

# Ponderosa Pine Seed Collection on the Colorado Front Range

Supplemental Information to *Schloegel et al. 2024*

[https://cfri.colostate.edu/wp-content/uploads/sites/22/2024/07/Schloegel\\_etal\\_PonderosaPineSeedCollectionontheCOFrontRangeAFieldGuide\\_CFR1\\_2409.pdf](https://cfri.colostate.edu/wp-content/uploads/sites/22/2024/07/Schloegel_etal_PonderosaPineSeedCollectionontheCOFrontRangeAFieldGuide_CFR1_2409.pdf)

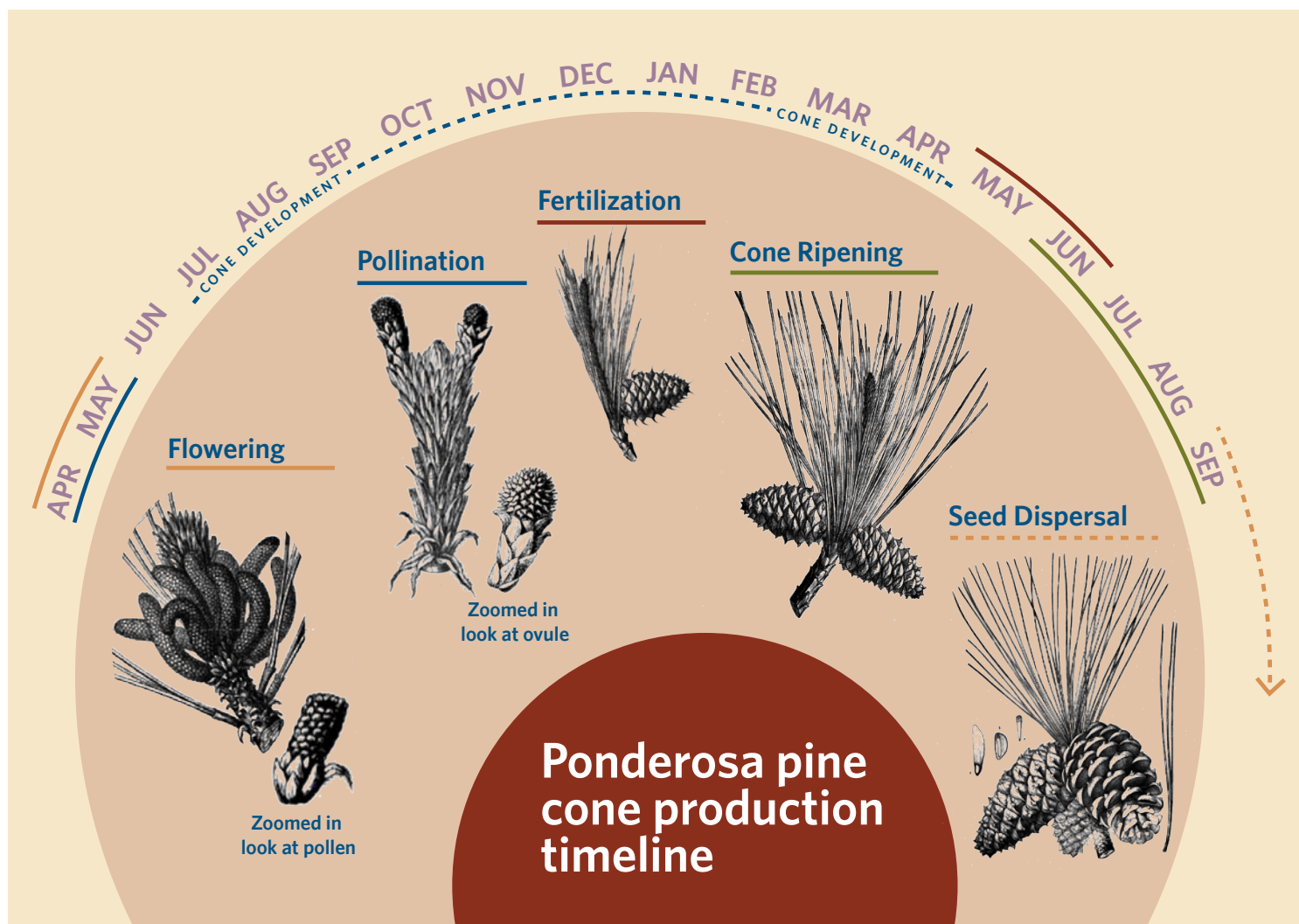


Figure 1. A timeline of ponderosa pine cone development from pollination to seed maturity. Portions of this figure are adapted from Sargent (1898). Source: A. Martinovich/The Nature Conservancy.

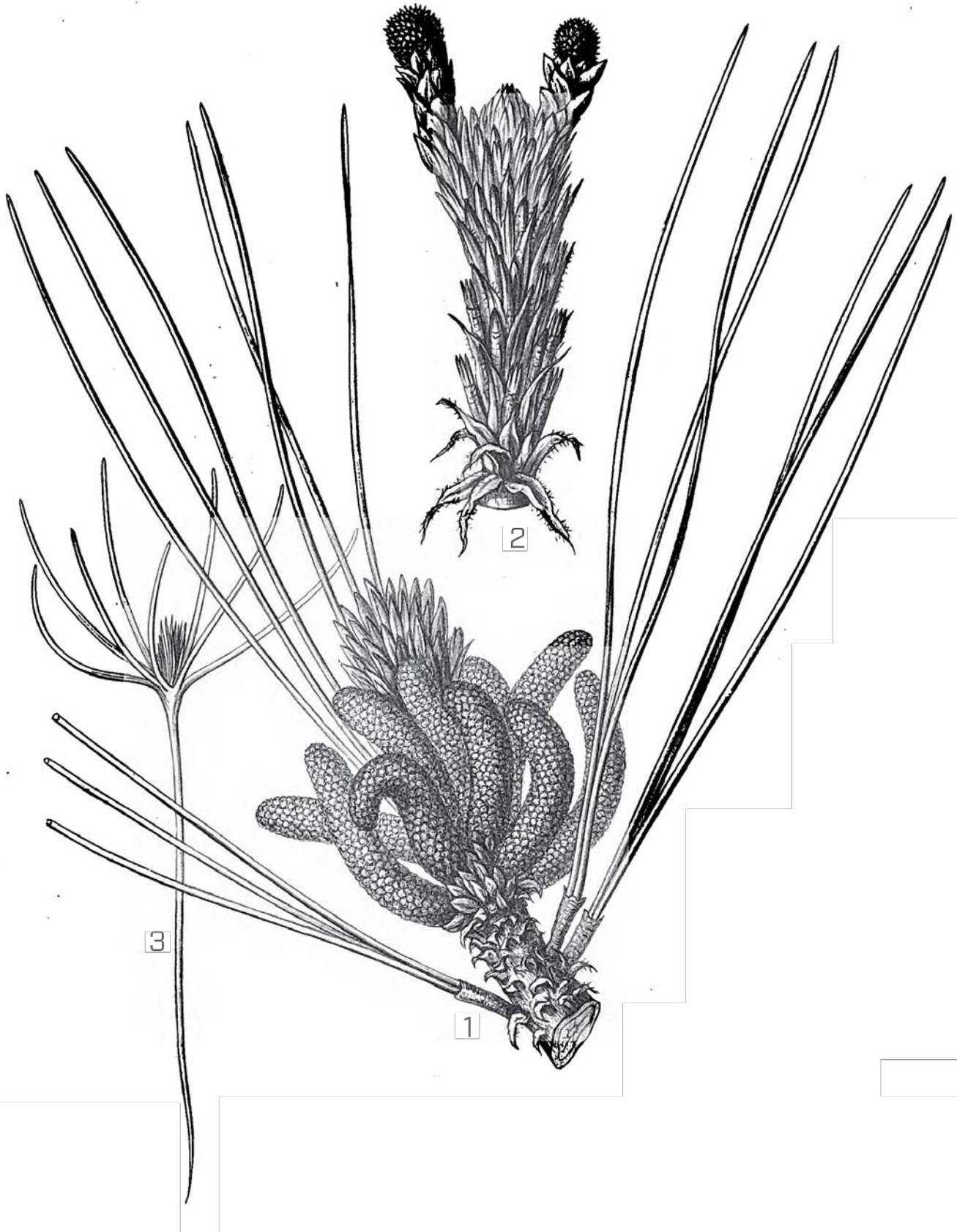


Figure 2. A drawing to scale of a male pollen sacs and a female ovule cone: 1) branch tip with male pollen sacs, 2) branch tip with female cones, and 3) a seedling plant (Sargent, 1898).

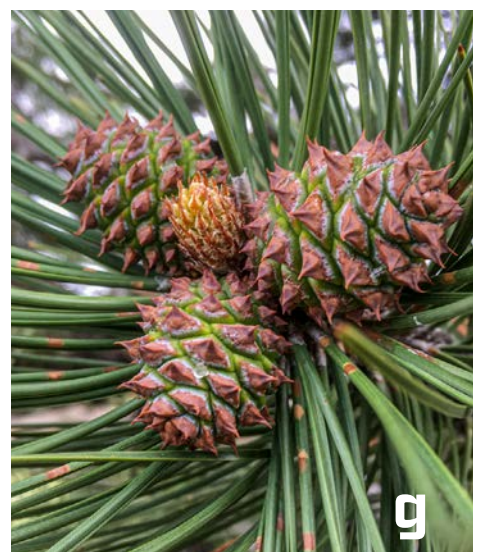


Figure 3. Photos of male pollen sacs and female ovule cone.

Male pollen cones (a-c) develop in early spring and are wind dispersed. Male pollen cones can be green to purplish as they develop (a-b) and are brown once mature (c).

Female ovule cones in year 1 in May/June (d-e), in August (f), and in year two in May (g).

Images: The Nature Conservancy, Colorado.



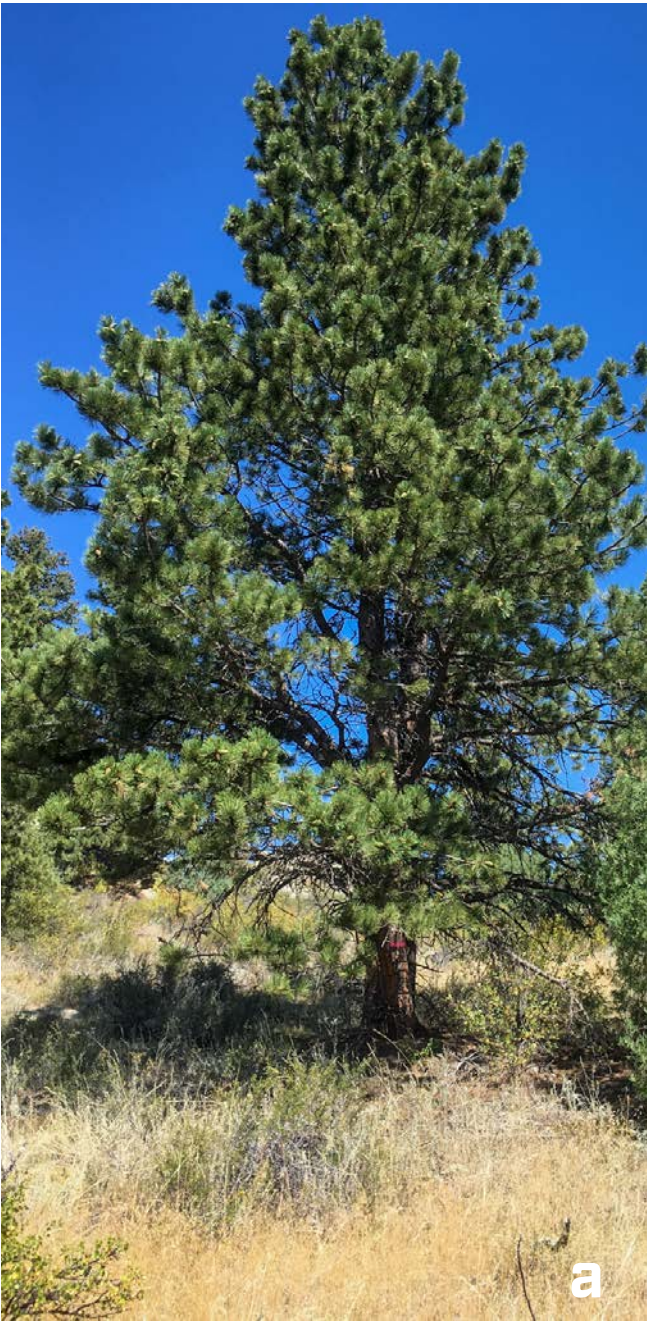


Figure 4. In a mast year (heavy), ponderosa pines will have 5-7 cones on each lateral bud (a and b), while in a non-mast year it will have 1-3 cones (c). Images: The Nature Conservancy, Colorado.

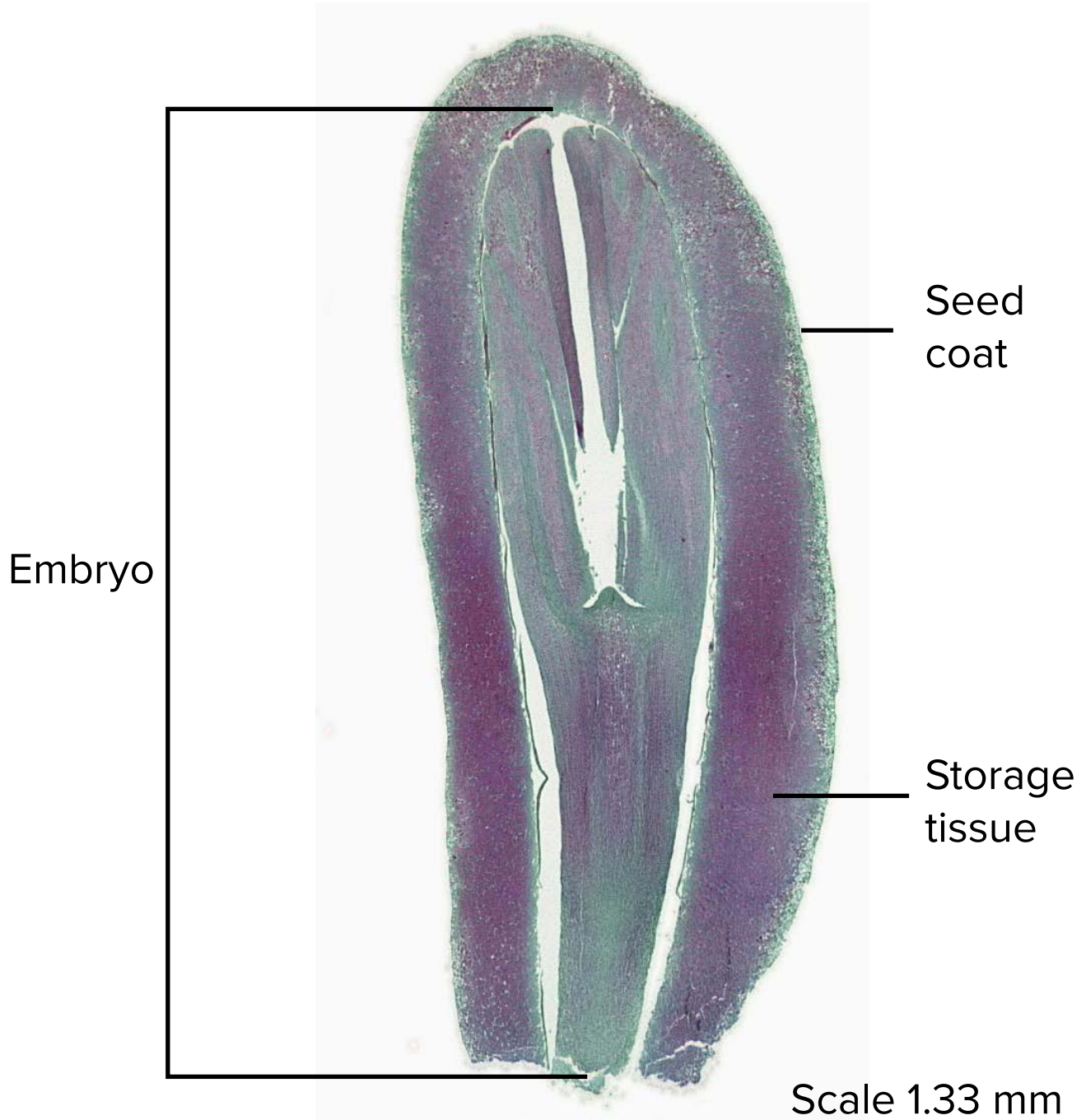


Figure 6. The seed has an embryo surrounded by tissue, the megagametophyte, which are encased inside a protective seed coat. Above, a mature pine seed with the embryo filling 90% of the cavity. Image: Jon Houseman and Matthew Ford via Wikimedia Commons (CC BY-SA <https://creativecommons.org/licenses/by-sa/4.0/deed.en>)

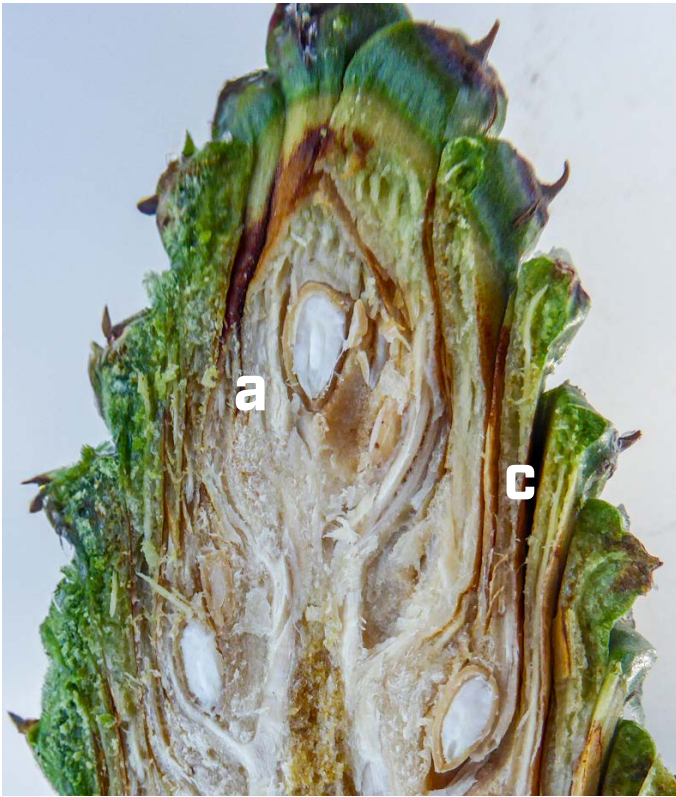


Figure 7. Immature seeds where the embryo fills 70% of the megagametophyte (a), seedwing is translucent/clear (b), and cone shows slight flexing at scale margins (c). Images: The Nature Conservancy, Colorado.

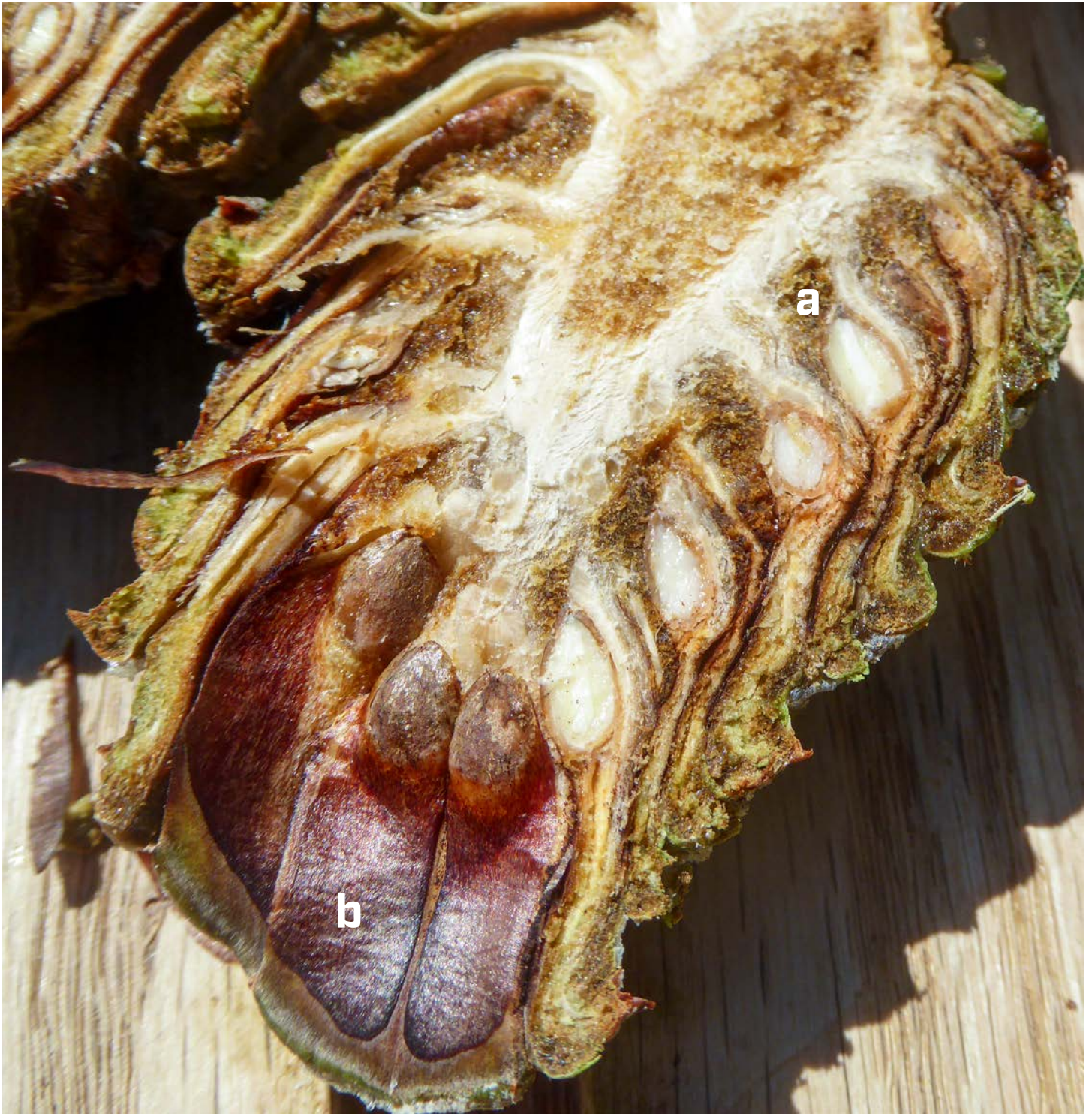


Figure 8. Cone cut showing mature seed with embryo filling 90% of cavity (a) and dark seedwing and seed coat (b). Image: The Nature Conservancy, Colorado.

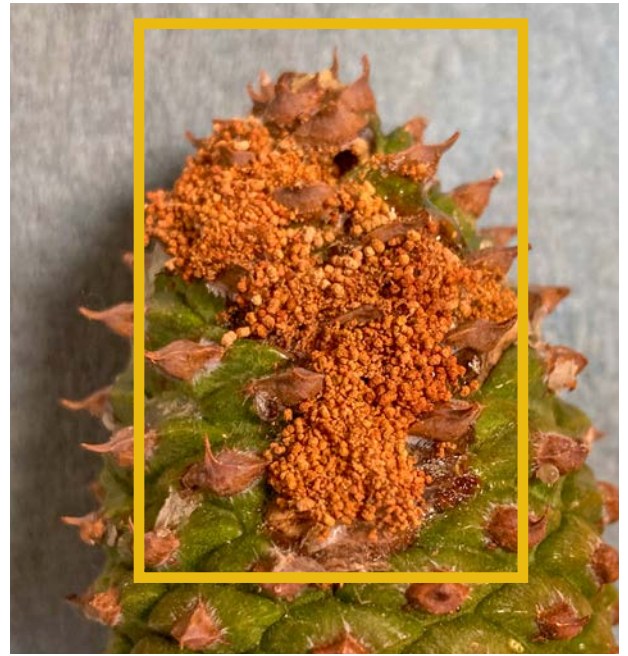


Figure 9. Examples of insect damage to cones and seeds. Images: The Nature Conservancy, Colorado.

**CONE IDENTIFICATION TAG**

Species: \_\_\_\_\_

Seed zone: \_\_\_\_\_

Elevation: \_\_\_\_\_

Location: \_\_\_\_\_

Date Collected: \_\_\_\_\_

Cone Collector and organization:

\_\_\_\_\_

\_\_\_\_\_

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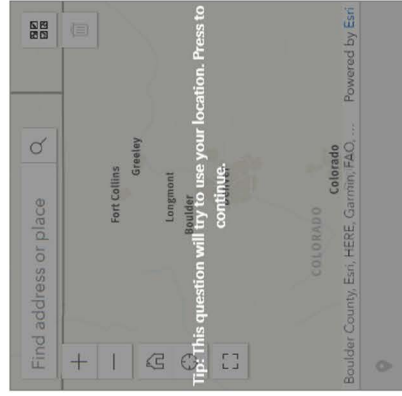
## Cone Handling Checklist

This form tracks the location and handling of conifer cones collected for use in restoration and reforestation on the Colorado Front Range.

For questions about cone maturity prior to collection, please contact Catherine Schloegel at The Nature Conservancy Colorado, phone: 303-541-0324, e-mail: c.a.schloegel@tnc.org

### Location of cone collection\*

This is a central point within the stand where cones are collected. Tap the circular compass symbol on the map to automatically select your location.



### Location name\*

Name of private property owner, city or county park or trailhead, and/or trail or road name.

### Today's date\*

MM/DD/YYYY

### Species

-Please select-

### Cone 1: Count the number of good seeds on one cut face\*

Sound seeds are milky white in appearance. Unpollinated or insect damaged seeds are missing or darkly colored.

Reset

### Seed zone

This is a 3-digit number. If you don't know it, leave it blank.

### Collected by\*

First and Last Name

### Organization Name\*

Full name of organization leading collection.

### Collection permit

Did the land manager give you a collection permit?

yes

no

### Number of bushels\*

1 bushel = 2 buckets of the 5-gallon size. Fill sacks with 1 bushel of cones, not more.

### Insect damage\*

Present

Absent

### Type of interim storage

Open on racks

Other

### Other Notes and Comments

Submit

Figure 11. An example Survey 123 checklist to record the collection location, species, and other site-specific factors. A paper survey or other digital may also be used. Image: The Nature Conservancy, Colorado.