



Standard Practice for Sampling Zooplankton with Conical Tow Nets¹

This standard is issued under the fixed designation E 1201; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers the procedure for obtaining qualitative samples of a zooplankton community by use of conical tow nets. Nets will collect most zooplankton, but some forms will avoid nets.

1.2 *This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Summary of Practice

2.1 The net is attached to a tow line and towed at the desired depth, using a cable depressor if necessary. After a specified distance or period of time, the net is retrieved and the captured zooplankton are removed from the net. The zooplankton may be preserved as dictated by the objective of the study.

3. Significance and Use

3.1 The *advantages* of using conical tow nets are as follows:

3.1.1 They are relatively inexpensive and highly versatile in a variety of inland, estuarine, coastal, and marine waters.

3.1.2 They can be used from a small or large powered boat with a minimum of auxiliary equipment.

3.1.3 They can be used to collect qualitative samples and semiquantitative samples when fitted with a flowmeter and even better samples when fitted with a companion meter on the outside of the hoop to monitor filtering efficiency.

3.2 The *disadvantages* of conical tow nets are as follows:

3.2.1 When equipped with a flowmeter they require frequent maintenance including calibration and, in some types, lubrication.

3.2.2 They are effective only where drawn through a stream of water having considerable thickness. They are not suitable for collecting samples from a small or restricted region.

3.2.3 They are not suitable for collecting in very shallow water.

3.2.4 They are clogged by grass beds, coelenterates, and filamentous algae.

3.2.5 When used with a flowmeter, they collect only qualitative samples, or semiquantitative samples.

3.2.6 When sampling discrete depths using a horizontal tow, the sample can be contaminated from other depths during the deployment and retrieval of the samples if opening and closing devices are not used.

3.3 There are several *special considerations* that shall be observed when using conical tow nets. They are:

3.3.1 Conical tow net samplers are designed to be towed at speeds less than three knots; however, greater speeds have been used for the larger nets with a concomitant increase in capture.²

3.3.2 A conical tow net 0.5 m in diameter or larger shall be used to reduce avoidance by organisms.²

3.3.3 The nets shall be washed frequently and inspected for pin-size holes, tears, net deterioration, and other anomalies.

3.3.4 Nets should be allowed to dry while suspended full length in air and in subdued light prior to storage.

3.3.5 Lower catches per sample may result when collections are made during the day. These are particularly noted in the larger zooplanktons.

4. Procedure

4.1 The conical net samplers are designed to be towed at speeds of approximately three knots. However, greater speeds of up to five knots have been used with a concomitant increase in organisms captured per unit volume of water filter.³

4.2 Select the bridle arrangement carefully. The most common arrangement is a three-point attached bridle resulting in considerable net avoidance.⁴ An attachment procedure resulting in no obstruction of the mouth is preferred and can be accomplished by using a simple gimbaled hoop arrangement, with a depressor at the bottom of the tow line.

4.3 Proper placement of the flowmeter within the conical net mouth is crucial for sample quantification. In order to

¹ This practice is under the jurisdiction of ASTM Committee E47 on Biological Effects and Environmental Fate and is the direct responsibility of Subcommittee E47.01 on Aquatic Assessment and Toxicology.

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² Schwoerbel, J., *Methods of Hydrobiology (Freshwater Biology)*, Pergamon Press, New York, NY, 1968, p. 200.

³ Clutter, R. I., and Anraku, M., "Avoidance of Samplers," *UNESCO Monograph on Oceanographic Methodology*, No. 2, 1968, pp. 57–76.

⁴ UNESCO, "Zooplankton Sampling," *Monographs on Oceanographic Methodology*, Unipub, Inc., New York, NY, 1968, p. 174.