

SECTION B – VIRTUAL POPULATION STUDIES INVESTIGATION

In this investigation an experiment was conducted in which two species of the protozoan *Paramecium*, were grown alone or together. The interactions between the two species and their influence on each other were investigated.

Objectives:

- To determine how competition for natural resources in the environment can affect population growth.
- To investigate how availability of resources, such as food, can be a limiting factor for population growth.

TABLE A : Growth of two species of *Paramecium* alone or in mixed culture over a period of 16 days

DAY	<i>P. aurelia</i> grown alone (cells/mL)	<i>P. caudatum</i> grown alone (cells/mL)	<i>P. aurelia</i> grown in mixed culture (cells/mL)	<i>P. caudatum</i> grown in mixed culture (cells/mL)
0	2	2	2	2
2	8	12	8	12
4	48	28	34	22
6	82	48	66	20
8	96	60	78	16
10	98	56	90	8
12	96	58	96	4
14	98	60	98	0
16	96	56	94	0

Now answer the following questions:

1.1. Write a possible hypothesis for this investigation. (2)

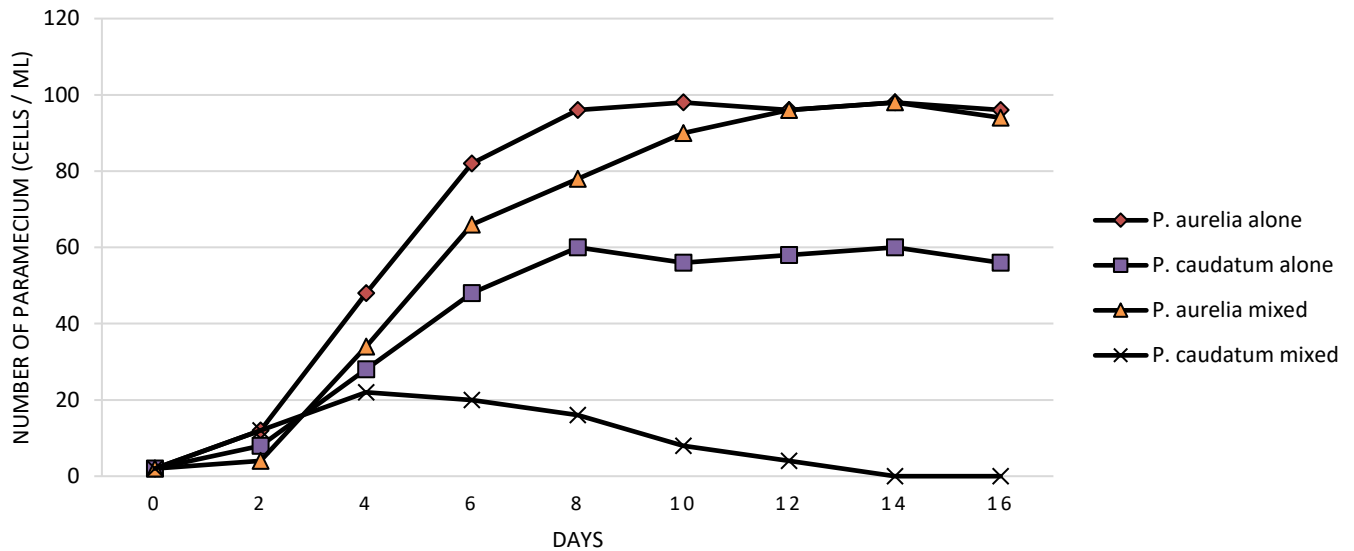
1.2. What is the ...

(a) Independent variable: _____ (1)

(b) Dependent variable: _____ (1)

The data in the table can be graphically represented as follows:

GROWTH OF TWO SPECIES OF PARAMECIUM ALONE OR IN MIXED CULTURE OVER A PERIOD OF 16 DAYS



- 1.3. On which day did the *Paramecium caudatum* population reach the carrying capacity of the environment when it was grown alone? Motivate your answer? (2)

- 1.4. On which day did the *Paramecium aurelia* population reach the carrying capacity of the environment when grown alone? (1)

- 1.5. Explain the differences in the population growth patterns of the two *Paramecium* species when grown alone in comparison to when they were grown together. (4)

1.6. Which **ecological principle** is displayed here? (2)

1.7. According to this study, which species of Paramecium is the dominant species in this ecosystem?

 (1)

1.8. What will happen to the non-dominant Paramecium species in this investigation?

 (1)

TOTAL SECTION B: [15]