

# Water transparency measurements using Secchi disk

## Background

- The Secchi disk was created by an astrophysicist, Pietro Angelo Secchi who was requested by the head of the Papal Navy to measure transparency in the Mediterranean Sea in April of 1865.
- A Secchi disk which is a circular, 20-centimeter diameter disk can be made from plywood, metal, or plastic. For easier visibility under water, the disk is divided into four equal sections and painted in alternate black and white quadrants.
- The disk could be attached to a rod, PVC pipe, rope or chain which should be permanently marked in inch or centimeter intervals.



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## Methods of measurement

- The disk is lowered into the water while observing and recording the depth at which the observer loses sight of the disk. The disk is then raised until it reappears.
- The average depth of the water where the disk vanishes and reappears is the Secchi disk reading.
- Mid day time suits better the measurement which should be done in the shade, and in sunny and calm days.



## Interpreting Secchi disk reading

- Secchi disk depths for seas and lakes could vary tremendously and may range from centimeters to tens of meters. In regard to fish ponds, maximum disk reading usually falls below one meter.
- Increased water transparency depth may be due to reduced nutrient inputs, increased grazing of algae by zooplankton or fish and reduced clay & suspended particles and could be also due to high flushing rate.
- Reduced water transparency depth could be due to the abundance of algae, increased nutrient inputs, and increased clay particles & other suspended materials.

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## Quality measurement

For a valid comparisons over time, some factors should be considered:

- Ensuring enough consistency in regard to the measurement location(s), timings and persons carrying out the measurements.
- Repeating the measurements is a good way to validate the measurement values

Even though Secchi disk is considered an excellent field tool for measuring water clarity, it has its own limitation.

Laboratory turbidity meters are used whenever scientific accuracy is required.

## Applications in fish pond management

- Clay turbidity is not desirable in almost all aquaculture systems.
- Desirable plankton densities may be required depending on farming system or cultured species.
- However, excessive nutrients that may result from over fertilizing or overfeeding could trigger undesirable plankton bloom.
- Water flushing, reducing or withholding fertilizers or feed are classic ameliorative actions usually taken against undesirable plankton bloom.
- Aeration (especially during night) should be considered for tackling dissolved oxygen problems associated with plankton bloom.
- Secchi disk measurements are used to determine the timings and quantities of fertilizers required.