Sidewalk Salt May Kill Plants, Cause Pollution

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Created *Mar 11 2009*

The salt that helps keep Cornell's pathways free of slippery ice does more than stain shoes: it can also leave a permanent mark on the local environment.

When Prof. Peter Davies, plant biology, noticed inch-thick piles of salt on Cornell's agriculture quad's pathways recently, he wrote to the University's Grounds Department explaining his concerns that de-icing salt is detrimental to surrounding vegetation.

"If you look at the edge of the road or of our pathways at the end of the [winter] season, you'll see it's all dead," Davies explained. "It pollutes the ground water and lake water that we rely on. It corrodes cars, and doesn't do our shoes any good either." [8]

According to Prof. Kenneth Mudge, horticulture, in very cold weather salt is useless because it only reduces the freezing point of water by a couple of degrees.

Salt damages plants mainly by 'stealing' water from their roots, according to the Department of Horticulture's website. By osmosis, water molecules diffuse from an area of high concentration to an area of low concentration. When salt soaks up water surrounding the plant, water within the plant migrates outward to achieve equilibrium. Without water, photosynthesis cannot take place, energy cannot be produced and the plant dies.

"The carelessness I've seen on two or three occasions is atrocious. There has been salt absolutely shoveled on some steps," Davies said.

"It's not an exact science," Grounds Department Director Peter Salino defended. "Sometimes the salt [dispensed by the plow machine] comes out very quickly, sometimes it's clumpy, sometimes it's wet … but we really do the best we can." Salino explained that operator awareness is crucial. During stormy weather, employees start plowing and salting by 5 a.m, often in messy conditions. He also asserted that the majority of Cornell's paths are salted with an appropriate amount, but mistakes can be made.

The University itself has a stake in the issue, according to Alan Bova, director of risk management and insurance. If people injure themselves on campus by slipping on ice, the University is liable for damages. "There have been a number of incidents where we've been sued for the conditions of the walkways. It's a significant concern for us and can be enormously costly," Bova said. "I would advise to over-salt rather than under-salt. We don't want people getting hurt."

Salino agreed, explaining that for every one phone call he gets complaining about environmental issues, there are 10 protesting hazardous conditions. Davies insisted that there must be alternatives to salting. He said that there is a noticeable difference in road and plant condition at the Ithaca-Dryden town line.

"Dryden does a better job plowing their roads before they lay down the salt, and they often use a mixture of salt and sand," Davies said. Dryden uses sand exclusively on some of its roads, according to the town's Highway Superintendent Jack Bush.

While sand, unlike salt, does not lower the freezing point of water, it settles on the ice and creates a sandpaper effect, increasing traction.

Prof. Ian Merwin, plant biology, explored the notion that the use of salt wreaks damages far beyond the local scope. He is thus a proponent of using sand as an alternative.

"With modern automobile engineering, we could attain up to twice the functional lifespan from our automobiles in the Northeast if there were no salt used on the roads. That limitation has major environmental impacts when you consider all the direct and indirect negative impacts of mining iron ore, smelting steel, manufacturing automobiles and distributing them to consumers," Merwin stated in an e-mail.

Ithaca once also used sand as a supplement because the salt runoff into the creeks was an environmental concern. According to Ithaca's Assistant Superintendent Richard Ferrel, a 50-50 sand-salt mix was applied on steep hills, while downtown roads saw no salt at all.

But the use of sand posed another problem: it clogged the water basins and had to be arduously cleaned out after every runoff. As a result, Ithaca replaced sand with salt for road maintenance six years ago.

"There's a salt mine under the lake, so Ithaca has salt readily available for use," Mudge said. "I'll see my street salted not once but twice in one day, even if there's no ice on the road …. There are safety issues but salt should be applied judiciously."

Merwin explained that there are other de-icing agents that are less damaging to plants, but are more expensive. Calcium chloride and several biomass based de-icers are such alternatives.

"I want to alert students about what is going on," said Davies on bringing this issue to the press' attention. "Policy will change if people demand it and if the changes are reasonable."

While Salino “welcomes the criticism,” claiming it has raised the awareness of his team, there are currently no plans for policy change.