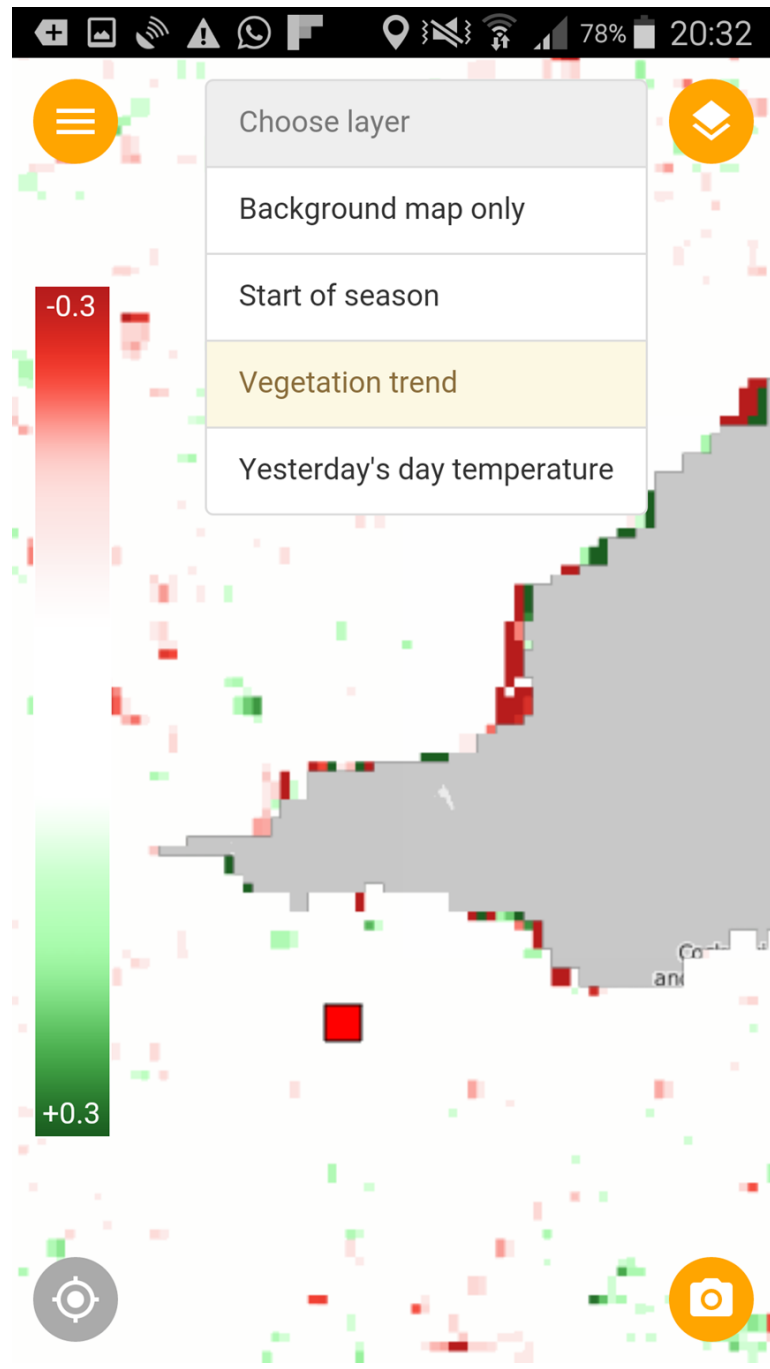
 Add description...



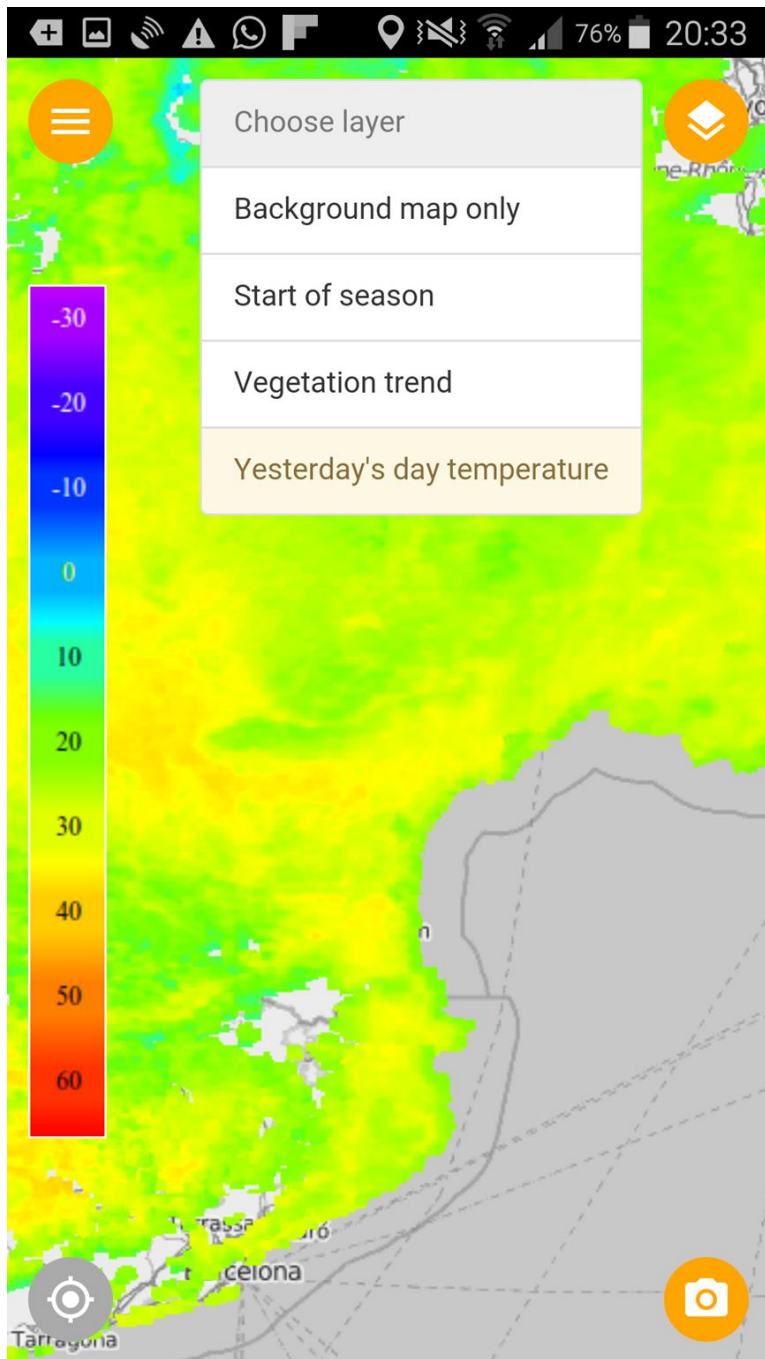


Extra reference map layers:

start of vegetation season



Extra reference map layers:
vegetation trend



Extra reference map layers:
yesterday's surface temperature

Animations of trees


Made with GrowApp



Let's go outside!



How to join?

- Go to www.globe.gov/web/european-phenology-campaign
- Sign in to your account and click on  Join Community
- Download app and learning materials

We look forward to your movies!



Partners

- **EU (MYGEOSS)** | funding building app
- **Ministry of environment Netherlands** | funding learning materials & outreach
- **GLOBE Europe & Eurasia board** | organisation and outreach
- **Wageningen University** | science
- **Leiden University** | strategy app development
- **Geodan** | development app
- **GLOBE Program** | connection to database (API) and visualisation
- **GLOBE Netherlands foundation** | coordination
- **Forget the fish** | website development