

Instructions for contributing to Fossil Atmospheres Leaf Survey

What you will need



A Ginkgo tree that is at least 10 feet tall



A smartphone or computer + camera



A free account on iNaturalist



Materials to mail in your leaves - a large envelope, cardboard, newspaper and tape

Questions? Email NMNH-Fossil-Atmospheres@si.edu

[1. Join the Fossil Atmospheres project on iNaturalist](#)

[2. Collect ginkgo leaves and document tree](#)

[3. Submit your observation through iNaturalist](#)

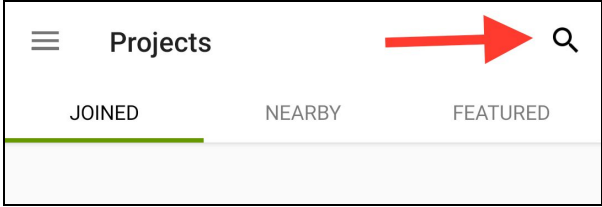
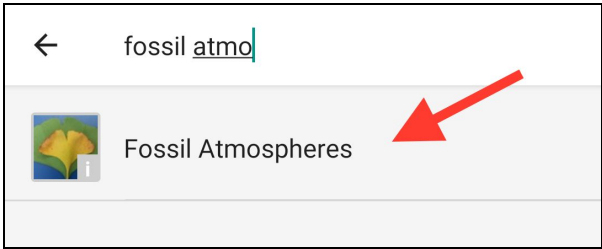

[4. Pack and send your leaves](#)

1. Join the project on iNaturalist

Sign up for iNaturalist [online](#) or using the iNaturalist mobile app.

- If you do not have the iNaturalist mobile app, you can download it for free from the [Apple App Store](#) for iOS or [Google Play](#) for Android.

Join the Fossil Atmospheres project.

Mobile App	Website
<p>In the app, open the left hand menu (≡) and select "Projects". Enter "fossil atmospheres" into the search feature to locate the project.</p>  <p>Select Fossil Atmospheres from the results that appear to view our project page.</p>  <p>Click the "JOIN" button under the leaf icon.</p> 	<p>From a computer, click the "Join this project" link in the upper right hand corner of our project page.</p>

2. Collect leaves and document tree

Overview

- [Find a ginkgo tree that is at least 10 feet tall](#)
- [Identify the sex of the tree.](#)
- [Collect 6 leaves from a short shoot.](#)
- [Collect additional data on the tree.](#)

A. Find a ginkgo tree that is at least 10 feet high with green, unfurled leaves.

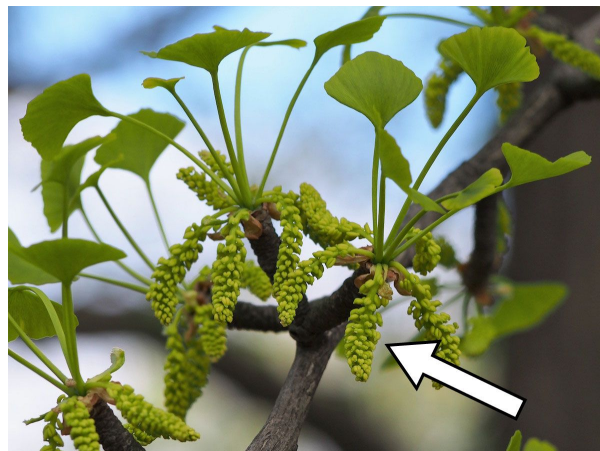
- Not sure what a ginkgo tree looks like? Look for the very distinctive leaves.



- Make sure you aren't breaking any rules by collecting from the tree you've chosen! You should have permission to collect from a tree grown in a garden or on private property.
- We only need one collection from each tree and are looking for geographic diversity, so if you are collecting with a group or want to send in more than one collection choose ginkgo trees that are at a distance from each other.

B. Identify the sex of your ginkgo.

- Ginkgo trees are either male or female. Males are often planted to avoid the stinky seed produced by female trees.
- The reproductive organs of the tree can be found alongside the leaves. While they are most prominent early on in the growing season (July), remnants of these organs should be visible on some of the branches or near the tree, if they have fallen.
- Male trees produce pollen cones. These form long bundles light yellow to green in color.



Pollen structures among leaves on a male ginkgo tree. (Modified from Agnieszka Kwiecień, Nova [CC BY-SA 4.0])

- Female trees are recognizable before pollination by long green stalks, ending in two round ovules. These develop into fleshy, green or yellow seeds that emit a strong odor later in the growing season.



Left: Ovules among leaves on a female ginkgo tree. (Modified from Marcin Kolasiński [CC BY-SA 4.0]) Right: Fruits produced after fertilization. (jy mit Kamera [Copyrighted free use])

- If you cannot determine the sex of the tree, please attempt to find another tree to collect from.

C. Collect 6+ leaves from a single short shoot on your ginkgo.

- Short shoots have a cluster of multiple leaves growing out from the end of a rough stub that is less than 1 inch long. Find a cluster with at least six leaves.
- If the leaves aren't clustered, don't collect them! Solitary leaves grow on long shoots, not short ones.



Close-up of a short shoot.

- Collect each leaf in the cluster by holding the stalk (i.e., petiole) and pulling down and away until the base of the stalk releases from the short shoot.
- The stalk is important for analysis so make sure to collect each leaf intact with its stalk.
- Put your leaves in a bag for temporary safekeeping.

D. Collect additional data on the tree.

- We highly recommend that you submit your observation immediately to iNaturalist while still at the tree. However, if you are unable to submit right away on the app, we need you to do the following to properly submit at a later time:



Photograph the entire tree



Photograph the base of the tree



Note the exact location of the tree (GPS coordinates or street address)

If possible, note which side of the tree (north, east, south, or west) you collected from

- Without this information, we cannot use your samples!

3. Submit your observation through iNaturalist

Additional instructions for using iNaturalist can be found in the [Getting Started guide](#) and [video tutorials](#) on the iNaturalist website.

Submitting your ginkgo tree data to the Fossil Atmospheres project on iNaturalist starts just like a regular iNaturalist observation. There are only a few project-specific fields to fill out at the very end once you add your observation to our project.

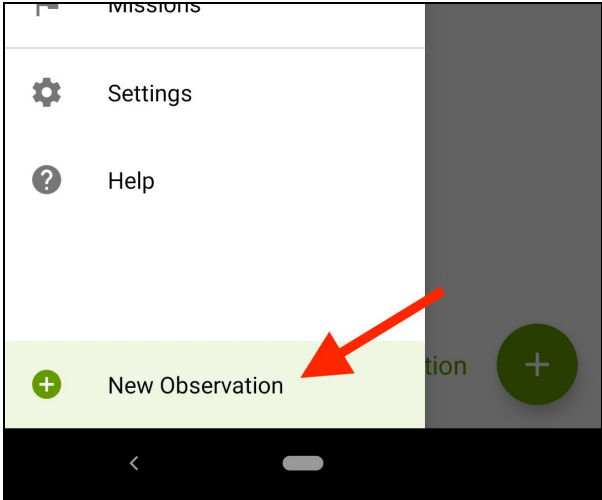

Overview

- [Login to iNaturalist online or in the mobile app.](#)
- [Begin a new observation.](#)
- [Add photos to the observation.](#)
- [Add a species identification to the observation.](#)
- [Check that the date, time, and location fields are correct](#)
- [Add your observation to the Fossil Atmospheres project.](#)
- [Fill in project-specific fields.](#)
- [Success! You've just submitted original data to Fossil Atmospheres!](#)

A. Login to iNaturalist [online](#) or in the mobile app.

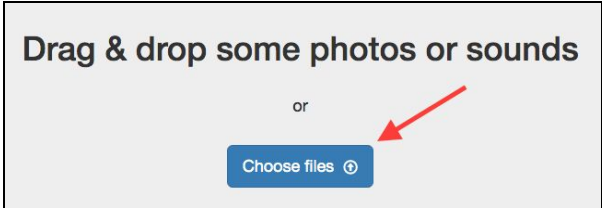
B. Begin a new observation.

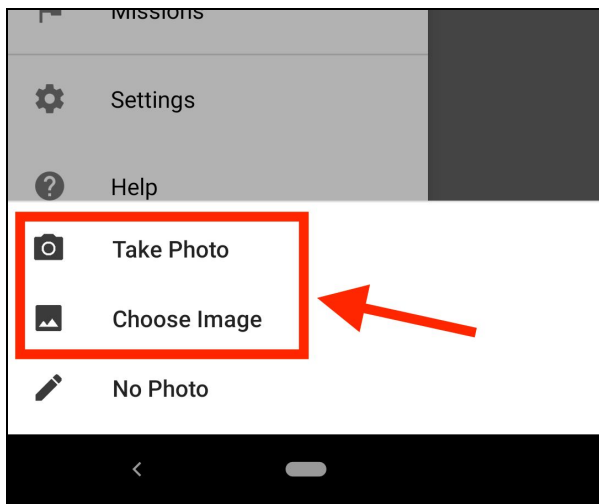
Mobile App	Website
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<p>Open the left-hand menu (≡) and click the green "New Observation" option located at the bottom.</p> 	<p>Click the green "Upload" button found in the upper right-hand corner of any page on iNaturalist.org.</p> 
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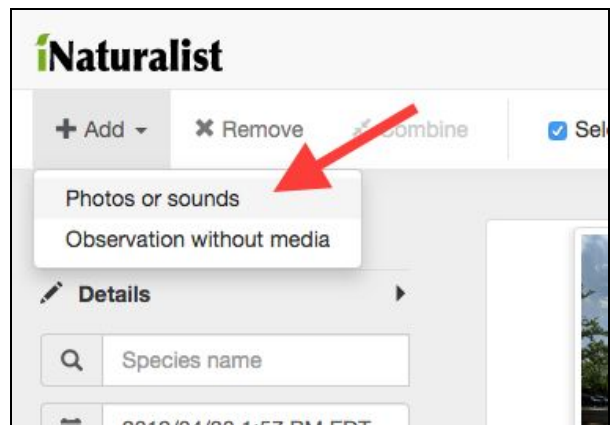
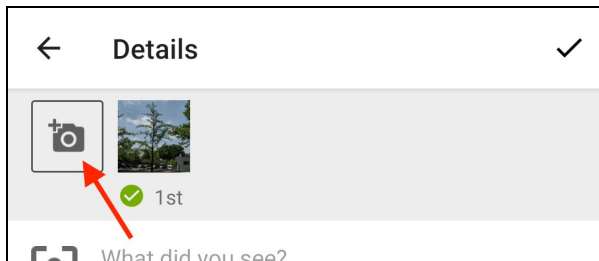
C. Add two photos to the observation.

- We require two photos of a sampled tree:
 - One photo should show as much of the entire tree, top to bottom, as possible.
 - The other photo should show the base of the tree's trunk, so we know what kind of environment it was planted in.

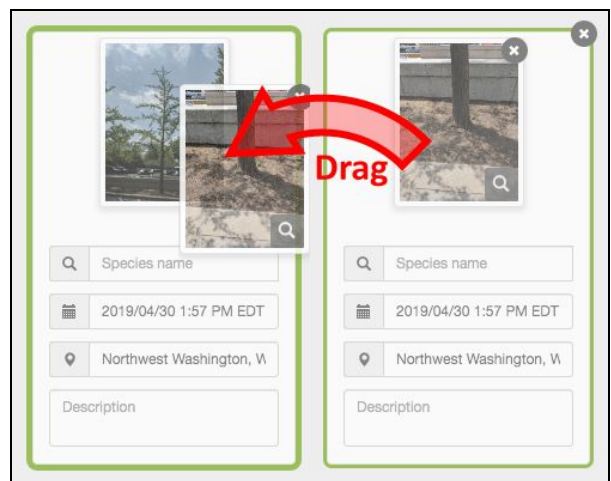
Mobile App	Website
<p>If you have already taken photos of the ginkgo tree, select "Choose Image" and choose a photo of the tree from your phone's gallery. Otherwise, select "Take Photo" and take your first photo of the tree.</p>	<p>Upload photos of the tree you sampled using the "Choose Files" button or by dragging and dropping your files into the browser window.</p>  <p>You can add additional photos on the next page by clicking "Add" > "Photos or sounds" in the top menu or by dragging files into the browser window.</p>



Once a photo has been uploaded, you will be taken to your new observation's "Details" page. Here, you can add additional photos by clicking the camera symbol in the upper left hand corner.



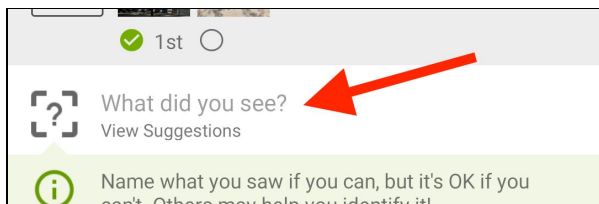
Merge the additional photo(s) with your new observation by dragging the photo into the same box.



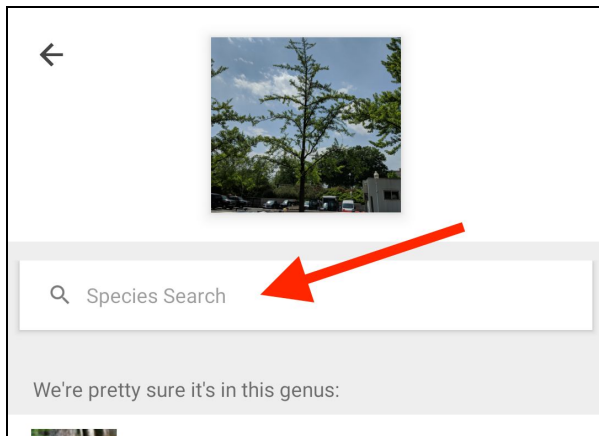
D. Add the species identification (*Ginkgo biloba*) to the observation.

- Records identified as "Ginkgo" without the "biloba" cannot be submitted to this project so please use the entire scientific name.

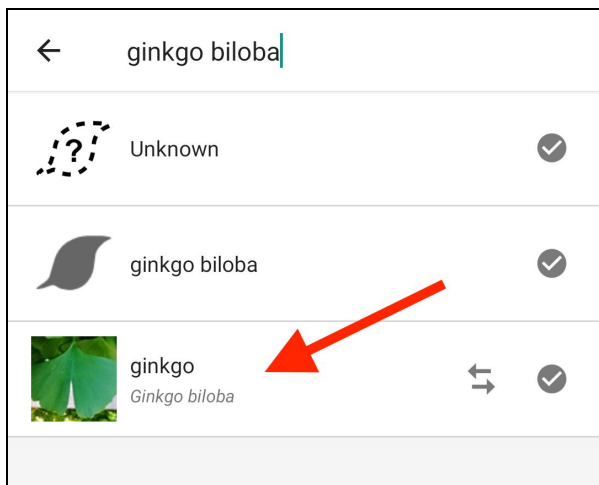
Mobile App	Website
Select the "What did you see?" field.	Search for "ginkgo biloba" in the "Species name" field under your uploaded photo and click on the matching "Ginkgo (Ginkgo biloba)" result, which features a photo of a ginkgo leaf.



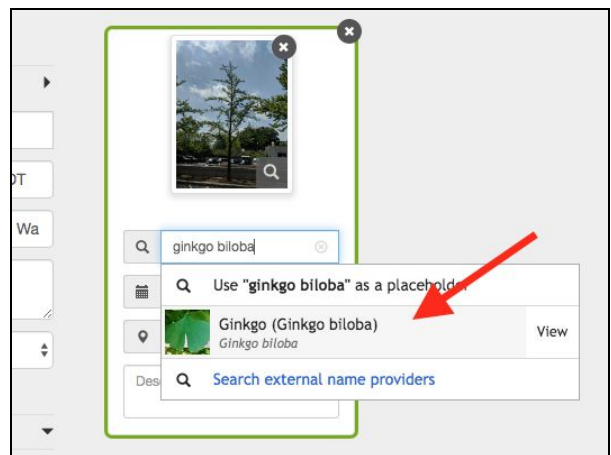
Type "ginkgo biloba" in the "Species Search" box.

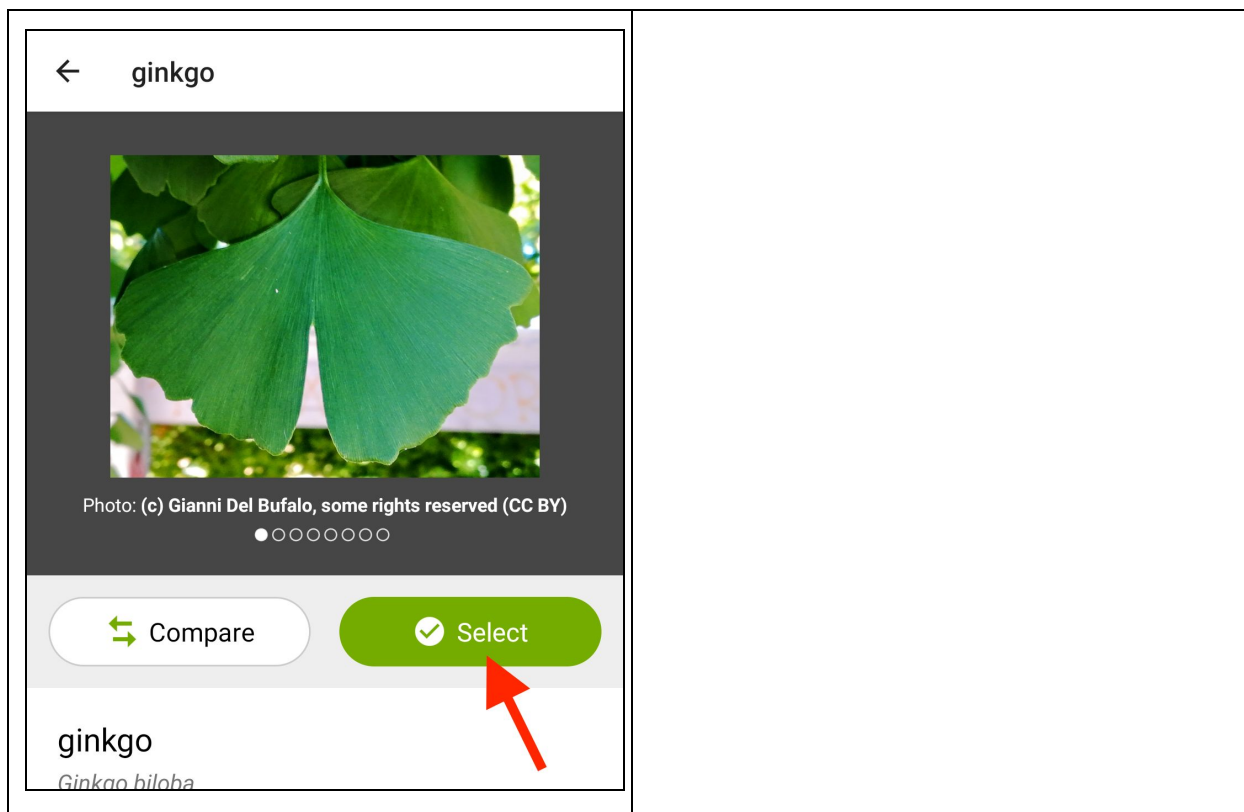


Select the "*Ginkgo biloba*" entry, which features a photo of a ginkgo leaf, from the search results.



Press the green "Select" button on the ginkgo details page to confirm your identification.

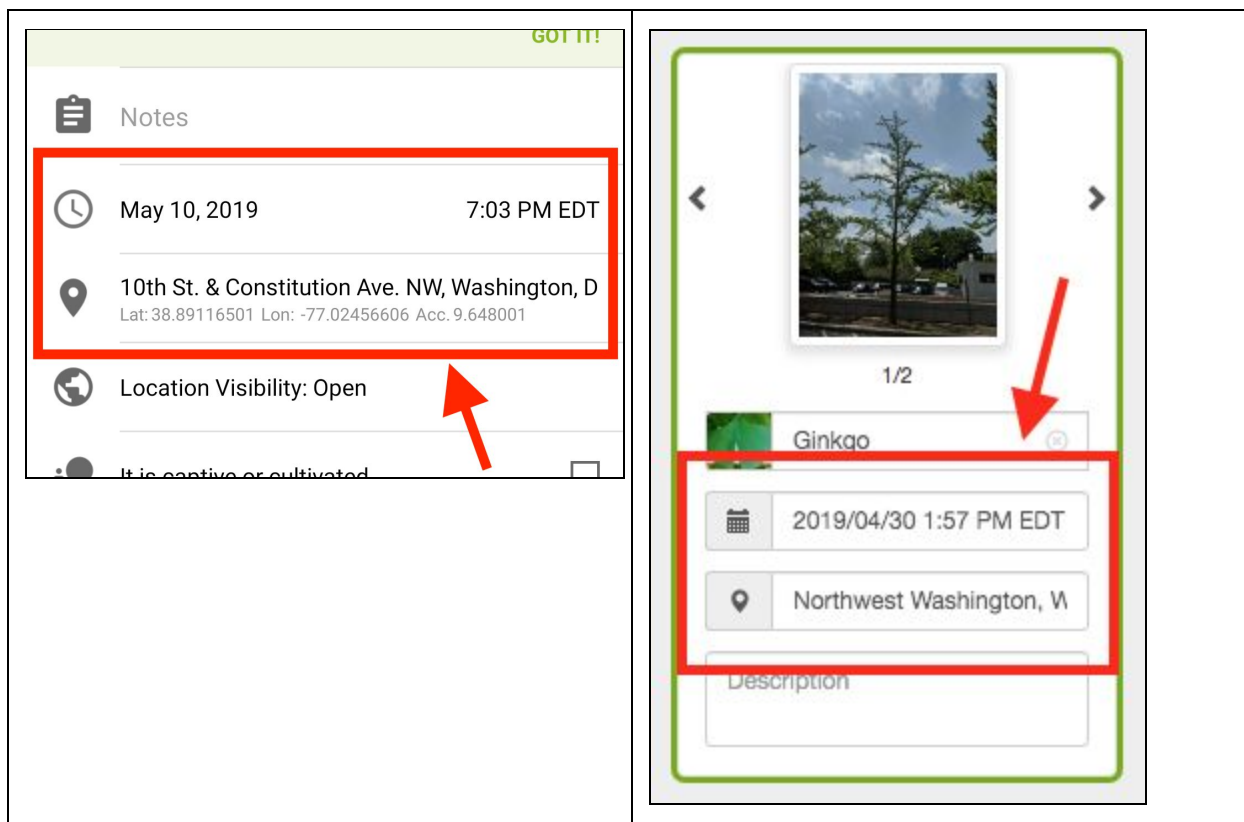




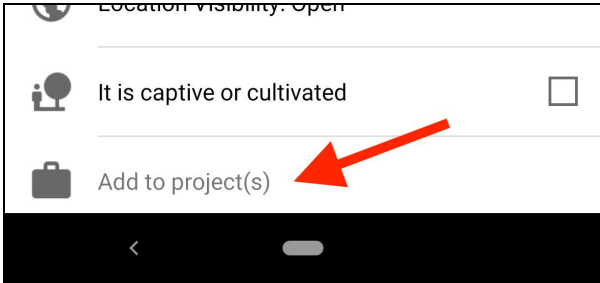

E. Check the date, time, and location fields are correct.

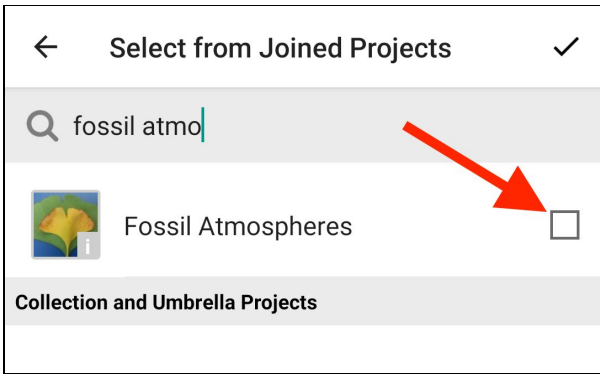
- Location is the location of tree.

Mobile App	Website
The date, time, and location fields will self-populate based on your current time and location or metadata associated with the uploaded photo. You can manually update any field by pressing it.	The date, time, and location fields under your uploaded photo will self-populate based on metadata associated with the uploaded photo. You can manually update any field by clicking it.




F. Add your observation to the Fossil Atmospheres project.

Mobile App	Website
<p>At the bottom of the screen, press "Add to project(s)".</p>  <p>Check the box next to "Fossil Atmospheres".</p>	<p>To add your observation to the Fossil Atmospheres project, you must first submit it to iNaturalist using the green button in the upper right-hand corner of the page.</p>  <p>You will then be taken to a page listing all of your submitted observations. View your new observation's detailed page by clicking on its photo or species name.</p>




If you do not see Fossil Atmospheres, scroll to the beginning of these instructions to find out how to join our project.

After checking the box, several project-specific fields will appear.



Add your observation to the Fossil Atmospheres project by searching for "fossil atmospheres" in the Projects section below the map of your observation location and select the matching result.



If you do not see Fossil Atmospheres, scroll to the beginning of these instructions to find out how to join our project.

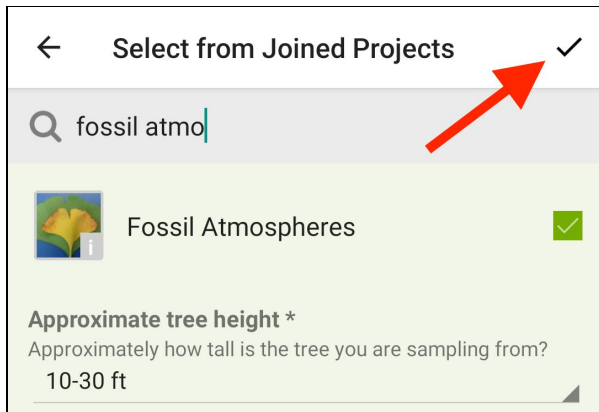
After selecting the matching result, pop-up box will appear containing several project-specific fields.

G. Fill in the project-specific fields.

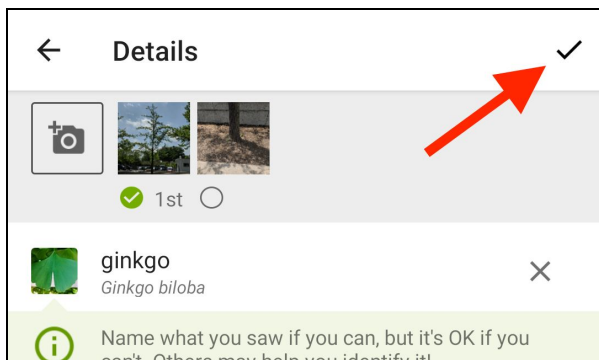
- When you add your observation to the Fossil Atmospheres project, iNaturalist will ask for some additional information:
 - Approximate height of the tree: 10-30 ft or 30+ ft
 - Sex of the tree: male or female
 - For information on how to identify the sex of the tree, see step two above
 - Confirmation that two photos have been uploaded: no or yes
 - Which side of the tree you collected from (optional): unknown, north, east, south, or west

Mobile App	Website
After checking the fields are accurately filled in, select the check mark in the upper	After checking the fields are accurately filled in, you must confirm each required field

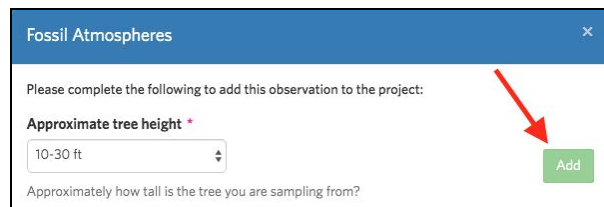
right-hand corner to confirm your answers.



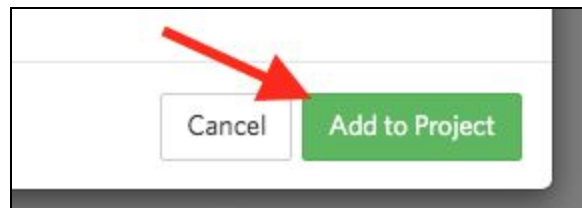
Finally, submit the observation using the checkmark on the observation details page.



individually using the "Add" buttons on the right before you are able to join the project.



Once all required fields are confirmed, press the green "Add to Project" at the bottom of the pop up box.



H. Success! You've just submitted original data to Fossil Atmospheres, now send us your sample!

- You can always access and make changes to observations you've submitted by visiting the "My Observations" view in the app, found by selecting your username in the left-hand menu (≡), or by viewing your list of observations on [iNaturalist.org](https://www.inaturalist.org).

4. Pack and send your leaves

Items you will need

- Ginkgo leaves, intact and collected within the past 24 hours
- Newspaper
- Tape
- Envelope for shipping
- At least 2 pieces of cardboard of similar size, a little smaller than the size of the envelope

Instructions

Making the Ginkgo sandwich

- A. If you are sending more than one set of leaves in the same shipment - for example, if you collected from multiple trees or were part of a group that made multiple collections, each collection must be in its own sandwich so please repeat steps 4B through 4F for each set of six+ leaves, then put all the sandwiches in the same envelope.
- B. Make sure the set of six+ leaves has its own unique observation submitted to iNaturalist.
- C. Sandwich the six+ collected leaves between two or more sheets of newspaper. Leaves should lie completely flat. No bent or overlapping leaves please.
- D. Place two sheets of rigid cardboard around the newspaper layers. In the end, your cardboard sandwich should look something like this:



- E. Wrap tape around all four edges of the cardboard ginkgo sandwich tightly so that no items within it move during shipping.



- F. Write clearly in marker or pen your (1) **iNaturalist username** as well as the (2) **date** and (3) **time of the observation** you submitted in iNaturalist on the outside of the ginkgo sandwich. We need to be able to link the leaves we receive to the data you submitted!
- G. Put all the cardboard sandwiches in an envelope or package, and **before the end of August** mail it to:
- Fossil Atmospheres
Smithsonian NMNH - Dept. of Paleobiology
10th and Constitution Ave NW
Washington, DC 20560

Congratulations! Thank you for partnering with us and contributing to ongoing scientific research.

If you or your organization would like shipping material or pre-paid postage labels please send an email request to
NMNH-Fossil-Atmospheres@si.edu