Parasites: The Problems Persist

In the mid-1800's, public health concerns about pork infested with a particular parasite—*Trichinella spiralis*—were so widespread in Germany that a butcher was jailed for a month for violating local regulations on meat inspection.

Around the same time, a German meat inspector spent 6 months behind bars for failing to check pork that had caused cases of trichinosis in German consumers.

Leading the push for public education in Germany about the dangers of *Trichinella* in pork was pioneering parasitologist Rudolph Virchow. Also a bluntly outspoken member of the German parliament, Virchow was once challenged to a duel by the dictatorial Otto von Bismarck, Prussia's famed "Iron Chancellor."

Legend has it that Virchow proposed fighting the duel with sausages, one of which would contain *Trichinella*-laden pork. Each combatant would eat a sausage, with Bismarck getting first choice. As the story goes, Bismarck declined the proposition as too risky. And while that tale isn't true, it underscores the undeniable impact of parasites on human history—past, present, and future.

It is believed, for example, that the biblical "fiery serpents" that tormented ancient Hebrews by the Red Sea were probably what we now call guinea worms. As recently as 1991, this parasitic scourge was the focus of a United Nations World Health Assembly resolution for eradication worldwide by the turn of the century.

Another parasitic disease, schistosomiasis, causes blood loss and tissue damage in as many as 300 million people worldwide, with 1 of every 5 Egyptians believed to be infected. And in this country, hookworm infection devastated the southern workforce in the early 1900's and still plagued the South as late as 1953.

In the economic arena, the United States in the summer of 1880 found its ground pork and sausage banned from import into Germany—a ban later expanded to all U.S. pork. The reason was reportedly excessive levels of *Trichinella* in American pork products, although some observers have long argued that the real threat was the overwhelming of European markets by cheap and abundant American pork.

The German ban on American pork led to a long-running squabble between the United States and Germany. At one point, the United States threatened to require mandatory certification of imported German wines because, as the U.S. Secretary of Agriculture explained, "certified American meats are as wholesome as foreign wines."

More seriously, human illnesses attributable to foodborne parasites today are monumental in their economic impact. It has been estimated that in the United States alone, losses to congenital infection with a single parasite, *Toxoplasma gondii*, total as much as $8.8 billion annually, notwithstanding the emotional price paid by the families of *T. gondii*-infected infants born blind, hearing-impaired, or mentally retarded.

In the agricultural sector, understanding and control of parasitic infections in livestock can contribute not only to human well-being, but also to the well-being of the environment.

As the world's developing regions struggle to feed themselves, meat and dairy products play an important role, especially where land is unsuitable for other agricultural production.

To meet consumer demands for meat and milk, the answer can't always be simply to raise more animals, because of overgrazing, soil erosion, possible groundwater contamination, and other environmental problems that can result. Instead, the projected 40- to 50-percent increase in meat production needed in developing countries must come from more efficient production—and that means healthy animals.

How much of a toll can parasites take on livestock? Consider these facts: Theileriosis kills about 3 million cattle annually in Africa, and toxoplasmosis is responsible for many abortions and deaths among newborn lambs and pigs in developing countries. Latin America has twice as many cattle as the United States but produces only half the beef because of pests and diseases in its herds.

A worldwide 6-percent reduction in losses from animal disease could provide food for as many as 250 million additional people.

Let's not forget poultry, either. In many developing countries, chickens are a major source of dietary protein. Yet a recent survey in Ethiopia found 73 percent of chickens were infected with tapeworms and 88 percent with nematodes, resulting in significant weight losses in those birds. More than 9 out of 10 chickens in Nigeria have some form of wormlike parasite.

It seems obvious that understanding and effectively controlling one of humanity's oldest foes—parasites—is key to the continued survival of many millions of people around the world, both in terms of ensuring an adequate food supply and in reducing animal-to-human disease transmission.

"Searching for Parasitic Roots" [page 4] describes efforts to expand our basic knowledge of these diverse organisms' taxonomies, origins, habits, and host relationships.

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