

Plant Adaptation

Educator- Summary of Lesson Plan 3

Objectives:

- . 1) Name 2 plants that can be found on Antelope Island
- . 2) Identify a plant adaptation

Introduction

Antelope Island plants have to adapt to a desert environment as well as a salt saturated environment. For most plants, too much salt would kill it. There are plants known as Halophytes that have special adaptations for managing their salt content. You can find some halophytes here on the island, mostly on the beach and near the water. Two examples of halophytes on the island are **Pickleweed** and **Fragrant White Sand Verbena**.

Pickleweed – This plant has an adaptation that allows it to hold the toxic salt water in little cell pockets (vacuoles). With the salt being pumped into a vacuole, (storage unit), the plant can then use the water it needs and store the salt it doesn't. These cell pockets, (vacuoles), make the plant spongy and squishy. Pickleweed is edible. Try some!

PLEASE REFER TO PICTURE OF PICKLEWEED IN BINDER PRIOR TO INGESTION

Fragrant White Sand Verbena- These plants have glands which take the excess salt and secrete it out of the cells and onto the surface of the leaf. You will notice that the leaves of this plant are covered with salt.

PLANT ADAPTATION

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Third stop- (line of vegetation just prior to the water's edge)

Information to provide:

A) Adaptation

- Antelope Island plants have to adapt to a desert environment as well as a salt saturated environment. For most plants, too much salt would kill them. There are plants known as Halophytes that have special adaptations for managing their salt content.
- Halophyte- A plant that is salt resistant or salt tolerant plants that thrive and complete their life cycles in soils and or waters containing high salt concentrations.
- The secret to pickleweed's high salt tolerance is found within its cells. Salt is a combination of two atoms, chlorine (Cl) and sodium (Na). It is known as sodium chloride (NaCl). When salt dissolves in water, the particles, or ions, Na^+ and Cl^- , are separated from one another by water particles

B) Examples of two halophyte plants that can be found on Antelope

Island are Pickleweed and Fragrant White Sand Verbena. (refer to pictures provided in binder of Pickleweed and Fragrant White Sand Verbena)

- **Pickleweed** (has other names such as marshfire, red swampfire, Salicornia, common glasswort) This plant can grow in a soil salinity of up to 6% but usually is found in areas of approximately 2.4%.
- The secret to pickleweed's high salt tolerance is found within its cells. Salt is a combination of two atoms, chlorine (Cl) and sodium (Na). It is known as sodium chloride (NaCl). When salt dissolves in water, the particles, or ions, Na⁺ and Cl⁻, are separated from one another by water particles.
- When the plant absorbs water through its roots these dissolved particles flow into the plant with the water. Salt in high concentrations is highly toxic to the plant. Therefore, there must be some kind of mechanism that can filter out or excrete the salt from the leaves and remove it from the cells.
- Some salt is filtered out at the roots by tiny sodium-potassium pumps within the cell membrane. Although these pumps filter out a lot of the salt there is still a great deal that "leaks" into the plant. Some salt plants, like **Fragrant White Sand Verbena** have glands which take the excess salt and secrete it out of the cells to the surface of the leaf. However, **pickleweed** does not have salt secreting glands. Instead it has

a special storage facility - the vacuole, a membrane bound structure inside all plant cells.

- In salt-succulent halophytes like **pickleweed**, energy requiring pumps within each cell move the salt into the vacuole where it is stored. When the vacuole cannot hold any more salt the cell breaks down and dies. If you taste the glands they would be very salty like pickles. That's how they got the name pickleweed. ([Trefil & Hazen, 1995](#))

C) Pickleweed is edible. (refer to picture of pickleweed and you can take small pieces and have the students try some) Dependent on the season you may not have an opportunity to do this due to lack of pickleweed in the area. The pickleweed we have at Bridger Bay (where you are at) turns red in the fall.

D) Fragrant White Sand Verbena can be found growing by the metal walkway. (can show students on the way back up to the pavilion)
NOT EDIBLE

**END OF STOP 3 AND TIME TO HEAD TO THE WATER'S
EDGE!**