http://beyondpenguins.nsdl.org/
Issue 13: Tundra

A Tundra Tale

by Stephen Whitt

The **tundra** is a land with no trees. It is cold, even when the summer sunshine finally melts the top layer of ice. Below ground, away from the warming rays of the Sun, the ice never melts. This layer of **permafrost** keeps the water above from draining away. Instead, the water forms a shallow **marsh**.

The tundra seems uninviting. It rarely rains or snows here. Yet there is life, if one knows where to look. The plants and animals of the tundra marsh depend on one another. Their relationships form interconnected webs of life. Each web tells a story. Here is one story of the tundra marsh.

A splash of color, bright yellow against the dirty brown earth, springs from the cold wet ground. It is a marsh marigold, its hardy flowers stretching toward the Sun. The flower of the marsh marigold is shaped like a cup. This shape protects the precious flower parts inside and helps the flower soak up the Sun's energy.

There aren't many **nutrients** in the tundra's poor soil for the plants to use. But a yearly traveler, the large, shaggy caribou, fertilizes the soil with its droppings when it stops here to rest, to drink, and to nibble on the sparse plant life.

On this day, a small group of caribou wanders by the marsh marigolds, looking for food and drink. They bend their heads and nibble. But then the caribou pause. They have sensed a most unwelcome intruder. The caribou snort and trot away. What caused their reaction? Arctic wolves? A human hunter? No, this is a small creature, one you might not even notice.

If you glance into the open flower of the marsh marigold, you will see it. Within the flower is a bot fly. The marigold's yellow color attracts the large, hairy, striped flies. Though they look like bumblebees, they are without stingers. Strangely, they also lack mouths. As adults, bot flies do not eat. Instead, bot flies seek out the marsh marigolds, not for nectar or pollen, as a bumblebee might, but for warmth.

The marsh marigold follows the Sun in its slow movement across the Arctic sky. Inside the flower, the cold fly can warm itself up. While the fly gathers the rays, pollen from the flower settles on the fly's body. The pollen clings to the fly's legs and abdomen, even after the fly flies away.

Flesch-Kincaid RL = 5.0

Marigolds reproduce by moving pollen from one flower to another. If the same fly visits a second marsh marigold, the pollen from the first flower may fertilize the second. Later, as the summer fades away, seeds develop where the flower once grew. The seed pods dry, then explode, flinging marsh marigold seeds into the wind. The seeds will lie on the tundra floor until cold meltwater again dampens the soil. Then the seeds will sprout. The flowers will grow and spread a new splash of color across the tundra.

But what of the bot fly? Why did the caribou run from this small creature? When the female fly is warm enough, she will leave the marsh marigolds behind and buzz through the Arctic air, searching out a mate. After mating, the botfly now must find a home for her young. That home is the nose of the caribou.

The botfly is a **parasite**. It depends on its caribou host for warmth, food, and protection. When the botfly finds a caribou, it crawls into the caribou's nose. There it releases its young; dozens of squirming, wormlike **larva** called maggots. The maggots crawl through the caribou's nose and into its breathing passages. There the maggots will feed and grow.

When they have eaten their fill and changed into **pupae**, the maggots release their hold on the caribou's nose lining. The irritated caribou sneezes a loud sneeze, and out tumble the botfly pupae. Much like the marigold seeds, the pupae land on the tundra floor. And there, like a caterpillar in a cocoon, the pupae change and grow into adult flies. When the time is right, the flies **emerge**. If they are near summer meltwater, those same flies may find their way to a colorful marsh marigold, gathering both sunshine and pollen within the flower's protective cup.

And so the web is complete. Without the caribou, the bot flies could not survive. But without the flies, the marsh marigolds could not spread their cheerful colors across the bleak tundra landscape. All are connected, and all play their role. And that's nothing to sneeze at!

Glossary

emerge – come out into view

larva – the first stage in the life cycle of an insect

marsh – land covered by shallow water

Flesch-Kincaid RL = 5.0

nutrients – substances, such as minerals, which all living things need to grow

parasite – an organism that survives by living on or in another animal and feeding on that animal

permafrost – a layer of frozen soil and ice below the ground. Permafrost does not melt.

pupae – a stage in the life cycle of an insect, in between the larva and adult stages

tundra – a place with a cold and windy environment and no trees. The land is covered with ice and snow for most of the year.

Flesch-Kincaid RL = 5.0