## Agriculture, Plant diseases, and Human Affairs

"The history of mankind is the story of a hungry creature in search of food".

## - Hendrick Van Loon

At any given time, on any given day, there is enough food to feed all the people on earth for only about three weeks. Even that small amount of food is unequally distributed, and famine stalks much of the world. One-third of the earth's population awakes hungry each morning and goes to bed hungry at night. Hunger is a way of life in many developing countries. Hunger and disease will claim more babies and young children and more of those surviving will be mentally handicapped by childhood malnutrition." A 1989 survey of leaders in the population field resulted in 100% of the respondents saying they expect today's population of 5 billion to be more than 10 billion in the next century, which will place such enormous demands on the biosphere, (e.g., arable soils, water supplies, and food) that in much of the world, human existence may be threatened. This alarming forecast underscores two of the most important problems facing human kind in the twentieth and twenty-first centuries-overpopulation and hunger.

Another problem we face is sustaining sufficient agricultural production to feed a hungry world while still preserving a clean, safe, and healthy environment for the every people we are trying to feed. Pollution of water and natural areas by pesticides and other agrochemical is of growing concern. Pollution of the air around us by automobile exhausts and industrial processes is increasing. Loss of precious soils due to improper management and erosion threatens to limit production of vital food crops in many areas of the world. As we approach the twenty-first century, our success and survival as a species on this planet depends on our ability to preserve and protect our natural resources-yet we must continue to place increasing demands on these resources if we are to feed a hungry world.

What has all this to do with plant diseases? Well, humans depend upon plants for their very existence. Only green plants and some blue-green algae can convert solar energy into food. Therefore, humans and other animals exist on earth as guests of the plant kingdom. Three-fourths of the total world food supply is drawn from the grasses, and all human civilization rests on the cultivation of cereal grains. Although more than 3000 species of edible plants have been used for food throughout our history, today only about 30 plant species make up 90% of our food supply. In fact, most of the human food supply worldwide is derived from the following 20 crops:

• Banana • Barley • Cassava • Citrus • Coconut • Com(maize) • Oats • Peanut • Pineapple • Potato • Pulses (beans, peas) • Rice • Rye • Sorghum • Soybean • Sugar beet • Sugarcane • Sweet potato • Wheat • Yam

In addition to the food we eat, plants provide food for the animals we use for meat, for work, and for pleasure. Lumber from the forests provides shelter and furniture; plant fibers furnish clothing, fabrics, rope, and paper. Other plants supply medicines. Many beverages and drugs-including beer, cocoa, coffee, tea, whiskey, wine, quinine, opium, and tobacco - are derived from plants. All fossil fuels such as oil and coal, on which our current high standard of living depends, originated from plants or from animals that lived on plant substances. Plants beautify our

surroundings, purify the air and water, stabilize soil, prevent floods and erosion, and protect our natural resources. Flowers, fields, and forests help satisfy our longings for beauty, fulfill our aesthetic cravings, and provide relaxation and recreation.

Plants and animals coexist. Plants provide food for animals, either directly or indirectly, and in turn use the carbon dioxide released into the atmosphere during the respiration of animals, burning of fuels, and processes of decay. Humans have learned to cultivate certain plant species for use as food, shelter, or clothing. These relatively few species have been selected from wild plants and improved to produce larger yields of superior quality.

However, plants do get sick. They have diseases. Plant diseases cause losses in yield, and, at times, losses are so great that famine results. Famine then leads to human suffering and diseases. People who are undernourished and weak from hunger are easy prey to cholera, pneumonia, stomach disorders, and other infectious diseases and parasites. Famine and epidemics ride side by side. People live together in unsanitary, crowded conditions are easy prey to unrest and panic. As Seneca said, "A hungry people listens not to reason nor cares for justice, nor is bent by any prayers."

Throughout human history, reductions in crop yields from diseases, pests, or bad weather have had profound effects on the whole human race and on specific, local populations. Despite the improved plant cultivars (cv) and more efficient cultural techniques that now are available to grow crops, many of the world's people still do not have an adequate diet, and hunger is their constant companion. Among the many plant diseases that have influenced world history are the following:

- Bacterial wilt
- Chestnut blight
- Coffee rust
- Downy mildew
- Ergot of rye
- Phytophthora root rot