

Parsons T R, LeBrasseur R J & Fulton J D. Some observations on the dependence of zooplankton grazing on the cell size and concentration of phytoplankton blooms. *J. Oceanogr. Soc. Jpn.* 23:10-7, 1967.  
[Pacific Oceanographic Group, Fisheries Research Board of Canada, Nanaimo, British Columbia, Canada]

Measurements were made of zooplankton grazing on natural populations of phytoplankton. Results showed that different zooplankton species grazed different sized phytoplankton and that food consumption was an asymptotic function of algal concentration. [The *SCI*® indicates that this paper has been cited in over 150 publications, making it the most-cited paper for this journal.]

Timothy R. Parsons  
Department of Oceanography  
University of British Columbia  
Vancouver, British Columbia V6T 1W5  
Canada

March 1, 1988

From about 1965 to 1968 a group of scientists from the Fisheries Research Board of Canada carried out ecosystem studies on the plankton and fish communities of some British Columbian fjords. These were multidisciplinary studies that *in toto* led to a much better understanding of how the supply of phytoplankton could eventually affect the feeding of commercially important young fish such as salmon. Many previous field studies on plankton had been carried out by scientists working on one part of the community (i.e., phytoplankton or zooplankton) without any trophodynamic integration of their work. Also, laboratory studies on phytoplankton and zooplankton physiology had developed quite well by the 1960s, but the adaptation of these experiments to field conditions was not widely practiced.

Our 1967 study reports on zooplankton/phytoplankton feeding relationships using natural populations of both plants and animals over a period of two months. The importance of the work appears to have been in the identification of an asymptotic relationship between zooplankton ration and phytoplankton cell concentration that was to some extent dependent on the cell size of the algae. This topic was discussed later by M.M. Mullin and E.F. Stewart;<sup>1</sup> Mullin was also involved in laboratory feeding experiments<sup>2</sup> that were important precursors to our work. The second important suggestion made in our paper was the existence of a low phytoplankton prey density below which zooplankton did not graze. This lower threshold has been a controversial suggestion,<sup>3</sup> but the recent use of high-speed microcinematography confirms a marked reduction in zooplankton feeding motions at very low algal concentrations.<sup>4</sup>

The reason that this paper has been widely cited appears to lie in the difficulty of deciding exactly how microscopic planktonic animals feed. I believe that it stimulated some later experiments in the physiology of feeding. However, our original purpose of encouraging multidisciplinary trophodynamic studies on ecosystems was the important mission in all of our fjord studies,<sup>5</sup> of which the above paper was but a small part.

[Editor's note: Professor Parsons was awarded the Oceanographical Society of Japan Prize for 1988 for his work on plankton feeding.]

1. Mullin M M & Stewart E F. Ingestion by planktonic grazers as a function of concentration of food. *Limnol. Oceanogr.* 20:259-62, 1975. (Cited 90 times.)
2. Mullin M M. Some factors affecting the feeding of marine copepods of the genus *Calanus*. *Limnol. Oceanogr.* 8:239-50, 1963. (Cited 180 times.) [See also: Mullin M M. Citation Classic. (Barrett J T, comp.) *Contemporary classics in plant, animal, and environmental sciences*. Philadelphia: ISI Press, 1986. p. 145.]
3. Frost B W. Effects of size and concentration of food particles on the feeding behaviour of the marine planktonic copepod *Calanus pacificus*. *Limnol. Oceanogr.* 17:805-15, 1972. (Cited 285 times.)
4. Price H J & Paffenhofer G A. Effects of concentration on the feeding of a marine copepod in algae monocultures and mixtures. *J. Plankton Res.* 8:119-28, 1986.
5. Parsons T R & LeBrasseur R J. The availability of food to different trophic levels in the marine food chain. (Steele J H, ed.) *Marine food chains*. Edinburgh: Oliver and Boyd, 1970. p. 325-43.