Culturing *Euglena*

Live Material Care Guide

Background

The various species of the genus *Euglena* swarm in stagnant pools and ditches, especially those contaminated with fecal matter. The organisms are often so abundant the water becomes green and soup-like in appearance. *Euglena* have unique anatomy—flagella for mobility, internal chloroplasts for photosynthesis, and a gullet (mouth region) for taking in large food particles. Despite these structures, *Euglena* thrive better if amino acids are present in the water and the organisms are kept out of direct sunlight. *Euglena* reproduce asexually. Under stressful conditions, the flagellum is withdrawn, the body becomes spherical, and forms a resistant cyst which can last up to several months. *Euglena* may be kept in this state for extended periods of time and then revived as needed by adding fresh media. (This property may be useful in a school setting for maintaining cultures during breaks in the school calendar.) *Euglena* are commonly used by students to evaluate classification criteria and for exploring the difficulties inherent in classifying organisms. Studies of *Euglena* can illustrate that differences between plants and animals may not be as clear cut as students often believe.

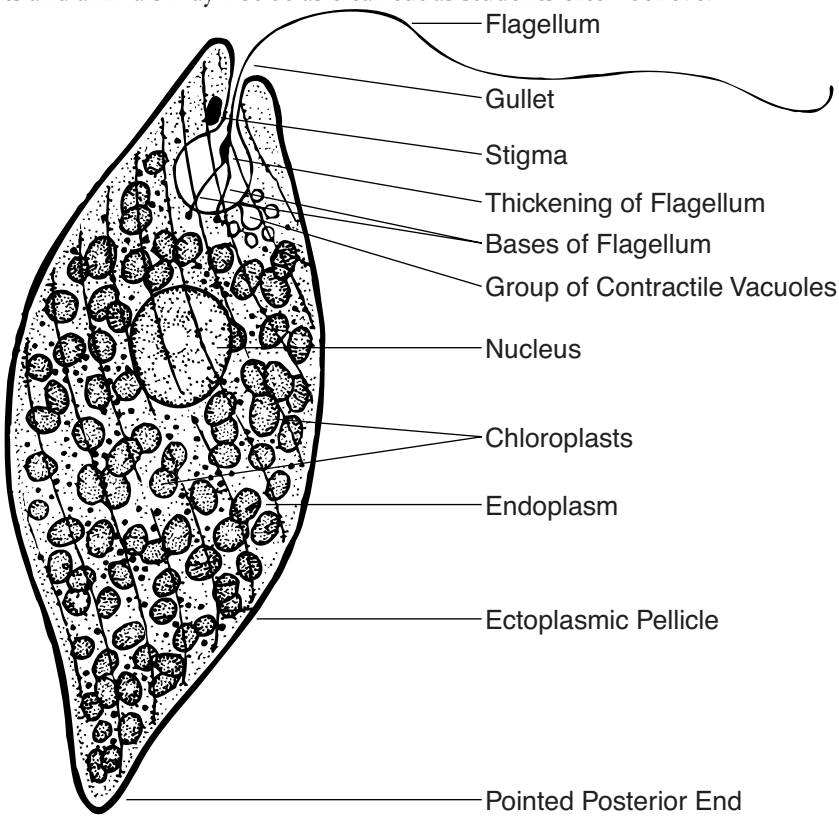

Figure 1. *Euglena*

Culturing/Media

Upon arrival of *Euglena* stock cultures, loosen the caps and immediately aerate the cultures by forcing air into the liquid using a clean pipet or an aquarium pump. Cultures should be kept at 16–22 °C and placed in a well-lit area out of direct sunlight. If the cultures get too warm, the heat will drive off oxygen in the water. Artificial illumination from normal fluorescent lights is usually adequate. A certain amount of experimentation may be necessary to find a suitable place to house stock cultures. Initially, it is wise to place multiple subcultures in a variety of sites while trying to determine the best environment for culture storage.

To prepare culture media for *Euglena*, use Pringsheim's Soil Water with a pea cotyledon or prepare Chalkley's as follows. Combine 1 L of spring water or Chalkley's 1x solution or Pringsheim's, 20 wheat or rice grains, and 5 mL (1 tsp) of dry powdered milk in a beaker. Boil the mixture for 5–10 minutes, and then dilute this mixture with 3 L of spring water. Let this solution cool and stand uncovered for 24 hours.

Shake or stir the media solution and fill shallow containers with wide bottoms approximately half full. (Stacking culture

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bowls work best.) Add 50–100 mL of *Euglena* stock culture to each bowl. The *Euglena* culture medium contains a great deal of organic matter. Bacteria will grow rapidly and the cultures are likely to have a pungent odor for several days. (Take this into consideration when selecting a culture storage location.)

Monitor the vigor of *Euglena* cultures regularly using a dissecting scope. Cultures can reach a "balance" and thrive for months or can "crash" within several weeks. When a population starts decreasing, transfer culture liquid to fresh media.

Chalkley's Stock Solution 10x*

0.06 g	$CaCl_2$
1.00 g	NaCl
0.04 g	KCl
1 L	Distilled water

*Dilute by a factor of 10 for 1x (e.g., dilute 100 mL to 1 L with distilled water)

Tips

- *Euglena* are small compared to other protists that may be studied by students. Therefore, it is important to have dense, viable cultures to assure student success. Scan for *Euglena* under low power (40X). Studying *Euglena* under higher magnification (400X) will reveal the intricate internal structures of *Euglena*. The green chloroplasts and the long flagellum will be the two most obvious features.
- A solution of methyl cellulose is helpful in slowing down the fast-moving *Euglena* during microscopic observation.
- Have students view prepared slides of *Euglena* first.
- *Euglena* exhibit positive phototaxis.

Disposal

Euglena may be disposed of according to Flinn Biological Waste Disposal Method Type IV. Please consult your current *Flinn Scientific Catalog/Reference Manual* for proper disposal methods.

Materials for *Culturing Euglena* are available from Flinn Scientific, Inc.

Catalog No.	Description
LM1039	Euglena, 30
LM1040	Euglena, 100
FB0541	Wheat Seed, 100 g
M0155	Quieting/Slowing Solution for Protozoa, 20 mL
ML1378	Depression Slides, Single

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.