# Life Cycle of Rhodophyta

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Rhodophyta is the scientific term for the entire classification more commonly known as red algae. These algae consist of between 2,500 and 6,000 species, with many distinct forms and life patterns. As a group, however, they generally demonstrate a life cycle showing three distinct stages.

## Algae

1. Algae consist of a broad selection of non-vascular, aquatic organisms similar to but separate from plants. The red algae, or rhodophyta, are true algae, unlike the cyano-algae, or blue-green algae, which are currently considered biologically separate. True algae are all eukaryotic, having cell nuclei contained in membranes. Red algae are consistent with this rule where blue-green algae are procaryotic and lack a cell nucleus. Red algae are occasionally found as single-celled organisms, but more commonly form larger multi-celled organisms--including a range of sea weeds, which are among the more commonly recognized forms.

## Considerations

2. There is a standard pattern of life cycle common to most rhodophytes. It is important, however, to realize that as wide a category of organism with so many variants will also display some variations in life cycle. If it is important to discuss a particular and specific algae's life cycle, it is equally important to research the specific species rather than assume all species will conform to the average pattern.

## Standard Cycle

3. The standard life cycle of rhodphytes includes three distinct stages, each a separate organism in the loop of reproduction. The three stages are the tetrasporophyte, the gametophyte and the cystophyte carpospores. Each of these forms of algae will produce offspring which may take the form of another stage.

## Tetrasporophyte

4. The tetrasporophyte is a form of the algae that contains a full pair of genetic sets in each cell: it is "diploid," which means it contains a set from a male parent and also from a female parent. The tetrasporphyte has the general form common to its own particular species of algae--seaweed forms vary, but the tetrasporophyte will look like standard seaweed of its type. The tetrasporophyte is ungendered, being neither male nor female. It

produces reproductive spore-like or seed-like starter plants called tetraspores. These consist of four genetically identical cells with only one set of genetic material. Because these cells contain only half the genetic material ever used in the cycle of the species they are called haploid spores, meaning "half."

## Gametophytes

5. Gametophytes are nearly identical in appearance to tetrasporophytes. They look like the standard common version of the red algae. However, gametophytes are haploid rather than diploid organisms, each with only half the possible array of genetic material, unlike tetrasporophytes. Gametophytes are also gendered: they are the "male" and "female" forms of the algae. Gametophytes will produce male or female sex organs. Male sex organs, called spermantangia, produce cells called spermatia. They don't have the flagella true sperm have, but they serve the same biological function: they fertilize a female reproductive cell. The female reproductive organ is called the carpogonium, and it contains an egg. Spermatia are released into the water, where they float free until they come in contact with a carpogonium. They travel down a thin tube and fertilize an egg, producing a seed-like new form called a cystocarp.

## Cystocarp

6. Cystocarps are a full form in their own right, and while they serve very much as seeds serve plants, it is best to think of them as the third phase or form of the rhodophyta life cycle. A cystocarp returns the cycle to the diploid form originally found in the tetrasporophyte. Containing a set of genetic material from the male spermatia and a set from the female egg, the new form now has a full array of genetic material. The cystocarp will be released from the tubes of the algae and will drift free. In an environment appropriate to the particular red algae species the cystocarps will begin a new phase, and will develop into new, fully formed tetrasporophytes, completing the life cycle.