The Many Benefits of Grass-Fed Meat

A higher content of omega-3 fatty acids, healthier animals and healthier grassland ecosystems are just some of the benefits of grass-fed meat, eggs and milk.
By Richard Manning Mother Earth News April/May 2015


Eating nutrient-dense meat from animals that grazed on perennial pastures helped humans evolve into big-brained, upright creatures.

This story hinges on two numbers: 5.0 and 6.8.

At 5.0 — the figure that dominates today's industrial food chain — both you and the environment suffer. For humans, it means more obesity, more diabetes, more heart disease, more weakened immune systems, more feeble brains and dementia, maybe even more cancer. For the environment, it means more carbon in the atmosphere, more floods, more erosion, more dying streams and lakes, more cruelty. Push that number to 6.8, however, and we can reduce all of those problems.

Ruminating on pH

These two numbers measure the health of an ecosystem that was the linchpin of human development through the hundreds of thousands of years of our evolution to our modern form. That ecosystem is still essential, because the fundamental facts of humanity have not changed: We are big-brained, upright mammals that thrive in grasslands.

Compared with other organs, the human brain is an energy hog, and because our brains are big, we need more calories and nutrients pound for pound than other animals do. Our upright posture places extraordinary

constraints on our structure, especially our center, and dictates a small, muscular abdomen. No room for guts to process a lot of food at one time.

Grass is useless to us — directly. We can't eat it. Its energy is locked up in cellulose, and we don't have the intestinal fortitude (or magnitude) to break those calories loose. So here's the deal evolution cut for us: We outsource grass digestion to the deer, gazelle, musk ox, elephant, caribou, elk, aurochs, goat, sheep and, now especially, cow.

All of those animals have in common a cavernous gut that is centered on a fermentation vat called the "rumen" — hence their name, "ruminants." Like all fermentation vats, the rumen is an ecosystem. It works by harboring bacteria that have the unique ability to break down cellulose to more usable forms of carbohydrates. The bacteria depend on a friendly environment in the rumen, which, especially in cows, happens to be best measured by acidity: a near-neutral pH of 6.8.

Subverting Evolution

In evolutionary terms, feeding ruminants grain instead of grass — the now near-universal habit of the industrial food chain — is a radical and arrogant experiment, tinkering with the basic function of a whole suborder of animals. The dense carbohydrate load of grain completely reworks the ecosystem of the rumen, creating an acidic pH of 5.0, which causes the condition called "acidosis." A cow with this condition has an acid concentration in its rumen that's 200 times greater than in the rumen of a healthy cow. Grain makes cows sick, and in this matter, organically grown grain makes no difference. The damage reverberates in human health.

. The normal, grass-happy bacteria digest cellulose to yield a combination of carbohydrates and essential fatty acids, which are those fats our bodies must have but cannot manufacture. A healthy, grass-fed digestive system delivers a mix of fats weighted to healthful fatty acids, including omega-3s. The sick, acidified rumen of a grain-fed animal supports different bacteria that yield a nutrient profile that will produce more omega-6 fatty acids. Research suggests that a diet high in omega-6s may create inflammation in humans, and a wide range of human health problems — from obesity to heart disease to dementia. (Our increased use of high omega-6 vegetable oils in recent decades has also shifted the balance of omega-6s to omega-3s. More about this in an upcoming article.)

A healthy rumen is proof positive that a cow has been eating grass, shrubs and forbs — a wide variety of deep-rooted perennial plants. Ruminants range because they must eat an enormous volume of food. This diverse diet concentrates an array of minerals and micronutrients in their milk and meat. This phenomenon extends beyond ruminants to hogs and chickens. The latter two are omnivores rather than ruminants, but they still bioaccumulate minerals and micronutrients if they feed on perennial pasture. Perennial pasture plants are deep-rooted, and they deliver a whole string of key nutrients and trace minerals — such as copper, magnesium and iodine — that shallow-rooted annual grains cannot.

Much research bears this out. For instance, a 2010 review article that examined all available publications on the benefits of grass-fed meat confirmed the assertion that levels of essential omega-3 fatty acids are higher in grass-fed meat, eggs and dairy, compared with industrial products (see Grass-Fed vs. Industrial Beef). The review also confirmed increased levels of other key beneficial fats, and of nutrients, such as beta carotene, vitamin E and cancer-fighting antioxidants, in grass-fed meat. Advocates for grass-fed systems (and the authors of some other studies) say these conclusions are actually overly conservative.

The Problems with Feedlots

Eggs, milk and meat from grain-fed animals come mostly from confinement systems and feedlots, and many issues arise from this fact. To begin with, an acidic rumen makes cows sick, so industrial dairy cattle have a scandalously short life span of just three to five years. Because of acidosis, all feedlot animals have compromised immune systems that require a steady flow of antibiotics to prop up. The threat this poses to human health through antibiotic resistance is serious and well-documented.

Feedlots are manifestly cruel, yet their less-obvious spinoff effects are also egregious. For instance, much attention has justifiably been focused on the environmental threat of the mountains of manure generated in feedlots and confinement operations. But a recent study by the U. S. Geological Survey of an area of southern Idaho plagued with an explosion of feedlot dairies showed that the nitrogen pollution from the fields that grew the grain and silage for the feedlots was about twice as bad as the feedlot manure itself.

Looking at the larger footprint of feedlots yields an even more appalling picture. For example, the British National Trust, which manages more than 600,000 acres in the United Kingdom, conducted an exhaustive examination of the research on the full range of environmental costs of feedlots and benefits of pasture in 2012. The report cites both the Trust's own studies as well as the available literature from the United States and Brazil — and ends in favor of pasture. Reducing global warming looms especially large in this study. A 2006 report from the Union of Concerned Scientists offers a similar conclusion, and includes qualifications that affirm the environmental costs of concentrated animal feeding operations.

Straight Lines vs. the Circle of Life

An industrial farm field is linear: Fertilizer, seed and water go in, and grain for cattle and soybeans for Tofurky come out. It's easy enough to see that a farm field with a single crop, its nutrient cycling solely dependent on the nozzle that sprays anhydrous ammonia fertilizer, is not a healthy ecosystem.

Yet we can't create circular, sustainable ecosystems simply by replacing corn and soybeans with the two or three hundred species of plants normally resident in a native prairie. The system needs grazing animals and their rumens to digest and recycle cellulose. Without them, the grasses grow old and rank; nutrients remain locked in them, because animals disdain such mature grass.

An ecosystem is cyclical, with cycles of life and death capturing, storing and reinvesting energy. Death and decay recycle nutrients, so they are integral to an ecosystem's productive capacity. Sustainable grassland ecosystems must include plants, microbes and grazing animals. Big animals with rumens drive the entire process, meaning these systems cannot be healthy without them.

To Eschew Meat — or Not?

A consumer considering whether to eat animal products seems to have two ways to proceed.

One course is to disengage by eating no milk, meat or eggs, a decision seemingly supported by a long body of shortsighted research that traces human disease and environmental destruction to meat and milk. Virtually all of this research is based on the food products of animals kept in feedlots and fed on grain. The fatty acid profile of these animals' products, so high in omega-6s, by itself is enough to explain the deleterious effects on human health cited in those studies.

Avoiding meat and dairy deprives a body of nutrients, however. We're focusing here on the differences between grass-fed and grain-fed, but products of both systems have a lot in common. They both contain high

concentrations of essential amino acids — proteins — difficult to obtain from plant sources, as well as vitamins A, B6, B12, D and E, and minerals, such as iron, zinc and selenium. Good grazing practices ramp up beta carotene in animal products, meaning the fat, egg yolks, milk and butter show a deeper yellow or orange color (think of beta-carotene-rich carrots). This color in dairy products and animal fats is a sign of good grazing.

This greater nutrient density in grass-fed products begins an argument for the other course — not disengaging, but rather following the path that supports healthy ecosystems. The magic of working ecosystems is that the whole is greater than the sum of the parts, which is why "reductionist" research, which looks at only a single detail, doesn't describe the whole. Nonetheless, the pieces describing the benefits of grass-fed meat do make a compelling case:

Nutrition. By every indication, the benefits of grass-fed meat are numerous — especially in its fatty acid profile. This is not a small thing, and piecemeal evidence suggests additional nutritional benefits contribute to grass-fed products' superiority.

Environment. Some research says that grass-based production systems increase carbon sequestration, which means grass-fed meat probably has a smaller carbon footprint than industrial animal production. Grass-based production certainly creates less erosion, uses less energy, and reduces the use of chemical fertilizers and pesticides.

Social justice. A close look at a set of counties in southern Idaho now dominated by feedlot dairies found that undocumented immigrants held 80 to 90 percent of the jobs in the industry, by the industry's own admission. These are miserable jobs, and childhood poverty and low wages plague the area, while income and farm subsidies are concentrated among a few mega-farms. Meanwhile, in a 2006 University of Wisconsin survey of all varieties of farmers in the dairy state, in which nearly 25 percent of dairy production comes from pastured animals, farmers whose cows grazed perennial pastures reported the greatest life satisfaction.

Economic viability. All sectors of grass-fed production are growing, driven by profit, not subsidy. The public is beginning to understand and act upon the arguments I'm summarizing here.

Pastured Products Done Right

In 2010, the journal Agricultural Systems published a paper titled "Comparative Life Cycle Environmental Impacts of Three Beef Production Strategies in the Upper Midwestern United States." The paper concluded that feedlot beef production has less environmental impact than grass-fed does. It was the sort of thoughtful and reasoned accounting that might give us all pause in the rush to buy products from pastured animals. The paper was anchored in valid assumptions, and one of those was to base the calculations on existing grazing practices in Iowa — where farmers typically seed old corn ground to annual grass, fertilize it, and then turn the cattle in. There are large energy costs in seeding, renewing and fertilizing these "pastures" each year.

This is a devil in the details and it's exactly why much of the nutritional and environmental evidence on grass-fed meat is highly variable and even contradictory. Grazing on an annual monocrop (usually wheat) is not the same as grazing on perennial pasture. Meat from animals on even poorly managed grazing can sport the U.S. Department of Agriculture's grass-fed label, however, because that standard requires only that pasture was the animal's sole source of nutrition. The animals may have the ideal rumen pH of 6.8, but the nutrition from those monocrop pastures doesn't equal its perennial prairie counterpart of deep-rooted plants pulling nutrients from deep in the soil.

The USDA standard is not good enough. The grass-fed movement commits to a system usually labeled "managed intensive rotational grazing," which mimics the effects of the wild ruminants, such as bison, that dominated the North American prairie for thousands of years.

Many of the benefits of grass-fed meat in general are greatly amped up under this perennial pasture regime. For instance, rotational grazing causes grass and other plants to slough off and regrow roots. The dead root matter is largely carbon, so this is the engine of carbon sequestration in the soil. Grazing, together with photosynthesis, stores carbon in the soil, and the soil thus becomes more fertile. Meanwhile, remaining roots drive deeper, giving the plants access to subsoil nutrients. Biodiversity increases, as a range of bugs, crawlers and microbes digest the dead matter in the soil. Legumes fix nitrogen as they do in a natural prairie — no seeding, fertilizer or renewal required. The goal is, in other words, permanence and sustainability through ecosystem restoration. If rotational grazing on perennial pasture is done right, the energy costs included in that Iowa cropland example cited earlier would never accrue, and suddenly the balance sheet looks much improved.

The 2011 report Raising the Steaks by the Union of Concerned Scientists gets at the crucial issue in all of this: The key is not just grazing, but how the grazing is done. The report concludes that managed grazing offers gains, especially in terms of environmental impact and methane production. The amount of methane released decreases when cows eat high-quality forage from a managed perennial pasture that works like a restored ecosystem, compared with cows grazed on annual grass. The Union of Concerned Scientists' report confirms that the better the forage, the less methane.

Genetics also play a role in grass-based systems' success. Modern cattle have been bred to function in feedlots, but old-line breeds, some now resurrected, fatten months faster and yield more usable meat when fed grass than breeds with feedlot genetics.

All of this is relevant to calculations of economic and environmental efficiency, but such calculations are almost nowhere considered in published research. Crossing that line from feedlot to even badly managed pasture heads us in the right direction. Beyond that, we can drive the system further toward smart, environmentally sound grazing by insisting on a more demanding standard than the USDA's current grass-fed label requires, by buying locally, by knowing producers, by education.

Advocates of grass-fed systems say there's another indicator of good pasture rotation. Badly managed pasture makes beef tough and less tasty, milk and cheeses less flavorful. Well-managed, deep-rooted pasture creates products with fine flavor and healthful benefits. Simply, we can taste and see quality and nutrition, which is evolution's way of making us take the trouble to find them.