

## **DESCRIPTIONS AND PHOTOS of pollen types, organized by family**

By Alison Fowler with help from Elisa Kola

Pollen in these photos collected directly from flowers

Collected samples from all flowering species during July and August 2020 at farms in Western MA

All photos at **40X** (one unit on the ruler = 2.5 micrometers) but some are zoomed in more than others so take note of the ruler in each.

Please contact me with questions, suggestions, or if you notice an error:

[aefowler@umass.edu](mailto:aefowler@umass.edu)

Unit conversion for Olympus Bx43

10x: 1 unit = 10um

20x: 1 unit = 5 um

**40x: 1 unit = 2.5 um**

100x: 1 unit = 1.01 um

In the process of adding descriptions and measurements to this page.

Current species count: 84

## Plant Orders

### Apiales

- [Apiaceae](#) - tiny, tic-tac shape

### Asterales

- [Asteraceae](#) - small, spiky

### Boraginales

- [Boraginaceae](#)

### Brassicales

- [Brassicaceae](#) - smooth, round, small
- [Cleomaceae](#)

### Caryophyllales

- [Amaranthaceae](#) - smooth, round, with pores (like a soccer ball)
- [Caryophyllaceae](#) - smooth, round, with pores (like a soccer ball)
- [Phytolaccaceae](#) - smooth, round, small
- [Plumbaginaceae](#) - round, bumpy texture
- [Polygonaceae](#) - smooth, round, medium

### Cornales

- [Hydrangeaceae](#)

### Cucurbitales

- [Cucurbitaceae](#) - smooth, round

### Dipsacales

- [Caprifoliaceae](#)

### Ericales

- [Balsaminaceae](#)
- [Polemoniaceae](#)

### Fabales

- [Fabaceae](#) - smooth, round

### Gentianales

- [Gentianaceae](#)
- [Rubiaceae](#) - smooth, round, medium

### Lamiales

- [Lamiaceae](#)
- [Plantaginaceae](#) - smooth, round
- [Scrophulariaceae](#) - smooth, round, small
- [Verbenaceae](#)

### Malpighiales

- [Euphorbiaceae](#) - three parts, thick & patterned exine

### Malvales

- [Malvaceae](#) - huge, spiky

Myrales

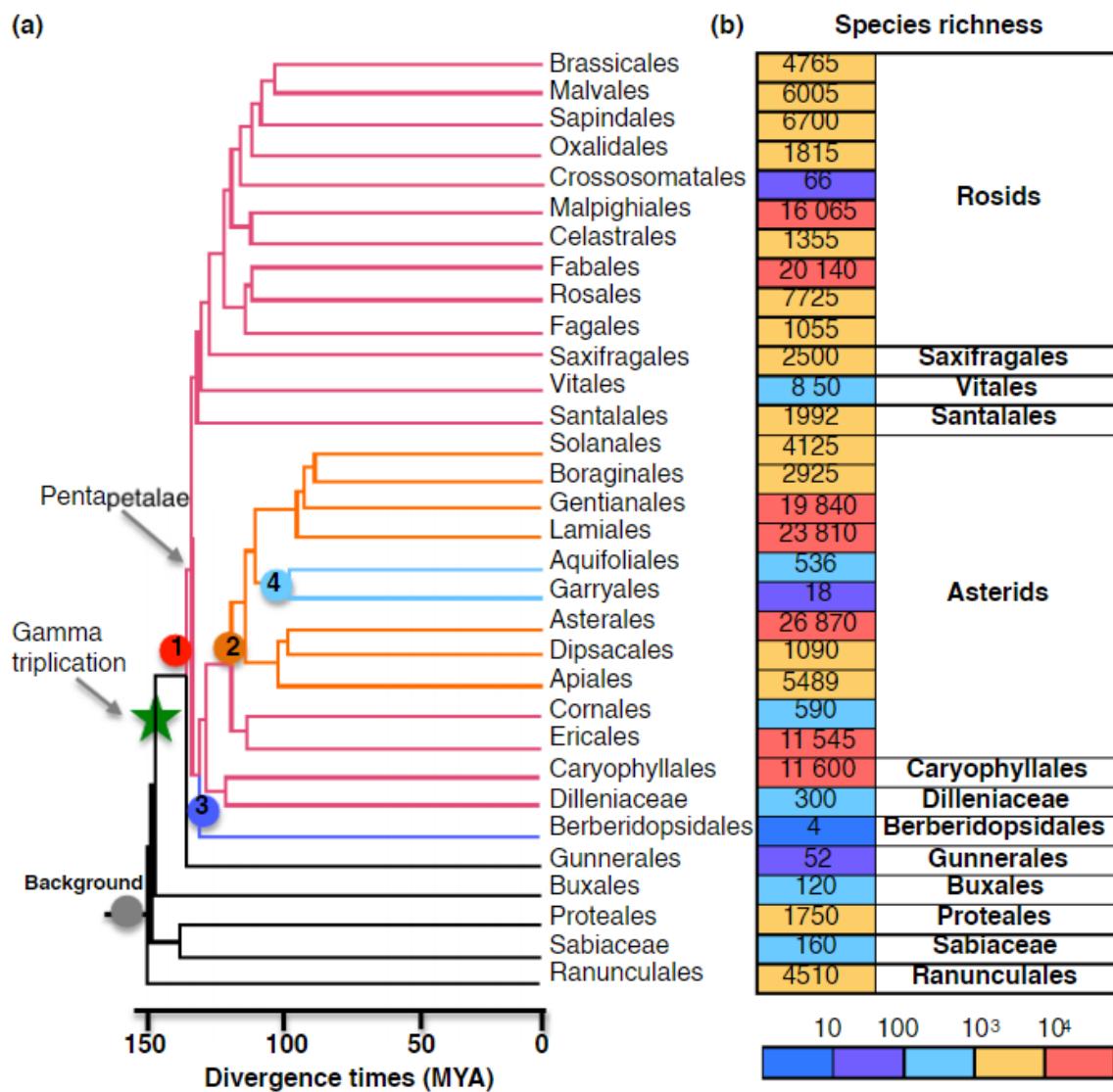
- [Lythraceae](#) - smooth, round, medium sized
- [Onagraceae](#) - big, triangular

Ranunculales

- [Papaveraceae](#)

Solanales

- [Convolvulaceae](#) - huge, spiky
- [Solanaceae](#) - small, round, smooth, often wrinkled and flattened

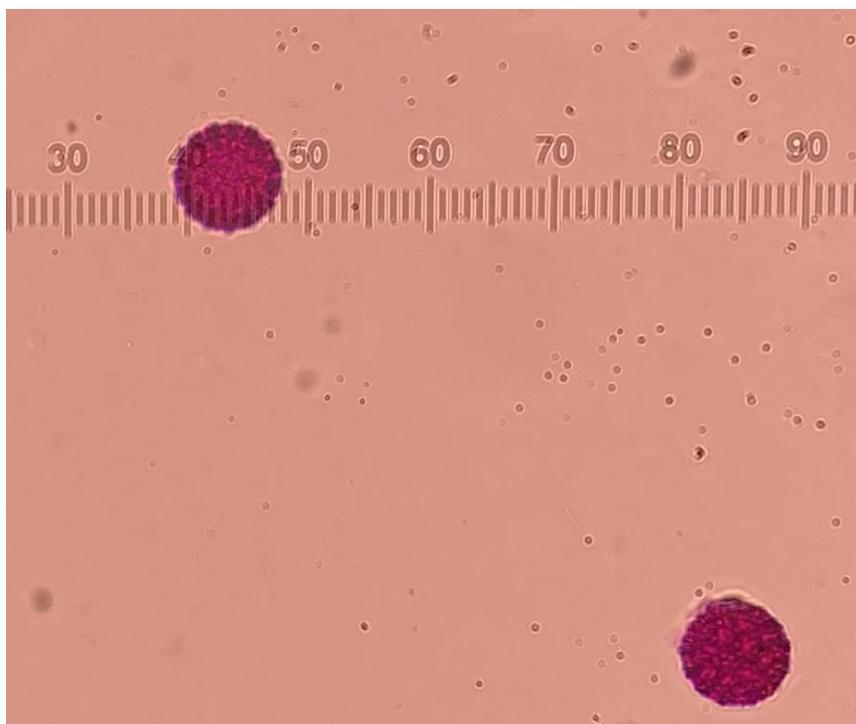


**Fig. 7** Diversity tree for analyses of lineage diversification in eudicots. (a) The time tree was collapsed to 32 representative stem lineages and colored according to estimated diversification rate shifts. Clades with unusual diversification rates are denoted with numbers that indicate the order in which rate shifts were added by the stepwise Akaike information criterion (AIC) procedure. (b) Estimated extant species numbers of each order colored by species numbers. (c)

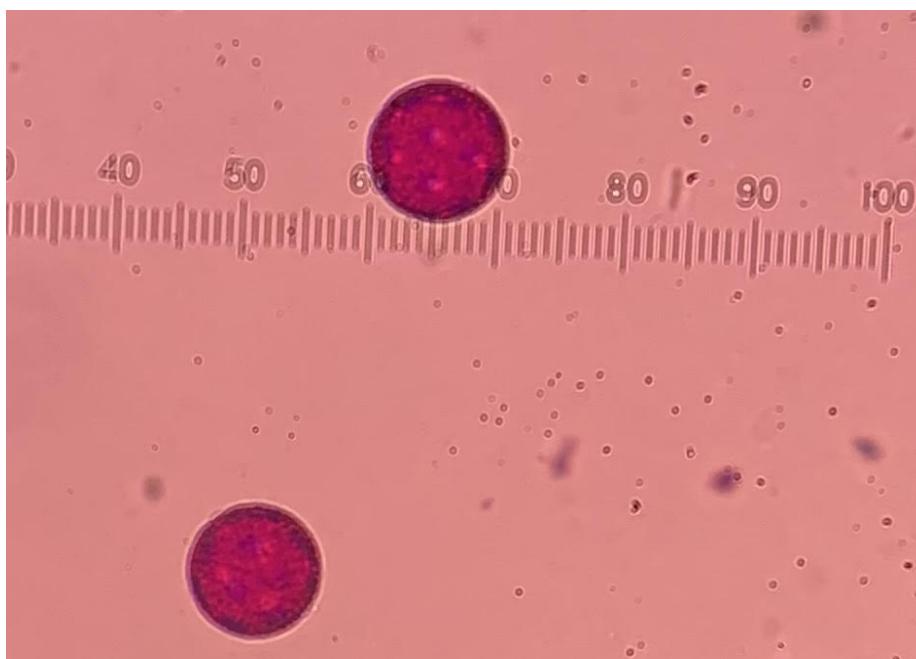
## Amaranthaceae family

Pendant amaranth (*Amaranthus caudatus*)

Global amaranth (*Gomphrena globosa*)



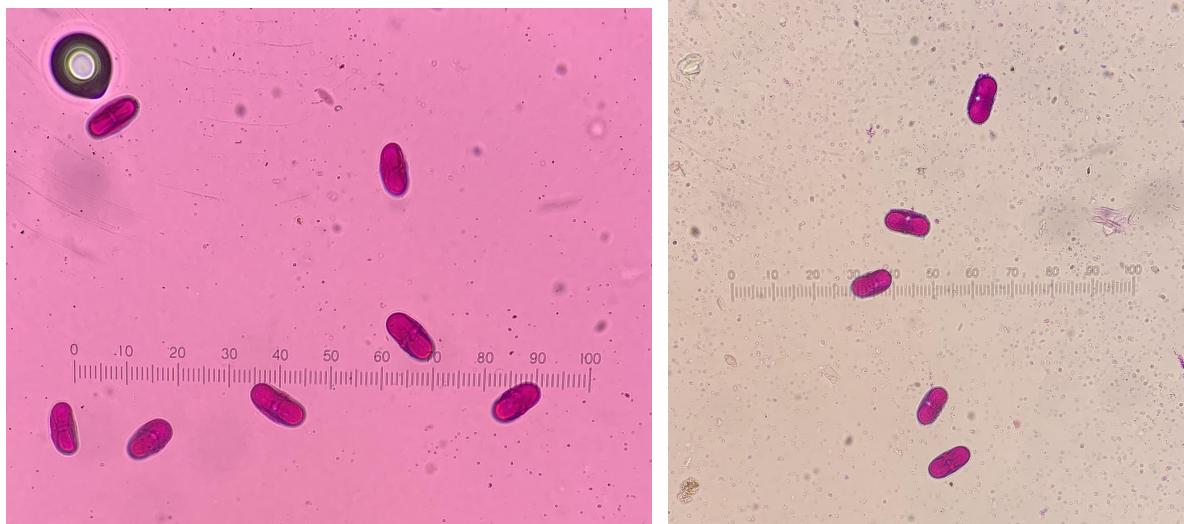
Cock's comb (*Celosia argentea*)



## Apiaceae family

**Shepherd's Needle (*Scandix pecten-veneris*)**

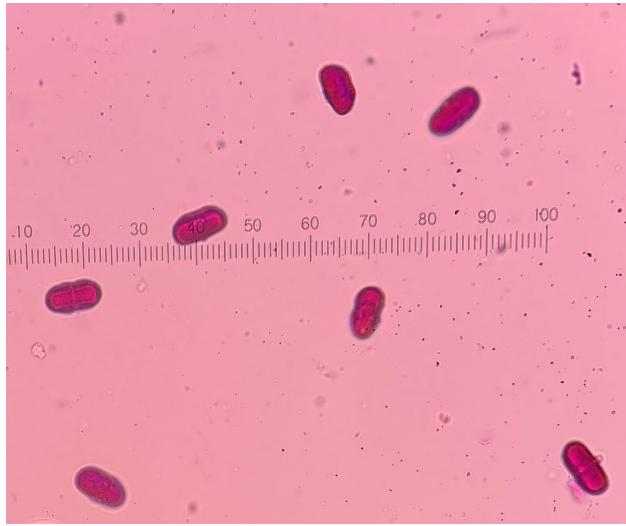
**Bullwart (*Ammi majus*)**



**Queen Anne's Lace/Wild Carrot (*Daucus carota*)**



**Dill (*Anethum graveolens*)**



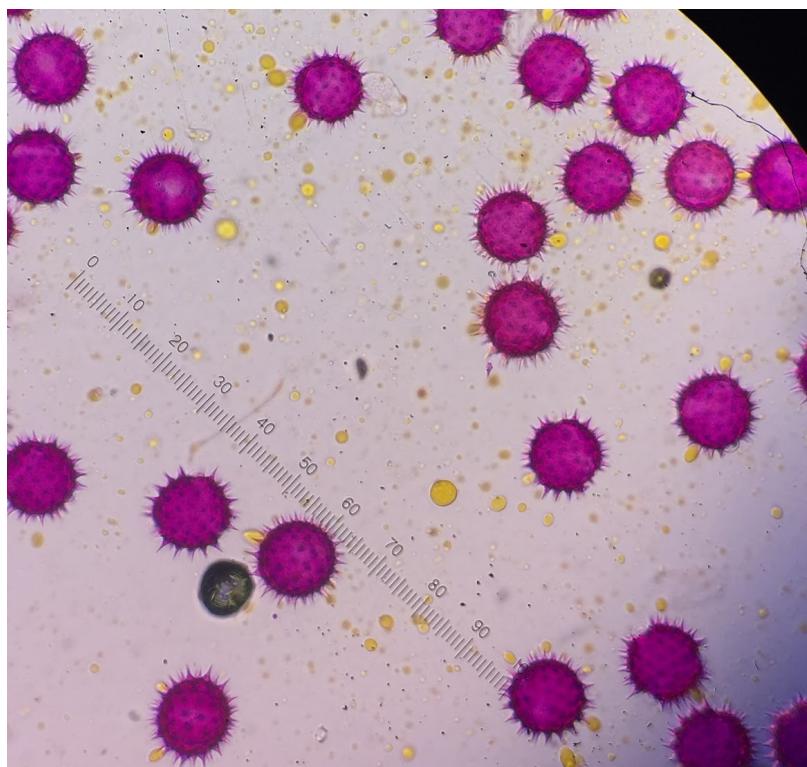
## Asteraceae family

### **Sunflower (*Helianthus annuus*)**

Description: spherical, spiky

Size: ~37 um diameter (excluding spikes), spikes ~5 um

Notes: spikes are more needle-like than most other asters

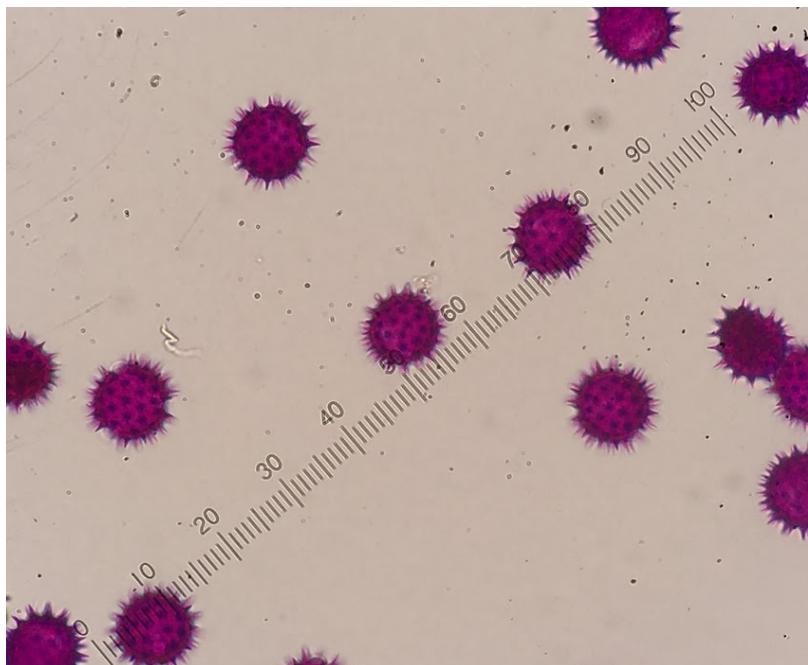


### **Cosmos (*Cosmos bipinnatus*)**

Description: spherical, spiky

Size: ~22.5 um diameter, spikes ~2.5 um

Notes:



### **Common Zinnia (*Zinnia elegans*)**

Description: spherical, spiky

Size: ~25 um diameter, spikes ~2.5 um

Notes:

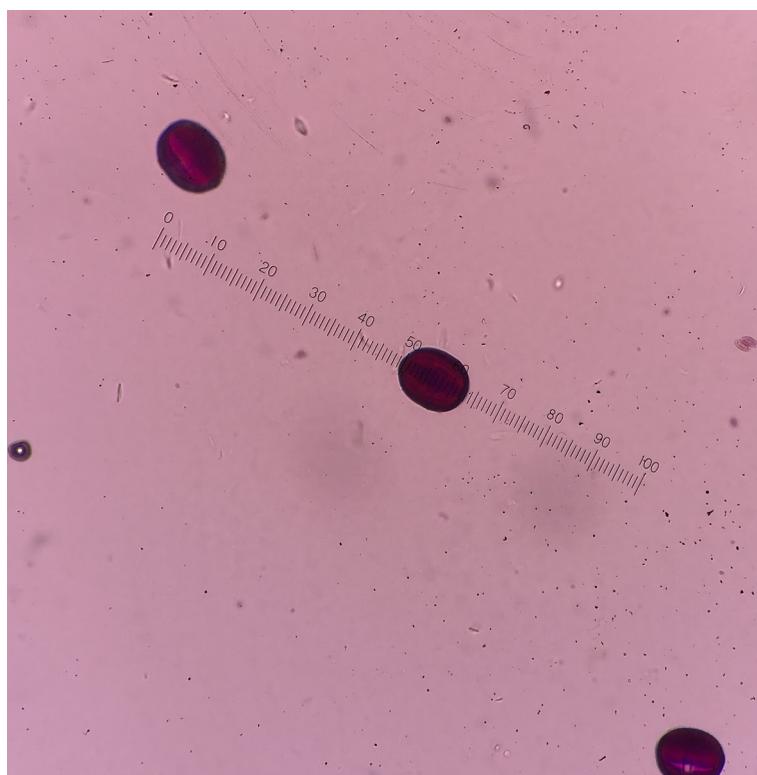


### **Bachelor's buttons (*Centaurea cyanus*) - I think this is not the right pollen**

Description: oval, smooth

Size: ~27.5 x 32.5  $\mu\text{m}$

Notes:



**Black-eyed Susan (*Rudbeckia herta*)**

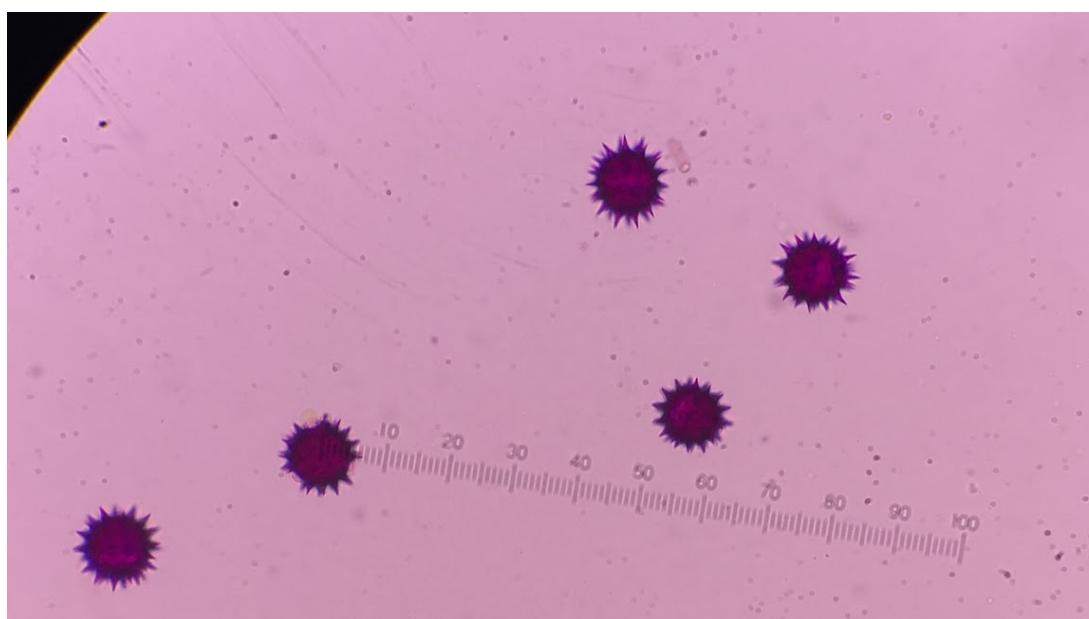
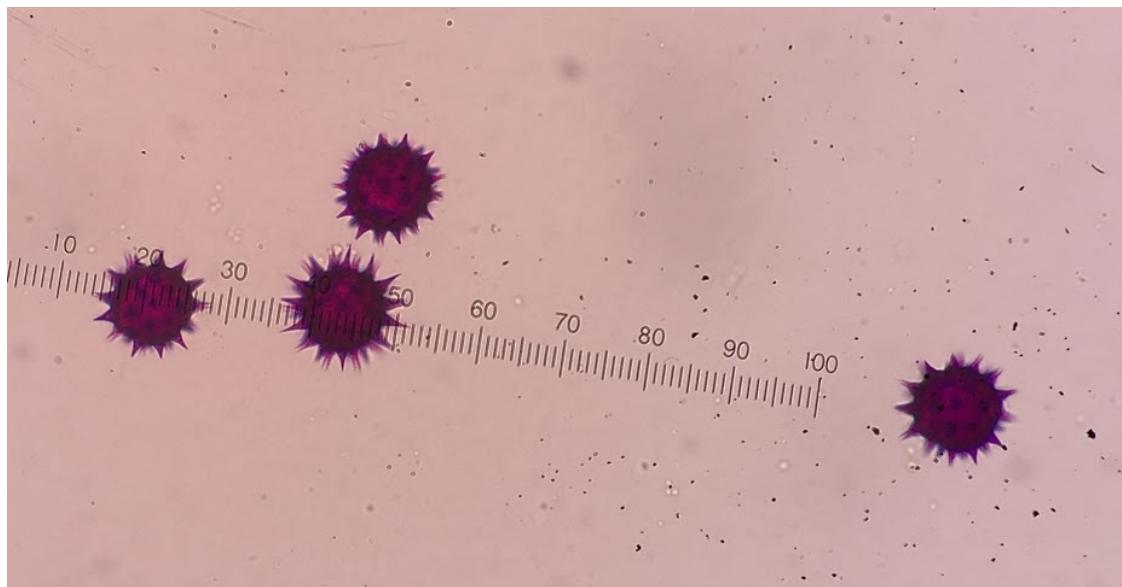




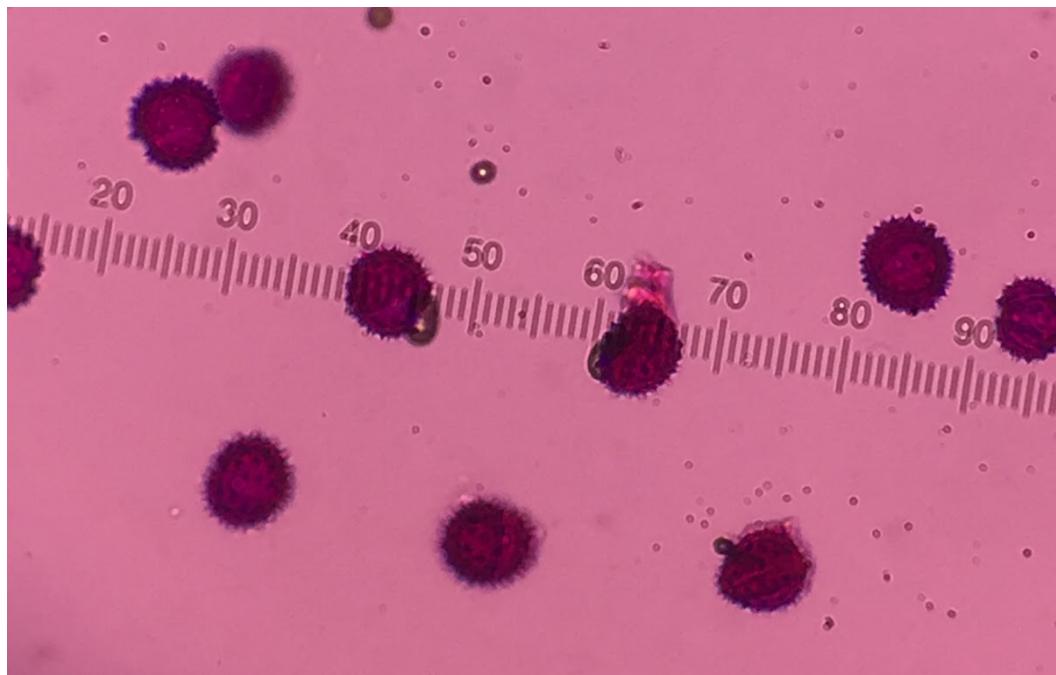
**Strawflower (*Xerochrysum bracteatum*)**



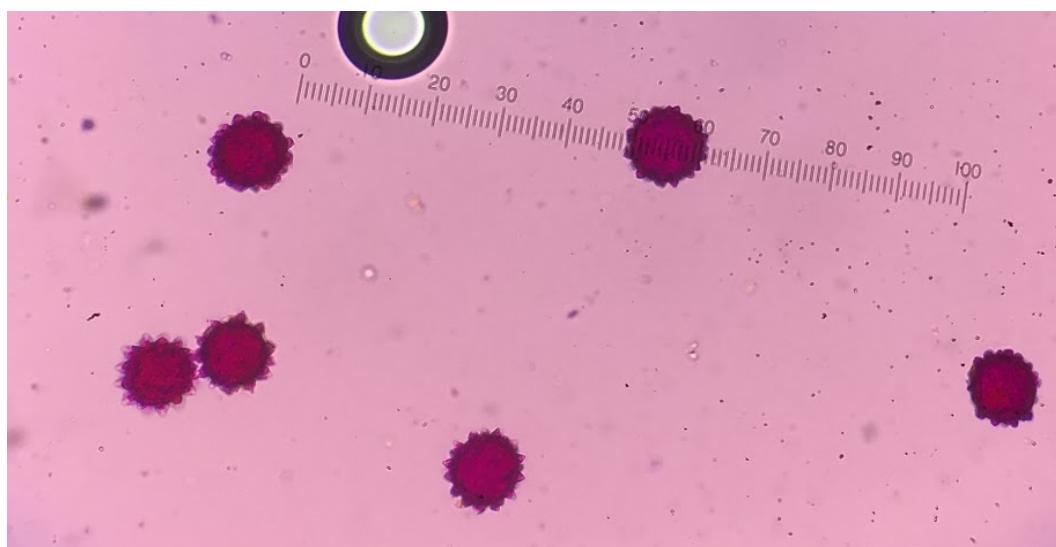
**Purple Coneflower (*Echinacea purpurea*)**

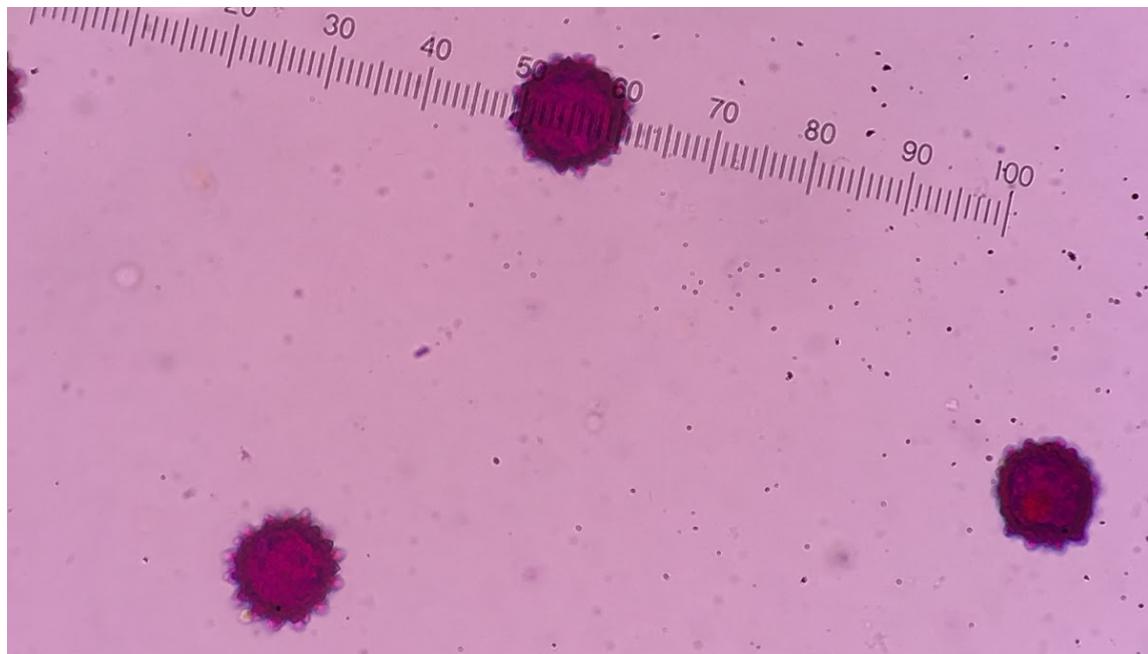


**Flossflower (*Ageratum houstonianum*)**



Dahlia (*Dahlia pinnata*)

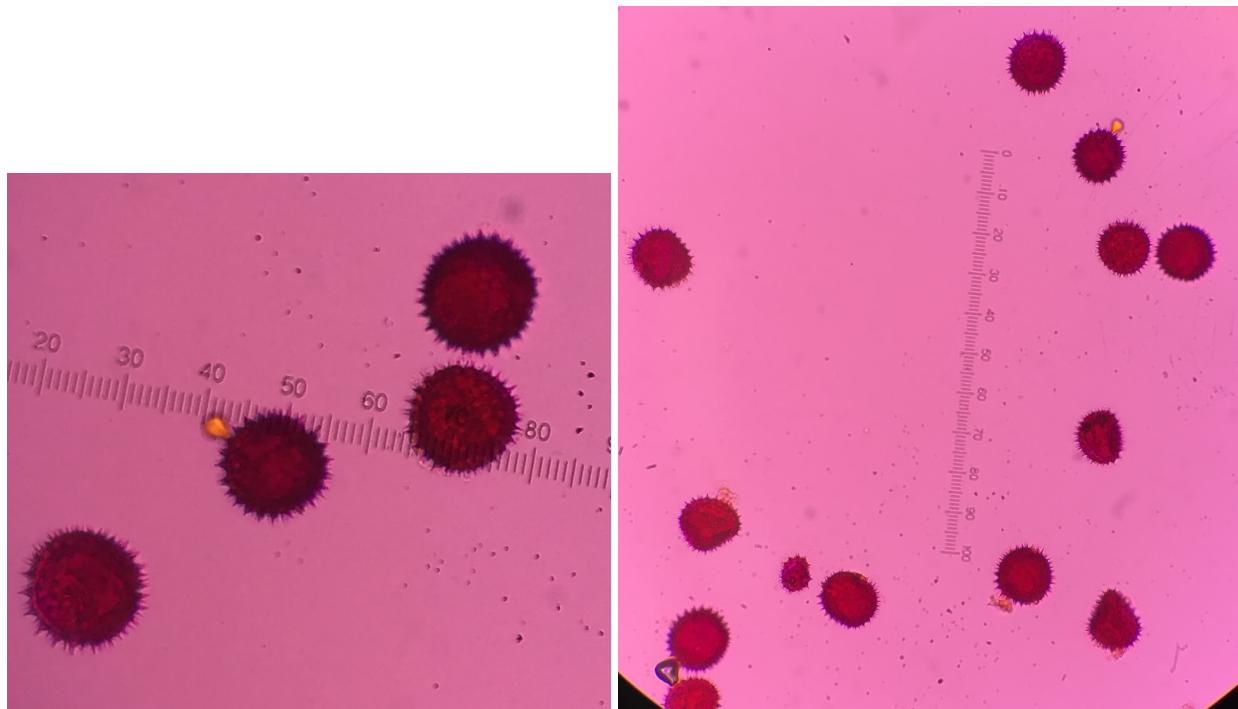




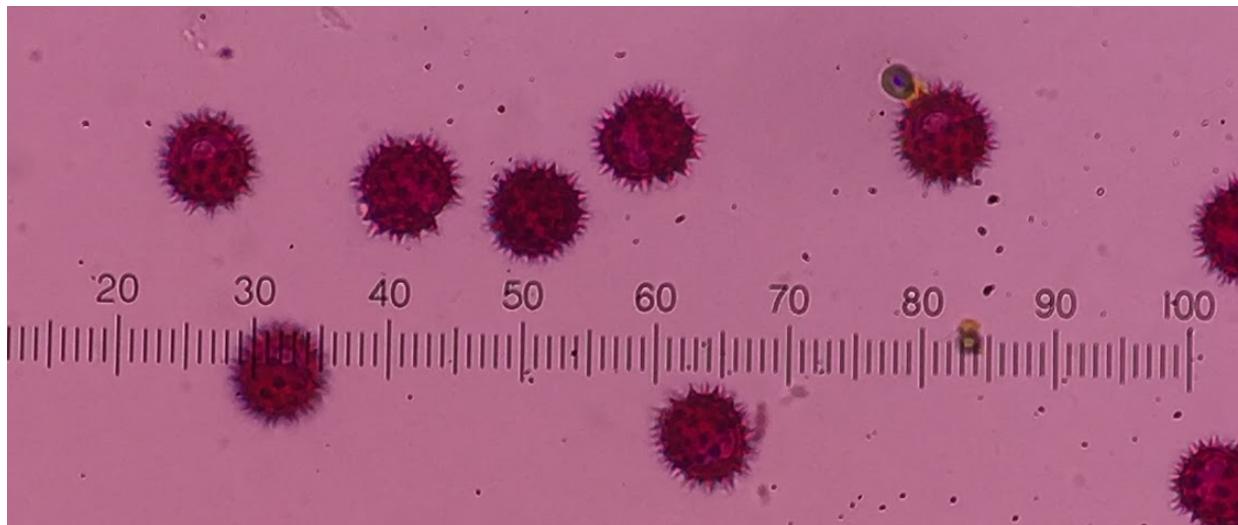
Pot Marigold (*Calendula officinalis*)



African/Mexican Marigold (*Tagetes erecta*)

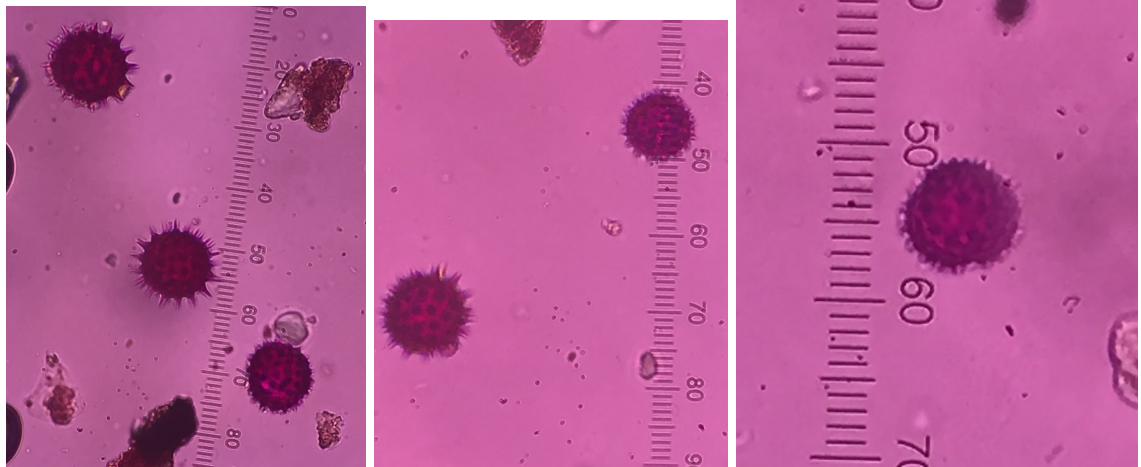


**Goldenrod (*Solidago* sp.)**

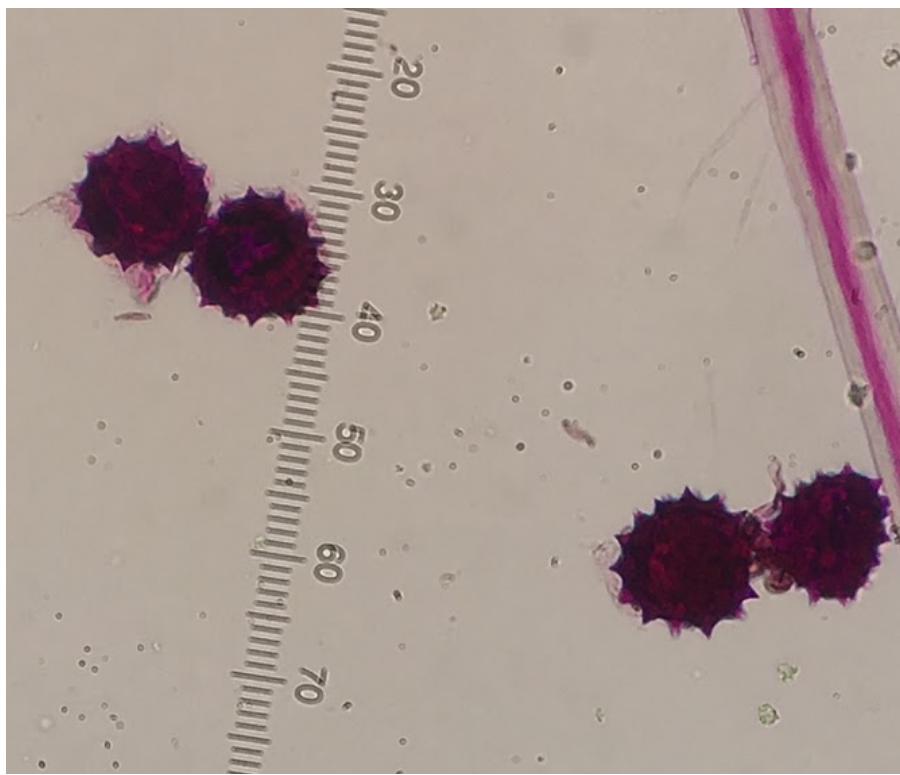


**Prairie Goldenrod (*Solidago ptarmicoides*) ??? - I'm not entirely confident with my plant ID on this one.**

There were a few different kinds of spiky pollens on the slide so not sure which is correct.



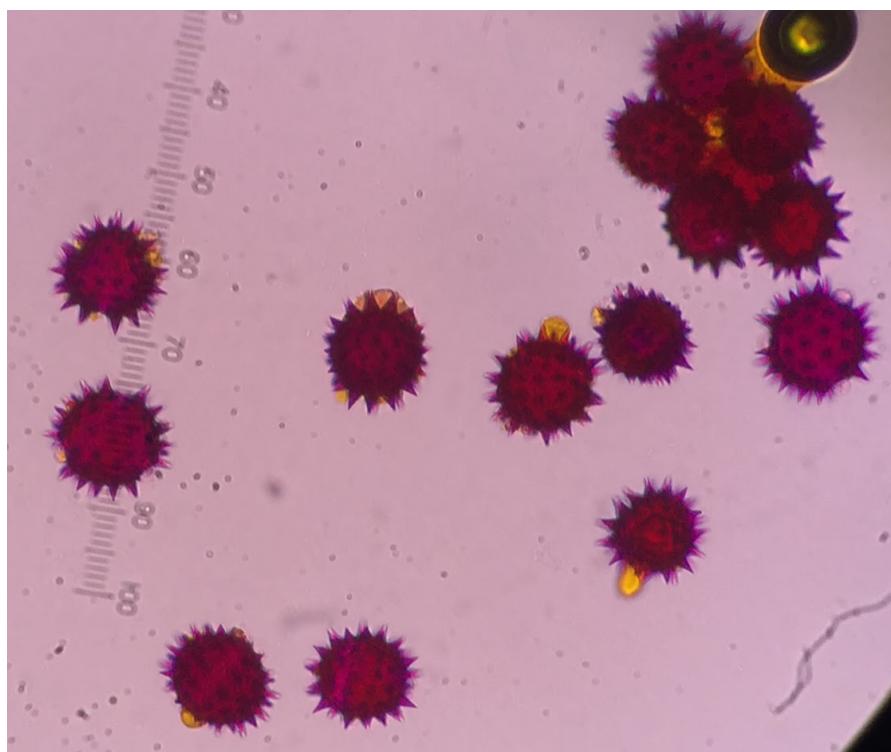
**Yarrow (*Achillea millefolium*)**



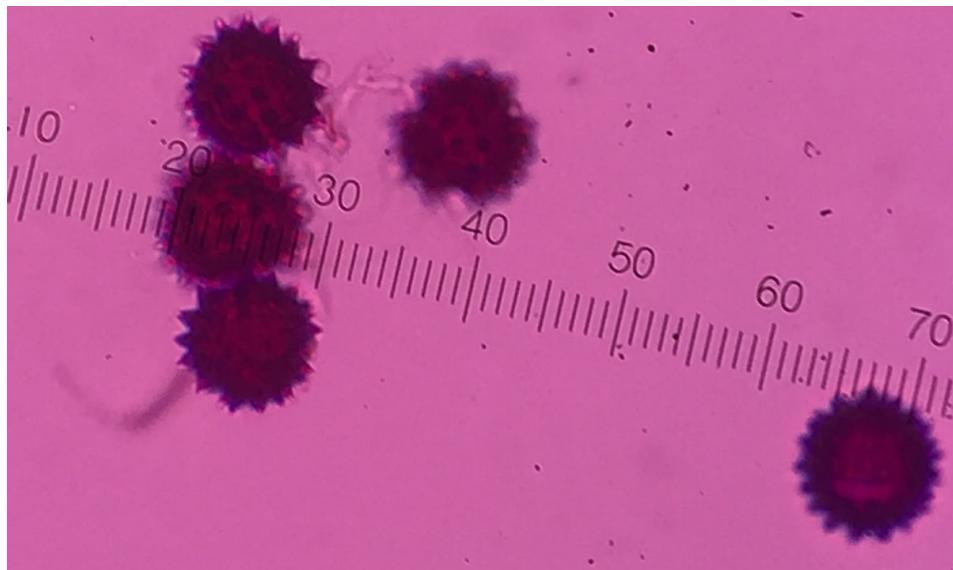
**Fleabane (*Erigeron annuus*)**



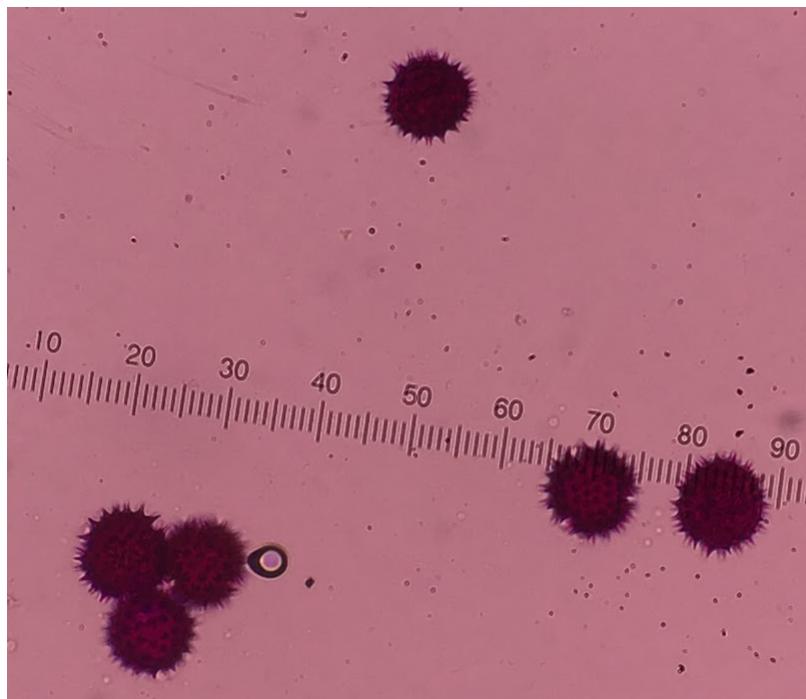
**Mexican sunflower (*Tithonia diversifolia*)**

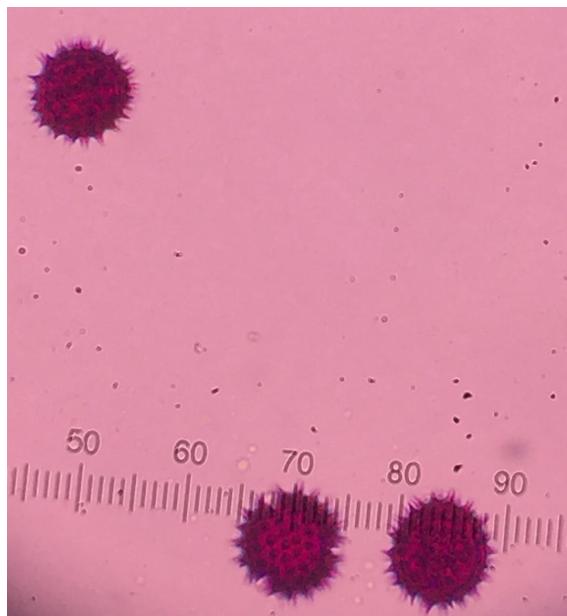


**Jersey cudweed (*Helichrysum luteoalbum*)**

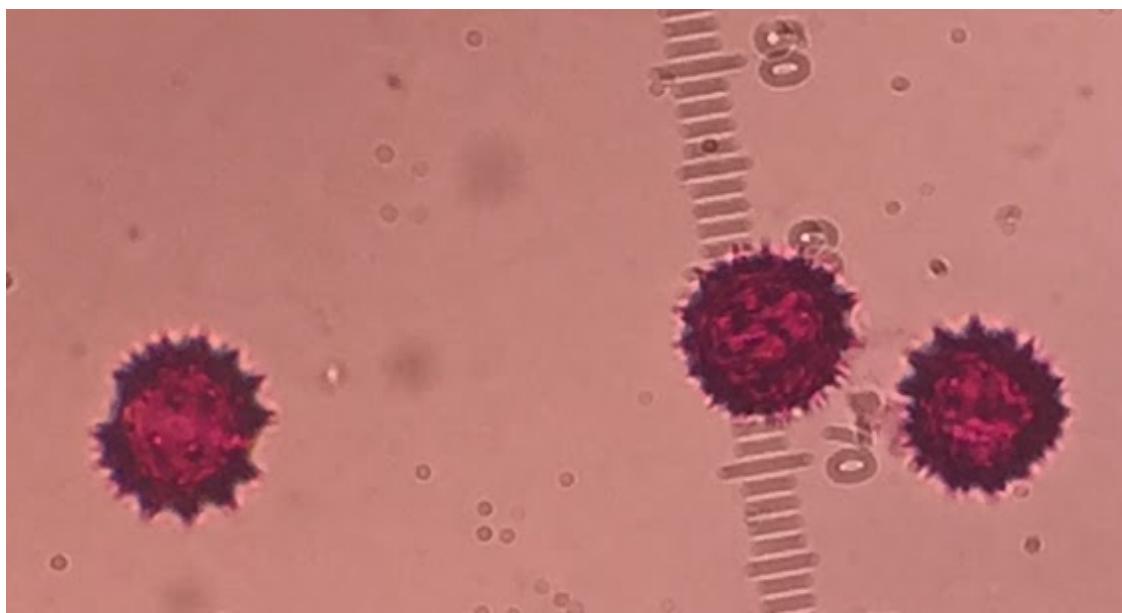


**Shaggy Soldier (*Galinsoga quadriradiata*)**



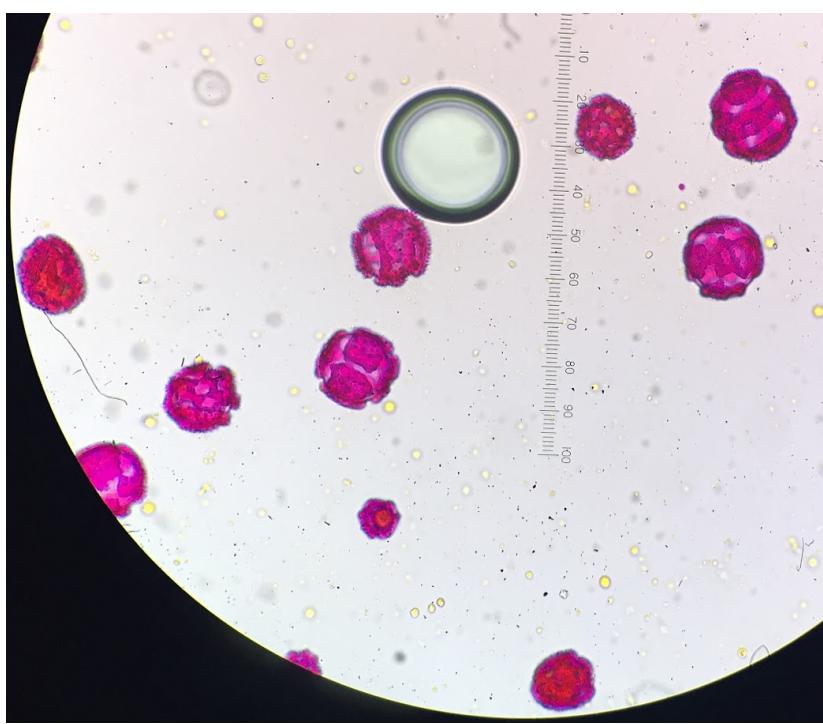
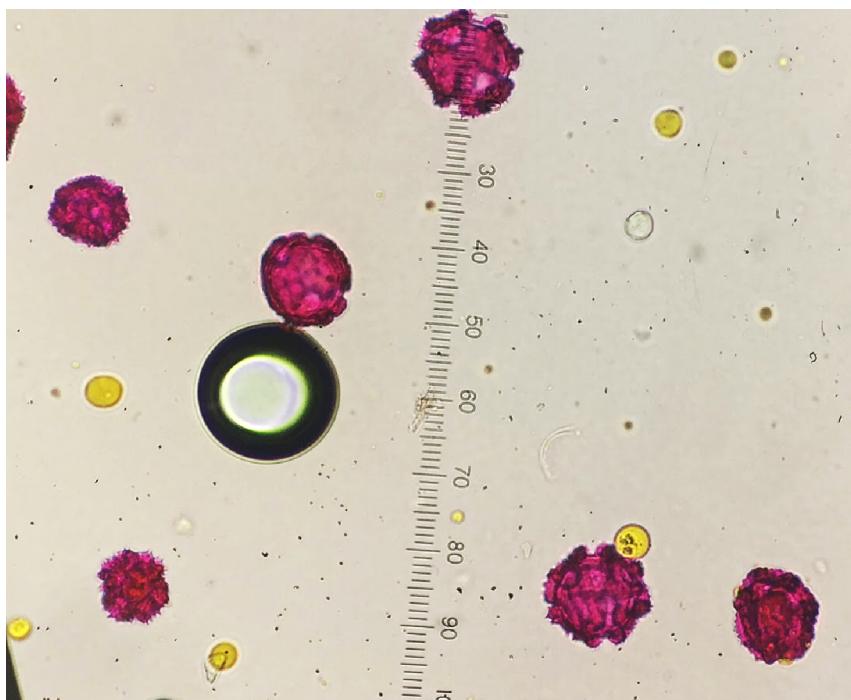


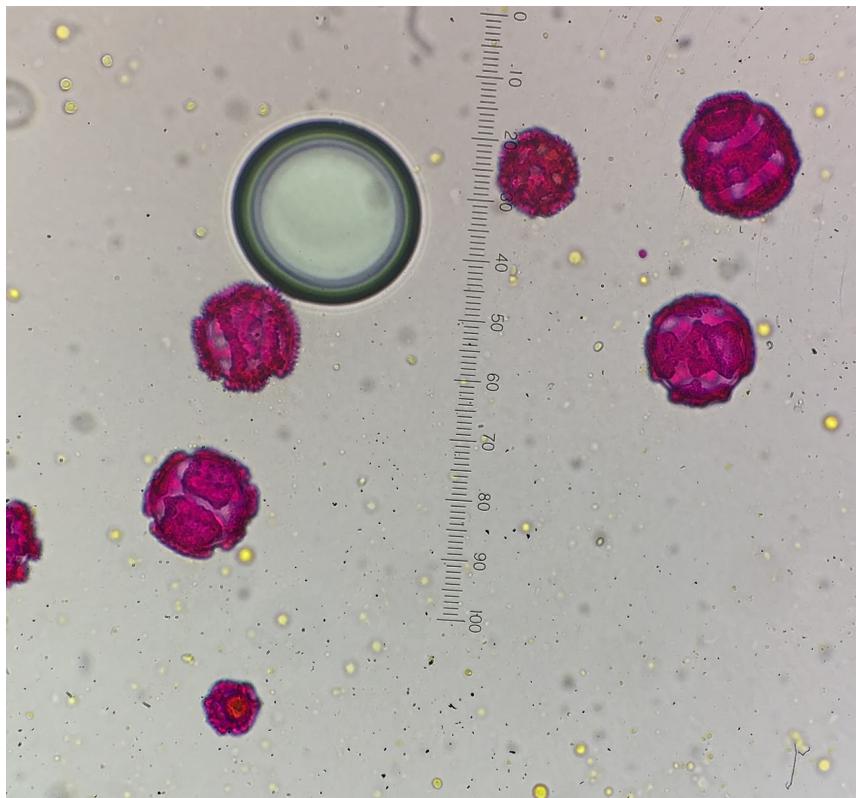
**Joe Pye Weed (*Eutrochium purpureum*)**



**Dandelion (*Taraxacum officinale*)**

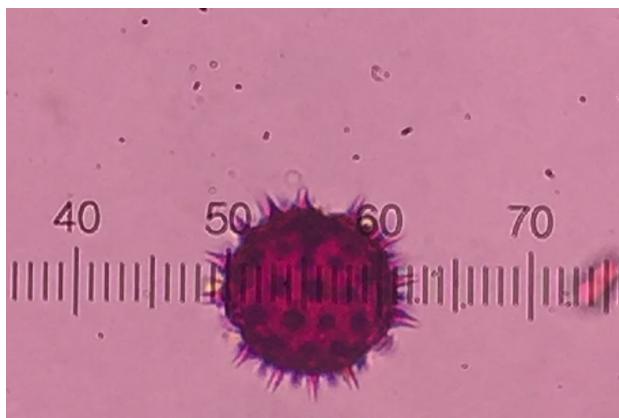
There were two morphs on this slide. I think Taraxacum is the smaller of the two, that looks more like a snowflake. But I'm not sure what the other ones are so I'm going to leave these photos with them in there.



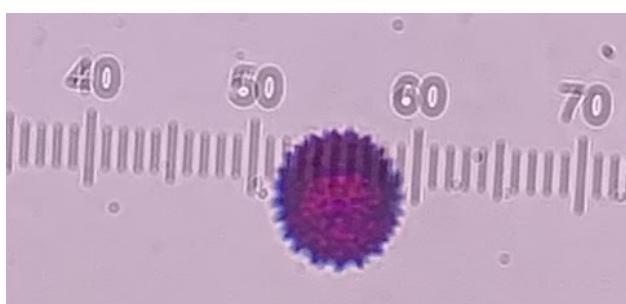
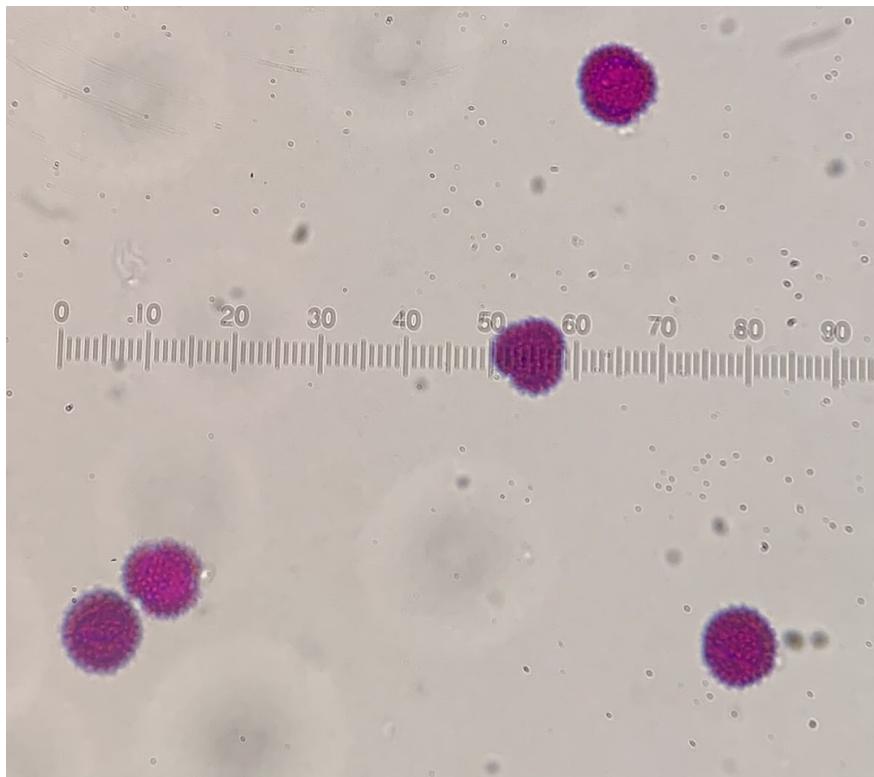


### Cup plant (*Silphium perfoliatum*)

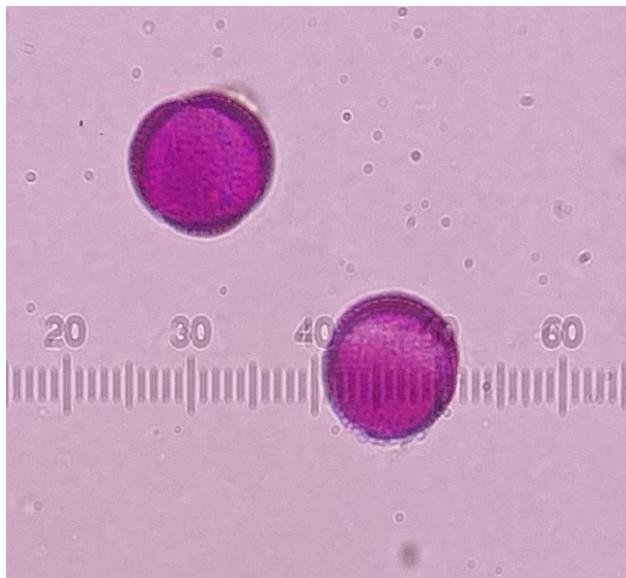
Slide was contaminated. I think it is the pollen on the left. What I think to be contaminant is on the right.



### Blue Mist Flower (*Conoclinium coelestinum*)

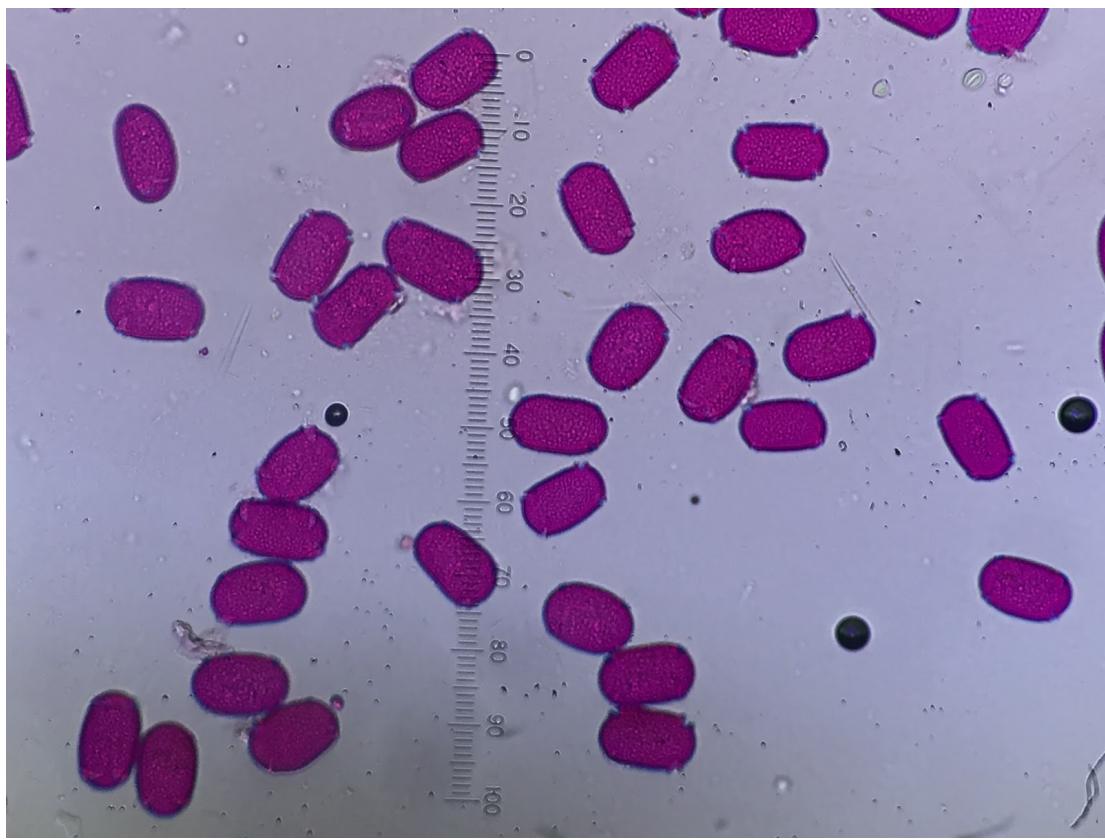


Lettuce (*Lactuca sativa*)



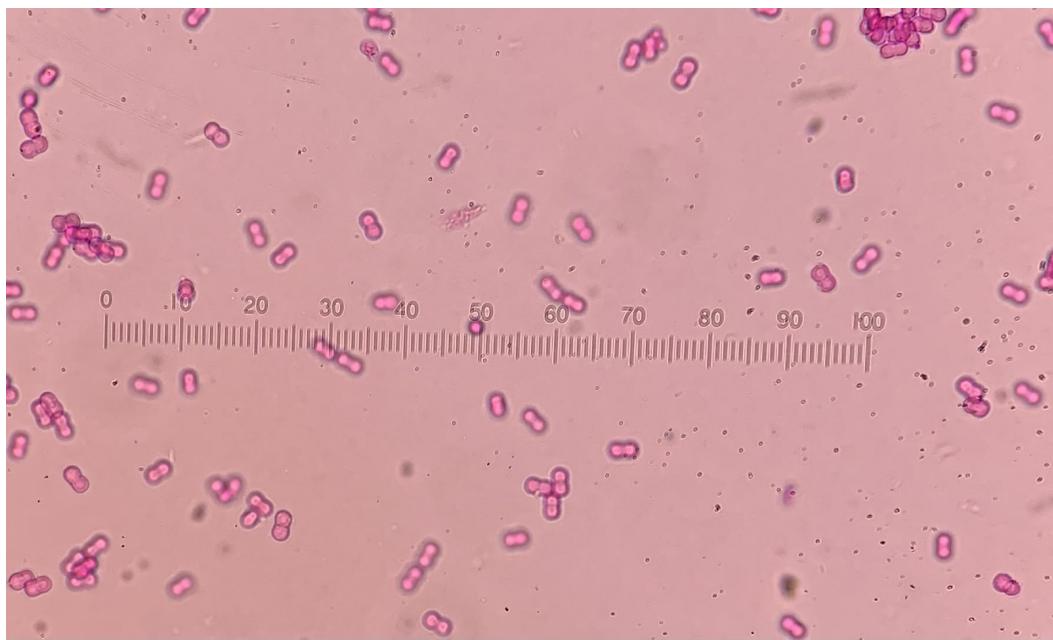
### Balsaminaceae Family

Jewelweed (*Impatiens capensis*)



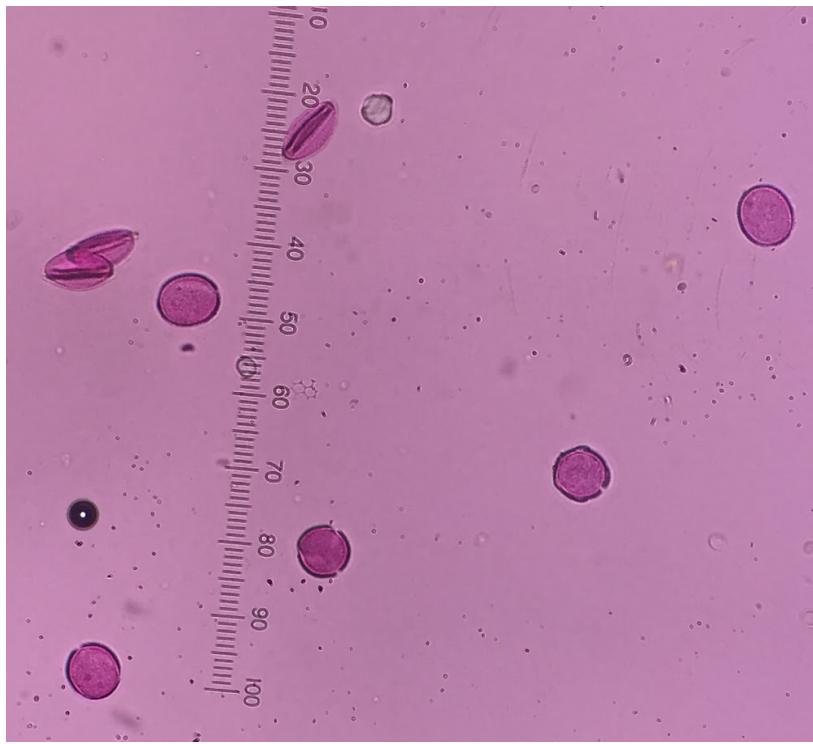
### Boraginaceae Family

**Forget-me-not (*Myosotis* sp.)**

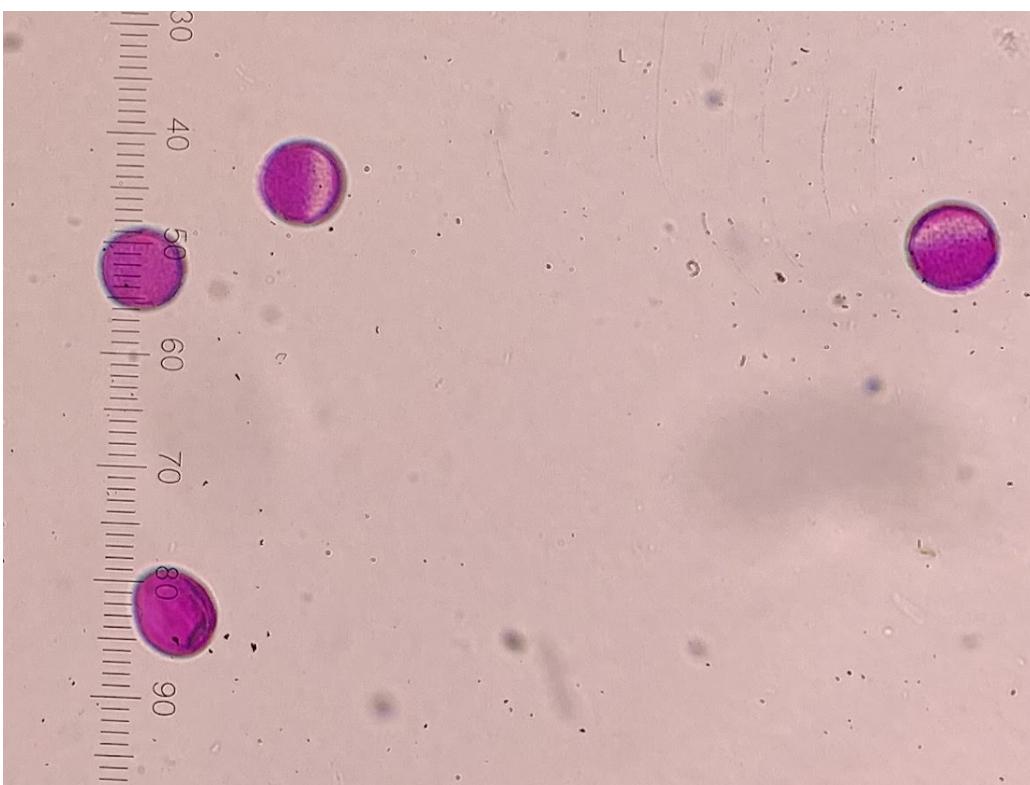


**Brassicaceae Family**

**Hoary Alyssum (*Berteroia incana*)**



Gardencress pepperweed (*Lepidium sativum*)



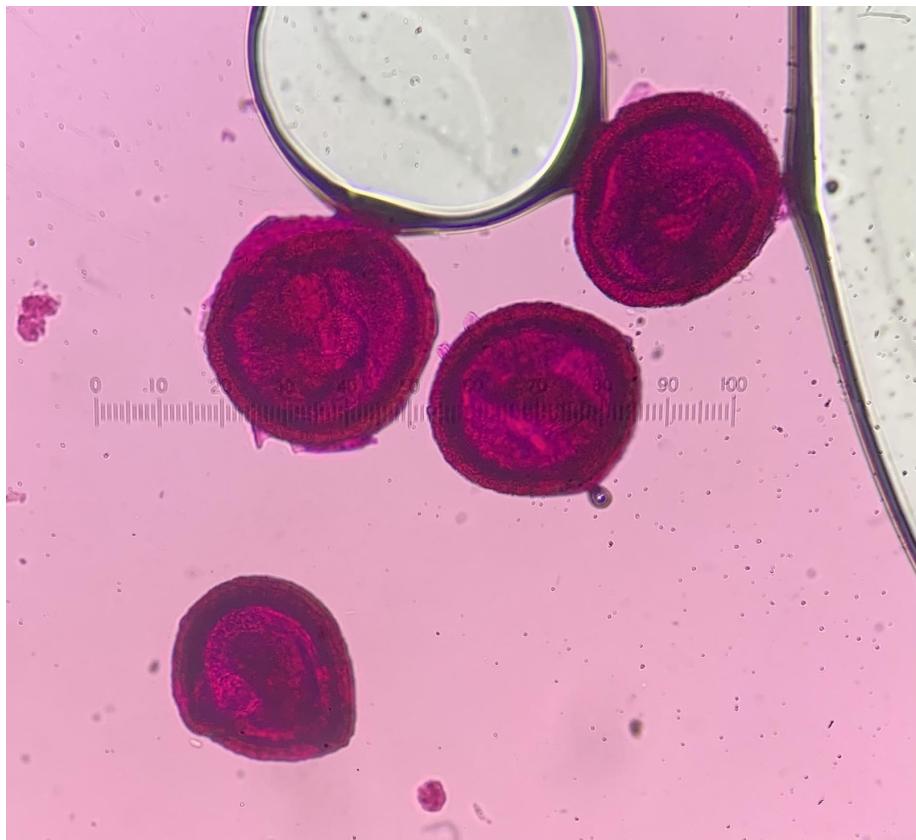
Kale (*Brassica oleracea*)

Caprifoliaceae

Pin cushion (*Scabiosa sp.*)

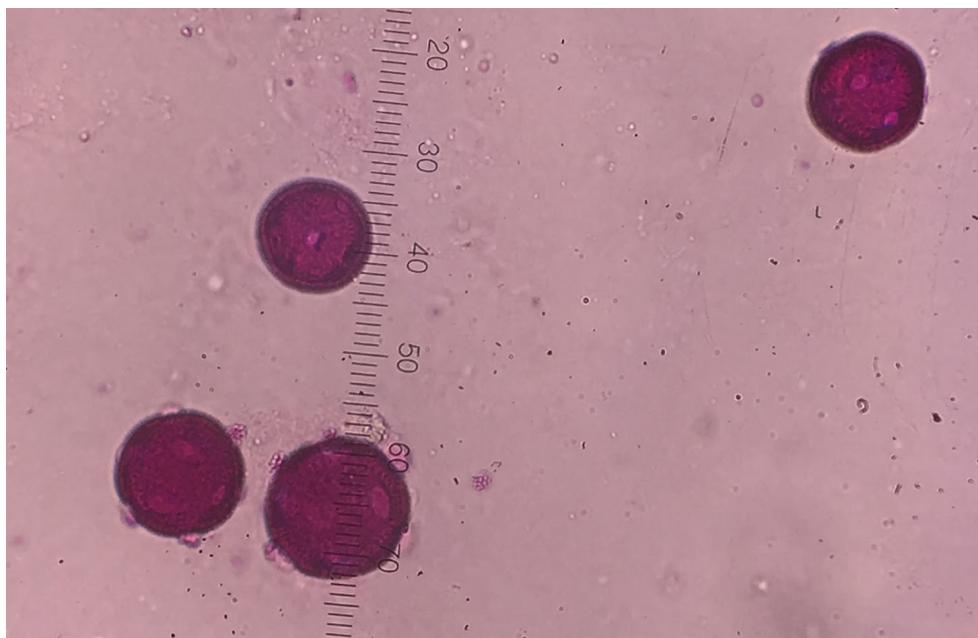
Got very different sizes on the two different slides... need to check again!





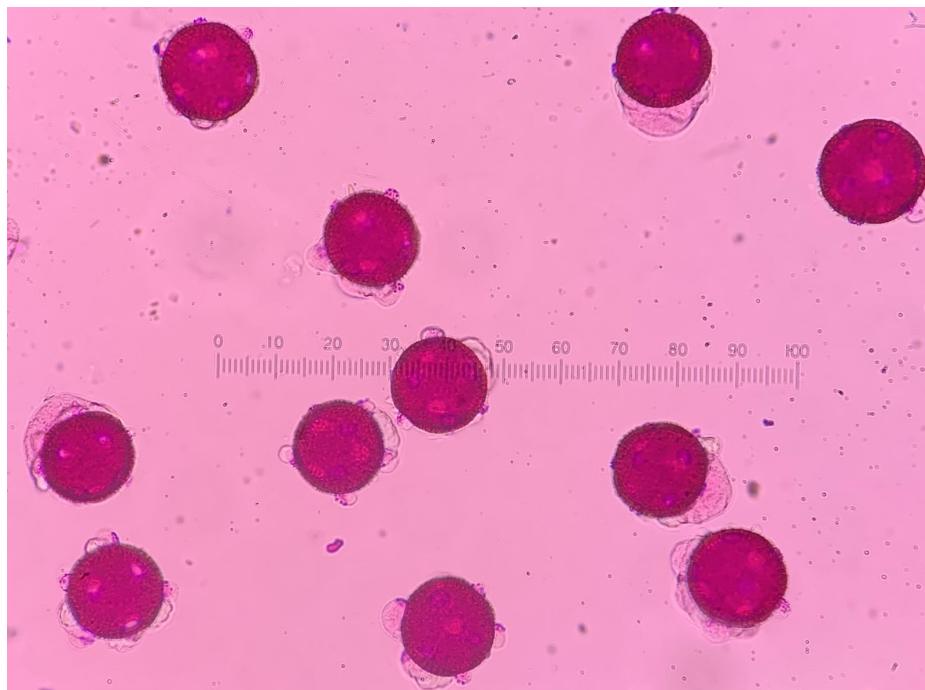
### Caryophyllaceae Family

Giant Chickweed (*Stellaria pubera*)



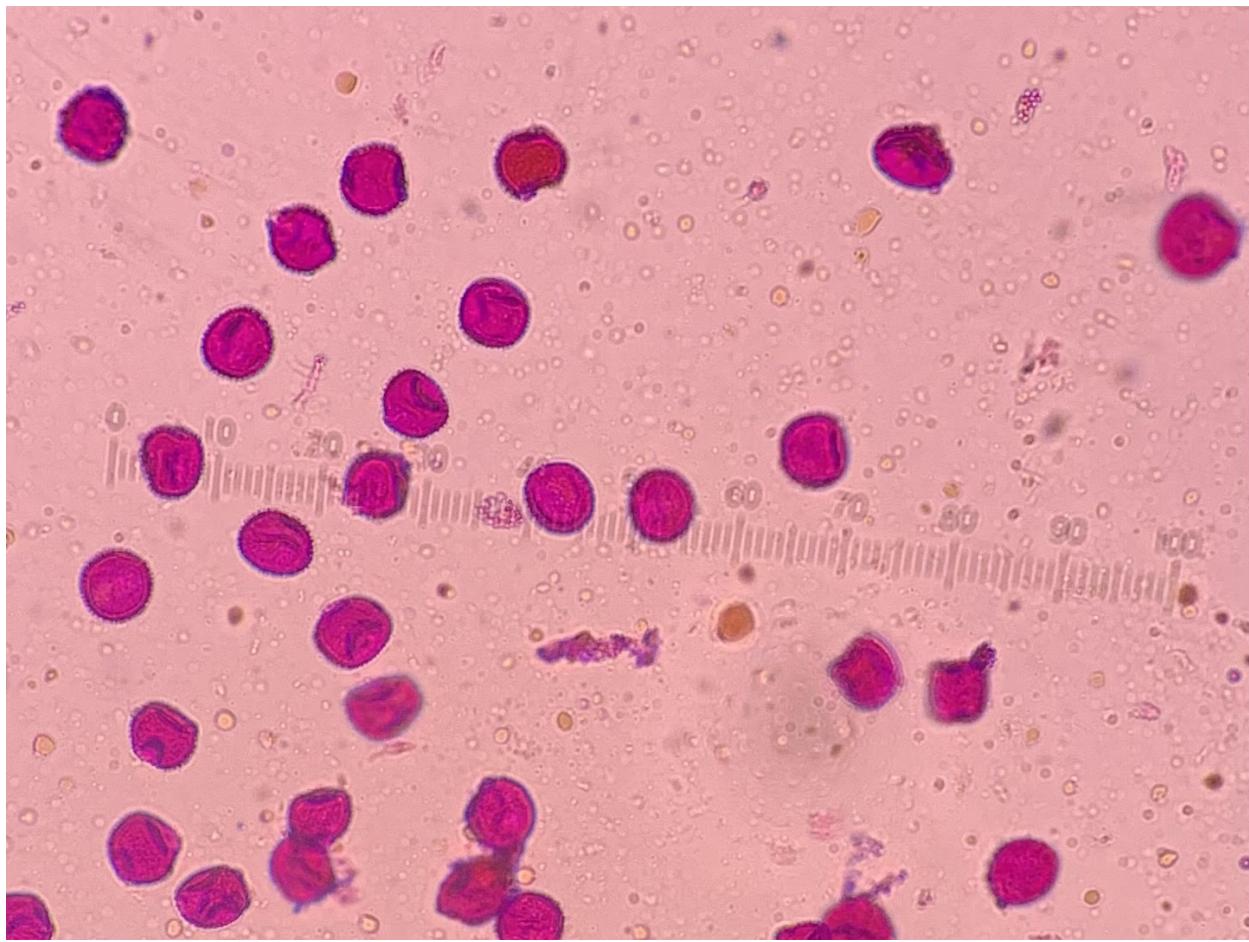
**Sweet William (*Dianthus barbatus*)**

**Bouncing-bet (*Saponaria officinalis*)**



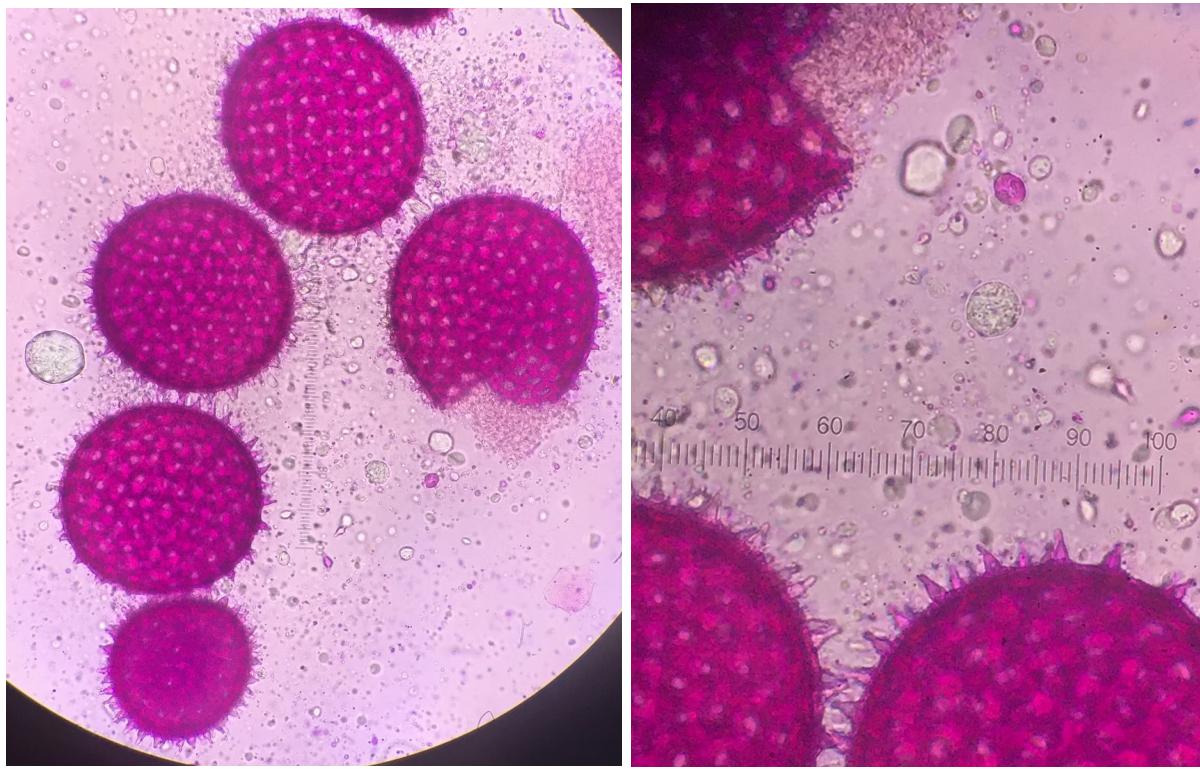
**Cleomaceae Family**

**Spider Flower (*Cleome sp.*)**

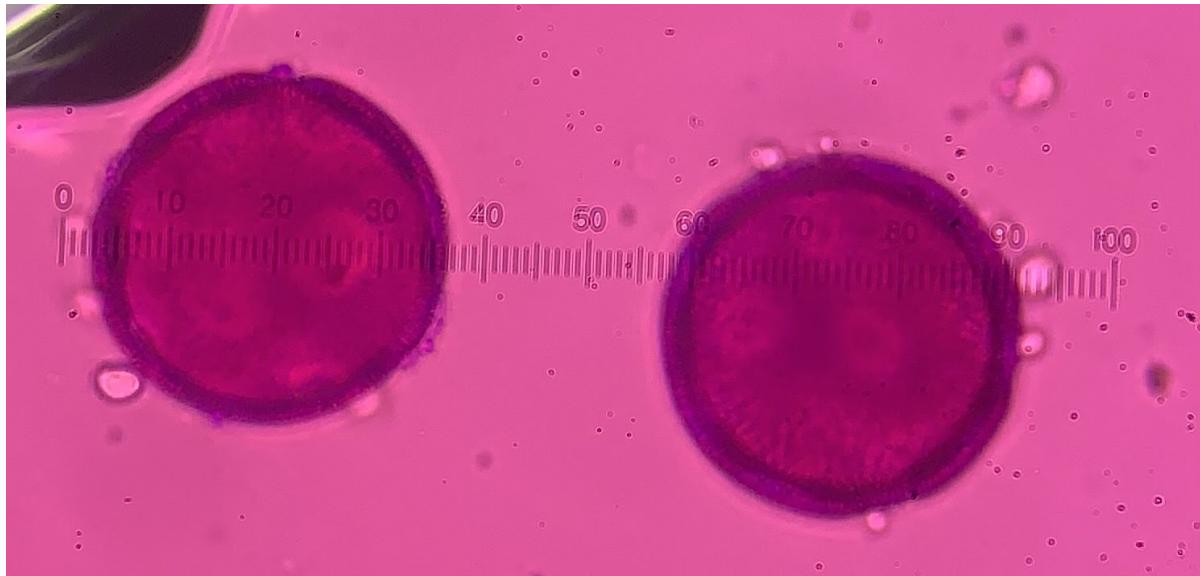


### Convolvulaceae Family

Sweet potato (*Ipomoea batatas*)



Hedge bindweed (*Calystegia sepium*)



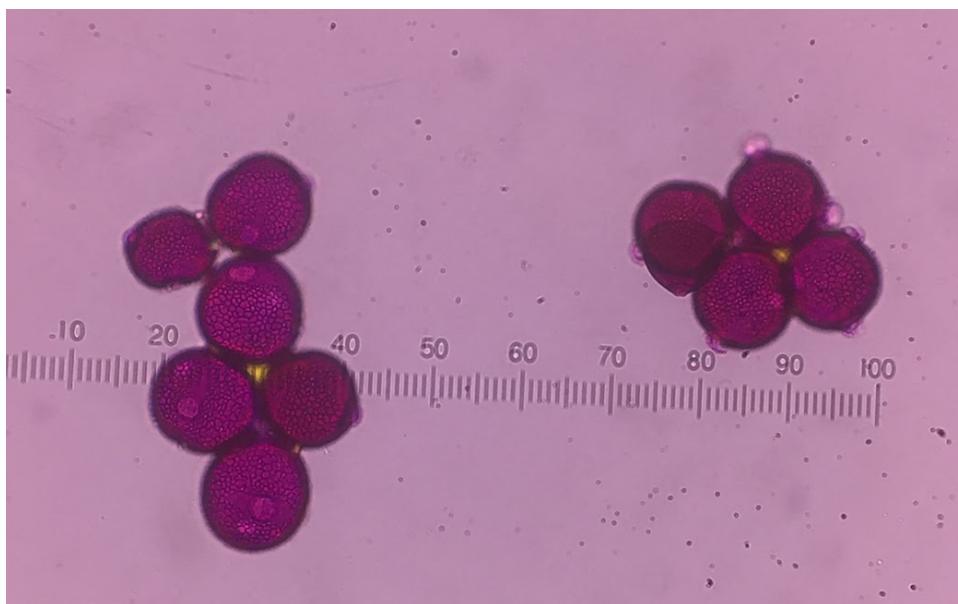
Cucurbitaceae Family

Cucumber (*Cucumis sativus*)



Squash (*Cucurbita sp.*)

Watermelon (*Citrullus lanatus*)





**Cantaloupe (*Cucumis melo* var. *cantalupensis*)**

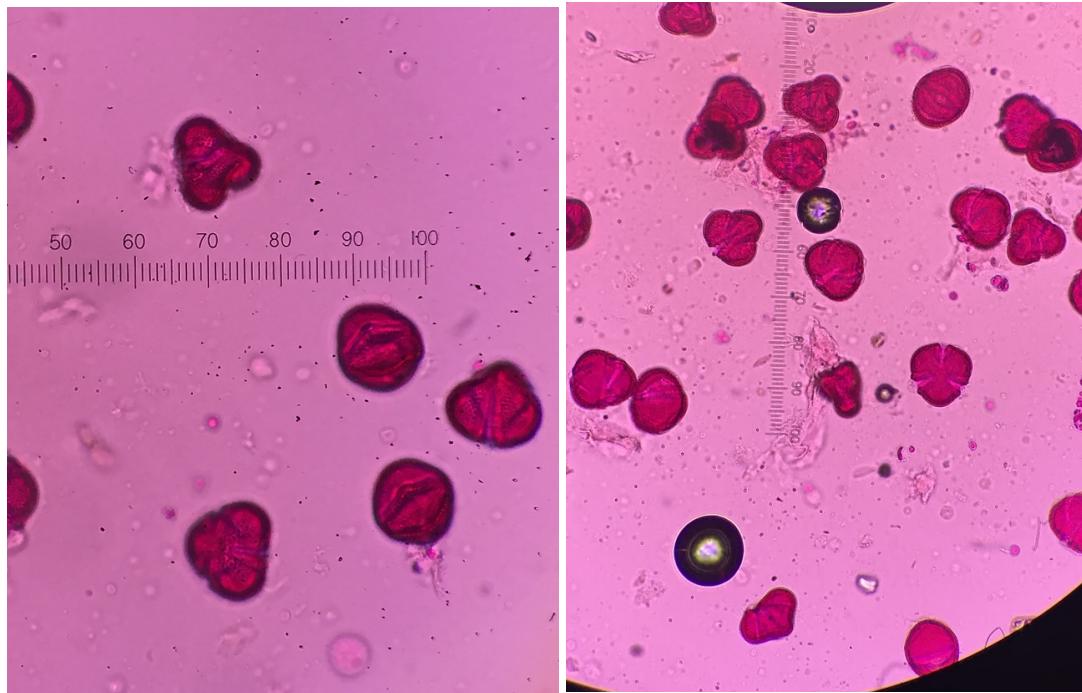


### **Euphorbiaceae Family**

#### **Snow on the Mountain (*Euphorbia marginata*)**

Description: (shape, texture, general morphology, etc.)

Size: (length, width, diameter, etc)

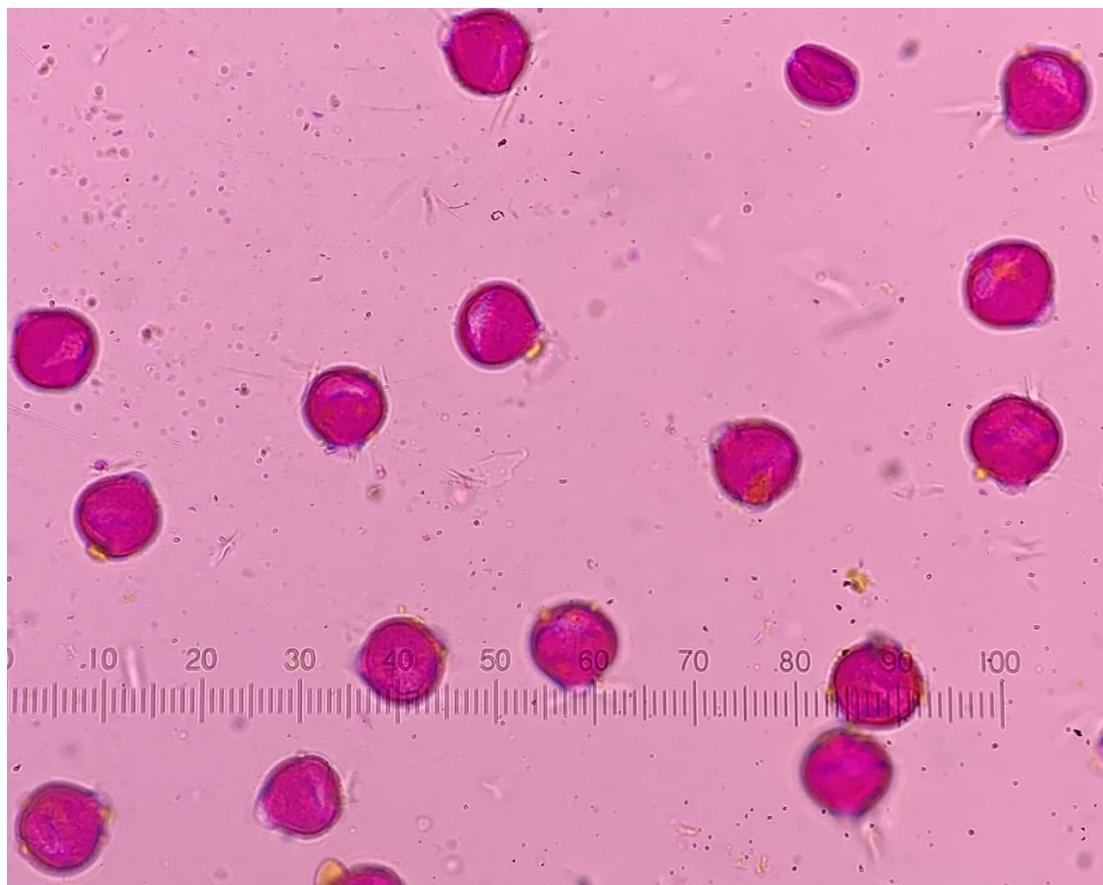


## Fabaceae Family

American Vetch (*Vicia americana*)



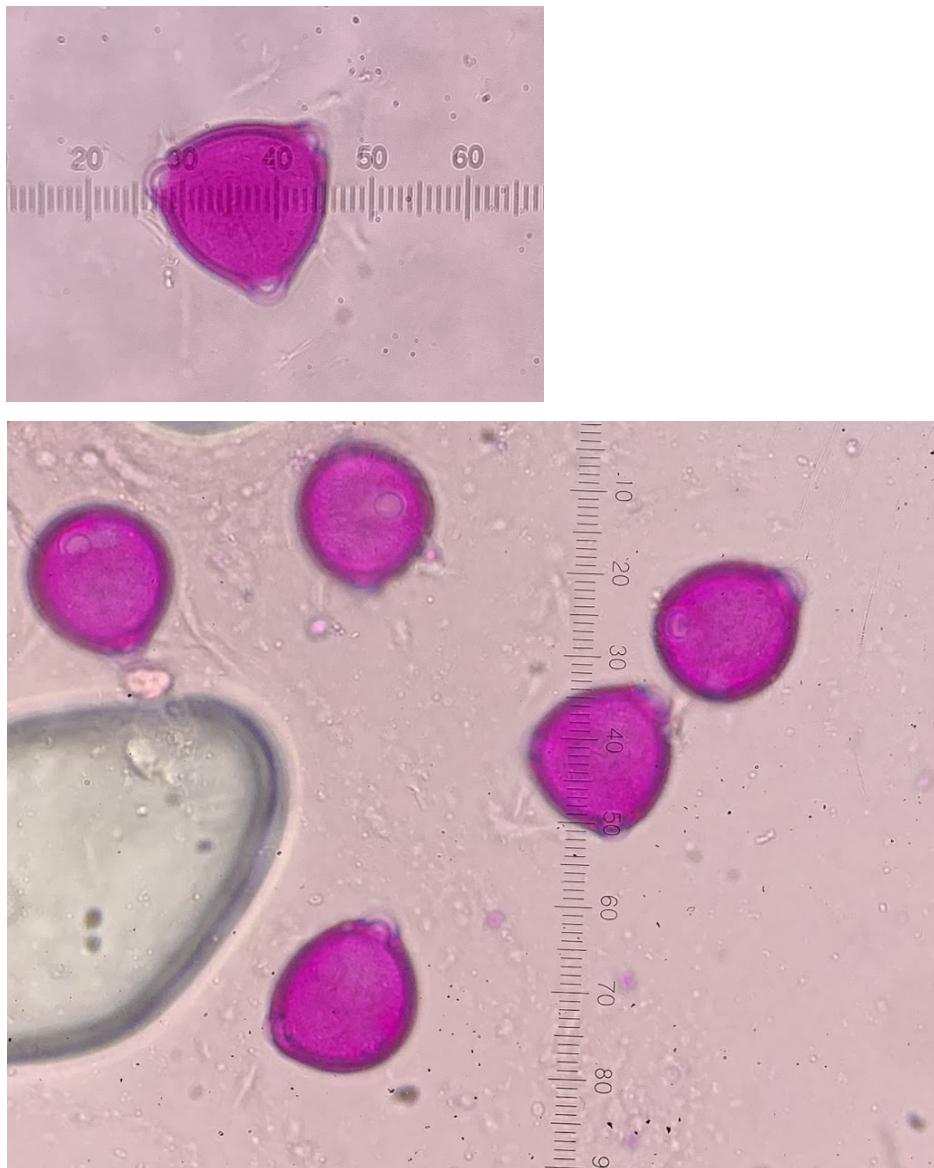
**White clover (*Trifolium repens*)**



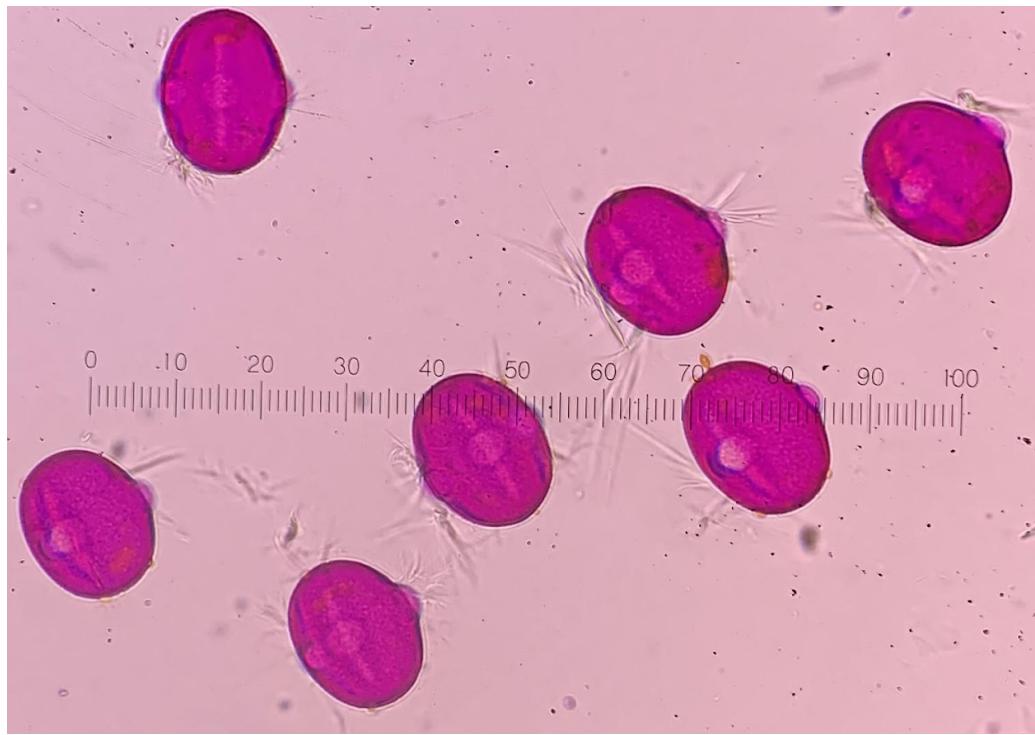
**Red Clover (*Trifolium pratense*)**



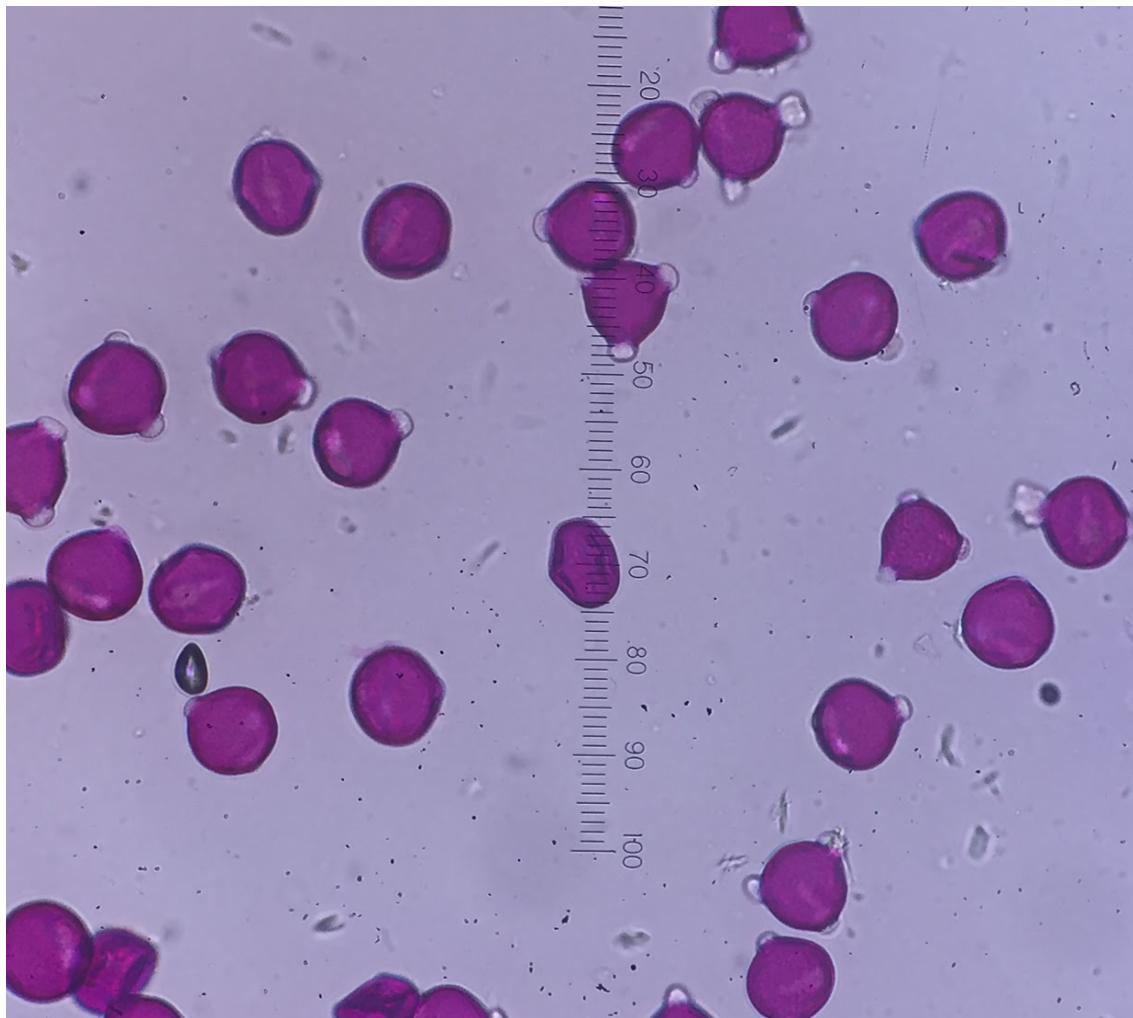
**Green bean (*Phaseolus vulgaris*)**



**Pea (*Pisum sativum*)**



Crown Vetch (*Securigera varia*)



**Gentianaceae Family**

**Gentian (*Gentiana* sp.)**



### Hydrangeaceae Family

Hydrangea (*Hydrangea sp.*)

### Lamiaceae Family

Baby sage (*Salvia microphylla*)

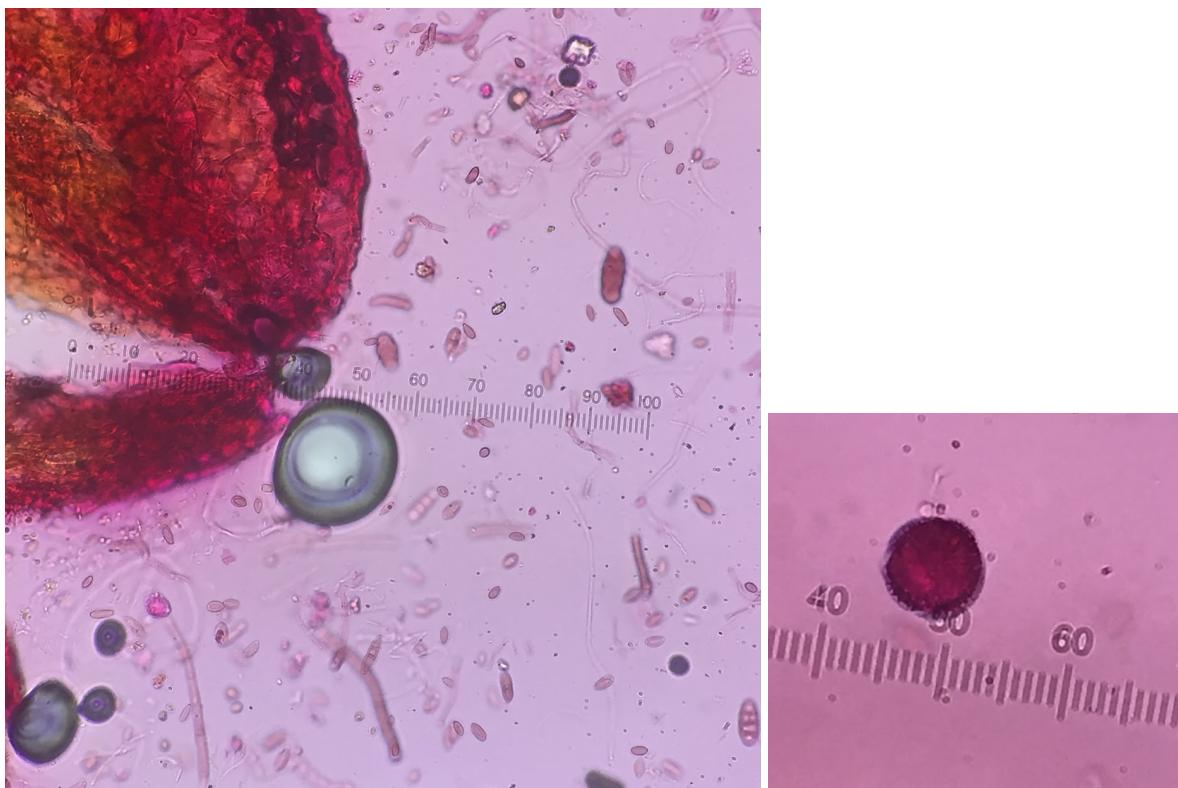
Sage (*Salvia sp.*)

Basil (*Ocimum basilicum*)



### Mint (*Mentha*)

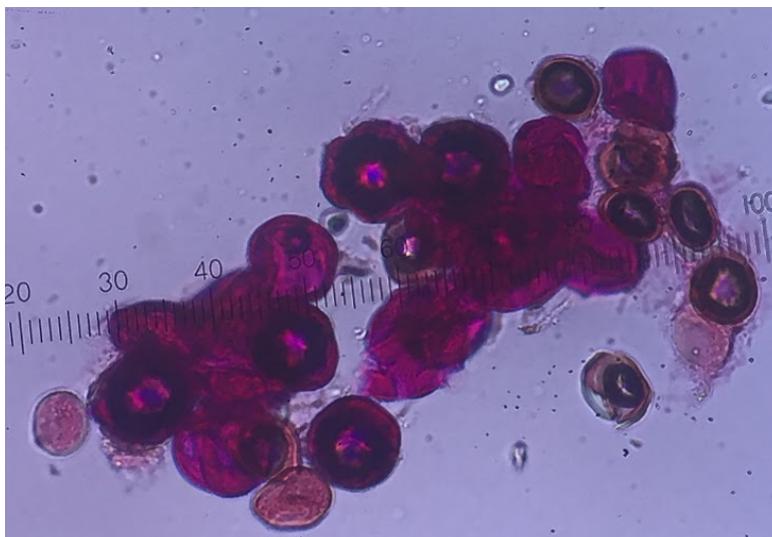
Not sure what is pollen here. There was one grain (right), not sure if that is Mint, though.



### Lythraceae Family

**Purple Loosestrife (*Lythrum salicaria*)**

Not a very good slide... this was the only cluster of grains.



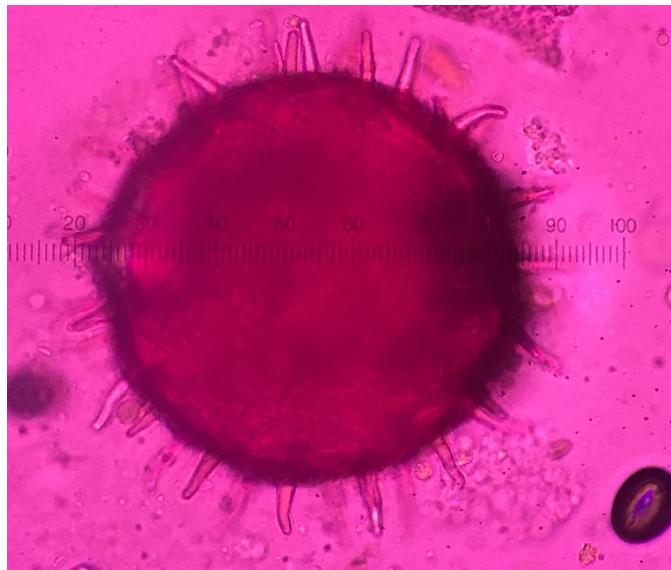
**Malvaceae Family**

**Velvet leaf (*Abutilon theophrasti*)**

**Swamp Mallow (*Hibiscus moscheutos*)**

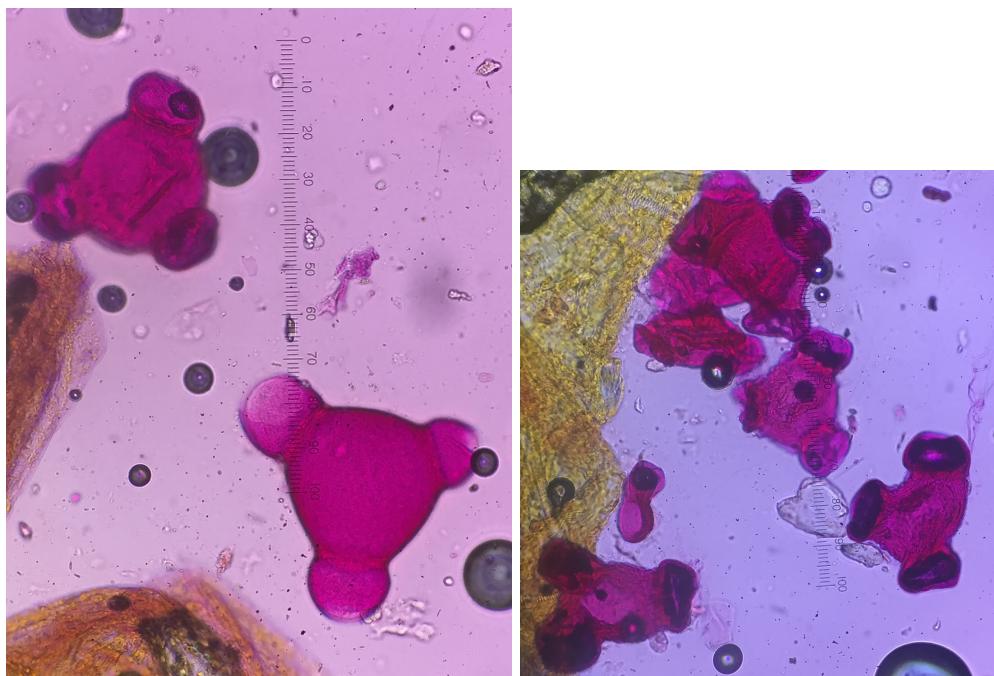


**Okra (*Abelmoschus esculentus*)**



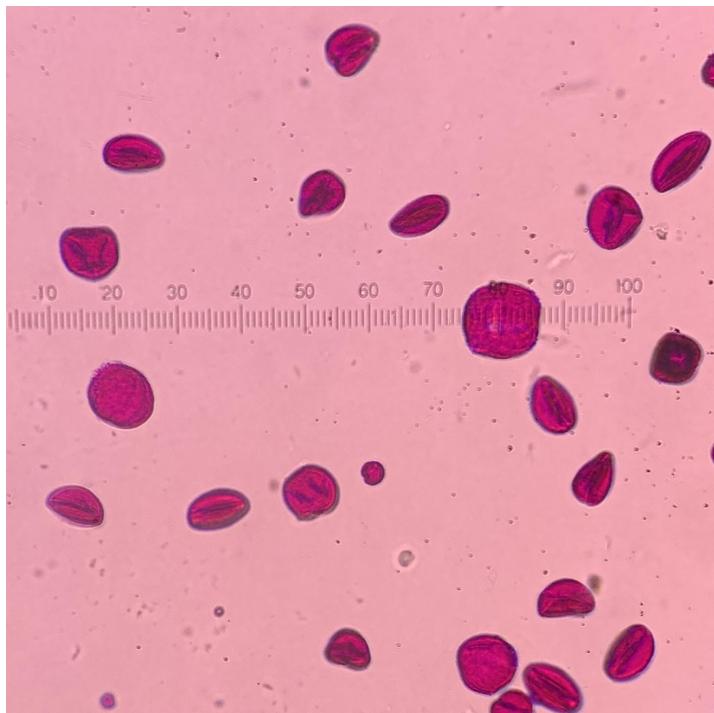
### Onagraceae Family

Common Evening Primrose (*Oenothera biennis*)



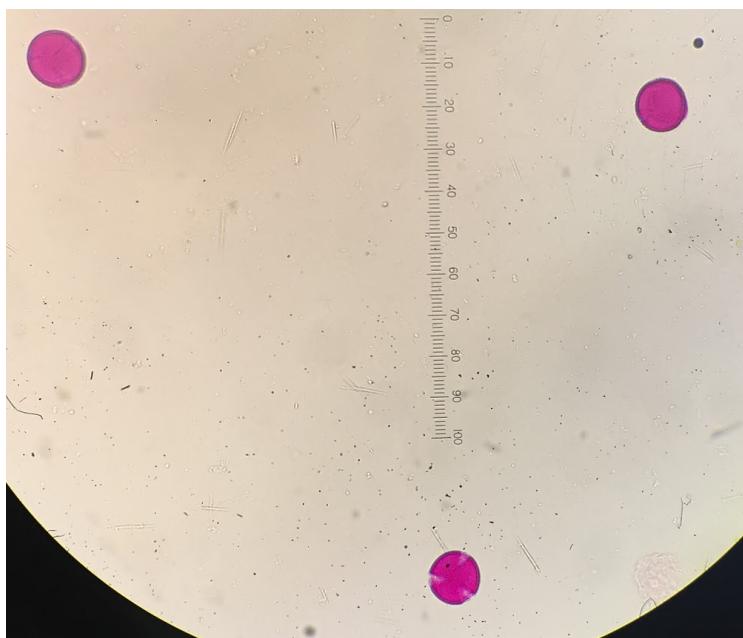
### Papaveraceae Family

Bleeding heart (*Lamprocapnos sp.*)



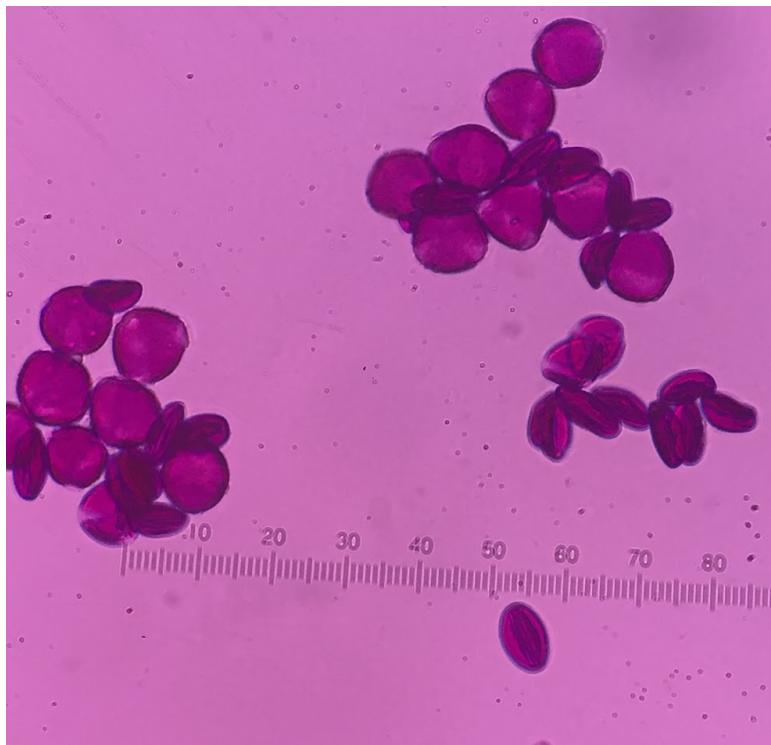
### Phytolaccaceae Family

Pokeweed (*Phytolacca americana*)



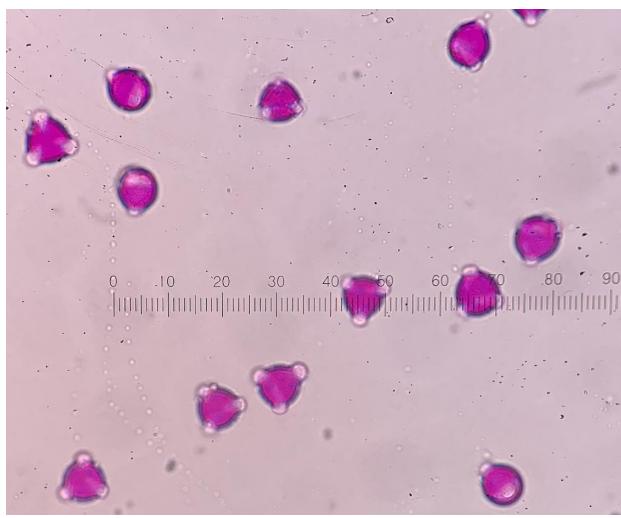
### Plantaginaceae Family

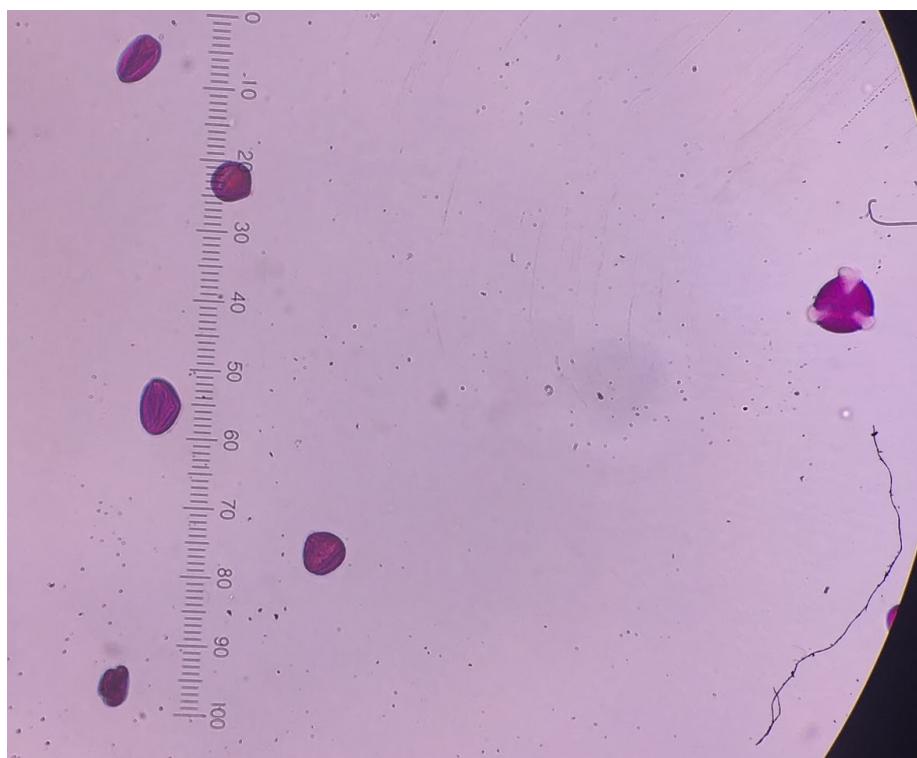
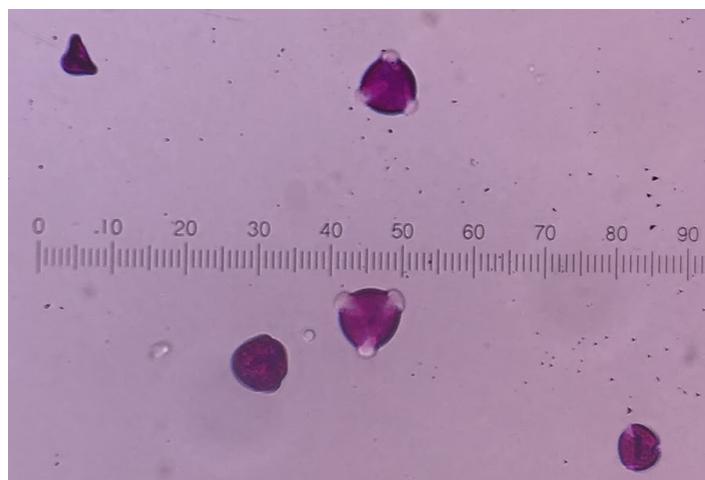
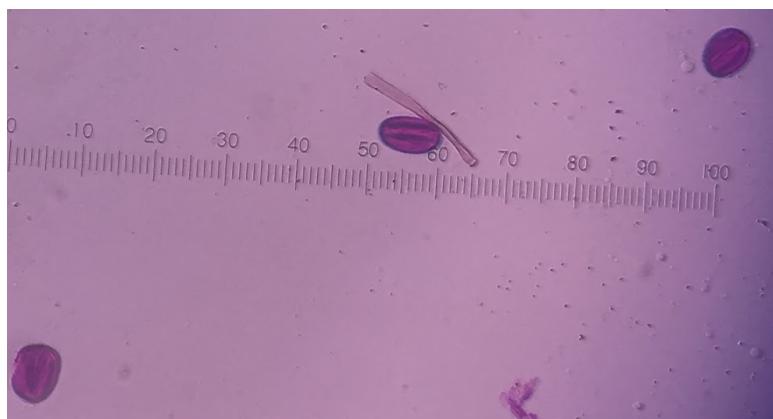
**Foxglove (*Digitalis* sp.)**



**Snap Dragon (*Antirrhinum* sp.)**

Not sure if these are all the same. Some are wrinkled and others are squishing out the sides. Maybe just has to do with how hydrated they were.



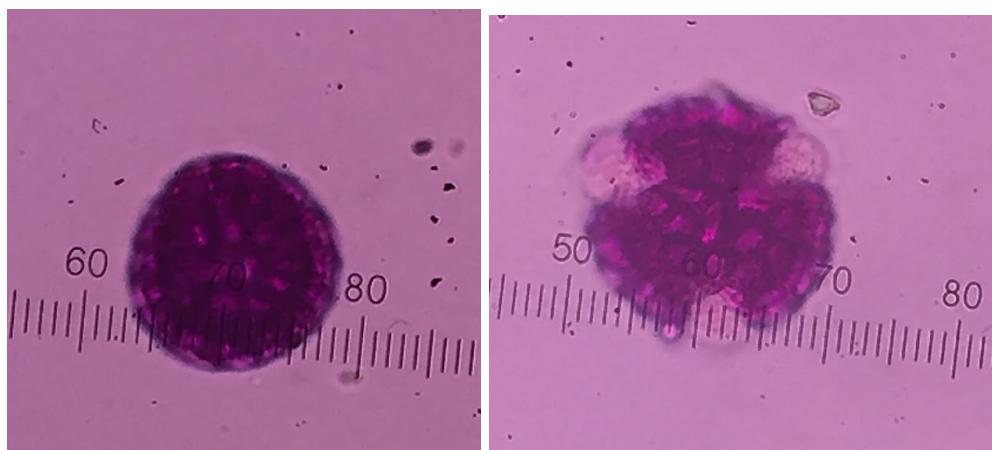


## Plumbaginaceae Family

### **Sea Lavender/Statice (*Limonium sinuatum*)**

Saw two types, both only a few grains

First - turtle shell pattern

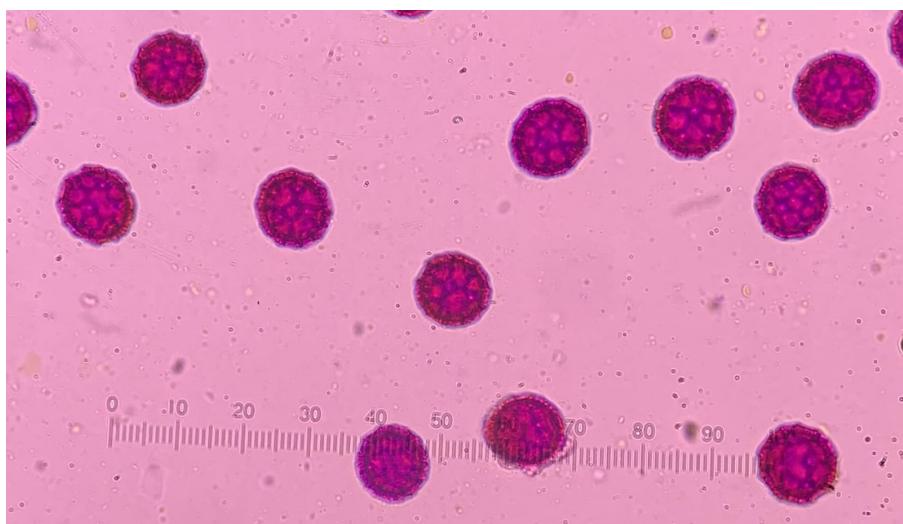


Second - smooth/ finer texture



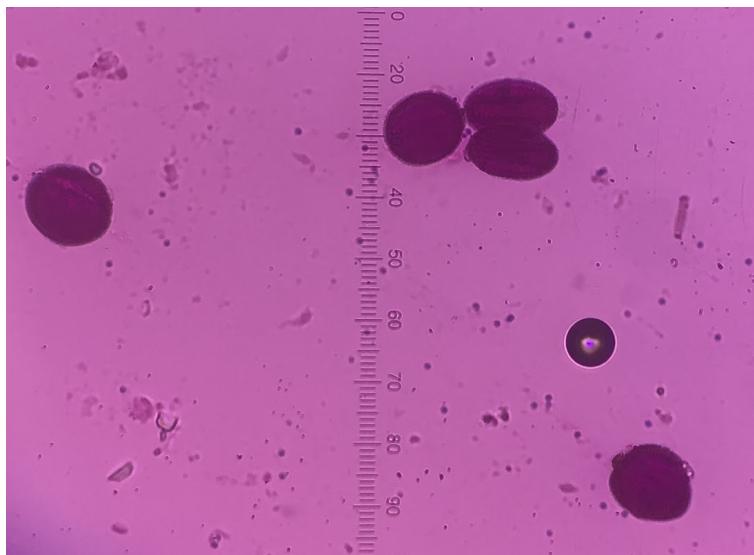
## Polemoniaceae Family

### **Phlox (*Phlox* sp.)**



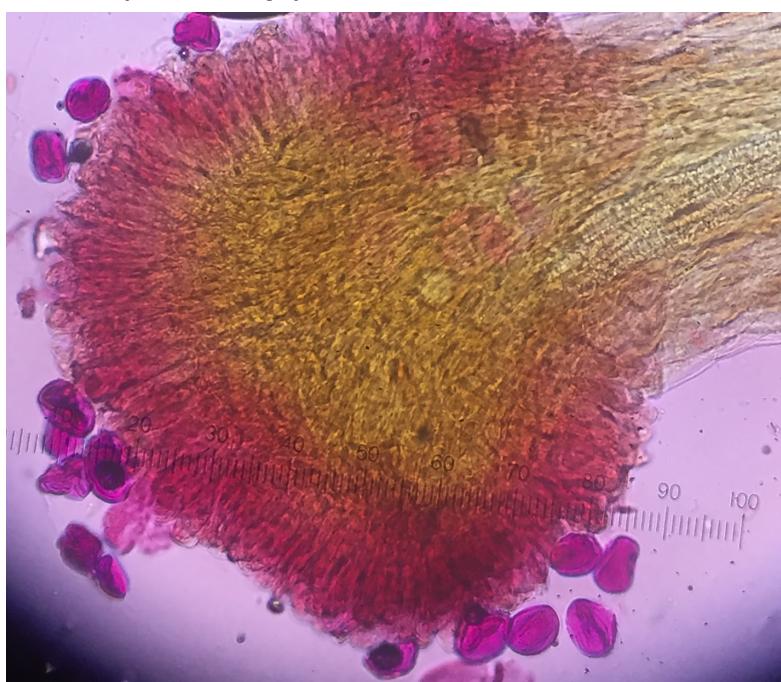
## Polygonaceae Family

Buckwheat (*Fagopyrum esculentum*)



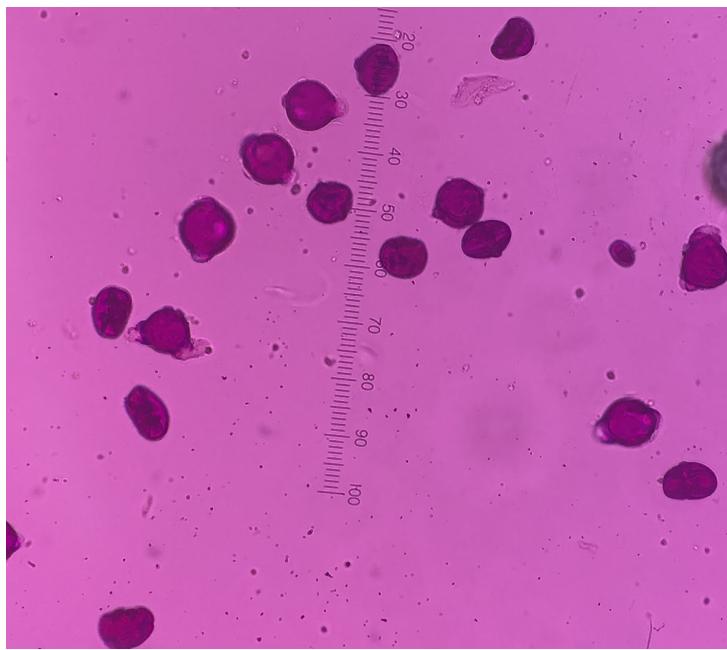
## Rubiaceae Family

Galium (*Galium* sp.)



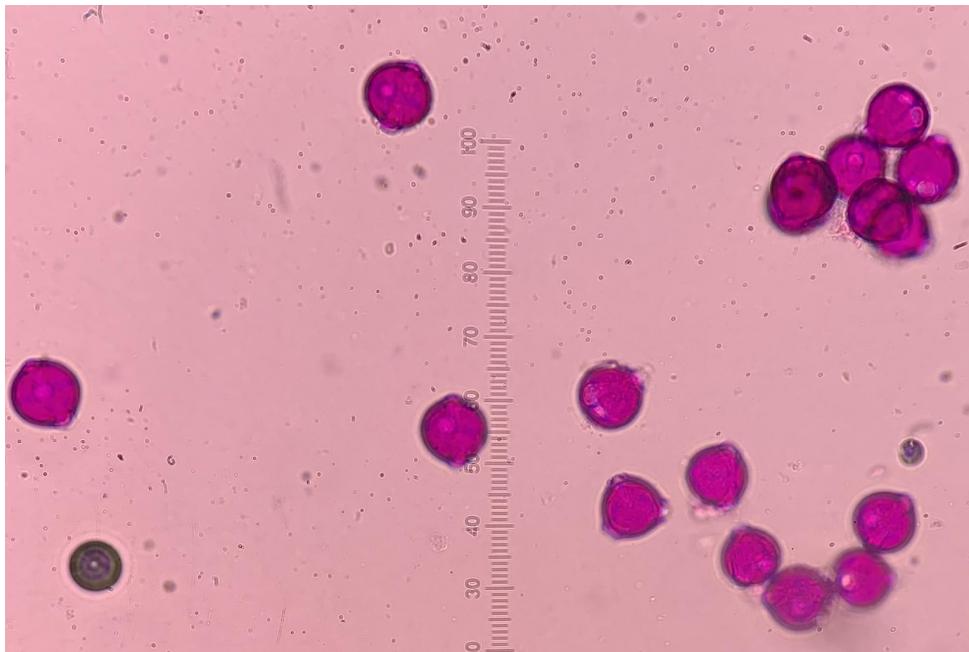
## Scrophulariaceae Family

**Butterfly bush (*Buddleja* sp.)**

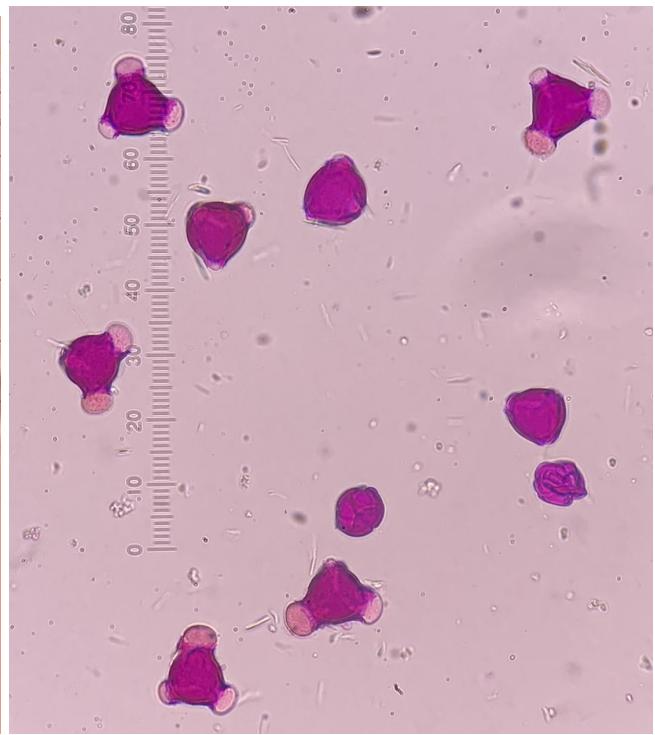
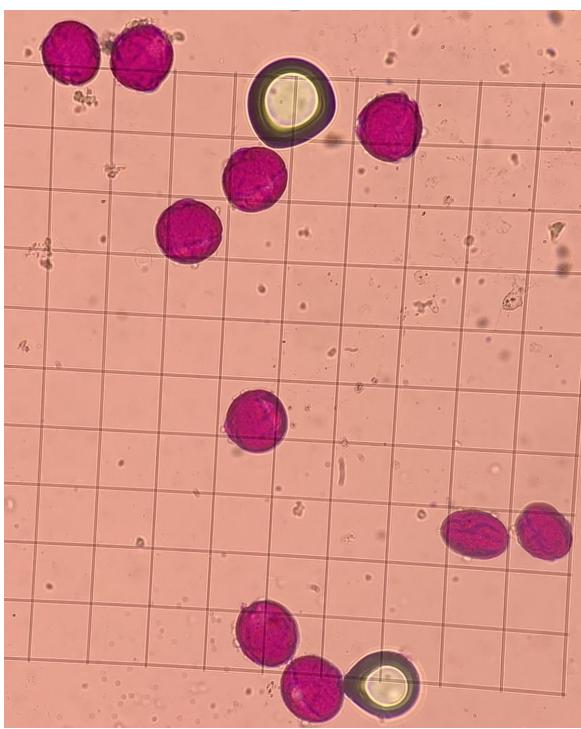


**Solanaceae Family**

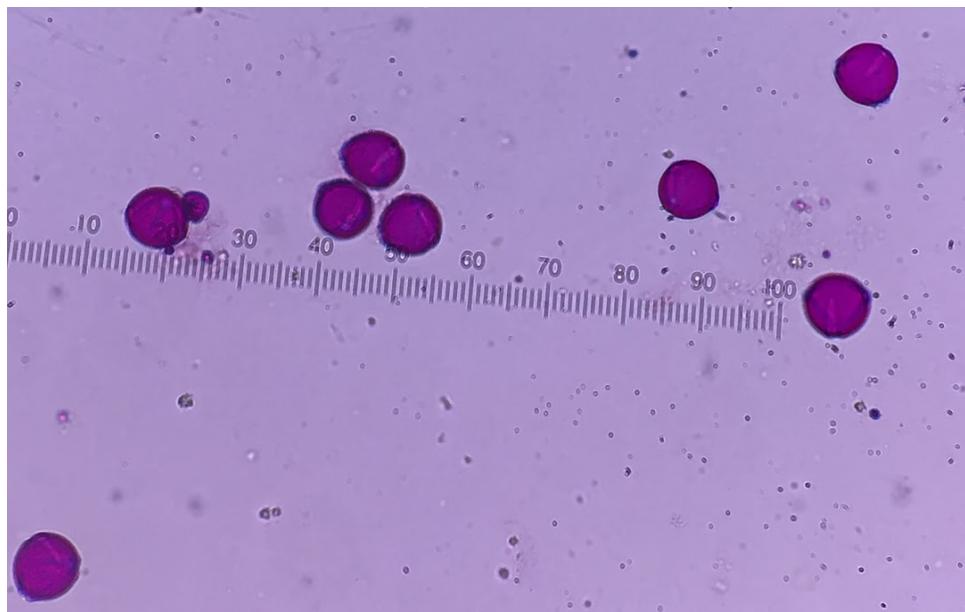
**Eggplant (*Solanum melongena*)**



Hot pepper (*Capsicum annuum*)

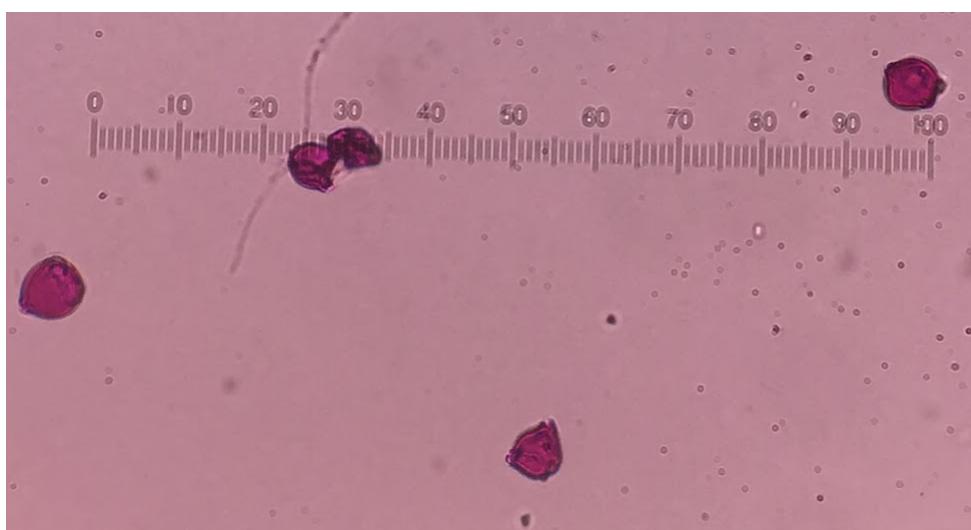
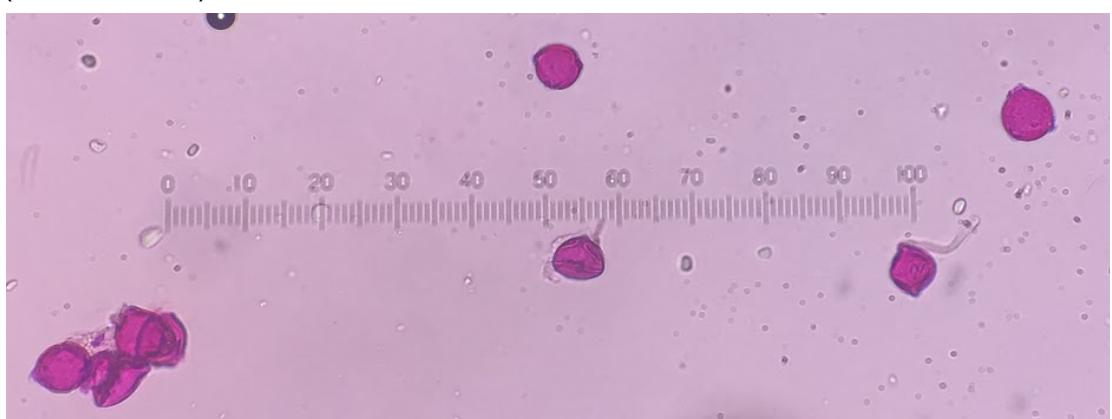


Tomato (*Solanum lycopersicum*)

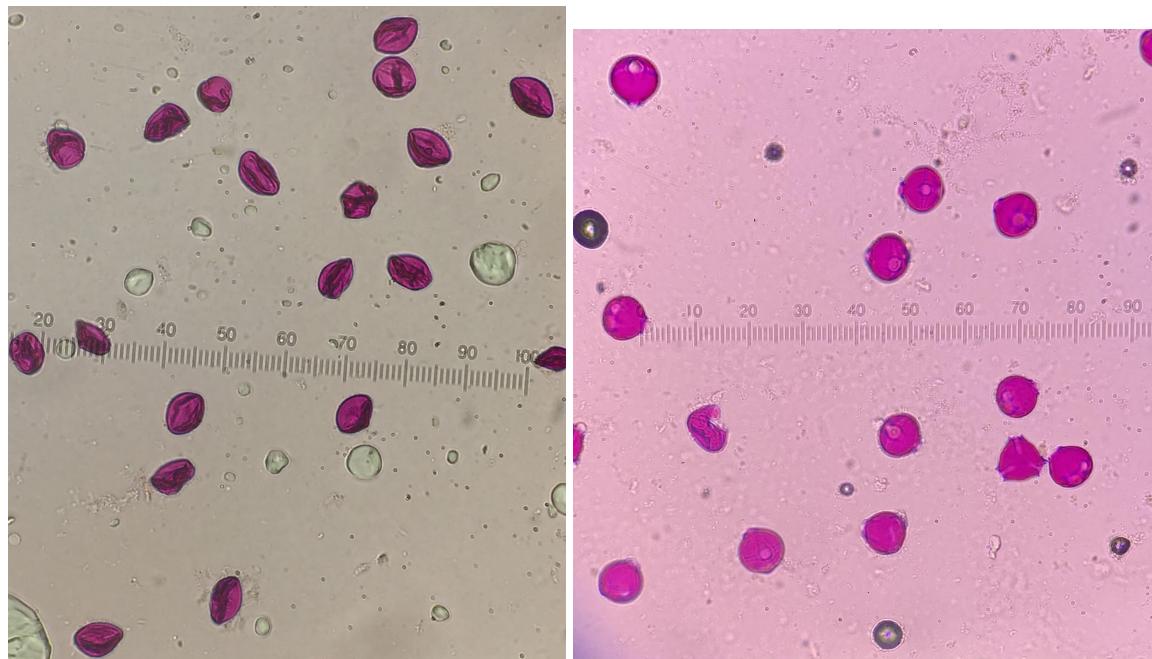


**Solanum sp.**

(small flowers)



**Tomatillo (*Physalis philadelphica*)**



**Verbenaceae Family**

**Purpletop vervain (*Verbena bonariensis*)**