

AGMIN NEWSLETTER No. 225

Growth Rates of Planktonic Algae and Algal Blooms Formation

Planktonic, unicellular algae such as the Cyanobacteria (blue-green algae) can multiply very rapidly under favourable conditions, which include:

1. Static water bodies
2. Ample sun-light
3. Warm temperatures
4. Adequate source of phosphate nutrients.

Under these circumstances, planktonic algae exhibit 20 - 25% growth rates per day, equivalent to a doubling rate in cell numbers over 3 - 4 days.

This rapid multiplication in algal cells leads to a formation of algal blooms, which dominate the aquatic eco-system to the exclusion of other algae, plants and fish. In the case of blue-green algae, these blooms can be highly toxic to animals and humans, if they ingest affected water or bathe in it. (Refer to Newsletter No. 222).

The Table and Graph below shows that an initial cell count of 200 cell/mL, leads to an Alert Level 1 of 2000 cells/mL within 10-15 days. If this growth is not controlled, the continuing multiplication of algal cells leads to the Alert Level 3, with 100,000 cells/mL in 25 - 30 days. The amount of toxins produced by blue-green algae is directly proportional to the cell density counts.

Hence, it is strongly recommended to treat an emerging algal bloom in the earliest stages of growth, at least at the stage of Alert Level 1 (2000 cells/mL). Cupricide® is highly effective against blue-green algae at 0.2 mg/L as copper and will immediately (12 - 24 hours) prevent the further growth of the impending algal bloom.

Growth Rate of Planktonic Algae

20% increase in cell count/day = doubling time of 4 days

25% increase in cell count/day = doubling time of 3 days

Day	20% Growth per Day (cells/mL)	25% Growth per Day (cells/mL)
0	200	200
5	500	610
10	1,240	1,860*
15	3,080*	5,680 ^{A**}
20	7,700 ^{A**}	17,300 ^{***}
25	19,000 ^{***}	53,000
27	27,500	83,000
28	33,000	103,000
30	47,000	160,000
35	118,000	490,000

Vigilance Level: 200 – 500 cells/mL

* Alert Level 1: 2000 cells/mL

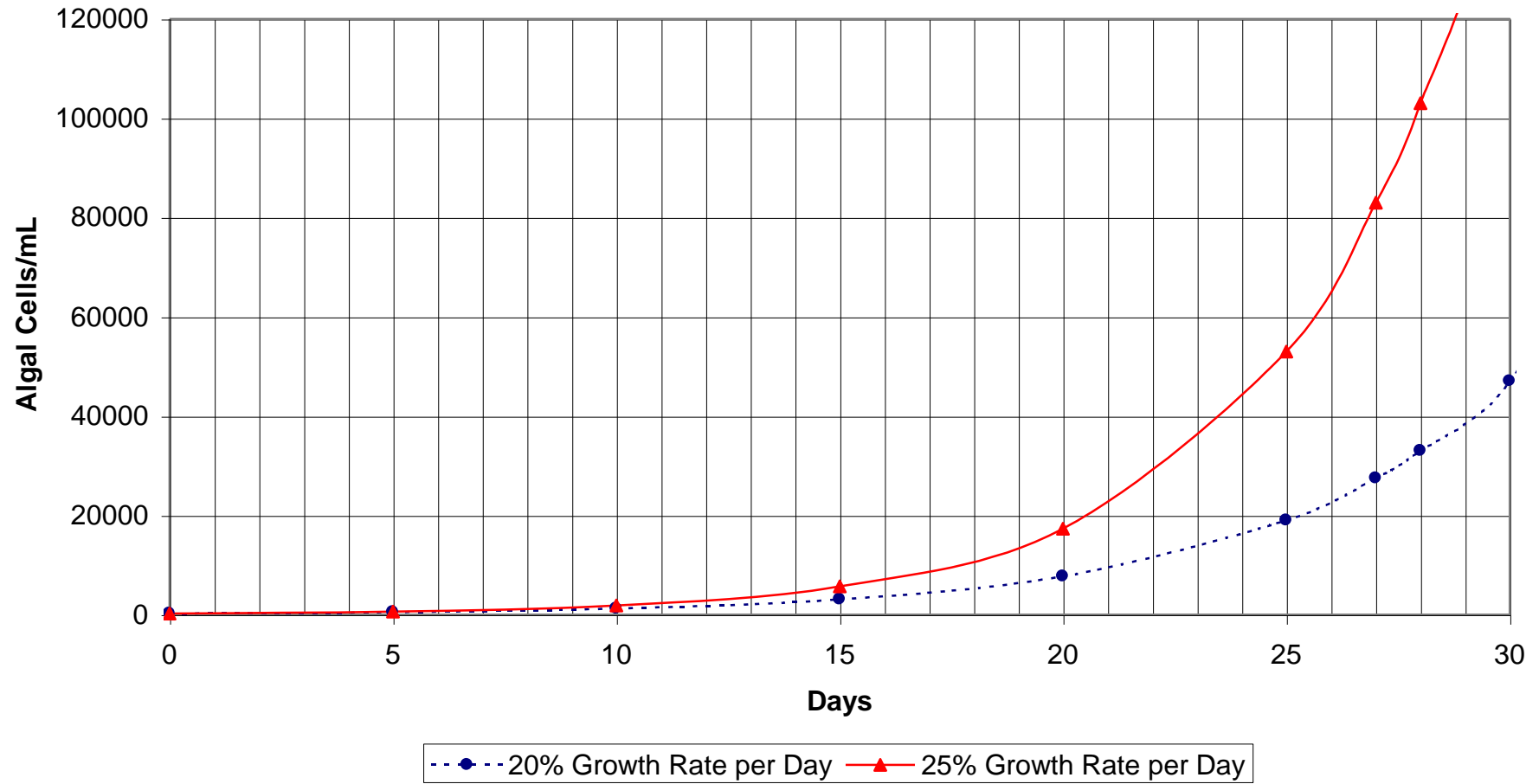
^A Epidemiology Guideline 1: 5000 cells/mL

** Alert Level 2: 2000 – 15,000 cells/mL

*** Alert Level 3: 15,000 – 100,000 cells/mL

Note: Graph showing these tabulated results are over the page.

Growth Rate of Planktonic Algae



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