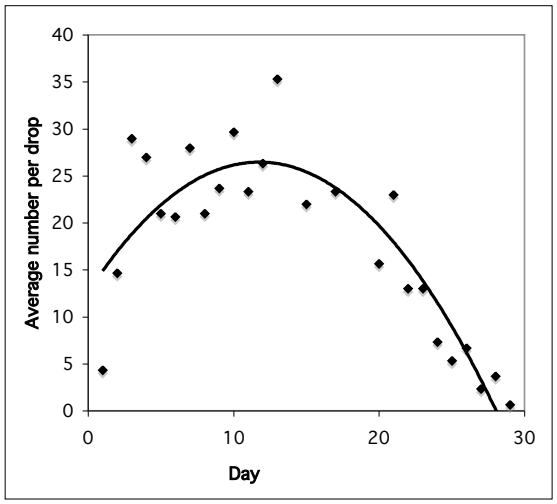
1.8) INSTRUCTOR'S GUIDE TO THE POPULATION DYNAMICS OF PARAMECIA

Overview: Prepare media by boiling about 100 grams of hay in 1 liter of tap water. Distribute the hot media into 125-mL Erlenmeyer flasks (about 2/3 full) and add 3-5 wheat grains per flask (the "bulgur wheat" which is usually available at health food stores can be used for this purpose). Plug the top of each flask with cotton and let it cool to room temperature. For long-term storage; cover the cooled flask with a rubber stopper or sheet of paraffin wax, and refrigerate up to 30 days. Bacterial contamination usually is not a concern because *Paramecia* eat bacteria, so sterile technique is not really necessary. A plastic Petri dish is preferable for counting because it repels water, thereby causing the drop to be more compact. The graph below is based on a 30-day trial:



Answers to Questions: 1) Answers will vary. Peak values may range from 25-35 per drop. 2) Answers will vary because this depends on average room temperature. Populations levels may peak from 1-2 weeks following inoculation. This level usually crashes in less than one week. 3) Answers will vary. This usually takes place within 3 weeks. 4) The shape is parabolic. 5) Lack of food, oxygen, and accumulation of waste products. 6) Higher temperatures will speed up this process, food availability may also play a role.

Logistics: This is a long-term lab that lasts from 30-60 days. Each daily reading (consisting of 3 counts) lasts 5-15 minutes, so you might choose to assign each student to take a reading on a given day and have this student come at the end of the assigned day when both the student and the instructor can spare a few minutes. It is wise to take your own count every other day to make sure that the student data are reliable. If you anticipate a holiday of more than two days, make arrangements to take the culture home so the counting will not be interrupted.

Degree of Difficulty: 2—The technique is easy to learn, but some students may struggle to count *Paramecium* when populations rise above 40 organisms per drop. This problem can be solved by diluting a subsample of the culture by a known volume and calculating based on the dilution factor.

Materials: A Pasteur pipette; *Paramecium* culture; a 125-mL flask; 200 mL of *Paramecium* media; a light microscope; a plastic Petri dish; and a small bottle of iodine solution.