**Adaptations to Life In The Arctic**

**1. Brow tines protect eyes**  
The long forward section on each antler is called the brow tine, although reindeer may not have brow tines on each antler. These brow tines help to protect the reindeer's eyes when they are sparring with another reindeer, scraping their antlers on a shrub, or feeding on tall willows leaves in the summer.



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**2. High nutrient milk**  
Reindeer milk is extremely high in fat and protein. Only sea mammals such as seals secrete more concentrated milk. Newborn reindeer calves start to nurse their mothers almost immediately after birth. The highly nutritious milk enables the calves to grow and develop very rapidly and provides the energy needed to follow their mothers who are nearly constantly moving in search of food, seeking shelter from wind and cold, or escaping from predators.

**3. Camouflage**  
****In winter, the hair of the reindeer's hide is many-colored. The mane is white. The underbelly, rump, legs, and face are generally dark brown and the shoulders and ribs are light tan. In summer when the long guard hairs fall out and the soft fine 'downy' hairs are exposed, the reindeer appear dark colored, and often black (with white 'socks'). When considering the colors in the vegetation, snow, and on the hills and mountains in the background, it is thought that the reindeer's hair color serves to conceal them from predators. Unfortunately it also makes is more difficult for the herders to find and follow the herd. Therefore, experienced reindeer herders usually include a few white colored or spotted reindeer in their herd to aid in locating the herd.

**4. High Flotation**  
A swimming reindeer seems to 'ride high' on the water. This results from the great buoyancy imparted by the air trapped within the hollow guard hairs. Reindeer are known to be great swimmers and will cross wide rivers and lakes during their annual migrations.

**5. High stepping gait**  
The reindeer's high stepping gait enables it to plant its feet accurately. This specialized and exaggerated type of walking and running helps the reindeer to travel across bogs and tussocks, deep snow and ice.

**6. Travel through snow**  
The relatively long legs of reindeer enable them to travel through deep snow in their almost constant search for food or when traveling to the calving grounds.

**7. Hooves as snowshoes**

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**Broad hooves and dewclaws act as snowshoes and thereby enable the reindeer to travel more easily across deep snow. Other members of the deer family generally have small pointed hooves and, because they are not able to travel freely, may become restricted to small grazing areas called 'yards' when snowfalls are heavy. As a result, death losses from starvation among these deer can be very great.**

**8. Hooves as shovels**

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The broad, snowshoe-like hoof enables the reindeer to dig through snow in search of food. Researchers have found that reindeer can dig feeding craters when snow is as deep as 3 feet. Their shovel-like hooves also enable the reindeer to chip through hard and crusted snow. However, when icing conditions are severe, digging becomes impossible and the reindeer must move, often several miles, to more favorable feeding areas.

**9. Hoof hair for quick stops**

**** Look closely at the underside of a reindeer's hoof and you will see hairs that extend down and across the pad. These hairs are thought to enable the reindeer to better control the movement. **of its feet, for example, to prevent slipping on slippery ice**

**10. Nose warms air**

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**The nostrils of reindeer are very highly developed for water and heat conservation. When seen in cross-section they appear as a rolled newspaper. Scientists call this a rolled scroll and have established that this specialized structure vastly increases the surface area within the nostrils. While the explanation of the biological function of this tissue is complex, we know that incoming air is warmed before it reaches the lungs and that heat in the expired air is 'robbed' and returned to the body before it is exhaled. Also water in the expired air condenses in the cooler portion of the nostrils and is used to moisten the incoming air or is absorbed back into the blood. This explains why you seldom, if ever, see the reindeer's breath when it grazes peacefully in deep winter.**



**11. No chapped lips  
Hairs on face extend down to and almost completely cover the lips. This protects the muzzle from frostbite during winter when reindeer obtain their daily food as frozen vegetation from beneath the snow. The lips of a reindeer are very fleshy and mobile. You will also notice that reindeer have no upper front teeth or incisors. Both of these characteristics facilitate the harvesting of northern food plants such as lichens, grasses, and willow shrubs.**



**12.Large organs**  
Some researchers have reported that reindeer have larger vital organs (heart, lungs, liver) than similarly sized domestic animals such as sheep and goats. These organs provide the nutrients and energy necessary for work and survival. Therefore if reindeer must work harder, grow fatter, run more quickly and generate more heat in winter, their vital organs contribute to their survival.

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**13. Summer appetite**  
It is a curious fact that reindeer eat less food in winter than in summer. This fact holds true even when reindeer have access to an abundance of the most nutritious and preferred foods. It is also strange but true that reindeer expend less energy during the winter and that they almost always lose body weight and body substance (mostly fat). We now know that reindeer have evolved to survive by using their body tissues for essential body functions and by living a sedentary rather than a highly active life during winter.

In summer when food is abundant, reindeer eat large quantities of highly nutritious green vegetation. It is during this time that reindeer grow and deposit large pads of fat beneath the skin of the rump and back. These fat pads enable the reindeer to survive the long cold winter when food supplies are scarce.



**Winter appetite**  
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**15. Winter preference for snow**  
During winter, the only source of water available to reindeer is snow and stated very simply, snow is little more than solidified, pure water. It contains almost no dissolved minerals and in addition, is very cold. The reindeer must use precious body heat to melt and warm snow when they eat it. Yet when given the opportunity to select different kinds of water while on winter diets, reindeer almost always choose snow. They refuse to drink seawater, warm water, salt water or cold water.

The explanation for these observations is quite complex and it may seem difficult to understand how the reindeers' preference for snow helps it to survive during winter. Our current hypothesis is based on the very fact that snow is a very pure form of water, i.e. it contains no minerals. Further, the intake of minerals over and above the needs of the body for normal functioning requires that these minerals be eliminated in the urine. But this requires water and therefore the reindeer must take in more water. In winter, any available mineral rich water would be very cold and ingestion of large quantities would rob the reindeer of even larger amounts of body heat while warming it. Therefore we think that because snow contains no minerals, the daily water requirement for reindeer is minimized and body heat that would have been needed to warm larger amounts of water is conserved.

<http://reindeer.salrm.uaf.edu/about_reindeer/adaptations/index.php#Adaptations%20To%20Life%20In%20The%20Arctic>

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| About Us **Mission Statement** To further develop and promote the production of reindeer in the state of Alaska through research and collaboration with producers and local communities.  **Program Description** Since its establishment in 1981, the Reindeer Research Program has taken an active role in the development and promotion of the Alaskan reindeer industry. Our research projects run the gamut, ranging from herd management and animal health to nutrition and meat quality. What all of our projects have in common is their direct applicability to reindeer herders and producers. For detailed information regarding past and present projects, visit our [research](http://reindeer.salrm.uaf.edu/research) page.  In addition to our research projects, we are heavily involved in outreach activities, both to the reindeer producers and to the community. For more information, check out these pages:  [Unique Production Topics](http://reindeer.salrm.uaf.edu/outreach_to_producers/) & [Educational Outreach](http://reindeer.salrm.uaf.edu/educational_outreach/).  **Our captive herd** To learn more about our research herd, check out the [farm page](http://reindeer.salrm.uaf.edu/afes_farm/).  **Data management** More information on our data management and technology is coming soon.  **Staff** For more about us, please visit our [staff](http://reindeer.salrm.uaf.edu/about_us/staff.php) page.  **Program Mailing Address** Reindeer Research Program University of Alaska Fairbanks P.O. Box 757200 Fairbanks, AK 99775-7200  **Fax number:** 907.474.7175  **General Program Information, Classroom Visits and Farm Tours**  Erin Carr [elcarr@alaska.edu](mailto:elcarr@alaska.edu) 907.474.5449  **Alternate Contact & Main Contact for Website & Data Issues** Darrell Blodgett [dsblodgett@alaska.edu](mailto:dsblodgett@alaska.edu) phone: 907.474.7516 |
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| [**Contact Information**](http://reindeer.salrm.uaf.edu/about_us/index.php#Contact) |
| **Reindeer Research Program** |
| ***Page Last Modified: 06/5/18 10:40 am by:***[***dsblodgett@alaska.edu***](mailto:dsblodgett@alaska.edu) |