GETTING STARTED

To get started with Caterpillars Count!, download the app from either the Google Play or Apple App Store and open it. If you have not already created an account through the website, you can tap the "Create new account" button. You'll then need to confirm a registration email sent to that account. Once you've registered, log in with your username and password. From that point on, you can open the app and get started without having to enter your user information.
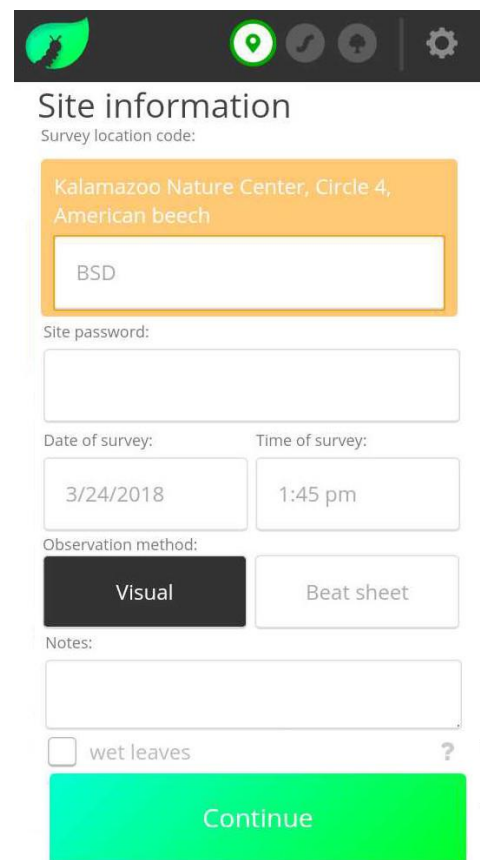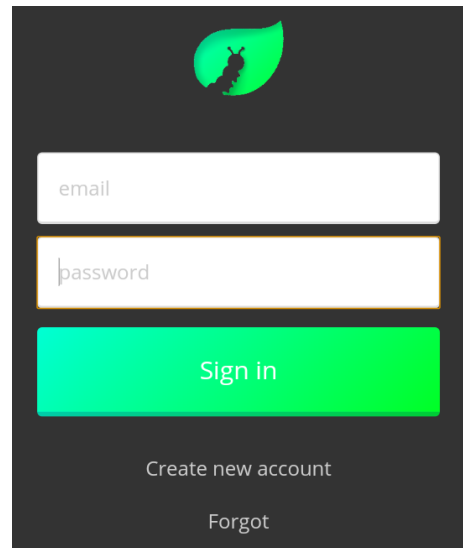
Site information

SURVEY CODE AND PASSWORD. To conduct a survey, you first need to enter the unique 3-letter code specifying the survey branch you are at. Confirm that the site name, circle, and tree species is correct. The first time at a new site, you will need to enter the site password which should have been provided to you by the local site coordinator. You only need to enter the password one time for a site and from then on the app will remember that you have permissions.

DATE AND TIME. Date and Time will autofill with the current time and date, and unless you are entering data that was collected on some other occasion, you will not need to adjust them.

SURVEY TYPE. Specify whether you will conduct a **Visual Survey** (in which you inspect a set of 50 leaves and associated petioles and twigs), or a **Beat Sheet Survey** (which requires that you beat a branch over a "beat sheet" [assembly instructions available on the website]).

NOTES. This is a space to enter notes about potentially relevant observations that might apply to the entire survey as a whole. For example, perhaps the branch was bent or disturbed since the last time it was surveyed, or there was an unusual weather event.

WET LEAVES. Tick this box if the foliage you are surveying is wet from dew or recent rain, which might impact arthropod activity.
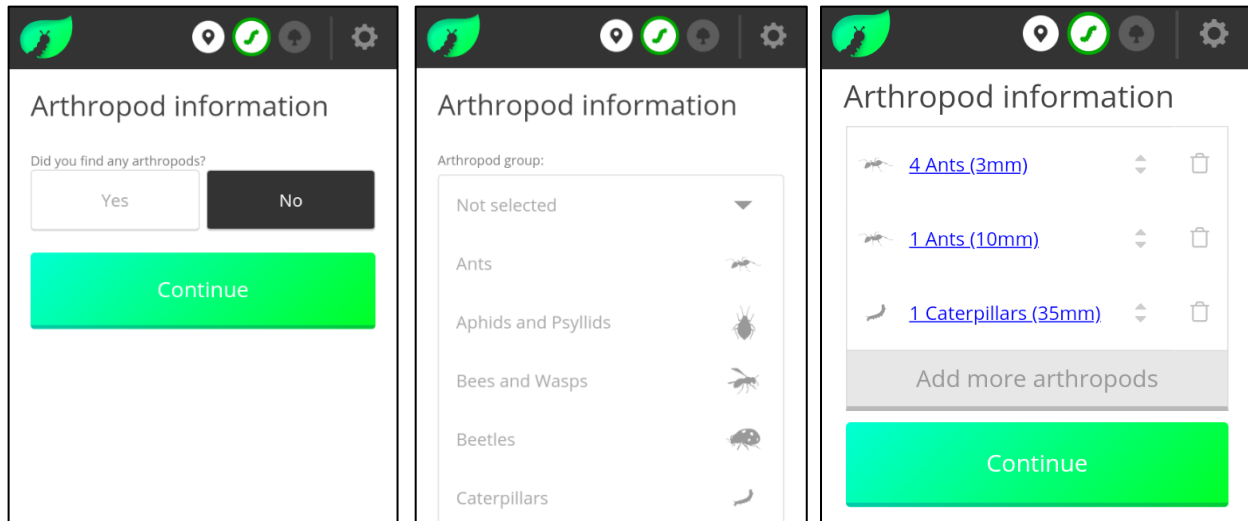
Arthropod information

Specify whether you observed any arthropods during your survey, and then tap **Continue**.

If you selected **Yes**, then you can now select the arthropod you observed from the dropdown menu. If the arthropod type is not listed and you know what it is, you may select "**Other**" and describe/name it in the Arthropod Notes field. If you are not sure what type of arthropod you observed, you may select "**Unidentified,**" and describe any relevant aspects of its appearance in the Notes. Also record the length of the arthropod(s) you observed in millimeters, and the number of arthropods observed of this type and size. You may optionally take a photo of the arthropod. Click **Save** to add this observation record to your survey, and you will see a record of this observation displayed in the **Arthropod information** section. For every new arthropod you see within this survey, fill out a new record by tapping **Add more arthropods**.
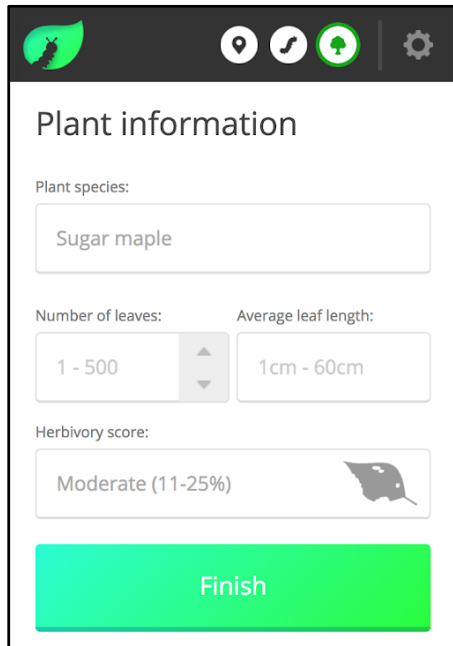
Note that if you conducted a survey and saw 5 ants, four of which were 3 mm and one of which was 10 mm, and 1 caterpillar of 35 mm, that would require 3 separate records to fill out: 1 for the ants of size 3 mm, 1 for the ant of size 10 mm, and 1 for the caterpillar.

You can optionally take a **photo** of any arthropod you observe. **We highly encourage taking photos of caterpillars!**

Any photos you take with the app will get submitted automatically to the project's iNaturalist account under a Creative Commons CC0 (no rights reserved, public domain) license. To find the observations only submitted by you, paste in this URL www.inaturalist.org/observations/caterpillarscount/?field: user=<username> but replace "<username>" with your own Caterpillars Count! username (the first part of the email address you used to register with our project).
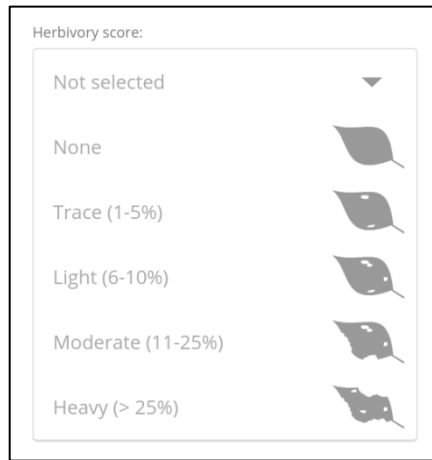
Plant information

PLANT SPECIES. Plant species names should autofill assuming your site coordinator has entered them in the database. (Site coordinators do this by clicking **Manage My Sites** and then **Edit Survey Plants**.) If not, you can manually fill in this field.

Amount of Branch Surveyed. Depending on whether the branch is *broad-leaved* or *coniferous*, you will characterize the amount of branch surveyed differently.

For broad-leaved branches you will be asked for:

LEAF COUNT. If you conduct a Visual Survey, this count will be 50 and cannot be edited. If you conduct a Beat Sheet Survey, please estimate the number of leaves that were hanging directly over the beat sheet when you beat the branch. Note that for plants with compound leaves like hickories and ashes, a survey "leaf" refers to an individual leaflet.

AVERAGE LEAF LENGTH. Record the length of an average leaf from your survey branch from the tip to the base (not counting the petiole/stem) in centimeters (2 inches = 5 cm, 4 inches = 10 cm, 6 inches = 15 cm).

For coniferous branches you will be asked for:

AVERAGE NEEDLE LENGTH. Record the length of an average needle from your survey branch in centimeters.

LINEAR BRANCH LENGTH. Linear branch length sampled is the sum of the lengths of all of the branchs and twigs examined. For a visual survey, we suggest examining between 100-300 cm of branch and twigs, including all of the component needles. Whichever total length works well for you, we ask you to be consistent and use it for all of your visual surveys on conifers, if possible.

For a beat sheet survey, after beating the branch and entering your arthropod observations, you will estimate the sum of the linear branch length sampled as in the animated figure below. Read more about surveying conifers [here](#).

Beat sheet: ~50 cm

Linear branch length sampled:
50 +
(30 x 4) +
(20 x 5) +
(10 x 8)
= 350 cm
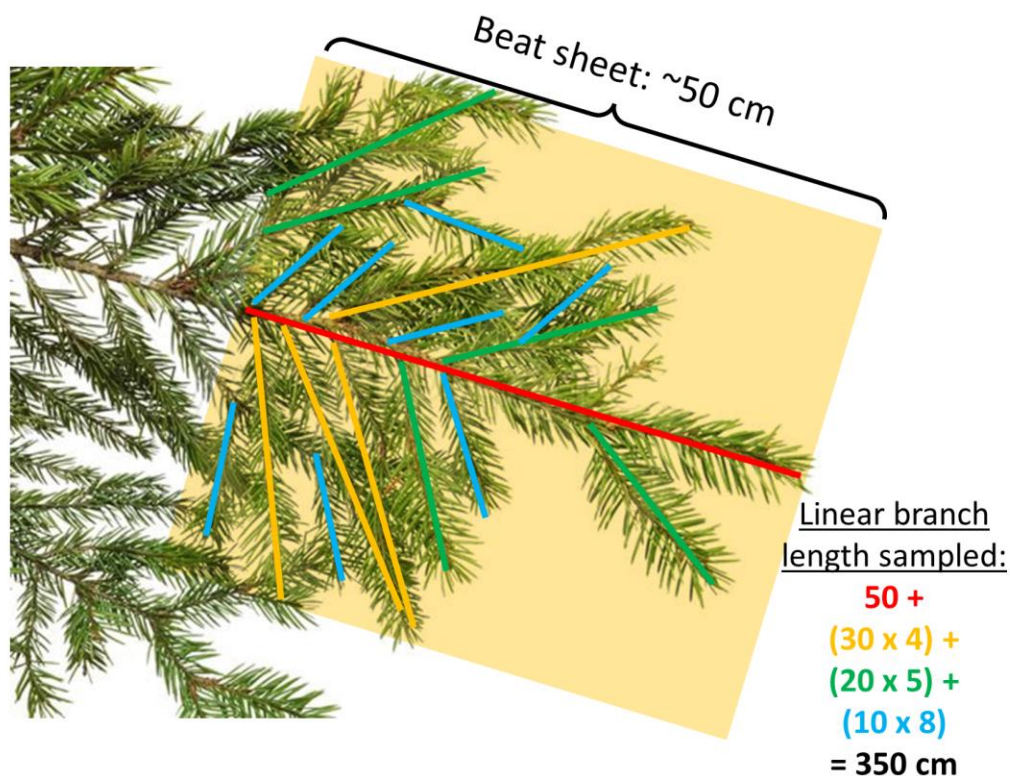
HERBIVORY. Give your survey branch an herbivory score based on how much leaf damage there is on average over the leaves you examined. Herbivory scores are as follows: 0 - none, 1 - trace (<5%), 2 - light (5-10%), 3 - moderate (10-25%), 4 - heavy (>25%). If you summed all of the observed leaf holes together over a 50-leaf survey and were able to cover 5 average leaves, that would be 10%. If leaf holes collectively sum to about 2 average leaves worth, that would be 4%, etc.

Once you've recorded all arthropods observed, and the plant information for the tree you surveyed, tap FINISH and move on to the next survey!

Settings

Tapping the gear icon at the top right gives you the following options: **Create New Site**, **Manage My Sites**, **Change Password**, and **Sign Out**.

CREATE NEW SITE. To create a new site, enter the site name and a brief description of the site. Use the map to zoom in and specify the precise location of your site. Enter the number of surveys that you will set up at your site, a number which must be a multiple of 5 and no fewer than 10. Finally, decide on a site password that you will share with participants to permit them to submit data for your site.

MANAGE MY SITES. If you are a site manager, you can click **Edit Site** to modify any of the basic site information including changing the site password.

Edit Survey Plants allows you to enter the plant species names for each of your survey locations, and to see the unique survey codes for each survey.

The **Print Tags** feature will email you a link to a webpage with the complete set of survey location codes/tags for printing, laminating (e.g. folding within a piece of packing tape), and hanging from survey branches.

CHANGE PASSWORD. Allows you to change your personal Caterpillars Count! account password (not a site password; see **Edit Site** above).

SIGN OUT. Signs you out of the app.
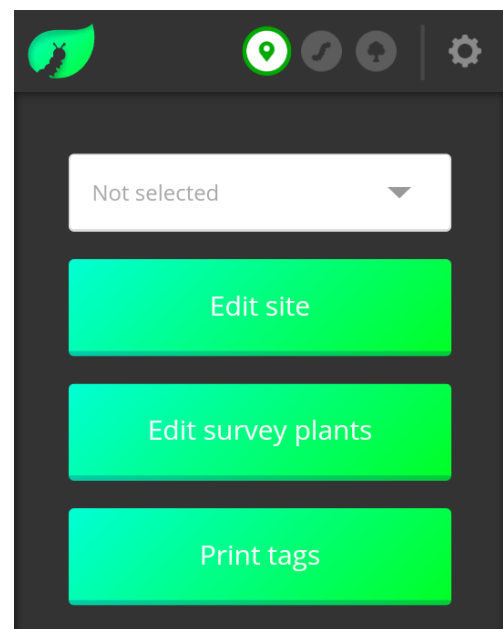
CONDUCTING A SURVEY <u>WITHOUT</u> CELL SERVICE

Even if you have no cell service at your site, you can still use the app to conduct surveys. There are three differences to be aware of when using the app without cell service.

- First, you will not be able to log in to the mobile app in the field, so **be sure to log in while you have an internet connection at home** or in the office beforehand.

- Second, the app will not be able to automatically check whether you have previously entered the appropriate Site Password before (whereas with internet, it would remember if you had, and wouldn't bother asking for the Site Password again). **You wil have to enter the Site Password for the first survey** of the day, but for each subsequent survey you should be able to check the box labeled "*Same as last submission*". (You might need to uncheck and recheck this box if the password is not being filled.)

- Third, once you hit '*Finish*, the surveys will be stored locally on your device. As long as you leave the app open, **the surveys will get submitted automatically the next time you get a cell or wifi signal**. If you have closed the app, the surveys will get submitted the next time you open the app with an internet connection.