

Greater Fringed Gentian Leaf Collection

SHEET 1 OF 3
How to collect

Range-wide genetics project · *Gentianopsis crinita* · Agrawal & Benning labs, Cornell University · Fall 2026

Please take all three sheets into the field. Sheets 1 and 2 tell you what to do; Sheet 3 is the data sheet, and it comes back to us inside the gallon bag.

THE SHORT VERSION

- **Three leaves from each of 25 plants**, spread across the patch. If there are fewer than 25 plants, please still sample the population.
- **One plant's leaves per small bag.** The numbered small bags hold drying beads, to preserve DNA.
- **Press the air out and seal each bag** before moving on, then drop it in the gallon bag.
- **Fill in the data sheet** — after collecting samples. Fill out on paper (Sheet 3) or on your phone (QR code to the right).
- **Mail it all back** (samples + data sheet) in the same box it came in, using the prepaid label.

Please keep disturbance to the plants and the site to a minimum.

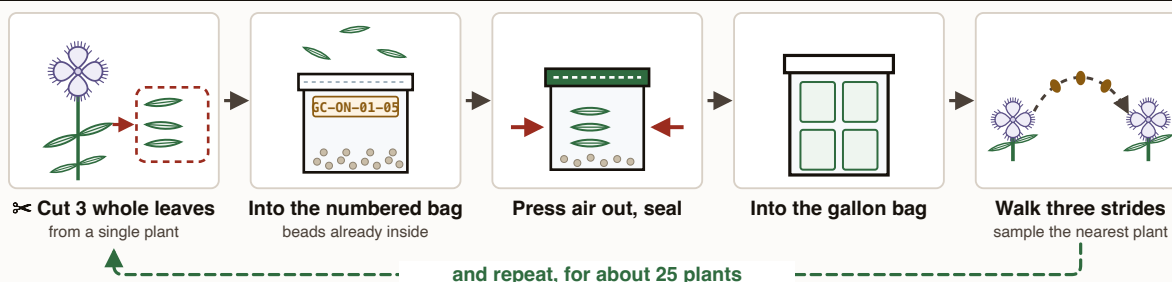
LOG YOUR COLLECTION



fringedgentian.org/collect

Fill out your data sheet online here.
(You can use the paper data sheet on Sheet 3 instead.) Photos come to us by email — see below.

The method



Turn this sheet over before you start walking. The back has the spacing rule and the plume moth damage to watch for as you go. Sheet 2 covers your kit, sending the box back, and what to do if something doesn't go as planned.

At the site

- 1 **Drop a “pin”** at the middle of the patch, on Google or Apple Maps. A geotagged photo works too.
- 2 **Take (at least) three photos:** a flower close-up, a whole plant, and a wide photo of the site. Email them to jbenning@cornell.edu with your population code. (Don't worry about sending us too many photos!)
- 3 **Walk the extent of the patch** before you cut anything, and estimate how many plants are there: under 10, 10–50, 50–200, 200–1000, or 1000+ individuals — a best-guess number is welcome too. Only count bolted plants, not rosettes.
- 4 **Collect from 25 plants.**
 - **Cut three leaves per plant, green and healthy ones, using the provided scissors.** Sample **bolted plants only** — ones that have sent up an upright stem (more bolting info on the back of this sheet).
 - **Spacing:** after each plant, take three strides and sample the nearest plant you see — which may be a good deal further away than three strides, and that is fine. Where population or site size won't allow that, try to keep at least 1 m (3 ft) between sampled plants when possible.
 - Wet leaves are fine, just pat them dry first (there is a napkin in your kit).
- 5 **Note the maximum distance between two of your samples** — this helps us estimate the sampling extent; a rough estimate is fine.
- 6 **One kit is one patch.** If you find gentians in separate spots more than ~200 m apart, sample the largest patch only and tell us about the others on the data sheet.
- 7 **Note what you saw** on the data sheet (Sheet 3) or online, and seal the gallon bag before you leave.

Questions at any point: Ella Mancino · emm359@cornell.edu · call or text 513-734-6928 · John Benning · jbenning@cornell.edu · call or text 252-915-8786. If anything is unclear, get in touch before you collect.

By post: John Benning, E145 Corson Hall, 215 Tower Road, Cornell University, Ithaca, NY 14853, USA.

SHEET 1 · FRONT

Getting the sampling right

✓ BOLTED PLANTS ONLY

A **bolted** plant has sent up an upright stem. First-year plants are small rosettes only a couple of centimeters across and very short — leave those alone.

A bolted plant can be sampled even if it's finished flowering, or if something has eaten the top of it.

! CAUTION

One plant per bag — never two. If you run short, use a spare bag with a scoop of the spare beads.

Press and seal each bag before the next plant. Leaves in an open bag dry slowly, and slow drying reduces DNA quality.



✗ **Don't sample from a single cluster**

Neighboring plants are often close relatives.



✓ **Space out your sampling**

Take three strides, then the nearest plant.

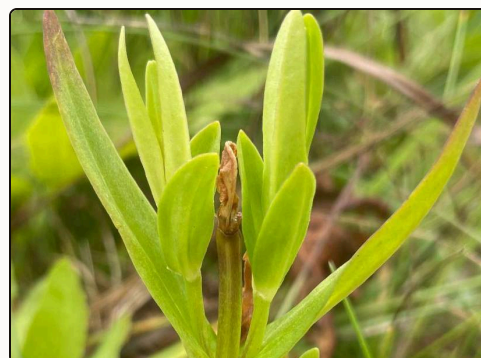
One thing to watch for: plume moth larval damage



The caterpillar — under 1 cm



Feeding near the plant tip, with dark frass



A killed tip, brown and dry

The caterpillar of a plume moth (*Stenoptilia coloradensis*) feeds on fringed gentian across much of its range — you will see the damage and maybe the caterpillar, but probably not the moth. Knowing how common it is at a site helps us understand this herbivore's ecology and its impact on gentian populations.

TWO THINGS TO LOOK FOR

A wilted or browned tip. Peel the top leaves back — a small caterpillar (0.4–0.8 cm, white, pale yellow or dark green) is often inside, eating the growing point, and it may bore into the stem. The damage spreads downward from there.

A tip that is already gone. Top leaves absent, the stem above brown and dead, new side shoots pushing out below.

Other types of herbivory. Deer damage is clean and takes whole mature leaves; slug/snail herbivory usually looks more like sections of leaves are removed cleanly. Plume moth damage is messy, with old dead leaves still hanging on the stem. A hand lens helps to differentiate, but isn't necessary. We are interested in knowing about all types of herbivory, and appreciate photos!

As you walk the patch, note roughly what fraction of plants have been damaged: none, under 10%, 10–50%, over half. Photos of the damage, and the caterpillar if possible, are great to have.

Your kit, and sending it back

Greater Fringed Gentian Leaf Collection · this sheet is printed on one side only

SHEET 2 OF 3

Kit & return

What's in your kit

If something is missing, email us and we'll send it.

- **25 labeled small bags**, with drying beads (silica gel) already inside
- **Spare bags and a bag of spare beads**
- **One gallon bag**, labeled with your population code
- **These three sheets** — Sheet 3 is the data sheet
- **A pencil, scissors, and a napkin** to dry wet leaves
- **A prepaid, pre-addressed label** for the return shipment

Sampling more than one population? Each has its own gallon bag and numbered set. Please fill in a data sheet for each.

Sending it back

- 1 Mail the sealed gallon bag in the same box your kit arrived in, using the prepaid label** — small bags with leaves and beads, and the data sheet, all still inside. Several populations can travel in one box, each gallon bag sealed and separate.
- 2 The return label is inside the box.** Postage is already paid, so there is nothing to buy and nothing to weigh.
- 3 Stick the return label over the old label.** It is big enough to fold over the loose edge and hold the box shut, which is how it reached you. If it won't cover the old label, draw a few heavy lines through the old barcode with a marker — if that barcode can still be read, the box may come back to you instead of reaching us.
- 4 Email or text us when it's on the way**, so we can watch for it.

If things don't go as planned

Don't worry — it will not ruin a sample. Just tell us what happened.

WHAT HAPPENED	WHAT TO DO
Only a handful of plants at the site	Sample all of them — even five is worth having. Send the unused bags back.
The plant is very small, and I'm worried taking three leaves would be quite harmful	Leave it be, or only take one or two leaves. Fewer than 25 plants is OK, and so is none at all — the population comes first!
Couldn't find the population at all	Tell us. That's a real result!
Leaves are wet from rain	Pat them dry on the napkin and bag them as usual. The beads handle the rest.
Ran out of small bags	Use a spare with a scoop of spare beads, or sample fewer plants. Never put leaves from two plants in the same bag.
Spilled the drying beads	Brush back what you can, top up from the spare-bead bag, and seal it.
Not sure it's the right species	Text or email photos of the flowers and the leaves, and we'll sort it out.
Something that isn't on this list	Email, call, or text.

Thank you, so much! We'll keep you posted as the project develops, acknowledge you in what we publish, and archive the genetic data in accessible repositories. There's a fringed-gentian mug headed your way this fall.

Field data sheet

SHEET 3 OF 3

Data sheet

One sheet per population. Fill it in and seal it inside that population's gallon bag. Snap photos of the finished sheet before you seal it, just in case.

✓ OR DO THIS ONLINE INSTEAD

The online form asks **these same questions**. Use whichever you prefer; there's no need to do both. Photos come by email either way.

fringedgentian.org/collect

Population code (printed on your gallon bag, e.g. GC-ON-01) _____

Your name

Your email

Date collected (e.g. 4 Oct 2026)

Site / population name

County and state / province

GPS coordinates (middle of the patch)

Photos (a flower, a whole plant, the site, and any others)

Have seed or plants ever been added to this population?

Roughly how many bolted *G. crinita* plants (upright stem, flowering or not) **are at the site?**

↳ If you are confident giving a best-guess 'point estimate' of the number, please do

How many plants did you sample?

Estimate the maximum distance between two of your samples

Plume moth larval damage — what fraction of plants? (see photos, Sheet 1 back)

Other herbivory (deer, slugs, etc.) — what fraction of plants?

Population flowering stage

Best description of habitat

Voucher specimen collected? (This is completely optional.)

☐ I sent a map pin by text or email instead

We mask exact coordinates by default in anything we publish or archive.

☐ sent

Email them to jbenning@cornell.edu with your population code.

☐ no ☐ yes ☐ don't know

If yes or unsure, please tell us what you know under **Site / population history & management** on the other side of this sheet.

☐ under 10 ☐ 10–50 ☐ 50–200 ☐ 200–1000 ☐ 1000+

_____ ☐ m ☐ ft

This helps us estimate the sampling extent.

☐ none ☐ under 10% ☐ 10–50% ☐ over half ☐ didn't look

☐ none ☐ under 10% ☐ 10–50% ☐ over half ☐ didn't look

☐ mostly in bud ☐ peak flower ☐ mostly finished / in fruit

☐ fen ☐ wet meadow ☐ roadside

☐ other: _____

☐ no ☐ yes — herbarium: _____

Site history, management, and anything else — please use the space on the other side of this sheet.

Site / population history & management

Anything you know: mowing, grazing, burning, flooding, herbicide, past seeding or planting, how the site has changed over the years, fluctuations in population size, who manages it. Any information is useful.

Anything else about the site

Sketch the patch, describe the surroundings, list nearby populations you know of. Any information is useful.

Herbivory notes

Notes on particular samples (01, 02, etc.)

Any information about a specific plant or bag — a plant that looked different, heavy herbivore damage, a bag you had to swap, etc. Give the sample number and what happened.

What happens to your sample

We extract DNA from the dried leaves and sequence the plant's genes. Set alongside dozens of other populations, these genetic data tell us how fringed gentian populations are related across their range, how much genetic variation each one holds, and which are showing signs of deteriorating genomic health, like a growing burden of harmful mutations or high inbreeding. Very few plants of conservation concern have ever been sequenced at this resolution across their whole range. Thank you for making this exciting science possible  