Conservation Corner

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October 31, 2018

"The answer, my friend, is blowin' in the wind. The answer is blowin' in the wind." Bob Dylan

Especially here in windy Iowa on a fall day. Conservation thanks everyone who took part in our annual Halloween Hike. I trust everyone has warmed up after our wagon rides along Three Rivers Trail in the cold northwest wind. Then last week, our neighbor's cornfield caught fire, the modern-day version of the early grass fires that raged across the Midwest and helped form the culture and landscape of the pothole prairie region we now call home. Today, though, I'd like to encounter the wind as it disperses the seeds of *Taraxacum officinale*, the common dandelion.

Recently, researchers at the University of Edinburgh, U.K. have uncovered the secret of the flight of the dandelion and their findings published in the October 17 edition of *Nature*. Now, I think everyone everywhere is familiar with the dandelion flower, which consists of hundreds of tiny florets that become a mass of seeds known as a dandelion clock. Each seed, suspended from a parachute-like stalk, is easily released by a puff of breath or breeze.

Scientists have long known about the parachute – a bunch of bristles called a pappus. Each pappus carries between 90 – 110 filaments, each of which is attached to a central point like the spokes on a bicycle wheel. Like a real parachute, it increases aerodynamic drag which slows the descent and allows each seed to be carried miles away from the parent plant.

However, scientists didn't know exactly how the parachute worked. They know that some animals, aero-planes, or seeds can fly because of the lift provided by rings of circulated air that form in contact with the wings. In the dandelion, however, the bristles are arranged so that when the pappus falls, the air flow creates a low-pressure vortex that travels above the pappus and yet is not attached, which also generates lift and prolongs the seed's descent.

Botanist Naomi Nakayama and Applied Mathematician Cathal Cummins used a vertical wind tunnel and laser to discover that the key lies not in the bristles themselves but in the spaces between them. Even though the bristles occupy just under 10% of the pappus's area, they create four times the drag of a solid disc. Their studies show that the air currents interact with neighboring air pockets to create maximum drag for minimum expenditure of mass. In other words, the pappus's porosity – the proportion of air that passes through it – determines the shape and nature of the low-pressure vortex.

And so it turns out that dandelion seeds have that rare combination of size, mass, shape, and porosity required for the vortex ring to be generated, and the idea that an unattached vortex would be too unstable to exist in nature was proven incorrect. On a dandelion scale, the bristle parachute is just as effective as the winged seeds of the maple, both of them just blowin' in the wind.