

# NON-INDIGENOUS AQUATIC SPECIES OF CONCERN FOR ALASKA

## Fact Sheet 16

## North West Pacific Red Alga *Rhodophyta (Chroodactylon ramosum)*

### BIOLOGY & PHYSIOLOGY

**Physical Description:** There are approximately 4,000 species of red algae and most are found in marine habitats with some in fresh water. As their name suggests, red algae are commonly reddish (some can be black in deep waters and greenish in more shallow waters) because of an accessory pigment called phycoerythrin. *Chroodactylon ramosum* (North West Pacific Red Alga) is a microscopic, primitive red alga. Its thallus consists of false-branched pseudofilaments composed of globose or barrel-shaped cells enclosed in a broad gelatinous sheath. It grows in dense tufts. The North West Pacific Red Alga is believed to lack the pigment phycoerythrin, giving this alga a more bluish-green color.

**Nutrition Requirements:** Red algae acquire nutrients from photosynthesis and by absorbing dissolved nutrients from the surrounding water.

**Reproduction:** All reproductive bodies (sperm, eggs and spores) of red algae lack flagella which is used for locomotion; thus, their gametes (eggs and sperm) and spores lack mobility. The North West Pacific Red Alga reproduces asexually (with no evidence of sexual reproduction) by direct transformation of undifferentiated vegetative cells into spores (monospores). These monospores are released in mid summer from the colonial sheath (a protective enveloping structure around the filaments).

**Lifecycle Stages:** The life history of an alga is of critical importance in any consideration of its biology, ecology or geographical distribution. Life cycles are especially diverse among the red algae. The life cycle of red algae typically involves an "alternation of generations" between diploid (a cell containing two sets of chromosomes, one set inherited from each parent) and haploid (a cell with one set of chromosomes) cells. Unlike other multi-cellular algae, red algae have no flagellated stages in their life cycles. A flagella is a structure used for locomotion. Eggs and sperm rely on water currents to get together.

**Habitat:** North West Pacific Red Alga is generally found in marine environments and brackish water (e.g. estuaries) where it is attached to other plant species. It appears that in many parts of the world, except in North America, this species is more common in brackish rather than marine waters. Studies have shown that filament morphology, cell diameters and lengths of North West Pacific Red Alga are quite similar in both brackish and marine forms. Virtually all forms of North West Pacific Red Alga that are found in brackish waters are limited to moving water because of requirements for gas and nutrient replenishment; low water flow is the major factor limiting its distribution. In North America, some species of the genus *Chroodactylon* tend to be found in large freshwater streams that are moderately flowing, warm (54-73°F) and alkaline (pH 6.8-8.5). North West Pacific Red Alga has been reported to be quite tolerant of a wide range of salinities and this particular species is wide spread in brackish waters. They have been observed in fouling communities in Prince William Sound, Alaska.

## **DISPERSAL POTENTIAL**

**Historical and Current Introduction/Spread:** North West Pacific Red Alga may originate from the North West Pacific; other sources indicate that it may actually originate from the Atlantic Coast. North West Pacific Red Alga has been observed in streams and rivers within Southern Ontario, Canada. It is currently widespread in Lakes Ontario, Erie and Huron. The Great Lakes population may have originated by a migration from the Atlantic Ocean via the St. Lawrence Seaway. In North America, North West Pacific Red Alga is much more widespread in the marine environments, extending from Massachusetts to Florida on the East Coast, in the Gulf of Mexico, and along the coast of California. Worldwide, it can be found in the North East and South East Atlantic, Mediterranean, Caribbean, North West and South West Pacific, Indian Ocean, the Philippines, and around Australia. The North West Pacific Red Alga was found growing on oyster floats in Tatitlek, Alaska but has not been found in the well-studied waters of British Columbia and Washington.

**Dispersal Methods:** Like most algae, red algae can reproduce and disperse from fragmentation of plant parts which then can be carried by ocean currents or humans. Short distance dispersal can occur by the gametes being carried on ocean currents. The North West Pacific Red Alga may have been introduced to the Prince William Sound and dispersed by the oyster industry and potentially by ballast water. Although there are no specific studies available on the introduction of North West Pacific Red Alga into Prince William Sound by ballast water, there are studies that show that North West Pacific Red Alga may have been introduced to the Great Lakes via ballast water, so ballast water is a known pathway for introduction of this species.

## **IMPACTS AND CONTROL**

**General Impacts:** Algal invasions can be of great concern because introduced species can have serious ecological consequences by competing with native macroalgae. Introduced species can eventually lead to changes in community structure and food webs. As fouling organisms, red algae can have ecological consequences when introduced to new habitats.

**Management Information:** Invasions by algal species have only recently received attention. Identifying the type and ecology of an invasive algal species can be very difficult but essential to understanding how to reduce or eradicate the invasive. Currently, molecular techniques that use DNA markers are being used to help identify and trace the origin of invasive species. There are no known eradication techniques currently being used for the NW Pacific Red Alga.